

40 Rock ©

Only 40p.

POPULAR

# Computing

WEEKLY

13-19 SEPTEMBER 1984

*It's the best selling weekly*

Vol 3 No 37



## Commodore's C16 ousts Vic 20

COMMODORE has confirmed that—with the launch of its new C16 micro this week—production of the Vic 20 has been ceased.

"The C16 will supersede the Vic 20," explained a Commodore spokesman. "The Vic will be sold in the shops while stocks last, then the C16 will take over. There are no plans to manufacture any more Vic 20s."

Of the major High Street retailers, Boots and Dixons both

confirmed that they would be selling off their existing stocks of the Vic and taking the C16 in its place.

The C16 is to be sold—like the Vic—as part of a starter pack costing £139.99.

Along with the machine, the package will include *Introduction to Basic Part 1* and four other software titles—*Picture Builder*, a graphic design aid, two arcade games, *Punchy* and *Zap*, and a chess program.

## Hesitant start for the Plus/4?

PRODUCTION delays now seem likely to ensure that Commodore's new Plus/4 micro will be in short supply this Christmas.

Work on the machine's four built-in Rom software packages was not completed until the end of August and this has delayed first production machines until October. Even then it may be some time before the Plus/4 can be manufactured in volume.

As a result, Commodore is now concentrating its efforts for Christmas on its 64 and new C16 machines.

The C16 is to be backed by a heavy TV advertising campaign. While advertising for the Plus/4 will be confined to

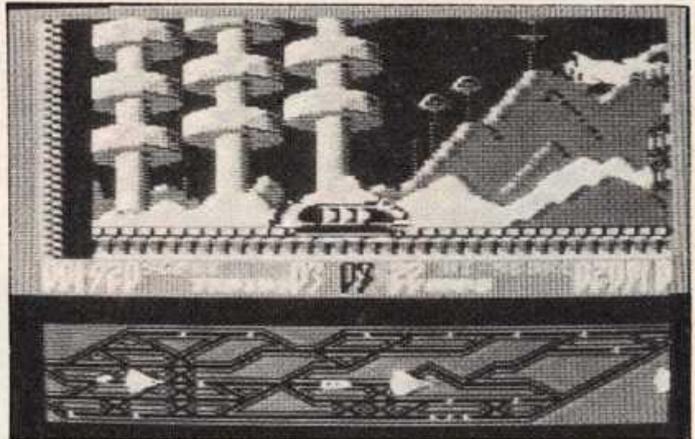
the national and specialist press.

"We feel there is a smaller market for the Plus/4, and this has been taken into account with the launch," said Aileen Bradley of Commodore. "It is far more of a serious home Computer, and not just for playing games."

The expected price for the Plus/4 has also risen since Commodore first previewed the machine in June. Then Commodore hoped it would sell at £249—now it will be priced at £299.99.

"Our initial price guidelines were underestimated, and also currency exchange rates have made it more expensive now," said Aileen Bradley.

## Gremlins at work again



SUICIDE EXPRESS will be the next release from Tony Crowther, the Sheffield-based Commodore 64 author, now working for Gremlin Graphics, responsible for top-selling titles like *Loco*, *Potty Pigeon* and *Monty Mole*.

He describes the new game as "Loco in the year 2000".

# COMMODORE PLUS/4 REVIEW

INSIDE } AMSTRAD PAGE } RAPSCALLION } ART ON BBC }



After the Spectrum, the 64 and the BBC, which are roughly competing machines, the big 'three'—are now moving apart.

Commodore has been the most conservative. Its new 16K/C16 is a Vic20 replacement intended as a 48K Spectrum-basher. Commodore's Plus/4 is really a tidied-up 64 with a less impenetrable Basic. Its four built-in software packages appear to be so simple that I can't see that they add much to the machine.

Sinclair is considered by some to have gone a bit off-beam with its QL. Yet the machine takes Sinclair into the impressive 68000 chip family. 128K is not to be sneezed at, the four Psion programs are workable and the machine is cheap.

Then there is Acorn. Acorn's ABM, expected to be previewed next week, is a full-blown business micro complete with built-in disc drive and bundled monitor. The machine is a direct development from the BBC and second-processor options—again the 6502 will be used to control, via the Tube interface, a choice of second-processor configurations.

The three companies' approaches differ considerably.

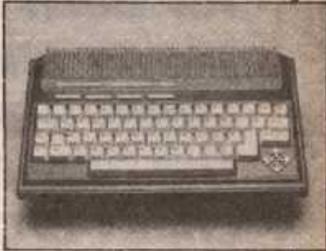
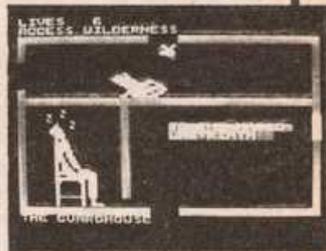
Commodore's Plus/4 is a conventional games/recreation machine which comes perilously close to stealing market from its existing 64 machine. Sinclair's QL is an original (and mostly successful) attempt to offer a powerful applications machine at a realistic consumer price. And Acorn's ABM is intended as a low-cost work-horse for business, based on the BBC's proven technology.

Which will succeed—the tried and tested or the innovative and unconventional?

# POPULAR Computing WEEKLY

Vol 3 No 37

## > Presents...

- |                                                                                                                                                  |           |                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------------------------------------------------------------------------|
| <b>News</b> > Retailers' Christmas plans > Marks & Spencers Software                                                                             | <b>5</b>  |   |
| <b>Star game</b> > The traditional sliding-block puzzle finds its way on to the Oric — model 1 or Atmos                                          | <b>10</b> |                                                                                      |
| <b>Street Life</b> > Graham Taylor talks to keyboard maestro Vince Hill of Siel                                                                  | <b>12</b> |  |
| <b>Hardware review</b> > David Lawrence takes a sneak preview of Commodore's Plus/4 machine, due for launch this week                            | <b>16</b> |                                                                                      |
| <b>Software reviews</b> > Bug Byte's latest offering, <i>Rapscallion</i> > Quicksilver's <i>Gate Crasher</i> tests arcade skills                 | <b>20</b> |                                                                                      |
| <b>The QL Page</b> > How to use <i>Quill</i> to edit and write your programs — Richard Snowdon explains > Using Spectrum microdrives with the QL | <b>23</b> |                                                                                      |
| <b>Spectrum</b> > Bubble sort routines in machine code, from Alan Went                                                                           | <b>24</b> |                                                                                      |
| <b>Commodore 64</b> > Sophisticated graphics made easy by Thomas Ellenrieder                                                                     | <b>27</b> |                                                                                      |
| <b>BBC &amp; Electron</b> > The second and concluding part of Michael Griffin's Computer Art                                                     | <b>29</b> |                                                                                      |
| <b>Amstrad</b> > Our fortnightly Amstrad Page makes its debut with a look at sound possibilities on the CPC 464                                  | <b>35</b> |                                                                                      |

## > Futures...

Dark secrets of the QL's Rom revealed. . . The latest Lo-Profile Spectrum keyboard from Advanced Memory Systems put under the microscope . . . a micro version of the dice game *Yahtzee* is Star Game for the BBC

Editor David Kelly News editor Christina Erskine Features editor Graham Taylor Production editor Lynne Constable Editorial secretary Geraldine Smyth Advertisement manager David Lake Assistant advertisement manager Alastair Macintosh Advertisement executive Tom Watson Classified executive Diane Davis Advertising production Lucinda Lee Administration Theresa Lacy Managing editor Duncan Scot Publishing director Jenny Ireland. Published by Sunshine Publications Ltd, 12-13 Little Newport Street, London WC2R 3LD. Tel 01-437 4343 Telex 296275 Typeset by The Artwork Group, 55-63 Goswell Road, London EC1, in association with Ink on Paper Ltd Printed by East Midland Litho Printers Ltd, Oundle Road, Woodston, Peterborough PE2 9QR Distributed by SM Distribution, London SW9, tel 01-274 8611, telex 261643. © Sunshine Publications Ltd 1984.

ABC

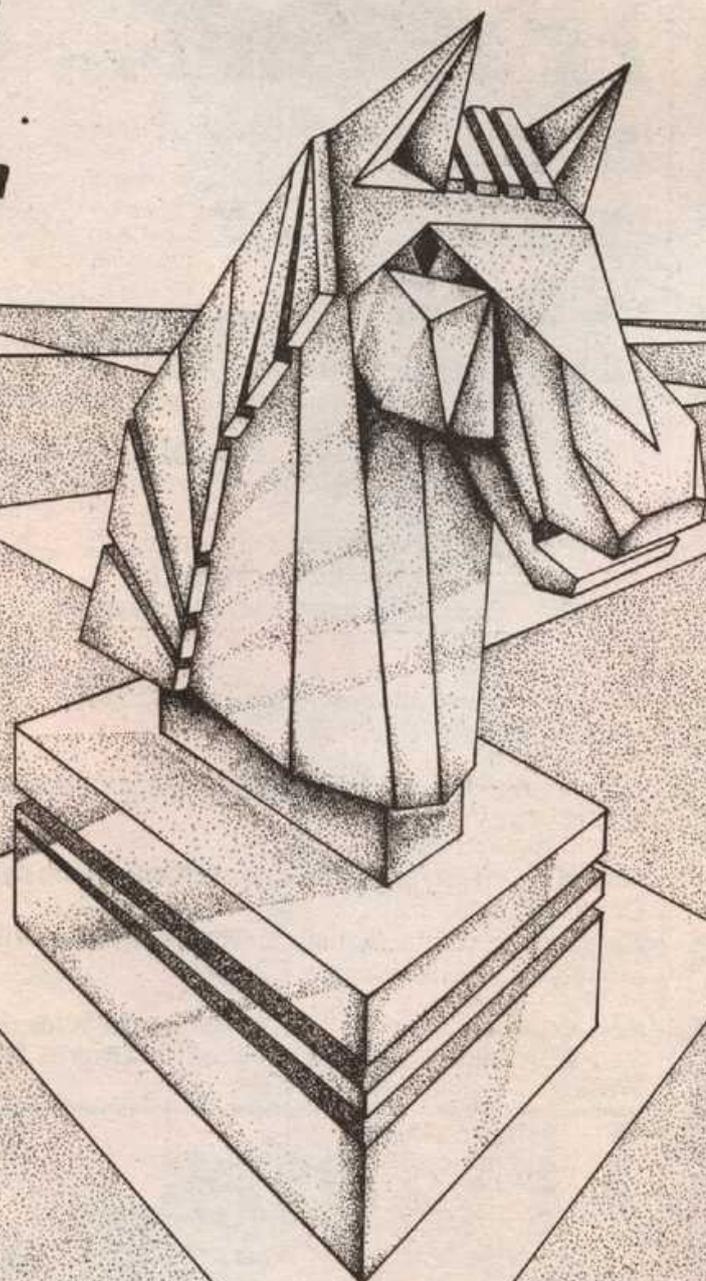
56,052 copies sold every week (Jan-June 1984 ABC).

**How to submit articles** Articles which are submitted for publication should not be more than 2000 words long. The articles, and any accompanying programs, should be original. It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted. **Accuracy** *Popular Computing Weekly* cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

Computer Trade Association Magazine of the Year

# From CDS, **'COLOSSUS CHESS 2-0'** the ultimate challenge by Martin Bryant

for both the chess  
player and the  
chess master  
the finest  
chess program  
ever written.



Available for the Commodore 64  
**£9.95**



**CDS Micro Systems**

Also disc version £12.95

\* Selected titles only

ONLY £9.95 each at W.H.Smiths, \*Boots, John Menzies and other leading Computer Stores, or... direct from CDS Micro Systems  
Send Cheque or P.O. To CDS, Silverhouse, Silver Street, Doncaster, DN11 1HL, Tel: (0302) 21134. (Trade enquiries welcome)

## Software for M&S

MARKS and Spencer is to enter the software field, with three packages being launched under the St Michael label this autumn.

The three titles — *Games Pack*, *Start to Program* and *Games Maker*, will all initially be available only for the 48K Spectrum.

"The games are being launched on a trial basis. They will be sold first in just half a dozen stores. If they are successful, then more of the larger stores will stock the range," explained Chris Maynard of Grise-wood and Dempsey Computer Publishing, which wrote the games for Marks and Spencer.

"We have worked in conjunction with a number of software companies to produce these games. *Games Maker*, for instance, is a modified version of Quicksilva's *Games Designer*. The two games on *Games Pack* — *Fearless Frank* and *Frozen Penguin*, were originally published by Visions for the Commodore 64 — this is their first appearance on the Spectrum.

"*Start to Program* is based on a series of short programs we published in a book called *A Beginners' Guide to the ZX Spectrum*. The micro version was originated by ourselves and Triptych Publishing."

Grise-wood and Dempsey has also set up a joint publishing venture with Pan Books to produce four software packages under the Piper Sof-

## QL takes off

THE first signs that the QL may be taking off could be seen at the 12th ZX Microfair, held last Sunday at Alexandra Pavilion in London.

Not only was the QL on sale over the counter for the first time — from the Sinclair stands but over ten of the exhibitors had QL material to show.

Two QL assembler packages were on display — one from Metacomco at £59.95, the other from Hisoft (as yet unpriced). GST showed its alternative operating system for the QL available on a plug-in board for £99.95, and a new software house Spectrascan demonstrated a range of QL games on microdrive at £12.

## Stores pin hopes on new micros

A PICTURE of which micros will be available in which stores this Christmas is beginning to emerge. MSX machines from four manufacturers — Toshiba, Sony, Sanyo and Mitsubishi — will be available in limited quantities.

Commodore's new C16 and Plus/4 machines and Sinclair's QL will also be in the shops — the C16 and QL well before December.

Currys aims to have 2000 Toshiba HX-10 machines available this month. Boots and Dixons will also both take the HX-10. For Boots it will be the only MSX machine it will take.

Dixons, however, also plan to be stocking the Sanyo MPC-100 and the Sony Hit-Bit in October.

W H Smith will also be taking the MPC-100, and both Mitsubishi's 64 and 132K models.

The Sinclair QL will be taken by W H Smith, Boots and Dixons, so far, and Laskey's is considering the machine.

The Commodore C16 will be taken by Currys, Boots, Dixons, W H Smith (October), and probably Laskey's and Rumbelows. Commodore's Plus/4 will be taken by Currys, Boots Dixons and probably Laskey's and Rumbelows. W H

Smith has decided not to take the Plus/4.

Retailers are however apparently treating the Oric Atmos machine with caution. Currys has dropped the machine from its range, and Dixon's has not yet decided whether it will stock the Atmos this autumn or not. Meanwhile Laskey's has reduced its price for the Atmos to £119.90 — "We'll see how it sells at that price before deciding whether to drop it or not," commented a Laskey's spokesman.

● Most of the major chain stores have now dropped the 16K Spectrum — the machine is now virtually unobtainable in this country.



ware label. These titles, *Aircraft*, *Astronomy*, *Birds* and *Dinosaurs*, for the Spectrum and Commodore 64, have more of an educational slant. They comprise games, database material, and an illustrated book. Each package will sell at £7.95.

The Marks and Spencer titles are due for launch in October at £6.99 each.

## Softek edge ahead

THE latest release from Softek's new programming team The Edge is *Psytraxx* for the 48K Spectrum.

*Psytraxx* uses The Edge's so-called 'Synergy' programming technique, which effectively gives the game over 1000 screens. Described as a 'giant maze adventure', the action takes place inside a robot's brain where the player must locate the robot's CPU and destroy it.

Softek International has split its various interests into two separate autonomous divisions. All further software releases will come out under the name The Edge, while still

## Apricot set for PCW show

MANY companies will be using the Personal Computer World Show, at Olympia which begins on September 19, to launch their Christmas products.

