

Your COMPUTER

► MARCH 1987 VOL. 7 NO. 3

BRITAIN'S BIGGEST-SELLING HOME COMPUTER MAGAZINE

COMPUTERS IN CONTROL —

PRACTICAL
APPLICATIONS
FOR THE HOME

ADVENTURE
REPORT —
INFOCOM
REVEALED

PC DATABASES
COMPARED

WIN THE LAST
STARFIGHTER
ON VIDEO

HINTS & TIPS ★ SOFT FILE ★ REVIEWS ★ NEWS ★ SOFTWARE PREVIEWS

£1

Denmark	Dkr.	36.00
France	Fr.	52.50
Germany	DM.	8.50
Greece	Dra.	360.00
Netherlands	DFI	8.90
Italy	L.	4300
New Zealand	NZ\$	3.70
Spain	Pts.	425.00

32,-
LUCCARELLI JAB 1987
UJÄRVÄ - OSLO

327 0870 NOVES BY
KROVOR

327 0870
JAB 6



With monitor, data £100 of software you (Until mummy catc



With the Amstrad 464 home computer the fun starts as soon as you get it home.

Because unlike many other home computers the 464 comes complete with its own green screen or full colour monitor.

It also comes with a convenient built-in datacorder.

And you get £100 worth of software with games like Harrier Attack and Sultan's Maze. Not to mention Oh Mummy.

64K of RAM



means you have plenty of memory to play with. And there are over 200 Amstrad games you can play, many exclusive to Amstrad.

But games are only half the fun on the 464.

The kids can learn spelling and arithmetic with software like Wordhang and Happy Numbers.

Whilst adults will love the way that it helps around the house with budgeting and accounts.



order and
u can't lose.
hes you.)



To help you make the most of your 464, you can join the Amstrad User Club.

And there are lots of books and magazines devoted to it as well.

What's more you can buy joysticks, printers, disc drives, speech synthesisers and light pens to make it even more fun.

But perhaps the most pleasurable thing about the 464 is the price.

The complete home computer costs just £199 with green screen or £299 with colour monitor.

Not much to pay for a chance to get away from mummy.

Please send me more information.

Name

Address

464 YC/03/87

The Amstrad 464.
The complete home computer.

Amstrad P.O. Box 462, Brentwood, Essex CM14 4EF.

Editor

Gary Evans

Deputy Editor

Francis Jago

Sub Editor

Harold Mayes MBE

Production Editor

Jim McClure

Production Assistant

Nick Fry

Editorial Secretary

Sheila Baker

Designer

Chris Winch

Design Assistant

Neil Tookey

Head of Advertising Sales

Dory Mackay

Advertisement Manager

David Lake

Advertisement Executives

Tim Seymour

Jane Brooks Wadham

Classified

Paul Monaf

Publisher

Paul Coster

Financial Director

Brendan McGrath

Managing Director

Richard Hease

Your Computer,
79-80 Petty France,
LONDON SW1H 9ED
TELEPHONE: 01-222 9090
FAX: 01-222 0461
TELEX: 9419564 FOCUSG

ISSN 0263 0885

© 1987 Focus Magazines Limited.
Printed by The Riverside Press, England.
Typeset by Time Graphics Ltd., Northampton.

ABC

Distributed by Quadrant Publishing Services,
Quadrant House, Surrey, SM2 5AS. Telephone
01-661 3239.

Reasonable care is taken to avoid errors in this magazine but no liability is accepted for any errors which may occur. No material in this publication may be reproduced in any way without the written consent of the publishers. The publishers will not accept responsibility for the return of unsolicited manuscripts, listings, data tapes or discs.

We will assume permission to publish all unsolicited material unless otherwise stated. We cannot be held responsible for the safe return of any material submitted for publication. Please keep a copy of all your work and do not send us original artwork.

Unfortunately we are unable to answer lengthy enquiries by telephone. Any written query requiring a personal answer MUST be accompanied by a stamped, self-addressed envelope; please allow up to 28 days for a reply.

Subscriptions: U.K. £15 for 12 issues. Overseas (surface mail) \$25 - airmail rates on request. Please make cheques/postal orders payable to Focus Magazines (allow 5 weeks from receipt of order to delivery of first subscription copy). Send orders to Your Computer Subscriptions, Oakfield House, Perrymount Road, Haywards Heath, RH16 3DH. Telephone (0444) 459188.

Back issues of the magazine from January 1986 onwards are available for £1.50 (U.K.), \$3 (Overseas) from the Back Issues Department, 79-80 Petty France, London, SW1H 9ED.

CONTENTS

COMPUTING

Turn to page 42 for some home into a house of...

19

THE LAST STARFIGHTER COMPETITION

Your chance to win a VHS video of this classic sci-fi adventure.



21

GAMING ON THE PCW

It may not look like a games machine but this popular Amstrad is building a solid base of excellent games.



24

READERS' LETTERS

Arguments rage in this month's letters page and one lucky reader wins the letter of the month prize.



30

WINNING FORMULA

From Silverstone to Saint Remo, we report on the best race simulations.



TING YOUR HOME

for some insights into how to change your use of the future.



36

ADVENTURE SPECIAL

Infocom, probably the most respected name in adventure games, is the subject of an in-depth feature.



52

SOFTWARE SHORTLIST

The latest games are put through rigorous tests to find the good, the bad and the ugly.



58

PC DATABASES

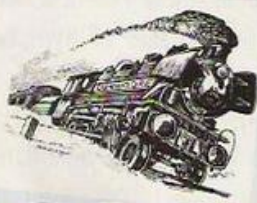
The new generation of inexpensive PC clones has meant an all-new market for software. We test some of the better databases.



68

THE COMMODORE LINE

Learn animation techniques on the Commodore 64 with some neat routines.



80

DREAM MACHINE

If a lap-top PC excites you, the new Bondwell will have you in ecstasy.



Your COMPUTER

NEWS

8 Four pages of information on the latest developments in computing.

CHARTS

16 What is up and what is down. We let you know the plain truth.

SOFTWARE PREVIEWS

17 Previews of some games yet to be released.

COMMUNICATIONS NEWS

20 Updates from the world of comms.

PROGRAMMING FEATURE

26 More tips for the Commodore 64.

SOFTWARE EXCHANGE

35 The last of the round-ups from last year.

SOFTWARE REVIEW

44 A sound sampler for the Spectrum from Cheetah.

ASSEMBLERS

46 What is an assembler and what can it do?

PROGRAM FILE

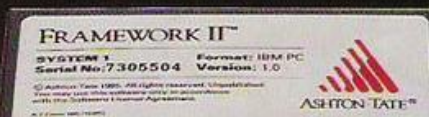
60 A plethora of programs for you to type.

A SOUND IDEA

72 More tips for music for the Spectrum 128 series.

If you think so are ridiculous ju

£550.



WORD PROCESSING. SPREADSHEETS. BUSINESS GRAPHICS.
DATABASE. COMMUNICATIONS.

Having bought your Amstrad or similar business PC for as little as £449 you've probably been amazed, not to mention disconcerted, by the price of software.

Which is why we've made Ability.

A high specification software package that doesn't carry a high price tag.

Now you can have a 6 function package for just £99, which will get you up and running in minutes.

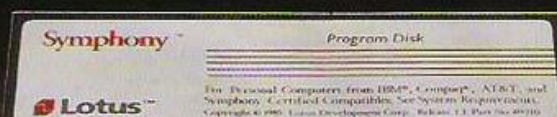
WHAT DO I GET FOR £99?

For a start, you get a saving of over £400 on those better known (and much more difficult to use) software packages.

Ability, which runs on Amstrad's 1512, the IBM PC and compatibles, comprises 6 functions:

Word Processing: Comprehensive text production.

£550.



WORD PROCESSING. SPREADSHEETS. BUSINESS GRAPHICS.
DATABASE. COMMUNICATIONS.

There are no control characters on the screen. 'What you see is what you get' when you print.

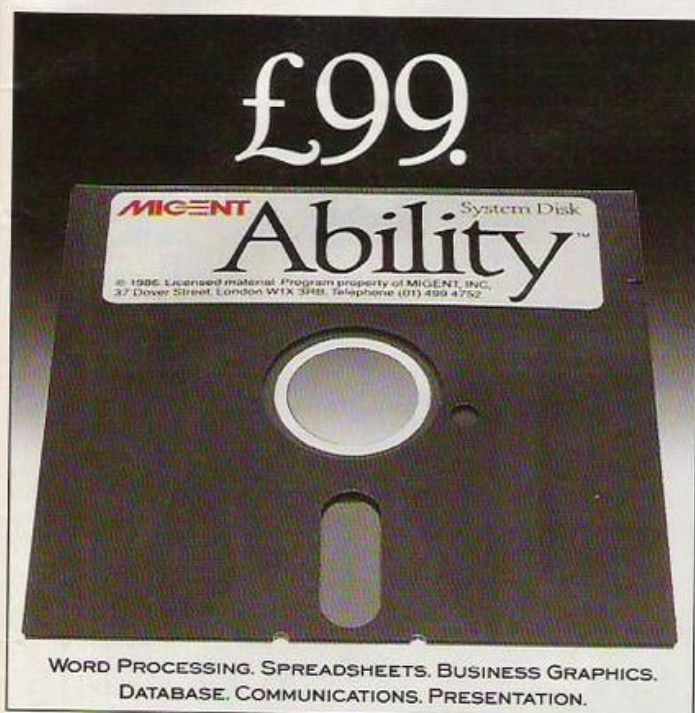
You can include 'live' spreadsheets and database information (even graphs) into your text.

Spreadsheets: As large as most business requirements demand. (Three times the size of Symphony.) Prints sideways for wide spreadsheets.

Business Graphics: Bar, line and pie charts are automatically updated when you change your database or spreadsheet information.

Database: Gives full record keeping facility to store names and addresses or more complex data. Like all functions, menu driven with no programming necessary at all. Up to 65,000 records and up to an impressive 32,000 fields per record.

software prices just look at this.



Communications: Has exceptionally easy file and data exchange with other computers.

Presentation: You can create a 'slide show' from your PC. Ability gives you snapshots of any screen to which you can add text, symbols and even sound, with the minimum of keystrokes.

WHY IS ABILITY SO INEXPENSIVE?

R&D is a notorious drain on capital. We, however, have brought together the best brains in the industry who have used their combined experience to create a product which meets today's business needs, without resorting to expensive research.

Working on these solid foundations, we can now offer a truly business orientated software package which cannot be matched for the money.

WHY SHOULD I


KEEP LOOKING OUT FOR MIGENT?

Because Ability is just the first in a range of products from Migent (UK) Limited, a company with the backing, finance, and personnel resources of a large American software corporation. We are committed to producing a range of products with the needs of the UK business market in mind.

The experience and expertise of the founding partners, who have worked for companies like Ashton-Tate, IBM, Lotus and Honeywell, has enabled us to provide a unique range of products which are designed to put science at the service of the businessman, not baffle him with science.

These will be launched throughout 1987 and will demonstrate, as Ability is already doing, that Migent really does create products which have a distinct edge over the competition.

Simply fill in the coupon for information on Ability from Migent (UK) Limited, 37 Dover Street, London W1X 3RB. Tel: 01-499 4752.

Tick	YC3
<input type="checkbox"/> Please send me all the details of Ability and the location of my nearest dealer.	
<input type="checkbox"/> Please send me information on how I can become a Migent dealer.	
Name _____	
Position _____	
Company _____	
Address _____	
P/code _____	
Tel. _____	
 Ability	
IT GIVES YOU EXACTLY WHAT IT SAYS	

A magazine's greatest asset is its readership, and it has become clear over the last few issues that *Your Computer* readers as a group are rapidly becoming more sophisticated as computer users. You are running increasingly powerful hardware and software to tackle applications which were just not viable with the older generation of systems. Naturally you expect in-depth coverage of the latest computers and programs but you also want a source of information on the best ways of using the technology available.

As personal computing evolves, *Your Computer* must evolve with it. Starting next month you will

COMMENT

notice a number of changes. Every month we will bring you regular updates by the leading specialists in the subjects which interest you, including expanded coverage of communications, computer music, and hints and tips for adventure and arcade games. Also in the pipeline are forums on serious topics like programming techniques and computing for writers.

As new computing products become more and more sophisticated it becomes more difficult to make the proper choice. From now all major hardware and software reviews will include a run-down on the rivals, enabling you to make direct comparisons between the alternatives. Just because computing is a serious business that does not mean it has to be dull and there will be plenty in each issue to keep you entertained as well as informed.

Meanwhile, there is something you can do for us. Regular feedback from readers is the only way we have of knowing what you need from the magazine, what you like and what you do not like. So if you have something to tell us, let us hear from you. Please give us your thoughts by letter rather than by telephone – a written record of your views helps us build an overall picture, and at some times of the month pressures of magazine production prevent us handling as many telephone calls as we would like. Similarly, we cannot guarantee a personal reply to every letter, though we make every effort to answer through the letters pages when we are able to help with problems. Every letter is read carefully, however, and your opinions will be a significant influence on the way the magazine develops.

Try-it-and-see facility

British Monomarks has launched a free noticeboard facility to show potential subscribers to electronic mail systems such as Telecom Gold how easy and economical its Monodata desk-top system is to use.

Anyone with telecommunications equipment can access British Monomarks Monodata Noticeboard by setting their communications settings to 300 baud, 7 bits, even parity, 1 stop bit, ASCII.

Then dial 01-405 6062 and follow the prompts and instructions. The noticeboard will be updated on a regular basis to enable users to learn about additions to Monodata, along with details on British Monomarks other business services which include Telex, fax bureau, and a personal telephone answering service.

Amstrad chosen for Bible revision



The National Bible Society of Scotland has chosen an Amstrad PCW 8256 for a spelling revision of the Bible in Gaelic. The revision, the first of its kind to be undertaken since the translation was first completed in 1801, will be made by an expert Gaelic scholar Dr Donald Meek, who has been seconded to the Bible Society for one year to carry-out the work.

Most of the changes will be minor and will include corrections to typographical

errors and some minor idiomatic changes.

The Amstrad will be interfaced to a photosetter using WordStar and the text to be keyed-in, some 800,000 words, will be handled by the Bible Society.

"Computer typesetting will enable us to produce the Gaelic Scriptures in a variety of typefaces and formats in response to popular demand. This revision will lead to the finest edition yet of the Gaelic Bible," the society says.

More power without the price

Atari has announced more price reductions for its ST range of computers, bringing 16-bit power in the form of the new 520 ST-FM down to £399.95. The 520 ST-FM is complete with 512K RAM and a 1/2MB disc drive built into the side of the machine similar in style to the 1040.

The cheapest Atari ST machine is the 520 ST-M, retailing at £259.95 + VAT. The user will need to buy a disc drive to use the machine, which will raise the price to close to that of the ST-FM.

Atari sees the move as allowing it to target its machines more precisely in three parts of the market, defined as the games sector, the home and educational market and the low-end business market.

The top-of-the-range machine, the 1040 ST-F, now retails for £899.95 and is complete with colour monitor, 1MB RAM, integral 1MB drive and mouse. The prices include VAT. The new Atari PC clones, shown for the first time at the CES show in Las



Vegas in January, are to be launched in the U.K. at the end of April. No U.K. prices were obtainable but the U.S. price is \$599 and \$200 for a monochrome monitor.

EGA is supported in grey-scale. The PC has no expansion slots but an expansion board can be added if required. The Atari

PC is based on the same 8086 chip used in the Amstrad PC1512. It is equipped with 512K RAM, expandable to the standard 640K on the motherboard.

The clock speed is switchable between 4.77 and 8MHz. An 8087 co-processor can also be added and can run at either speed.

Apple profit

Apple Computer revenue for the first quarter ending December 26 rose 24 percent compared to the same period a year earlier. Net sales were \$662.3 million compared to \$533.9 million last year. Net earnings were \$58.5 million whereas last year they were \$56.9 million.

"We are especially pleased with our growth in revenue during the quarter," commented John Sculley, Apple chairman and chief executive. "Our Apple II GS has been well-received and our Macintosh products continue to achieve record sale levels."

"As we have stated for several months, we foresee a difficult comparison in our second fiscal quarter – January to March, 1987 – due to gross margin pressure and increased spending on new products planned for launch in the fiscal year."

David Hancock, managing director of Apple Computer U.K., said: "We are obviously pleased with the latest figures. They parallel our own success in the U.K. market, where we have had a strong growth in Mac-plus sales, as well as the launch of the Apple IIGS. Specific solutions in areas of business productivity, communications, desk-top publishing and education, highlighted at our AppleWorld exhibition in October, will lead our continual growth in 1987."

and review copy of the product to try to pre-empt pre-release piracy of the game. It is also insisting that recipients sign a non-disclosure agreement which permits Microprose to sue in the event of piracy. The move was welcomed by everyone in the industry and should help set a trend among manufacturers.

All guns for the U.K.

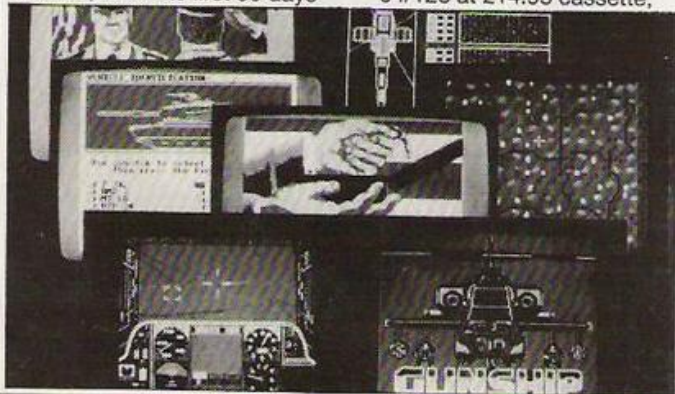
Gunship, the helicopter simulation from Microprose which reputedly sold more than 50,000 in its first 30 days

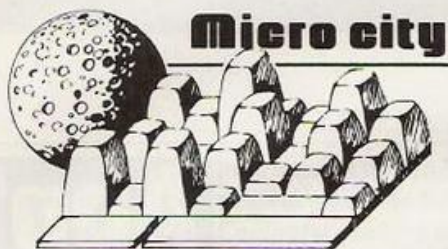
of sale in the U.S., was launched in the U.K. at the end of January for the CBM 64/128 at £14.95 cassette,

£19.95 disc, and is expected by the company to take the market by storm.

Gunship cost more than \$1.5 million to develop and is "an accurate in every detail" simulation of the Hughes AH-64A Apache combat helicopter. The culmination of five man-years of game design, *Gunship* is one of the most adventurous Microprose projects. Before the final version was released, the game was play-tested by U.S. military helicopter pilots.

In a move against piracy, Microprose has serial-numbered each pre-release





1A QUEENS ROAD, NUNEATON, WARCS CV11 6NN

IBM COMPATIBLES FROM £399

AMSTRAD PC 1512 SD + Mono Monitor	£449
AMSTRAD PC 1512 SD + Colour Monitor	£619
AMSTRAD PC 1512 DD + Mono Monitor	£559
AMSTRAD PC 1512 DD + Colour Monitor	£729
HARD DISC VERSION	
10 Megabyte PC 1512 HD10 + Mono Monitor	£799
10 Megabyte PC 1512 HD10 + Colour Monitor	£969
20 Megabyte PC 1512 H20 + Mono Monitor	£899
20 Megabyte PC 1512 H20 + Colour Monitor	£1069

- ★ TECHNICAL SUPPORT TEAM
- ★ HIGHLY COMPETITIVE PRICES
- ★ AFTER SALES SUPPORT SERVICE
- ★ REPAIR SERVICE ON AMSTRAD PRODUCTS

FREE COPY OF SIDEKICK WITH EVERY 1512 PURCHASE

CREDIT CARD HOT-LINE



0203-382049

All prices exclude VAT
Export Enquiries Welcome

UK Delivery FREE. For Europe add 6%; outside Europe 10%

CADMASTER™

THE ULTIMATE GRAPHICS PACK

SUPERB GRAPHICS SOFTWARE
PLUS
A QUALITY LIGHT PEN



Discover the exciting world of creating your own graphics on screen.

Look at these options:-

	AMSTRAD CP1512/1512R COLOUR MONITOR	COMODORE 64/128	PLUS4	C16	VIC 20 (STEXAS SUPER EXPANDER)	SPECTRUM	DRAGON 32/64 TANDY COLOUR 32/16
DISC OPTIONAL	✓	✓	✓	✓	✓	✓	✓
EXTRA	✓	✓	✓	✓	✓	✓	✓
MICRO DRIVE	✓	✓	✓	✓	✓	✓	✓
COMPATIBLE	✓	✓	✓	✓	✓	✓	✓
SOLID COLOURS	✓	✓	✓	✓	✓	✓	✓
CASSETTE	✓	✓	✓	✓	✓	✓	✓
FREEMAN DRAW	✓	✓	✓	✓	✓	✓	✓
DRAW BOX	✓	✓	✓	✓	✓	✓	✓
DRAW CIRCLE	✓	✓	✓	✓	✓	✓	✓
DRAW LINE	✓	✓	✓	✓	✓	✓	✓
DRAW TRIANGLE	✓	✓	✓	✓	✓	✓	✓
DRAW RAYS	✓	✓	✓	✓	✓	✓	✓
PEN THICKNESSES	✓	✓	✓	✓	✓	✓	✓
PEN QUILLS	✓	✓	✓	✓	✓	✓	✓
PAINT BRUSH	✓	✓	✓	✓	✓	✓	✓
TEXT	✓	✓	✓	✓	✓	✓	✓
PIN POINT ACCURACY	✓	✓	✓	✓	✓	✓	✓
ACTIVE HANDING	✓	✓	✓	✓	✓	✓	✓
COPY FUNCTION	✓	✓	✓	✓	✓	✓	✓
WASH	✓	✓	✓	✓	✓	✓	✓
COLOURS	27	16	121	121	16	8	4
FILL	✓	✓	✓	✓	✓	✓	✓
FILL PATTERNS	5	11+5	11+5	5	—	7+5	5
ORASE FUNCTIONS	✓	✓	✓	✓	✓	✓	✓
SAVE SCREEN	✓	✓	✓	✓	✓	✓	✓
PRINTER DUMP	✓	✓	✓	✓	✓	✓	✓
PROGRAM FORMAT	C6	C6	C6	C6	C6	C6	C
RETAIL PRICE	£14.95	£19.95	£19.95	£19.95	£19.95	£19.95	£17.25

This powerful PROGRAM + a QUALITY LIGHT PEN and an INSTRUCTION BOOKLET in one reasonably priced package.
Easy to use by all ages for creating colourful pictures or technical drawings.
Full back-up service from the manufacturers.

TROJAN

Trojan Products, 166, Derlwyn, Dunvant, Swansea SA2 7PF. Tel: (0792) 205491

Short of Floppy Disc storage?

3" Discs now available

New low price for these top
quality discs. Suitable for
all Amstrad disc based
computers.

Except the PC1512.

Order your CF-2 Discs now

ONLY £2.99 each

Available from good Amstrad computer stockists. Or send coupon to
Marketing Dept, Amstrad, Brentwood House, 169 King's Road,
Brentwood, Essex. CM14 4EF.

AMSTRAD

Brentwood House, 169 King's Road, Brentwood Essex. CM14 4EF.
Tel. 0277 230222



Send coupon to: Marketing Dept, Amstrad Consumer Electronics Plc, Brentwood House, 169 Kings Road, Brentwood, Essex. CM14 4EF

Name

Address

Post code Tel. No.

CF-2 PACK OF 5 ☐ CF-2 PACK OF 10 ☐

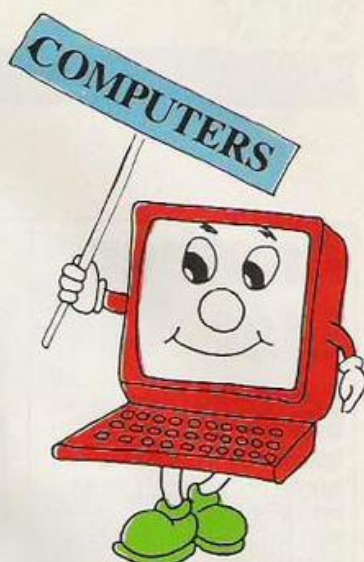
Other quantity (please state)

(PLEASE DO NOT SEND ANY MONEY WITH THIS COUPON)

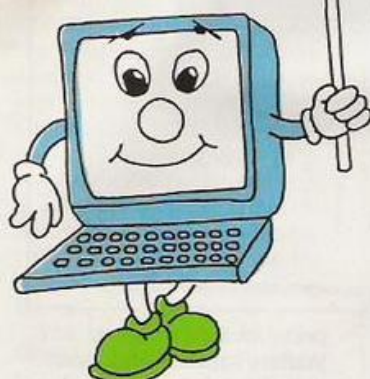
YC/3



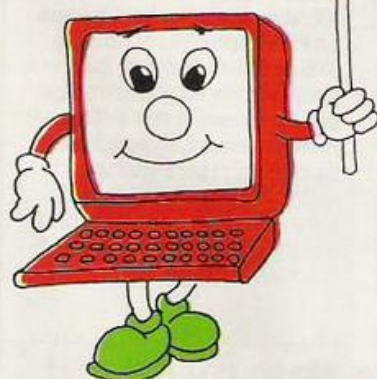
THE FIRST IDEAL MICRO COMPUTER SHOW



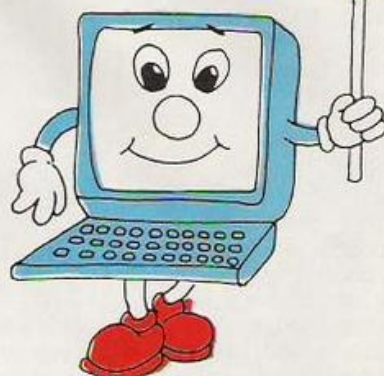
DISK DRIVES



SOFTWARE



PRINTERS



Computer Enthusiasts!
Why not take a day out in the luxurious surroundings of the Kensington Exhibition centre and see an exhibition to suit everyone from business users to home computer enthusiasts. Many famous brands on show and much, much more!

Saturday 1000 to 1900
Sunday 1000 to 1700

2 — 3rd MAY 1987

The Kensington Exhibition Centre
99 Kensington High Street
(Entrance Derry Street)
London W8 5TD

Please supply tickets at £2.00 each

Admission at the door £3.00

I enclose a CHEQUE/P.O. for £
Cheques and P/O made payable to
Ramco International Exhibition

THE FIRST
IDEAL
MICRO
COMPUTER
SHOW

Name:

Address:

Signed

Post to 123A The Broadway
London NW7 3TG

Tel: 01-906 3363

Avoid queuing!

Book your ticket in advance
SAVE £1 per ticket!

Another Star is born

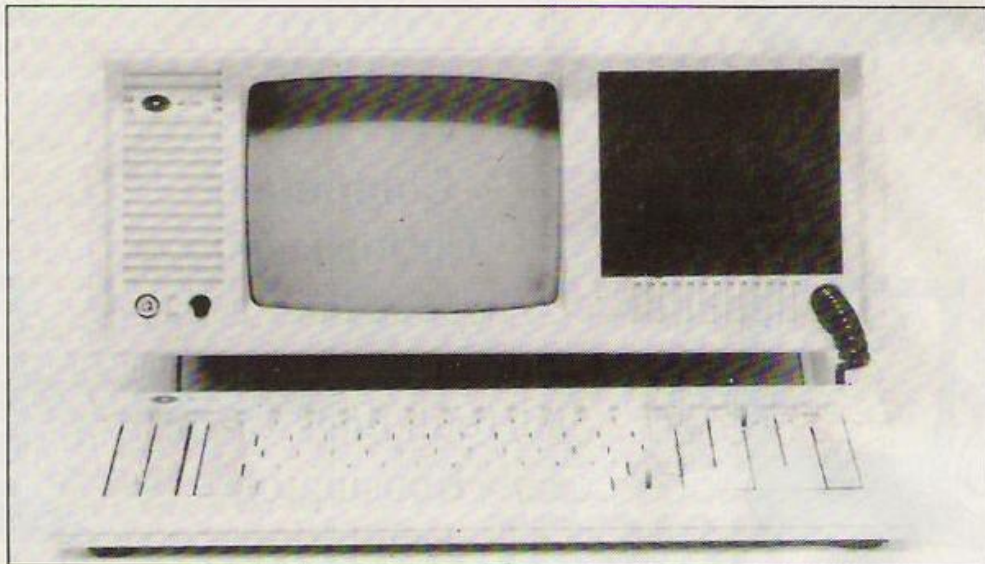
Star has announced the launch of its latest N series printer, the NX-15. Intended as a replacement for the successful SG-15, the machine costs £389 and, like all the N series printers, features a full front-control panel which saves the irritation of fiddling with the back or inside of the machine.

Included as standard are tractor and friction feed, together with an automatic single-sheet feeder for letterheads. The NX-15 is also fast, capable of 120cps in draft mode and 30cps in NLQ.

Typestyle selection, draft or NLQ, print pitch and form and paper controls are all touch-operated. Interfaces are available in either parallel or serial form and are easily connected to the printer.

Further information from Star Micronics U.K., Craven House, 40 Uxbridge Road, Ealing, London W5 2BS.

Walters launches new PC AT-compatible range



Walters International Ltd has launched two now low-priced AT-compatible machines and believes that it will give the company the most comprehensive AT-compatible range of any clone manufacturer.

The Baby AT, so-called because of its small footprint, 17in. x 16in. x 6in., costs £1,280 plus VAT and includes an eight-slot motherboard, 640K RAM expandable to 1MB on-board, a 1.2MB drive, 84-way keyboard, clock/calendar, mono monitor, Hercules-compatible display and a parallel printer port. The Baby AT uses an 80286 processor switchable between 6 and 8MHz. There is also provision for an 80287 maths co-processor.

Walters has also launched an AT-compatible portable for the same price as the Baby AT. Commenting that there was plenty of interest in the XT

portable, Edward Moir, Walters sales director, said that people were looking for more power and so an AT portable was developed.

In external appearance the AT portable is almost identical to the XT but inside it has an AT-style specification. It uses an 80286 processor running at 6 or 8MHz and has provision for an 80287 maths co-processor. It has 640K RAM on-board, expandable to 1MB, and six expansion slots. The specification is identical to the Baby AT, apart from the integral 9in. mono monitor.



Sharp releases powerful new transportable

Sharp has released a new transportable computer, the PC-7100, which features a built-in 20MB disc drive and 320K RAM as standard, expandable to 704K. The LCD is said to be a vast improvement on previous LCD screens which, with electro-luminescent backlighting delivers improved image contrasting,

giving a brighter, sharper display over a wider field of vision.

The keyboard is detachable and folds away conveniently for transport. The PC-7100 will retail for £1,995. In addition to the 7100, Sharp has released a companion model, the 7000A, an updated 7000 which features two 360K floppy drives.

Results round-up

Golden Trivia challenge

The winner of the heat of the Domark competition, in the September issue of *Your Computer*, was one of 13 finalists who competed for the prize of the Golden Trivia game featuring trays and segments die cast in solid gold and valued at £10,000. Entrants had studied the questions and were awarded 10 points for each correct answer. Iain MacNeil of Cardross, Dunbartonshire gained most points. He, together with four runners-up, in addition to taking part in the final with other heat winners, each received a copy of the Games II edition of Trivial Pursuit.

The runners-up were Salim Vohra, Ribblesdale, Preston, Lancs; George Hooson, Bradford, Yorkshire; D M Williams, Thornton, Liverpool; and T Lafford, Barry, S. Glamorgan.

Other runners-up each received a pack of chocolates: C Vine, Clacton-on-Sea, Essex; R Cavi, Dewsbury, W. Yorks; R McDonald, Redhill, Surrey; S T Cronon, Wolverhampton, West Midlands; J



Sender, Jordanthorpe, Sheffield; G Smith, Chellaston, Derby; C King, Hayfield, via Stockport, Cheshire; D

Pickstock, Churchdown, Gloucester; R Chowdhury, Houghton Regis, Dunstable, Beds; and J Shaw, Liff by

Dundee, Tayside. The winner of the Golden Trivia game was D J Cooke of Wibley, Portsmouth.



Colossus Chess

In the November issue of *Your Computer*, in conjunction with CDS Software, the Colossus Competition winners were: first, Andrew Skinner, Plymouth, Devon, who will receive a table-top Systema Turbo 16K Chess computer; second, Miss R Traylor, Plymouth, Devon, who will receive the portable Express 16K Chess computer. A copy of the Colossus Chess game goes to each of the 10 runners-up:

I M Fernandex, Isa Town, Bahrain; D T Cimatti, Llandudno, Gwynedd; G O'Mara, Tolworth, Surbiton, Surrey; R

Firebird winners

The Firebird Competition, in the November issue of *Your Computer*, was won by Sean Minter, Congleton, Cheshire. He receives a superb framed picture of the cover as used in magazine advertisements. The runners-up who received two Firebird games are:

R Shaw, Nailsea, Avon;

W Davies, Skenfrith, Abergavenny, Gwent; Avril Corbett, Halifax, West Yorkshire; D Casnin, Killinard, Talaght, Dublin; L Dahlen, Dals-Laanged, Sweden; J Jacobsen, Glostrup, Denmark; F T Holt, Clonfield, Portsmouth; and E A Cook, Llanfrehfa, Cwmbran, Gwent.

Carla Mayers, Thornhill, Cwmbran, Gwent; Paul Mighall, Tunbridge Wells, Kent; David McMahon, BFPO 24; Martin Birch, West Leigh, Havant, Hampshire; Jason Dobbs, Newton Abbot, Devon; Jorgen Jacobson, Glostrup, Denmark; D M Williams, Thornton, Liverpool; Kieron Haywood, Llandudno Junction, Gwynedd; Gerard O'Mara, Tolworth, Surbiton, Surrey; Michael Davies, Llandilo, Dyfed; David Conner, Aintree, Liverpool; Stephen Dhesiu, Charlton, London; N Brownlee, Wester Langlee, Galashiels, The Borders, Scotland; and Richard Hood, RAF Gatow, BFPO 45.

THE
THINKING
MANS SHOOT
'EM UP!

ORIGINAL
ARCADE
CONCEPT!

FAST
FULL COLOUR
SCROLLING

NOW
OUT ON

CBM 64/128
Spectrum 48K
Atari, Amstrad
Coming soon on MSX

The Mission

Can violent aggression and mindless destruction ever be justified in the name of peace. That is the enigma, the TRAP in which you are to be placed as you energetically defend your planet, your people from a once peaceful ally.

Your Quest

To demonstrate the reactions and skills of a legendary space fighter or to show the genius of a master strategist will not be enough. TRAP has a secret that needs to be told, until it is revealed, you will never be able to rest in peace.

TRAP

Alligata Software Ltd., 1 Orange Street, Sheffield S1 4DW. Tel: (0742) 755796

Classic Snooker

CBM 64/128 — C16/PLUS 4 (ENHANCED)

AUTHENTICITY

CLARITY OF GRAPHICS

ACCURACY

Classic Snooker is entertainment at its best and a tough challenge with facilities to practice and improve. Perhaps one day beat the computer at its own game!

Computer option. Play against the computer or a friend.

Three skill levels. Amateur, Novice and Professional.

Flicker free graphics and smooth action.

Clear identification of the colours on a green table.

Facility to set the table and practice those difficult shots (CBM 64, PLUS 4 and C16+64K expansion).

Fine control of the power of the shot and facility to impart TOP, BOTTOM or SIDE spin to the cue ball.

PRICE

£5.95

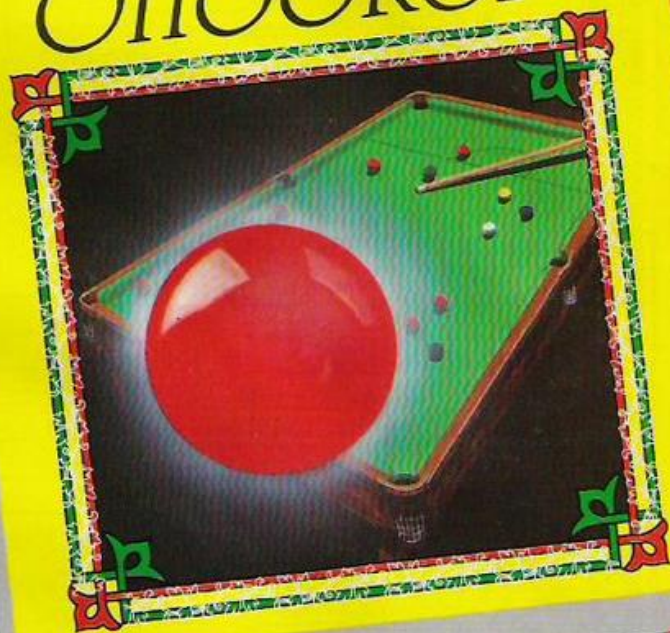


Screen Shot 64



Screen Shot PLUS 4

Classic Snooker



64K RAM PACK FOR C16 - £39.95

VOICE MASTER

YOUR COMPUTER CAN TALK IN YOUR OWN VOICE. Not a synthesizer but a true digitizer that records your natural voice quality, in any language or accent. Words and phrases can be expanded without limit from disk. Speech Edit program alters or improves sounds.

WILL IT UNDERSTAND WHAT YOU SAY? A real word recognizer for groups of thirty two words or phrases with unlimited expansion from disk/tape memory. Speech playback and word recognition can work together. Have a two way conversation with your computer.

Easy to use with new basic commands like SPEECH, LEARN, VOLUME etc. Machine code programs and memory locations for more experienced programmers.

Totally transportable software. Speech recorded on a CBM 64 using a V.M. can be loaded into another CBM 64 via tape or disk and reproduced without using a V.M.

EXCITING MUSIC BONUS. Lets you hum or whistle to write and perform. Notes literally scroll by as you hum! Your composition can be edited, saved and printed out. You don't have to know one note from another in order to write and compose!

NEW! DEMO SPEECH DISK AVAILABLE an introduction to Covox speech. The disk gives several general vocabularies that you can use in any of your own programs. Sample programs include a talking keyboard, calculator, clock and more. English, French and German selections. Samples of level 1 and 2 speech editing. Twenty eight page booklet included. Price £2.50p Available from ANCO.

Dealers write to us on your letter headed note paper for a FREE sample of the talking disk.

ULTIMATE HUMAN TO COMPUTER INTERFACE - You will never find better value.

AVAILABLE FOR:- COMMODORE CBM 64/128, ATARI 800/800XL/130XE, APPLE IIc/IIe.

THE AMAZING VOICE MASTER

SPEECH SYNTHESIS-VOICE RECOGNITION
plus a whole lot more!



£59.95

ANCO

ANCO SOFTWARE, 4 WEST GATE HOUSE, SPITAL STREET, DARTFORD,
KENT DA1 2EH. Telephone: 0322 92513/8 Telex: 892758 ANCOG.

24 HOUR CREDIT CARD SERVICE 0322 522631

This chart is based on the MicroScope chart as compiled by Gallup.

MicroScope GALLUP

MicroScope is the weekly trade paper of the microcomputer industry. If your computer store doesn't display the latest MicroScope chart, ask the manager to call Mark Salmon on 01-631 1433 - we'll send a copy every week.

THE CHARTS

TOP 20

1	GAUNTLET	U.S. GOLD	SP CO AM
2	COMPENDIUM OF HITS 10 VOL. 3	BEAU JOLLY	SP CO AM AT BB MS C1 EL
3	PAPERBOY	ELITE	SP CO
4	TRIVIAL PURSUIT	DOMARK	SP CO AM AT BB
5	SPACE HARRIER	ELITE	SP CO AM
6	KONAMI'S COIN-OP HITS	IMAGINE	SP CO AM
7	FOOTBALLER OF THE YEAR	GREMLIN GRAPHICS	SP CO AM MS C1
8	HIT PACK	ELITE	SP CO AM C1
9	FIVE STAR GAMES	BEAU JOLLY	SP CO AM BB MS C1 EL
10	COBRA	OCEAN	SP CO
11	SCOOBY DOO	ELITE	SP CO AM C1
12	SUPER SOCCER	IMAGINE	SP
13	BREAKTHRU	DATA EAST - U.S. GOLD	SP CO AM
14	THE GREAT ESCAPE	OCEAN	SP AM
15	HEAD COACH	ADDICTIVE	SP CO
16	THEY SOLD (3)	HIT SQUAD	SP CO
17	INFILTRATOR	MINDSCAPE - U.S. GOLD	SP CO AM
18	KONAMI'S GOLF	IMAGINE	SP AM
19	REPTON 3	SUPERIOR	CO BB EL
20	TOP GUN	OCEAN	SP AM

BUDGET TOP TEN

1	180	MASTERTRONIC	SP CO AM
2	OLLIE AND LISA	FIREBIRD	SP
3	BMX SIMULATOR	CODE MASTERS	SP CO AT
4	FLASH GORDON	MASTERTRONIC	CO
5	NINJA MASTERS	FIREBIRD	SP CO AM AT MS
6	HAPPIEST DAYS	FIREBIRD	SP CO
7	SPEED KING 2	MASTERTRONIC	SP
8	AMERICAN FOOTBALL	BUGBYTE	SP CO
9	THRUST	FIREBIRD	SP CO AM AT BB EL
10	VAMPIRE	CODE MASTERS	SP AM MS

BUBBLING UNDER

CRYSTAL CASTLES	U.S. GOLD	SP CO AM BB EL
DRACULA	CRL	SP CO AM
HYPABALL	ODIN	SP CO
NINJA	MASTERTRONIC	SP CO AM AT
PANTHER	MASTERTRONIC	CO
RED MAX	CODE MASTERS	SP CO AT
SCALEXTRIC	LEISURE GENIUS	SP CO
TERMINUS	MASTERTRONIC	SP
TERRA CRESTS	IMAGINE	SP CO AM

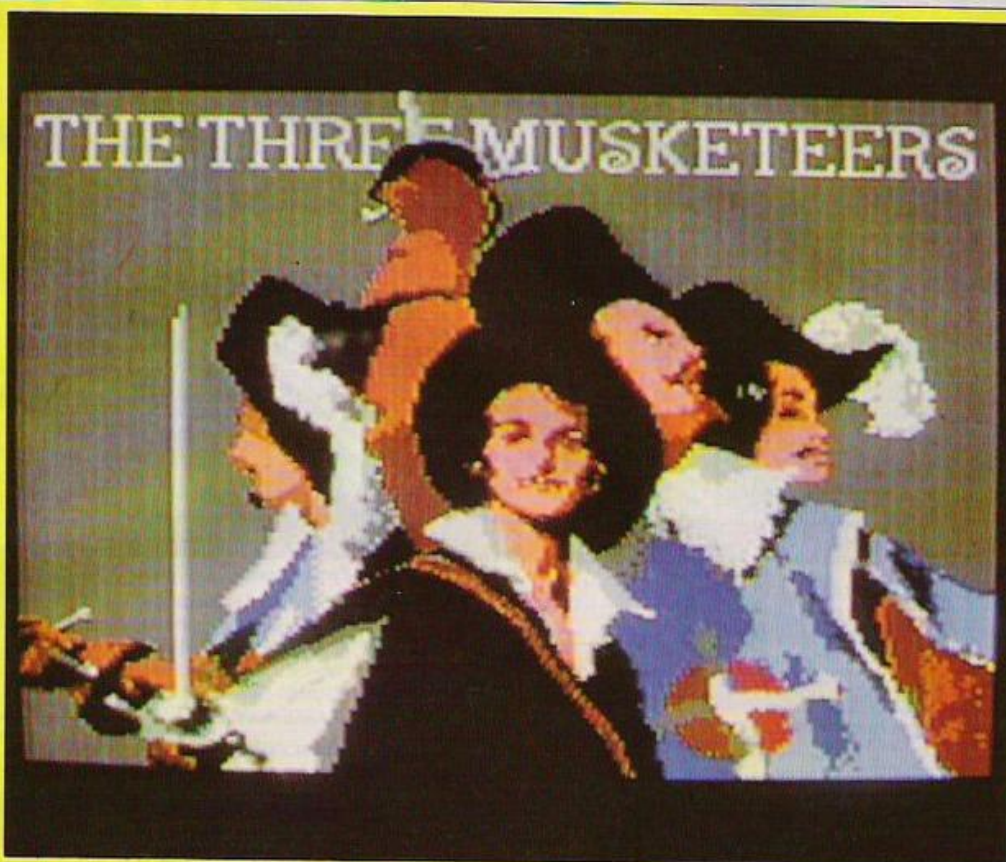
MACHINE CODES:

SP = SPECTRUM; CO = COMMODORE; AM = AMSTRAD; MS = MSX; AT = ATARI; V2 = VIC20

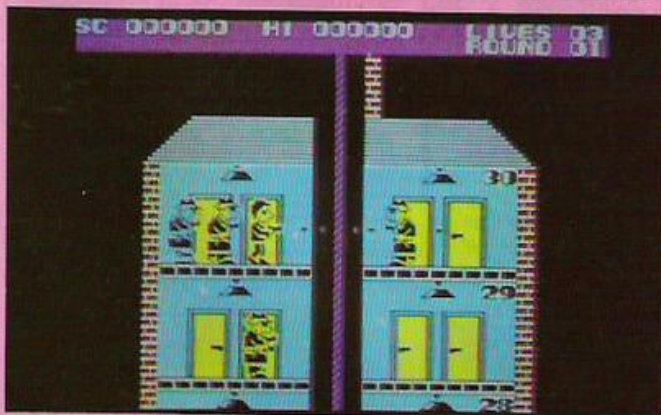
All for one and one for all . . .