Acorn and Enterprise will both have long-awaited micro-computers making their debuts at the show — the Enterprise 64K and Acorn's business machines, currently being tagged as the ABM series.

Apricot will be demonstrating its new F1, F1E and portable micros. The F1 has 256K Ram, a 3.5 floppy drive and business software bundled with it.

Touchmaster, the company headed by former Dragon Data directors Brian Moore and Ri-

chard Wadman, will have its graphics pad on show, while Sinclair will be selling QLs from the stand.

On the software side, Quicksilva is launching its range of autumn games, and *Sherlock Holmes*, will, at last, make its first public appearance.

Psion will have its Xchange business software — for the IBM PC and Sirius — on show. *Xchange Quill*, *Abacus*, *Archive* and *Easel* are enhanced versions of the bundled QL software for the business market.

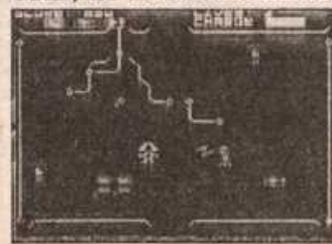
The Personal Computer World Show opens to the public on September 20 at 10.00am. The entrance fee is £3.50.

being marketed by Softek.

The forming of a separate group also involved a staff shake-up. Softek retained only a few of its programmers to work in The Edge, while Marten Davies, formerly UK Sales Manager at Activision, was brought in to help set up the group.

*Psytraxx* could be available this month, priced at £7.95.

● The Edge is also considering converting its first release, *Quo Vadis*, for the MSX machines.



## Fantasia games live on

ADVENTURE house Digital Fantasia has gone into liquidation.

Its range of Mysterious Adventures has however been saved. Prior to the company's demise, Channel 8 Software took over the series. Channel 8, which produced Commodore and Atari versions of the adventures, will not only continue marketing the series of 11 titles, but also release three additions to the range.

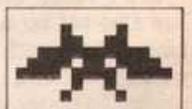
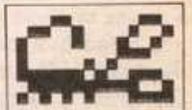
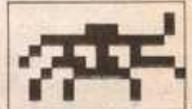
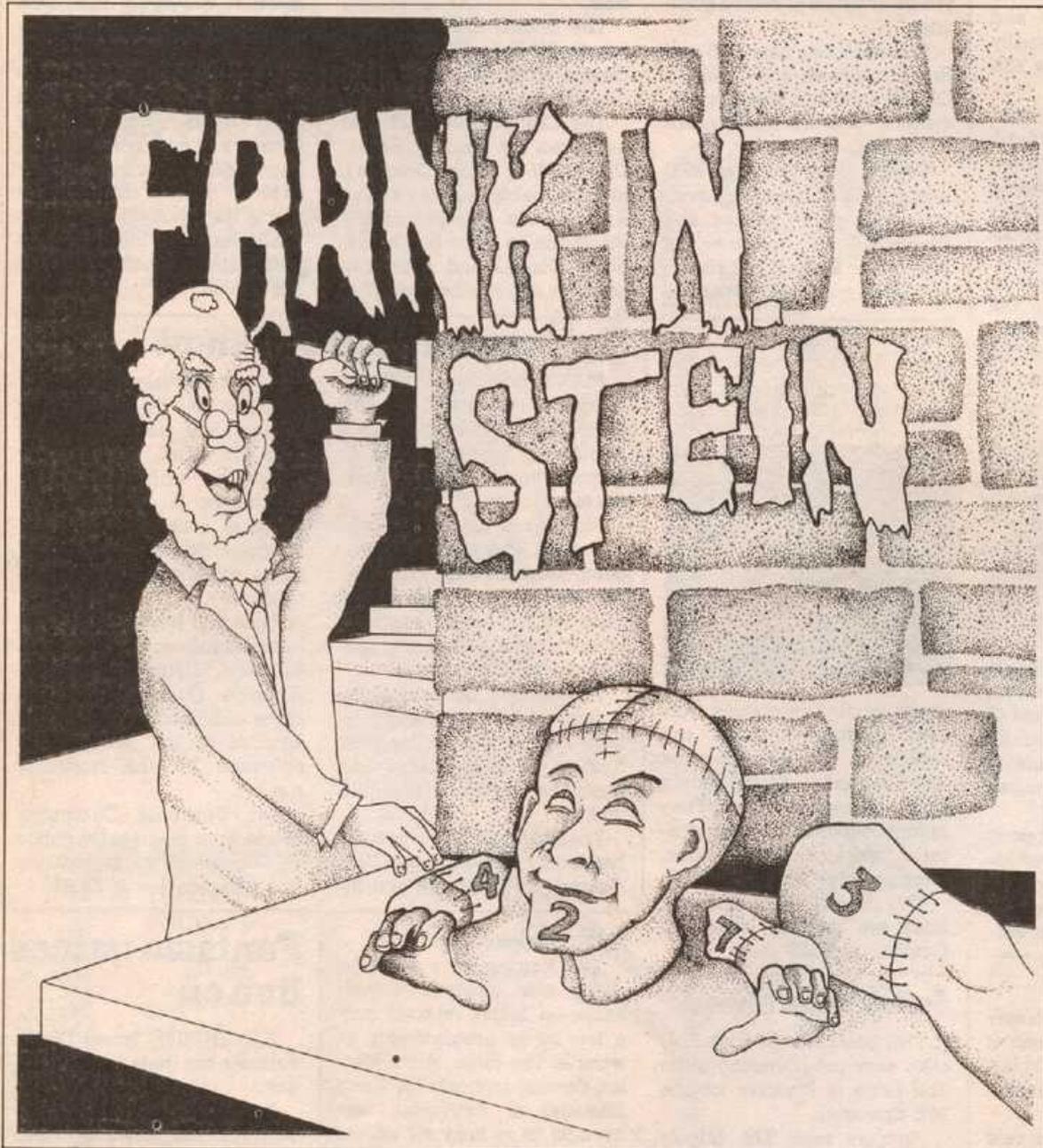
The new titles will be *Midwinter*, *After the Fire* and *Beyond the Infinite*, to be produced on Commodore 64, Atari, Dragon, Spectrum, BBC and Atmos.

Have you got what it takes to  
build your very own monster?

# FRANK N. STEIN

BY COLIN STEWART

NEW  
RELEASE  
AVAILABLE  
SOON



**THE SETTING:** Professor F.N. Stein's laboratory in his Castle in the Black Forest.

**THE TIME:** 1884

**THE GAME:** 50 Screens requiring timing, logic and planning to complete.

**THE OPPOSITION:** Too many to list here but featuring:- Snails, bats, ice (it makes you slip), firemen's poles, man eating pumpkins, spiders, slime (it slows you down), caterpillars, tanks, springs, light bulbs (they electrocute you), mice, lobsters, snakes, bumble bees, jack-in-the-box etc.

**THE OBJECT:** As you know, all the best monsters are hand built. Prof. Stein's life long ambition has always been to build his own monster - but first he needs all the bits!

You guide him around the dungeon picking up the bones - make sure you get the right order - then activate him by throwing the switch - the longer you take to complete each screen the higher will be the charge you give him - and the angrier he will become - so watch out!

ARCADE HORROR FOR SPECTRUM 48K

£5.95



P.S.S. 452 STONEY STANTON RD. COVENTRY CV6 5DG.  
TEL. COVENTRY (0203) 667556

## Handmade Vic

Like M J Davies (letters, August 23 issue) I have experienced trouble with breaking wires on my Vic20 modulator. I eventually decided to fit it inside the Vic20 case.

This was easily done by screwing the modulator to the lid. A co-axial socket was then also fitted on to the lid and the relevant wires to the modulator were soldered to the back of the DIN output socket on the Vic pcb.

Elegant it may not be, but it was well worth the effort and my Vic is now trouble-free.

R Mather  
138 Clensham Lane  
Sutton  
Surrey

## Programming structure

I feel that I must write to you after reading Mr George's letter attacking good programming style.

Mr George first attacks structured programming, saying that Basic should throw away all pretence of being a structured programming language because it includes Goto statements. Though they are completely superfluous except in error trapping, structured programs are far easier to write, debug and follow. It calls for a more reasoned and logical approach to solving problems. The pity is that beginners are not taught to program in a block structured programming language first of all.

As I think Mr George knows, recursion does not involve merely executing the same piece of code several times, it is when a procedure or function is able to call itself in order to perform a task. Recursion gives the same advantages that structured programming affords — which is probably why Mr George dislikes it so. There is also a bug in his program: the program does not work for the factorial of zero.

Mr George seems to prefer a ZX81, which originally sold for £100, to a 16K Spectrum for the same price. The Spectrum is the product of technology much superior to the ZX81. Does Mr George dislike tech-

nology as much as the excellent microcomputers it has brought.

I'm afraid that I cannot agree with any of the points in Mr George's letter with its Pythonesque "Ee, when Ah wer a lad we didn't have any of this graphics stooft, tha knaws, we 'ad a wun byte memory mapped display an' wer proud of it" observation!

P Bhagat  
Clare College  
Cambridge



"It's most embarrassing — they want an Orc, a Vic 20 and a 16K Spectrum to give as Christmas presents."

## Shades of Superbasic

When asked Ver\$, my QL responds with AH — all very well, but which version?

There must be differences — John Lawlor (issue 35) writing about procedures in issue 34's QL page finds problems only with Merge and Dine, while my QL says that all mcirdrive commands must have no strings attached. So most of the procedures were of no use. Incidentally, I have no problem with Auto 30000, so long as the increment is not too large.

Here are two instructive examples of Superbasic readers may like to stow in the 'boot'. They force upper and lower case from string inputs containing letters:

```
10 Input x $: Upc x $: Print x $
20 Input y $: Lwc y $: Print y $
30 Def Proc Upc(z$)
40 For z=1 to Len(z$): If code(z$(z)) > 90
   z$(z)=Chr$(Code(z$(z))+32)
50 End Def
60 Def Proc Lwc(z$)
70 For z=1 to Len(z$): If Code(z$(z)) < 97: Y z$(z)=
   Chr$(Code(z$(z))-32)
End def
Entering mixed upper and
```

lower case letters will cause one string of each to be printed. Such commands as written in my manual give error reports; the following may be helpful to some QL owners:

RENUM start TO end; base, step — with semi-colon after 'end' L/N

SAVE Mdv1 name, start TO end — with comma after 'name' to save parts or lines of a program.

Brian Johnson  
2 Block X Peabody Avenue  
London SW1

## Thrashing around

How threatened John Beckett of Manchester must feel to be thrashing around in all directions — 'Support the Electron' PCW Vol 3 no 36.

Perhaps his feeling that the world has let him down is linked to the item in 'News Desk' where we get a bit of an insight into the way in which the Acorn company thinks, that it is putting up the price of its second processor option to 'enable dealers to receive a larger margin on sales'. It even has the cheek to wrap this up as a service to the customer!! One assumes that it would never strike Acorn that a better way of helping both dealer and customer would be to be less greedy on the wholesale

price of its products?

Both of the BBC and the Electron are excellent machines, as in their own way were all the other machines that Mr. Beckett rages against, but it is surely obvious to everyone that they are Very overpriced.

Geoff Crowther  
60, Fleckney Road  
Kibworth Beauchamp  
Leicester

## Heavy on pink

I have been reading your magazine since it was A4 size, with nice titles on the cover in green, red and blue.

The reduction in size spoiled my home-made binders. Never mind, I thought, it's still a great mag. But the last straw was Vol 3, No 32. Being a biker (long hair, into heavy metal etc) I felt a right nancy walking up to the counter with a PINK edition.

Timufy Sheldon  
Peel Cottage  
Holyhead Road  
Albrighton  
Wolverhampton

PS Is someone doing this magazine for a bet?

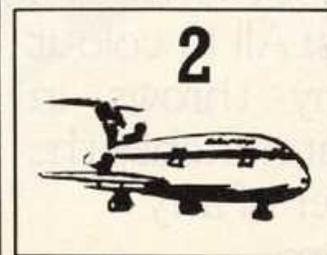
The odds against another pink edition occurring are two to the power of 250,000 to 1 against and falling. We have normality. Anything you still can't cope with is therefore your own problem.

## Learn to Fly Competition: Week 2

Competition week 2 and here are this week's vouchers.

Collect the four weeks' vouchers and fill out the coupons printed in the last week. Send the form and the four 'plane' vouchers and you could win a go on a real flight simulator—as used by British Airways to train their commercial pilots!

Send in the form and the second set of four vouchers and you are entitled to unbeatable discounts on Hewson Consultants flight simulation and air traffic control software for all the major micros—offer available only to Popular Computing Weekly readers!



# Could this be the biggest selling disc since White Christmas?

A few months after its release, the latest disc from Lotus™ is now romping up the charts.

Symphony™ is the follow-up to that other catchy number, the Lotus 1-2-3™, itself the biggest selling integrated software disc of all time.

But Symphony's success isn't altogether surprising. It takes the proven benefits of 1-2-3 then adds a few ideas of its own.

The spreadsheet, for instance, is even bigger (8192 rows by 256 columns, to be precise).

The database is even better. Its graphics verge on the artistic (bar charts, line charts, not to mention exploded pie charts). All in colour.

Next, Symphony throws in word processing that matches the speed and the power of any popular WP program.

It adds communications that let you chat with computers anywhere.

And to cap it all you can put everything on the screen at the same time.

So that when you change the numbers in one window the graphics change in another.

But for all this, Symphony is easier to learn and simpler to operate than programs that do half as much.

To find out more about Lotus Symphony and the name of an authorised dealer call Teledata on 01-200 0200.

It may not capture hearts in quite the same way as Bing's disc, but for millions of executives it'll be music to their ears.