A new company, Computer Novels, has just announced the imminent launch of its first title, *The Three Musketeers*. Based on the famous novel by Alexander Dumas, the game initially will be released for the Commodore 64, 128 and Amiga. The tape version for the Commodore 64 consists of four separate loads, each containing more than 63K of data, so the quality of the graphics should be really good.

The game also contains six new scores lasting, in total, more than 15 minutes, so the game really should be a cracker.



Action stations



Although not one of the most sought-after arcade licenses, the recent announcement by Argus Press Software of the imminent arrival of its *Elevator Action* conversion should bring back fond memories for some arcade gamers.

The game places the player as a spy, who must travel from the top of a liftshaft, right down to his getaway car which is at the bottom of the

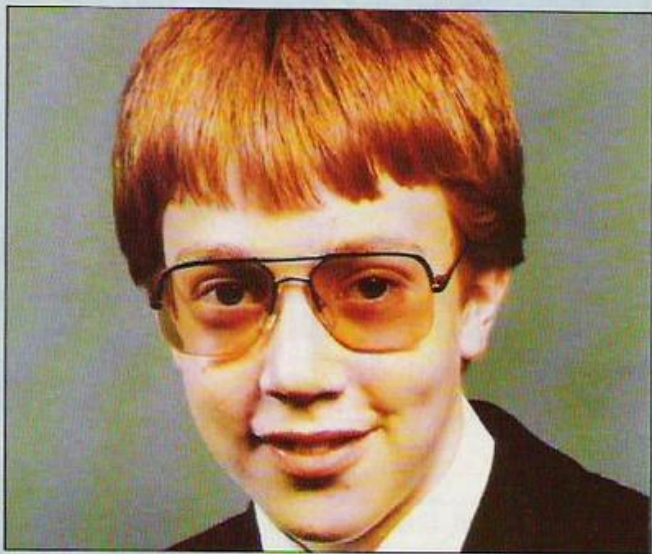
building. This may all sound amazingly simple, but in practice it certainly is not. To make your task more complicated, there are various mac-cloaked baddies who would like nothing better than to pump you full of lead.

Although a simple idea, in the arcades the game played very well, and that addictiveness will be carried on to the range of home micros for which it is being converted.

Home on the Grange

To tie closely with the tenth anniversary of the series, Quicksilver has licensed the name and characters from the immensely popular television series, *Grange Hill*.

The game uses the characters Hollo and Gonch and revolves round their attempts to break into school to recover a confiscated personal stereo. Designed by Colin Jones, who was also responsible for two CRL hits, *Deux Ex Machina* and *iD*, the game promises to be both enjoyable and, in places, frustrating.



ROMANTIC ROBOT present

£39.95
SPECTRUM 48K
& 128 K (48K MODE ONLY)

MULTIFACE 1&2 must rank as the most useful multi-purpose interfaces for SPECTRUM or AMSTRAD. They enable you to stop ANY program at ANY point and SAVE it onto ANY media - disk, tape, cartridge, wafer. They have a unique MULTI TOOLKIT to study/modify programs - you can PEEK/POKE every single byte in a window. (to reveal any text in programs) etc. Each MULTIFACE has an 8K ROM & 8K RAM - needs NO additional software, takes NO part of AMSTRAD/SPECTRUM RAM - is FULLY AUTOMATIC and 100% reliable - all you have to do is 1) press the MULTIFACE button 2) select a function - 3) input a name for saving instead of returning. 4) press disk etc. and choose to save Program or Screen only.

MULTIFACE 1 is the ONLY product that can put literally anything onto anything - Tape, Microdrive, Disc, Data or Kempston. Similarly MULTIFACE 2 is the ONLY device capable of saving any program PROPERLY and AUTOMATICALLY into screen, colours and sound !!! Both MULTIFACES are menu-driven with on-screen prompts and instructions, user-friendly, fully error-trapped/ idiot-proof. 1st class professional products with a full money-back guarantee. MULTIFACE 1 also gives you a RESET button instead. Both have a thorough extension bus for connecting other peripherals. They are powerful & efficient compressing for fast re-loading and taking minimal room on disk, tape etc. - using MULTIFACE 2, for instance, 84 K programs usually load in approx. 20 seconds from disk and 5 minutes from tape (when saved at hyper-speed). Programs saved with MULTIFACE ONE can RUN independently. Please state if using KEMPSTON disc interface on Spectrum.

AMSTRAD 464, 664, 6128
£46.95

NO.1 MULTIPURPOSE INTERFACES FOR AMSTRAD & SPECTRUM

I enclose a cheque/PO for £..... (UK & Europe please add £1 overseas £2)
or debit my ☐ No ☐
Name..... Card expiry.....
Address.....

Please send MULTIFACE ONE £39.95 ☐ MULTIFACE TWO £46.95 ☐
SELENE & ANACHRONISM £ 9.95 ☐ STEEPLEJACK £ 4.95 ☐
NEVER MIND... Amstrad £ 9.95 ☐ or disk version £ 14.95 ☐
MUSIC TYPEWRITER £ 7.95 ☐ WRIGGLER Spectrum £ 2.95 ☐
WRIGGLER Amstrad tape £ 7.95 ☐ or disk version £ 11.95 ☐
TRANS-EXPRESS cartridge ☐ disk ☐ wafer ☐ £9.95 ea

ROMANTIC ROBOT UK LTD 77 Dyne Road London NW6 7DR ☎ 24 hrs **01-625 9463**

£39.95
SPECTRUM 48K
& 128 K (48K MODE ONLY)

MULTIFACE 1&2 must rank as the most useful multi-purpose interfaces for SPECTRUM or AMSTRAD. They enable you to stop ANY program at ANY point and SAVE it onto ANY media - disk, tape, cartridge, wafer. They have a unique MULTI TOOLKIT to study/modify programs - you can PEEK/POKE every single byte in a window. (to reveal any text in programs) etc. Each MULTIFACE has an 8K ROM & 8K RAM - needs NO additional software, takes NO part of AMSTRAD/SPECTRUM RAM - is FULLY AUTOMATIC and 100% reliable - all you have to do is 1) press the MULTIFACE button 2) select a function - 3) input a name for saving instead of returning. 4) press disk etc. and choose to save Program or Screen only.

MULTIFACE 1 is the ONLY product that can put literally anything onto anything - Tape, Microdrive, Disc, Data or Kempston. Similarly MULTIFACE 2 is the ONLY device capable of saving any program PROPERLY and AUTOMATICALLY into screen, colours and sound !!! Both MULTIFACES are menu-driven with on-screen prompts and instructions, user-friendly, fully error-trapped/ idiot-proof. 1st class professional products with a full money-back guarantee. MULTIFACE 1 also gives you a RESET button instead. Both have a thorough extension bus for connecting other peripherals. They are powerful & efficient compressing for fast re-loading and taking minimal room on disk, tape etc. - using MULTIFACE 2, for instance, 84 K programs usually load in approx. 20 seconds from disk and 5 minutes from tape (when saved at hyper-speed). Programs saved with MULTIFACE ONE can RUN independently. Please state if using KEMPSTON disc interface on Spectrum.

AMSTRAD 464, 664, 6128
£46.95

NO.1 MULTIPURPOSE INTERFACES FOR AMSTRAD & SPECTRUM

I enclose a cheque/PO for £..... (UK & Europe please add £1 overseas £2)
or debit my ☐ No ☐
Name..... Card expiry.....
Address.....

Please send MULTIFACE ONE £39.95 ☐ MULTIFACE TWO £46.95 ☐
SELENE & ANACHRONISM £ 9.95 ☐ STEEPLEJACK £ 4.95 ☐
NEVER MIND... Amstrad £ 9.95 ☐ or disk version £ 14.95 ☐
MUSIC TYPEWRITER £ 7.95 ☐ WRIGGLER Spectrum £ 2.95 ☐
WRIGGLER Amstrad tape £ 7.95 ☐ or disk version £ 11.95 ☐
TRANS-EXPRESS cartridge ☐ disk ☐ wafer ☐ £9.95 ea

ROMANTIC ROBOT UK LTD 77 Dyne Road London NW6 7DR ☎ 24 hrs **01-625 9463**

SELENE plus ANACHRONISM

A fantastic two bumper pack of sci-fi adventures for travellers in time - both very intriguing and exciting, complex and detailed, funny and witty. Travel in time backwards and forwards as you never did before - certainly not in any adventure yet...

STEEPLEJACK

A ghost town stands in the way of motorway 1987 and only STEEPLEJACK can demolish it with his drill and oversized pair of lead boots in this highly fresh, original, and stylish arcade game. STEEPLEJACK must be very fast, crafty, alert and strong - there is a whole army of creatures and features one can only find in a ghost town, so much to do, so little time left...

NEVER MIND THE NASTIES

NMTN contains the same unique humour and addictivity as its older brother, the hit game WRIGGLER. The action takes place in a weird and bizarre world full of mutants and monsters, dungeons and sewers, conveyor belts and express elevators, deserts and pyramids, transplices and space stations, a world that must be explored and fought through to prevent a total annihilation of human race.

MUSIC TYPEWRITER

Complete Spectrum music system for writing, editing, playing, printing & storing music with real notation graphics.

TRANS-EXPRESS

The software way of transferring Spectrum software. 4 utilities for m'drive, 2 for wafadrive, 2 for Opus Discovery.

TOP SOFTWARE AT BOTTOM PRICE

Please send MULTIFACE ONE £39.95 ☐ MULTIFACE TWO £46.95 ☐
SELENE & ANACHRONISM £ 9.95 ☐ STEEPLEJACK £ 4.95 ☐
NEVER MIND... Amstrad £ 9.95 ☐ or disk version £ 14.95 ☐
MUSIC TYPEWRITER £ 7.95 ☐ WRIGGLER Spectrum £ 2.95 ☐
WRIGGLER Amstrad tape £ 7.95 ☐ or disk version £ 11.95 ☐
TRANS-EXPRESS cartridge ☐ disk ☐ wafer ☐ £9.95 ea

ROMANTIC ROBOT UK LTD 77 Dyne Road London NW6 7DR ☎ 24 hrs **01-625 9463**

WIN A VIDEO OF THE LAST STARFIGHTER, THE ULTIMATE SCI-FI ADVENTURE

PRESENTED IN CONJUNCTION WITH CHANNEL 5

Are you sick of playing computer games you cannot beat? Now is your chance to watch someone who really can play computer games. Alex Rogan was so good that he was chosen by the man who invented *Starfighter*, the game at which he is so good, to use his skills in a real life space battle.

With some of the most impressive computer graphics ever used in cinema, *The Last Starfighter* is a video which will appeal to everyone from eight to 80 and now, in this competition, *Your Computer* offers you the chance to win one of the five copies we have to give away.

To enter, answer the three simple questions below and send your answers to *Your Computer*, 79-80 Petty France, London SW1H 9ED. The winners will be the first five correct entries drawn by the closing date of the competition, the last working day of March.

Available only in VHS format.



QUESTIONS

1. What was the name of the first arcade computer game?
2. What does VHS stand for?
3. Which company invented the VHS format?



COMPETITION RULES

- * The winners of the competition will be the first five correct answers drawn from all those received before the closing date of the competition.
- * The names of the winners will be announced in the June 1987 issue of *Your Computer*.
- * All entries must arrive at the *Your Computer* offices by the last working day in March, 1987.
- * Each person may enter the competition only once.
- * Entries to the competition cannot be acknowledged.
- * No employees of Focus Investments nor their agents or close relatives may enter the competition.
- * The decision of the Editor in all respects of the competition will be final.
- * No correspondence with regard to any aspect of the competition will be entered into.
- * Focus Magazines assumes no responsibility or liability for any complaints arising from this competition.

STARFIGHTER COMPETITION

Do not forget to enclose this coupon, or a photocopy of it, when you send your entry, marked Starfighter Competition, to the *Your Computer* editorial offices at the address shown at the front of the magazine.

Answers 1

2

3

Name _____

Address _____

POSTCODE _____

Day Tel. No _____

Yellow Pages on-line

BT has launched its Electronic Yellow Pages service, a condensed on-line version of the printed directory. Advertisers who wish to appear in the new service have to buy extra space, in addition to their standard business telephone entry.

Electronic Yellow Pages runs on its own computer database. It offers both

scrolling text and viewdata format display, accessible at a variety of speeds from 300 to 1,200/75 baud. The service is also available via a gateway link on Prestel. Apart from the cost of your telephone call, the service is free.

Initially the service is limited to London, Reading, Guildford, Watford and St. Albans.

Acorn starts communicating

The Acorn answer to the Sinclair QL-based ICL One Per Desk comms-orientated desk-top micro, the Communicator, which was launched more than a year ago as an OEM product, has finally secured some customers.

Around 2,000 of the 65C186-based micros, with integral modem and telephone handset, are believed to have been ordered, including 500 by Thorn EMI Business Communications division and an unspecified number by Pickfords Travel, for its 350 high street branches, to act as all-purpose business micro/viewdata terminals.

The 16-bit Communicator, which is similar in appearance to the Acorn BBC Master Compact, is a complete turnkey comms solution, with integral business applications – View WP and Viewsheets – which can be expanded by software development.

The latter feature was one of the main reasons Pickfords chose the Communicator.

Three-and-a-half-inch disc drives and up to 20MB of hard disc storage are available as optional extras. Acorn would not disclose how much the Communicator costs but we suspect that the standard configuration, with keyboard and colour monitor, is around £1,000.

Pace reduces prices

The Series 4 range of smart modems from Pace Microsystems has been reduced in price "because of reduced component costs" according to Barry Rubery of Pace. With Prestel due to launch its new high-speed Vascomm network soon, it is no surprise that the 1,200S (with 1,200/1,200 baud V22) and 2,400S (up to 2,400 baud V22bis) have been reduced in price – from £479 to £399 and £619 to £499 respectively. The standard V21/23 (300 and 1,200/75 baud) version remains unchanged at £265.

Cheaper Minitel terminal

The price of the Alcatel Terminatel 254 combined Prestel/Minitel terminal has been reduced by £105 to £295. Alcatel announced the price reduction to celebrate the sale of its two millionth Minitel terminal.

Ninety-nine percent of those terminals are Minitel-only versions of the compact mono-display terminal used in the French electronic

Banks agree on point of sale

If you are a regular traveller to France or Germany, you will probably have noticed how many retailers, from modest hotels and petrol stations to department stores, use electronic credit card readers linked to large credit card organisations like Visa and Mastercharge (Access). In the U.K., both banks and retailers have been slow to make use of this new technology.

The top U.K. clearing banks recently agreed on a future Electronic Funds Transfer at Point of Sale system which eventually will be featured countrywide.

The system, which could spell the end of the paper chequebook as we know it, will be card-based and may use "smart cards" – plastic cards with tiny integral microcomputers.



Miracle soon

Miracle Technology has increased both the specification – extra control LEDs – and price, up £20 to £169.95, of its base smart modem. That compares favourably to the similar model WS3000 – both are Hayes-compatible V21/23 modems which can be

upgraded internally to V22 or V22bis.

The WS4000 is to appear soon in PCW-compatible form – interfacing directly to the Amstrad PCW, without taking up the PCW optional RS232 interface. The price is expected to be the same as the new standard WS4000.

Compulink expands

Guildford-based bulletin board Compulink, well-known for its PC support, will soon be expanding to cater for Amiga users. The board, which has

telephone directory program.

U.K. importer, Blick, is not claiming exciting sales figures for the terminal, though Alcatel appears pointed to start large-scale manufacturing in the U.K., should a large-scale French-style electronic directory scheme get underway.

Most observers agree this will happen eventually.

more than 3,000 subscribers, specialises in articles and software support, including Freeware public domain software, for IBM PCs and compatibles. New Amiga-based subscribers will be able to download a large selection of free public domain Amiga software – 37 discs full.

Access to Compulink, which occupies the top floor of a modest terraced house in Guildford, can be via 300, 1,200/75, 1,200 full duplex or 2,400 baud. Full details can be obtained from Compulink on 0483 65895.

Bounder

One of the biggest surprises in the computer games world was the failure of the original versions of *Bounder* – for the Amstrad, Commodore and Spectrum it is uninteresting. The object is to guide your bouncing ball along various courses, with the screen scrolling vertically, top to bottom, trying to avoid the various objects which will kill you.

If you complete a level and still have some of your allotted bounces left, you must then attempt the bonus screen, in which every block on which you manage to land will give you a bonus, although the bonuses will vary from 500 to 10,000 points.

Graphically, *Bounder* is surprisingly good on the PCW, and indeed many of the defined sprites seem better in green than in the original multi-colours. The only obvious criticism of *Bounder* is that it is, at least on this machine, too slow. Whether it is absence making the heart grow fonder is not certain but the other versions were considerably faster. That apart, *Bounder* is still highly playable and should provide a refreshing alternative to hours spent tapping away at *LocoScript*.

Contact Gremlin Graphics on 021 356 3388.

Gaming on the PCW

At first glance, the specification of the PCW is scarcely one which would endear itself to games programmers but, as Ocean proved with Batman, it is possible to produce excellent games on this monochrome machine. Michael Graham and Francis Jago examine some of the best.

Frank Bruno's Boxing

It now seems that the PCW is officially recognised as a games machine; not only Ocean but Elite is getting in on the act. The first game Elite is releasing for the PCW is still one of its best early products, namely *Frank Bruno's Boxing*.

Although Frank never made it to the top his name is still well-respected by the general public and that can only help sales of this game.

The object of the game is to work your way through the eight various boxers, defeating each of them as quickly as possible. Points are awarded on a depleting bonus system, and therefore getting



three knockouts quickly is what the game is about.

To complete the game, there are eight boxers, ranging from easy to almost impossible, all of whom you must defeat. The first competitor you contact is Canadian Crusher, a giant of a man who lumbers uselessly round the ring in an attempt to squash you.

As the boxers get more difficult, and correspondingly more dirty, the game starts to depend slightly on a degree of dexterity, especially as you have to use seven separate keys most of the time. For a first game on the PCW, FBB is both enjoyable and well converted. If it sells well, Elite promise more conversions; there can be no better reason for buying this game, except that it also happens to be an excellent one.

Contact Elite on 0922-55852.

Micro Trivia

The PCW is an excellent machine but animated graphics are not its forte. Therefore, any game designed specifically for the machine is unlikely to use graphics. One of the more enjoyable quiz games to reach the office recently is *Micro Trivia*.

Unlike its auspicious cousin, *Trivial Pursuit*, this game uses noughts and crosses, combined with questions to add to the excitement of the game and, as an added bonus, there is a chance to win a £1,600 cruise up the Nile.

In the version of the game we had, there were 1,000 general knowledge questions, although the producers of the

game have promised that they will release 10 new groups of 1,000 questions in the near future. To get a chance to enter the competition, you must first achieve a score of at least 150 – no mean feat.

In a slightly jocular vein, the authors have included a busy button which, when pressed, changes the screen into a fairly good representation of a word processor – very useful if the boss insists on checking on you. Overall, *Micro Trivia* is an excellent quiz game, it is easy and yet frustrating and should appeal to the Mensa-like group of people who love to see just how clever they are.

Contact Harold Gale Associates on 0902-772771.

First choose your square and then press 1, 2, 3 or 4 for your answer

Which of these famous artists was German?

- 1 Constable
- 2 Monet
- 3 Raphael
- 4 Holbein

ELAPSED TIME

3 4 5 6

1	2	3
4	WIN	5
1	WIN	3



Within Your Reach

£169.95* for a Hayes compatible, autodial, autoanswer with speed seeking smart modem from one of the UK's best-known modem manufacturers — that really brings the world of data communications within your reach!

If that wasn't enough, the new WS4000 is also fully intelligent and speed buffered. And you can add your choice of optional extras now or later, taking it right up to full V22 or even the 2400 bps V22 bis standard.

For only £169.95* you can reach out to Prestel, Telecom Gold, Micronet, Microlink and the world's databases, bulletin boards and telex links through your own telephone line. User-user file transfer too.

WS4000 is made to the same high quality as all our products. The price breakthrough is a direct result of our massive component buying power through high volume sales to business, home, educational and Government users throughout the world.

If £169.95* is within your reach — then so is the world.

*Price excludes VAT. Total delivered price, UK mainland, is £201.76. Prestel, Telecom Gold, Micronet and Microlink are registered trade marks of those companies.

FREE OPTION
Inbuilt Serial Interface
For Amstrad PCW 8256/8512
Contact us for details

APPROVED
for connection to
telecommunication
systems specified
in the instructions
for use subject to
the conditions set
out in them.



MIRACLE TECHNOLOGY

MIRACLE TECHNOLOGY (UK) LTD ST PETERS STREET IPSWICH IP1 1XB ENGLAND
☎ (0473) 216141 6 LINES TELECOM GOLD 79: KEY 001 (Dealerlink 72: DTB 10135)
✉ 946240 CWEASY G 19002985 PRESTEL MAILBOX 919992265

Software standards

Stewart Bell, managing director of Microprose, has criticised entertainment software houses for not catering for the increasingly-sophisticated micro user. He believes that as machines are becoming more sophisticated so, too, are the end-users, but he says:

"There are far too many software houses which are apparently working on the assumption that end-users have IQs less than orang-utangs."

According to Bell, the result of all this is that the entertainment side of home computing is not achieving its full potential and that sales are being lost through bad experience with poor quality games.

Despite the criticism, no

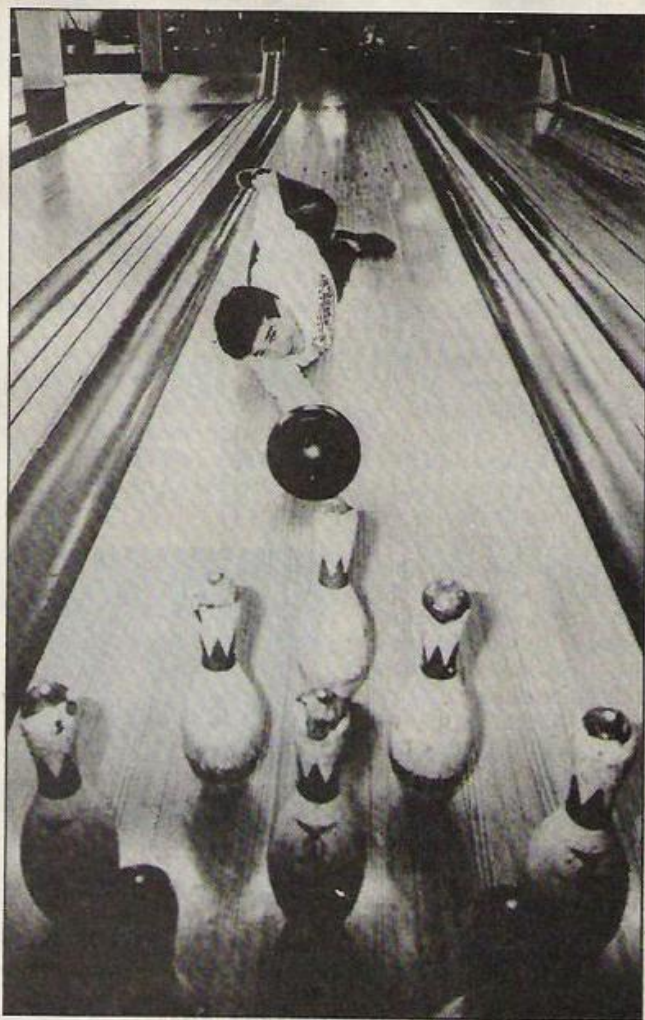
Slip-sliding away

This picture shows U.S. Gold public relations chappie Richard Tidsall in a very compromising position designed to attract attention to the latest Access sports simulation, *Tenth Frame*.

Based, as the picture suggests, on ten-pin bowling, the game is both well executed and great fun – as would be expected from the company which produced *Leaderboard*.

Due to be released for the Commodore, Spectrum and Amstrad very soon, with Amiga and Atari ST versions to follow, it should be in the shops by the time you read this.

constructive advice has been offered by Bell to help solve the problem.



Knight and day

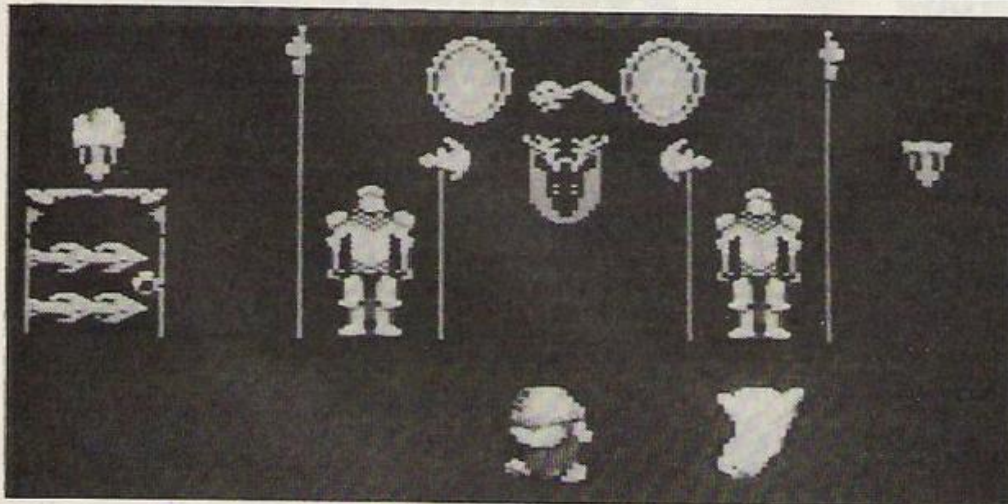
Succumbing to the success of *The Pawn*, Level 9 has announced that its latest adventure, *Knight Orc*, will feature state-of-the-art digitised graphics to add to the atmosphere of the game.

Knight Orc features the ability to communicate with, and give commands to other

characters, as well as those characters leading their own lives, independent of you.

Using a new language interpreter with multiple command sentence and a 1,000-word vocabulary, the game promises to be one of Level 9's best.

Frankie says 'Ariolasoft'



Latest game for Amstrad and Spectrum owners from Covent Garden-based Ariolasoft is *Bride Of Frankenstein*. In this spoof game, it is your task to revive your beloved (oh yeah?) Frankenstein before the wedding day. To do this you must rob graves and crypts, in search of a pair of lungs, kidneys, a liver, a brain and a good heart to bring your hubby to life.

To stop you in this task there are lost souls who would like nothing better than to see you cop it, and a variety of hideous ghoulies and zombies.

LETTERS

Please don't knock the Amiga

I want to say I am disgusted at the way that you have been putting down the Amiga ever since it appeared. You have always been attacking it from price reviews to software reviews. Your review about the Amiga in Santa's Selection in the December issue was altogether disgusting. First you attack the price. My answer to that is that the high-level price of the Amiga is for a high-level person. If someone is serious enough about computing to buy such a high-level computer, you can be sure he is willing to spend a high-level price.

What you said about the software is altogether a lie. The Amiga has almost as much software as the Atari ST, at least 100 pieces. Most of the software is from Electronic Arts and Mindscape. There are at least two great word processors which I have. They are Regis-write and one other I do not know the name of. That is in contradiction to what you said in the article that to this day there is not one good word processor available.

I am saying this because I own an Amiga. It is the best computer on the market and you know it. No other computer offers you 640/400 graphics, 4,096 colours, four-channel stereo all together, with just as much software as the ST. Even where I live we have all the software for the Amiga including great graphic word processors, mostly from Aegis.

**Nathan Singer,
Safed, Israel.**

Editor's reply: Although I would not say that we have been putting down the Amiga, I would like to try to justify the obvious lack of coverage. No-one would argue other than that the Amiga is an excellent machine, especially when it is

used for vertical applications. On the other hand, our criticism of price seems now to have been proved correct as Commodore U.S. is now releasing a new Amiga, the A500, which will have 512K as standard and sell for less than \$700 – roughly £500.

As for the lack of word processors, I use an Amiga at home and I still stand by what I say about the inadequacy of any of the current batch, including the Commodore Textcraft.



New Amstrad User Group

A new Amstrad user group has been set up just outside the centre of Birmingham and we would welcome new members wishing to join us. If you enjoy computing with your Amstrad, whether it is playing games or writing *dBase II* programs, we would be delighted to hear from you.

**John Woods,
Secretary,
Birmingham Amstrad Users'
Group,
54 Lockwood Road,
Northfield,
Birmingham B31 1QD.**

Amstrad CPC no match for Atari games graphics

I am writing about D. Jenkins' letter claiming that the Amstrad CPC machines were the 'Games machines of the future'. What a load of trash. I own an Atari 520STM and while still considered a business micro, I feel its ability to produce games with graphics such as *Starglider* proves that the real games machines of the future will surely be the ST or similar quality machines.

While still probably a little too expensive for home use, the price should fall in the future and even now is good value. I am not denying that the CPC range is a pleasant home micro but it certainly is not in the ST league.



I would like to thank *Your Computer* for its coverage of the ST and I hope to see more reviews and perhaps some programs.

**Gary Marshall,
Aberdeen.**

Editor's reply: The ST seems to be the games machine of the future, especially as Atari has now reduced the price even further. It has now reached the stage where anyone buying a computer for games purposes only must take the ST into consideration. With games at an average of £25 each, however, I think the Commodore, Amstrad and Spectrum still have a few years at the top.

Star rating or percentage system?

I have been reading *Your Computer* for the last two years and the software shortlist has been of constant interest to me. Although I find your reviews interesting and informative I have one major criticism – that is that you rate out of only five stars. That leaves a non-precise summary to otherwise excellent reviews which leaves many readers in a dilemma about possible purchases.

The situation is even worse when the overall rating is three stars, as the over- or under-generosity of the reviewer can

be the difference between a bad game and a reasonable one.

Alternatives to your present rating system would be either 20 stars – as 10 can still be a little restrictive – or a percentage rating system, as employed by many of the top game reviews magazines.

**M. Knight,
Harlow, Middlesex.**

Editor's reply: I agree with you and in the near future we will try to think of a more reflective rating system, though it will have to be original as well as useful.



Firmware guide was available

Richard Sargent complains – Vol. 7 No. 1 pages 66-67 – “If only Amstrad had produced its disc firmware guide in time.”

I would like to point out that the disc firmware guide has been out for many, many months and the original Firmware Guide, which contains all the routines he requires for saving files to disc, came out at the same time as the CPC464 more than two

years ago. In fact, the Firmware Guide was in the hands of some software houses before the CPC464 reached the market. That is why so many games appeared at the same time as the computer.

I wish people would get their facts correct before knocking this machine. All too often people have a go at the Amstrad. I have yet to see any derogatory comments about

the CPC computers which have any foundation in truth.

I agree with Jenkins when he says that the Amstrads are far superior to Spectrums. Consider the amount of space given to Spectrum listings which provide extra Basic commands such as on error goto, renumber, block delete, auto line numbers, all standard on CPC machines.

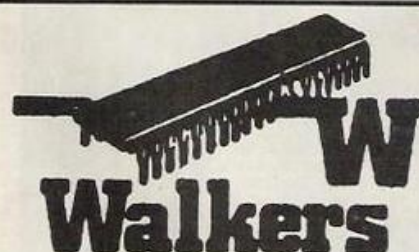
Next consider the number of

advertisers offering repair facilities and proper keyboards. To me at least for an Amstrad owner the purchase of a Spectrum can only be a step back into the stone age. Yet for a Spectrum owner to purchase an Amstrad, it is only a logical step forward into the world of real computers.

Alex Aird,
Birmingham.

MAN LOGIC

By NEIL BRADLEY



COMPUTER REPAIRS AND SPARES

BY THE  SPECIALIST

SPECTRUM REPAIRS £20.00 COMMODORE £32.00
COMMODORE POWER SUPPLY .. £25.00

Also many other spares – prices on request

All prices are inclusive of V.A.T.

While-you-wait service

Call in or send your computer to:

THOMAS WALKER & SON LIMITED

37-41 Bissell Street, Birmingham B5 7HR

TELEPHONE: 021 622 4475

When it is a matter of graphics or sound routines, not even Jack Tramiel could claim that the CBM64 is user-friendly. Yet here is a computer with sound and graphics facilities still superior to those of most of the popular computers marketed since the CBM64 first appeared. It is the POKEs which make it difficult. Not only do you have to know which address to POKE and what value to POKE to it but you need to check your typing with great care.

One false digit and there is the inevitable hang and a blank screen. Switch off and start again. That leads us to the most important of all programming precautions. Never try to run a newly-typed Commodore program without saving it first.

This month we present some fast machine code routines intended to take the hassle out of Commodore graphics and, incidentally, to help you to put bright and lively pictures on your screen. The routines make use of the *multi-color bit-map* mode. In this mode the screen is considered to be made up of 200 rows each of 160 dots, or pixels. Each of the pixels is identified by its x and y co-ordinates – figure one. Each pixel is displayed in one of four colours. Colour 0 is the same colour as the screen in text mode. Colours one to three can be any of the first eight Commodore colours – table one.

Colour codes

Note the difference between the colour numbers and colour codes. Colour numbers refer to the four colours – 0 to 3 – you can have in each character block, an area of screen four pixels wide and eight pictures deep – see figure one. The four numbered colours are usually all different, though two or more could be the same colour. Colour codes refer to the eight Commodore colours – table one. We use the colour codes when allocating specific colours to colour 0, colour 1, colour 2 and colour 3. If you find that confusing, take comfort in the thought that Amstrad owners have the same difficulty in distinguishing between its keywords PEN and INK.

The four-colour mode has a little more to it than at first appears. Colour 0 applies to the whole screen but a different selection of colours 1, 2 and 3 can be set for each character block. That means you can have up to eight colours on the screen at once.

Figure two shows how we have allocated the CBM64 memory in our graphics system. Note that the bottom 32K is left entirely free for the Basic program and variables, except for the small area below \$0401, which the

The Commodore plot

In this month's programming conspiracy, Owen and Audrey Bishop collaborate to design fast graphics routines for your CBM64.



computer always needs for its own purposes. Thus you have plenty of program space. Eight kilobytes of memory from \$8000 onwards is reserved for the machine code routines. That

```
50 REM *****GRAPHICS PROGRAM *****
60 POKE 53281,5:POKE 40957,0:POKE 40958,
2:POKE 40959,3:REM COL0 TO COL3
70 SYS 32815
80 A=.003
90 A=A+.0209:R=50*(1-COS(A)):X=INT(80+R*
SIN(A)):Y=INT(100+R*COS(A))
100 IF X<0 OR X>159 OR Y<0 OR Y>199 THEN
GOTO 120
110 POKE 40954,2:POKE 251,X:POKE 253,Y:
SYS 33016
120 IF A<6.28 THEN GOTO 90
130 FOR J=1 TO 8000:NEXT
900 REM *****END OF GRAPHICS PROGRAM*****
*
```

space is required only partly for our routines, so you have room here to store your own machine code or data tables.

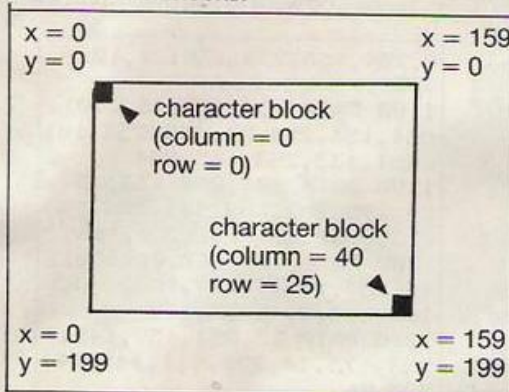
The screen routines make use of the 16K block of RAM from \$C000 onwards – HIRAM. In normal operation of the computer, that block holds the Kernel ROM, 4K of input/output addresses and buffers, and the character ROM. The 16K of RAM normally is unused; many Commodore users are probably unaware of its existence. If you POKE addresses in this area, the value POKED is stored in the RAM but if you try to recover the value by PEEKing the address, all you get is the value from the kernel ROM.

Character memory

By making the CPU switch a certain control line – HIRAM – low, we can switch out these ROMs. Then we can PEEK values directly from the hidden RAM. That cannot be done from a Basic

program, since switching out the ROMs deprives the Basic program of essential routines and information. From a machine code routine which runs

Figure 1. Graphic co-ordinates and character blocks.



```
10 REM *** PLOT ***
20 PRINT CHR$(147):PRINT"STORING CODE"
30 FOR J=32768 TO 33172:READ X:POKE J,X:
NEXT
40 SYS 32768
50 REM *****GRAPHICS PROGRAM *****
60 POKE 53281,5:POKE 40957,0:POKE 40958,
2:POKE 40959,3:REM COL0 TO COL3
70 SYS 32815
80 POKE 40954,2
90 FOR J=0 TO 150:POKE 251,J:POKE 253,J:
SYS 33016:NEXT
100 FOR J=1 TO 8000:NEXT
900 REM *****END OF GRAPHICS PROGRAM*****
*
910 SYS 32971:POKE 53281,6:POKE 53282,14
920 PRINT CHR$(147):PRINT"PROGRAM FINISH
ED"
930 END
970 DATA 169,128,133,52,133,56,173,24,28
8,9,8,141,24,208,173,17,208,9,32
980 DATA 141,17,208,173,22,208,9,16,141,
22,208,173,2,221,9,3,141,2,221
990 DATA 173,0,221,41,252,141,0,221,96
1000 DATA 169,63,133,253,169,255,133,254
,169,64,133,251,169,31,133,252,162,0
1010 DATA 169,0,129,253,165,253,208,2,19
8,254,198,253,165,251,208,2,198,252,198
1020 DATA 251,208,234,165,252,208,230,32
,98,128,32,157,128,96
1030 DATA 169,231,133,253,169,199,133,25
4,169,232
1040 DATA 133,251,169,3,133,252,162,0,17
3,253,159,10,10,10,13,254,159,141
1050 DATA 253,159,173,253,159,129,253,16
5,253,208,2,198,254,198,253,165,251,208
1060 DATA 2,198,252,198,251,208,233,165,
252,208,229,96,169,231,133,253,169
1070 DATA 219,133,254,169,252,133,251,16
9,3,133,252,162,0,173,255,159
1080 DATA 129,253,165,253,208,2,198,254,
198,253,165,251,208,2,198,252,198,251
1090 DATA 208,233,165,252,208,229,96
1100 DATA 173,17,208,41,223,141,17,208,1
73,22,208,41,239,141,22,208
1110 DATA 173,24,208,41,247,9,4,141,24,2
08,173,2,221,9,3,141,2,221
1120 DATA 173,0,221,41,252,9,3,1,0,221
,96
1130 DATA 173,14,220,41,254,141,14,220,1
73,250,159,240,23,170,165,251,41,3,73
1140 DATA 255,56,105,3,168,208,4,138,24,
144,6,138,10,10,136,208,251,141,251,159
1150 DATA 169,0,133,254,133,252,165,251,
41,252,10,144,2,230,252,133,251,165,253
1160 DATA 41,7,141,252,159,165,253,41,24
8,10,38,254,10,38,254,10,38
1170 DATA 254,170,164,254,10,38,254,10,3
```

independently of Basic, there is no problem.

Figure two shows that we use three areas of HIRAM. The main one is the

character memory. That is where the bit-map is stored. The term character memory is confusing, since it is derived for the function of this area during the normal CBM text mode. We retain the term, to be consistent with Commodore terminology. Each byte of the bit-map holds the colours for four pixels – figure three. Since each byte consists of eight bits, we have two bits for each pixel. Each bit of a pair may be off (=0) or on (=1). That gives us four possible settings, 00, 01, 10 and 11, which are the binary values of the four colours, 0, 1, 2 and 3. The 8,000 bytes of this area hold the bit-map for the 32,000 pixels – 160 x 200 – of the graphics screen.

The screen memory, another confusing term, consists of 1,000 bytes, each byte corresponding to a character block – figure one. The data in screen memory sets two of the colours – 1 and 2 – for each block. Since the screen is 40 characters wide and 25 deep, screen memory requires 1,000 bytes. Each byte stores two colours, colour 1 in the upper four bits – upper

nibble – and colour 2 in the lower nibble.

The color RAM – more sensible term, odd spelling – stores colour 3 for each character block. The locations of color RAM are not able to store full 8-bit bytes. They hold only 4-bit nibbles, which is adequate for storing colour numbers up to 15 but only numbers up to 7 may be used.

The only other memory location used for storing colour data is that at 53281. It stores colour 0, the screen background colour. Listing one provides all you need to get started with the multi-colour bit-map mode. The DATA statements contain the machine code for six routines. When you run the program, the code is read into the part of memory set aside for machine code. Take extreme care when typing-in the DATA statements, as a single error makes a routine unworkable. The routines provided, and the addresses they occupy, are:

SETUP (32768-32814). Reserves memory for machine code; turns on multi-colour bit-map mode; points the VIC-II chip to screen memory and

Figure 2. Memory map for graphics system.