**Lotus™** 1-2-3™ and Symphony™

SYMPHONY NOW AVAILABLE FOR THE IBM® PC AND XT,™ COMPAQ™ AND 100% IBM COMPATIBLES. 1-2-3 NOW AVAILABLE FOR THE IBM PC AND XT, COMPAQ, OLIVETTI™ M24, 100% IBM COMPATIBLES, DEC RAINBOW,™ WANG PROFESSIONAL,™ AND TI PROFESSIONAL COMPUTER™



# Slide

Try to solve the sliding-block puzzle in this game  
for the Oric by B Johnson

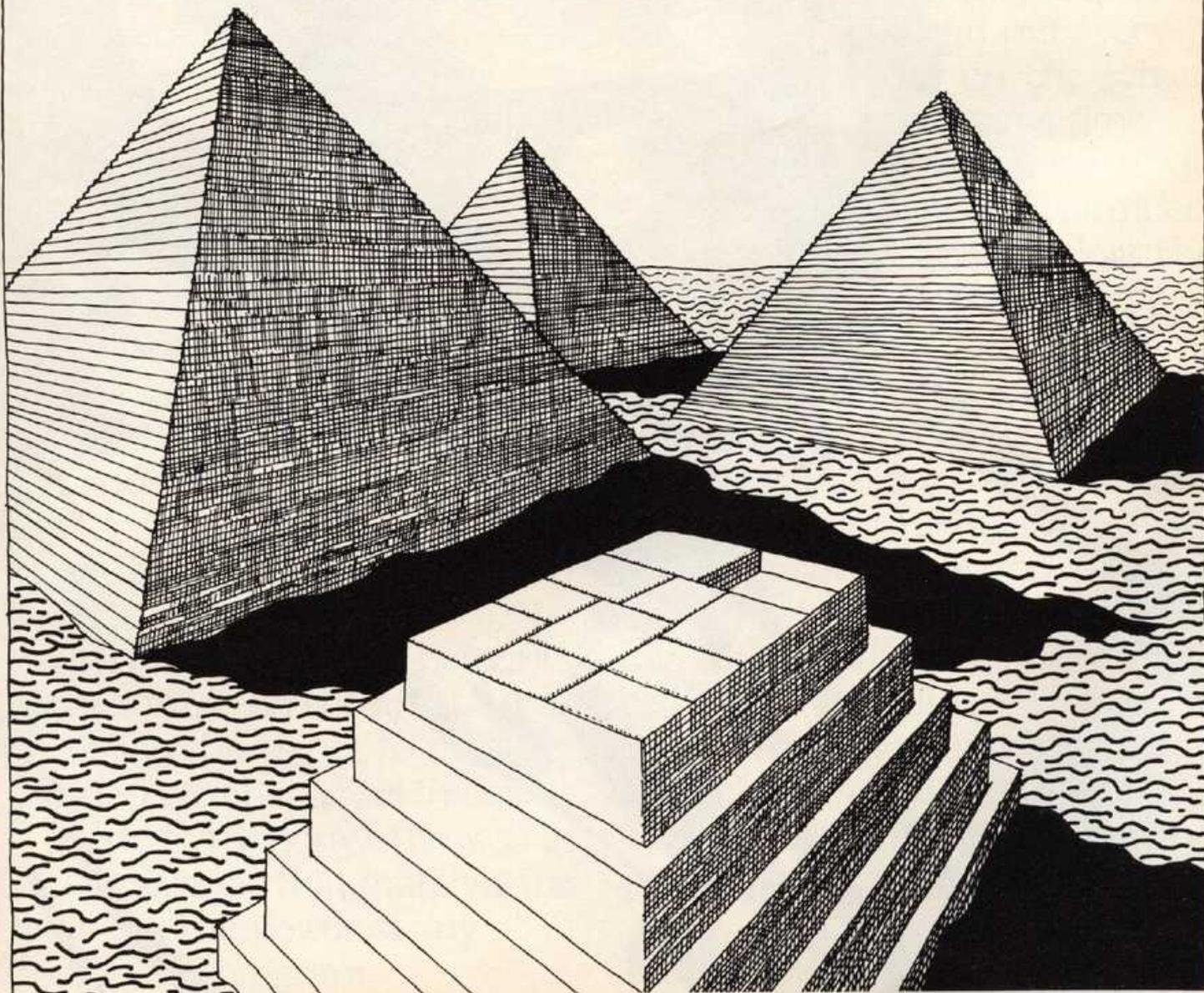
**T**he program simulates the well-known sliding-block puzzle, and shows a few of the facilities of the Oric-1. It has three levels of difficulty and lets you quit if you just solve it!



## Program Notes

100 Keyboard and Screen POKES. Look at addresses from #268 to #270 for some useful POKES  
105-120 Set-up  
140 A different start each time  
150-166 Sets difficulty and screen colours

250-280 Jumbles the puzzle  
300-360 Puts it on screen and checks for finish  
370-410 GETs your choice  
420-450 Moves it  
475-478 Music  
500 CALL #F430 is Warm Start vector — saves all that messy PRINTCHR\$ (17)(4)(20)(6) .. PAPER, INK business!!



```

100 POKE#26D,88:POKE#26F,28:CLS:POKE#26A,74
101 REM POKES FOR SCREEN AND KEYBOARD SET-UP
105 DIMA(35):PAPER3:INK0:CLS
110 FORI=1TO35:A(I)=-1:NEXT
120 FORI=1TO4:FORJ=1TO4:A(6*I+J)=60+4*I+J:NEXTJ,I:I=28:A(I)=0:IFZZ=
1THEN130
122 PRINT:PRINT:PRINTSPC(13)CHR$(27)"JSLIDE"CHR$(4)
124 PRINT:PRINT:PRINT"All you have to do is to re-arrange "
125 PRINT"the pieces into vertical alphabetical ":PRINT"order.":PRI
NT:PRINT"Just press the ";
126 PRINT"letter that you want to ":PRINT"move.":PRINT:PRINT"Q to q
uit..."
127 PRINT:PRINT:PRINT"Press any key to play.":GETA$
130 CLS:PRINT:PRINT"1=Easy 2=Normal 3=Hard"
140 A$=KEY$:R=RND(1):IFA$=""THEN140
150 IFASC(A$)<49ORASC(A$)>51THEN140
160 F=VAL(A$):IFF=1THENPC=3:BC=20:F=20
161 IFF=2THENPC=2:BC=21:F=50
162 IFF=3THENPC=4:BC=17:F=200
165 C=0:PAPERPC:CLS
166 FORQ=8TO16:PLOT22,Q,PC+16:PLOT12,Q,0:PLOT13,Q,BC:NEXT
250 FORJ=1TOF
260 K=INT(RND(1)*4+1):L=(K=1)-(K=2)+6*(K=3)-6*(K=4):IFA(I+L)<0THEN2
60
280 A(I)=A(I+L):A(I+L)=0:I=I+L:NEXTJ:GOTO370
300 PRINTCHR$(30):PRINT"Move ";L;:K=0:H=5:FORI=1TO4:FORJ=1TO4:Z=A(6
*I+J)
310 IFZ=0THENZ=32
320 POKE#BCCA+H+J*80,Z
321 REM use #3CCA for a 16k ORIC
330 IFA(6*I+J)=60+4*I+JTHENK=K+1
340 NEXTJ:H=H+2:NEXTI
350 IFK=15ANDA(28)=0THEN460
360 PRINT" Letter? "CHR$(8)::RETURN
370 L=0
380 GOSUB300
390 A$=KEY$:IFA$=""THEN390
400 IFA$="Q"THENPAPER3:CLS:PRINT:PRINT"You quit after "L"moves.":GO
TO490
410 IFASC(A$)<65ORASC(A$)>79THEN390
420 PRINTA$::PRINT:PRINT:PRINT:FORI=7TO28:IFA(I)=ASC(A$)THENJ=I
430 IFA(I)=0THENK=I
440 NEXTI:I=J-K:IFABS(I)<1ANDABS(I)<6THEN380
450 A(K)=A(J):A(J)=0:L=L+1:GOTO380
460 POKE#26A,74:CLS
470 PRINT:PRINT:PRINTSPC(11)CHR$(27)"NWELL DONE "CHR$(4):PRINT:PR
INT
474 PLAY0,0,0,0
475 TU$="1358135813581"
476 FORI=1TOLEN(TU$):P=ASC(MID$(TU$,I,1))-47:MUSIC1,3,P,0:MUSIC2,4,
P,0
477 PLAY3,0,1,1500:WAIT12:NEXT
478 WAIT200:PLAY0,0,0,0
480 PRINT:PRINT"You finished in "L"moves."
490 PRINT:PRINT"Another go? (Y/N)"
500 GETA$:IFA$="N"THENCALL#F430' WARM RESET
510 IFA$="Y"THENCLEAR:ZZ=1:GOTO105
520 GOTO500

```

## A Siel barks

Graham Taylor talks about music keyboards and computers to Vince Hill from Siel

For many people a major consideration in buying their micro was the possibility of experimenting with sound and music composition in a cheap, easy to understand, way.

Programs which 'turn your BBC into a synthesizer' or let you 'compose and edit your own compositions' have always done well, if not actually shot into the top of the charts.

People like to play music with their micros but, obviously, there are major problems — the Querty keyboard isn't very suitable for playing music, the sound chips are not really that powerful, and it is difficult to use computer music in conjunction with other instruments.

A solution to all these problems which should also be soon quite cheap is provided by MIDI the digital communication standard which allows not only the linking of keyboards but also keyboards and micros.

In fact MIDI means much more than being able to add a keyboard to your micro — it means using your computer for composition, automatic notation, sequencing, and all kinds of other wonderful things.

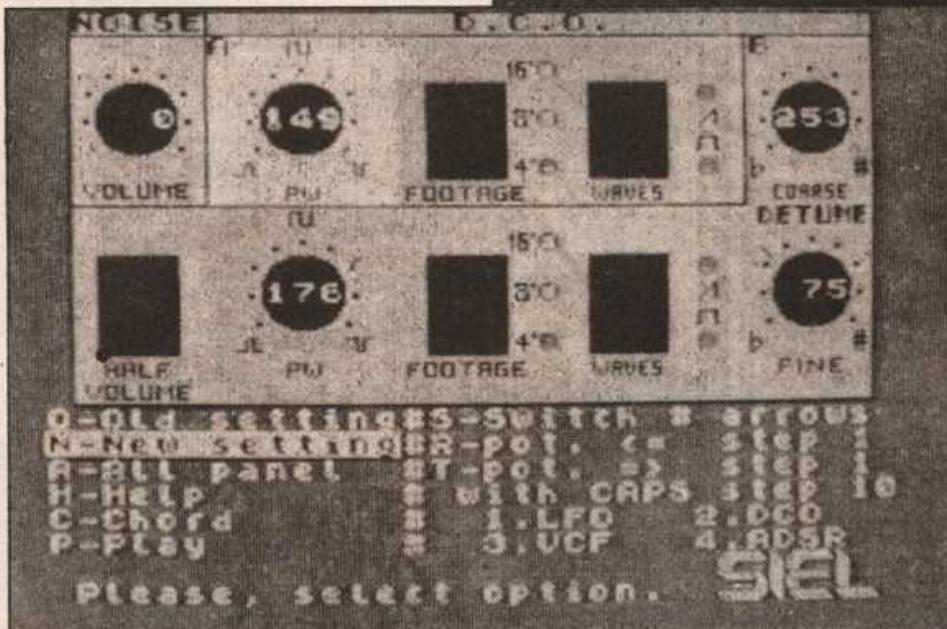
In the past MIDI keyboards have been expensive and it is only recently that computer interfaces and software are becoming available. Now prices look like falling dramatically in a race between Yamaha with its CX5 MSX machine and expected new low-cost keyboards from Casio and Siel.

Siel's Vince Hill is one of those actively involved in promoting MIDI in this country, and I asked him how computers fitted in: "There are some interesting similarities between the keyboard and computer industries — the computer industry is much newer but with something like MSX the two areas overlap."

MIDI can be dated not by the release of any one item of equipment, but by the signing of the MIDI charter — literally a piece of paper that most major keyboard manufacturers signed in which common electrical fittings and standards were agreed. "It had a long gestation period before it finally emerged and even then some of the early MIDI machines didn't really communicate properly with one another — information like keyboard velocity, the speed at which you press the keys on a touch-sensitive machine — has taken a while to get right."

Electronic music is digital information, information in the form of binary digits, and the same language is used by both keyboards and computers — they sometimes even use the same or similar microchips. It was inevitable, therefore, that the two should be linked.

The MIDI computer link gives musicians a powerful composing tool and polyphonic sequencing, and arranging. "What you have to remember is that the keyboard market has one big problem associated with it — the people who are going to buy it need some skill — some sort of technique or flair for music." The cheap-end portable keyboard manufacturers have spent a lot of time producing endless devices providing new ways of making it easy for the



One of Siel's first MIDI software packages — a programming tool for their MK600 synthesizer

non-musician to quickly acquire enough skill to play satisfyingly — auto chord and bass accompaniment, lights that flash as each note is played by the machine, LED's that tell you what key your playing in etc etc.

MIDI will enable software houses to create music education programs that use the TV monitor and test and encourage budding musicians on a real keyboard. Not only will these programs ask you to 'play the key of C' but they will also judge how smoothly and quickly you managed it and

give you appropriate advice.

"The computer users can gradually be drawn through, just playing about with sounds, to a real understanding and sense of purpose with their music — with the right software it could be like having a music teacher in your home, twenty-four hours a day."

If the MIDI keyboard-computer link really takes off then it will quite probably change the way the keyboard manufacturers think about the way their hardware is marketed.

"If you take something like the cheap Casio keyboards with their dozen or so preset sounds and rhythms you can see what might happen — Casio put on a number of presets because they know that the market they are aiming for wants something nice and simple — they are not looking for a DX7 where they have to spend five hours constructing the sounds.

"So Casio choose some basic sounds and put those in as presets even though the chip that generates them is probably capable of



put voices into computers without using hardware.

Next year Siel is planning a range of keyboards capable of being controlled by computer with prices starting at about £190. Also a substantial portable keyboard with MIDI called the MK900 is available from Siel for just over £400.

This keyboard will be able to use the existing Siel software/hardware interfaces for the Spectrum and Commodore 64 (the BBC version is expected soon) and a growing range of educational software.

"There will be an increasing number of computers supported — Siel would very much like to do something with the QL. With multi-tasking and windows we could do wonderful things and with 128K — we can store a vast amount of music — unfortunately Sinclair are not very helpful though."

For those who, like me, fancy the idea of making music and want something else to do with our computers MIDI is going to offer a lot of new alternatives. And by next year it should be cheap too.

In the end though what you get out of it will depend on you. As Vince says, "No matter how much technology you have in the final analysis it's up to you and what you do with it — music is the whole thing, the only objective there is."



making quite a few more; it's a compromise for the sake of simplicity.

However, if the keyboard has MIDI then it's easy to give it extra facilities via the computer so that it is possible to experiment — MIDI opens up the lower-cost keyboards for more complex applications."

A computer link should make cheap sampling possible too. Sampling is where

an analogue sound is fed into a machine via a microphone, or from tape, and turned into digital information and stored — then it can be altered or converted into notes for a keyboard and played — you could store, for example, the sound of a voice playing a single note and then play it at any note over as many octaves as you want. This is the same technique that is sometimes used to

# The computer game is DEAD...



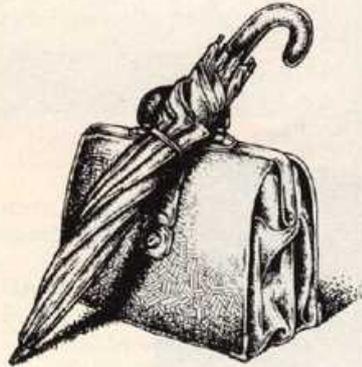
AUTOMATA U.K. PRESENTS  
YOURSELF  
IAN DURY  
JON PERTWEE  
MEL CROUCHER  
DONNA BAILEY  
and FRANKIE HOWERD in

# DEVS EX MACHINA

WRITTEN AND DIRECTED BY MEL CROUCHER  
48K ZX SPECTRUM PROGRAM BY ANDREW STAGG

PLEASE USE THE AUTOMATA ORDER COUPON ON THE BACK COVER

There's more to Mr. Pettigrew  
than meets the eye.



THE PETTIGREW CHRONICLES

COMMODORE 64, SPECTRUM 48K

SHARDS

*Software*

...LONG LIVE

**Eureka!**

250K of pure mystery. Be the first to know.

Send your name and address to: Eureka!, 228 Munster Road, London SW6 6AZ

## Solid and sturdy

David Lawrence takes a look at the machine on which Commodore is pinning high hopes — the new Commodore Plus/4



It is inevitable that the Plus/4, Commodore's new home micro, should have to face comparison not only with the machines of competitors, but also with its own best selling Commodore 64.

With that in mind, perhaps it is only fair to say from the outset that the new Plus/4 is not a bigger and better version of the 64. Rightly or wrongly, Commodore has chosen to go down a very different path than that which the 64 might have indicated.

Gone are the sophisticated Sid and Vic chips which gave the 64 the sound capabilities of a synthesiser, and graphics wonders like sprites. The problem with all these marvellous facilities was always that they were never integrated with Basic and it was only the best of programmers who could ever really make use of them.

With the Plus/4, Commodore has aimed a machine squarely at the average user. Experienced programmers will find many nice touches and elegant programming structures to play with but it is the ordinary domestic user who will notice the real difference. Here is a machine which has all of its major facilities available from a new Basic, version 3.5 and a full 60K available for programs on the 64K versions.

I have been working and playing with the finished version of the Plus/4 (without the built in software packages) and its smaller brother, the C16, for some three months now, and during that time it is fair to say that it has grown on me immensely. The first impression, and a continuing one, is of good design, solid manufacture, thorough preparation before release and the capacity to listen to the pleas of existing owners on the limitations of the 64. Physically the Plus/4

has a robust feel to it and while the keyboard seems little slack, it has not revealed weaknesses under intensive usage.

### Specification

The Plus/4 appears to have been styled by the same team responsible for several of the Japanese MSX machines. The almost black casing has space-ship lines and sets off the main keyboard of 58 ivory coloured keys plus space bar to perfection (well anyway I like it). Eight programmable function keys (four keys, two on each), a convenient cluster of cursor keys, and a power light complete the top. The main keyboard is slightly dished for easier typing.

Briefly, the Commodore Plus/4, like its relative the Commodore 64, has 64K Ram. But whereas the C64 has only about 39K of Ram available for programming in Basic, the Plus/4 has 60K available to Basic.

The machine has a 32K Rom containing the operating system and Basic and the machine also includes four in-built software packages contained on Rom chips.

It is from these four software packages that the machine takes its name — they are a word-processor, a simple spreadsheet, a database program and a graph-plotting package.

Seven function keys are provided — together with a *Help* function key.

The Plus/4 also has a simple built-in machine-code monitor with 12 commands.

The machine is based around the 7501 processor chip — a development of the 6502 used in the 64 and the Vic20.

Up to 121 colours can be displayed. The maximum graphics resolution is 320 × 200 pixels and the text display mode is 40 × 20 characters.

Sockets are provided at the back for monitor, joysticks, disc drive/printer, RS232, power, and cartridge. TV output comes from the left whilst an on/off switch occupies the right along with a reset button. And all that finning along the top also acts as a grill for ventilation.

Separate manuals are provided for Basic and the *3-Plus-1* integrated software. These give tutorial instruction for beginners and reference sections for memory lapses. The Basic manual is well presented and gives sufficient information to use the machine.

### Plus/4 Integrated Software

The Plus/4 comes complete with built-in software (named *3-PLUS-1* by Commodore) for word processing, data filing, graphics, and setting up spreadsheets.



The software has the advantage of a high degree of integration — that is the programs can exchange data, tend to use common commands, and are all resident in memory at the same time.

The software is, of necessity, rather limited in scope though because it is supplied on a couple of solid-state Rom chips fitted inside the machine.

The advantage is that access to the packages is instant — at the touch of a function key.

The disadvantage is that that size of the programs has had to be kept pretty short — a far cry, for example, from their equivalent programs on the QL.

Judging from a demonstration of the four Plus/4 software presented by Commodore at June's Chicago CES show the programs will, as suspected, be rather primitive.

In the word-processor for example, such refinements as right-justified, centred or highlighted text are not available.

The graphics package looked particularly disappointing. Information from the

spread-sheet can be displayed only in the form of a bar-chart (pie charts are apparently not possible) where the bars are built up out of ordinary character-square size # signs. Each bar can therefore only be accurate to plus or minus the height of one character square. Only one set of data can be represented at a time.

## Ease of programming

When the time comes to program the new machine, existing Commodore owners will be relieved to know that the Plus/4 keeps to the same tried and tested full-screen program entry and editing methods.

Commodore has recognised this strength and even built upon it with a whole series of extra editing capabilities called up by *Escape* sequences (*Escape* followed by another key).

The overall effect is that developing a program is even easier on the Plus/4 than on the 64 and, accordingly, streets ahead of most of machines on the home and personal market.

## Programming structures

Many of the new machines coming onto the market this year have followed BBC Basic in moving away from the use of *Gotos* and *Gosubs* as a programming style by means of *Do* loops, extended *If* statements and procedures.

With Basic 3.5, Commodore has opted to not provide procedures or even an extended *If*, a fact that will disappoint many purists, but instead has chosen to concentrate on flexible repeat loops.

As well as the standard *For... Next* loops, the Plus/4 supports *Do... Loop*. Conditions based on either *While* or *Until* (eg *Do While X > 10* or *Do Until X <= 10*) may be attached to the beginning or end of a loop so that there is almost no action based on a decision which cannot be expressed in a straightforward form.

In addition to terminating a loop with the *Loop* instruction, the *Exit* command allows execution to jump to the line following the end of the loop. Combinations of *Do* loops with *Exit* allow the simulation of the extended *If* found on some new machines. This flexibility in the loop instructions means that the Plus/4 is the first home micro from Commodore where the *Goto* command effectively becomes redundant.

The other major programming structure provided is *Trap... Resume*. *Trap* [line number] at the beginning of a program section will send execution to the specified line whenever an error is detected which would otherwise have stopped the program. Having detected an error, the system variables *Err\$, Err* and *El*, which will return the current error message, the error number and the line in which it occurred, allow the program to selectively deal with different kinds of problems. Finally, with the error having been dealt with, *Resume* allows program execution to recommence either at the line which first produced the



error, at the following line, or at any specified line within the program.

## Graphics

In return for the loss of sprites, which everyone praised and only a small proportion of 64 owners ever used, Basic 3.5 provides a useful set of graphics capabilities which can only be described in outline here.

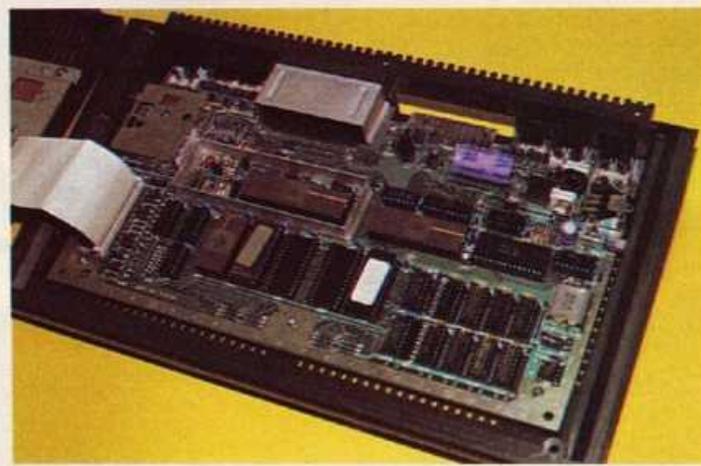
Line and shape drawing commands include *Draw*, *Circle* and *Box*. *Draw* is a standard line-drawing command, while *Box* allows the drawing of a rectangle on the basis of the co-ordinates for two opposite corners. Most flexible of all is the *Circle* command, which will draw any regular shape from a straight line to a circle, including the facility to rotate the shape or to stretch it along either of its axes.

Closed shapes may be coloured by use of the *Paint* command.

## Graphics modes

Like the 64, the Plus/4 does not automatically reserve memory for a high-resolution graphics screen on start-up. The default screen mode is a standard 25 lines by 40 characters. Other screen modes are set by use of the *Graphic* command.

*Graphic 1* provides a full 320 x 200 high-resolution screen, occupying 10K of memory in total (including colour attributes). The full range of colours is permitted on the screen in this mode, with the limitation that only one foreground colour is available in each character square. Text is supported in all modes by the *Char* command, which also supports screen positioning in low and high resolution.



*Graphic 2* mode is similar to *Graphic 1* except that the bottom five lines of the screen are maintained in normal text mode and can be written to by use of *Print* statements.

*Graphic 3* is a half-resolution multi-colour screen which allows two foreground colours to be resident in the same character square in return for a minimum resolution of two pixels horizontally, which makes for rather unsatisfactory lettering when text is displayed.

*Graphic 4* is the split-screen version of *Graphic 3*.

Finally, *Graphic 0* returns the screen to normal text mode.

One useful feature of all these screen manipulations is that once reserved, the high-resolution screen is not overwritten unless the memory allocated is freed with the *Graphic Ctr* command. It is possible to shuttle between high- and low-resolution screens without damage to either, a useful facility for the would be games writer.

## Colour and low resolution

The colour and low-resolution capabilities of the Plus/4 are outstanding, even better than on the 64.

The full Commodore low-resolution character set is available, making possible a great many effects which would only be available in high resolution on other machines. Sixteen main colours can be displayed, all of them specified from Basic with the *Color* command (yes, unfortunately it is the American spelling). In addition, however, the 'luminance' (brightness) of a colour can be specified, providing a total of 120 shades, plus black.

## Other graphics commands

Apart from the standard drawing commands, there are a variety of other useful graphics facilities. *Rclr*, *Rdot*, *Rgr* and *Rlum* are functions which return information on the current print colour, the position and colour of the pixel at the current cursor position, the current graphic mode and the currently prevailing luminance.

*SShape* and *GShape*, similar to the Microsoft *Get* and *Put* commands first seen in this country on the Dragon, allow small areas of screen to be stored in the form of string variables for later replacement.

## Sound

As with the graphics capabilities, the Plus/4 is a simpler machine than the 64 when it comes to sound, and most users will find it easier to use.

continued ▶

# SABRE WOLF

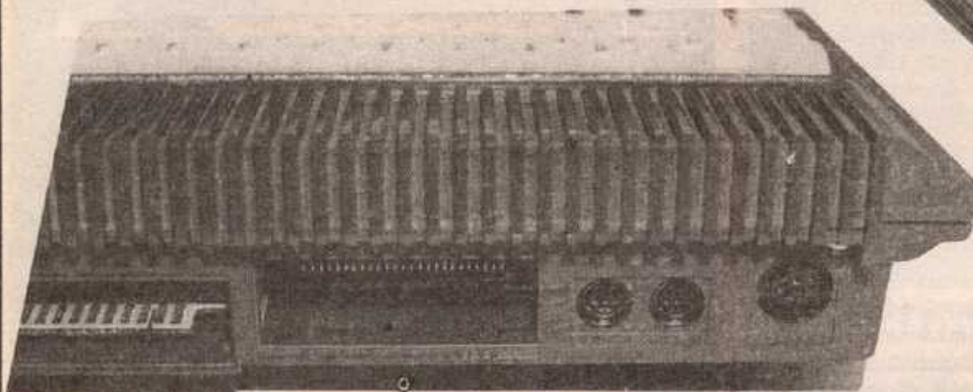
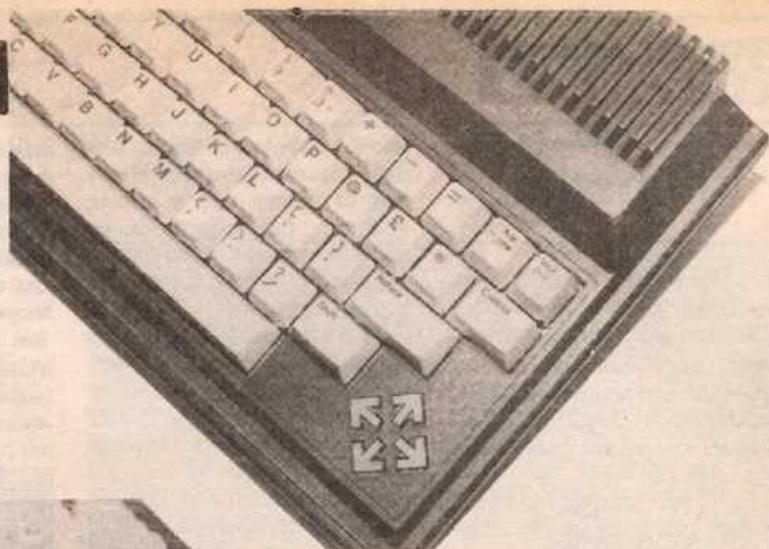
**ULTIMATE**  
**PLAY THE GAME**

THE GREEN  
ASHBY DE LA ZOUCH  
LEICESTERSHIRE LE6 5JU

48K SINCLAIR ZX SPECTRUM  
£9.95

# Hardware Review

The main command is called, simply, *Sound* and specifies the number of the voice to be played (there are three, including a white-noise channel), the value of the note and its duration. Unfortunately, the *Sound* command does not support a sensible set of values for musical notes, so the user has to resort to tables of values and calculations if music is to be played. The shape of note produced, although fixed, is more pleasant than the average *Beep* and some attractive results can be achieved



with very little effort compared to the complex settings necessary for the 64's Sid chip.

## Disc commands

The Plus/4 must be the first home micro to be launched in this country to take account of the growing emphasis on disc — rather than tape-based systems.

The machine will work with the current generation of 1541 drives (via the serial port) or with a promised new breed of drives which will use the parallel port and transfer the data at twice the speed. All the normal disc commands have been made a part of normal Basic, rather than having to be sent down a specially opened channel in a relatively inscrutable form. In addition, the disc operating system error numbers and messages are available in the system variables *Ds* and *Ds\$* to cope with any problems which may arise during disc access.

## Basic

There is very little in Basic 3.5 which could be described as new. Rather it would seem that Commodore has gathered together some of the features which users have come to expect from the better dialects of Basic. Some of the more interesting features are:

- Auto* — auto line-numbering facility.
- Dec* — function returns the decimal value of a hexadecimal string.
- Delete* — removes specified lines from the program.
- Getkey* — creates an indefinite wait for a key press.
- Hex\$* — function returns the hexadecimal form of a decimal number.
- If... Then... Else* — *If... Then* extended by the provision of *Else*.

*Instr* — string search function, returning the position of one string within another.

*Joy* — function returning the current position of the joysticks.

*Print Using* — compared to many other versions of Basic this is quite a powerful version of this useful formatting tool, extended even further by the addition of the *Pundef* command, which allows characters in a standard *Print Using* format to be redefined.

*Renumber* — standard renumbering of lines, *Gotos* and *Gosubs*.

*Tron* and *Troff* — the standard debugging facility, printing out the number of lines being executed as the program progresses.

*Rstore* — the added facility to specify the line number from which *Data* will be read.

## The Monitor

The built in machine code monitor, *Tedmon*, is not and does not claim to be a full assembler package but instead more of a powerful tool for the development of shorter pieces of coding. Each line of assembly language has to be entered, checked and processed separately, making any extensive coding, and especially alternations to existing programs, fairly tedious.

Having said that, *Tedmon* does provide an assembler and, in addition, a disassembler and a wide range of machine-code monitor facilities like searching and displaying memory, transferring blobs of memory, filling memory areas with specified values, saving and loading memory areas to disc or cassette, and displaying the current state of the registers. Machine-code programs can also be executed from within

*Tedmon* but, unfortunately, there is no trace

facility to allow a faulty program to be stepped through, a major limitation in the frustrating process of developing new code.

Whatever the limitations, however, the instant access to *Tedmon* and, through *Tedmon*, to the memory and machine-code/assembly-language programming and the standard 6802 mnemonics, ensure that the Plus/4 is going to be a popular machine with machine-code buffs of all ages and levels of skill.

## Conclusion

Who is going to buy Commodore's new baby? Well, with its friendlier Basic it becomes an obvious candidate for the first time user who wants a well thought out and produced machine with the inevitably high level of software support that accompanies any new Commodore machine.

Exiting owners of the 64 who are more interested in the quality of the *Basic* on their machine than the cleverness of the sound and sprites, may well be tempted by the fact that Commodore's emphasis on compatibility has ensured that existing peripherals like printers and disc drives (though not the cassette recorder) will all work with the new machine. In fact, even Basic programs from the 64 can be transferred to the Plus/4 and will run without difficulty provided they make no use of *Peeks* and *Pokes*, which may well crash the system.

As for other users, the Commodore Plus/4 is not going to set fire to the imagination of micro-snob who are interested only in new and exotic developments in Basic.

What it will do though, I think, is allow a great many owners of existing machines, whether it be a Spectrum, a Dragon, an Oric or whatever, to move up comfortably to a more powerful and more amenable machine.

The success of the machine will of course also depend on the quality of the built-in software packages — they are one of the main selling points of the machine.

Being on Rom they are quick to access but fairly simple in scope and this may limit the serious application of the machine.