\$FF40	CHARACTER MEMORY (8000 bytes)	65344	} HIRAM (BANK 3)
\$E000		57344	
\$DBE8		56296	
\$D800	Screen Memory (1000 bytes)	55296	
\$C7E8	COLOUR RAM (1000 nibbles)	51176	
\$C400		50176	
\$C000		49152	
	8K BASIC ROM		
\$A000		40960	
	8K RAM (For machine code)		
\$8000		32768	
	16K RAM (For BASIC programs etc.)		
\$4000		16384	
	16K RAM (For BASIC programs etc.)		
\$0401		1025	
\$0000	MACHINE WORKSPACE	0	

character memory in HIRAM. The calling statement is SYS 32768.

SCREEN (32815 to 32865). Clears the graphics screen – character memory – to colour 0; sets the screen memory and colour memory to colours 1 to 3. This gives a standard four colour display. If you wish, you can later POKE various locations in the screen memory and colour memory to obtain other colours in various character blocks. Before calling: POKE 53281,col0: POKE 40957,col1: POKE 40958,col2: POKE 40959,col3. col0 – col3 are chosen from the Commodore colour codes – table one. Calling statement: SYS 32815.

COL12 (32866-32920) sets the screen memory to colours 1 and 2. SCREEN calls this routine automatically. Before calling: POKE 40957,col1: POKE 40958,col2. Calling statement: SYS 32866.

COL3 (32925-32970) sets the colour memory to colours 3. SCREEN calls this routine automatically. Before calling: POKE 40959,col3. Calling statement: SYS 32925.

RESET (32971-33015) reverses the effect of SETUP, except that memory space about \$8000 is still reserved for machine code. Calling statement: SYS 32971.

PLOT (33016-33172) plots a point – a pixel – of a given colour at co-ordinates x,y. Before calling: POKE 40954,col: POKE 251,x:POKE 253,y. col is the colour number. It has the value 0 to 3, producing a pixel of colour col0 to col3 respectively as previously set by SCREEN, COL12 or COL3. x is in the range 0-159: y is in the range 0-199. Calling statement: SYS 33016. The routines use addresses 40954 to 40959 for storing data.

Listing one is intended for use when

trying the routines. After storing the machine code – lines 20-30 – it calls RESET – line 40 – to configure the computer to multi-coloured bit-map mode. The next part of the listing – lines 50-900 – contains the graphics routines. Having POKEd the colour codes, we call SCREEN to clear the screen and set up the colours – lines 60-70. Then follows the graphics program, represented here by a very simple line-drawing loop – lines 80-100.

Stand on your head

After a pause to see the line, the program calls RESET – line 910 – and restores the text colours. That takes you back to text mode, to substitute another graphics routine line, or lines. You could try to plot the rather hackneyed sine



curve, or you might try the curve of listing two. This is the algorithm for a rather more interesting shape, called a cardioid. When you have seen it, you will

know why it has that name – hint, stand on your head. Try varying the parameters to alter its shape. For astrophoid alter the equation for R to $R=50*(1-\cos(a)-2*\cos(A))$. Give this time to run. Try the effect of altering its parameters.

Those who want to use these routines

```
8,254,133,253,138,24,101,
253
1180 DATA 133,253,152,101,
254,133,254,24,165,253,101,
251,133,253,165,254
1190 DATA 101,252,133,254,
24,173,252,159,101,253,133,
253,169,224,101,254,133
1200 DATA 254,160,0,165,1,
41,253,133,1,177,253,170,
165,1,9,2,133,1,138
1210 DATA 13,251,159,145,
253,173,14,220,9,1,141,14,
220,96
```

in games programming should begin with lines 30 to 40 of listing one. After that, SCREEN, COL12, and COL3 and PLOT are the routines you will need.

If you want to change colours 1 to 3 for parts of the screen, it can be done using Basic subroutines. They POKE values directly into memory. The equation for calculating the address corresponding to a given character location is:

$$\text{address} = \text{base} + 40 * \text{row} + \text{column}$$

Rows are numbered 0 to 24, top to bottom. Columns are numbered from 0 to 39, left to right. For colours 1 and 2, the base address is 50176. For colour 3 it is 55296. The value to be POKEd for colours 1 and 2 is:

$$16 * \text{col1} + \text{col2}$$

where col1 and col2 are colour codes in the range 0-7. For colour 3, POKE its colour code.

For example, to set the colours of the character block at column 6, row 13, to (1) red, (2) blue, and (3) yellow, the value for colours 1 and 2 is $16*2+6=38$. The address is $50176+40*13+6=50702$. The statement required is POKE 50702,38. For colour 3 the statement is POKE 55822,7.

The routines are not limited to simple experiments in colour graphics. You could insert a complete game program between lines 50 and 900, should you be so ambitious. The straightforward PLOT routine, called from a Basic program, is the essential requirement. It would make things easier to have machine code routines to DRAW lines from one point to another. A routine to FILL outlines with solid blocks of colour would make the graphics more striking. We intend to provide such additional routines from time to time during the next few months.

Figure 3. How the bits of character memory control the colours of pixels.

COLOUR 0 = BLUE
COLOUR 1 = RED
COLOUR 2 = BLACK
COLOUR 3 = WHITE

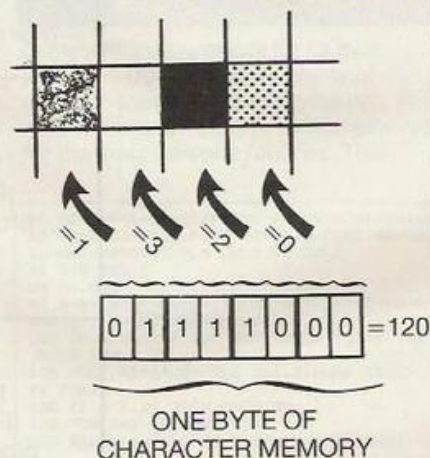


Table 1 Colour codes

0 = black	1 = White	2 = Red	3 = Cyan
4 = Purple	5 = Green	6 = Blue	7 = Yellow

THE ULTIMATE UTILITY FOR YOUR COMPUTER

SPEECH!

**NO EXTRA HARDWARE
REQUIRED**

**FOR THE
COMMODORE
AMSTRAD AND
BBC COMPUTERS**

**AS REVIEWED ON
BBC TV**

COMMODORE 64/128

Cassette **£9.95**

Disc **£11.95**

AMSTRAD CPC464/664/6128

Cassette **£9.95**

Disc **£14.95**

BBC MICROS: B, B+, Master

Cassette **£9.95**

Disc **£11.95**

**THE RECENTLY RELEASED BBC MICRO
VERSION HAS BEEN GREETED WITH
ACCLAIM AND INCREDULITY—**

At last, speech synthesis at a price you can afford. SPEECH! works entirely in software taking up less than 9K of RAM: no extra hardware whatsoever is required. Unlike other systems, SPEECH! has an unlimited vocabulary: it will say anything you want it to, and is simplicity itself to use. Simply type in: **"SAY I AM A TALKING COMPUTER, AS EASY TO USE AS 1 2 3..."** and the computer speaks.

SPEECH! has a built-in parser which translates English words into "phonemes", or speech particles. There are 49 phonemes and 8 different pitch settings which can be used directly by the *SPEAK command (eg. *SPEAK/HEH4LOW4) so stress or intonation can easily be added wherever desired. You can change the overall pitch with the *PITCH command.

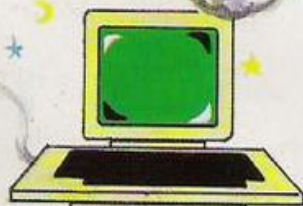
Every copy of SPEECH! comes complete with extra software:

DEMO — shows off all the features,
SPELL — an innovative educational program,
SAYFILE — speaks the lines of your programs.

Applications in:

- games
- education
- business
- utilities

**SUPERIOR
SOFTWARE**
Limited



24 HOUR TELEPHONE
ANSWERING SERVICE FOR ORDERS

- OUR GUARANTEE**
- All mail orders are despatched within 24 hours by first-class post.
 - Postage and packing is free.
 - Faulty cassettes and discs will be replaced immediately.

REVIEWS ON BBC-1 AND BBC-2 TV

Saturday Superstore (BBC-1)

"This is knockout! This is great! ... Wonderful! Very, very clever." ... Fred Harris

Micro Live (BBC-2)

"Really good value!" ... John Coll

REVIEWS IN THE COMPUTER PRESS

"The reproduction is surprisingly good, and certainly on a par with some of the more expensive speech interfaces I have heard. An excellent low cost speech synthesiser that really is very good value for money." ... ACORN USER

"... incredibly easy to use. The end result is as good as anything I've heard this side of the Amiga." ... POPULAR COMPUTING WEEKLY

"Overall an excellent package" ... MICRONET 800.

"This is one utility which cannot be beaten on quality or price" ... The MICRO USER.

"SPEECH! from Superior Software is a truly remarkable offering. A rare gem indeed. Superior Software has produced a price breakthrough by achieving an apparent technical impossibility." ... A & B COMPUTING.

Dept. SP14, Regent House, Skinner Lane, Leeds LS7 1AX. Telephone: 0532 459453

WE PAY TOP ROYALTIES FOR HIGH QUALITY SOFTWARE



Winning formula



All the thrills and spills of motor racing, from your armchair. Tom Courtenay checks the grid.

So Nigel Mansell failed to deliver the goods in Adelaide. Can you succeed where he failed? Well, as in almost every other activity the computer allows you to conduct hideously dangerous tasks from the safety and comfort of an armchair.

Broadly, the offerings fall into two categories – games and simulations. One of the first of the former was *Pole Position*, an adaptation of the arcade classic. You zip around a circuit. There are two gears, accelerate, brake, steer left and right. The track is divided into two lanes and opposition cars amble down one or the other or, if you are unlucky, both.

Once you have ascertained that there is just sufficient room to squeeze between two cars, it is possible to rack up massive scores. There is only one place on the track where the player must brake hard to avoid spinning off the track. The game is a classic because of the number of tricks you can learn, like overtaking on the grass and using the verges to rub off excess speed in an emergency. The Atari and Commodore versions are good but the Spectrum version is somewhat of a disappointment.

Spectrum owners have their own race games. *Chequered Flag* was a good attempt at a race game. It had plenty of gears, still only one race track, but it had a new motion – two degrees of steering so you could either steer lightly or steer hard. The difficulty is that it meant there was a huge number of keys – just too many. So the game eventually faded somewhat into obscurity.

Perhaps better remembered on the Spectrum is *Full Throttle*. Originally from Micro-mega, it was revived recently on the Classics label from Elite. It is a far simpler game – back to left/right steering and

no gears. There was a choice of circuits and the simple object of the game is to steer past the opposition bikes and just keep the throttle open and go like the clappers.

Tough opposition

Another in this line of simple games which are good fun but hardly realistic is *Speed King*. It appeared on the Commodore from Digital Integration and then Mastertronic took it over, re-released the Commodore version and provided Amstrad and Spectrum versions. The Commodore version is head and shoulders above the rest.

The opposition is tough. There are plenty of circuits from which to choose. With five gears there is plenty to think about. There is a field of 15 other drivers and they are tricky guys to pass. They will happily carve you up on the bends. Bashing into one of them is the best way to finish last and there is plenty of scope for tactics as, once again, the old plays like a quick spot of overtaking on the grass come into play. Once in the lead, though, things are plain sailing unless you forget the odd tough bend.

The Amstrad version had

really hideous graphics. That disguised the fact that there was still a good game beneath it all but I am sure few people persevered with the nasty flickery graphics long enough to discover the fact.

The Spectrum graphics suffered from the same minimalist approach to graphics but also gained a two-player mode. Two people at once could thrill to the awesome flickery graphics with a split-screen format. The trouble was that all the other bikes disappeared and the game lost what remained of its playability.

Meanwhile, at Commodore, things were going from strength to strength.



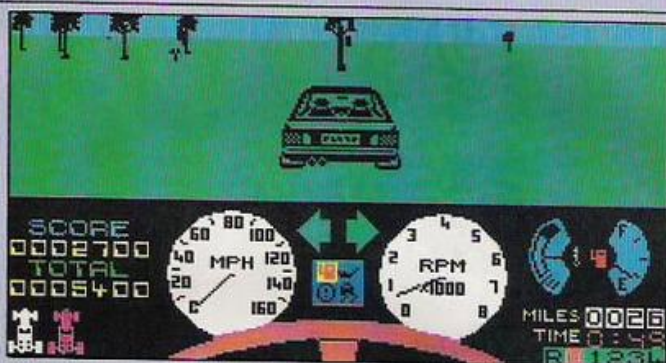
Obviously our American cousins have taken to burning rubber on their machines. Epyx, possibly the best and definitely one of the most consistent software houses, issued *Pit Stop* and followed it up with *Pit Stop 2*. They are both good little racing games which use the Commodore sound and graphics to good effect. A somewhat different side of racing was displayed in John Petty's *Stock Racing*. It is a very tough little game. There are 20 opposition cars, with different characteristics. Some just get on with the racing; others will just block your way at all times. The player has to make pit-stops whenever he runs low on fuel. The player can use turbo boost to pass particularly awkward opposition but this is rather thirsty on fuel.

Another variation on the argy bargy theme is *Scalextric* from Leisure Genius. It is available on the Commodore and will soon be around on the Spectrum. There are circuits included with the game from round the world and you can construct your own in the time-honoured *Scalextric* fashion. The game features a split screen view, with the player driving against another player or the computer. If the track is designed with plenty of chicanes and sharp corners it can be a good little game.

Digital skidding

Those with Amstrad computers might feel out of all this macho machine-mangling. Those with a driving ambition have limited choice. *3D Grand Prix* is one of the few efforts in this field. It has good graphics, passable sound, gears, corners and wing mirrors, but somehow the whole thing does not hang together. Skidding is somewhat digital. There you are zipping round a corner and suddenly the sound effect changes and you know you are headed for the armco.

Following the success of *Pole Position*, the next refugee from the arcades has received rave reviews. *Super Cycle*, once more from Epyx, is an adaptation of the arcade hit



Hang On. It is on the Commodore at the moment but Spectrum and Amstrad versions are on the way. It is short on realism but long on excitement. The bike accelerates through three gears and the track ahead is full of tight bends, obstacles, and other motor bikes. There are 12 courses, each strewn with tougher obstacles than the previous one. The idea is to get through the course in the time limit. Any time remaining is divided according to the level on which the game is being played.

Not really a riveting scenario but the sheer speed at which everything happens is really exciting.

Saving the heavyweights until last, we reach the simulators. Foremost among them is *Revs*. It is, in my view, one of the best programs available. The Acorn version portrays a Formula Three racing car going around Silverstone. The Commodore version has several other tracks as well. The car has five gears and reverse. To start, just slip the clutch, rev the

engine and then let out the clutch. From the cockpit view, the front of the car rears as the acceleration bites. Trying all the time to keep the engine revs in the power band, the player zips through the gears. The steering system takes plenty of getting used to. The left and right keys change the amount of steering lock, so if you keep pressing left, you turn the wheel more and more. Using the space bar as well amplifies the movement.

Hot opposition

A true racing car is steered by the driver selecting the lock he requires and holding it as he goes through the corner. Experienced Revs men learn to do it by using the spacebar and then, when the required turn is reached, holding down both direction keys. Then, when the direction keys are released, the steering centres.

There are all kinds of other goodies such as adjusting the angle of the wings for better handling and road-holding; real skids, which experienced drivers can get out of; and a contest mode, where several

players take turns and their performances are compared by the computer; the opposition, especially on pro level, is really hot. It is about as close as a computer game can get to the real thing.

The other simulator is *TT Racer* from Digital Integration. It attempts to do for bikes what *Revs* does for cars and gets close. The game portrays the four classes of Grand Prix bike and takes the player through a full Grand Prix season for that particular class. The spectacular thing you notice about the game is that when you lean into corners, the screen tilts at a fairly alarming angle.

The game plays very fast, in real-time, and again seeks to



simulate the performance of the machine. Using the gears, throttle and brakes is important to keep the bike in the power band. Steering is achieved by moving the stick to lean the bike. When the bike is almost vertical, the steering is self-centring.

The performance of the bike can be altered to suit the track by altering the gear ratios, the steering and the tyre grip. A multi-player mode is included with the Spectrum, whereby up to eight players can compete using the Sinclair network supplied with Interface One. An Amstrad version is on the way but it is not clear if it will feature networking. Despite four skill levels, the game suffers from being too easy for the bike aficionado and probably too difficult for the non-initiate. Even on the highest level, there is little encouragement to corner correctly – the program just allows the player to run around the track edge. A near miss.



OFF THE HOOK

CHARITY COMPILATION TAPE

ALL PROCEEDS GO TO THE
PRINCE'S TRUST

LIGHTNING DISTRIBUTION LTD
841 HARROW ROAD
LONDON NW10

48K SPECTRUM

PITFALL II	ACTIVISION
PSYTRON	BEYOND
FALL GUY	ELITE
AD ASTRA	GARGOYLE
SAM STOAT SAFEBREAKER	GREMLIN GRAPHICS
SPLAT	INCENTIVE
MUGSY	MELBOURNE HOUSE
KONG STRIKES BACK	OCEAN
CHEQUERED FLAG	PSION
BLUE MAX	U.S. GOLD

COMMODORE 64

PITFALL II	ACTIVISION
SPACE PILOT 2	ANIROG
PSYTRON	BEYOND
FALL GUY	ELITE
DEMONS OF TOPAZ	FIREBIRD
SHEEP IN SPACE	LLAMASOFT
KONG STRIKES BACK	OCEAN
BLACK THUNDER	QUICKSILVA
DEATH STAR INTERCEPTOR	SYSTEM 3
TALLADEGA	U.S. GOLD

COULD THIS BE YOUR PROGRAM?

ARCADE
SIMULATION
STRATEGY
ADVENTURE



SPACE
SPORTS
WAR
ACTION

Is your program good enough to fill this spot?

Will your game be the next No. 1 hit?

Are you looking for **top** royalties?

Are you writing for leading computers such as Commodore 64/128, C16/Plus-4, BBC/Electron, Atari, Amstrad, MSX, Spectrum or any other 6502/Z80 Micro.

Answer YES to any of these questions and we would like to hear from you. Send your program tape or disc, together with full instructions for fast evaluation. Be sure to state your computer type, memory, peripherals used and your name, address and telephone number.



34 BOURTON ROAD GLOUCESTER GL4 0LE
Tel (0452) 412572

Too Busy Earning a Living To Make Any Real Money?

You think you've got problems?

Well, I remember when a bank turned me down for a \$200 loan. Now I lend money to the bank - Certificates of Deposit at \$100,000 a crack.

I remember the day a car dealer got a little nervous because I was a couple of months behind in my payments - and repossessed my car. Now I own a Rolls Royce. I paid \$43,000 for it - cash.

I remember the day my wife phoned me, crying, because the landlord had shown up at the house, demanding his rent - and we didn't have the money to pay it.

Now we own five homes. Two are on the oceanfront in California (I use one as my office). One is a lakefront "cabin" in Washington (that's where we spend the whole summer - loading, fishing, swimming, and sailing). One is a condominium on a sunny beach in Mexico. And one is snuggled right on the best beach of the best island in Hawaii - Maui.

Right now I could sell all this property, pay off the mortgages - and - without touching any of my other investments - walk away with over \$750,000 in cash. But I don't want to sell, because I don't think of my homes as "investments." I've got other real estate - and stocks, bonds, and cash in the bank - for that.

I remember when I lost my job. Because I was head over heels in debt, my lawyer told me the only thing I could do was declare bankruptcy. He was wrong. I paid off every dime.

Now, I have a million dollar line of credit; but I still don't have a job. Instead, I get up every weekday morning and decide whether I want to go to work or not. Sometimes I do - for 5 or 6 hours. But about half the time, I decide to read, go for a walk, sail my boat, swim, or ride my bike.

I know what it's like to be broke. And I know what it's like to have everything you want. And I know that you - like me - can decide which one it's going to be. It's really as easy as that. That's why I call it "The Lazy Man's Way to Riches."

So I'm going to ask you to send me

something I don't need: money. £10 to be exact. Why? Because I want you to pay attention. And I figure that if you've got £10 invested, you'll look over what I send you and decide whether to send it back... or keep it. And I don't want you to keep it unless you agree that it's worth at least a hundred times what you invested.

Is the material "worth" £10? No - if you think of it as paper and ink. But that's not what I'm selling. What I am selling is information. More information than I give when I'm paid \$1000 as a guest speaker. More information than I give in a one-hour consultation for \$300.

But you're really not risking anything. Because I won't cash your cheque or money order for 31 days after I've sent you my material. That's the deal. Return it in 31 days - and I'll send back your cheque or postal order - uncashed.

How do you know I'll do it? Well, if you really want to be on the safe side, postdate your cheque for a month from today - plus 2 additional weeks. That'll give you plenty of time to receive it, look it over, try it out.

I know what your thinking: "He got rich telling people how to get rich." The truth is - and this is very important - the year before I shared "The Lazy Man's Way to Riches," my income was \$216,646. And what I'll send you tells just how I made that kind of money... working a few hours a day... about 8 months out of the year.

It doesn't require "education." I'm a high school graduate.

It doesn't require "capital." Remember I was up to my neck in debt when I started.

It doesn't require "luck." I've had more than my share. But I'm not promising you that you'll make as much money as I have. And you may do better. I personally know one man who used these principles, worked hard, and made 11 million dollars in 8 years. But money isn't everything.

It doesn't require "talent." Just enough brains to know what to look for. And I'll tell you that.

It doesn't require "youth." One woman I worked with is over 70. She's travelled the world over, making all the money she needs, doing only what I taught her.

It doesn't require "experience." A widow in Chicago has been averaging \$25,000 a year for the past 5 years, using my methods.

What does it require? Belief. Enough to take a chance. Enough to absorb what I'll send you. Enough to put the principles into action. If you do just that - nothing more, nothing less - the results will be hard to believe. Remember - I guarantee it.

You don't have to give up your job. But you may soon be making so much money that you'll be able to. Once again - I guarantee it.

I know you're sceptical. Well, here are some comments from other people. (Initials have been used to protect the writer's privacy. The originals are in my files.) I'm sure that, like you, these people didn't believe me either when they clipped the coupon. Guess they figured that, since I wasn't going to deposit their cheques for at least 31 days, they had nothing to lose.

They were right. And here's what they gained:

"Thanks to your method I'm a half millionaire"

"Thanks to your method I grossed about \$500,000. Would you believe last year at this time I was a slave working for peanuts?"

G.C., Toronto, Canada.

"\$24,000 in 45 days"

"...received \$24,000.00 in the mail the last 45 days.

"Thanks again."

Mr. E.G.N., Matewan, W.VA

"Made enough to retire at 41"

"If it hadn't happened to me, I wouldn't have believed it... A few years ago, I had nothing to lose. I was unemployed and broke."

"Now, thanks to you and the 'Lazy Man's' program, I have made enough money (at age 41) to retire in style."

R.A., Huntingdon Beach, Calif.

"There's no stopping me"

"Since I've got your (Lazy Man's Way to Riches) in July, I've started 4 companies... there's no stopping me and I'm so high I need chains to keep me on the ground."

M.T., Portland, OR

"Wow, it does work!"

"Oddly enough, I purchased Lazy Man's Way to Riches some six months ago, or so, read it... and really did nothing about it. Then, about three weeks ago, when I was really getting desperate about my financial situation, I remembered it, re-read it, studied it, and this time, put it to work and WOW, it does work! Doesn't take much time, either... I guess some of us just have to be at a severe point of desperation before we overcome the ultimate laziness, procrastination."

Mr. J.K., Anaheim, CA

"Made \$70,000"

"A \$70,000 thanks to you for writing The Lazy Man's Way to Riches. That's how much I've made..."

"I use this extra income for all of the good things in life, exotic vacations, classic automobiles, etc. Soon I hope to make enough to quit my regular job and devote full time to making money the easy way..."

Mr. D.R., Newport Beach, CA

"\$260,000 in eleven months"

"Two years ago, I mailed you ten dollars in sheer desperation for a better life... One year ago, just out of the blue sky, a man called and offered me a partnership... I grossed over \$260,000 cash business in eleven months. You are a God sent miracle to me."

B.F., Pascagoula, Miss.

"Steadily upward ever since"

"I ordered Lazy Man's Way to Riches in June... by September, my career was launched and has gone steadily upward ever since."

Mrs. B.A., Walnut Creek, CA

"\$7,000 in five days"

"Last Monday I used what I learned on page 83 to make \$7,000. It took me all week to do it, but that's not bad for five day's work."

M.D., Topeka, Kansas

What I'm saying is probably contrary to what you've heard from your friends, your family, your teachers, and maybe everyone else you know.

I can only ask you one question. How many of them are millionaires?

So it's up to you.

A month from today, you can be nothing more than 30 days older - or you can be on your way to getting rich. You decide.

The wisest man I ever knew told me something I never forgot: "Most people are too busy earning a living to make any money."

Don't take as long as I did to find out he was right.

I'll prove it to you, if you'll send in the coupon to my publisher now. I'm not asking you to "believe" me. Just try it. If I'm wrong, all you've lost is a couple of minutes and a postage stamp. But what if I'm right?

Some have called it a Miracle. Some have called it Magic. You'll call it "The Secret of the Ages."

As for me, I thank God that before he died Millionaire Joe Karbo left, for all to share, the secret of "The Lazy Man's Way to Riches." The above story, which is in his own words, is his gift to you.

Sworn Statement:

"On the basis of my professional relationship as his accountant, I certify that Mr. Karbo's net worth is more than one million dollars."

Stuart A. Cogan

PROOF!

Don't take my word for it. These are excerpts from articles in newspapers and magazines:

Time:

He only works half the year in his stunning office on California's Sunset Beach, and even when he's there he puts in short hours... In other words, Joe Karbo, 48, is the prototype for... "The Lazy Man's Way to Riches."

Boston Herald-American:

The book has drawn hundreds of letters from persons who have profited by it...

Los Angeles Herald-Examiner:

An unpretentious millionaire, Joe Karbo of Huntington Harbor is a vibrant, living testimonial to his intellectual, pragmatic conviction.

Money Making Opportunities:

Maybe Joe Karbo has the secret. Don't you think you owe it to yourself to find out what it is all about?... I just finished it - and I'm off on a vacation myself. Get the idea?

Chartsearch Ltd.,
11 Blomfield Street,
London EC2M 7AY

You may be full of beans, but what have I got to lose? Send me the Lazy Man's Way to Riches. But don't deposit my cheque or postal order for at least 31 days after it's in the mail. If I return your material - for any reason - within that time, return my uncashed cheque or postal order to me.

- ☐ On that basis, here's my £10
☐ Please charge my credit card.

A/C Number

(Access/Visa/Diners/Amex)

Name

Address

Code

Signed

Date

(Please Print Clearly)

YC 0387

Please allow
14-21 days
for delivery

REGISTERED IN ENGLAND No. 1340222



B B C

SOFTWARE EXCHANGE



CBM 03

Fruit Machine

Program type: Simulation
Author: Shaun Hewitt

A fast-scrolling screen produces a realistic simulation of the one-arm bandit machine. You are also able to nudge, shuffle and gamble all from the comfort of your home.

Haywire

Program type: Arcade/logic
Author: J. P. Lord

Faced with a grid of connections, you must swap blocks in the grid to form new routes. In doing so you must allow a small bubble car, travelling along those routes, to reach a particular destination. In the car are explosive experts on their way to defuse a bomb. If you do not reach the target in time, the bomb explodes.



CBM 04

Kung-Fu

Program type: Arcade
Author: David Chung

This martial arts program features all the aspects you would expect, such as kicks, punches and jumps. You are Lewis Lee, who has just completed his masters' examination but, unknown to you, your superiors have planned one final surprise test.

Bird of Prey

Program type: Arcade
Author: N. Sheard

You play the part of an animated golden eagle and at each stage you must collect two items of prey to feed the young in the nest. There are 20 stages to be completed before the young eventually leave the nest and, when hunting, care must be taken not to fly into trees and rocks littered about the landscape.



CBM 05

Address Book

Program type: Database
Author: Brian Hobson

This is a program for people not pretentious enough to own a Filofax or wealthy enough to own an Organiser. You can load a file of previously-saved addresses, add new addresses or printout. The program also enables you to search your files with a wild card which will allow addresses with a certain letter or number to be printed-out.

Pandomonium

Program type: Arcade adventure
Author: Peter Scott

Set in a strange land filled with springs, platforms, deadly lasers and teleport stations, you have to kill the nasty monster which reigns supreme. The only way to do it is to travel round the 75 screens collecting the various parts of a powerful bomb with which you can blast the nasty to pieces. This action-packed program also features continuous background music, 16 types of animated alien and a high-score table.

ORDER FORM

To increase the efficiency of processing your orders, please complete both the panels on the order form below, with the same information in each. Please make cheques payable to Focus Magazines.

Please insert reference number(s) of tape(s) required.

Ref. No(s)

Send order to Software Exchange, 79-80 Petty France,
London SW1H 9ED - please allow 28 days for delivery.

I enclose a cheque/Postal Order value £
(please remember to add 40p p&p per tape).

NAME

ADDRESS

Please insert reference number(s) of tape(s) required.

Ref. No(s)

Send order to Software Exchange, 79-80 Petty France,
London SW1H 9ED - please allow 28 days for delivery.

I enclose a cheque/Postal Order value £
(please remember to add 40p p&p per tape).

NAME

ADDRESS

Infocom special

Roger Garret's Adventureline

The first few weeks after Christmas are not easy for an adventure reviewer, mainly because software houses always try to release any new game for the Christmas rush, which is understandable, but it leaves January and February devoid of new material.

The only consolation for the unhappy state of events is that it allows one to write about one's special preferences and lean very much towards Infocom adventures, so this month I offer a kind of Infocom potpourri.

My first indication that such brilliant adventures existed was from reading the late lamented *Micro Adventurer*. Going through the problem page I would read such questions as "How do I cross the river?" or "How do I open the egg?" in *Zork I*. I never gave the games much thought as at that time I was busy with other games like *The Hobbit*, *Twin Kingdom Valley* and the Brian Howarth *Mysterious Adventures* series, plus anything else I could lay my hands on and because the Infocom games were disc only and I had only a CBM64 without disc drive I continued to devote myself to cassette-based games.

It was not until an article appeared in *MAD* extolling the brilliance of these games that I decided to buy a disc drive and find for myself what all the noise was about. Little did I know that trying to buy an Infocom game in the U.K. was like trying to find gold under Wigan pier. Nobody stocked Infocom games. Finally I managed to track down two, *Starcross* and *Suspended*, so to say my initiation into the world of Infocom was somewhat mind-boggling is to say the least.

To me an adventure was an adventure. All this standard level business meant nothing to me. I had solved numerous adventures so, apart from more text why should Infocom be any different? Imagine me with a new disc drive raring to go, pen and paper in front of me, and then the magic words appearing on the screen of *Starcross*, an interactive fiction from Infocom, typing-in my first commands and then waiting while the disc drive whirled away.

Who cares about a slow drive, especially when I was about to solve an Infocom

game? I think I was kidding myself, I can honestly say *Starcross* drove me bonkers. How my micro did not end up on the lawn is still a mystery. It was no ordinary adventure – it was a figment of a twisted mind sent to destroy me forever. Would I ever complete it?

Climbing Everest

After hours and hours of frustrating enjoyment I did and what an amazing feeling it is. I felt as if I had just climbed Everest and from that day I still derive the same sense of satisfaction on completing an Infocom adventure.

To understand how Infocom came into existence we must go as far back as 1960,

enabled interaction among virtually all computers capable of logging into the net or by knowing a certain telephone number and, because of the lack of security features, budding hackers from all parts of the country soon discovered a wonderful playground. Also around 1970 a language called Muddle – later MDL – was developed as a successor to Lisp. It never fully replaced Lisp but it developed a loyal band of followers, including the Dynamic Modelling Group. DM was responsible for some famous games – only in the States – among which was a maze game in which various players wandered round a maze shooting each other.

Each user's screen showed the view of the maze which his computerised alter-



when Digital Equipment Corporation created the PDP-10, a medium-sized computer. The 10 became popular at many research stations and a great deal of software was written for it. At the Massachusetts Institute of Technology artificial intelligence laboratory an operating system called Incompatible Time-Sharing System was written for the 10. ITS was designed to make software development easy and the designers assumed that it would have a small, knowledgeable, friendly group of users, so they included no security features.

In 1970, ARPAnet was invented, which

ego saw updated in real-time. One of the chief developers of the game was Dave Lebling. Another well-played/hacked game was *Trivia*, which was written – second version – by Marc Blank.

Doing it better

In 1977 *Adventure* swept the ARPAnet. Willie Crowther was the original author but Don Woods expanded the game and released it on an unsuspecting network. When *Adventure* arrived at MIT the reaction was typical. Everyone spent a good deal of time doing nothing except trying to

solve the game. It is estimated that Adventure set the entire computer industry back two weeks. Naturally the true lunatics began to think of how they could do it better. One was Bruce Daniels, who was the first person to get the last point, even though he had to examine the game with a machine language debugger as there was no other way to do it.

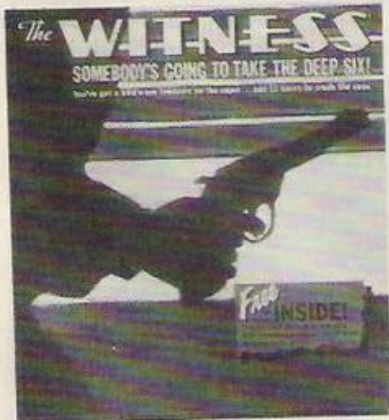
By that time another hacker had joined forces with Lebling and company, Tim Anderson, and after Lebling had devised and written a command parser, Anderson, Blank and Daniels wrote a real adventure and the early form of Zork began to take shape.

By that time Trivia was old-hat, so the multitude of hackers sat waiting for some-



thing new. Then Zork arrived on the network and people went bananas over it. Extras were added to the game in the next few months. Lebling invented the now famous *Grues* and Daniels infested the early Zork with them.

The first major change addition was in June, 1977. It was the river section devised and implemented by Blank and remains



unchanged to this day. Further problems and locations were added on such as the volcano and mine sections.

More scenarios and problems were added until the game as we know it was finished. Until then nobody had thought of it being a commercial proposition. The

programmers were content with what they thought was just a hobby until 1979.

Zork was one great big computer game, about one megabyte in size - as large as it could be and still fit in its original home, a DECsystem-10. Blank and Lebling designed and wrote the program with the help of Daniels and Anderson. All four had worked together in the research dept of MIT along with other computer buffs but the team was slowly disappearing into the real world. That created a problem. What could the group work on together and to whom could they sell it?

Discussions had been going on from 1976 about the potential of the minicomputer market from a hardware and software point of view. The group was ignoring the vast potential of the micro market, not only from lack of experience but also from a serious concern about software piracy.

Chinese meetings

Enter Joel Berez. He had graduated from MIT and was working in his family business in Pittsburgh. Blank had also taken a medical residency in Pittsburgh and so naturally the two got together for various outings, where invariably the talk would turn to the good old days at MIT. One reason for the good old days was Zork. The idea of taking Zork to more people evolved from their weekly meetings in the local Chinese restaurant. More people were buying micros, like the TRS-Model 1 or the Apple II, but those computers were too small to run Zork - or were they?

In those days when PCs ran to about 16K there was no way Zork would fit unless some form of specially-written program was written. Finally they concluded that, by inventing a programming system specifically for Zork, they could fit about half of it into a computer with 32K and one floppy disc drive.

Meanwhile, the group at MIT was forming a corporation, choosing Infocom as the name least offensive to everyone, and searching for a product to start generating income for the company. There were ideas such as systems for keeping track of documents, handling electronic correspondence and processing text but, until Berez added Zork to the list, nobody gave adventures a second thought.

Z-machine code

There was still the problem of compressing the text. Berez and Blank worked that out to create the programming tools for their design and by the late autumn of 1977 had succeeded in creating the Z-machine chip. The breakthrough had happened.

The key to their design was an imaginary chip called the Z-machine. The chip

would be able to run Zork, or at least part of it, if the program was coded in a special, very compact language. The design also called for each personal computer to have a program to interpret the special Z-machine language and make the computer act in the same way a real Z-machine computer would.

It involved creating another language called ZIL - Zork Implementation Language. Blank built a two-stage translator program to translate a ZIL program into the Z-machine language. He also built a ZIP - Z-Machine Interpreter Program - so that a DECsystem 20 could emulate the Z-machine.

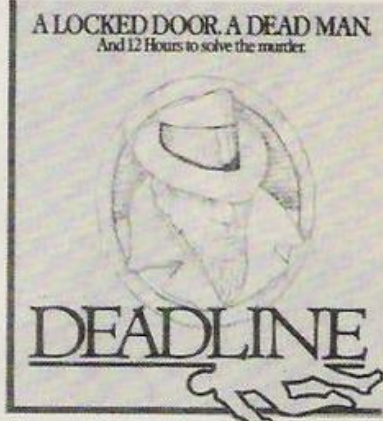
The other problem was to cut Zork in half. Lebling examined his overall map of the Zork kingdom and, eventually, by drawing certain boundaries, found about 100 locations which included the above-ground scenario and the numerous locations around the round room. The rest would be saved for another day.

After numerous problems of copyright and distribution, Zork 1 hit the streets. The rest is history.

In some of the numerous letters I receive from fellow adventurers one question seems to be asked more often than most, apart from the questions about games, and that is what is my favourite Infocom adventure? Each adventure has always delighted me because each game contains certain novel characters which leave a warm feeling.

Turtle risked all

For instance, who has played *Planetfall* and not been drawn towards Floyd, that silly little robot whose one aim was to



please you? I will bet many of you said "Oh" when he died, only to smile when he returns at the end. Remember the mailbox in *Wishbringer* who bravely gave his life in your defence, or the Turtle from *Enchanter*, who risked all to fetch the scroll back for you and how many times have we muttered "Oh no, not him again"

when, on nearly completing a task, the Wizard of Froboz rears his head and casts a spell on you?

So making a choice from the Infocom range is difficult but I have made two choices. The first is also the first in the Enchanter series. Called Enchanter, it introduced spell-casting into adventures, originally to be released as *Zork III*, but because of the difference in character you play, a new trilogy was planned and called the Enchanter trilogy. *Sorcerer* followed not long after with the final part,



Spellbraker, entering our lives in the summer of 1986.

Enchanter produced a change in the type of character we were used to playing – the greedy adventurer whose sole intent was to collect as many treasures as possible, killing or maiming anybody or anything standing in our path. In this game

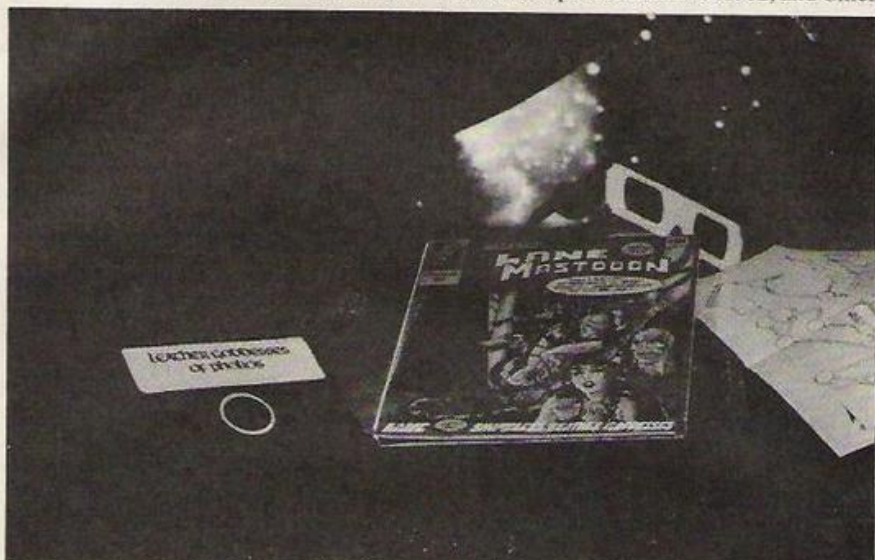
if the game had a mind of its own and, once having started, you were instantly enmeshed in the subtle gameplay.

Enchanter

The land of the Enchanters is a peaceful, pleasant place to live, looked after by the wise Wizards who rule with wisdom and

members were sent to defeat Krill but his magic was so powerful that none of the Enchanters could defeat him. It would appear that Krill could read minds and if there was the slightest threat an invisible barrier would surround the castle.

The Enchanters thought long and hard about the problem until Belboz, and Chief



compassion. The Great Underground Empire is now only a memory. The splendour created by Lord Dimwit Flathead has disappeared slowly into the mists of time. Only ruins now stand where once mighty Aqueducts and magnificent palaces stood.

Peace reigned until one day when from

Enchanter, had an idea so simple that Brains – reputedly the brainiest of the Enchanters – cut off his beard, left the guild and took up yak farming for not having thought of the idea. Rumour has it he is still there to this day.

Belboz's idea was to send a novice Enchanter to defeat Krill because, to put it in Belboz's words, "Anybody with the brains of a drelb, later to be known as a Dodo, should be able to approach the castle without posing a threat to Krill." With those words of encouragement echoing in your ears you set forth on your quest.

Enchanter contains some of author Dave Lebling's most endearing charac-



the only protection we had was our trusty spellbook. Enchanter introduced fans to new words like Rezrov, Gnusto, Gaspar and other equally bizarre names but, more important, spell-casting added a new dimension to the adventure. It seemed as

the mysterious forbidden lands of the freezing north an evil sorcerer called Krill went to dwell in an old deserted castle not far from Froboz. News of Krill and his unholy sacrificial rites soon reached the ears of the Enchanters' Guild. Various

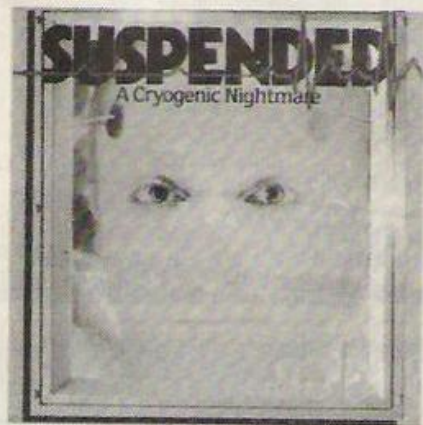


ters, such as the Turtle who, if you talk to him, will follow you round and perform a most astounding feat which, believe it or not, requires dexterity and speed – none of your common or garden type turtle in

this game. Another highlight is when you meet the lone adventurer, a true parody with his drawn eyes looking furtively this way and that, lantern held high, rusty sword dangling from tattered scabbard, some long lost treasure gripped tightly in a grimy hand, willing to do whatever you ask in return for a reward.

Before your eventual showdown with Krill, Lebling will amaze you with his masterful way of introducing problems, delight you with the text descriptions, and frustrate you at the pure logic behind the problems.