## Imperial

**Program** *Empires Micro*  
**Spectrum Price** £19.95 **Supplier** Imperial Software.

**E**ver fancied coal mining the universe? Well take a look at *Empires* — an unusual four-player game from Imperial.

As an intergalactic Ian MacGregor your mission is to mine other solar systems for their mineral wealth, not forgetting to build large military fleets to protect your expansion from like-minded alien tycoons.

For your £19.95 you get a fancy packet containing three player cassettes, an umpire cassette and various cardboard maps and cards which certainly look impressive, but which, according to the instructions, are not essential to the game.

Each of the three players takes it in turn to load a cassette

into the Spectrum, choose their fleet movements using a system of menus and a cursor, and save this information on another cassette which is then passed on to the umpire for processing.

The umpire then loads all players' data files, calculates the outcome of any moves or battles, and returns the results on cassette to each player.

This procedure is then repeated for each move. There is also a facility for sending messages to each player via the umpire for the purpose of making alliances or gratuitous insults.

*Empire* players will need to be pretty dedicated, as with one move every couple of days a game can go on for weeks.

An unusual idea, but the hassles involved in actually involved in actually specialising the logistics of the game remove most of the fun.

**Nigel Lackey**



## Word Play

**Program** *Computer Scrabble*  
**Micro** Commodore 64 **Price** £12.95 **Supplier** Leisure Genius

**C**omputerised board games or card games are often difficult to justify, since they usually only provide a less convenient way of playing the standard game, without giving you any extra facilities.

However, *Computer Scrabble* from Leisure Genius is worth looking into, because it actually does give you much more than just a way of playing the game on a TV screen.

Although at its simplest it can

be used as a means for two to four people to play *Scrabble* on the TV, the program can do much more than this. Most importantly, the computer can play the part of one or more (even all!) of the players. It can play at one of four skill levels, and each computerised player can have a different skill level if required.

At the highest skill level the computer provides quite a challenging opponent, although rather a slow one! It has a vocabulary of 11,000 words, which isn't vast, but is big enough for a reasonable game.

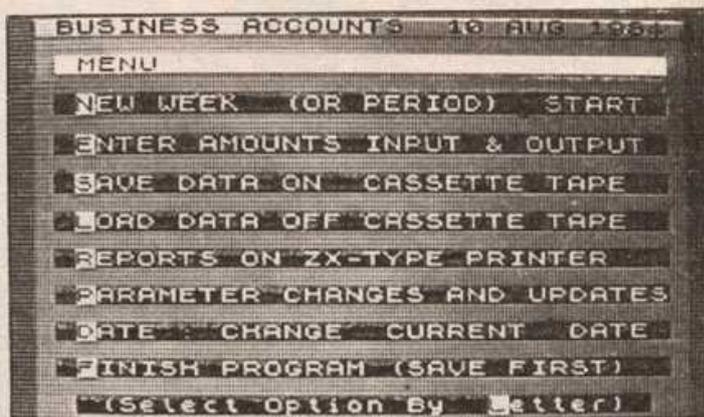
There are a number of other playing options. One of the nicest is the facility to watch the computer 'thinking', ie, you can

see the words it makes up and tries until it finds the best. If you wish to, you can see all your opponents racks, but this seems a bit like cheating. You can also choose whether or not to have sound effects, and how fast the computer places its words on the board.

All in all, this is an impressive

program. It simulates a pretty good *Scrabble* player, and provides a number of nice features which aid the game. The board and racks of letters are clearly presented, and the whole package is very easy to use.

**Richard Corfield**



## Cash in hand

**Program** *Simple Business Accounts, Micro* Spectrum **Price** £11.98 **Supplier** Flowchart Limited 62 High Street Irthlingborough, Northants

**I**n the midst of the invaders and aliens there is a constant call for serious software for the ZX Spectrum, and this program is aimed fair and square at that market.

In itself it represents a good piece of programming, demonstrating just what can be done with Basic, but I am not sure quite where it expects its market to be.

Entering data is tedious in the extreme, even with the use of an add-on keyboard. The program is designed to be very user-friendly: most options are selected by a single key-press and data is entered direct to the screen rather than by *Input* statements. The difficulty with the combination of this and Basic is in the speed at which events happen — or rather the lack of it. Most small businesses would get on faster with a cash book.

One advantage of computing the accounts is in accuracy, but this requires a "single entry" system, where data is entered just once. *Simple Business Ac-*

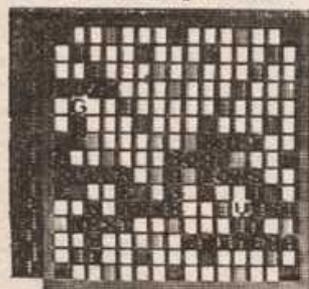
counts, however, requires you to keep a hard copy print-out each week and then re-enter all the weekly totals at the end of the year. It is a shame that a reasonably competent program should be spoiled by this omission especially when full microdrive support is given. Why isn't there a routine to load each week in turn onto Microdrive and take the information off these directly?

The manual that comes with the tape is just eight sides long, and although it claims on the back that the program is fully tested and approved in use in small business with turn-overs up to £1 million, I find that hard to believe. The booklet also claims disc drive support, but there is no evidence of this in the program itself.

I suspect that *Simple Business Accounts* is an also-ran. I know that sounds harsh, but the market is a harsh one for this software, and I don't think that the program is good enough to be worth buying for any except the very small business person who may want a low-cost introduction to computerised account.

Even then, my advice would be not to throw away the accounts book just yet.

**Simon Springett**



CRRI. ENTER A WORD OR CHOOSE AN OPTION

PLAYER'S SCORES

IRON 54  
CRRI 241

TILES: 31

OPTIONS  
QUIT  
PRINT  
VALUES  
TILES  
CHANGE  
TANGLE  
TUNE  
SNAPE

RON IUAJHOT  
CRRI UNELEGL

## Warwager

**Program** *Battle for Midway* Micro Commodore 64 **Price** £9.95 **Supplier** Personal Software Services, 462 Stoney Stanton Road, Coventry, CV6 8DG.

**M**idway from PSS is one of the most complicated and difficult computer games I have yet encountered.

It is essentially a sort of graphics plus action adventure game, based on the *Battle of Midway* which took place in the Pacific during World War II.

In the game you are the commander of the American forces protecting Midway, and

you have to defend the island against Japanese attack. As in the real battle, the Japanese will give up if their four aircraft carriers in one of their fleets are sunk, so in order to win, your main objective is to find and destroy these ships.

All the various forces at the disposal of the Japanese and American commanders are represented in the game, and the Japanese will follow basically the same tactics as in the war. However, this leads to much complexity since the forces are large and varied, and are divided up into many different combat units. The facilities for controlling the forces and for examining their status also take quite a bit of mastering.

The game takes place in real

time, and the Japanese attacks are simulated in arcade-style

action which is all quite well done. **Richard Corfield**



## Labyrinth

**Program** *Rapscallion* Micro Spectrum **Price** £6.95 **Supplier** Bug-Byte, Mulberry House, Canning Place, Liverpool.

**R**apscallion — the new game from Bug-Byte — has so far received a good deal of pre-publicity and after playing the game I would say that it was all justified.

The game challenges you to move through an arid wilderness, consisting mainly of dungeons of one sort or another, through a labyrinth and into your castle, stolen from you by

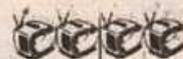
the dreaded Rapscallion the Rogue.

You have six lives, and two identities: bird and a fly. As bird you are vulnerable to dangers such as cats, whereas as fly you are safe from these, but prey to spiders who don't bother the bird.

There are a very large number of locations, and a good selection of barriers and hindrances to be overcome.

Bug-Byte deserve their good reputation, and this game will enhance it further. Recommended.

**Simon Springett**



## Black blob

**Program** *Atom Smasher* Micro Amstrad CPC64 **Price** £6.99 **Supplier** Romik, 272 Avenue, Slough, Berks.

**R**omik, who seem to believe in quantity rather than quality, have added yet another computer to their catalogue — the Amstrad. This game is a conversion of an old Vic20 game. Sad to say, the game might have been good on the Vic, several years ago, but now on the Amstrad, it looks a bit old hat.

'You' are a 'greater-than' sign, or an arrow-head. You can rotate and move in the same way as in *Asteroids* (remember that?). And, of course,

you can fire. When you have shot the black blob, another electron appears, and you have to start again, trying to shoot another black blob. By the time there are four or five electrons flying around the screen this gets quite tricky — you have to keep an eye on all the electrons, at the same time as trying to shoot the blob. I ended up by being very frustrated by this and yet, because the game is so simple, this did not turn into wanting another go. I just remained frustrated.

This might sell, as it is cheaper than Amsoft's close to making use of the Amstrad's advanced graphics capabilities.

**David Lister**



## Gold mine

**Program** *Gilligan's Gold* Micro Commodore 64 **Price** £7.95 **Supplier** Ocean Software, Ocean House, 6 Central Street, Manchester 2.

**T**he author of the very popular *Manic Miner* has got a lot to answer for.

The number of imitators of that style of game continues to increase. One of the latest in this vein to appear for the Commodore 64, *Gilligan's Gold* from Ocean Software. This follows the standard pattern for this type of game.

You have to guide Gilligan through the mine workings to collect bags of gold and place them in a wheelbarrow. You make your way around the

mine via platforms, ladders and lifts, avoiding the outlaws who are out to get you and the gold. You have a limited time in which to collect the bags, but each one you get gives you more time.

This is all very much standard stuff, and the game lacks anything which really distinguishes it from many other similar efforts. Nevertheless, it is quite enjoyable and not badly programmed. However, the graphics and sound are definitely run of the mill.

There are plenty of better versions of the same type of game on the market already, and most of these give more variety and interest than this one.

**Richard Corfield**



## Check list

**Program** *Physics O-Level Revision* **Price** £6.95 **Supplier** Longman Software, Longman House, Burnt Mill, Harlow, Essex CM20 2JE.

**U**nfortunately, the subject of this review arrived too late for the market for which it was intended.

*Physics O-level Revision* from Longman Software is one of those once-a-year things, intended to help students with their revision.

The cassette contains five programs. Four cover some of the major areas of the subject

and one acts as a sort of reference index to topics in Physics. This reference program will list out all the topics which are related to a particular area of Physics, so that you can use it as a kind of check-list to ensure that all the relevant items have been revised.

The other four programs cover formulae, circuits, light and mechanics.

This is a well planned package, however, it is very much a nice little extra to the main revision material, which remain as notes and the text book, and is not a substitute for them.

**Richard Corfield**



## Magic potions

**Program Merlin Micro Commodore 64 Price £6.95 Supplier Wye Valley Software, Parton House, Kinnersley, Herefordshire.**

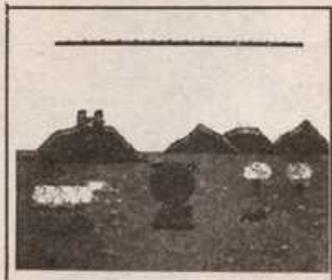
**M**erlin from Wye Valley Software is very much a typical high-speed arcade action type of game, although the setting is a little different.

You take the part of the wizard Merlin, who is being attacked by various evil creatures. You can destroy your opponents by casting spells on them, but your magic energies are limited, and must be restored occasionally by brewing up a magic potion.

To do this you must collect various delightful ingredients like a skull, a frog's leg, an eye and a shimmering crystal. Not surprisingly, the creatures do

their best to stop you. When you do manage a successful brew-up, your powers are fully restored and you move on to the next level.

If you stick to the standard arcade-game tactics with this one you won't go far wrong; shoot everything that moves



and collect all the bits that don't. Although the principle of the game is not new, it is well presented with nice graphics and sound, and the action is certainly fast. Definitely worth a look if you are an arcade action fan.

**Richard Corfield**



## Flippers

**Program Gate Crasher Micro Spectrum 48K Price £6.95 Supplier Quicksilva.**

**G**ate Crasher is a refreshing change from the normal 'shoot-em-up' games on the market, although the idea is still quite simple.

Barrels are released from the top of the screen, and you must manoeuvre an intervening maze to guide them to slots at the bottom. This is further complicated by flippers within the maze which will deflect the

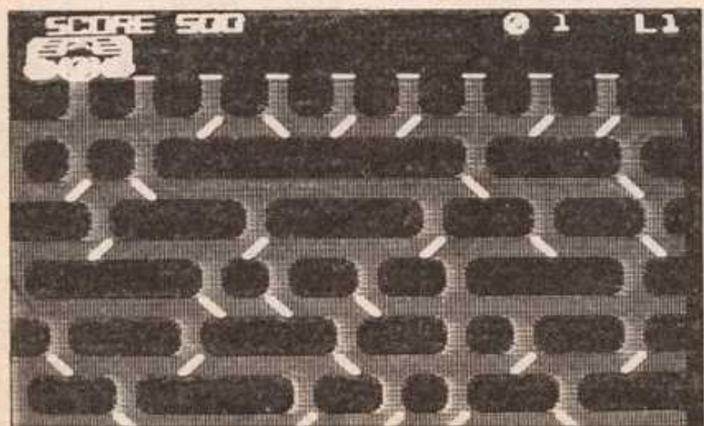
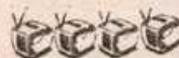
barrels making their way down.

The combination of concentration (needed to drop the barrels into the right slots to complete the screen) and pure reaction makes this a challenging and addictive game.

For extra incentive, Quicksilva have put forward a £200 prize for the first person to complete Screen 7. The game is Kempton Joystick compatible, and has user definable keys, which will enable other joysticks to be used.

For those who prefer their arcade games a little different it is definitely recommended.

**Philip Martin**



## Flower-pots

**Program Jump for your Life Micro Spectrum Price £5.99 Supplier Unique, 16 Thorney Lane, South Iver, Bucks.**

**J**ump For Your Life, says the press release, will have you jumping mad, and there's no denying that this is true.

The tape is an arcade-type game setting you in the role of a climber attempting to scale the outside of a large skyscraper. As usual, I never did discover just what reward there was for reaching the top, but I was able to suffer the various fates in store for the unwary. Rough looking men appear at the windows and push you off the edge, or possibly drop a flower-pot on you.

The game uses sprites well, and though the claim about

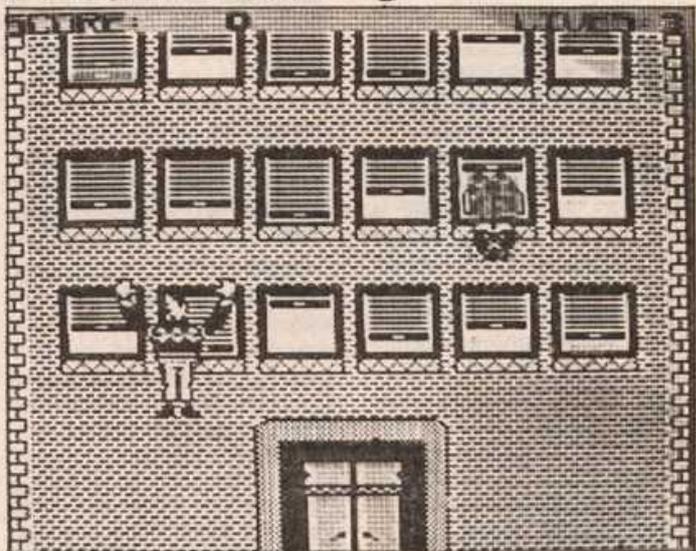
"smooth-scrolling action" was hardly justified, the game does use colour to good advantage and has music at the beginning that would grace a real arcade game.

As you play, unfortunately, the music has to be left out to allow the Spectrum to cope with the graphics.

This would never be my favourite game. In particular, the keyboard controls are cramped together in one part of the keyboard and seem designed for ET to use, rather than a human. My other grouse is that the falling flowerpots are sometimes released so close to you that there is no opportunity to avoid them.