My first choice was relatively easy, as Enchanter remains my favourite but making my next choice was more difficult. The Zork Trilogy stands out in my mind, as do



Planetfall and Starcross, but I feel that *Wishbringer*, written by Brian Moriarty, must take second place, mainly because of the freshness it brought into adventuring. It is not a particularly difficult adventure with relatively few locations but Moriarty's brand of humour and writing ability set it apart from the more predictable Infocom style – if you can call any work by Infocom predictable.

Taking a rather simple idea of returning a cat to its owner, Moriarty sets about weaving an intricate tale where one minute you are a normal person trying to deliver a letter and then it is tighten-your-belt time and off we go into Moriarty's fantasy world, where talking Boots tramp around the streets, poodles turn into large ferocious dogs, platypus live on their own island ruled by King Platypus and a mailbox comes alive, acts like a cat, and dies bravely defending you from another male-eating mailbox amid shouts of "Poor little devil" and "Oh what a shame, I liked him." Such is the involvement when playing the games that one feels as if one is the person involved in all the dilemmas.

Wishbringer

Life is not very exciting for a lowly postal clerk living in the old town of Festeron. In fact, the most exciting time is watching the traffic lights change – when they are work-

ing – which is usually every third week in December. This day seems different. Not being able to understand why, you trudge to your place of employment there to be

INFOCOM HINTS

ZORK I

Wave the Sceptre at the Falls.
Pray at the Altar with the Coffin.

ZORK II

A Newspaper helps fill a Balloon.
An angry Dragon will always follow you.

ZORK III

Use compassion when encountering the Hooded figure. Touch the Table to travel.

STARCROSS

To enter the spacecraft you must study the bumps and remember astronomy.

TRINITY

The Pram and Umbrella make travelling easier. Give the Origami to the little girl as a means of transport. The giant Venus Flytrap smells like Honey and what do bees like?

MOONMIST

To get rid of an unwelcome guest make sure you have the aerosol. To enter the locked gates is just a matter of seeing eye to eye with something.

WISHBRINGER

Give a dog a bone and later say "Alexis Heel". If you want to surprise a Toll Keeper give him the can. Remember the note Miss Voll gave you? Use it when in a trying situation – or is that tying?

greeted by the crusty old postmaster. The Boss wants you to deliver a letter to The Olde Magick Shop on the hill just outside the town limits. As you leave the post office the Boss issues one last command – "Make sure you deliver the letter before five-'o'clock or woe betide you." That is just the kind of joyful message you need to help you on your way.

No ordinary shop

Further along the road Miss Voss entrusts you with a note for your boss while her pet poodle distrusts you and to show his distrust sinks a pair of needle-sharp teeth into your right ankle. After detaching said ankle from said jaws you eventually make it to the Magick shop. Moriarty's skill at writing grips you instantly as you open the door and walk inside, because this is no ordinary shop.

Scattered around are various masks, herbs and other brick-a-bat but what hits you most is the claustrophobic atmosphere which prevails. After delivering the letter you turn to leave when suddenly you lose all sense of time and reason. The next thing you remember is awakening outside the shop with the words "find my cat" ringing in your mind and that is when your heartaches begin.

An evil transformation

Everything has changed. What was once a boring little town is now an evil place. Nightly patrols by the Boot Patrol are to be avoided at all cost but if you have done an act of kindness being thrown into the briny by the boot patrol is not too bad. As in all Infocom games there are plenty of problems to overcome before the conclusion, such as rescuing a princess, getting past a ferocious dog, escaping from the cells, plus other assorted brain-teasers, but one thing for sure is that you will enjoy yourself immensely before it is over.

All the Infocom adventures are now being released by Activision, which bought Infocom last summer, and are available for the CBM64/128/Amiga.



AtariXL/XT/ST, Amstrad CPC and Apple.

The latest, *Hollywood Hijinx*, was scheduled for February release. Written by Dave Anderson it is a kind of spoof about the good old Hollywood 'B' movies. Set inside an old-style Malibu movie producer's home, your task is to find 10 treasures a la Zork. Only then can you inherit this vast estate. The catch is you must find all the treasures in one night or lose everything.

To add to the fun the character you control is a special effects creature from a Buddy Burbank sci-fi film. The package contains a gossip-filled Tinseltown magazine, an autographed photo of your Uncle Buddy, a letter from Aunt Hidegarde and a lucky palm tree swizzle stick. It sounds like just the thing to occupy a few pleasant hours.

MAKE YOUR INTERESTS PAY!!

Train at home for one of these Career Opportunities

More than 8 million students throughout the world have found it worth their while! An ICS home-study course can help you get a better job, make more money and have more fun out of life! ICS has over 90 years experience in home-study courses and is the largest correspondence school in the world. You learn at your own pace, when and where you want under the guidance of expert 'personal' tutors. Find out how we can help YOU. Post or phone today for your **FREE INFORMATION PACK** on the course of your choice.

Introduction to Computer Programming	Programming in BASIC
Programming in COBOL	Electronics
Electrical Engineering	Electronic Engineering
Elec. Contracting/Installation	Radio, Audio and TV Servicing
GCE over 40 'O' & 'A' level subjects	

Course of Interest

Name

Address

P. Code

ICS

International Correspondence Schools, Dept. ETS37
312/314 High St., Sutton, Surrey SM1 1PR.
Tel: 01-643 9568 or 041-221 2926 (24 hours)

COMPUTEC

MUSIC UK - (0902) 405100

HARDWARE

Prophet 5 to MIDI interface £100 inc VAT
Chroma to MIDI interface £299 inc VAT
DX Voice Vault
Decillionix The Box
DX7 ROMs from Skyslip and Rittor
Shadow GTM6 guitar to MIDI

SOFTWARE

Steinberg Syntech Passport C.Lab Joreth
Microvoz Treesoft DHCP Lemi MIDI soft
XRI Systems Icon Cheetah Roland Etc.
Roland JX8P Editor for the Commodore
Prophet 2000 Editor for the Commodore

Overseas Customers Welcome
UK Send Cheque or PO for £1. Overseas send £2
International Money Order, for facts pack and price list.
Refund on purchase
* The only music-software specialists in the country *

24 HIGH ST., BROCKMOOR, BRIERLEY HILL,
WEST MIDLANDS DY5 3JA

THE VOLEX TELETEXT-TELESOFTWARE ADAPTOR

FOR USE WITH SPECTRUM, BBC & AMSTRAD MODELS

FREE COMPUTER PROGRAMS INSTANT SPORTS RESULTS CONSTANT TV. UPDATE
A WORLD OF INFORMATION AT YOUR FINGERS

TELETEXT

Extra information available day or night whilst television transmitters are on air and without any charge can now be enjoyed without the need of having a special Teletext TV. set. All you need is to plug in your VOLEX ADAPTOR to receive 4-Tel from Channel 4, CEEFAX or ORACLE services.

TELESOFTWARE

Telesoftware is the name for computer programs which are broadcast on Teletext. Thus they may be loaded OFF AIR into the appropriate micro computer instead of being loaded from say TAPE or DISC. Both Channel 4 and BBC are broadcasting Telesoftware, however there are the following limitations:-

- (a). Spectrum Adaptor:- All Teletext Channels but Channel 4 Telesoftware only.
- (b). BBC Adaptor:- All Teletext Channels but BBC Telesoftware only.
- (c). Amstrad Adaptor:- All Teletext Channels, Channel 4 Telesoftware programs and BBC Telesoftware data files including the Education Newsletter.

*Channel 4 is currently expanding its Telesoftware programs particularly CP/M based material.

Because of the special nature of Teletext these programs are frequently updated-So you will not see the same thing each time you run the program.

STORING PAGES

With the Volex Adaptor it is possible to send received pages to your printer or to disc or cassette for storage and later recovery.

EASY TO SET UP AND USE

A simple procedure tunes the Volex Adaptor to your local teletext channels. All loading of Telesoftware is via an index page which the Adaptor will automatically find and display for you. Absolutely no modification is necessary to TV. or Computer.

*User friendly-built in disc/tape and printer routines.

*Comprehensive User Guide included.

*2nd Processor Compatible. (BBC Version).

*Incorporates Custom gate array and Crystal controlled Data Slicer.

*Free Power Supply included.



Simply write out your order and post to
VOLEX ELECTRONICS, STOWELL TECHNICAL PARK,
ECCLES NEW ROAD, SALFORD, M5 2XH. TEL. 061-736 5822.

I enclose cheque/P.O. payable to VOLEX ELECTRONICS
OR charge my ACCESS/BARCLAYCARD/VISA number:

NAME

ADDRESS

- ☐ £64.99 (SPECTRUM) 16 - 48K
- ☐ £89.99 (BBC) Model B
- ☐ £79.99 (AMSTRAD) 464, 664, 6128

VOLEX ELECTRONICS
A DIVISION OF VOLEX GROUP p.l.c.

DOSOFT'S BACKUP BREAKTHROUGH SHATTERS PRICES AS WELL

FIRST TAPE, THEN DISK, NOW CARTRIDGE!



NEW! NEW! Action Replay Cartridge 2

This is the one you have been waiting for! Designed and produced by Datel, using the programming skill of DoSoft, the new Action Replay Cartridge Mark Two is really two cartridges in one. Completely self-contained, it gives you almost total back-up capability, and offers disk drive owners a superb fast loader—all independent of computer memory. Just see what it can do for you!

- Freezes the action on your computer at the touch of a button
 - Works with both Disk and Tape
 - Backups reload at Turbo speed without cartridge
 - Built in reset switch
 - No screen blanking during load
 - Handles programs which load in several stages
 - Backs up Multi-Stage programs to Disk
 - Special compacting techniques save Disk space
 - Three or more programs per disk side
 - Unique Code Inspector allows you to look at whole memory, including program, registers, etc.
 - Saves high-res screen pictures—you select format
 - No other software necessary • No user knowledge
- We have tested literally hundreds of games—including the latest titles—and have yet to find one which will not transfer. We think that Action Replay Mark Two has more features at a better price than any other cartridge. See for yourself!

£24.99

Action Replay Mark Two cartridge also available from Datel Electronics.

MegaTransfer Disk V 4.0

The one the others try to follow! MegaTransfer 4.0 is vastly extended over previous editions and will back up programs that no other utility can handle. And now it's at a price you can't afford to miss.

- Backs up all major Turbo Systems
- General purpose routines for Nova, Burner, Visaloid, Flash, early and recent Pavloaders, and more
- A collection of specific routines for individually protected programs, including Multi-Stage games
- Transfers programs which won't normally load with Disk Drive present
- Economical use of Disk space
- Program Identifier
- Diskus 1.2 makes backup of ordinary programs so simple
- Improved Disk TurboLoader fastloads your regular software. This just has to be the most capable, best value back-up software on disk for only

£12.50

The DoSoft Collection

A special offer comprising MegaTransfer, MegaUtility, MegaTape and Prosprite spirit editor/library on one disk (usually £32.50) together with 10 FREE Disks and Storage Box (worth £11.95) for our bargain price of

£24.99

How's that for value! **MONEYSAVING OFFER!**

MegaTape SuperValue

So simple to operate, our famous Tape-to-Tape Utility for one Datasette requires no additional hardware. MegaTape also features DoSoft's RBS Plus Turboape converter.

- No user knowledge required
- Backs up major Turbo Systems
- Vast collection of specific routines to handle most TurboLoader games
- Often increases loading speed
- VisalScreen Striped TurboLoader
- RBS Plus converts ordinary programs to load at SEVEN times normal rate
- A must for heavy tape users it is a real bargain

£7.50

MegaUtility Disk V4.0

Lots of really useful programs, designed to make your programming life easier

- Programmer's TurboDisk Utility: fast load, save, verify; display start and end addresses; easy DOS commands and more
- New AlphaLoad Disk TurboLoader: no menu required; much improved version
- Whole Disk Copier (THREE minutes)
- Turbo File Copy at five times normal speed
- Nibble Disk Copy backs up most protected disks in just five minutes
- Fast format
- Disk to Tape Plus
- Tremendous value at only

£12.50

SAVE! SAVE! SAVE!

3M Disks at Low Prices

Top class 3M branded Disks at low, low prices. • SS3DD 7440-0, suitable for all 5 1/4" drives • Complete with labels and write protect tabs • Tough Tyvac spun acrylic sleeves • FREE High Impact Plastic Storage Box (worth £2.75) Our inclusive price is just £11.95 per box of ten. No extras.

£11.95

No catches. This is the price you pay. UK POST FREE!

All DoSoft's programs are unprotected for your convenience. DoSoft customers will receive details of future updates and can buy new DoSoft Programs at advantageous prices.

Action Replay Mark Two carries a twelve month replacement guarantee against mechanical failure of the device.

How to get your DoSoftware
Please send cash/cheque/P.O. with order for fast despatch (S&A only for full details). Send off now to:
DoSoft (Dept CU), 2 Oakmoor Ave, Blackpool, FY2 0EE
UK Postage included. Europe add £0.75, or £2 if order includes Blank Disks. Overseas add £1.50 for Airmail, or £3.50 if order includes Blank Disks.

DoSoft
You'll Do it Better with DoSoft

RS232C Serial Interface



FREE!

Registration to MICROLINK in association with TELECOM GOLD and 1st quarter subscriptions to MICRONET 800 and PRESTEL.

Available from good Amstrad computer stockists. Or send coupon to Marketing Dept, Amstrad, Brentwood House, 169 King's Road, Brentwood, Essex. CM14 4EF.

AMSTRAD

Brentwood House, 169 King's Road, Brentwood Essex. CM14 4EF.
Tel. 0277 230222

*Micronet 800 is the trading style of Telemap Ltd. and British Telecom. Prestel and the Prestel symbol are trade marks of British Telecommunications.

V21/23 Modem



PACE

APPROVED for connection to international data systems specified in the instructions for use subject to the conditions set out therein.
S/S IND 5/2882/3/G/500472

Send coupon to: Marketing Dept. Amstrad Consumer Electronics Plc, Brentwood House, 169 Kings Road, Brentwood, Essex. CM14 4EF

Name

Address

Post code Tel. No.

RS232C INTERFACE ☐

V21/23 MODEM ☐

(PLEASE DO NOT SEND ANY MONEY WITH THIS COUPON)

YC/3

In the not-too-distant future, a householder shopping for a washing machine will be asking not only the usual questions regarding maximum spin speed and load but whether or not the machine features an RS232 or Centronics interface. Electrical equipment throughout a home will be linked to a central computer

On the subject of the physical - wire - link between units, householders would be reluctant to install a jungle of wires connecting the various units to be controlled. Not only would that look unattractive but it would probably be unreliable in operation.

Fortunately, though you may not realise it, every house

control unit, quaintly named Red Leader, which may be programmed by a home computer.

That unit may then issue command signals to units scattered throughout the home. Those units react to the control signal superimposed on the mains voltage which powers them. The units are plugged into standard mains

Exact protocols are likely to vary between manufacturers but, as the number of home control installations increases, there will almost certainly be pressure for an agreed standard form of information interchange.

Since technology of home control systems is with us, what benefits will the adoption of such systems bring to the

COMPUTERS IN CONTROL

which will be responsible for controlling and monitoring all the functions of the units. The potential benefits in terms of convenience, economy and increased security will mean that the investment in such systems will soon pay for itself.

The technology for implementing such a home control system is with us today. Most modern household appliances, from washing machines to cookers, feature at their heart a microprocessor responsible for controlling the operation of the unit. Other equipment such as video recorders and hi-fi systems have for some years featured one, occasionally two, MPUs as part of their control systems.

If Alan Sugar is to be believed, it will not be long before even the humble domestic refrigerator will feature a microprocessor to optimise its performance and perhaps speak to its owner. It does not require too much imagination to realise that were those various items of equipment linked to a central control system which could co-ordinate their activities, there would be considerable benefits for the home owner of the future.

The major difficulty in linking various items of equipment scattered throughout a home concerns the way in which data will be exchanged between the appliances and the central computer. The problem concerns both the physical connection of the two units and the protocols which would govern the form in which the data is exchanged.

The home of the future is likely to feature a central computer in control of all aspects of its electrical equipment - everything from heating to lighting and possibly including the kitchen sink. Peter Luke gazes into the future.

in the country already has a data distribution system in the form of the ring main which carries power throughout the home. By using a special interface it is possible to superimpose data signals on to the 240V AC mains supply. One such system was described in the November issue of *Your Computer*. That was the Red Boxes home control system which features a central

sockets and any appliance to be controlled is, in turn, plugged into the slave unit. The unit incorporates an electronic on/off switch which reacts to the mains-borne signals transmitted by the central control computer.

Data is likely to be exchanged between the central control computer and slave units as a serial stream of data much like the RS232 standard.

average household? The advantages of installing an intelligent control system fall into three areas. The first is one of convenience. By locating the central control panel in, for example, the living room, it would be possible to control all the appliances in the home from a favourite armchair.

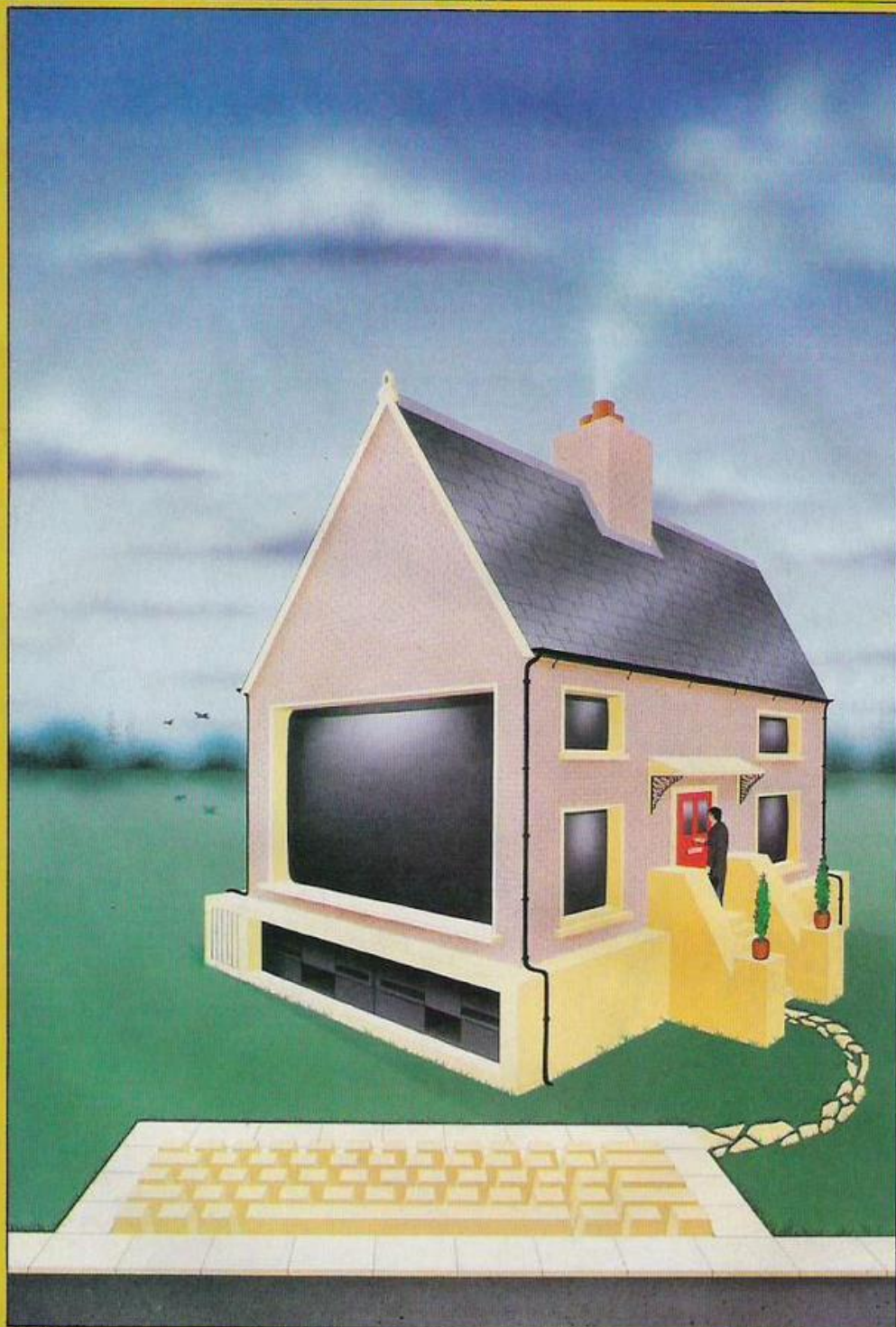
That concept is an extension of the control offered for TV

The Red Box control program can display information on up to ten devices.

Device number	Device name	Status	On time	Off time	Duration	Device type	Auxiliary
Red Control					21:36:51		
→	W Device	Sta	On	Off	Time	1	RA
1	PORCH	ON	2030	0130		1	R
2	HALL	ON				1	
3	LAMP	ON				1	2
4	DOOR	OFF				1	
5	BELL	OFF				1	4

Enter Command:		
(U)p	(D)own	(S)et
(N)ew	(E)rase	(R)epet
(C)lock	(T)ime	(A)ux
(K)eep	(O)n time	(F)offtime
(L)oad	(G)o	(Q)uit

Installed devices Command summary



and hi-fi systems by the infra-red remote control systems which have become common in recent years. With a computerised home, though, it would be possible to switch on the electric blanket in the bedroom without missing a second of News at Ten.

The second major area of benefit lies in the potential for

increased security in the home. The Red Box system has as part of the starter system a passive infra-red motion detector which can alert the main control system if there is any movement in the room in which it is located. On detecting a signal indicating movement in the protected area the central unit could take

one of a series of actions depending on its control program.

The actions could include sounding either an internal or external alarm bell, depending on the time of day and whether or not the house was occupied. If connected to a modem, the computer would also dial a pre-determined telephone

number and play a synthesised voice message over the line. Another option would be to have the control computer switch on a floodlamp to illuminate the grounds of a house.

In addition to controlling an alarm system, the central computer could be programmed to simulate the occupation of an empty house by switching lights on and off at pre-determined times, even perhaps turning on an audio system in the early evening and off at bedtime.

Either of those options may mean that an insurance company would be prepared to lower the premiums payable on a household contents policy for the home. Savings made in this area could well mean that the cost of any security system could be recouped after only two years. In addition, the peace of mind which would result because you knew that your home was protected during absence could well make the system worthwhile.

A computer-controlled home could also mean savings in other areas, most notably by making a home more energy-efficient. By placing thermostats throughout a home and linking them to a heating system and an intelligent control program, it should be possible to make savings on the annual heating bill.

When the potential benefits of installing a home control system are weighed against the cost of such an installation, it is apparent that many forward-thinking builders will be paying particular attention to this area of computing in the next few years. The day when it will be relevant to ask about the interface potential of your refrigerator may not be too far away.

• *Your Computer wishes to thank Red Box for its help in writing this feature.*

INFORMATION

PR MATTERS
1 WHITE HART YARD
LONDON SE1 1NX

Sample pleasures

Until about a year ago there was almost no commercial software or hardware for the Spectrum owner wanting to experiment with music-making and sound manipulation. Not any more. Reporting on this change is Tony Sacks.



Cheetah sound sampler for the 128K Spectrum.

Until about a year ago there was almost no commercial software or hardware for the Spectrum owner wanting to experiment with music-making and sound manipulation. The demand for such packages was demonstrated when Cheetah Marketing unleashed its SpecDrum percussion simulator. To date more than 30,000 SpecDrums have been sold.

Cheetah is hoping to repeat this success with a new crop of

musical products for the Spectrum. They include a Midi package which will allow the Spectrum to communicate with electronic musical instruments, and a five-octave musical keyboard which can be used to control either the sound chip included in recent Spectrums or Midi-equipped instruments.

Cheetah has also launched a Sound Sampler. It turns the Spectrum into a sound recorder by using the micro memory to store a digitised

version of a fragment of sound. The sound can later be extracted from the memory and reconstituted into its original form.

Six-foot cable

The sampler hardware takes the form of an unassuming black box which plugs into the Spectrum user port. Two anonymous control knobs project over the Spectrum chassis – the function of one of them remains a mystery until near the end of the finely-

printed instruction manual. To hear the sampler output you will need an amplifier within the six-foot reach of the audio cable which protrudes from it.

One attraction of sampler programs is that they load relatively quickly because as much memory as possible has to be reserved for storing the sampled sounds. Another result of this requirement is that the programs tend to be graphically rather stark. The Cheetah sampler is no exception, loading in less than

three minutes – or even quicker if you take up the option of transferring the program to Microdrive – to present you with a bland five-option main menu.

You will probably head straight for the sampling option which takes you to a sub-menu offering a choice of six alternatives. One of these produces a slightly-delayed oscilloscope effect so that, as you talk or sing into the microphone supplied with the sampler, the sound waves are displayed on the screen. This display allows you to adjust the first of the mystery knobs to set the sampler sensitivity. If you are overloading the input, the sound will distort, with obvious effect on the oscilloscope trace. On the review model, the sensitivity knob had very little effect for most of its rotation but small adjustments near the end of its travel could make a large difference to the sensitivity.

Devoted units

Cheetah divides its sampler memory into 116 units, each about 1/144 second long. If my arithmetic is correct, this means that the longest sample possible at the normal sampling speed lasts just less than a second. Several shorter samples can be stored at the same time and, before recording a sample, you are asked how many units you want to devote to the sound. This can be difficult to estimate, unless you are used to thinking in terms of 1/144th of a second. If you allow too few units your sample could be cut off in its prime, while too many units would waste precious memory.

If you are privileged enough to own a 128K Spectrum, you can use the extra memory to store up to 256 extra units of sound in four banks. The maximum length of any one sample, however, is not increased.

Before you record a sample you have to give it a name and decide whether you want to record it at full or half-speed. In the latter case, your sample will last twice as long but the quality of the replayed sample

is noticeably reduced.

You are now ready to record your sample, either when the program tells you to or, if you prefer, when you hit the space bar.

Dubious tuning

The quickest way to listen to the results is to use an option which lists all the samples in memory, replaying each of them as its name appears on the screen. A few more keystrokes will take you to a section where you can play back the sample at different pitches in a two-octave range using two rows of the Spectrum QWERTY keyboard transformed into a makeshift piano keyboard. The tuning of some of the notes is dubious.

To take the rough edges off your sample or to alter its character you head for the edit menu. There you can reverse the sample, produce a copy of it or combine it with a second sample to produce a more complex sound. More important, you can also configure the sample by chopping unwanted bits at either end and by defining a central section to be repeated or looped several times to extend the sound.

Looping

Looping is done by placing markers on displays of the soundwaves stored in each of the units of sample memory. You place the markers where you feel the replayed sample should start and finish and where you would like it to be looped, if at all. Unfortunately there is no single display of the complete sample to give you an overall idea of how it varies with time. Instead you have to step through each of the units in the sample with the screen being re-drawn each time. This can be a laborious process if you have a single sample taking up all 116 units of memory. Stepping sequentially from one end of such a sample to the other can take almost a minute.

There is an option of going directly to a particular unit by selecting its chronological position but as this number is not displayed on the screen,

finding a specific unit is a hit-and-miss affair.

Once you have configured your sample, you can return to the musical keyboard section and the looped section of the sample will play repeatedly until a key is released. If you are lucky this can give an impression of a note lasting much longer than the original sample but the chances of the repeat points merging smoothly with each other are small.

Sample files

On the second side of the program cassette, Cheetah has stored six sample files to give you an idea of what can be achieved with the sampler.

Also lurking on the cassette – but not made clear in the manual – is a second program which turns the sampler into a real-time effects processor. This offers half-a-dozen ways of transforming any sound fed into the sampler.

They include an echo chamber, a reverb, a pitch shifter to give Donald Duck effects, a fuzz box which produces a distorted version of the input sound, a sound chopper for Dalek-type effects, and an intriguing bubbleiser which performs indescribable mutations on your original sound. The role of the second control knob is now revealed as controlling feedback levels for the echo and reverb effects.

Fun to play with

The effects program is more than a mere gimmicky afterthought to the sampling program. It produces some attractive and musically useful variations on the input and is also fun to play with.

Indeed, many musicians would probably find the effects section more useful than the sampler. Despite the Cheetah claim that the sampler is suitable for professional use, it is unlikely to make an appearance on Top of the Pops. The sound quality is not high enough and, equally important, the Spectrum QWERTY keyboard does not make a very convincing musical keyboard, especially

as you have to use a Shift key to change octaves.

One way of avoiding this limitation would have been to include a Midi interface in the sampler as Ram Electronics does in its Music Machine package – see *Your Computer*, January 1987. Cheetah has not provided this or any other means of controlling the sampler from a conventional musical keyboard. This omission is surprising because, as mentioned previously, Cheetah is already marketing both a Midi software package and a full-size, five-octave keyboard.

Stiff competition

Six months ago the Cheetah Sampler would have had the market to itself. Now it has to face formidable competition from the Music Machine which, for about £5 more, offers a Midi interface, a drum machine and a simple music composing section. The Ram package also allows samples to be played back at two pitches simultaneously for greater harmonic interest.

More sophisticated

In its defence, the Cheetah Sampler produces higher-quality sounds than the Music Machine but the difference is not so great as the 17.5kHz bandwidth – compared to 9.5kHz for the Music Machine – would imply. Its sample manipulation facilities are more sophisticated and its real-time effects more versatile and convincing than those of the Music Machine package.

At £44.95, the Cheetah Sampler offers undoubted value but you may feel that the £49.95 Music Machine provides even better value.

Information Cheetah Marketing,

1 Willowbrook Science Park,
Crickhowell Road,
St Mellons,
Cardiff,
Wales.

Telephone: 0222 777337



Understanding as

Anyone interested in machine code should learn about assemblers. Ian Duerden explains why.

The world of machine code has inherent advantages of speed and controlability. Its major disadvantage is its complexity but by using assembly language much of that can be overcome. The computer you use arrives complete with a Basic interpreter which converts Basic programs into a form the machine can understand. To write in assembly language you will need to buy an assembler/disassembler package. There are many on the market for all types of machine, ranging from a few pounds for simple versions and up to £50 for ROM-based ones.

Checking

The first part of any good assembler package is the Editor. As you can appreciate from its name it provides you with the opportunity to type-in your assembly listing and make any corrections or modifications necessary. It is vital, if you type-in and run any Basic program, that errors are spotted and the machine will stop, give you details of the fault and let you correct it.

In machine code that is not possible; any attempt to run a faulty program generally will result in the machine locking-up with no indication of where the fault lies. The Editor therefore allows you to check your program or listing fully but that is not the only safety device. After saving any data, the second part of the package, the assembler, goes into operation. It converts your assembly code into binary, the language the machine understands. If you have made a serious error or

the assembler cannot understand any of your code it will stop assembling to give you a printout or on-screen display of the error or errors it has found. You can then return to the Editor to correct the errors before attempting to re-assemble.

When the program/listing has been assembled it can be saved to tape or disc and run with either a small Basic program, added to a subroutine of programs, or added to other programs to make a much larger and more complex one.

Monitor aid

An incidental advantage of the Editor part of the package is that it can be used as a mini word processor; most of the usual word processing commands are found on the better assembler/disassembler packages so it is possible to write all your letters using this method.

You have probably noticed that the assembler package is described as an assembler/disassembler, so what is a disassembler? Most packages call the disassembler part of the package a monitor, which gives you a much better description of the use to which it is put.

Even when you have assembled and saved your work of art, it does not necessarily mean that everything is perfect and will work first time, so you need a way to run through the program – that is where the monitor assists.

Figure one shows a typical monitor screen. It is complex but once you get used to the commands and different screen areas it is relatively

assemblers

straightforward.

The monitor allows you to run your program either in steps to see what is happening or set break points at various intervals throughout the program. Many other commands can be used, such as Search for a particular address, Examine particular addresses, Copy areas of memory to another memory location, and so on.

The monitor is probably the most complex part of the program and will need a fair amount of practice. Using the monitor, it is possible to look at someone else's program and perhaps even modify it but unless you are fully conversant with such packages it is best to leave such things alone.

What should you look for in such a package? First, much will depend on how much you are willing to spend; normally, the dearer the package the more it will do. Take, for instance, the Amstrad range

of machines. There are some assembler/disassemblers for less than £10 but they tend to be extremely basic, without

much of a manual. At £14 there is *The Code Machine* from Picturesque/Gremlin which is tape-based and contains probably most of the commands needed, and a reasonably concise manual. Then there are the more complex packages such as *PyraDev* from Gremlin and *Laser Genius* from Ocean which retail between £20 to £30, both on disc. The most expensive are *Maxan* on ROM – also available on tape and disc – and the Hi-Soft *Devpac 80* package, both at around £40.

It really depends on how serious you will be taking the subject. It is probably advisable to look at the manuals before you buy, as that will give you a reasonable idea of the standard of a particular package.

As well as an assembly package it is probably advisable to buy a good book on the subject. There are many on the market for all machines, so look for one written in terminology you can understand. Most books retail at around £7 to £10 but you could attempt to get them from your local library initially and then buy one later.

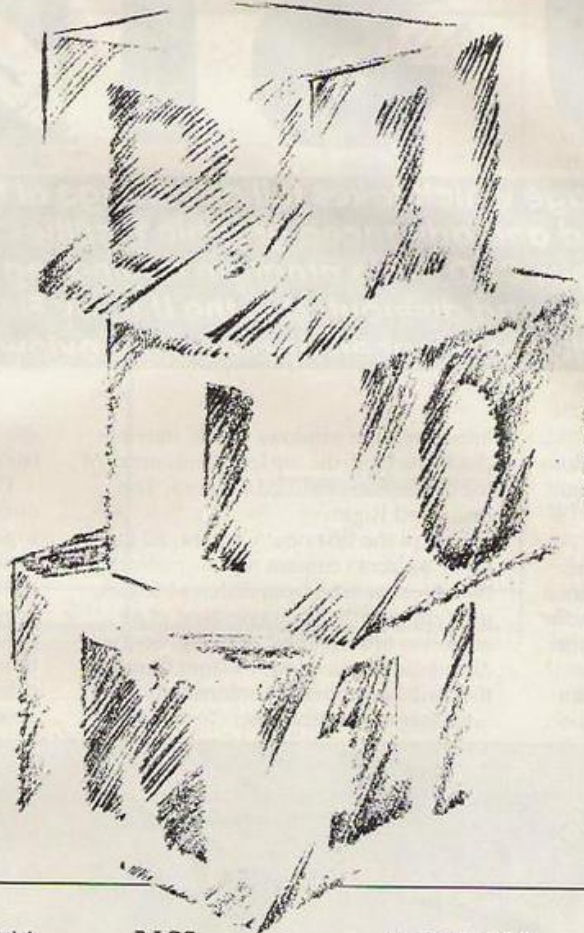


Figure 1.

*** AMSTRAD MONITOR ***

DISC

L-ROM OFF

U-ROM 255 OFF

T 1
R 2
A 3
P 4
S 5
S

A-F	B-C	D-E	H-L	IX	IY	SP	PC
4E0C	0001	2E0B	60F1	9164	A458	BFF8	0000
0000	0000	0000	0000	0000	0000	0000	0000
*FLAGS * (0000-4E00-204E-DF5E-5200)							
-----P-- (0000-0003-000D-A4C9-9AB9)							
8E8C	7F8E	1268	BB8C	0008	Alt regs & I,R		

8000	6A
8001	CB 4E
8003	C8
8004	23
8005	CB D6
8007	CD FE 80
800A	78
800B	FE D7
800D	28 06
800F	3E 04
8011	30 02
8013	3E 06
8015	C3 03 81
8018	CB 68

LD	L,D
BIT	1, (HL)
RET	Z
INC	HL
SET	2, (HL)
CALL	80FEH
LD	A,B
CP	0D7H
JR	Z,8015H
LD	A,4
JR	NC,8015H
LD	A,6
JP	8103H
BIT	5,B

.8000	6A CB 4E C8 23 CB D6 CD FE 80 78 FE D7 28 06 3E
8010	04 30 02 3E 06 C3 03 81 CB 68 28 04 1E 5C 18 37
8020	CB 60 28 1E 54 26 61 18 22 CD 68 80 CD 3F 7E 5A
8030	FE 02 28 05 FE 04 DC CC 80 0C 5C CB 70 20 1F 1D
8040	18 32 CD 52 80 CD FC 80 C3 CC 80 CD CC 80 5A 54
8050	18 01 0D CD CC 80 5A CD 68 80 0C 0D 5C C0 7C FE
8060	01 28 11 FE 05 DA 03 81 CD 3F 7E CB 7B 28 08 CB
8070	BB 1F 18 03 78 E6 07 83 5F FE 07 28 41 FE 0A 28

CTRL-X to EXIT

Press ESC for MENU

```
jKNHfKVM~ x~W(.>
.O.>.C..Kh(..\..7
K'(.T&a."Mh M?~Z
~(..~.\L..Kp..
.2MR M: CL ML ZT
...ML ZMh ..\@:~
(..~.Z..M?~K(..K
;...xf...~.(A~.(
t PYRAMON 1.0
```


3D STart

A package which takes full advantage of the Atari speed and advanced graphic facilities is the marvellous CAD 3D, a program originating from the States and distributed in the U.K. by Electric Software. Stephen Applebaum reviews it.

In the January issue of *Your Computer*, I looked at an ambitious 3D modelling package, designed for the CPC range of Amstrad computers, called *Model Universe*.

Although superficially impressive, the program was ultimately ineffectual since its operation was greatly hampered by the limitations imposed on its design by the Amstrad 8-bit central processing unit.

Similar hindrances do not occur with machines such as the Atari ST, as it, unlike the CPC 464, for example, utilises the more efficient 16-bit 68000 chip. This can perform arithmetical functions at a much faster rate, which manifests itself as an increase in the speed at which programs are executed.

Computer-aided design encompasses a variety of uses. On the one hand it can help in the make-up stage of two-dimensional plans – of circuit boards, house layouts and so on; while on the other, there is the, in my opinion more exciting, field of solid modelling. CAD 3D is an example of the latter.

For me, the most advantageous feature of the ST is the GEM operating system. The majority of readers will be familiar with GEM and its similarity to the Macintosh operating system, insofar as it, too, is WIMPs based. Windows, pull-down menus and a mouse are the principal features of such an arrangement, making the whole supremely user-friendly.

CAD 3D makes good use of all these qualities and as a result is extremely easy to get along with. Its work area is divided

into four large windows which, moving clockwise from the top left-hand corner of the display, are entitled Camera, Top, Front and Right.

Except the first one, Camera, all the other windows contain representations of the object as seen from different angles, in keeping with the conventions of an orthodox orthographic drawing. So as to distinguish these windows from Camera, they will henceforth be referred to as 'auxiliary view' windows.



The Camera view window is not like the others, because it allows the user to add perspective to an object, so producing a picture of how it would look were it a tangible body, and not a flat simulacrum on a monitor. At least that is the theory.

How this works is simple. All the windows are equipped with two slide controls running vertically and horizontally along their borders. For now I will just concentrate on those appertaining to the Camera window, as they are the more interesting. As those connected with the auxiliary view windows produce a slightly different

effect, I will return to them briefly a little later.

The Camera view window is distinguished from the auxiliary view windows by two modes called Rotate and Zoom/Perspective. In the former mode the two slide controls, mentioned earlier, provide the means to rotate an object in the horizontal and vertical planes. Or to be more correct, they alter the user's view point and not the displacement of the object *per se*.

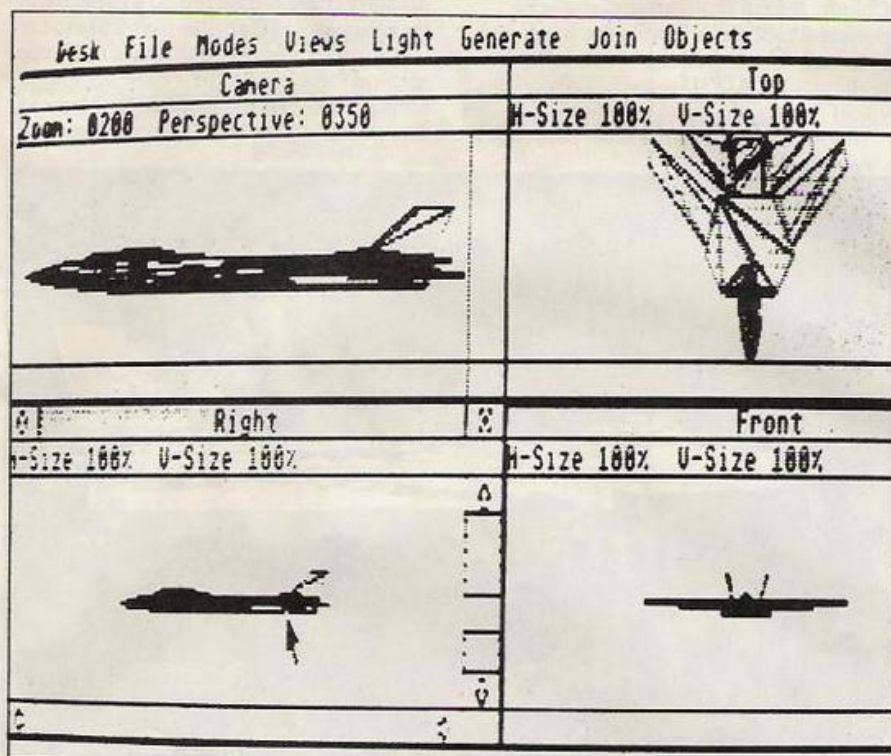
To understand how changing one's viewpoint produces a different effect to moving the object, try to imagine a solid cube suspended just in front of you, at about eye level. Now, were the cube rotated vertically downwards, then the effect would be to move the top edge towards you. Conversely, if you were to lower your line of sight, completely the opposite would occur. Exactly the same is true when moving your viewpoint from left to right. Although this is fairly fundamental stuff, it

can be confusing at first.

When in Zoom/Perspective mode, the functions of the Camera view window slide controls alter to accommodate these two new factors.

The horizontal bar along the bottom of the Camera view window sets the zoom factor. This can be anything between 0 to 1000, where the numbers are a measure of closeness. Selecting a high number moves your viewpoint nearer to the object on hand, so apparently increasing its size. In other words, the zoom factor is a measure of magnification.

Perspective is added via a slide control



running down the right-hand edge of the Camera view window. Again the limits are set between 0 and 1000, except this time choosing a large number does not enlarge objects but adds realism to the overall picture by making foreground objects appear larger and background ones smaller, so producing the illusion of depth or distance.

Object rotation

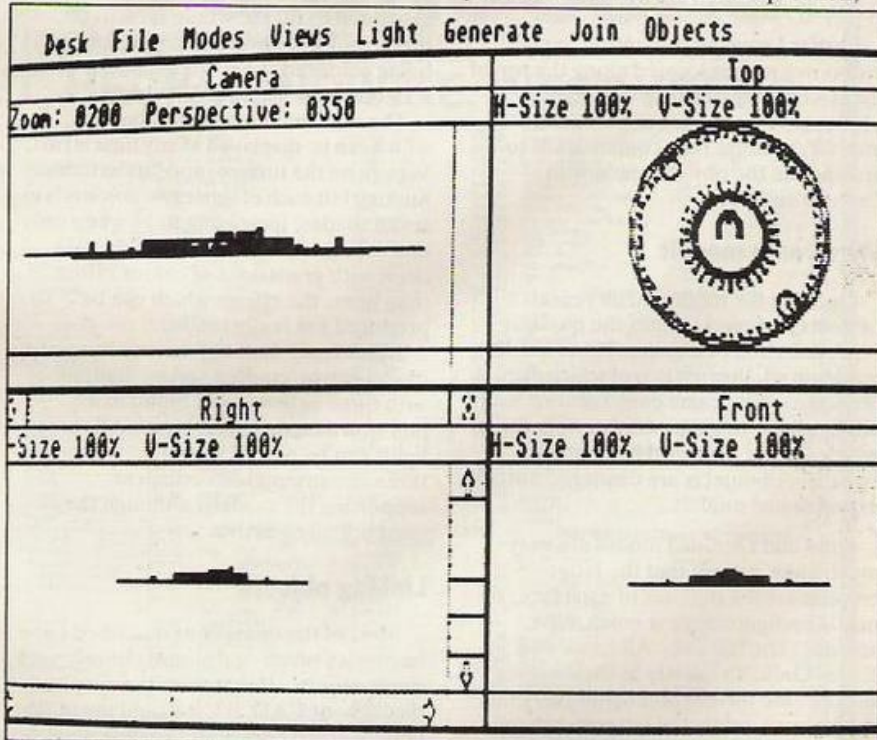
The three auxiliary view windows are similar to the Camera view window in the sense that they, too, have two modes. Their different functions set them apart. Instead of Rotate and Zoom/Perspective modes, the auxiliary view windows have Rotation and Scale. Even the former is not like that described earlier, because rather than the user's viewpoint moving as before, this time it is the object which is rotated. In Scale mode, individual objects can be enlarged or shrunk, though only in the plane of the slider.

So far I have restricted myself to describing the functions of CAD 3D which must be grasped before you can go ahead and start 'modelling' your own objects. Now they have been covered, I can tell you of the various design tools contained in the program.

Extrusion

Objects are formed in CAD 3D through two processes termed extrusion and spinning. The tools to perform each of these operations are found in a

pull-down menu called Generate, which is just one of eight such menus located along the top of CAD 3D workscreen.



In manufacturing, the term extrusion applies to a process where metals, plastics and other malleable materials are shaped by being forced through a die of some description. Although the agency is

obviously very different, the results of the CAD 3D Extrude command are not dissimilar to the effects produced by the aforementioned procedure.

Options aid

Selecting Extrude from the Generate menu changes the display from four small windows to one large one which fills the entire work area. To help users maintain symmetry in their designs, this window is cut by a vertical and a horizontal line, splitting it into four equal portions.

Another aid with a similar function is a grid which can be called-up from within a pull-down menu called Options. The grid's aim is simply to provide a guide for drawing.

Simple technique

An extruded object starts as a two-dimensional outline, the so-called template. This is drawn using a simple technique whereby dots are laid down to mark the beginning and end of a line. When two points are selected, the program draws a line between them

Which is to say, were the shape being drawn a square, then obviously, the amount of dots one would be required to indicate is four.

So far as the user is concerned, designing a template is the most important phase in the entire extrusion operation,

since its outline forms the mask for the cross-section of the completed figure.

To turn the flat silhouette into a solid three-dimensional model, the template must be extruded by clicking on an item

called Do Extrude in the Options menu. After having been extruded, the result of the operation can be investigated in the Camera view window, where the new object can be rotated through almost any angle.

Lathe effect

Although spin functions very much like extrude, the objects created with it are of a very different nature. Whereas those modelling using the process just described are expanded three-dimensional versions of the template, objects formed with the spin tool finish up as 'radially symmetric' figures. An effect similar to that produced by a lathe.

Creating a template with the spin tool is almost exactly the same as already outlined, except for one major distinction: instead of drawing a complete figure as before, only one half needed to delineated on one side of the work area, because the computer mirrors every move on the other, producing a perfectly uniform copy.

Just before the figure can be spun, the number of segments which will form the finished model have to be specified by means of a slide control at the bottom of the Spin window. If the number chosen is either too high or too low, then the roundness of the final object will be seriously affected.

Earlier I gave brief mention to eight pull-down menus located along the top of the CAD 3D display. Two of them, Modes and Views, are of particular interest, because they contain tools to manipulate the objects made with Extrude and Spin.

Wireframe models

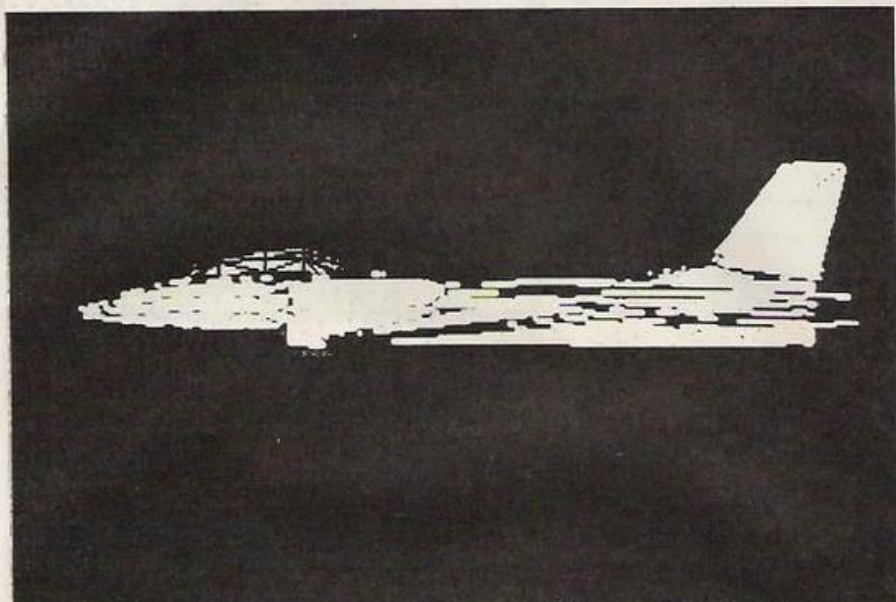
Opening the modes menu reveals a list of items designed to alter the physical representation of objects. There are six modes in all, the first two of which display objects as wire frame constructions with either all the lines showing or only those which are not obscured by another surface. All objects are displayed initially as wireframe models.

Solid and Outlined modes are very much alike, except that the latter emphasises the outlines of each face, so making a figure appear much more angular. The last two, All Lines and Edges Only, do exactly as their names suggest; the former highlights every line in an object, while the latter shows only the edges of faces on an object.

Also contained in the Modes menu are various facilities for controlling the way colour can be used to enhance the apparent physical form of a figure.

Colour, if used thoughtfully, is a very powerful tool for deceiving the brain into believing that something which is flat is really solid. CAD 3D relies heavily on this visual fraud.

Before going further, I must point out



that colour is displayed only in something called Super View. This is an option found in the Views Menu and is really nothing more than the Camera window expanded to fill the whole screen. So, therefore, whenever I refer to an object being coloured, I am talking about when it is looked at in Super View only.

The maximum number of colours which can be displayed at any time is two. Which, on the surface, appears extremely limiting but each of those two colours is in seven shades, increasing to 14 when only one colour is used. Because CAD 3D deals with gradations of colour rather than hues, the effects which can be produced are really realistic.

Apart from shading, the structure of a model can be emphasised by 'lighting' it with three light sources found in a pull-down menu called Light. All three lights can be placed anywhere within the three dimensional environment supporting the models, although they need not all be active.

Linking objects

Most of the operations described have been ones which deal almost entirely with single objects. If that were the case throughout CAD 3D, it would mean that designs could consist only of one single type of model. That is not the case.

Another of the pull-down menus, Join, plays host to a collection of tools for linking individual objects in several ways.

If more than one object is present in

memory, they can be joined by specifying their names and then inputting a name for the resultant figure. Addition is only one method for creating a new object. Funnily enough, subtracting one from another can also produce a pleasant effect, since the

new shape is much the same as the original, minus any of its area previously overlapped by the subtracted object. On the other hand, an operation can be initialised which leaves behind only those parts which were overlapping. Finally, the shape of one object can be stamped on the face of another and the motif illuminated with one of the three light sources.

Two special features worth noting about CAD 3D are its ability to save screens not only in a format it can read but also in such a way so as to be recognisable to painting programs like DEGAS, C.O.L.R. and Neochrome.

The other thing is a primitive but effective in-built animation program which gives users the opportunity to create simple animated sequences frame by frame.

Exciting

CAD 3D is an exciting introduction to computer-aided design. I would be more prone to refer to it as an art program, though, since I do not think that it is as comprehensive as most other true CAD programs on the market.

There are not really any other programs of its type around, so it is difficult to try to compare it to existing CAD or painting packages. Suffice it to say that CAD 3D is something of a fantastic anomaly which anyone who has an Atari ST and is interested in art/design should buy. Because, in its little niche, there is nothing to touch it.

AMSTRAD
Vampire
Robin Hood
Space Harrier
Palltron

ATARI
Karate Kid II
Flight Simulator II

C64
Sky Runner
Blood 'n Guts
Knuckle Busters

C128
Knuckle Busters

SPECTRUM
Agent X
Falcon Patrol II

(AMIGA SOFTWARE
COURTESY OF MPC)

Software Shortlist

Each of the games reviewed in Software Shortlist has been reviewed extensively by our team of reviewers.

We do not include reviews of unfinished products in this section of *Your Computer*; they are the games you can buy now or in the near future.

See the Software News and Preview features for advance news of games being developed.



Watch for the *Your Computer* Soft Stars. They are awarded to games which, in our opinion, offer outstanding value.

KARATE KID PART II

► Atari ST ● Microdeal ● Arcade ● Jim McClure ● £19.95

So where is part one? Microdeal would have us believe that *Karate Kid Part II* is the sequel to the Columbia Pictures release but in this movie the fight is yours. With a convincing sound track at the beginning which is Midi-compatible and called *The Glory of Love*, the game bears a fairly strong resemblance to the movie and its characters – not an easy task with only seven obviously different screens in the one-player mode and only slight cosmetic changes to the first two screens when clocking player two.

Daniel, like all good guys in the movies, is dressed in white and your first enemy is dressed in pink. Either he has bad dress sense or is it a tactic to deter you? The locations where all the fights take place, as you would expect of any good Hollywood set, are perfect in every detail.



Also the players, like many good film stars, are small, and permit a good camera angle but are a strain on the eyes to a short-sighted computer user. That will probably be a problem with all ST arcade games because of the dimensions of the screen and not because of the actors starring in them.

Beating each enemy is effected by striking blows to any part of the body – one point for a hit and two for decking him. After negotiating the first two screens there is a bonus screen. Remember the expression 'You couldn't catch a fly'; well, now is your chance.



Using chopsticks and the knowledge that Miyagi took 40 years to catch one



you cannot miss – after all, it is a movie. The secret is to press the 'P' button before you go insane and get back to what the game is about, karate.

The next two screens are more difficult

than the first but to any avid Bruce Lee fan they present no problem. The next bonus screen is set in the kitchen of a Chinese restaurant, probably a chilling thought for some. It appears that the ice crusher has broken down. Discover the secret of the drum and this will give you Chi, a mystical energy force to which you can feel no pain; you could have done with some of it when you were catching that fly.

It is done by increasing the speed of the drumbeat to a consistent drone. A reinforced joystick to handle the speed may also be required. Hit the fire button to release the energy and again just before the ice block, which is easier said than done.

In the final encounter, Daniel fights Chozen in the castle of King Shobashi. I cannot get you his autograph – I do not even know who he is. The fight takes place on top of an ice tower, which seems as good a place as any. This time the fight is for real. What you were doing in the past, I suppose, was a figment of your imagination. With no stunt men to stand in for you there are two choices – you can live or die. That sounds logical and yet irrational. Surely it is what a good game should be.



FLIGHT SIMULATOR II

► Atari ST • Sublogic • Simulation • Jim McClure • £49.95



San Francisco Bay area panorama.

Flying is meant to be the safest way to travel – until now. The pilot's seat of a Cessna 182 propeller-engined aircraft or a Gates Learjet get closer to the real thing in the Sublogic *Flight Simulator II* than in any other previous flight simulator. Developed on the PC, the infamous software has earned respectability for testing PC compatibility in the business market. So much for those supposedly serious users. Now that it has been converted for the Mac, ST and Amiga, who wants to be a boring serious user?

Flight Simulator II has five scenarios all based on different locations across the United States. A vast selection of 120 airports is available from small airstrips to large internationals. One of the

the sunshine state of California there are two major locations. The uninviting smog of Los Angeles, probably the least attractive scenario, and San Francisco, the most attractive of all. That leaves only Seattle and, like LA, it is nothing special, which is probably why neither is mentioned on the pre-set locations and can be accessed only by keying-in the co-ordinates.

Oakland International sets the scene for your maiden voyage. The Cessna lies ready for take-off at one end of runway 27. Over the navigational radio there is clearance from the tower. You have alpha. Increase throttle until full power is achieved and the aircraft will reach a maximum ground speed of 100 knots. Increase pitch and the aircraft will rise almost vertically. Look back and the runway below will diminish slowly into the landscape. The air speed indicator

drops below 40 knots as a result of the sharp climb and the aircraft goes into a nose dive. That can be pulled out of at the last minute without doing anything. I wonder if Biggles had that problem? Wiping the sweat from your brow you can see the skyline of San Francisco and the Golden Gate Bridge. Enhancing allows greater detail of the bridge to be picked up and thoughts of flying underneath it seems to be a greater challenge than trying to land the aircraft for the first time.

Lacking only a stewardess to offer you coffee and in-flight entertainment, the simulator has more desirable features. Pre-setting turbulence at different altitudes and gauge reliability are only minor operations which can be set.

Others may range from setting the time



View before take-off.

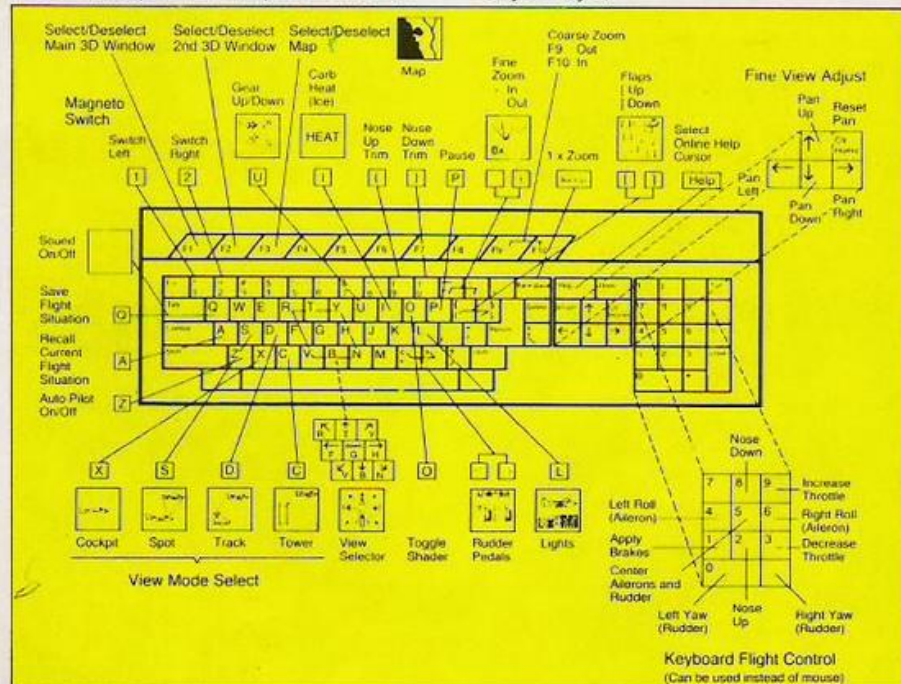
of day or season, conditions over which not even *Maverick of Top Gun* could have control. Numerous other functions can be seen in the diagram. The diagram shows an ST keyboard converted into a cockpit and probably has more buttons than the real thing. The software has a manual with 132 pages of instructions showing how to use the various instruments and window options. The simulation is essential for all, so don't just buy it – fly it.



scenarios is set in the Big Apple, otherwise known as New York, where one of the largest international airports in the world has runways to dwarf the size of any aircraft, let alone a Cessna, and are inviting to a novice pilot, allowing plenty of room for error on approach.

New York's other attractions are best seen from the air. The Statue of Liberty and the twin towers of the World Trade Center in downtown Manhattan are perfect obstacles to fly over, or between. That not only shows off the manoeuvrability of the aircraft but takes the amazing capability of the 68000 graphics chip to a possible limit.

Other scenarios include Chicago, where the Sears towers can be seen scraping the skyline and Lake Michigan provides freezing waters for those who over-shoot Merrill C. Meigs runway. In



ST-FS2 Keyboard Controls.

PALITRON

► Amstrad ● The Edge ● Arcade ● Stephen Applebaum ● £8.95

Ever since Ultima produced its revolutionary method for depicting 3D interiors in games, other software companies have kept the bandwagon rolling by reproducing the same tired thing in a different format. The Edge *Palitron* could, if one were to look at it only fleetingly, be mistaken for one of those sub-quality pastiches.

In reality, *Palitron* is a great deal more intelligent than many of its contemporaries, since the old theme of negotiating obstacle-laden rooms has been leavened with a smidgen of

GRAPHICS
● ● ● ● ● ● ● ●
SOUND
● ● ● ● ● ● ● ●
PLAYABILITY
● ● ● ● ● ● ● ●
VALUE FOR MONEY
● ● ● ● ● ● ● ●
OVERALL
● ● ● ● ● ● ● ●

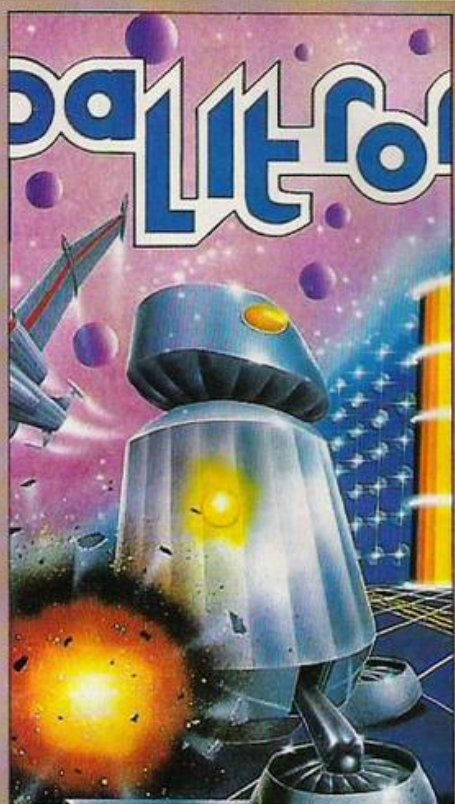
'programming'. By which I mean certain things in the game can be controlled using a set of pre-defined functions stored in a logical order to produce an effect either instantaneously or at a later time.

Palitron's action takes place in an alien city where someone or something has left some matter-destroying crystals which are slowly killing the planet's inhabitants. Unless they are located and destroyed, the crystals will addle the planet totally.

The object of the game is to guide a robot through the city locations in search of the destructive objects. Dotted about the city are powerful mechanical devices called Class Beast Mark 3 robots. When one of those is found, it can be programmed to perform specific tasks using special commands found in the *Palitron* manual.

Apart from the programming part, *Palitron* is a run-of-the-mill game. Its graphics, though, are stunning, placing it above almost every other Amstrad game in this department. Some imaginative sounds complement the colourful graphics perfectly, the two together creating an atmosphere which is changing constantly.

If you have an Amstrad and you like maze games, *Palitron* is certainly worth a look. It is not the most original game of its ilk on the market but what it does it does better than almost anything else.



BLOOD 'N GUTS

► C64 ● Action ● Arcade ● Stephen Applebaum ● £9.95

Long ago, before the advent of civilised man, Earth was inhabited by races of barbarians. Those people were tough, intrepid, and most significantly, stupid. To survive, barbarian man relied on his physical cunning and the respect of his fellow tribesmen.

Barbarian man maintained his fitness and the favour of his peers by competing in bone-crushing tests of strength and agility.

All round the globe, men partook, generally with dire consequences, in games which earned kudos for the winner, but a slow and painful death for the loser.

Since early man could not write, the form those games took went unchronicled and has since been lost in

the mists of time. The Action apocryphal *Blood 'n Guts*, if somewhat speculative, endeavours to revive those long-forgotten contests.

Blood 'n Guts follows the fortunes of four of the ancient world's greatest heroes, Nop, Knorr, Hawk and Dog, as they grunt and groan their way through 10 extremely odd and amusingly sick tests of true grit.

In common with most computer-based sports simulations, *Blood 'n Guts* has both single- and two-player modes. When the former is selected, the player takes on the persona of one of the champion fighters listed.

The competition starts with a harmless tug of war match, but degenerates into violent farce by the second round and

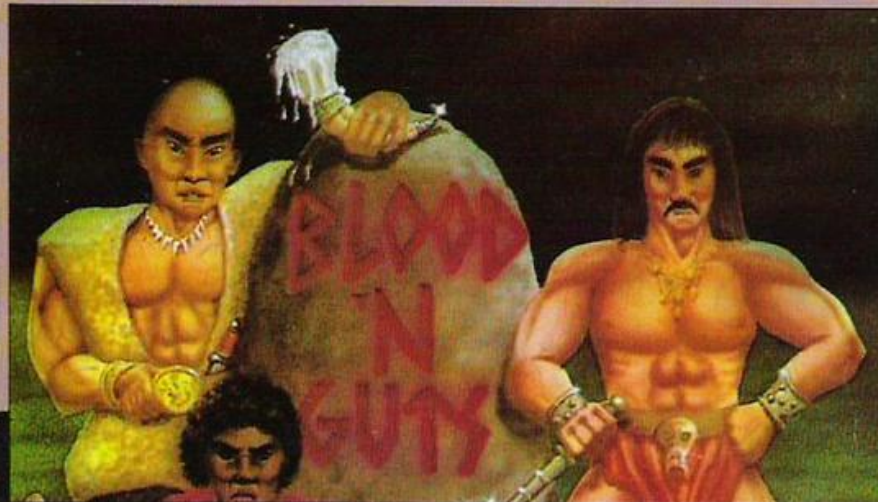
something called Towerjump. In this, a barbarian throws himself off the top of a tower in an attempt to land a greater



distance from its base than his opponent. If that were not bad enough, his leap is deemed only legal if he lands on his head.

As the contest draws on, the events get sillier and the action more stomach-churning; cat haters will love the felcidal Cat Throwing competition, an event exactly like the hammer throw, except that the projectile the barbarian launches from his mits is an unfortunate moggy.

Compared to other games of the sporting genre, *Blood 'n Guts* is highly original and most definitely over the top. Its knockabout gags make it not unlike the Dangerous brothers or a coach load of Millwall supporters who, were the program not American, could very well have been its creator's muse.



SPACE HARRIER

► Amstrad ● Elite ● Arcade ● Stephen Applebaum ● £8.95 (cassette) £14.95 (disc)

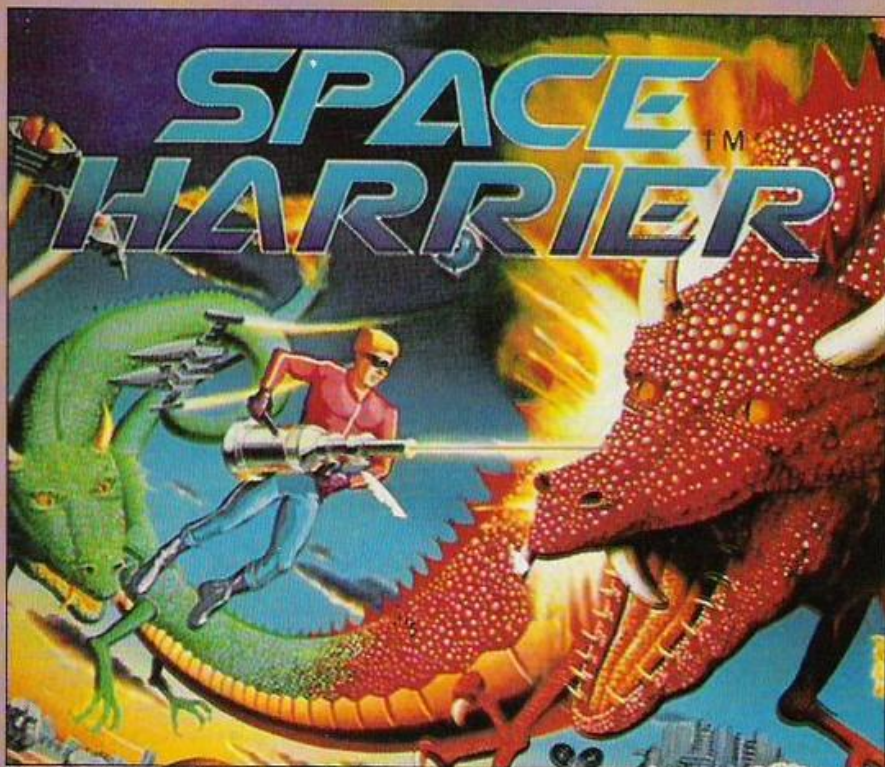
Any company which thinks it can reproduce successfully a game which, when it was in the arcades, apparently won most of its popularity through having a moving chair as part of the machine, must be either mad or have inordinate faith in its designers. Any company which succeeds in carrying off such a venture must be very special.

After having played the Amstrad version of *Space Harrier*, I concluded that Elite, one of the most frustrating



software houses in the games market, is very special.

Admittedly, I was one of those reviewers who laughed when Elite announced it was to recreate *Space Harrier* on a home micro. Amstrad Space



Harrier captures a great deal of the feel of the arcade original, although in places the graphics, most of which are simple outline drawings, lack detail.

Space Harrier deserves to be a big hit and I have no doubt it will be. People who have played the original might be deterred because they do not sit in a chair which mimics the movement of the joystick; so for them, I have a tip – when you decide to play *Space Harrier*, drink three large vodkas and wait 20 minutes.

I can assure you that the sensation you will get when playing it after that will be exactly like, if not better, than sitting in a hydraulic chair.

it, I asked. It has done it and in doing so cocked-a-snook at many cynics in the computer press.

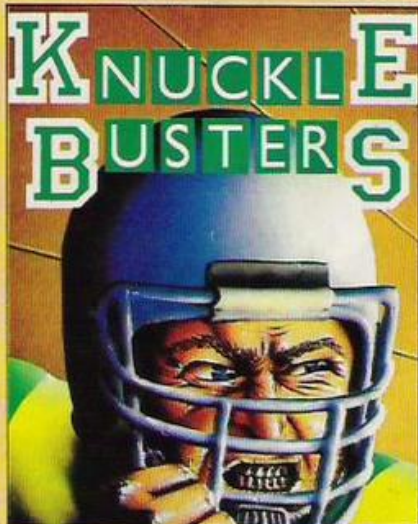
For readers who have not set foot in an arcade recently, *Space Harrier* is a shoot-'em-up of the highest quality. The idea is to guide a jet-powered trooper across a multitude of scrolling landscapes, inhabited by all kinds of weird and surreal flora and fauna.

Just as in the original, the trooper in the micro version can be made to run and fly to dodge the hordes of beasts which fly at him relentlessly. There are space ships, rock heads and one-eyed mastadons. When they have been diverted, a small dot, hovering in the distance, suddenly becomes a twisting two-headed dragon which charges forward, threatening to burst out of the screen at you.



KNUCKLE BUSTERS

► C64/128 ● Melbourne House ● Arcade ● Stephen Applebaum ● £9.95



However many times I read and re-read the credits on *Knuckle Busters*, I still cannot come to terms with the idea that it originates from the company which gave us such milestones of software as *The Hobbit*, *Sherlock* and *Way Of The Exploding Fist*. Which is, I suppose, another sign of the Melbourne House

continuing downward slide.

Knuckle Busters is a humourless game which never rises above the belief that violence is the only way. In it, the player becomes a character called Deke, who, when the game begins, is in the process of escaping the confines of a futuristic prison and the horrors of a threatened frontal lobotomy.

I think having the latter performed on oneself would be a bonus when playing



Knuckle Busters, as it could only heighten one's enjoyment of it.

Controlling Deke, the aim is to break out of the prison and cross the city to a place of sanctuary. Before he can reach his nirvana, our gormless hero must play a dangerous game of cat and mouse with

the androids which guard the road to freedom.

Using a joystick, Deke can be made to kick, punch, jump, drop and run. The first two actions are, for the most part, used against the android guards. There are times when the target is a crate or an oil drum, the places in or under which are hidden foodstuffs, extra lives, points and the keys which will effect Deke's passage through the locked doors of the prison.

I would like to be able to say something good about *Knuckle Busters* graphics, at least, but even they are not really up to the quality expected today. The backgrounds are excellent but are ruined by the awful animated characters which dart about in the foreground. Deke, for example, when he is not running, jumps round the screen like a flea on a high.

If *Knuckle Busters* has one redeeming quality, it is the brilliant musical score written by the ubiquitous Ron Hubbard. His swirling synthesiser sounds and thumping monotonous beats create a doom-laden atmosphere which helps the game in the sense that it diverts one's attention from its flimsiness.

SKY RUNNER

► CBM64 ● Cascade ● Arcade ● Stephen Applebaum ● £9.95

Cynicism is not something you usually find in a computer game; that is the preserve of politicians, journalists and the disillusioned. The written script of the Cascade Games *Sky Runner* exudes cynicism from every syllable. In a few lines, the game's authors indict politicians and the ambivalent conscience of society, while themselves



remaining apolitical – the required *modus operandi* for populist writing.

According to Cascade Games, man's inability to deal with crime will finally be overcome by governments which will introduce drugs into the water supply, so making people too apathetic to exercise free thought.

In the Cascade game, the drug is called 'sky' – after the film *Liquid Sky*, perhaps? The eponymous 'sky runners' are government-employed 'pushers' who harvest the narcotic. To protect the runners and their giant mechanical sky

harvesters from attack, the powers that be employ airborne sky bikers.

Very gradually, benighted governments learn about sky and send out runner squads to prevent the harvest.

As the player, you take the role of a member of the runner squad. When the game begins, you find yourself the pilot of a skimmer, a small craft designed for low-level flight.

The object, initially, is to use the skimmer to shoot out the giant towers which protect the sky harvesters.

When all the towers have been

destroyed you cede control of the skimmer and become a sky biker. As with the towers, the object is to destroy the government sky bikers.

Finally, when the last biker is out of the way, your on-board computer informs you where the harvester must be shot to destroy it, so cutting off the supply of sky completely.

Sky Runner is an interesting game, if only for its scenario. How many other programmers have dared to deal with the question of drugs, however tenuous the link?



ATARI COMPUTERS



All All ST computers come with mouse and software except where stated. Atari 1040STF with b/w monitor £664 (£651) £751. New Atari 520STFM with built in disc drive (512K ram) £378 (£369) £419. Atari 520STFM+ (1000K ram) £466 (£452) £502. Atari 520STFM with b/w monitor £474 (£460) £560. Atari 520STFM without mouse £243 (£242) £283. Atari 520STFM £268 (£267) £308. Atari 520STFM+ (1000K ram) £356 (£350) £391. Cumana 1000K disc drives for the 520STFM: single £151 (£151) £173, dual £244 (£244) £276. Atari 500K ST disc drives £142 (£142) £162. Atari 1000K ST disc drives £187 (£184) £204. Atari ST monochrome monitor £139 (£149) £198. Atari 12" medium resolution ST colour monitor £377 (£368) £419. 20 Megabyte ST hard disc (Now available from stock) £649 (£626) £695. New 800 Chip £66 (£66) £68. Centronics printer cable for the ST range £16 (£16) £20. We offer good discounts on most ST software for example: HiSoft DEVPAK £42 (£42) £46, Metacombo Lattice C £81 (£81) £85, Computer Concepts Fast Basic £79 (£76) £80, LDW Basic ST, new basic compiler £99 (£98) £32, VIP Professional, Lotus 1-2-3 Clone for ST £159 (£139) £143, Pro Fortran 77 £121 (£108) £112, Pro Pascal £121 (£108) £112. Atari 130 XE computer + game £95 (£99) £120. Atari 130XE + disc drive + 1023 printer + software £313 (£315) £373. Atari cassette recorder £34 (£38) £48. Atari 1020 4 colour printer £93 (£94) £114. Atari 1027 letter quality printer £118 (£124) £151. Atari 1029 dot matrix printer £118 (£124) £151. Atari 1050 disk drive with DOS 3 £118 (£124) £151.

SINCLAIR PRODUCTS

Spectrum 128K Plus Two computer with built in cassette recorder and joystick interface £149 (£153) £183. Blank microdrive cartridges for the QL and the Spectrum £2.50 (£3) £4. QL floppy disc interface (See Cumana disc section for suitable drives) £88 (£86) £96. Spectrum floppy disc interface (See Cumana disc section for suitable drives) £78 (£78) £88. Spectrum centronics printer interface and cable £46 (£42) £47.

COMMODORE COMPUTERS

Commodore Amiga with colour monitor: System 1 £1022 (£1022) £1772. System 2 £1842 (£1842) £1999. Commodore 128D £553 (£532) £582. 1571 Disc drive £283 (£280) £302. Commo-

dore 64C computer with mouse, cassette recorder and software £245 (£254) £294. Converter to allow the use of most ordinary mono cassette recorders with the Commodore 128 and Commodore 64 £378 (£391) £411. MPS803 printer with tractor unit £166 (£170) £191. Centronics printer interface and cable £30 (£31) £36.

AMSTRAD COMPUTERS



We can supply a wide range of software for the 1512, the PCW8256 and the PCW8512 - write for a quote. New Amstrad 1512 IBM Personal Computer Clones: 1512 computer with single disc drive and b/w monitor £516 (£543) £650, dual disc b/w £645 (£653) £760, single colour £710 (£715) £822, dual colour £839 (£824) £931, 10MB hard disc b/w £903 (£912) £1032, 20MB HD b/w £1033 (£1026) £1146, 10MB HD colour £1098 (£1078) £1198, 20MB HD colour £1228 (£1198) £1318. DMP3000 printer £194 (£197) £230. FD3 £168 (£175) £206. HD10 £497 (£496) £545. HD20 £606 (£597) £647. Amstrad CPC464 computers: colour £297 (£328) £410, green £197 (£236) £316. Amstrad 6128 colour £397 (£428) £510. Amstrad PCW8256 £449 (£474) £581. Amstrad PCW8512 £564 (£587) £694. Amstrad DMP2000 printer £169 (£174) £207. Extra disc drive for Amstrad 6128 £99 (£105) £136. Amstrad DD1 Disc Drive £157 (£158) £188. Amstrad joystick £11 (£12) £16.

CUMANA 3.5" AND 5.25" Cased Disc Drives With Cable and Power Supply

40/80 track switchable double sided, to suit floppy disc interfaces of the Sinclair QL, Sinclair Spectrum and BBC B. 3.5" drives: single £134 (£137) £159, dual £224 (£229) £261. 5.25" drives: single £172 (£175) £205, dual £310 (£316) £357.

PRINTERS

Epson LX86 £281 (£280) £314. Tractor for LX86 £20 (£20) £30. Star NL10 £239 (£244) £279. Interfaces for NL10 £41 (£41) £45. Brother M1109 £220 (£224) £265. Shinwa CTI CP480+ £193 (£196) £233. Cannon PW1080A £399 (£312) £363. Micro-peripherals MP165 £223 (£222) £269.

SWANLEY ELECTRONICS

The Computer Export Specialists

Dept. YC, 32 Goldsel Rd., Swanley, Kent BR8 8EZ, England

Tel: SWANLEY (0322) 64851

Official orders welcome. UK prices are shown first and include post and VAT. The second price in brackets is for export customers in Europe and includes insured airmail postage. The third price is for export customers outside Europe (including Australia etc) and includes insured airmail postage.

FEATURES • COMPETITIONS • NEWS REVIEWS • CHARTS AND MORE

NEW ISSUE EACH WEEK !!!

NEW!



NEW!

THE NEW WEEKLY POP MUSIC INFORMATION PACKAGE ON CASSETTE FOR YOUR SPECTRUM 48K/128K

FIRST ISSUE OUT FEB. 6th 1987

To order your SHAKE write to: SHAKE, SUITE 3.2, Dept. YC., EPIC HOUSE, CHARLES STREET, LEICESTER LE1 3SH, sending cheque or postal order.

- ☐ I enclose £1.49 for the current issue of SHAKE.
☐ I enclose £7.25 for the next five issues of SHAKE.
✓ Tick as appropriate.

Name

Address

Signature

Currently available issue dispatched for all orders unless otherwise stated. Postage free within UK. Europe and Eire add 30p postage per issue ordered. Rest of world add £1.20 per issue for airmail.



£1.49



£1.49



SUPERTEC COMPUTER OFFERS



AMSTRAD

PC 1512 SM	£516.35
PCW 8526	£458.85
PC 1512 DM	£642.85
PCW 8512	£573.85
PC 1512 SC	£711.85
PC 1512 DC	£838.35

PC 1512 SOFTWARE

Wordstar 1512	£69.95	Sidekick	£29.95
Supercalc 3	£69.95	Various Games (Eg. Pitstop II)	£19.95

PRINTERS... PRINTERS... PRINTERS

Including: EPSON • BROTHER • MANNESMANN TALLY

STOP PRESS!

Call for details of NEW Mannesmann MT910

LASER PRINTER

PERSONAL SHOPPERS WELCOME
MON - FRI
9 a.m. - 5 p.m.



BULLETIN BOARD
0268 293639 (24 HOURS)
300 BAUD

ATARI

MANY ST SYSTEMS
AVAILABLE FROM
STOCK - CALL FOR DETAILS
Eg. 520 STM From £343.00

ST GAMES

E.G. STAR GLIDER
DEEP SPACE - ARENA
SUNDOG - THE PAWN
HACKER - SILENT SERVICE
FLIGHT SIMULATOR II
PLUS MANY MORE

ST SOFTWARE

Including:
KUMA - HABA - ATARI - PHILON
CASHLINK - SOFTWARE PUNCH
CHIPSOFT (ST ACCOUNTS)
BATTERIES INCLUDED
Call for details and prices

CUMANA D/D DRIVES FOR ST

CSA 354 (Single) £159.00 CSA 358 (Twin) £269.00

DISKS

5 1/4" SS/DD (Pack of 10)	£7.50
3 1/2" DS/DD	£2.50 ea.
3 1/2" SD/DD	£1.95 ea.

MODEMS by Miracle Technology

WS2000	£125.00
WS4000	
Auto-dial/Auto-answer	£172.44

SUPERTEC LTD. CORNWALLIS HOUSE, HOWARDS CHASE, BASILDON, ESSEX SS14 3BB Tel (0268) 282308

Inexpensive indexing

The introduction of the Amstrad PC1512 has been followed by a mass of inexpensive software. Here Paul Hendy looks at some databases.



There are several important criteria to consider when buying a database. How much information is to be stored? Should it be simple to use or extremely powerful? Should it use drop-down menus or the mouse? How much does it cost?

Many people expressed doom and despondency when Alan Sugar launched the PC, because it was felt that entering the IBM market meant that users would have to pay hundreds of pounds for software. Those three magic letters seemed to be a licence to add £200 to the price of any word processor or database.

That, however, has in many cases proved not to be so. Many manufacturers have either initiated a new pricing policy whereby they can offer substantial reductions specially for Amstrad machines or, by some miracle/coincidence, all the software development costs have now finally been covered so they can now reduce the price accordingly for all machines. Whichever you believe, the result is cheaper, high-quality software.

With good databases you can often link more than one datafile and that is almost essential in any serious application. A small shop will need a file of customers, accounts, stock and suppliers and they all need to be integrated. A relational database will enable you to type-in a customer's name and the address will be supplied

automatically, assuming it is on file; type-in the product and you will be informed whether it is in stock, the price, and delivery date; generate an invoice and store the transaction on the accounts file; and notify the supplier automatically when your stock level runs low.

Several databases were tried on the Amstrad PC and all appeared to behave normally, having been designed to run under the MS-DOS operating system of the IBM machine. There is an important difference in the prices of the

disc. Of all the packages it has the smallest manual and, though well-written, it lacks some detail and could be better organised.

There is a tutorial section whereby you follow the instructions on the left half of the page, while the right half provides a small explanation of what is happening. That proved to be a helpful way of learning the database and, with the good use of menus on the screen, it was easy to learn how to manipulate data.

There is a two-tier passport arrangement for supervisors to

able to export data in pure ASCII form for mail-merging with *NewWord*, it has much to commend it.

Tas+ – it stands for The Accounting Solution – has a superbly-printed, spiral-bound manual, even though its writers tend to assume that all users are using a hard disc. There is a simple tutorial to follow and I strongly advise users to work through it, because it is a good form of training. It is a fine database to use, with drop-down menus all over the place to make the handling of data very easy. The system operates with a programming language – you can join several commands in special sequences to make your life easier, not having to type each one individually, and to enable the system to run more efficiently and faster.

Form painting

With this language you can design your database on the screen – known as form-painting – and when finished, *Tas* will write the appropriate program. You can then edit and add to the programs to incorporate more features as you become more proficient with the language. It is a relational database and can cope with 16 files open at the same time. It is not so powerful as *VPInfo* or *dBase III* but I understand a Mk2 version with go-faster stripes is on the horizon. For £69 it represents excellent value.

Discs and a ring binder of solid text with few illustrations make up the *Superfile* package



packages, so readers must take that into account when reading the comments.