Dedicated arcade fans will probably enjoy this one, but the rest of us may well find it a bore.

**Simon Springett**



## Symbiotic

**Program Rogue Ship Price £7.95 Micro Spectrum Supplier Alan Pywell 3 Cleve Avenue Matlock Derbys DE4 3BD**

**P**raised be the Quill. An outpouring of well-constructed adventures from people who would otherwise not have the programming skills to write them. *Rogue Ship* is a Quilled adventure which will, form the first part of a trilogy called *Earthquest* about the search for the lost planet Earth.

It is different - instead of a help command, you consult

Inman, a symbiotic being who lives in your body and occasionally makes helpful, unhelpful or irrelevant comments at timely, untimely and irrelevant moments. It's also incredibly devious, much furious note taking and map making is required.

*Rogue Ship* has much to recommend it - cleverly constructed, apparently lacking in spelling mistakes, witty(ish). I really only have two complaints, firstly why spaceships, lasers, etc, why not make the plot really original, and £7.95 is a bit steep.

**Ian Waltham**



## Into overdrive

Malcolm Bryant shows how Spectrum Microdrives can be used with the QL.

Sinclair claim that the Spectrum Microdrives are not compatible with the QL. This means that you cannot take a cartridge with a Spectrum program and read it into the QL, which is not really surprising.

However, it is possible to connect Spectrum Microdrives directly to the QL and they will then work exactly as if they were additional QL Microdrives.

Proceed as follows. Take your Spectrum

Microdrive(s) along with their connecting cable and plug into the QL Microdrive expansion port on the right-hand side of the computer. By putting a single twist in the cable, the Spectrum Microdrive(s) can sit on top of the QL Microdrives. You will now find that these drives can be accessed as MDV3, MDV4 and so on. This can be extremely useful. A practical example of how four drives can be used is while running the Psion packages. The back-up

commands (eg, *Archive*) are almost worthless with only two drives, since a file cannot be copied from MDV2 on to a new cartridge, unless it is to MDV1 which is not normally what is required. Now files can be backed up from MDV2 to MDV3—far more convenient.

A further tip when running *Quill*. To improve the speed of the Microdrive operations, keep your document on MDV3 (if you also have MDV4 then put your back-up cartridge in there). The work file *def-doc* will still be written to MDV2 and file reading and writing then be faster, particularly if you can keep a lot of free sectors on MDV2.

## Another string . . .

Use this program by Richard Snowdon to edit and write text using *Quill*.

This program is very useful as it allows you to edit or even write programs using the word processor, *Quill* and then convert the text to a machine readable form so that the edited program can be tested.

The following is a fools guide to using this *Quill* utility.

- 1) Load program to be edited, eg, load *mdv2\_invader* (if the program is called 'invader')
- 2) Save this program with the extension '\_lis' so that it can be loaded into *Quill*. eg *save mdv2\_invader\_lis*
- 3) Boot *Quill*, eg, *lrun mdv1\_boot*
- 4) Choose the import option on *Quill* (under 'Files' on the second command screen) to load the program to be edited, eg,

*Import, invader\_lis* (making sure *invader\_lis* is on *mdv2*)

- 5) When it's loaded, press ESC to leave 'Files' and edit the program using any of the ample features of *QUILL*:  
I used *QUILL* with this program to replace short variable names with long meaningful ones and split multi-command lines. It could also be used to move blocks of code to the end of a program and head them as procedures, etc.
- 6) When finished editing, use the 'Save' option (on the first command screen) to save the program, and then *Quit Quill*.
- 7) Load this utility, and enter the drive number of the program and the name you saved it as, and the file name you

want the loadable version to be.

- 8) When the utility is finished, you will be able to load the final version of the edited program.

This utility is needed because *Quill* saves text (documents and programs) with excess codes (linefeeds, page markers, margin information) padded around the text. This utility strips all of these characters from the program proper, enabling it to be loaded. I have taken advantage of the fact that *Quill* saves text unjustified. This is the reason it takes such a long time to *Save* and *Load*—when a document is loaded, the characters are read one at a time from a file, and each line has to be justified as it comes. Similarly, *Quill* has to reformat/unjustify text before filing.

As the present generation of mainframe/mini users have found, it is much easier to write and edit programs using a word processor. I hope that with the help of this utility, other QL users will realise this too.

```
100 REMark QUILL utility
110 REMark by Richard Snowdon
120 MODE 4:PAPER 0:STRIP 2
130 DIM text$(1000),search$(1):count=0:memory=0
140 REPEAT validate
150 PRINT #0,"Which drive ? ":drive#=KEY$(1)
160 IF drive#="1" OR drive#="2" THEN EXIT validate
170 END REPEAT validate:PRINT #0,drive#
180 INPUT #0,"What is the name of the Quill
file ?":quill#
190 IF LEN(quill#)>3 THEN
200 last#=quill#(LEN(quill#)-3 TO)
210 IF last#<>"_doc" AND last#<>"_DOC" THEN
220 quill#="quill#&"_doc"
230 END IF
240 ELSE quill#="quill#&"_doc"
250 END IF
260 INPUT #0,"What do you want the resulting
file to be called ?":final#
270 OPEN #6,"mdv"&drive#&"_"&quill#
280 DELETE "mdv"&drive#&"_"&final#
290 OPEN_NEW #7,"mdv"&drive#&"_"&final#
300 REPEAT check
310 first#=KEY$(6)
320 IF CODE(first#)=110 THEN count=count+1
:ELSE count=0
330 IF count=3 THEN count=0:EXIT check
340 END REPEAT check
350 REPEAT main_loop
360 text#=KEY$(6)
370 asc=CODE(text#)
380 IF asc=0 THEN count=count+1:ELSE count=0
390 IF count=3 THEN EXIT main_loop
400 SELECT ON asc
410 =49 TO 57
420 PRINT text#;
430 REPEAT rest
440 char#=KEY$(6)
450 IF CODE(char#)=0 THEN
460 length=LEN(text#)
470 IF length=1 THEN EXIT rest
480 memory=memory+length
490 PRINT #7,text#=:PRINT
500 EXIT rest
510 END IF
520 PRINT char#;
530 text#="text#&char#"
540 END REPEAT rest
550 END SELECT
560 END REPEAT main_loop
570 CLOSE #6:CLOSE #7
580 PRINT "\Finished.....Program length ";
INT(memory/1024*100)/100;" Kb"
590 DEFINE FUNCTION KEY$(chan) :
RETURN INKEY$(#chan,-1)
```

## Putting the record straight

Alan Went presents a relocatable machine code bubble sort routine

A common use for computers is the sorting of lists of data into alphabetical or numeric order. The simplest form of sorting, and that most used by home programmers, is the 'Bubble Sort'. This is a simple, easy to understand Sort method, but in its Basic form is very slow.

This article gives a machine code bubble sort that is very much faster in operation.

Bubble sorting involves comparing each item in the list with the following item swapping if that next item is 'smaller'. The checking continues until no more swops are required.

Both the Basic (List 4) and the machine code routines (Lists 1 and 3) presented here

work in the same way, taking data in an array  $AS(YY,ZZ)$  and sorting strings 'ZZ' into ascending order. Both routines use approx 300 bytes, but the Basic version will sort an array  $AS(100,1)$  in approx 4 min 17 secs and the machine code version sorts the same array in 1.7 Secs.

When comparing with a fast Basic sort (Shell Sort) the times for an array  $AS(309,33)$  were:-

Basic Bubble — over 1 Hour: Basic Shell — 4 Mins: Machine Code Bubble — 30 Secs.

The machine code sort routine checks the list for the last string used (checks for space in position  $AS(YY,1)$ ), thus ensuring that unused blank strings are not moved ahead of data strings.

The code is relocatable and thus can be run in any area of Ram except the printer buffer (5B00h on) as this area is used with the position in string 'ZZ' from which sorting is to take place; ie,  $POKE 23299, 10$  will sort by order  $AS(XX, 10 TO)$ .

The maximum length of 'ZZ' should not exceed 245 bytes. To use routine load data in List 2 into RAM starting at 32000 then Save "SORT" CODE 32000,262. The code can then be reloaded into any position by Load "SORT" CODE XXXXX. To sort use  $RAND USER XXXXX$  or  $LET X = USER XXXXX$ . (See List 3).

List 5 shows the routine put into practical use in arranging an index for magazine articles.

### List 1

|             |                        |      |                  |               |      |                    |
|-------------|------------------------|------|------------------|---------------|------|--------------------|
| 0010 :..... | FA34 5E                | 0660 | LD E, (HL)       | FA93 1804     | 1300 | JR LARGE           |
| 0020 :*     | FA35 23                | 0670 | INC HL           | FA95 13       | 1310 | CONT INC DE        |
| 0030 :*     | FA36 56                | 0680 | LD D, (HL)       | FA96 23       | 1320 | INC HL             |
| 0034 :*     | FA37 E5                | 0690 | PUSH HL          | FA97 10F4     | 1330 | DJNZ LOOPC         |
| 0035 :*     | FA38 19                | 0700 | ADD HL, DE       | FA95 161D     | 1340 | LARGE JR END?      |
| 0040 :*     | FA39 22045B            | 0710 | LD (END), HL     | FA9B E1       | 1370 | SMALL POP HL       |
| 0050 :..... | FA3C E1                | 0720 | POP HL           | FA9C D1       | 1380 | POP DE             |
| 0060 :*     | FA3D 23                | 0730 | INC HL           | FA9D D5       | 1390 | SWOP PUSH DE       |
| 0070 :*     | FA3E 23                | 0740 | INC HL           | FA9E E5       | 1400 | PUSH HL            |
| 0080 :*     | FA3F 7E                | 0750 | LD A, (HL)       | FA9F 42       | 1410 | LD B, D            |
| 0090 :..... | FA40 32015B            | 0760 | LD (NO.), A      | FAA0 4B       | 1420 | LD C, E            |
| 0100 :*     | FA43 23                | 0770 | INC HL           | FAA1 A7       | 1430 | AND A              |
| FA00 0110   | ORG 0FA00H             | 0780 | LD A, (HL)       | FAA2 ED52     | 1440 | SBC HL, DE         |
| 0120 :      | FA45 32025B            | 0790 | LD (NO.+1), A    | FAA4 E5       | 1450 | PUSH HL            |
| 0130 :      | FA48 23                | 0800 | INC HL           | FAA5 C5       | 1460 | PUSH BC            |
| 5C4B 0140   | VARS EQU 5C4BH         | 0810 | LD A, (HL)       | FAA6 11105B   | 1470 | LD DE, TEMP        |
| 0150 :      | FA49 7E                | 0820 | LD (LEN), A      | FAA9 ED80     | 1480 | LDIR               |
| 0160 :*     | FA4A 32005B            | 0830 | INC HL           | FAAB C1       | 1490 | POP BC             |
| FA00 2A4B5C | LD HL, (VARS)          | 0840 | INC HL           | FAAC D1       | 1500 | POP DE             |
| FA03 7E     | 0180 SEARCH LD A, (HL) | 0850 | LD (BEG), HL     | FAAD C5       | 1510 | PUSH BC            |
| FA04 FE80   | 0190 CP 80H            | 0860 | LD D, 0          | FAAE ED80     | 1520 | LDIR               |
| FA05 2B26   | 0200 JP Z, NEND        | 0870 | LD A, (LEN)      | FAB0 C1       | 1530 | POP BC             |
| FA08 FE01   | 0210 CP 0C1H           | 0880 | LD E, A          | FAB1 21105B   | 1540 | LD HL, TEMP        |
| FA0A 2B26   | 0220 JR Z, SORT        | 0890 | ADD HL, DE       | FAE4 D1       | 1550 | POP DE             |
| FA0C CB6F   | 0230 BIT 5, A          | 0900 | PUSH HL          | FAE5 D5       | 1560 | PUSH DE            |
| FA0E 2B19   | 0240 JR Z, N+3         | 0910 | NSPAC LD A, (HL) | FAE6 ED80     | 1570 | LDIR               |
| FA10 CB7F   | 0250 BIT 7, A          | 0920 | CP 20H           | FAE8 E1       | 1580 | END? POP HL        |
| FA12 2B19   | 0260 JR Z, NUMB        | 0930 | JR Z, SPACE      | FAE9 D1       | 1590 | POP DE             |
| FA14 CB7F   | 0270 BIT 6, A          | 0940 | ADD HL, DE       | FABA 19       | 1600 | ADD HL, DE         |
| FA16 2B06   | 0280 JR Z, LOOP        | 0950 | PUSH DE          | FAE8 D5       | 1610 | PUSH DE            |
| FA18 011300 | 0300 LD BC, 15         | 0960 | LD DE, (END)     | FAE9 ED5B045B | 1620 | LD DE, (END)       |
| FA1B 09     | 0310 ADD ADD HL, BC    | 0970 | FUSH HL          | FAC0 E5       | 1630 | PUSH HL            |
| FA1C 18E5   | 0320 JR SEARCH         | 0980 | DEC HL           | FAC1 2B       | 1640 | DEC HL             |
| JA1E 23     | 0340 LOOP INC HL       | 0990 | AND A            | FAC2 A7       | 1650 | AND A              |
| FA1F 7E     | 0350 LD A, (HL)        | 1000 | SBC HL, DE       | FAC3 ED52     | 1660 | SBC HL, DE         |
| FA20 CB7F   | 0360 BIT 7, A          | 1010 | POP HL           | FAC5 E1       | 1670 | POP HL             |
| FA22 20FA   | 0370 JR Z, LOOP        | 1020 | POP DE           | FAC6 D1       | 1680 | POP DE             |
| FA24 010600 | 0380 NUMB LD BC, 6     | 1030 | JR NZ, NSPAC     | FAC7 20AA     | 1690 | JR NZ, COMP1       |
| FA27 18F2   | 0390 JR ADD            | 1040 | SPACE DEC HL     | FAC9 2A065B   | 1700 | CHECK LD HL, (BEG) |
| FA29 23     | 0400 N+3 INC HL        | 1050 | LD (END), HL     | FACC 19       | 1710 | ADD HL, DE         |
| FA2A 4E     | 0410 LD C, (HL)        | 1060 | POP HL           | FACD D5       | 1720 | COMP2 PUSH DE      |
| FA2B 23     | 0420 INC HL            | 1070 | COMP1 PUSH DE    | FACE E5       | 1730 | PUSH HL            |
| FA2C 46     | 0430 LD B, (HL)        | 1080 | PUSH HL          | FACF 3A035E   | 1740 | LD A, (POS)        |
| FA2D 03     | 0440 INC BC            | 1090 | LD A, (POS)      | FAD2 3D       | 1742 | DEC A              |
| FA2E 18E8   | 0450 JR ADD            | 1095 | DEC A            | FAD3 F5       | 1743 | PUSH AF            |
| FA30 CF     | 0460 NEND RST 8H       | 1100 | PUSH AF          | FAD4 4F       | 1750 | LD C, A            |
| FA31 01     | 0470 DEFB 01           | 1110 | LD C, A          | FAD5 0600     | 1760 | LD B, 0            |
| 0480 :      | FA7B 0600              | 1120 | LD B, 0          | FAD7 09       | 1770 | ADD HL, BC         |
| 0490 :      | FA7D 09                | 1130 | ADD HL, BC       | FAD8 54       | 1780 | LD D, H            |
| 0500 :..... | FA7E 54                | 1140 | LD D, H          | FAD9 5D       | 1790 | LD E, L            |
| 0510 :*     | FA7F 5D                | 1150 | LD E, L          | FADA 3A005E   | 1800 | LD A, (LEN)        |
| 0520 :*     | FA80 3A005B            | 1160 | LD A, (LEN)      | FADD 4F       | 1810 | LD C, A            |
| 0530 :*     | FA83 4F                | 1170 | LD C, A          | FADE 4F       | 1820 | AND A              |
| 0540 :..... | FA84 A7                | 1180 | AND A            | FADF ED42     | 1830 | SBC HL, BC         |
| 0550 :      | FA85 ED42              | 1190 | SBC HL, BC       | FAE1 EB       | 1840 | EX DE, HL          |
| 0560 :      | FA87 EB                | 1200 | EX DE, HL        | FAE2 F1       | 1850 | POP AF             |
| 5B00 0570   | LEN EQU 5B00h          | 1210 | POP AF           | FAE3 47       | 1860 | LD B, A            |
| 5B01 0580   | NO EQU 5B01h           | 1220 | LD B, A          | FAE4 79       | 1870 | LD A, C            |
| 5B03 0590   | POS EQU 5B03h          | 1230 | LD A, C          | FAE5 90       | 1880 | SUB B              |
| 5B04 0600   | END EQU 5B04h          | 1240 | SUB B            | FAE6 47       | 1890 | LD B, A            |
| 5B06 0610   | BEG EQU 5B06h          | 1250 | LD B, A          | FAE7 1A       | 1900 | LOOPC LD A, (DE)   |
| 5B10 0620   | TEMP EQU 5B10h         | 1260 | LOOPC LD A, (DE) | FAE8 BE       | 1910 | CP (HL)            |
| 0630 :      | FA8E BE                | 1270 | CP (HL)          | FAE9 2884     | 1920 | JR Z, CNT2         |
| FA32 F3     | 0640 SORT DI           | 1280 | JR Z, CONT       | FAEB 3806     | 1930 | JR C, LARG1        |
| FA33 23     | 0650 INC HL            | 1290 | JR NC, SMALL     | FAED 18AC     | 1960 | JR SMALL           |