New File can be obtained from NewStar, probably the best-known Amstrad software distributor, and comprises a small ring-binder manual and

be able to alter the data and for users able to view the data only. The menu options are largely self-explanatory, e.g., PRINT A REPORT, or AMEND DATABASE DEFINITION and, as a simple, no-nonsense database,

but do not be deterred by that. It is a powerful data management system worthy of further investigation. One of the really good features about Superfile is its logically equivalent field. If you are searching for all people who live in Aberdeen, but out of the three address fields, Aberdeen may be in field 2 or

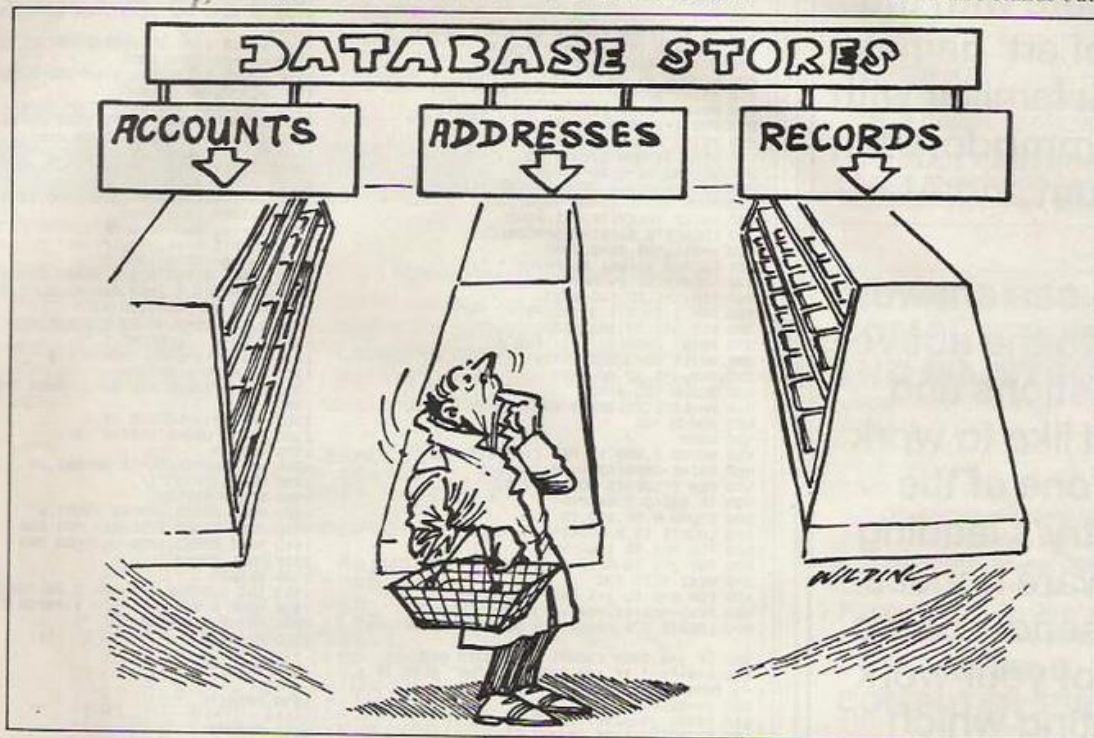
needed with Superfile because it is rather difficult to follow. The package contained a price list, revealing the staggering sum of £685 but on the reverse side it advertised a special Amstrad price of £200 – an encouraging trend. Superfile has established a solid reputation. Many schools/colleges use it on the RML

loops and IF-ELSE statements. dBase programs, called command files, are run with DO at the dot prompt – the dBase equivalent of the A> prompt of CP/M and MS-DOS.

dBase II can be purchased for approximately £120, with dBase III+ costing more. The latter, however, is

features. There are minor differences in the commands and the manual needs to be read from beginning to end. While that sounds like a truism, with the dBase manuals the arrangement is slightly different and you use sections as and when required.

Of the databases tried, VPIInfo stands out as the most



3. In which do you search? Superfile will allow you to search both, treating them both as an address field. To quote the manual: "It is very useful for handling any sort of shortlist of vaguely-defined qualities."

Accessing data

Superfile does not have its own built-in language as such. Instead the manual states that because Superfile joins on to the operating system and stays in the machine with any other program you may load, it is possible to interface with almost any standard language. A section of the manual explains in detail how data is stored, to enable programmers to access it from Basic, Cobol and so on. This is a very interesting concept, as it obviates the need to learn yet another language.

A good deal of reading is

Nimbus but I feel it needs to be made more approachable.

dBase II, the big daddy of all databases, was developed years ago for the American space programme and since then has become the yardstick by which others are measured. A newcomer would find it very slow and unfriendly, because it is at its most powerful once you have taken time to master the built-in programming language. The designer, Ashton-Tate, has upgraded to dBase III+, a true giant among databases, with two massive manuals and seven discs, one of which is a badly-needed tutorial.

Similar concepts

If you are conversant with a programming language such as Basic, learning dBase would be considerably easier, because the overall concepts are similar, with DO-WHILE

unbelievably powerful. A two-stage compiler is built-in, to convert your programs into a type of machine code able to run much faster and stored in a non-readable form, so that if you are selling an application commercially, customers cannot break in and pirate your source code.

VPIInfo is a clone of dBase III+ and so will be familiar to any who have used dBase II or III on other machines, including II on the PCW. The difference is that VPIInfo costs less than £100. The single manual is very thick, with thin paper, so plenty of reading is necessary to master this database.

Almost inevitably, I suppose, this aggressively-priced clone with apparently more features than the original, is from NewStar, home of NewWord, the clone of WordStar with more

powerful for the money, because it is a clone of the master – dBase III – with a built-in, single-stage compiler.

Tas will accept dBase files but is not completely compatible but for less than £70 it fulfils most needs in a delightful way.

Powerful

Superfile is difficult to understand but is clearly a very powerful system. Not being so popular as dBase, there are not many books to help.

The ultimate, in terms of weight, printed matter, discs, support books, and price must be dBase III+.

It is difficult to conceive of a database application which could not be solved by the package – and therefore VPIInfo as well.

GAMES PROGRAMMES

Tel: 01-685-1476

◆ Amstrad CPC range ● D. K. Huff

```

1060 dy=-dy:GOTO 1300
1070 SOUND 2,250,0,0,1:in=50:GOSUB 1340
1080 dy=-dy:IF dx=0 THEN dx=SGN(INT(RND*7-3
1090 GOTO 1100
1090 dx=CINT(RND)*dx
1100 IF dx=0 AND dy=0 THEN dx=ox:dy=oy:GOTO
1300
1130 GOSUB 1430:IF PEEK(24997)-1 THEN 1300
1140 dx=-dx:GOTO 1300
1150 SOUND 4,170,0,0,1:in=100:GOSUB 1340
1160 dy=-dy:GOTO 1300
1170 IF po<pn AND dx<1 THEN dx=dx+1
1180 IF po>pn AND dx>-1 THEN dx=dx-1
1190 IF x=26 AND dx=1 THEN dx=-1
1200 dy=-dy:SOUND 1,338,0,0,1:GOTO 1300
1210 IF PEEK(24996)*PEEK(24995)<>1 THEN 130
0
1220 ON PEEK(24997) GOTO 1300,1230,1230,130
0,1240,1260,1300,1290
1230 dy=-dy:dx=-dx:GOTO 1300
1240 LOCATE x+dx,y+dy:PRINT " ";
1250 dx=-dx:GOTO 1050
1260 SOUND 2,250,0,0,1:in=50:GOSUB 1340
1270 IF RND<0.5 THEN dx=-dx:dy=0:GOTO 1300
1280 dx=0:dy=-dy:GOTO 1300
1290 dy=-1:dx=0:SOUND 1,338,0,0,1
1300 LOCATE x,y:PRINT " ";
1310 x=x+dx:y=y+dy:LOCATE x,y
1320 PRINT("):RETURN
1340 IF sc<10000 AND sc+in>9999 THEN GOSUB
1380
1350 sc=sc+in:LOCATE 34,7
1360 PRINT USING"#####";sc;
1370 RETURN
1380 bal=bal+1:LOCATE 30+bal,24
1390 PEN 1:PRINT(");
1400 PEN 2:RETURN
1420 POKE 24990,y:POKE 24991,x
1430 POKE 24992,(256+dx) MOD 256
1440 POKE 24993,(256+dy) MOD 256
1450 CALL 25000
1460 RETURN
1480 INK 0,0:INK 1,6:INK 2,26:INK 3,18
1490 MODE 1:BORDER 1:PEN 1:PAPER 0
1500 PRINT STRINGS(31,"")
1510 PRINT" | | | | | | | | | |
| |
1520 PRINT" | |
| |
1530 PRINT" | |
| |
1540 PRINT" | |
| |
1550 PRINT" | |
| |
1560 PRINT" | |
| |
1570 PRINT" | |
| |
1580 PRINT" | |
| |
1590 PRINT" | |
| |
1600 PRINT" | | | |
| |
1610 PRINT" | |
| |
1620 PRINT" | |
| |
1630 PRINT" | | |
| |
1640 PRINT" | | | |
| |
1650 PRINT" | | | | |
| |
1660 PRINT" | | | | | |
| |
1670 PRINT" | | | | | | |
| |
1680 FOR j=1 TO 4
1690 PRINT" | | | |
| |
1700 NEXT
| |
1710 PRINT" | | |
| | | | | |
1720 PRINT" | |
| |
1730 PRINT" | | | | | | |
| |
1740 LOCATE 5,20:PRINT "I":
1750 PEN 3:FOR j=1 TO 29:READ x,y
1760 LOCATE x,y:PRINT "&";NEXT
1770 PEN 2:FOR j=1 TO 11:READ x,y
1780 LOCATE x,y:PRINT " ";NEXT
1790 MOVE 0,399:DRAW 320,0,1
1800 MOVE 0,0:DRAW 478,0
1810 LOCATE 33,2:PEN 3
1820 PRINT"PINBALL":RETURN

```



```

1850 SYMBOL 33,255,255,255,255,255,255,255,
255
1860 SYMBOL 35,255,127,83,31,15,7,3,1
1870 SYMBOL 36,128,192,224,240,248,252,254,
255
1880 SYMBOL 37,126,126,126,126,126,126,0,0
1890 SYMBOL 38,60,56,153,189,189,153,60,60
1900 SYMBOL 39,0,126,24,60,102,102,255,255
1910 SYMBOL 40,0,56,124,254,254,124,56,0
1920 SYMBOL 41,126,126,24,56,28,56,20,56
1930 SYMBOL 42,0,0,0,0,0,126,126,60
1940 SYMBOL 129,255,0,0,0,0,0,0,0
1950 SYMBOL 130,0,0,0,0,0,0,0,0,255
1960 ENV 1,6,-2,3:ENT 1,200,5,2
1970 FOR I=J TO 5:K(J)=1000:NEXT
1980 CALL &BC02:INK 2,18
1990 MODE 1:LOCATE 17,4
2000 PEN 1:PRINT"PINBALL"
2010 MOVE 256,332:DRAW 110,0,3
2020 LOCATE 13,7
2030 PRINT"by D. Huff"
2040 PEN 2:WINDOW 3,37,10,25
2050 PRINT" Guide the ball around the pinba
11"
2060 PRINT"table using the bat."
2070 PEN 1:PRINT
2080 PRINT" Controls :-<D> moves bat left"
2090 PRINT" <P> moves bat right"

```

```

2100 PRINT" <SPACE> releases the balls"
2110 PEN 3:PRINT
2120 PRINT"SCORES : '-100 pts & - 50 pts"
2130 PRINT:PRINT TAB(10)"Abrick - 20 pts"
2140 PEN 2:PRINT
2150 PRINT"A bonus ball is given at 10000 p
ts"
2160 PRINT:PRINT" Press any key to start"
2170 WHILE INKEY<>"":WEND
2180 CALL &BB18:RETURN
2240 DATA 42,158,97,58,160,97,132,103
2250 DATA 245,205,117,107,205,96,187
2260 DATA 221,33,163,97,205,218,97,42
2270 DATA 158,97,58,161,97,133,111,205
2280 DATA 117,187,205,96,187,221,35
2290 DATA 205,218,97
2300 DATA 241,205,111,187,205,96,187
2310 DATA 221,35,6,8,33,235,97,190,40,5
2320 DATA 35,16,250,6,1,221,112,0,201
2330 DATA 129,39,38,37,35,36,33,32
2340 DATA 21,2,27,2,19,3,29,3,18,4,30,4
2350 DATA 21,5,27,5,24,6,20,7,28,7,31,8
2360 DATA 24,9,6,10,15,11,19,11,15,12
2370 DATA 19,12,29,13,10,14,24,14,28,15
2380 DATA 5,16,5,17,17,17,5,18,16,18
2390 DATA 18,18,5,15
2400 DATA 3,1,6,1,9,1,12,1,15,1,23,2
2410 DATA 24,2,25,2,16,12,17,12,18,12

```

AMSTRAD SOFTWARE

Aliens	£9.05
Batman	(disc) £9.99
Spitfire 40	£7.95
Ace Flight Simulator	£7.95
Ace Flight Simulator	(disc) £10.95
Gauntlet	£8.05
Red Arrows	(disc) £6.99
Tapper	£7.95
Space Harrier	£9.99
Top Gun	£7.49
Silent Service	£7.99
Palitron	£7.99
Bridge 3	(disc) £7.99
Devils Crown	(disc) £7.99
'V'	(disc) £9.99
Heavy on the Magick	(disc) £7.99

Note new address:
MAIL ORDER, RETAIL, EXPORTS

FACULTY ENTERPRISES
7/7A, SHERWOOD CRESCENT,
MARKET DRAYTON, SHROPSHIRE

POWERHOUSE

◆ Any Spectrum ● T. Glover

The year is 1990 and already nuclear reactors are springing up everywhere. You have been assigned the job of destroying all the nuclear reactors before they build so much waste that they become a hazard.

To achieve this you must collect 10 power packs – the purple blobs – to enable you to destroy each reactor. Excellently programmed, the game features Currah Speech, pause feature and an excellent high score table.

```

0:REM POWERHOUSE
@ INFINITE SOFTWARE 1984
1 BORDER 0: PAPER 0: INK 6: C
LS : GO TO 15
2 BORDER 0: PAPER 0: INK 6: C
LS
3 CLEAR 32499: PRINT AT 10,10
: FLASH 1;"STILL LOADING"
5 LOAD ""CODE USR "A"
15 LET hs=5360: LET N$="CLEVER
TREVER": POKE 23650,8
16 LET S$="s(tt)op (DTH) (ee) (
TT) (aa)p"
17 CLS : FOR F=1 TO 140: PRINT
BRIGHT 1;AT 1,10; INK F/20+2;"S
TOP THE TAPE": NEXT F: PRINT AT
1,10; INK 6;"
22 PRINT AT 8,12;"POWERHOUSE"
AT 10,3;"WOULD YOU LIKE INSTRUCT
IONS": FOR F=1 TO 20: BEEP .1,20
: NEXT F
25 GO SUB 5000
27 IF INKEY$="Y" THEN GO TO 40
30 IF INKEY$="N" THEN GO TO 10
0
35 GO TO 27
39 REM INSTRUCTIONS
40 PRINT #1;AT 0,9; INK 0; PAP
ER 6;"POWER HOUSE"
50 PRINT #1;"DESTROY AS MANY
NUCLEAR REACTORSAS YOU CAN BY G
ETTING TEN POWER PACKS FOR EACH
ONE YOU EXPLODE.""WATCH OUT FO
R THE WALLS-THEY'RE ELECTRIFIED!
...AND IF YOU TOUCH THE NUCLEAR
WASTE YOU WILL ALSO BE DESTROYED
"
60 PRINT #1;"KEYS ARE>""
UP DOWN LEFT RIGHT""
0 A 0 P""
65 PRINT #1;" PRESS H TO
END THE GAME"
70 PRINT #1;"TAB 4; FLASH 1; P
APER 6; INK 0;"PRESS ANY KEY TO
PLAY"
75 FOR f=0 TO 50: BEEP .01,f:
NEXT f
80 PAUSE 0: COPY
99 REM START NEW GAME
100 FOR f=0 TO 50: BEEP .01,f:
NEXT f
120 LET aa=1: LET xx=0: LET pp=
0: LET al=0
150 LET sc=0
159 REM START NEW LEVEL

```

HOME & BUSINESS COMPUTER REPAIR AND MAINTENANCE

Approved Amstrad/Sinclair Service Centre

SPECTRUMS	£19.50
CBM C64+4	£29.50
CBM C128 AND 1541	£35.00
AMSTRAD COMPUTERS	£35.00

Other Computers phone for prices

All prices fully inclusive

Returned by insured COD Post

Carry in repairs from £12.50 + parts + VAT
Printers, Monitors, Disc Drives also repaired

Dealer Enquiries welcome

SHIELD COMPUTER SERVICES

Freeport,

Urmston, Manchester M31 2HX

Telephone: 061 747 0515

2 miles from Junction 3 M63 Motorway

Free Parking

Formerly GJS Computer Services

BITS AND PCs

VAST RANGE OF EX STOCK COMPUTERS
AVAILABLE INCLUDING:

- Amstrad CPC464 and CPC6128
- BBC B
- Spectrum 48K+ Starter Packs
- Atari 800 XL with disc drive
- Acorn Electron
- Commodore C64
- Vic 20
- C16
- Commodore Power Packs £18

Send S.A.E. for full price lists

Computers start from £30

Telephone enquiries welcome on (0536) 516709

Also available:

5.25in. discs from £4.00

3.50in. DDS set of ten with Library Case from £18

BITS AND PCs

6 Alness Close, Kettering,
Northamptonshire NN15 5BJ

MICRO MARKET

GOEL COMPUTER SERVICES

45 Boston Road, London W7 3SH
01 579 6133

COMMODORE 64

Title	R.R.P.	OUR PRICE
Skyrunner	£9.95	£7.25
Top Gun	£8.60	£6.60
Antirad	£8.99	£6.60
Uchi Mata	£8.95	£6.60
Fist II	£9.95	£7.25
Biggles	£9.95	£6.60
Ace of Aces	£9.95	£7.25
Kettle	£8.95	£6.60
Lightforce	£8.95	£6.60
World Games	£9.95	£7.25
AlleyKat	£8.95	£6.60
Graphic Adventure Creator	£22.95	£18.00
Space Harrier	£9.95	£7.25
Gauntlet	£9.95	£7.25
Cobra	£8.95	£6.60
Tomahawk	£9.95	£7.25
Blood and Guts	£9.95	£7.25
Leaderboard Golf	£9.95	£7.25
Infiltrator	£9.95	£7.25
They Sold a Million III	£9.95	£7.25
Five Star Games	£9.95	£7.25
Computer Hits III	£9.95	£7.25
Breakthru	£9.99	£7.25
Howard the Duck	£9.99	£7.25
Labyrinth	£9.99	£7.25
Marble Madness	£9.95	£7.25
Arcticfox	£9.95	£7.25

AMSTRAD

Title	R.R.P.	OUR PRICE
Graphic Adventure Creator	£22.95	£18.00
Silent Service	£9.95	£7.25
Top Gun	£8.95	£6.60
Jailbreak	£8.95	£6.60
Space Harrier	£8.95	£6.60
Elite	£14.95	£11.75
They Sold a Million III	£9.95	£7.25
Five Star Games	£9.95	£7.25
Scooby Doo	£8.95	£6.60
Computer Hits III	£9.95	£7.25
Elite Hit Pack	£9.95	£7.25
Rogue Trooper	£8.95	£6.60
Ikari Warriors	£14.95	£11.75
Trivial Pursuit	£9.99	£7.25
Tempest	£8.95	£6.60
Legend of Kage	£9.95	£7.25
Gauntlet	£9.95	£7.25
3" Discs	£5.00	£4.00

Fuji 5 1/4" discs colour DS/DD £19.50 box of 10

Printer ribbons: re-inking £2.00 black, £3.50 red, blue green, purple yellow.

This is just a small selection from our stock. Just write the titles required with a second choice and enclose cheque/P.O. (add 75p for overseas orders per tape) or send 40p for list, refundable on first order.

SPECIALS

AMSTRAD PCW8256/8512

Hardware	
RS232/Centronics	£56.95
CF2 Disks	each £3.90
CF2 Disks	Box of 10 £36.25
Dust Cover Set	£7.98
Printer Ribbons	2 for £10.85

Software	
ADVICE ON SELECTION AND SET UP OF SOFTWARE IS AVAILABLE	
dBase II	£99.95
DELTA	£91.00
Cambase 2	£40.44
Cracker 2	£42.88
Newword 2 and Word+	£60.38
Prospell	£24.29

SINCLAIR QL	
Microdrive cartridges now in stock	
6 for £10	
12 for £18	
Sandy Mouse	£85.00
Dust Cover	£3.15
Super Q Board 512K (with toolkit 2)	£239
512K Expanderam	£115.00
10 3 1/2" DS/DD disks	£25.00

SEE PRESTEL FOR LATEST (*258880061)

Prices include VAT & POSTAGE
THESE ARE JUST A SELECTION -
PHONE FOR FURTHER DETAILS
Subject to availability

PERIPHERY

117 GAINSBOROUGH AVE.,
OLDHAM OL5 1AJ. TEL: 061 626 5802

```

200 BORDER 0: PAPER 0: INK 9: C
L5
250 LET X=10: LET Y=10
300 GO SUB 9200
350 REM PRINT REACTORS
400 FOR F=1 TO 33: PRINT INK 6;
BRIGHT 1; AT RND*15+3, RND*25+3;
Y: NEXT F
1999 REM MOVE PLAYER
2000 IF INKEY$="O" THEN PRINT AT
X,Y; " ": LET Y=Y-1
2010 IF INKEY$="P" THEN PRINT AT
X,Y; " ": LET Y=Y+1
2020 IF INKEY$="A" THEN PRINT AT
X,Y; " ": LET X=X+1
2030 IF INKEY$="Q" THEN PRINT AT
X,Y; " ": LET X=X-1
2039 REM HOLD
2040 IF INKEY$="H" THEN PRINT AT
10,10; INK 3; PAPER 6; FLASH 1;
"GAME SUSPENDED": FOR F=1 TO 50:
BORDER 3: NEXT F: PAUSE 0: PAUS
E 0: PRINT AT 10,10; PAPER 0; "
": BORDER 0
2049 REM TEST FOR WALL
2050 IF Y<>11 AND Y<>22 AND X<1
OR Y<>11 AND Y<>22 AND X>20 OR Y
<>11 AND Y<>22 AND X<1 OR Y<>11
AND Y<>22 AND X>20 OR Y<1 OR Y>3
0 THEN GO TO 9500
2059 REM GO THROUGH GAPS
2060 IF X=0 AND Y=11 OR X=0 AND
Y=22 THEN LET X=20
2070 IF X=21 AND Y=11 OR X=21 AN
D Y=22 THEN LET X=1
2074 REM PRINT EXTRA REACTORS
2075 IF RND*100<3 THEN PRINT INK
6; BRIGHT 1; AT RND*15+3, RND*25+
3; Y:
2075 REM TEST SCREEN
2080 IF ATTR(X,Y)=70 AND PP<10
THEN GO TO 9500
2081 REM CHECK FOR REACTOR
2082 IF ATTR(X,Y)=70 THEN PRINT
AT X,Y-1; PAPER 0; "100": GO SUB
9500: LET XX=XX+1: LET PP=PP-10
: LET SC=SC+100: PRINT AT X,Y-1;
1
2085 IF XX=33 THEN GO TO 9700
2089 REM CHECK FOR POWER PACK
2090 IF ATTR(X,Y)=3 THEN FOR F=
1 TO 7: PRINT AT X,Y; INK F; "o":
NEXT F: POKE 32507,0: LET L=USR
32500: LET SC=SC+10: LET PP=PP+
1
2094 REM CHECK FOR FALLOUT
2095 IF ATTR(X,Y)=68 THEN GO TO
9500
2099 REM PRINT PLAYER & SCORE
2100 IF AL=0 THEN PRINT AT X,Y;
INK 5; BRIGHT 0; "O": LET AL=0
2150 PRINT #1; AT 1,0; PAPER 2; "S
CORE>"; SC; AT 1,12; "LEVEL>"; 33; AT
1,22; "POWER>"; PP; "
2160 IF PP<10 THEN PRINT #1; AT 0
,4; FLASH 1; INK 7; "YOU NEED SOM
E POWER PACKS"
2170 IF PP>=10 THEN PRINT #1; AT
0,0; "
2200 GO SUB 3000
2300 GO TO 2000
3000 REM PRINT P/P & FALLOUT
3010 LET A=RND*19+1: LET B=RND*2
9+1
3015 PRINT AT A,B; INK 3; BRIGHT
0; "
3020 IF ATTR(A,B+1)=70 THEN PRI
NT AT A,B+1; "
3025 IF ATTR(A,B-1)=70 THEN PRI
NT AT A,B-1; "
3030 LET A=RND*19+1: LET B=RND*2
9+1
3040 PRINT BRIGHT 1; INK 4; AT A,
B; "
3050 IF ATTR(A,B+1)=70 THEN PRI
NT AT A,B+1; "
3060 IF ATTR(A,B-1)=70 THEN PRI
NT AT A,B-1; "
3150 RETURN
5000 REM MACHINE CODE SOUND
5005 RESTORE
5010 FOR F=32500 TO 32525: READ
C: POKE F,C: NEXT F
5030 FOR F=32530 TO 32596: READ
C: POKE F,C: NEXT F
5040 FOR F=32530 TO 32549: READ
C: POKE F,C: NEXT F

```



```

5050 RETURN
5100 DATA 6,1,197,33,0,3,17,1,0,
229,205,181,3,225,17,18,0,167,23
7,82,32,240,193,16,233,201
5300 DATA 33,0,2,43,125,211,254,
06,1,05,32,-3,175,132,200,24,-14
5400 DATA 6,5,197,6,0,197,6,198,
120,211,254,16,-5,193,16,-11,193
,16,-17,201
9200 REM PRINT WALL
9205 PRINT INK 4; BRIGHT 1;
9210 FOR f=1 TO 21: PRINT INK 4;
BRIGHT 1; AT f,0; " "; AT f,31; " "
9250 NEXT f
9250 PRINT INK 4; BRIGHT 1; AT 21
,0; " "
9270 INK 9
9300 RETURN
9500 REM END GAME
9510 PRINT #1; AT 0,0; " "
9511 IF PP>=10 OR ATTR (X,Y)<>70
THEN LET D=USR 32530: PRINT #1;
AT 1,0; INVERSE 1; " YOU GOT ELEC
TRIFIED-TRY AGAIN! " : LET S$="Y(
OUU)GGG)O(T) (ee)LE(CK)t(r)(i)
(F)(II)(ee)(DD) . (T)r(ii) A(GGG
) (ay)n"
9514 PAUSE 100
9515 IF PP<10 AND ATTR (X,Y)=70
THEN PRINT #1; AT 1,0; FLASH 1; "
YOU DIDN'T HAVE ENOUGH POWER "
FOR F=1 TO 100 STEP 3: POKE 32
585,F: RANDOMIZE USR 32580: NEXT
F
9520 FOR f=50 TO 0 STEP -3: BEEP
.02,f: NEXT f
9530 IF SC>HS THEN PRINT PAPER 2
; INK 5; FLASH 1; AT 21,1; "YOU HA
VE BEATEN THE HIGH SCORE": LET S
$=" " : POKE 23658,8: INPUT "ENTER
YOUR NAME>>"; N$: LET HS=SC
9533 IF N$( TO 3) <> "CLE" THEN LE
T S$=" (CK) 'ON(GGG)RA(TT) (Y) (OO)L
(AY) (SH)UN(Z) "
9535 FOR f=0 TO 21: PRINT AT f,0
; PAPER 0; " " : NEXT f
9536 PRINT AT 6,5; " "
9537 FOR F=7 TO 15: PRINT AT F,5
; " " : AT F,26; " " : NEXT F
9538 PRINT AT 15,5; " "
9540 PRINT AT 8,8; "LEVEL>>"; aa; A
T 10,8; PAPER 2; "YOU SCORED>>"; S
C; AT 12,8; "HIGH SCORE>>"; HS; AT 1
4,8; "BY "; N$
9544 IF N$="CLEVER TREVER" THEN
LET S$=" (H) (II) (S) (CK) (OR) (BB)
(II) KLE(V) (ER) (T)R(e) (U) (ER) "
9545 IF aa<2 THEN PRINT AT 0,12;
"LEARNER"
9546 IF aa>1 AND aa<5 THEN PRINT
AT 0,13; "NOVICE"
9547 IF aa>4 AND aa<8 THEN PRINT
AT 0,11; "MODERATE"
9548 IF aa>7 AND aa<11 THEN PRIN
T AT 0,10; "VERY GOOD"
9549 IF aa>10 AND aa<21 THEN PRI
NT AT 0,10; "EXCELLENT"
9550 IF aa>20 THEN PRINT AT 0,6
; "COMPUTER WHIZZ KID": FOR f=1 T
O 50: PRINT OVER 1; PAPER INT (R
ND*5+2); AT 0,6; " " : BEEP .005,f: NEXT f
9560 PRINT #1; AT 1,0; " " ANOT
HER GAME? (Y/N)
9570 IF INKEY$="Y" OR INKEY$="Y"
THEN GO TO 100
9580 IF INKEY$="N" OR INKEY$="N"
THEN CLS : PRINT AT 10,10; FLAS
H 1; INK 2; PAPER 6; "START THE T
APE": LET S$="ST(AR) (TT) (DTH) (E
E) (TT) (AR)P": FOR F=0 TO 300: N
EXT F: LOAD " "
9590 GO TO 9560
9700 REM CHANGE LEVEL
9705 LET S$="(N)e(CK) (s)t Le(V)U
(L) "
9710 FOR f=1 TO 19: PRINT AT f,1
; " " : NEXT f
9720 LET aa=xx+1
9730 LET xx=0
9740 BORDER AND*7
9750 GO TO 200
9800 REM EXPLOSION
9810 LET A$="OOO"
9815 POKE 32588,50: FOR F=1 TO 1

```

MICRO MARKET

SPECTRUM — AMSTRAD — COMMODORE

NOBLES COMPUTER REPAIRS

* Repairs carried out by our own engineers on site.
* All repairs carry a 4 MONTH GUARANTEE
For estimates phone or send your computer to NOBLES.

Spectrum Plus £16.95 inc parts
post and pack
Commodore 64/VIC 20 from £8.95 plus
parts
BBC from £18.95 plus
parts

Also repair specialists for Amstrad and MSX computers

NO HIDDEN CHARGES

★SPECIAL OFFER

5 FREE GAMES WORTH £25

with each Spectrum repair Trade/School and Club dis-
counts arranged.

*For free, no obligation estimates phone or send your
computer to NOBLES for the fastest, cheapest repairs in
ESSEX.

NOBLES

14-17 Eastern Esplanade
Southend-on-Sea

Essex

0702 63377/8

63336/7/8/9

7 days a week, 24-hour Answering Service

SPECTRUM — AMSTRAD — COMMODORE

BRANDED DISKS Incredible prices

Price per box of ten

3in. Maxell CF2	£34.50
3 1/2in. Verbatim Datalife SS DD 135tpi OMD3440	£21.75
3 1/2in. Sony SS DD 135tpi MF350	£19.45
3 1/2in. Memorex DS DD 135tpi MX3460	£24.30
5 1/4in. Verbatim Datalife SS DD 48tpi MD525	£12.75
5 1/4in. Verbatim Datalife DS DD 48tpi MD550	£15.35
5 1/4in. Verbatim Verex SS DD 48tpi MD200	£11.00
5 1/4in. Verbatim Verex DS DD 48tpi MD250	£12.45
5 1/4in. Maxell DS DD 48tpi MD2-D	£15.00

All inclusive prices. No extra to pay.

Please make cheques and postal orders
payable to:

ORIOLE LTD

Government and educational orders welcome

Dept. XB3, P.O. Box 297, London N3 2TS

ALL IN STOCK
RDC SPECIALISTS

S. P. ELECTRONICS

Amstrad 6128 Green	£290.00	Colour	£390.00
Amstrad 8256	£458.00		
CPA 80 Printer (inc. cable)	£190.00		
Full Cumana range	From £89.00		
ACORN 1770 DFS	£40.95		
G3 WHO RTTY PROGRAM (TAPE)	£7.50		
G3 WHO RTTY PROGRAM (EPROM VERSION)	£20.00		
Circuit board for RTTY decoder Mk. 3 (inc. instructions)	£7.00		
CANNON Dot Matrix 160cps NLQ	£299.00		
Joysticks (pair) self centering + analogue	From £17.95		
Printer Cable (Centronics)	£12.90		
Speech Synthesis	£35.00		
Disc Doctor	£33.00		
WORDWISE Word Processor	£39.00		
Cumana CD800S 40/80 psu	£250.00		

FULL REPAIR SERVICE AVAILABLE

Wide selection of software, books, loads, plugs, etc.
SAE for full list. All available Mail Order
All prices apply while stocks last - carriage extra

48 Linby Road, Hucknall, Notts.
NG15 7TS
Tel: 0602 640377
All prices include VAT

MICRO MARKET

MICRO WORKSHOP

Games or business software
at

★ **DISCOUNT PRICES** ★
For Amstrad, Spectrum and Commodore

★ **BARGAINS** ★
on Peripherals and Computer Supplies

★ **REPAIRS** ★
Send 40p for price list (refundable from first order) stating type of computer and quote ref. no. YC0187

**12 STATION APPROACH,
EPSOM, SURREY**
Telephone: 03737 21533

SAVE BEST PRICES IN UK? WHY PAY MORE!

BBC	
MASTER 120K	£290 + VAT
MASTER COMPACT (TV system)	£284 + VAT
MASTER COMPACT (Mono system)	£454 + VAT
MASTER COMPACT (Colour system)	£584 + VAT

Plus EXTRA £10 Voucher off our already discounted printer prices

MicroP MP185 (Dot matrix printer)	£195 + VAT
STAR POWERTYPE (Daisywheel printer)	£195 + VAT
Philips TV1114 (TV Monitor)	£170 + VAT
ATPL Sideways Rom Boards	£38 + VAT

MINIMUM 10% off all printers (Canon, Citizen, Epson, Mamek, Micro, Peripherals, Sekissha, Shinwa, Star) Plus AKHTER/CUMANA/PAGE Doc drives at discount

AMSTRAD	
CPC 6128	£325 + VAT
PCW 8256	£379 + VAT
PCW 8512	£475 + VAT
PC range	
PC 1512 50-MM	£389 + VAT
PC 1512 90-MM	£489 + VAT
PC 1512 HD10-MM	£689 + VAT
PC 1512 HD20-MM	£789 + VAT

ADD £150 for COLOUR Monitor

AT SAGE/CANTON software for 8256/8512 at 15% OFF

SAGE/GEM/SUPERCALC/WORDSTAR for PC1512 at 10% OFF

COMMODORE	
Compendium	£209 + VAT
Commodore's Pack	

WILLOW SOFTWARE (YC2)

Prices include THE WILLOWS, WRINGTON LANE
p&p CONGRESBURY, BRISTOL BS19 5BQ
ADD 15% VAT Tel: (0934) 834056

Many others available all at discount - ask for a quote

SINCLAIR REPAIR SPECIALISTS

SPECTRUM/+ REPAIRS £12.00
KEYBOARD FAULTS £9.00 - £13.00
PERIPHERALS Price on application

ALL PRICES FULLY INCLUSIVE OF LABOUR,
PARTS, VAT + P&P

3 MONTHS GUARANTEE

I. T. (WESTERN) ELECTRONICS
UNIT F2A + F3

AVONSIDE ENTERPRISE PARK
NEW BROUGHTON ROAD
MELKSHAM, WILTSHIRE
Telephone: 0225 705017

```
0: LET D=USR 32580: BORDER 0: NE
XT F
9816 LET ss="Ue(LL) (DD) (U)n"
9820 FOR f=1 TO LEN ss
9830 FOR g=0 TO 2
9840 PRINT PAPER 0: INK f+3: BRI
GHT 1: AT X-G,Y-G: AS(F): AT X+G,Y+
G,AS(F): AT X+G,Y-G: AS(F): AT X-G,
Y+G: AS(F)
9850 NEXT G
9860 NEXT f: RETURN
9998 REM SAVE
9999 SAVE "POWERHOUSE" LINE 2: 3
AVE "XOHI" CODE USR "A",21+0:
VERIFY ""
9845 PRINT PAPER 0: INK F+3: BRI
```

```
GHT 1: AT X-G,Y-G: AS(F): AT X+G,Y+
G,AS(F): AT X+G,Y-G: AS(F): AT X-G,
Y+G: AS(F)
9850 NEXT G
9860 NEXT f: RETURN
9998 REM SAVE
9999 SAVE "POWERHOUSE" LINE 2: 3
AVE "XOHI" CODE USR "A",21+0:
VERIFY ""
```

GUESS THE PAIR

◆ Any Spectrum ◆ N. Panagiotides

Although neither arcade nor adventure, this game will be familiar to almost everyone who types it in. Based on the all-time classic card game, as featured many times on Play School, this version of Pairs uses a five by four grid, for a total of 20 squares - 10 pairs.

The object of the game is to match each of the 10 pairs as quickly as possible. Once this has been achieved, the computer will tell you how long you took and then generate a completely new and random grid.

```
30 BORDER 6: PAPER 6: INK 1: C
LS
40 FOR i=1 TO 10
50 READ h$
60 FOR j=0 TO 7
70 READ gr: POKE USR h$+j,gr
80 NEXT j: NEXT i
90 DIM a(20): DIM b(10)
100 GO SUB 1100
102 GO SUB 1200
104 LET cnt=0: PRINT AT 21,3: "
": PRINT AT 0,16
;cnt;" ": PRINT AT 20,14;"
```

```
110 GO SUB 2200
122 DEF FN f()=65536*PEEK 23674
+255*PEEK 23673+PEEK 23672
124 LET t1=FN f()
126 IF INKEY$="" THEN GO TO 126
128 LET b$=INKEY$
130 IF INKEY$<>"" THEN GO TO 13
0
140 LET g$=b$: GO SUB 6600
142 IF c*(21-c)<=0 THEN GO TO 1
26
144 GO SUB 7700
146 IF ch=1 THEN GO TO 126
150 LET w1=a(c): GO SUB 3300
154 IF INKEY$="" THEN GO TO 154
156 LET b$=INKEY$
160 IF INKEY$<>"" THEN GO TO 16
0
```

```
164 IF b$=g$ THEN GO TO 154
170 GO SUB 6600
180 IF c*(21-c)<=0 THEN GO TO 1
54
```

```
184 GO SUB 7700
186 IF ch=1 THEN GO TO 154
190 LET w2=a(c): GO SUB 4400*(w
1=w2)+5500*(w1<>w2)
192 IF cnt=10 THEN GO TO 8010
200 GO TO 126
1000 REM prints the *'s
1100 FOR i=2 TO 18 STEP 4: FOR j
=6 TO 26
1110 PRINT AT i,j;"*"
1120 NEXT j: NEXT i
1130 FOR j=6 TO 26 STEP 4: FOR i
=2 TO 18
1140 PRINT AT i,j;"*"
1160 NEXT i: NEXT j
1170 RETURN
1190 REM prints the letters
1200 FOR i=1 TO 4: FOR j=1 TO 5
1210 PRINT AT 4*i,4*j+4;CHR$(5*
(i-1)+j+96)
1220 NEXT j: NEXT i
1230 RETURN
2000 PEM makes an arbitrary corr
espondance of letters to figures
```



```

2200 FOR i=1 TO 20: LET a(i)=i:
NEXT i
2210 RANDOMIZE
2220 FOR j=1 TO 19
2230 LET i=INT ((20-j)*RND)+j+1
2240 LET ex=a(j): LET a(j)=a(i)-
10*(a(i)>10): LET a(i)=ex
2250 NEXT j
2252 LET a(20)=a(20)-10*(a(20)>1
0)
2260 RETURN
3000 REM prints the figures corr
esponding to the pair one hits
3300 LET v=INT ((c-1)/5): LET w=
c-5*v
3310 PRINT AT 4*(v+1),4*(w+1);CH
R$ (143+w1)
3320 RETURN
4000 REM two correct hits
4400 LET cnt=cnt+1
4404 LET b(cnt)=w1
4410 PRINT AT 0,16;cnt
4420 GO SUB 3300: BEEP .2,28
4430 RETURN
5000 REM two bad hits
5500 LET w1=w2
5510 GO SUB 3300: BEEP .7,-8
5520 LET f=CODE g$-97: LET d=CODE
E b$-97
5530 LET f1=INT (f/5): LET f2=f-
5*f1+1
5540 LET d1=INT (d/5): LET d2=d-
5*d1+1
5550 PRINT AT 4*(f1+1),4*(f2+1);
g$;AT 4*(d1+1),4*(d2+1);b$
5560 RETURN
6000 REM
6600 LET c=CODE b$-96: RETURN
7000 DATA "a",28,28,28,8,127,28,
28,20
7010 DATA "b",0,20,20,34,34,34,3
4,62
7020 DATA "c",0,2,6,14,30,62,126
,0
7030 DATA "d",0,31,4,142,255,159
,14,0
7040 DATA "e",0,60,126,213,126,6
0,66,66
7050 DATA "f",4,12,29,127,29,12,
4,0
7060 DATA "g",0,60,36,126,255,66
,0,0
7080 DATA "h",0,126,124,120,112,
96,64,0
7090 DATA "i",16,16,56,124,254,1
6,56,0
7100 DATA "j",8,12,14,15,14,8,12
7,63
7500 REM checks if letter previo
usly hit
7700 LET ch=0
7710 FOR i=1 TO cnt
7720 LET ch=ch+(b(i)=a(c))
7730 NEXT i: RETURN
8010 LET t2=FN f(): PRINT AT 20,
14;(t2-t1)/50;" sec"
8020 PRINT AT 21,3;"again?(y/n)"
8030 IF INKEY$="" THEN GO TO 803
0
8031 LET w$=INKEY$
8032 IF INKEY$<>"" THEN GO TO 80
32
8040 IF w$="y" OR w$="Y" THEN GO
TO 102
8050 IF w$="n" OR w$="N" THEN GO
TO 9000
8060 GO TO 8030
8080 SAVE "guess" LINE 1: VERIFY
""
9000 REM

```

MICRO MARKET

MEGA BYTE

Commodore CBM 64, C16/+4,
CBM128, Amiga
Atari 800XL, 130XE, ST.
Amstrad CPC, PCW, PC1512
Sinclair SPECTRUM, SPECTRUM+,+2

★ IBM LEISURE SOFTWARE ★

Suppliers of Software
and Hardware

**12, ETTRICK SQUARE
CUMBERNAULD
G67 1ND**

TEL: 0236 738 398

BRANDED DISKS (BOX of 10)

3" MAXELL CF2 £27.50
3.5" SONY MF2-2DD 135tpi £28.95
5.25" MAXELL MD2-D 48tpi DSDD £15.00
5.25" MAXELL MD2-DD 96tpi DSQD £19.95
5.25" MAXELL MD2-HD (IBM AT) £27.50

C.W.O. PRICES INCLUDE CARRIAGE & V.A.T. (C.O.D. ON REQUEST)

★ QUANTITY DISCOUNTS ★

e.g. 10 Boxes SONY MF2-2DD £21.95/BOX

JOHN HOLMES COMPUTERS

FULBECK, GRANTHAM, Lincs. NG32 3LD.



TEL: (0400) 72818

OFFICIAL GOVERNMENT & EDUCATIONAL ORDERS WELCOME

SPECTRUM REPAIRS

From £3-£19 incl. all parts,
labour and 3 month
Guarantee.

*From Bristol's Sinclair
Specialists*

MICRO FARE

296 Gloucester Road,
Horfield, Bristol
Tel: 0272 46575

21st CENTURY WARRIOR: Apache **GUNSHIP**

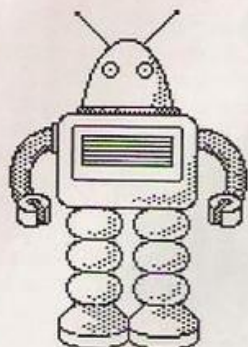


See your software dealer today and become a part of the GUNSHIP adventure! Challenge the enemy, the sky, and YOURSELF with this extraordinary simulation.

GUNSHIP for Commodore 64/128. Cassette £14.95, Disk £19.95

MICRO PROSE
SIMULATION • SOFTWARE

More good news from the front line!



As the year wears on, you find your money seems to shrink in purchasing power. This is one of the hitherto unexplained Laws of Nature...

In an effort to reverse these laws, Interface Publications has decided to do a warehouse clear-out, and give you the chance to build up an incredible library of computer books - for just one pound per book. Send us cold hard cash (we'll also grudgingly accept cheques, book vouchers or money orders, if you insist) and we'll get your books to you, el pronto!

Books which give you the power...
without the price!

[] Mastering Machine Code on your

Commodore 64
Mark Greenshield's
best-selling guide to give
you machine-code control
over your Commodore 64

BBC/ELECTRON

- ☐ Let your BBC Micro Teach You to Program
- ☐ Exploring Artificial Intelligence on your BBC Micro - Hartnell
- ☐ Putting your BBC Micro to Work
- ☐ Advanced Programming Guide to BBC - Jeremy Ruston
- ☐ Using the BBC Micro in Education - Clive Gifford
- ☐ 36 Challenging Games for the BBC Micro
- ☐ Creating Adventures on the BBC Micro
- ☐ 40 Best Machine Routines for BBC Micro - Ian Hutt
- ☐ Dynamic Games for the Electron - Neal Cavaller-Smith

ATARI

- ☐ Mastering the Atari 400/600/800
- ☐ Making the Most of 400/600/800

COMMODORE 64/128

- ☐ Exploring Artificial Intelligence on your Commodore
- ☐ Mastering the Commodore 64 - Mark Greenshields
- ☐ Challenging Games for the Commodore
- ☐ Putting your C64 to Work
- ☐ How to Program the C64
- ☐ Creating Arcade Games on your Commodore 64
- ☐ Creating Adventures on your Commodore 64
- ☐ MEGABASIC for the C64

APPLE IIc/IIc+/II+

- ☐ The 3-D Animated Apple
- ☐ How to Program the Apple II
- ☐ Outstanding Programs for Apple
- ☐ Challenging Programs for Apple

TEXAS TI 99/4A

- ☐ Dynamic Games TI 99/4A
- ☐ Making the Most of TI 99/4A

SINCLAIR QL

- ☐ Exploring the QL
- ☐ QL Games Companion
- ☐ The QL Handbook
- ☐ Exploring Artificial Intelligence on your QL

EDUCATION

- ☐ Using Computers in Education
- ☐ Art of Structured Programming
- ☐ Exploring Expert Systems
- ☐ Replicating Reality: Exploring Computer Simulations
- ☐ Easy Way to Program your New Computer

SPECIAL TITLES

- ☐ Dynamic Games for the Oric
- ☐ Creating Political & Military Simulation Games
- ☐ Beginner's Guide to FORTH
- ☐ Practical uses for the Micro in Home
- ☐ Capital Radio's Book of Simple Computer Programming

Interface Publications Ltd.,
9 - 11 Kensington High Street,
London W8 5NP
Please send me the indicated books.

Value of order (@ £1 a book) £ _____
PLUS 35p per book postage £ _____
Total for this order £ _____
*I enclose cheque/money order/
cold hard cash*

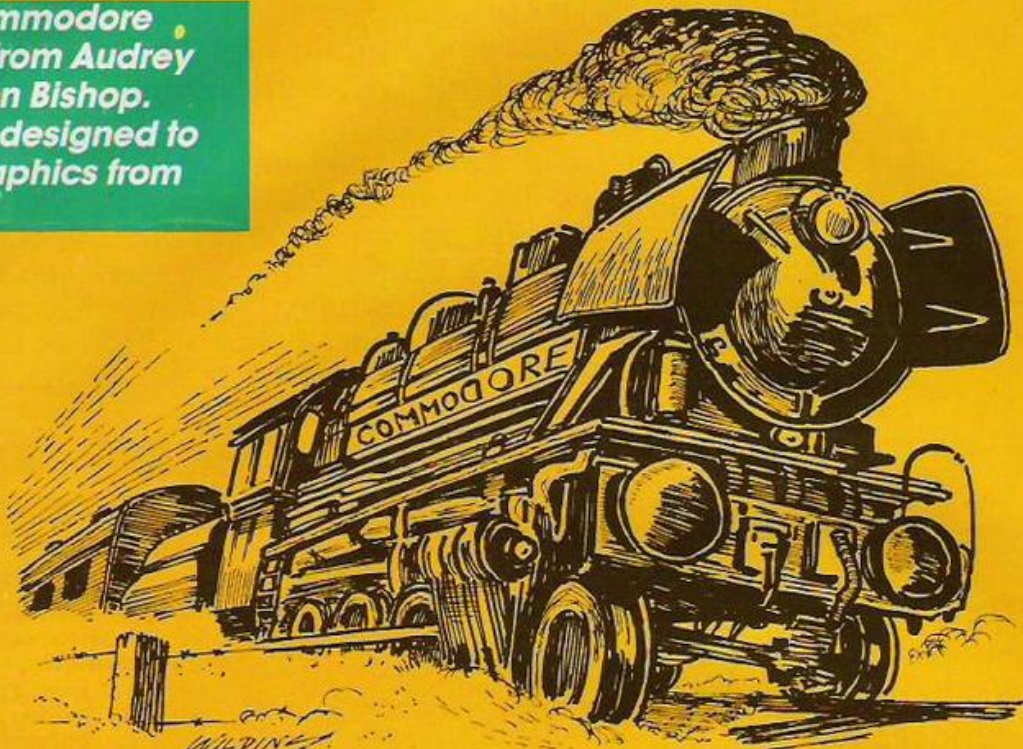
Name _____

Address _____

YCN/87

The Commodore line

More Commodore routines from Audrey and Owen Bishop. They are designed to move graphics from A to B.



Some machine code routines to help you use the CBM64 multi-colour bit-map mode were described last month. With this mode, pixels can be plotted individually in any one of eight colours. This month we add a routine which draws a straight line from point A to point B. We plotted lines last month but only by using Basic routines to calculate the co-ordinates of each pixel on the line. That made an interesting demonstration but is too slow for any graphics program in which many lines have to be drawn. With this month's routine, LINE, all you need to do is to specify the co-ordinates of A and B and then call the routine.

LINE has another advantage over a Basic line-drawing routine. Unless it is programmed carefully, a Basic routine may possibly leave gaps in the line from time to time. That may not matter for ordinary purposes but, if we intend to use a FILL routine to block in enclosed areas with solid colour, it is imperative that the lines have no gaps. If they do, FILL becomes SPILL. The LINE routine guarantees an unbroken line.

The principle of the routine is simple. In figure one we have the two points, A and B, with a straight line joining them. The shaded squares represent the pixels which must be set to the line colour to

draw the line. In the figure, the difference between the x-co-ordinates of A and B ($X_2 - X_1$) is more than the difference between the y-co-ordinates ($Y_2 - Y_1$). In other words, the line has a small gradient.

That being so, we begin at A and step along the line one pixel column at a time, plotting a pixel at each step. For each pixel we have to work out in which row it is to be. We first need to calculate the gradient of the line which, in the example of figure one, is $3/20 = .15$. Let us see what happens if we have a value - call it g - which we increment by 0.15 each

time we move to a new pixel column. We give g the value 0.5 initially, since the centre of pixel A is 0.5 pixels below its top. The sequence of incrementing x by 1 and g by 0.15 runs as shown in table one.

Every few steps, the digit to the left of the decimal point in g increases by 1. That is the step at which the line crosses from one row of pixels to the next. It is the step at which we need to increment y. In the example, y is incremented at columns 7, 13 and 20. The sequence ends with '.5' after the decimal point, since end B of the line is halfway down

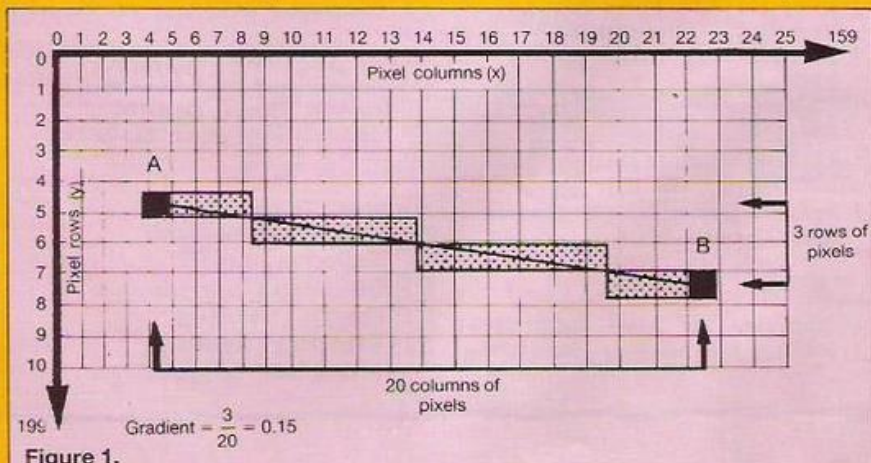


Figure 1.

from the top of the pixel at B. The result of this calculation produces the pattern of pixels shown in figure one. To sum up, we work along the line, incrementing x by 1 at each step and incrementing y by 1 whenever there is a carry-over. We call the PLOT routine to plot a pixel at each step.

That sounds simple but there are complications. The routine needs to be able to handle lines which slope in other directions. It may be necessary to decrement either x or y or both by 1 to obtain the required direction of slope. There is also the problem of what to do if the line is a steep one, with (Y2-Y1) being greater than (X2-X1). The obvious thing is to flip over the routine, exchanging x-parameters with y-parameters. After calculating x and y, we exchange their values again before calling the PLOT routine.

Amazing speed

Computation is complicated by the fact that we need to maintain accuracy in the calculation of g for up to 200 steps along the line. That makes it necessary to work with 16-bit binary fractions. It is amazing how fast the microprocessor copes with it all.

The code for the LINE routine is contained in the DATA statements of listing one, lines 1220-1490. Readers of last month's article will be glad to hear that lines 970 to 1210 are exactly the same as those given then. All you need to do is type-in the additional lines and adapt the graphics program. For the

Listing 1.

```
1 REM *** LINE ***
20 PRINT CHR$(147):PRINT "STORING CODE"
30 IF PEEK(33601) < 96 THEN FOR J=32768 TO
0 33601:READ X:POKE J,X:NEXT
40 SYS 32768
50 REM *****GRAPHICS PROGRAM *****
60 POKE 53281,5:POKE 40957,0:POKE 40958,
2:POKE 40959,3:REM COLOUR TO COL3
70 SYS 32815
80 POKE 40954,2:REM COLOUR NUMBER
90 POKE 40939,10:POKE 40940,5:REM X1,Y1
100 POKE 40941,150:POKE 40942,185:REM X2
,Y2
105 POKE 252,0:POKE 254,0
110 SYS 33173
120 FOR J=1 TO 4000:NEXT
900 REM *****END OF GRAPHICS PROGRAM*****
*
910 SYS 32971:POKE 53281,6:POKE 53282,14
920 PRINT CHR$(147):PRINT "PROGRAM FINISH
ED"
930 END
970 DATA 169,128,133,52,133,56,173,24,20
8,9,8,141,24,208,173,17,208,9,32
980 DATA 141,17,208,173,22,208,9,16,141,
22,208,173,2,221,9,3,141,2,221
990 DATA 173,0,221,41,252,141,0,221,96
1000 DATA 169,65,133,253,169,255,133,254
,169,64,133,251,169,31,133,252,162,0
1010 DATA 169,0,129,253,165,255,208,2,19
8,254,198,253,165,251,208,2,198,252,198
1020 DATA 251,208,254,165,252,208,230,32
,98,128,32,157,128,96
1030 DATA 169,251,133,253,169,199,133,25
4,169,232
1040 DATA 133,251,169,3,133,252,162,0,17
3,253,159,10,10,10,13,254,159,141
1050 DATA 253,159,173,253,159,129,253,16
5,253,208,2,198,254,198,253,165,251,208
1060 DATA 2,198,252,198,251,208,233,165,
252,208,229,96,169,251,133,253,169
1070 DATA 219,133,254,169,232,133,251,16
9,3,133,252,162,0,173,255,159
1080 DATA 129,253,165,253,208,2,198,254,
198,253,165,251,208,2,198,252,198,251
1090 DATA 208,253,165,252,208,229,96
1100 DATA 173,17,208,41,223,141,17,208,1
73,22,208,41,239,141,22,208
1110 DATA 173,24,208,41,247,9,4,141,24,2
00,173,2,221,9,3,141,2,221
1120 DATA 173,0,221,41,252,9,3,141,0,221
,96
1130 DATA 173,14,220,41,254,141,14,220,1
73,250,159,240,23,170,165,251,41,3,73
1140 DATA 255,56,105,3,168,208,4,138,24,
144,6,138,10,10,136,208,251,141,251,159
1150 DATA 169,0,133,254,133,252,165,251,
41,252,10,144,2,250,252,133,251,165,253
1160 DATA 41,7,141,252,159,165,253,41,24
8,10,38,254,10,38,254,10,38
1170 DATA 254,170,164,254,10,38,254,10,3
8,254,133,253,138,24,101,253
1180 DATA 133,253,152,101,254,133,254,24
,165,253,101,251,133,253,165,254
1190 DATA 101,252,133,254,24,173,252,159
,101,253,133,253,169,224,101,254,133
1200 DATA 254,160,0,165,1,41,253,133,1,1
77,253,170,165,1,9,2,133,1,138
1210 DATA 13,251,159,145,253,173,14,220,
9,1,141,14,220,96
1220 DATA 173,237,159,205,235,159,144,13
,56,237,235,159,133,251,169,1
1230 DATA 141,239,159,16,14,173,235,159,
56,237,237,159,133,251,169,255
1240 DATA 141,239,159,173,238,159,205,23
6,159,144,13,56,237,236,159,133
1250 DATA 253,169,1,141,240,159,16,14,17
3,236,159,56,237,238,159,133
1260 DATA 253,169,255,141,240,159,169,0,
141,249,159,133,252,133,254,141,245,159
1270 DATA 169,128,141,246,159,173,235,15
9,141,247,159,173,236,159,141,248,159
1280 DATA 165,251,141,241,159,238,241,15
9,165,253,141,242,159,238,242,159
1290 DATA 165,251,197,253,176,03,238,249
,159,173,235,159,170,173,236,159
1300 DATA 141,235,159,138,141,236,159,17
3,237,159,170,173,238,159,141
1310 DATA 237,159,138,141,238,159,165,25
1,170,165,253,133,251,138,133,253
1320 DATA 173,239,159,170,173,240,159,14
1,239,159,138,141,240,159,173,241
1330 DATA 159,170,173,242,159,141,241,15
9,138,141,242,159,173,247,159,170
1340 DATA 173,248,159,141,247,159,138,14
1,248,159,165,251,197,253,208,10
1350 DATA 169,255,141,245,159,141,244,15
9,48,98
1360 DATA 165,253,133,254,169,0,133,253,
133,2,162,16,6,253,58,254
1370 DATA 42,168,38,2,197,251,165,2,229,
252,144,12,152,229,251,168
1380 DATA 165,2,229,252,133,2,230,253,15
2,202,208,224,133,254,165,253
1390 DATA 141,244,159,169,0,133,253,169,
0,133,2,162,16
1400 DATA 6,253,38,254,42,168,38,2,197,2
51,165,2,229,252,144,12
1410 DATA 152,229,251,168,165,2,229,252,
133,2,230,253,152,202,208,224
1420 DATA 165,253,141,243,159,173,249,15
9,240,14,173,247,159
1430 DATA 133,253,173,248,159,133,251,16
9,0,240,10,173,247,159,133,251
1440 DATA 173,248,159,133,253,32,240,120
,173,247,159,24,109,239,159,141
1450 DATA 247,159,24,173,243,159,109,245
,159,141,245,159,173,244,159,109
1460 DATA 246,159,141,246,159,144,10,173
,240,159,24,109,240,159,141,248
1470 DATA 159,206,241,159,200,170,173,24
9,159,240,14,173,237,159,133,253
1480 DATA 173,238,159,133,251,169,0,240,
10,173,237,159,133,251,173,238
1490 DATA 159,133,253,32,248,128,96
```

Table 1

x	g		
3	0.50	13	2.00
4	0.65	14	2.15
5	0.80	15	2.30
6	0.95	16	2.45
7	1.10	17	2.60
8	1.25	18	2.75
9	1.40	19	2.90
10	1.55	20	3.05
11	1.70	21	3.20
12	1.85	22	3.35
		23	3.50

benefit of those who missed the previous article, we outline the essential features of the routines used:

SETUP puts the computer into multi-colour bit-map mode. Call SYS 32768 (line 40).

SCREEN clears the graphics screen and set colours. The colour codes POKEd in line 60 are any of the Commodore colour codes 0 to 7. The background colour is POKEd to 53281. POKE the other 3 colours as shown in line 60, then call SYS 32815 (line 70).

RESET is used as in line 910 to restore

the computer to its normal text mode.

For details of the other routines – COL12, COL3 and PLOT – see last month's issue.

Cobweb of colour

Before calling LINE, you need to POKE memory with the number of the colour the line is to be, and the x and y co-ordinates of the two ends of the line. In the listing, line 80 selects colour 2. In line 60 the background – colour 0 – has been set to colour code 5 and colour 2 has already been set to colour code 2, so the line is drawn in red on a green background. Lines 90 and 100 show how to set the co-ordinates. Remember that the x-co-ordinate must be in the range 0 to 159, while the y-co-ordinate must be in the range 0 to 199. Line 110 calls the LINE routine and the line is plotted.

As explained last time, the computer is configured to leave almost 16K of RAM free for your programs. There is therefore no need to confine yourself to displaying just one line. You have plenty of memory for your imagination to run riot, covering the screen in a cobweb of colour.

There is also some memory space reserved for the machine code graphics routines. The present ones occupy addresses from 32768 to 33601 and from 40939 to 40959. That leaves 33602 to 40938 – just over 7K – free for storing your code or data.

We intend to present two more routines – FILL and PRINTTEXT – later, which will occupy some of this space. If you want to get down to graphics programming in the meantime, it should be safe for you to use memory in the range 34200 to 40800.

Probably the best joysticks in the world

THE TOP PEOPLES CHOICE

125 +

The Explosive Joystick

Compatible with ZX Spectrum, 16k, 48k, 128k, +2, Commodore 64, Vic 20, Amstrad, Atari, etc.

At only £8.95 the features on the 125 are second to none. Besides its unique internal structure, built to withstand immense punishment from even the most vigorous games player, the joystick contains no less than four extremely sensitive fire buttons. Two are housed in the handgrip which has been moulded for extra comfort and ease of operation. The trigger finger fire button provides ease and comfort for your finger and the top fire button is contoured to fit your thumb for sure fire shooting. The base fire buttons are positioned for extra control and two hand firing whether you are right or left handed.

A built in auto-fire switch provides continuous shooting at the touch of a fire button.

Including Spectrum +2 Selector Connector.

The 125 comes complete with a full 12 months warranty

Prices include VAT, postage & packing. Delivery normally 14 days. Export orders at no extra cost. Dealer enquiries welcome.

Cheetah, products available from branches of

Dixons **WHSMITH** High St. Stores and all good computer shops.



A Right Royal Joystick

Cheetah MACHI + MICROSWITCH JOYSTICK

- ⚙ METAL SHAFT ⚙ AUTO FIRE
- ⚙ +2 SELECTOR CONNECTOR
- ⚙ 12 MONTH WARRANTY

ONLY
£14.95

- Deluxe, robust construction.
- Comfortable rugged hand-grip, 8 directional control with automatic centering.
- Heavy duty base with strong stabilizing suction cups.
- Highly sensitive light touch **MICRO SWITCH** fire buttons.
- Ergonomically designed control handle with indestructible **METAL SHAFT**.
- Built in **AUTO FIRE** function.

Machi+ Joystick compatible with: ● Sinclair ZX Spectrum 16K, 48K, 128K, +2

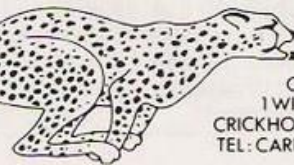
- Amstrad computers
- Commodore 64 & VIC 20 Computers
- Commodore C16 & Plus 4 Computers (adaptor sold separately)
- MSX Computers
- Atari 2600 & Atari 5200 Video Game Systems
- Atari Home Computers

Prices include VAT, postage & packing. Delivery normally 14 days. Export orders at no extra cost. Dealer enquiries welcome. Cheetah products available from branches of **Dixons** **WHSMITH** High St. Stores and all good computer shops.



Cheetah

Marketing



CHEETAH MARKETING LTD.
1 WILLOWBROOK SCIENCE PARK
CRICKHOWELL ROAD, ST. MELLONS, CARDIFF
TEL: CARDIFF (0222) 777337 TELEX: 497455
FAX: 0222 779404

Spectrum mania!

Back in the beginning of history, we were all amazed and delighted when Uncle Clive launched the Spectrum.

Now, you can be amazed and delighted that Tim Hartnell has decided that Spectrum owners should have access to computer books at a trifling price. And those with other computers don't have to miss out.

Tim's company, Interface Publications, has decided to do a warehouse clear-out, and give you the chance to build up an incredible library of computer books - for just one pound per book. Send us cold hard cash (we'll also grudgingly accept cheques, book vouchers or money orders, if you insist) and we'll get your books to you, el pronto!

**Books which give you the power...
without the price!**



"I cannae explain it," says MacHartnell, "the cold must have gone to me wee brain, but I just have to sell me bonny books for one lousy English pound each!"

SPECTRUM/SPECTRUM+

- ☐ Exploring Artificial Intelligence on your Spectrum - Tim Hartnell
- ☐ Programming your Spectrum
- ☐ Delving Deeper into your Spectrum - Dilwyn Jones
- ☐ Putting your Spectrum to Work

Master Machine Code!

- ☐ Spectrum Machine Code Made Easy - Volume One - James Walsh
- ☐ Spectrum Machine Code Made Easy - Volume Two - Paul Holmes
- ☐ Machine Code Programmers Reference Guide
- ☐ 20 Electronic Projects for your Spectrum - Stephen Adams
- ☐ 60 Games and Applications for the Spectrum
- ☐ Creating Arcade Games on the Spectrum

COMMODORE 64/128

- ☐ Exploring Artificial Intelligence on your Commodore 64
- ☐ Mastering Machine Code on your Commodore 64 - Mark Greenshields
- ☐ Mastering the Commodore 64 - Mark Greenshields
- ☐ Challenging Games for the Commodore 64
- ☐ Putting your C64 to Work
- ☐ How to Program the C64
- ☐ Creating Arcade Games on your Commodore 64
- ☐ Creating Adventures on your Commodore 64
- ☐ MEGABASIC for the C64

APPLE IIe/IIc/II+

- ☐ The 3-D Animated Apple
- ☐ How to Program the Apple II
- ☐ Outstanding Programs for Apple
- ☐ Challenging Programs for Apple

TEXAS TI 99/4A

- ☐ Dynamic Games TI 99/4A
- ☐ Making the Most of TI 99/4A

SINCLAIR QL

- ☐ Exploring the QL
- ☐ QL Games Companion
- ☐ The QL Handbook
- ☐ Exploring Artificial Intelligence on your Sinclair QL

**100 bent coppers=
One Interface book!**

BBC MICRO/ELECTRON

- ☐ Let your BBC Micro Teach You to Program
- ☐ Exploring Artificial Intelligence on your BBC Micro
- ☐ Putting your BBC Micro to Work
- ☐ Advanced Programming Guide to BBC
- ☐ Using the BBC Micro in Education
- ☐ 36 Challenging Games for the BBC Micro
- ☐ Creating Adventures on the BBC Micro
- ☐ 40 Best Machine Routines for BBC Micro
- ☐ Dynamic Games for the Electron

GENERAL TITLES

- ☐ How to Computerise your Business
- ☐ Practical Uses for Computer in the Home
- ☐ Using Computers in Education
- ☐ The Art of Structured Programming
- ☐ Creating Adventures on your Computer
- ☐ The Capital Radio Book of Simple Computer Programming
- ☐ Creating Political/Military Simulations

Interface Publications Ltd.,
9 - 11 Kensington High Street,
London W8 5NP

Please send me the indicated books.

Value of order (@ £1 a book) £ _____

PLUS 35p per book postage £ _____

Total for this order £ _____

*I enclose cheque/money order/
cold hard cash*

Name _____

Address _____

YCA/87

At the heart of the Sinclair Spectrum 128 and Amstrad/Spectrum 128+2 is the programmable sound generator or PSG. Incorporated in the machine-code part of the program ("psgmc") are a few bytes we will use shortly. Don't worry if you do not have "psgmc" since it is included in this month's first demonstration program, which is listing one.

There are two topics covered in this remaining sound article. Listing one continues the Test Bed principle by allowing Basic to change the PSG registers – and registers 11, 12 and 13 are as yet unexamined. Listing two introduces the topic of machine code music. This program is also mostly in Basic, but by using the principles incorporated in it, whole tunes can be written in Z-80 code with no Basic support. As with Test Bed, the listings will also run on the CPC computers.

Sirens and lasers

In the program of listing one only one PSG register is altered by the CALL to 32786 and by embedding this call inside a Basic FOR...NEXT loop it is possible to create sounds such as sirens, explosions and accelerating/decelerating cars. In the example of listing one, a laser sound is created every time the <ENTER> key is pressed. When typing-in the program

Tunes on the 128



Dick Sargent looks at the Spectrum 128 and +2 with some sound programs which allow experimentation and play music.

remove the words REM** from those lines which concern your particular computer. If the machine code "psgmc" is not in memory, type-in lines 400 to 590 and remove the word REM from line 105. Although the laser

demonstration – lines 110 to 320 – looks complicated, it is all built from the simple format:

POKE 32769 with the register number

POKE 32768 with the period value then RANDOMIZE USR 32786

Thus one register is loaded with one sound frequency value. The rest of the program is self-explanatory.

PSG registers AMPLITUDE, ENVELOPE-PERIOD and ENVELOPE SHAPE/CYCLE need further explanation. In the previous article PSG register R8 (Channel A Amplitude) was used as a volume control with the values 0 representing zero amplitude (SOUND OFF) and 15 representing maximum amplitude (SOUND ON). If bit 4 of this register is set, then the register is holding a number in excess of 15 and it ceases to become a volume

control. In fact, bits 0, 1, 2 and 3 are ignored and bit 4 (the set bit) acts as a switch which diverts the sound from channel A into a hardware envelope generator. The envelope generator moulds the sound into one of eight shapes – technically it amplitude-modulates the sound. These envelope shapes, when illustrated graphically – see figure one – can be seen to be made up of lines which rise and fall from the minimum sound level to the maximum sound level. They are all basically ramps of one kind or another, and are in two varieties – the endlessly repeating patterns forming a "sawtooth" modulation and the single "one-off" pattern. The patterns are numbered 8 to 15, not 0 to 7 as you might expect. Note that both patterns 11 and 13 terminate with the sound set at full volume, so be careful how you use them. The pattern number you want should be loaded into register R13. The duration of one ramp or envelope cycle is the time it takes for the modulation to change from zero amplitude to full amplitude and it is set by a fine and coarse envelope period value, loaded in registers R11 and R12. A short period gives steep slopes to all the ramps, as shown in figure one, while a long period gives shallow slopes.

Bell synthesis

The envelope registers of the PSG produce complicated waveform patterns which can synthesise a variety of sounds, including those of bells and other percussion instruments. With R8 set at 16, try a succession of numbers in registers R11 and R13 to explore the range available. R12 is the coarse-tune register and is best left holding zero, unless you want some very lengthy envelopes. Load R9 and R10 with zero to turn off channels B and C.

Listing two can be used for a variety of purposes. As it stands it can be used to test the effects of different envelope shapes on musical notes. With slight modifications it can play different notes but the real

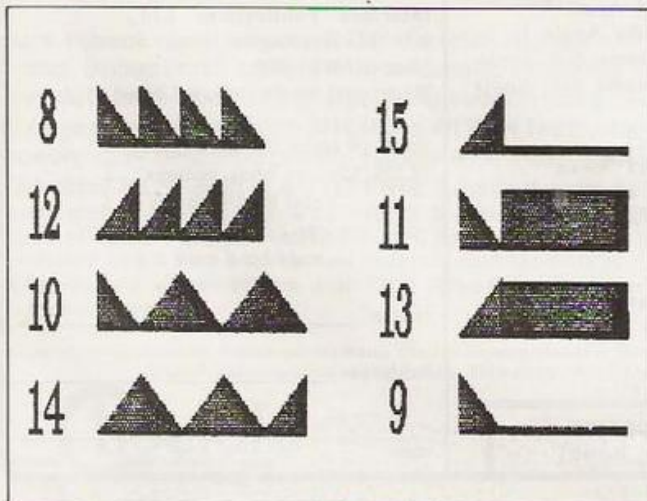


Figure 1 – envelope shapes.

Listing 1.

```

100 REM Spectrum 128 sound -- Listing one
102 REM PSG single register load demo
105 REM GOSUB 400:REM to load "psgmc"
110 RESTORE 320
120 FOR L=1 TO 3
130 READ V:POKE 32769,V:READ V:POKE 32768,V
140 REM** RANDOMIZE USR 32786 : REM *128*
150 REM** CALL 32786 : REM *CPC*
160 NEXT L
170 FOR X=0 TO 255 STEP 30
180 POKE 32769,0:POKE 32768,X
190 REM** RANDOMIZE USR 32786 : REM *128*
200 REM** CALL 32786 : REM *CPC*
210 NEXT X
220 FOR X=255 TO 0 STEP -8
230 POKE 32769,0:POKE 32768,X
240 REM** RANDOMIZE USR 32786 : REM *128*
250 REM** CALL 32786 : REM *CPC*
260 NEXT X
270 POKE 32769,8:POKE 32768,0
280 REM** RANDOMIZE USR 32786 : REM *128*
290 REM** CALL 32786 : REM *CPC*
300 INPUT Z$:IF Z$="A" OR Z$="a" THEN STOP
310 GOTO 110
320 DATA 7,62,8,15,1,1
400 :
410 REM** CLEAR 32767 : REM *128*
420 REM** MEMORY 32767 : REM *CPC*
430 RESTORE 500: LET a=32786
440 FOR r=1 TO 8:READ v:POKE a,v: LET a=a+1
450 NEXT r
460 IF a<32853 THEN GOTO 440
470 PRINT "Saving m/c to tape/disc..."
480 REM** SAVE "psgmc"CODE 32786,72: RETURN: REM *128*
490 REM** SAVE "psgmc.bin",8,32786,65: RETURN: REM *CPC*
500 DATA 243,30,255,58,1,128,254,7
510 DATA 32,2,30,63,71,58,0,128
520 DATA 163,87,120,205,71,128,251,201
530 DATA 243,221,33,3,128,221,126,7
540 DATA 230,63,221,119,7,175,221,86
550 DATA 0,205,71,128,221,35,60,254
560 DATA 14,32,243,251,201
570 REM** DATA 197,1,253,255,237,121,1,253,
191,237,81,193,201: REM *128*
580 REM** DATA 245,74,205,52,189,241,201,0,0,0,0,0,0: *CPC*
590 DATA 0,0,0,0,0,0

```

purpose behind the program is to show how musical notes are presented to the PSG without the help of the 128 PLAY A\$ function.

TV speaker tune

If that ubiquitous piece of machine code "psgmc" is not already in the Spectrum, you can append lines 430-590 from listing one to the end of listing two, and alter listing two line 116 to read GOSUB 430.

RUN the program and listen to the little tune given in DATA lines 380-386. It plays through the TV speaker, using channels A and B of the PSG chip. The numbers which you see in these DATA statements are "note-numbers". The notes of just over five octaves (63 notes) have been given numbers, starting with number two for the lowest note A. Middle C is note number 16. Top B is 63. Number 1 is silence, a musical rest.

Period values

These 64 items - 63 notes and the rest - are matched by an array, J(N) which holds 64 PSG period-values. The correct value for each musical note has been calculated by the Basic program which was given previously. When the program wants to play note-number 28, it looks at J(28) and reads the period-value, which is 221. This number must next be split into

The table below is a useful reference aid illustrating the PSG registers.

	B7	B6	B5	B4	B3	B2	B1	B0
R0	8-bit fine tune A							
----- CHANNEL A TONE PERIOD								
R1	4-bit coarse tune A							
R2	8-bit fine tune B							
----- CHANNEL B TONE PERIOD								
R3	4-bit coarse tune B							
R4	8-bit fine tune C							
----- CHANNEL C TONE PERIOD								
R5	4-bit coarse tune C							
R6	5-bit period control							
R7	ENABLE	--I/O--	noise		tone			
	x	0	C	B	A	C	B	A
R8	CHANNEL A AMPLITUDE				volume			
	ENV				x	x	x	x
R9	CHANNEL B AMPLITUDE				ENV			
	ENV				x	x	x	x
R10	CHANNEL C AMPLITUDE				ENV			
	ENV				x	x	x	x
R11	8-bit fine tune envelope							
----- ENVELOPE PERIOD								
R12	8-bit coarse tune envelope							
R13	ENVELOPE SHAPE/CYCLE				CONT ATT ALT HOLD			

Listing 2.

```

100 REM Spectrum 128 sound -- Listing two
110 REM Machine code music on test, using BASIC
112 CLS
113 CLEAR 32767 **128**
114 REM** MEMORY 32767 **CPC**
115 DIM J(64):GOSUB 121
116 REM either GOSUB 430 or else load "psgmc"
117 GOTO 129
118 :
121 RESTORE 123
122 FOR N=1 TO 64:READ J(N):NEXT
123 RETURN
124 DATA 0,1053,994,938,886,836,789,745,703,664,626,591
125 DATA 558,527,497,469,443,418,395,372,351,332,313,296
126 DATA 279,263,248,235,221,209,197,186,176,166,157,148
127 DATA 140,132,124,117,111,105,99,93,88,83,78,74,70,66
128 DATA 62,59,55,52,49,47,44,41,39,37,35,33,31,29,28
129 LET EPC=0:LET EPF=175:LET SHP=14
130 INPUT "16 FOR ENVELOPE, OR <16 FOR VOLUME ";V
140 INPUT "TEMPO (eg 10) ";T
145 IF V<16 THEN GOTO 180
150 INPUT "SHAPE 8 to 16 ";SHP
160 INPUT "ENVELOPE PERIOD COARSE eg 0 ";EPC
170 INPUT "ENVELOPE PERIOD FINE 2 - &FF eg &B0 ";EPF
180 LET REGN=32769:LET REGV=32768:LET MC=32786
190 POKE REGN,8:POKE REGV,V:RANDOMIZE USR MC
191 POKE REGN,9:POKE REGV,V:RANDOMIZE USR MC
192 POKE REGN,10:POKE REGV,0:RANDOMIZE USR MC
193 POKE REGN,7:POKE REGV,62:RANDOMIZE USR MC
194 POKE REGN,11:POKE REGV,EPF:RANDOMIZE USR MC
195 POKE REGN,12:POKE REGV,EPC:RANDOMIZE USR MC
280 :
285 REM THE "FOR X..." LOOP PLAYS THE TUNE
290 RESTORE 380
300 FOR X=1 TO 62
310 READ N:LET NAC=INT(J(N)/256):LET NAF=J(N)-NAC
320 READ N:LET NBC=INT(J(N)/256):LET NBF=J(N)-NBC
330 POKE REGN,0:POKE REGV,NAF:RANDOMIZE USR MC
331 POKE REGN,1:POKE REGV,NAC:RANDOMIZE USR MC
332 POKE REGN,2:POKE REGV,NBF:RANDOMIZE USR MC
333 POKE REGN,3:POKE REGV,NBC:RANDOMIZE USR MC
334 POKE REGN,13:POKE REGV,SHP:RANDOMIZE USR MC
350 FOR D=1 TO T:NEXT
360 NEXT X
380 DATA 53,32,55,31,56,29,56,29,55,34,53,34,52,36,52,36,53,34,55
381 DATA 34,48,32,48,32,50,31,52,31,53,29,53,29,51,31,49,31,48,32
382 DATA 48,32,46,34,44,34,43,36,43,36,44,34,46,34,48,32,46,32,44
383 DATA 36,43,36,41,29,41,31,53,32,55,31,56,29,56,29,55,34,53,34
384 DATA 52,36,52,36,53,34,55,34,48,32,48,32,50,31,52,31,53,29,53
385 DATA 29,51,31,49,31,48,32,48,32,46,37,44,37,43,39,43,39,44,39
386 DATA 44,39,32,44,32,44,1,1
387 STOP
500 :
502 REM Lines 1000-1040 are optional -- see text
1000 CLEAR 32767:DIM J(64):GOSUB 121
1010 RESTORE 380:LET A=32849
1020 FOR X=1 TO 62
1030 READ N:LET NAC=INT(J(N)/256):LET NAF=J(N)-NAC
1040 LET A=A+1:POKE A,NAF:LET A=A+1:POKE A,NAC:NEXT X

```

the coarse and fine period-values required by the PSG. Note the maths at lines 310 which does this, preparing the way for the register loading operation for channel A, lines 330 and 331. The same thing is done for channel B. Line 334 triggers the sound, while line 350 introduces a delay which gives tempo to the music.

Pure tone music

The program is initialised by loading the J(N) array and

then by asking the user for one of five PSG set-up values. For pure-tone music which does not use envelopes, enter the value 15 and for amplitude-modulated music try 16,300,14,0,176. Re-enter the program using GOTO 170 to experiment with different envelopes.

The music for the tune in listing two is stored as DATA statements, translated into period-values in real time and played by the "FOR X=1 TO

62" loop. To lose the Basic completely it is necessary to store the period-values for the tune of your choice as a table in RAM so that a machine code loop can step through the table and send the values found there directly to the PSG. If you want to stick with the tune in listing two, add lines 1000-1040 to that listing and execute RUN 1000. A table of values for the 62 notes will be sent to RAM starting at address 32850 and finishing

124 bytes later at 32974. Save the bytes on tape for later. All the Basic can be killed by executing NEW and a machine code routine similar to the one shown in listing three can be written to play the 62 notes.

Listing 3.

```

;SPECTRUM 128 --
;LISTING THREE

```

```

;MACHINE-CODE TUNE
;SOURCE CODE

```

```

ORG 32980

```

```

TABLE: EQU 32850
COUNT: DB 100

```

```

;RUN USING
;RANDOMIZE USR 32981

```

```

;FIRST INITIALISE PSG,
;CH A

```

```

DI
LD D,0
LD A,6
L1: CALL PSG
DEC A
JR NZ,L1
LD A,8
LD D,15
CALL PSG ;CH A ON
;
;NOW STEP THRU TABLE
LD HL,TABLE
LD B,62 ;62 NOTES
L2: LD D,(HL)
LD A,0
CALL PSG ;LOAD R0
INC HL
LD D,(HL)
LD A,1
CALL PSG ;LOAD R1
INC HL
CALL TEMPO ;WAIT
DJNZ L2
;finished
LD A,8
LD D,0
CALL PSG ;CH A OFF
EI
RET ; ---> TO BASIC

```

```

TEMPO: LD A,(COUNT)
L3: LD C,0
L4: DEC C
JR NZ,L4
DEC A
JR NZ,L3
RET

```

```

PSG: PUSH BC
LD BC,0FFFDH
OUT (C),A
LD BC,0BFFDH
OUT (C),D
POP BC
RET

```

```

END

```


Your COMPUTER

Copy Dates: April issue:
23rd February; May issue: 23rd March

Classified

CONTACT PAUL MONAF ON 01-222 9090

Post to: Your Computer
Classified Dept.,
79-80 Petty France,
London SW1H 9ED.

TAPE and DRIVE SPECTRUM and AMSTRAD UTILITIES

We offer on all our programs (not updates) a money back guarantee + update service.

★ ★ SPECTRUM ★ ★

NEW TAPE UTILITY 9
This program gives a tape back-up of most software! Even converts most jerky loaders to normal for reliable loading. Manages v.long programs (even 51K!), fast loaders, etc. etc. 48K Spectrums only.
£6.99 on tape (£4.99 if updating).

NEW TRANSFER PACK 3 - FOR TAPE TO DRIVE

A software system to convert many TAPE based programs to your DRIVE (no matter what type) + OTHER USEFUL utilities. Most jerky loaders are EASILY converted to drive. Pack has at least 7 programs! Only 48K Spectrums.

State name of your drive when ordering. £11.99 on tape OR £12.99 on m/drive cartridge. (£5.50 if updating).

INFORMATION SHEETS - £1 each - approx 8 transfers of popular programs, per sheet - needs TP3. Up to No. 25 available. Special offer - No's 1 to 20 only £4.50!

MICROTRANS - for m/drive to m/drive back-up + tape to m/drive (incl headerless) - does NOT convert programs. £3 on tape, £4 on m/drive cartridge.

THE PRICES QUOTED ARE ALL INCLUSIVE EXCEPT overseas: add £1 within Europe, £1.50 others. SAE for more information

LERM, DEPT YC, 11 BEACONSFIELD CLOSE, WHITLEY BAY, TYNE AND WEAR.

STOP PLAYING GAMES

Use your computer to make money. Turn your hobby into a home-based income. Full and part time opportunities to cash in on this tremendous market. High earnings easily possible. Open to any amateur micro user and gamer. Write for free details.

Westlink Promotions (CV1)
108 George Street
Edinburgh EH2 4LH

★ ★ AMSTRAD ★ ★

TAPE SPEED TWO (TS2) - ESSENTIAL FOR ALL AMSTRAD OWNERS

Convert your slow loading software from 1000 to a max of 3600 baud. Stop and study programs.

- ★ AMAZING - now manages MOST of the clunky loaders - some will now run on the 664/6128 for 1st time!
- ★ Fully automatic. It loads in continuously up to 44K.
- ★ Save at range of 9 speeds.
- ★ Permanent display of HEADER plus STATUS information.
- ★ Motor on/off. Insert PAUSE. Removes protection.
- ★ Handles HEADERLESS files, and PULSED/clunky loaders.
- ★ Handles AMSTRAD programs with Spectrum loaders. Speed (Baud rate) detector.
- ★ VERY SIMPLE TO USE - FULL MANUAL

PRICE ONLY £6.99 - state 464, 664, or 6128

DISC MANAGER ONE. - for 464 + 6128 + 664

Essential to help you manage your AMSTRAD drive. No risk - try it and see how useful it can be.

- ★ Does a CAT which can then be used to do repeat ERASURES very easily. Gives disc type. Memory free/used.
- ★ 2 Disc editors - edit or study sectors of a disc.
- ★ Recover ERASED files.
- ★ Simple and fast whole disc or sector BACKUP copier.
- ★ Send outputs to printer (CAT, sector contents, etc)
- ★ Unsecured for easy adaptor/drive transfer.
- ★ Menu driven - FULL manual.

PRICE only £5.99 - amazing!

AMSTRAD 3" DISKETTES

1 £4.70
10 £45.00

Also: Dysan, Precision 3M diskettes. Printer ribbons a speciality.