## List 1 (cont)

```
FAEF 13 1970 CONT2 INC DE
FAF0 23 1980 INC HL
FAF1 10F4 1990 DJNZ LOGPC
FAF3 E1 2000 LARG1 POP HL
FAF4 D1 2010 POP DE
FAF5 19 2020 ADD HL,DE
FAF6 D5 2030 PUSH DE
FAF7 ED5B045B 2040 LD DE,(END)
FAFB E5 2050 PUSH HL
FAFC 2B 2060 DEC HL
FAFD A7 2070 AND A
FAFE ED52 2080 SBC HL,DE
FB00 E1 2090 POP HL
FB01 D1 2100 POP DE
FB02 20C9 2110 JR NZ,COMP2
FB04 FB 2120 EI
FB05 C9 2130 RET
2140 FINIS END
```

```
FINIS FB06
LARG1 FAF3
CONT2 FAEF
LOOPC FAE7
COMP2 FACD
CHECK1 FAC9
END? FAB8
SWOP FAFD
SMALL FAFB
LARGE FAF5
CONT FAF5
LOOPC FAFD
COMP1 FAF3
SPACE FAF6
NSPAC FAF5
SORT FAF3
TEMP 5B10
BEG 5B06
END 5B04
POS 5B03
NO. 5B01
LEN 5B00
NFND FAF3
N+3 FAF3
NUMB FAF4
LOOP FAF1
ADD FAFB
SEACH FAF3
VARS 5C4B
# 6106
```

## List 3

```
1000 REM BUBBLE SORT - MACHINE CODE - BASIC DRIVER
1010 REM
1020 REM Sorts Array A$(1),Z$) into Ascending Order.
1030 REM Code from List 2 loaded to Address XX000
1040 REM Suggest 63000 for 48K or 32000 for 16K
1050 REM position = 1st. Character in String Y) to Sort by.
1060 POKE 32009,position
1070 RANDOMIZE USR XX000
```

## List 3

## List 4

```
1000 REM BUBBLE SORT - BASIC VERSION.
1010 LET a=.
1020 IF a$(a,pos TO )/a$(a+1,pos TO ) THEN LET b=a$(a):
LET a$(a)=a$(a+1): LET a$(a+1)=b
1030 LET a=a+1: IF a<>len THEN GO TO 1020
1040 LET a=.
1050 IF a$(a,pos TO )/a$(a+1,pos TO ) THEN GO TO 1020
1060 LET a=a+1: IF a<>len THEN GO TO 1050
```

## List 5

```
10 REM SAMPLE PROGRAM USING SORT ROUTINE
20 REM ARRANGES INDEX OF ARTICLES
30 REM SET W IN LINE 9010 TO MAX LENGTH REQUIRED
40 REM TO START NUM 9000 THEN IF BREAK USE CUTO 1000
50 REM ENSURE SORT ROUTINE LOADED BEFORE FIRST RUN
60 REM ALAN D. WENT 1984
1000 CLS : PRINT TAB 7;"MAGAZINE INDEX"
1010 PRINT "1. Enter Information." "2. List by Article" "3. List by Issue" "4. List by Page" "5. Save"
1020 INPUT #1; INVERSE I;"Select Option"
1030 LET I=INKEY$: IF I="" THEN GO TO 1030
1040 IF I="1" THEN GO TO 2000
1050 IF I="2" THEN GO TO 3000
1060 IF I="3" THEN GO TO 4000
1070 IF I="4" THEN GO TO 5000
1080 IF I="5" THEN GO TO 6000
1090 GO TO 1030
2000 REM ITEM ENTRY
2010 CLS
2020 IF endw THEN PRINT "List Full": PAUSE 300: GO TO Menu
2030 PRINT end: INPUT "Article" (Max 18 letters)"; LINE a$: IF LEN a$>18 THEN LET a$=a$( TO 18)
2040 LET a$(end,y TO )=a$: PRINT a$(end, TO y-1);
2050 INPUT "Issue" (Max 8 letters)"; LINE b$: IF LEN b$>8 THEN LET b$=b$( TO 8)
2060 LET a$(end,y TO )=a$: PRINT a$(end,y TO z-1);
2070 INPUT "Page" (3 letters eg.007)"; LINE c$: IF LEN c$>3 THEN LET c$=c$( TO 3)
2080 LET a$(end,z TO )=c$: PRINT a$(end,z TO )
2090 INPUT "Another Article (Y or N)"; LINE d$: IF b$="Y" OR c$="Y" THEN LET end=end+1: GO TO 2030
2100 LET end=end+1: GO TO Menu
3000 POKE 23299,x1: RANDOMIZE USR 44000: GO TO Print
4000 POKE 23299,y1: RANDOMIZE USR 44000: GO TO Print
5000 POKE 23299,z1: RANDOMIZE USR 44000: GO TO Print
6000 CLS : INPUT "Name To Save (8)"; SAVE a$ LINE 6100: SAVE "SORT CODE 44000,265": GO TO Menu
6100 PRINT "PLEASE WAIT": LOAD "CODE": GO TO Menu
7000 REM Print List
7010 POKE 23658,b1: INPUT "Screen (S) or Printer (P)"; b$
7020 LET p="2+(b$(1)=""P")
7030 FOR a=1 TO end STEP 20
7040 CLS : FOR b=a TO 19+a: IF c=b THEN GO TO 7060
7050 PRINT a;p;a$(b): NEXT b
7060 IF p="3 THEN NEXT a: GO TO Menu
7065 PRINT #1; INVERSE I;" N = Next Page A = Menu B=Back 1 Page
7070 POKE 23658,b1: LET b=INKEY$
7080 IF b="" THEN GO TO Menu
7090 IF b="N" THEN NEXT a: GO TO Menu
7100 IF b="B" THEN LET a=a-20: IF a<1 THEN LET a=1
7105 IF b="A" THEN GO TO 7040
7110 GO TO 7070
9000 CLEAR 63999
9010 LET x=100: DIM a$(x,32): LET pos=1: LET a$pos: LET y=20: LET z=29
9020 LET PRINT=7020: LET end=1: LET Menu=1000: GO TO Menu
```

## List 2

|       |     |     |     |     |     |     |     |     |     |     |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| XX000 | 42  | 75  | 92  | 126 | 254 | 126 | 40  | 40  | 354 | 193 |
| XX010 | 40  | 38  | 203 | 111 | 40  | 25  | 203 | 127 | 40  | 16  |
| XX020 | 203 | 119 | 40  | 6   | 1   | 19  | 0   | 9   | 24  | 229 |
| XX030 | 35  | 126 | 203 | 127 | 40  | 250 | 1   | 6   | 0   | 24  |
| XX040 | 242 | 35  | 78  | 35  | 70  | 3   | 24  | 235 | 207 | 1   |
| XX050 | 243 | 35  | 94  | 35  | 66  | 229 | 25  | 34  | 4   | 91  |
| XX060 | 225 | 35  | 35  | 126 | 50  | 1   | 91  | 35  | 126 | 50  |
| XX070 | 2   | 91  | 35  | 126 | 50  | 0   | 91  | 35  | 35  | 34  |
| XX080 | 6   | 91  | 22  | 0   | 58  | 0   | 91  | 95  | 25  | 229 |
| XX090 | 126 | 254 | 32  | 40  | 15  | 25  | 213 | 237 | 91  | 4   |
| XX100 | 91  | 229 | 43  | 167 | 237 | 62  | 225 | 209 | 32  | 236 |
| XX110 | 43  | 34  | 4   | 91  | 225 | 213 | 229 | 58  | 3   | 91  |
| XX120 | 61  | 245 | 79  | 6   | 0   | 9   | 84  | 93  | 58  | 0   |
| XX130 | 91  | 79  | 167 | 237 | 66  | 235 | 241 | 71  | 121 | 144 |
| XX140 | 71  | 26  | 190 | 40  | 4   | 48  | 8   | 24  | 4   | 19  |
| XX150 | 35  | 16  | 244 | 24  | 29  | 225 | 209 | 213 | 229 | 66  |
| XX160 | 75  | 167 | 237 | 62  | 229 | 197 | 17  | 16  | 91  | 237 |
| XX170 | 175 | 193 | 209 | 197 | 237 | 176 | 193 | 33  | 16  | 91  |
| XX180 | 209 | 213 | 237 | 176 | 225 | 209 | 25  | 213 | 237 | 91  |
| XX190 | 4   | 91  | 229 | 43  | 167 | 237 | 62  | 225 | 209 | 32  |
| XX200 | 175 | 42  | 6   | 91  | 25  | 213 | 229 | 58  | 3   | 91  |
| XX210 | 61  | 245 | 79  | 6   | 0   | 9   | 84  | 93  | 58  | 0   |
| XX220 | 91  | 79  | 167 | 237 | 66  | 235 | 241 | 71  | 121 | 144 |
| XX230 | 71  | 26  | 190 | 40  | 4   | 56  | 6   | 24  | 172 | 19  |
| XX240 | 35  | 16  | 244 | 225 | 209 | 25  | 213 | 237 | 91  | 4   |
| XX250 | 91  | 229 | 43  | 167 | 237 | 62  | 225 | 209 | 32  | 201 |
| XX260 | 251 | 201 | 0   |     |     |     |     |     |     |     |

Bubble Sort Machine Code Version.  
Can be loaded and run at any address.

# PSYDAM

The second from The Edge.  
The first ever Mega-Game for the  
48K Spectrum; over 1000 screens of  
unbelievable arcade adventure.



## Design of the times

Thomas Ellenrieder's program enables you to create sophisticated graphics

With this program, complex graphics can be created on the Commodore 64 very easily. It has many advanced features, such as different paint brushes and the ability to draw circles, eclipses and rectangles. It is also possible to paint specific areas and to dump the screen to a printer.

### Program notes

|         |                |   |
|---------|----------------|---|
| 30-180  | command table  | 1 |
| 200-280 | sets up sprite | 2 |
| 300-600 | main program   | 3 |

600-1160  
1600-1680  
1700-1730

### Variables

x,y  
ps  
pb  
d  
z

interprets commands

eclipse  
save

position of joy stick  
paint, move, erase  
paint brush  
value from joystick  
move fast/slow

normal brush  
thick brush  
fountain brush

4

f1  
f2  
f3

spray brush

move brush  
paint brush  
erase brush

1 draws a line between cursor position and n  
c circle; n defines centre; distance between n and cursor defines radius  
e draws an eclipse; cursor defines centre  
r draws a rectangle; "n" defines top right hand corner, cursor or bottom left  
← give menu  
f fills an area; cursor in area to be filled  
↑ new screen  
p dump to printer

Define position of n by pressing n at appropriate cursor position.

```

10 REM ARK COMPLEX DRAWING PROGRAM!!
20 REM ARK T.ELLENRIEDER 1984
25 GOTO 300
30 REMARK COMMAND TABLE
40 RLOCMB 0,0,0,0,1: CSET0:PRINT"$
  COMMAND TABLE"
50 PRINT"Q [F1] MOVE
60 PRINT"Q [F2] DRAW
70 PRINT"Q [F3] RUB
80 PRINT"QQ [1] PEN (NORMAL)
90 PRINT"Q [2] PEN (THICK)
100 PRINT"Q [3] PEN (FOUNTAIN)
110 PRINT"Q [4] PEN (SPRAY PAINT)
120 PRINT"QQ [L] LINE (P.DEF N)
130 PRINT" [C] CIRCLE (P.DEF N)
140 PRINT" [R] RECTANGLE (P.DEF N)
150 PRINT" [F] FILL (P.DEF N)
160 PRINT" [E] EQLIPSE (P.DEF N)
170 PRINT" [D] DUMP TO CN2
175 GET D$: IF D$="" THEN 175
176 CSET2:MMOB0,0,0,X,Y,0,1
180 GOTO 380
200 REMARK SPRITE SET-UP
210 HIRES0,1: DESIGN 0,832+49152
220 @BBBBBBBBBBBBBBBBBBBB...
221 @BB.....B.....BB...
222 @B.B.....B.....B.B...
223 @B.....B.....B.....
224 @B...B...B...B...B...
225 @B...B...B...B...B...
226 @B.....B.....B.....
227 @B.....B...B...B...B...
228 @B.....B.B.B.....B...
229 @B.....B.....B.....
230 @BBB.BB.BB...BB.BB.BB...
231 @B.....B.....B.....
232 @B.....B.B.B.....B...
233 @B.....B...B...B...B...
234 @B.....B.....B.....
235 @B...B...B...B...B...
236 @B...B...B...B...B...
237 @B.....B.....B.....
238 @B.B.....B.....B.B...
239 @BB.....B.....BB...
240 @BBBBBBBBBBBBBBBBBBBB...
250 MOB SET 0,13,0,0,0
260 RETURN
300 REMXXXXXXXXXXXXXXXXXXXX
301 REM*CP MAIN PROGRAM*
302 REMXXXXXXXXXXXXXXXXXXXX
320 PRINT"$
330 PRINT"QQQ JOYSTICK IN #2
340 FOR N=1TO700:NEXT N
350 PRINT"$
355 GOSUB 200
360 PRINT"$
370 X=180:Y=100:Z=1:PS=1
380 D=JOY
390 GET A$: IF NOT A$="" THEN 1000
395 IF D>127 THEN D=D-128:Z=3

```

```

400 IF D=1 THEN Y=Y-Z
410 IF D=2 THEN Y=Y-Z:X=X+Z
420 IF D=3 THEN X=X+Z
430 IF D=4 THEN Y=Y+Z:X=X+Z
440 IF D=5 THEN Y=Y+Z
450 IF D=6 THEN X=X-Z:Y=Y+Z
460 IF D=7 THEN X=X-Z
470 IF D=8 THEN X=X-Z:Y=Y-Z
480 Z=1
500 RLOCMB 0,X+14,Y+40,0,2
505 IF PS=-1 THEN 600
510 IF PB=1 THEN PLOTX,Y,PS
520 IF PB=2 THEN PLOTX-1,Y,PS:PLOTX+1,Y,
  PS:PLOTX-1,Y-1,PS:PLOTX,Y-1,PS
530 IF PB=2 THEN PLOTX+1,Y-1,PS:PLOTX-1,
  Y+1,PS:PLOTX,Y+1,PS:PLOTX+1,Y+1,PS
540 IF PB=3 THEN PLOTX,Y,PS:PLOTX,Y-1,PS
  :PLOTX,Y+1,PS
550 IF PB=4 THEN I=INT(RND(1)*6)-3:O=INT(
  RND(1)*6)-3
560 IF PB=4 THEN PLOTX-1,Y-O,1:PLOTX-O,Y
  -I,1
600 GOTO 380
1000 IF A$="" THEN GOSUB 30
1010 IF A$="N" THEN X1=X:Y1=Y
1030 IF A$="L" THEN LINE X1,Y1,X,Y,PS
1040 IF A$="C" THEN A=ABS(X1-X):B=ABS(Y1-Y)
  :Q=A^2+B^2:C=SQR(Q):CIRCLEX1,Y1,C,C,PS
1050 IF A$="R" THEN RECX1,Y1,X-X1,Y-Y1,1
1060 IF A$="F" THEN PAINTX,Y,1
1070 IF A$="E" THEN 1600
1080 IF A$="D" THEN 1700
1090 IF A$="1" THEN PB=1
1100 IF A$="2" THEN PB=2
1110 IF A$="3" THEN PB=3
1120 IF A$="4" THEN PB=4
1125 REMARK PAINT-MOVE-DELETE
1130 IF A$="e" THEN PS=-1
1140 IF A$="i" THEN PS=1
1150 IF A$="a" THEN PS=0
1155 IF A$="↑" THEN GOSUB 200
1160 GOTO 380
1600 REMARK EQLIPSE
1610 CSET0:PRINT"$
1620 PRINT"QQQ EQLIPSE"
1630 INPUT "X-RADIUS":RX
1640 INPUT "Y-RADIUS":RY
1650 CIRCLE X1,Y1,RX,RY,PS
1660 CSET2:GOTO 1160
1700 REMARK DUMP TO PRINTER
1710 PRINT"$
1730 COPY
1740 GOTO 1160
READY.