**PEARLDECK
TRADING LTD.**
FREEPOST, Billingford, DISS, Norfolk
IP21 4BR

BLANK CASSETTES

WITH LIBRARY CASES

	C10	C15	C20	C30
20	7.50	7.70	7.90	8.70
50	16.00	16.20	16.90	18.50
100	29.00	30.00	31.00	35.00

Superior Tapes. Don't Settle for less!

DISKS

10 5 1/4 DS/DD £8 inc. plastic case
10 3 1/2 SS/DD £17

MEMOTECH COMPUTERS AND ACCESSORIES

MTX 512 COMPUTER	£75.00
DMX 80 PRINTER	£150.00
RS232	£35.00
PASCAL ROM	£35.00
SPECULATOR ROM	£35.00
1/2 mb. DISK DRIVE & INTERFACE	£110
1 mb. DISK DRIVE & INTERFACE	£160

All the above prices are fully inclusive. We stock the entire Memotech Range. Orders/Enquiries to:

UK HOME COMPUTERS
82 CHURCHWARD AVENUE,
SWINDON, WILTS. SN2 1NH
24-hr Phone Service 0793 695034

MONEY FROM YOUR MICRO?

Yes, your micro can earn you real ££££. Our manual tells you how. Send stamp for free details to:

COMPASS PUBLICATIONS
46E2 - Wroxham - Norwich
NR12 8TR

SPECTRUM ADVENTURE OFFER

3 Spectrum 48K Adventures and Free strategy games.

Paradox, Spook, Robyn Hode and Spectreallm. All adventures are as yet unsolved. All received good press reviews. Send only £7.95 for all programs.

ACO Computer Services
32 Harewood Avenue,
Nottingham NG6 9EF

ASTROLOGY for beginners

only £11.50 (cass)

5.25" Disc add £2

3/3.5" Discs add £4

A Starter Pack comprising a simple program to calculate a horoscope, an introductory booklet & 2 self-teaching programs (how to interpret the horoscope).

No previous knowledge required

Spectrum, BBC/Electron, Oric, Dragon, Tandy/Genie, Commodore 64/PET, Atari, Sharp, Amstrad/Schneider, Colour Genie, MSX, IBM, Apricot, etc.

many more programs for experienced astrologers also other micros

Cash with order (add 50p outside UK) or large s.a.e. for free catalogue to:

ASTROCALC (Dept YC)
67 Panscroft Road,
Hemel Hempstead, Herts HP3 8ER
Tel: 0442 51809

SORD M5 computer, brand new, boxed + Basic G, F, and FALC. Cartridges, Graphic Designer for Graphics Music, scientific and business applications plus 18 assorted games.

PRICE £75 + £5 p&p

PLAYFAIR PRODUCTS
133 Huckfield, Harlow,
Essex CM18 6QL
Telephone: 0279 417636

QL & SPECTRUM CONNECTIONS

56-w 3-way extender for 1 or 2 peripherals to Spectrum 512	£10.50
4-w extender for 3 peripherals	£14.00
Microdrive extender, 8"	£6.00
QL to Interface 1, data cable, 1.5m	£6.00
QL & Plus 2 joystick converters	£5.00
QL and Interface 1 serial printer cables, 2 metres	£7.50
Wafadrive printer cables, 1.5m	£8.00

Price includes VAT & postage. All other cables or connectors by request

HIGHBLADE LTD.
P.O. Box 1, Appleby, Cumbria CA15 6QX
Telephone: 0930 52560

MAKE MONEY with your microcomputer: start your own business with this practical manual. £10. Guidelines, 2 Orchard Close, Great Ayton, Middlesbrough TS9 6EG.

UNLOCK THE SECRETS OF PENNY SHARE PROFITS



Did you know that there are thousands of men and women in this country quietly making money out of low priced Penny Shares?

Most of these people are private investors. Many of them started with just a few hundreds pounds. Few had any previous stockmarket experience. Some never buy any other sort of share. What is the secret of their success?

FANTASTIC GROWTH RECORD

Sixteen out of last year's top twenty performing shares were Penny Shares. Here are a selection of the recent winners.

	from	to	gain
Noble & Lund	10p	101p	+910%
WA Holdings	9p	45p	+400%
Woodhouse Rixson	15p	78p	+420%
Somportex	19p	188p	+880%
Ashley Industrial	14p	88p	+528%
A C Cars	30p	125p	+316%
Tozer Kemsley	26p	115p	+342%
British Benzol	11p	83p	+654%
Unigroup	14p	120p	+757%
Spencer Clark	35p	172p	+391%

Imagine how much your capital would have increased if you had invested in any of these Penny Share winners. But where do you find them? ... after all, shares do not rise in value just because they are low priced.

If you had the time, and the know-how you could isolate the potential winners and then complete a thorough investigation of the company.

Now there is an easier route to Penny Share success. Each month the Penny Share Focus team of analysts condense days of research into a four-page no nonsense action guide. Its sole aim ... to provide investors like you with opportunities for big capital gains. By carefully monitoring every Penny Share on the market ... by collating masses of financial and company data ... by making painstaking enquiries into the company's management, sometimes even visiting their offices, PENNY SHARE FOCUS helps you to spot the next Penny Share winner, and keeps you clear of the losers.

WHAT ARE PENNY SHARES? ...and WHY IS THEIR RECORD SO GOOD?

A Penny Share is quite simply a share that you can buy for mere pennies. The shares are cheap because the City has lost confidence in the

company's ability to make profits. It could be because of poor management, adverse trading conditions, or just plain bad luck. But the slump in the price of the shares means something has to be done ... something has to change.

In some cases the company may be restructured, new management installed, new products launched, new ideas and techniques introduced. Alternatively, the company's shares may be so cheap that a rival company moves in to take them over. Or a successful private company might buy them out as a cheap way into the stockmarket. Whatever happens, it's nearly always good news for the investor who was brave enough to buy when the company was down.

Remember, these companies are still trading and they often have quite sizeable assets. Apart from the very few that do 'go to the wall' - and they're really surprisingly few - the only way a share price that has fallen to mere pennies can go is up.

Join the Penny Share investors today and subscribe now to claim a discount of £20 off your first year's membership subscription and be fully protected with our unique MONEY BACK GUARANTEE.

The editor of PENNY SHARE FOCUS has for more than ten years been the country's leading authority on Penny Shares ... the man who spotted Wire and Plastic when it was just 27p, and then watched it rise to £4.70 ... put another way, if you had

invested just £500 in Wire and Plastic when he told you, that investment would now be worth more than £8,500!

You can now have access to this valuable information each month through the pages of PENNY SHARE FOCUS. In just 4 tightly written pages he reviews the latest news, recommends the hottest Penny Shares of the moment, and keeps investors in touch with his past recommendations. You only make money when you sell, and it's the aim of PENNY SHARE FOCUS to get you out at the top of the market so you can move on to the next Penny Share winner.

APPLY NOW FOR YOUR MEMBERSHIP ... AND SAVE £20

An annual subscription to PENNY SHARE FOCUS is normally £59.50 - a sum easily recouped by investing in just one Penny Share winner.

As a first time subscriber you qualify for a £20 discount, if you complete and return the order form below within the next seven days.

That's right, you pay just £39.50 for twelve months' issues of PENNY SHARE FOCUS that will put you well on the road to stockmarket riches - simply follow our advice.

STOP PRESS · STOP PRESS · STOP PRESS · STOP PRESS · FREE BONUS ISSUE

We recently launched an additional service for Penny Share Focus subscribers - a mid month bonus issue.

Each month you will receive an additional Penny Share recommendation in the form of a no nonsense one page letter with JUST ONE SHARE selected for its potential to provide subscribers with quick capital gains and fast in-and-out profits.

This additional service, launched earlier this year has already proved a winner. In the first issue we recommended our subscribers buy PEEK HOLDINGS at 16p. Those who did were more than delighted when they shot up to 25p in just a few weeks.

ECOBRIC followed as our next recommendation and this share quickly rose from 15p to 24p giving subscribers a short-term gain of more than 50%, even after allowing for dealing costs.

DON'T MISS OUT ON OUR NEXT MID-MONTH PENNY SHARE WINNER - SUBSCRIBE TODAY.

UNIQUE MONEY BACK GUARANTEE

We are confident that you will make money from our recommendations. If you invest equally in any five of our recommendations over the next six months, and don't make enough money to recoup the cost of your membership subscription at least ten times over by this time next year, we will refund your subscription in FULL in CASH by return of post.

We are currently researching several companies from the 'bargain basement' of the stock market that look set for phenomenal growth. Ensure you don't miss them - complete and return your membership application today.

© Penny Share Focus Ltd. 1986
Registered in England 1846706
11 Blomfield Street London EC2M 7AY

SPECIAL INTRODUCTORY MEMBERSHIP OFFER - £20 OFF FIRST YEARS SUBSCRIPTION

Please return to Penny Share Focus, 11 Blomfield Street London EC2M 7AY

YES Please show me how I can make money with Penny Shares and enter my subscription to Penny Share Focus on the understanding that I am fully covered by your Money Back Guarantee above.

Name

Address

Post Code

FOR OFFICIAL USE ONLY
MEMBERSHIP NO.

To Bank plc
Branch Code &
Full Address

A/c Name and No. (if known)

Please pay to National Westminster Bank PLC (60-18-43T),
2 St Alphage Highwalk, London Wall, London EC2 for the
account of Penny Share Focus. Account number 46979948
the sum of £39.50 on receipt of this order and thereafter
£59.50 on the same date each year until countermanded by
me.

Date Signed

YC/1087

EXPORT

AND OVERSEAS VISITORS

ALL MAKES OF MICRO
COMPUTERS, PRINTERS,
PERIPHERALS AND SOFTWARE
SUPPLIED AT DISCOUNT
PRICES.

AMSTRAD • ORIC • SINCLAIR
• BBC MICRO • ATARI •
COMMODORE • APRICOT •
STAR • BROTHER AND ALL
POPULAR MAKES

MICROGOLD

UNICOM HOUSE
182 ROYAL COLLEGE STREET,
LONDON NW1 9NN
TELEX: 295932 UNICOM G
TELEPHONE: 01-482 1711

EDUCATION

Phone 010-353-61-27994

DISKS/CASSETTES ALL 1986 RELEASES

MAIL
ORDER

Amstrad, BBC, Commodore
Amstrad PCW cassettes & discs
Magic Maths (Age 4-8)
Maths Mania (Age 8-12)
Better Maths (Age 12-16)
Spelling (Age 8-Adult)
*Physics 1 (Age 12-16) CSE/O Level
*Biology 1 (Age 12-16) CSE/O Level
*Chemistry 1 (Age 12-16) CSE/O Level
Wether/Climate (Age 12-17)

CASSETTES £9.95
STI DISCS £11.95
AMSTRAD DISCS £14.95

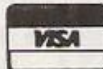
MAIL
ORDER

GCSE... GCE... 'O' LEVELS

SCHOOL
SOFTWARE LTD.

IMMEDIATE DELIVERY SEND CHEQUE/PO/VISA
TO School Software Ltd, Meadowdale Estate,
Raheen, Limerick, Ireland
Tel (UK) 010/353/61/27994
IRI 061/27994

AVAILABLE WORLDWIDE



MICROSNIPS

37, SEAVIEW ROAD
WALLASEY
MERSEYSIDE
L45 4QN
TEL: 051 630 3013



3 in. CF2 DISCS £28 per 10
5¼ DSDD By AXIOM £5.95 per 10
3½ SSDD By AXIOM £14.95 per 10
SAGA Elite keyboard £54.50

Send for free comprehensive price list.
U.K.'s widest range of computers and software.
Telephone orders welcome.
Mail order postage add 5p for every £1.00 spent.
Overseas postage add 10p for every £1.00 spent.

Name _____

Address _____

Tel No. _____

Dept YC

QUANTA

The independent QL users group

- * monthly newsletter (36/40 pages)
- * free advice
- * massive software library (mostly free)
- * supports for local groups
- * printer hotline
- * tutors (Archive etc.)
- * workshops

Further details from Brian Pain, 24 Oxford St, Stony Stratford, Milton Keynes, MK11 1JU Tel: (0908) 564271

AMSTRAD SOFTWARE HIRE

- * Low Rates
- * Free Membership
- * Fast Service
- * 100s of Titles

Our members say we are the BEST

Details from:
K & M COMPUTERS
40 Fairstead, Birch Green, Skelmersdale,
Lancs WN8 6RD

ATARI ST public domain software, lots
available, games, desk accs., utilities etc.
SAE details PDLIB-YC PO Box 54,
Macclesfield, SK10 5EH.

THEORY of Music grades 2-5: Spectrum
software sets questions, many options. £5.
Details: Ted Kirk, 33 Humber Crescent, St.
Helens, Merseyside.

RE-USE YOUR OLD PRINTER RIBBONS!

We will re-ink your old fabric ribbon cassettes for more cheaply
than the price of a new one. Send your dry fabric ribbon (stating
printer make & model) with £2 and we'll re-ink it & quote for
future re-inkings.

ALADDINK, (Dept. YC),
4 Hurkur Crescent, Eyemouth,
Berwickshire TD14 5AP.
Tel: 08907 50965

Spectrum Repairs

£14.90 inclusive of labour, parts
+ p.p. Fast reliable service by
qualified engineers. Average repair
24 hrs. 3 mths guarantee. For help
or advice ring:

HS Computer Services
2 The Orchard, Warton
Preston, Lancs. PR4 1BE
Tel: 0772 632686 327

AMSTRAD (CPC/PCW) & ORIC/ATMOS

Software for sale or hire
Super Selection of Software now available
*** CPC Users - first 3 hires FREE! ***
For details, send S.A.E. (stating computer) to:
THE SOFTWARE CLUB
26 Beechley Drive, Cardiff CF5 3SN

**TO PLACE YOUR
CLASSIFIED ADVERT
CALL PAUL MONAF ON
01-222 9090**

24 HOUR

COMPUTER REPAIR CENTRE

*The only AMSTRAD SPECIALISTS
recommended by Amstrad*

Repairs also undertaken for all the
following computers:
**SPECTRUM,
COMMODORE, ATARI,
BBC, IBM**

**NO HIGH
FIXED
PRICE
REPAIR!**

FREE
SOFTWARE WORTH
£33
WITH EVERY
SPECTRUM
REPAIR

**The established
company with a proven reputation**

Over the years we have built up an enviable reputation in the UK for computer repairs, which is second to none. This is based on many years experience in repairing Spectrum, Commodore, BBC and other leading makes – and we were the first AMSTRAD repair centre anywhere. This is why we have customers all over the world.

We are the best, forget the rest, look what we offer

- No high fixed price – you only pay what the repair actually costs.
- While-U-Wait Service – spare parts for all leading computers – available over the counter.
- State of the art test equipment to provide comprehensive test report and locate faults.
- Repairs to all leading makes of computer.
- Amstrad specialist.
- Spectrum rubber keyboards repaired for only £8.95.
- Commodore 64's, Vic 20's, Atari, Commodore 16's and Plus 4's repaired.
- Discounts for colleges, schools etc.
- Every computer repaired by us is completely overhauled and tested before return.
- All computers returned carriage paid and covered by insurance.
- Three months guarantee included.
- Free Software worth £33 with every Spectrum repair.

**DON'T DELAY –
ACT TODAY
It's as easy as
ABC!**

A Simply send your computer securely packed, together with a cheque or postal order for the maximum fee to the address below. Your computer will be repaired and returned to you within 24 hours together with the balance of the fee and your FREE £33 worth of software.

B Or if you prefer a written quotation just send £2.50 to cover post & packing.

C Alternatively just quote your Access or Visa card number.

DISCOUNT COMPONENTS
e.g. Power Transformers



Commodore £29.00
+ £1.50 p.p.

Spectrum
£9.95
+ £1.50 p.p.



**AMSTRAD
REPAIRS
from
£9 to £35**

**BBC
REPAIRS
from
£12 to £45**

**SPECTRUM
REPAIRS
from
£7 to £19.90**

**COMMODORE
REPAIRS
from
£12 to £35**

SPECIALIST COMPUTER REPAIR CENTRE

Dept 12, Unit 4, M.E.B. Works, Windsor Road,
Enfield, Redditch, B97 6DJ. Tel: Redditch 65671.

Trade orders
welcome



WE SET THE STANDARD BY WHICH EVERYONE ELSE IS JUDGED

Classified Rates

Lineage: 60p per word (Min 20 words) - prepayable.

Lineage advertisers should complete the form provided in **BLOCK CAPITALS**. Phone number counts as 2 words. Name and address to be paid for if used in advertisement. Box Number if required is £7.00 extra.

Display - rates per scc (Min 2scc)

One insertion : £10.00
Three insertions : £9.70
Six insertions : £9.50
Twelve insertions : £9.00

Display advertisers should provide separate copy and preferably reserve space by phone (01-222 9090).

Method of Payment

Cheques etc. should be made payable to Focus Investments Ltd., and crossed. I enclose herewith cheque/PO for

£

Post to:

Cut out the order form and return together with your remittance to:
Classified Department, *Your Computer*, 79-80 Petty France,
London SW1H 9ED.

**THIS FORM SHOULD BE
RETURNED BY FEB. 23rd
FOR THE APRIL ISSUE
OR BY MARCH 23rd
FOR THE MAY ISSUE**

Please insert the following advertisement in Your Computer Classified Section

					LINEAGE	PLUS 15% VAT	TOTAL
					£12.00	£1.80	£13.80
					£15.00	£2.25	£17.25
					£18.00	£2.70	£20.70
					£21.00	£3.15	£24.15
					£24.00	£3.60	£27.60
					£27.00	£4.05	£31.05
					£30.00	£4.50	£34.50

No. of insertions required ☐ Box No. required: YES/NO

NAME Please include initials).

ADDRESS

Daytime Tel. no.

Company Registered Number: 1895201. Registered Office: Sceptre House, 169-173 Regent Street, London W1R 8HE.

Subscribe to *QL World*

Copies of the latest issue of *QL World* disappear fast from the shelves. If you cannot go to the shops on our publication date, you can miss the mixture of news, reviews and features which make *QL World* the only magazine for serious QL users.

The only way to avoid possible disappointment is to subscribe to the magazine. In that way, a copy will drop on to your doormat each and every month. Copies are sent direct by our printer, so by subscribing you should receive the magazine even

before it reaches newsagents.

A subscription also makes an ideal present for someone who takes the QL seriously. Why not make a present of a subscription?

To subscribe to *QL World*, complete the order form and send it, together with a cheque or postal order for £15 for the U.K. and £30 for Europe, to the address shown. Do not delay. Send your order now and relax in the knowledge that you will never again miss a copy of *QL World*.

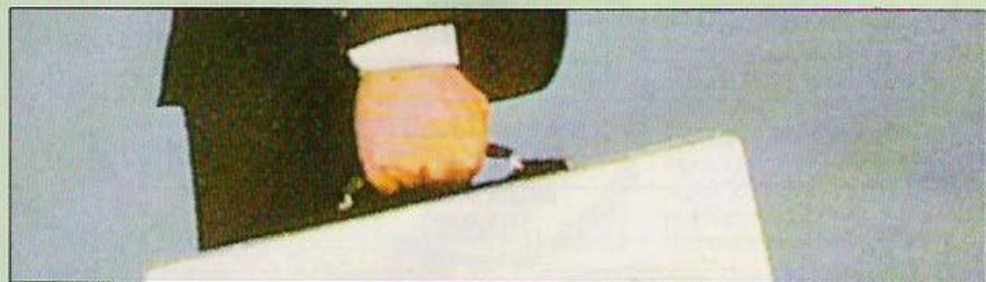
Sinclair/QL World
(Subscriptions)
Oakfield House,
Perrymount Road,
Haywards Heath,
RH16 3DH.

Name

Address

Postcode

Portable dream



If small is beautiful then the Bondwell lap-top should be the answer to many people's prayers. Geof Wheelwright assesses its performance and value.

The world of dreams is not entirely logical, particularly when it concerns journalists. Whenever computer journalists start musing about the perfect computer, it always emerges as something which features the best word processing software in the world, operates at the speed of a Cray 1, works on batteries and fits inside a briefcase.

In short, we are obsessed with portable computers. From the word 'go' we have been unashamed proselytisers of the lap-held machine. From the first Tandy 100 computers, with little 8-line LCD screens and 8K memories to today's giant 640K RAM AT-compatible Toshiba T-3100s, we have been the portable computer's biggest boosters. Even when the computer industry insisted there was no widespread market for portables, we stuck to our guns – giving massive coverage to any corporate Tom, Dick or Harry who offered as much as a sniff or a portable computer with batteries.

Now, however, our dreams look set to come true. New battery-operated portables are

expected from the likes of Sir Clive Sinclair, Compaq Computer – which started the whole IBM-compatible portable computer business – and even arch-conservative Alan Sugar. All those manufacturers are going to have to work hard, however, if they are to produce a portable computer which offers better value and performance than this month's dream machine – the Bondwell BW8.

Future familiarity

Bondwell may not be a familiar name but if the company's portable computer is any indication of the value it intends to offer, I am sure you will hear more about it in the future. Hongkong-based Bondwell produces a range of PC-compatible computers – sold in the U.K. exclusively through the Spectrum Group.

The BW8 is a PC-compatible portable which weighs less than 10lb., offers a rechargeable battery life of up to six hours, includes 512K RAM and a built-in 3.5in. 720K disc drive, with disc formats compatible with the new Convertible portable computer, as well as the Atari 1040STF and the Apricot

Xen. Other features include a plug for an external 2.5 or 5.25in. disc drive, parallel and serial ports, RGB and composite video outputs, a built-in backlit 80-column by 25-line LCD screen and a carrying handle. The latter feature may seem scarcely worthy of mention but the fact is that many



lap-held computers which claim to be portable do not include a carrying handle. After several months gazing various portable computers on trains, air

buses, I was tremendously glad of this low-tech feature of the BW8.

Value for money

Carrying handles aside, the most dreamlike quality of this whole package is the price – £799 plus VAT. With the addition of a 5.25in. external drive for copying your favourite non-protected software to 3.5in. disc, the price of the whole system is still less than £1,000 – something which would have been remarkable value for a PC-compatible even a year ago, let alone for a battery-operated portable with built-in LCD screen.

By now, you are probably thinking there has to be some fatal flaw in this little dream – some incompatibility threatening to turn the whole affair into a nasty nightmare. The BW8 is as PC-compatible as they come – and a good deal more compatible than some other portables. It does, admittedly, use non-standard serial and parallel ports but Bondwell offers its own low-cost connector cables for each – the parallel cable being a standard connector to an Epson-style parallel port and the serial cable offering a standard 25-pin male RS232 socket.

The only other incompatible feature is that you cannot

expand the BW8 RAM beyond 512K. I would have to think long and hard to find any portable computer application – and few desk-top applications – requiring more than 512K.



Even when using two applications at once, I found no problems with the 512K limit. I used the Psion *Xchange* word processor to take notes at various meetings and press conferences and kept the Lattice Software *SideTalk* memory-resident background communication software program in RAM at all times, so that I could send information to my office via a modem.

The final test of compatibility for the BW8 was in running the Microsoft *Flight Simulator* program. Flight Simulator is one of the few applications for the PC which does not use the MS-DOS operating system but relies on a fully-compatible

IBM BIOS being resident in the computer. If a PC is not compatible, it will not run Flight Simulator.

The last word

The BW8 ran Flight Simulator with flying colours – in both the RGB colour mode, using an external monitor connected to the BW8 monitor port, and on the backlit LCD screen. It also had no problems using a configuration of the Flight Simulator set-up for the IBM Convertible lap-held computer.

The last word about the BW8 should concern its display screen. That is where most portable computers fall down –

either the screen is awful and renders the whole computer unusable, or it is brilliantly clear but draws so much power that you can no longer use the machine under battery power.

The BW8, I am happy to report, has an adequate LCD display screen – helped considerably by the backlighting feature, which can be switched on and off to save battery power when there is sufficient ambient light to see the screen without backlighting. That is not to say it is the best LCD screen in the world – slightly better screens are offered on the Zenith X-181 and Tava Flyer machines – but the BW8 LCD panel is far better than

non-backlit LCDs and provides a clear and readable display without using excessive power.

No awakening

The best thing I can say about my encounter with this dream machine is that it was a dream from which I did not wish to wake. Reverting to the real world of pen and notebook journalism will be difficult after having a wonderful lap-held portable like the BW8 in my office for two months.

At the low prices Bondwell is asking for this machine, this may just be one time that my dreams become a reality.

CUT-PRICE DISKS - LOWEST YET!



5.25" 'Universal'

to suit all drives SSDD, SSDD, SSDD,
DSDD & DSQD 48 or 96tpi (40/80)

£ 14.99 - 25 disks ★ Life-time no
£ 26.99 - 50 disks quibble warranty
£ 49.99 - 100 disks ★ Full spec
£ 96.99 - 200 disks ★ Hub-rings
£ 119.99 - 250 disks ★ No extras - VAT
£ 219.99 - 500 disks & delivery included

Media Life Reversible

Save money
by using
both sides

£ 18.99 - 25 disks
£ 35.99 - 50 disks
£ 69.99 - 100 disks
£ 129.99 - 200 disks
£ 149.99 - 250 disks
£ 279.99 - 500 disks

2 notches and
index holes.
complete sets
of 25 disks.

3.5" Hlgrade

Life-time Warranty & fully certified

SSDD	DSDD	
£ 39.99	£ 49.99	25 disks
£ 75.99	£ 85.99	50 disks
£ 139.99	£ 159.99	100 disks
£ 259.99	£ 299.99	200 disks
£ 319.99	£ 365.99	250 disks

Lowest **3M** & branded prices Try us!

Direct Disk Supplies Ltd.

Dept YCOMP FREEPOST, 129 High Street, Hampton Hill, Middlesex TW12 1BR

DIAL-A-DISK

Order hotline
01-979 7811

Answering service
for out of hours
orders



CUT-PRICE DISKS - LOWEST YET!



5.25" 'Universal'

to suit all drives SSDD, SSDD, SSDD,
DSDD & DSQD 48 or 96tpi (40/80)

£ 14.99 - 25 disks ★ Life-time no
£ 26.99 - 50 disks quibble warranty
£ 49.99 - 100 disks ★ Full spec
£ 96.99 - 200 disks ★ Hub-rings
£ 119.99 - 250 disks ★ No extras - VAT
£ 219.99 - 500 disks & delivery included

Media Life Reversible

Save money
by using
both sides

£ 18.99 - 25 disks
£ 35.99 - 50 disks
£ 69.99 - 100 disks
£ 129.99 - 200 disks
£ 149.99 - 250 disks
£ 279.99 - 500 disks

2 notches and
index holes.
complete sets
of 25 disks.

3.5" Hlgrade

Life-time Warranty & fully certified

SSDD	DSDD	
£ 39.99	£ 49.99	25 disks
£ 75.99	£ 85.99	50 disks
£ 139.99	£ 159.99	100 disks
£ 259.99	£ 299.99	200 disks
£ 319.99	£ 365.99	250 disks

Lowest **3M** & branded prices Try us!

Direct Disk Supplies Ltd.

Dept YCOMP FREEPOST, 129 High Street, Hampton Hill, Middlesex TW12 1BR

DIAL-A-DISK

Order hotline
01-979 7811

Answering service
for out of hours
orders



MPC SOFTWARE

SOFTWARE FOR AMIGA & ST

AMIGA

Flight Simulator II	£49.95
Defender of the Crown	£45.95
Marble Madness	£27.00
Deluxe Music	£83.00

ATARI ST

Flight Simulator II	£40.00
SDI	£45.95
Gauntlet	PHONE
Star Trek	PHONE
Starglider	£21.00

Coming Soon ... JET

Also available much more software & hardware for the
Amiga, ST and QL. Phone for details.

MPC Software

72 Julian Road,
West Bridgford,

Nottingham NG2 5AN

Telephone: (0602) 820106



All prices correct at time of going to press. E&OE.

ADVERTISERS INDEX

A	MICROPROSE	66
ALLIGATA	MIGENT	6, 7
AMSTRAD	MIRACLE TECHNOLOGY	22
ANCO	MPC	82
C	R	
CHEETAH	RAMCO	11
COMPUTECH	ROMANTIC ROBOT	18
D	S	
DIRECT DISK	SILICA SHOP	83
DOSOFT	SUPERIOR SOFTWARE ...	29
E	SWANLEY ELECTRONICS	57
ECL	T	
I	THOUGHTS & CROSSES	51
ICS	TROJAN	10
INTERFACE	U	
J	U.S. GOLD	84
J.B. SOFTWARE	V	
K	VOLEX	40
KEEP PUBLISHING	W	
M	WALKERS	25
MICRO CITY	W.A.V.E.	51

TECHNOLOGY SO ADVANCED ...

MEMORY

- * 512Kbytes RAM (520ST-M, FM)
- * 1024Kbytes RAM (1040ST-F)
- * 192Kbytes ROM
- * 128Kbytes external plug-in ROM option

ARCHITECTURE

- * Motorola 68000 Central Processing Unit (CPU) with a clock speed of 5MHz
- * 16-bit external data bus
- * 32-bit internal data bus
- * 24-bit address bus
- * 8-32-bit data & address registers
- * 7 levels of interrupts
- * 50 instructions
- * 14 addressing modes
- * 5 data types
- * DMA (Direct Memory Access)
- * real time clock as standard

GRAPHICS

- * full bit-mapped display palette of 512 colours
- Using Atari Monitors (on 520 & 1040):**
 - * 640x400 high resolution - monochrome
 - * 640x200 medium resolution - 4 colours
 - * 320x200 low resolution - 16 colours
 - * 80 column text display (40 col low res)
- Using Domestic TV (on 520):**
 - * 640x200 medium resolution - 4 colours
 - * 320x200 low resolution - 16 colours
 - * 40 columns x 25 line text display

SOUND AND MUSIC

- * 3 programmable sound channels
- * frequency programmable 30Hz - 125KHz
- * programmable volume
- * built-in dynamic envelope shaping
- * programmable attack, decay, sustain, release
- * Musical Instrument Digital Interface (MIDI)
- * MIDI allows connection of synthesizers etc



MOUSE

- * high precision
- * 2 button control
- * free with 520ST-FM/1040ST-F
- * non slip ball motion sensor
- * removable ball for easy cleaning

STANDARD SOFTWARE

- * GEM desktop + TOS operating system
- * ST BASIC interpreter/language system

INPUT/OUTPUT

- * MIDI out (5 pin DIN) 31.25K baud
- * MIDI in (5 pin DIN) 31.25K baud
- * audio out 1.0V DC peak to peak, 10K ohm
- * audio in 1.0V DC peak to peak, 10K ohm
- * RGB monitor 1.0V DC, 75 ohm
- * mono monitor 1.0V DC, 75 ohm
- * mono horizontal scan rate 35.7KHz
- * mono vertical scan rate 71.2KHz
- * sync 5V DC (active low) 3.3K ohm
- * modem/serial RS232C, 50 to 19200 baud
- * floppy disk 250 Kbytes
- * hard disk 13.3 Mbytes
- * mouse standard Atari connector
- * joystick standard Atari connector
- * cartridge port 128K capacity
- * RF output (520ST-FM) for TV use

OPERATING SYSTEM

- * TOS with GEM environment in ROM
- * hierarchical file structure with sub-directories and path names
- * user interface via GEM, with self explanatory command functions
- * multiple windows + icons
- * window resizing, re-positioning and erasing
- * drop down menus (selected by mouse)
- * GEM virtual device interface

COMMUNICATIONS

- * RS-232C serial modem port
- * 8-bit parallel printer port
- * MIDI port (also for networking use)
- * VT52 terminal emulation

KEYBOARD

- * standard QWERTY typewriter format
- * 95 full stroke keys
- * 10 function keys
- * 18 key numeric keypad + cursor keys
- * variable auto-repeat & key click response
- * keyboard processor reduces CPU overhead

... IT'S AFFORDABLE

ONLY FROM SILICA

Finally, there's a personal computer that not only solves problems like other computers, but also solves the one problem that other computers have created. Affordability. Silica Shop are pleased to present the ST range of personal/business computers from Atari. The ST was designed utilizing the most recent breakthroughs in semiconductor technology, producing a personal computer that performs tasks with fewer parts. Which means it costs less to make. And less to buy. The latest ST computers now include built-in power supplies and built-in disk drives. The TOS operating system and GEM window environment are now on ROM chips which are already installed in the ST keyboard. This enables automatic instant booting when you switch on. Silica Shop are pleased to offer the complete Atari ST range. Our mail order department is situated in Sidcup and we have 4 retail outlets at Sidcup, Orpington, Lion House (Tottenham Court Rd) and Selfridges (Oxford Street). We have eight years experience of Atari products, longer than any other UK company, and are well established as the UK's No.1 Atari specialist. With a group turnover of over £5 million and in excess of 70 staff, we provide unbeatable service and support. We provide several facilities which you will find invaluable during your Atari computing life and most of these facilities are available ONLY FROM SILICA. We suggest that you read through what we have to offer, before you decide where to purchase your Atari ST.

FREE STARTER KIT - Only From Silica

When you purchase any Atari ST keyboard, you will not only receive the best value for money computer on the market, but you will also receive the following from Atari Corporation as part of the package. * BASIC Language Disk * BASIC Manual * ST Owners Manual * TOS/GEM on ROM. If you buy your ST from Silica Shop, you will also receive: * NEOchrome - colour graphics program * 1st Word - Word Processor. In addition, we at Silica would like to see you get off to a flying start with your new computer, so we have put together a special ST STARTER KIT worth over £100, which we are giving away FREE OF CHARGE with every ST computer purchased at our normal retail prices. This kit is available ONLY FROM SILICA and is aimed at providing users with a valuable introduction to the world of computing. We are continually upgrading the ST Starter Kit, which contains public domain and other licensed software, as well as books, magazines and accessories all relevant to ST computing. Return the coupon below for full details.

DEDICATED SERVICING - Only From Silica

At Silica Shop, we have a dedicated service department of five full time Atari trained technical staff. This team is totally dedicated to servicing Atari computer products. Their accumulated knowledge, skills and experience makes them the second to none in their field. You can be sure that any work carried out by them is of the highest standard. A standard of servicing which we believe you will find ONLY FROM SILICA. In addition to providing full servicing facilities for Atari ST computers (both in and out of warranty), our team is also able to offer memory and modulator upgrades to ST computers.

1Mb RAM UPGRADE: Our upgrade on the standard Atari 520ST-M or 520ST-FM keyboard will increase the memory from 512K to a massive 1024K. It has a full 1 year warranty and is available from Silica at an additional retail price of only £86.96 (VAT - £100).

TV MODULATOR UPGRADE: Silica can upgrade the 1040ST-F to include a TV modulator so that you can then use it with your TV set. This is an internal upgrade and does not involve any unsightly external boxes. A cable to connect your ST to any domestic TV is included in the price of the upgrade which is only £49 (inc VAT). The upgrade is also available for early 520ST computers at the same price.

THE FULL STOCK RANGE - Only From Silica

We aim to keep stocks of all Atari related products and our warehouse carries a stock of £4 million. We import many software titles direct from the USA and you will find that we have new releases in advance of any of our competitors. Unlike dealers who may only stock selected titles, we have the full range. In addition, we carry a complete line of all books which have been written about the Atari ST. A range as wide as ours is something you will find is available ONLY FROM SILICA.

AFTER SALES SUPPORT - Only From Silica

Rest assured that when you buy your ST from Silica Shop, you will be fully supported. Our free mailings give news of releases and developments. This will help to keep you fully up to date with what's happening in the Atari market. And in addition, our sales staff are at the end of a telephone line to service all of your Atari requirements. If you purchase an ST from Silica and would like any programming or technical advice, we have a full time technical support team to help you get the best from your computer. Because we have both the staff and the systems specifically dedicated to providing after sales service on Atari ST computers, we are confident that our users enjoy an exceptionally high level of support. This can be received ONLY FROM SILICA.

FREE CATALOGUES - Only From Silica

At Silica Shop, we recognise that serious users require an in-depth information service, which is why we mail free newsletters and price lists to our ST owners. These are up to 48 pages long and are crammed with technical details as well as special offers and product descriptions. If you have already purchased an ST and would like to have your name added to our mailing list, please complete the coupon & return it to us. The information service is available ONLY FROM SILICA.

FREE OVERNIGHT DELIVERY - From Silica

Most orders are processed through our computer within 24 hours of receiving them. Most hardware orders are sent by the overnight METRO courier service FREE OF CHARGE to customers within the UK. This method helps to ensure minimum delay and maximum protection.

PRICE MATCH - Only From Silica

We hope that the combination of our low prices, FREE UK delivery service, FREE Starter Kit and FREE after sales support, will be enough to make you buy your Atari equipment from Silica Shop. If however, there is something you wish to purchase, and you find one of our competitors offering it at a lower price, then please contact our sales department, providing us with our competitor's name, address and telephone number. If our competitor has the goods in stock, we will normally match the offer (on a same product - same price basis) and still provide you with our normal free delivery. We realise that we are not the only company who will match a competitor's price. However, if you come to us for a price match, you will also be entitled to our after sales service, including free newsletters and technical support. This makes our price match promise rather special, something you will receive ONLY FROM SILICA. We don't want you to go anywhere else for your Atari products. So shop at Silica, the UK's No.1 Atari Specialist.

SIDCUP (& Mail Order) 01-309 1111
1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX

LONDON 01-580 4839
Lion House (1st floor), 227 Tottenham Court Rd, London, W1

LONDON 01-629 1234 ext 3677
Selfridges (1st floor), Oxford Street, London, W1A 1AB

520ST-M

The affordability of Atari computers is reflected in the price of the 520ST-M keyboard, which is a mere £259 (inc VAT). This version of the ST comes with 512K RAM, as well as a modulator and lead for direct connection to any domestic TV. The price does not include a mouse. In addition, when you buy your 520ST-M from Silica, you will also receive the FREE Silica 'ST Starter Kit'. During 1987, many software houses will be producing games software on ROM cartridges, which will plug directly into the cartridge slot on the 520ST-M keyboard, giving instant loading without the expense of purchasing a disk drive. With the enormous power of the ST, you can expect some excellent titles to be produced, making this the ultimate games machine! If your requirement is for a terminal, then the 520ST-M can fulfill this role too. Leads are available to connect the ST to a variety of monitors, and with the imminent introduction of terminal software on ROM cartridge, the ST provides a low price terminal for business use. If you wish to take advantage of the massive range of disk software available for the ST range, you will need to purchase a disk drive. Atari have two floppy disk drives available, a 1/2 Mbyte model £149 and a 1Mbyte model £199. Full details of these drives, as well as the Atari 20Mbyte hard disk are available on request. If required at a later date, the mouse may be purchased separately.

£259

520ST-FM

The 520ST-FM with 512K RAM and free mouse, represents a further breakthrough by Atari Corporation in the world of high power, low cost personal computing. This model is the latest addition to the ST family, and is not only powerful, but compact. It is priced at only £399 (inc VAT) a level which brings it within the reach of a whole new generation of computer enthusiasts. When purchased from us, it comes with the FREE Silica 'ST Starter Kit' (see paragraph on the left). To make the 520ST-FM ready for use straight away, Atari have built into the keyboard a 1/2 megabyte disk drive for information storage and retrieval, allowing you easy access to the massive range of disk based software which is available for the ST. This new computer comes with all the correct cables and connections you will need to plug it straight into any standard domestic television set. You do not therefore have to purchase an Atari monitor. If you do require a monitor however, these are available with the 520ST in the following money saving packages:

- 520ST-FM Keyboard Without Monitor - £399 (inc VAT)
- 520ST-FM Keyboard + High res mono monitor - £499 (inc VAT)
- 520ST-FM Keyboard + Low res colour monitor - £599 (inc VAT)
- 520ST-FM Keyboard + Med res colour monitor - £699 (inc VAT)

Because the 520ST-FM has its own power transformer built into the keyboard, there are no messy external adaptors to clutter up your desk space. You are left with only one mains lead, serving both the disk drive and the computer. You couldn't ask for a more stylish and compact unit.

£399

1040ST-F

For the businessman and the more serious home user, Atari have their most powerful model, the 1040ST-F with 1024K RAM. This low cost powerhouse can be introduced into a business environment as a stand-alone system or can support a mainframe computer as a terminal. The 1040ST-F not only features twice as much memory as the 520ST-FM, but also includes a more powerful built-in disk drive. The drive featured on the 1040ST-F is a one megabyte double sided model. The extra memory facility of the 1040ST-F makes it ideal for applications such as large databases or spreadsheets. Like the 520ST-FM, the 1040ST-F has a mains transformer built into the console to give a compact and stylish unit with only one mains lead. The 1040ST-F is also supplied from Silica with a free software package and 'ST STARTER KIT'. In the USA, the 1040ST-F has been sold with a TV modulator like the 520ST-FM. However, for the UK market, Atari are manufacturing the 1040ST-F solely with business use in mind and it does not currently include an RF modulator, this means that you cannot use it with a domestic TV (Silica Shop do offer a modulator upgrade for only £49). The 1040ST-F keyboard costs only £599 (inc VAT) and, unless a modulator upgrade is fitted, will require an Atari or third party monitor. There are three Atari monitors available and the prices for the 1040 with these monitors are as follows:

- 1040ST-F Keyboard Without Monitor - £599 (inc VAT)
- 1040ST-F Keyboard + High res mono monitor - £899 (inc VAT)
- 1040ST-F Keyboard + Low res col monitor - £799 (inc VAT)
- 1040ST-F Keyboard + Med res col monitor - £899 (inc VAT)

The 1040ST-F comes with a mouse controller and includes 1Mbyte of RAM. It has a 1Mbyte double sided disk drive and mains transformer, both built into the keyboard to give a compact and stylish unit, with only one mains lead.

£599

ATARI

ST

To: Silica Shop Ltd, Dept YC 0387, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX

PLEASE SEND ME FREE LITERATURE ON THE ATARI ST

Mr/Mrs/Ms: _____ Initials: _____ Surname: _____

Address: _____

Postcode: _____

Do you already own a computer
If so, which one do you own? _____



ATARI-ST
AMSTRAD

£14.95
£8.95



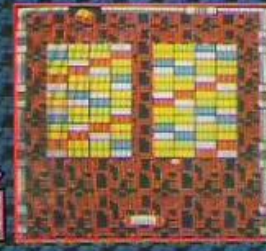
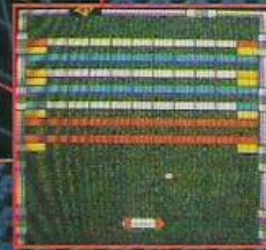
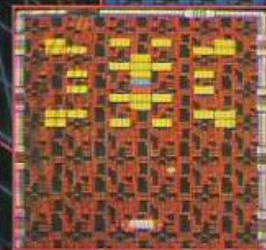
COMMODORE £8.95
SPECTRUM £7.95



WIZARD



Licensed from © Taito Corp. 1986.
Programmed for Amstrad, Spectrum,
Commodore, Atari by Imagine Software.



Imagine Software (1984) Limited
6 Central Street • Manchester M2 5NS
Tel: 061 834 3939 • Telex: 669977

Screen shots taken
from Arcade version.