```

# QL

NEW  
LOW  
PRICE

## £39.95

FULLY INCLUSIVE

## PARALLEL PRINTER INTERFACE

- ★ 12 months guarantee
- ★ Fully self-contained with connectors and 3.0 metre cable
- ★ Plugs into Sinclair QL's RS232C port
- ★ Drives any CENTRONICS compatible printer, eg, Epson Selkoshu Juki OKI NEC Shinwa Star MCP-40 Canon, etc, etc.
- ★ 14 day, full money back "no satisfaction" guarantee
- ★ Fully compatible with QDOS, Superbasic, and Psion packages
- ★ No software required
- ★ Fully employs QL's internal 80 ch. buffer
- ★ Does not preclude the use of 512K RAM pack

AVAILABLE NOW

To order send name & address with cheque to

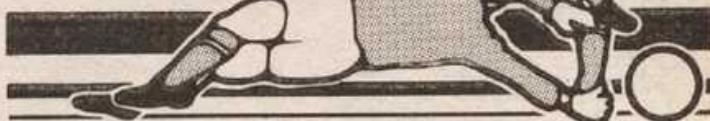
MIRACLE SYSTEMS LTD  
Woodland Way, Avondale Workshops  
Kingswood  
Bristol BS15 1QLB  
Tel: 0272-603871 x210

Ask at your local computer shop.  
Sinclair and QL are trademarks of Sinclair Research Ltd  
Also Amstrad printer cable available £14.95 inc..

# WIN THE POOLS?

SPECTADRAW 3 - THE LATEST VERSION OF THE ORIGINAL AND BEST POOLS PREDICTION PROGRAM FOR THE 48K ZX SPECTRUM!!

AND NOW... AMSTRA-DRAW - THE FIRST POOLS PREDICTION PROGRAM FOR THE AMAZING NEW AMSTRAD CPC 464!!



- Supplied with Database containing data on over 10,000 matches since 1980!
- You update the Database each week - but no tedious typing, as team and division names already in program!
- Errors easily corrected - the program even checks your entries!
- Comprehensive instruction manual and menu driven program - easy to use, even for a newcomer to computing!
- Will forecast the least likely draws for those who prefer to bet on fixed odds!
- Built in perm generator - complete your coupon direct from the screen!
- Fully microdrive compatible! (Spectadraw only).
- Compatible with Currah Microspeech - the first pools program to read you its predictions! (Spectadraw only).

Spectadraw 3 for the 48K Spectrum .....£9.95 inclusive  
Amstra-Draw for the Amstrad CPC 464 .....£9.95 inclusive  
(Cheques/P.O.s payable to B. S. McALLEY)

We dispatch every Monday with the database made up to include all matches up to the date of dispatch.

SPECTADRAW (Dept PC), 1 Cowleaze, Chinnor, Oxford OX9 4TD.  
(Tel: 0844-52426)



## BECOME A MASTER GAMES DESIGNER

How? Buy a P&M Software designer. No programming skill required. Unique Games utility high quality programs for 16K or 48K Spectrums. The technique Using the P&M Creation technique redesign the layout of each game by simply picking up parts of the screen and dropping them somewhere else. Redesign all the levels of each game then save to tape for further use.

Our layout designers:

\* Manic designer (48K): Redesign Manic Miner. Features rename cavern. Change robot, exit, willy key positions. Change robot speed and add new features.

\* Jet Set designer (48K): Redesign Jet Set Willy. Features rename room, cheat mode. Change map, conveyor belts etc., positions and more. Create three new rooms.

\* Chuckie Egg designer: (48K)

Redesign Chuckie Egg and stop farmer Giles getting pecked.

\* Horace designer (16K or 48K):

Amazing machine code program lets any Spectrum owner redesign Hungry Horace. Also available are graphics designers. Featuring music from the games, roll sprite. Enlarge, sprite smoothly around screen - much more. Excellent graphic designers.

Our graphic designers:

Redesign all the graphics of Manic Miner.

\* Jet Set designer 2 (48K):

Redesign all the graphics of Jet Set Willy. Includes cheat mode.

Send SAE for Competition details and illustrated details on our products.

Send your cheque or PO to:

P&M SOFTWARE, 16 Bridge Road, Park Gate,

Near Southampton SO3 7AE

Tel: 04895 5722

All products are only £2.99 each.

## A Fair Deal For Our Advertisers

No guesses, no wishful thinking - the circulation of this magazine is audited to the strict professional standards administered by the Audit Bureau of Circulations

ABC

The Hallmark of Audited Circulation

## A masterpiece

Michael Griffin concludes Computer Art, a sophisticated graphics program

Computer Art allows you to create complicated pictures on screen using a simple single-key system of instructions and either a joystick or the cursor keys.

The first part of *Computer Art's* commands were published last week; the remainder follow.

**Select joystick/cursor key cross control.**

Accessed by pressing the Tab key. The control is switched between the two and the function is accompanied by a warning beep.

**Draw arc.** Accessed by pressing the Ctrl key. This is identical to *Ellipse* except only an arc is drawn.

**Set Point2.** Accessed by pressing the Return key. This sets the value of a point called *Point2* to be the same as the current cross position.

**Erase.** Accessed by pressing the Delete key. This wipes out a triangular area to the current background colour (black).

The vertices (corners) of this triangle are the current cross position, *Point* and *Point2*.

**Light dotted area fill.** Accessed by pressing the '1' key. This fills an area enclosed by a perimeter with spaced dots — the fill routine is non-recursive, but if it escapes the routine can be aborted by pressing the *Escape* key.

**Striped area fill.** Accessed by pressing the '2' key. Same as above except it fills an area with stripes.

**Heavy dotted area fill.** Accessed by pressing the '3' key. Same as above except it fills an area with a checker-board fill.

**Solid area fill.** Accessed by pressing the '4' key. Same as above except it fills an area with solid black.

**Reference grid.** Accessed by pressing the '6' key. Plots a fine grid of dots on the screen to assist with accurate scale drawing.

**Draw grid.** Accessed by pressing the 'T'

key. Removes the reference grid.

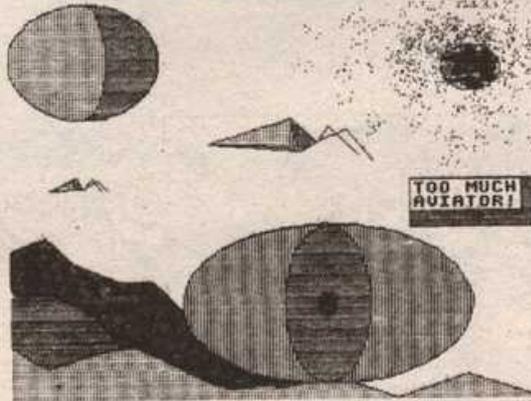
**Display screen co-ordinates.** Accessed by pressing the *Shift* key. This displays the present screen co-ordinates of *Point* (as *V* and *W*) and the present screen co-ordinates of the cross (as *X* and *Y*).

**Escape fill or print-out.** Accessed by pressing the *Escape* key. Aborts fill routine or printer dump.

**Load screen image; Save screen image; Dump screen to printer, Clear screen and Key summary.** All accessed by pressing *Copy* key and then pressing the appropriate number of the options displayed. Any other key returns to normal operation.

The program *Loads* and *Saves* screen images as the name 'Picture'. It will automatically overwrite old images and any other programs of the same name. It is therefore wise to check beforehand for any possible name clashes before use, and any images you wish to keep must be *\*Renamed* for their own protection.

**Note:** For some strange reason my printer has put £ signs instead of # signs between lines 1640 and 1970. Wherever the £ sign is printed it should be replaced with a #.



```

1270DEFPRDCCHOICE
1280 PROCREMOVEGRID
1290 PROCCROSS
1300GCOL3,3
1310 VDU19,1,7,0,0,0,19,2,0,0,0,0
1320VDU5,MOVE0,1000,PRINT"1 - SAVE PICTURE""3 - LOAD PICTURE""5 - PRINT PICTU
RE""7 - CLEAR SCREEN""9 - HELP MENU""ANY OTHER KEY ABORTS"
1330 *FX15
1340 AS=GET#
1350 VDU19,1,3,0,0,0,19,2,2,0,0,0
1360MOVE0,1000,PRINT"1 - SAVE PICTURE""3 - LOAD PICTURE""5 - PRINT PICTURE""
7 - CLEAR SCREEN""9 - HELP MENU""ANY OTHER KEY ABORTS"
1370 IF AS="5" PROCDDUMP
1380 IF AS="1" PROCSAVE
1390 IF AS="3" PROCLOAD
1400 IF AS="7" CLS
1410 IF AS="9" PROCKEYS
1420 PROCCROSS
1430 ENDPROC
1440 DEFPROCSAVE
1450 *SAVE PICTURE 3000 7FFF
1460 ENDPROC
1470 DEFPROCLOAD
1480 *LOAD PICTURE 3000
1490 ENDPROC
1500 DEFPROCASSEMBLE
1510 OSWORD=&FFF1
1520 OSWRCH=&FFEE
1530DIM S% 00
1540XL0=S%
1550YHI=S%+1
1560YLO=S%+2
1570YHI=S%+3
1580 value=S%+4
1590BYTE=S%+5
1600COUNT7=S%+6
    
```

```

16100=S%+7
1620 FOR opt=0TO2STEP2
1630P% =S%
1640EOPT opt
1650.POINT LDA 29
1660LDX EXLO MOD 256
1670LDY EXLO DIV 256
1680JSR OSWORD
1690RTS
1700.Printchar LDA #1
1710JSR OSWRCH
1720LDA BYTE
1730JSR OSWRCH
1740RTS
1750.INCY CLC
1760LDA YLO
1770ADC #4
1780STA YLO
1790BCS INC_YHI
1800RTS
1810 .INC_YHI INC YHI
1820RTS
1830.one_byte LDA #1
1840STA BYTE
1850.LOOP ASL BYTE
1860JSR POINT
1870LDA value
1880BEQ GO_ON
1890EOR #FF
1900BEQ GO_ON
1910INC BYTE
1920.GO_ON JSR INCY
1930DEC COUNT7
1940BNE LOOP
1950JSR Printchar
1960RTS
1970J
1980NEXT
1990ENDPROC
2000 DEFPROCKEYS
2010 GCOL3,3
2020 VDU19,1,7,0,0,0,19,2,0,0,0,0
2030 VDU5
2040 MOVE 0,1023,PROCFUNCTIONS
2050 *FX15
2060 AS=GET#
2070 VDU19,1,3,0,0,0,19,2,2,0,0,0
2080 MOVE 0,1023,PROCFUNCTIONS
2090 VDU4
2100 ENDPROC
2110 DEFPROCFUNCTIONS
2120 PRINT"KEY FUNCTION SUMMARY ON PRESSING ECOPYJ"
2130 PRINT"6'-Plots a grid for reference"
2140 PRINT"7'-Removes reference grid"
2150 PRINT"(F0)-Rubber band (F1)-Move Point"
2160 PRINT"(F2)-Vertical LN (F3)-Horizontal LN"
2170 PRINT"(F4)-Draw line (F5)-Draw and move"
2180 PRINT"(F6)-Rectangle (F7)-Ellipse"
2190 PRINT"(F8)-Place text (F9)-Air brush"
2200 PRINT"ETABJ-Joystick/cursor key control toggle"
    
```

continued over the page

```

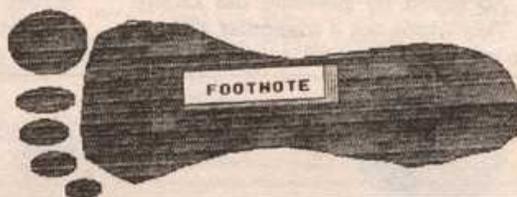
2210 PRINT"CTRLJ-Draws an arc from cross to Point"
2220 PRINT"RETURNJ-Sets Point2"
2230 PRINT"DELETEJ-Wipes out area, cross, P'int, P'int2"
2240 PRINT"1'-Light dotted area fill"
2250 PRINT"2'-Striped area fill"
2260 PRINT"3'-Heavy dotted area fill"
2270 PRINT"4'-Solid area fill"
2280 PRINT"SHIFTJ-Displays cross and Point coords"
2290 PRINT"COPIJ-Load, save, Print, wipe, help menu"
2300 PRINT"ESCAPEJ-Aborts fill and Printout"
2310 PRINT"Printer dump Produced in a 54x25 box on the
seikos printer."
2320 PRINT"Disc files of the screen are saved and loaded
as the file 'PICTURE'."
2330 ENDPROC
2340 DEFPROC FILL
2350 PROCROSS
2360 GCOL0,2
2370 EX=X, FY=Y
2380 REPEAT PROCLINEFILL FX=FX+4 UNTIL POINT(X,FX)>0
2390 EX=X, FY=Y-4
2400 REPEAT PROCLINEFILL FX=FX-4 UNTIL POINT(X,FX)<0
2410 PROCROSS
2420 ENDPROC
2430 DEFPROC LINEFILL
2440 GX=EX
2450 REPEAT GX=GX-4 UNTIL POINT(GX,FX)<0
2460 HX=GX
2470 GX=EX
2480 REPEAT GX=GX+4 UNTIL POINT(GX,FX)>0
2490 IF HX DIV 4 MOD 2 = 1 HX=HX+4
2500 EX=HX+(GX-HX)/2
2510 IF JX=1 MOVE HX,FX:PLOT21,GX,FX:ENDPROC
2520 IF JX=0 AND FX DIV 4 MOD 2 = 1 THEN ENDPROC
2530 IF JX=3 MOVE HX,FX:DRAWGX,FX:ENDPROC
2540 IF FX DIV 4 MOD 2 = 1 MOVE HX+4,FX ELSE MOVE HX,FX
2550 PLOT21,GX,FX

```

```

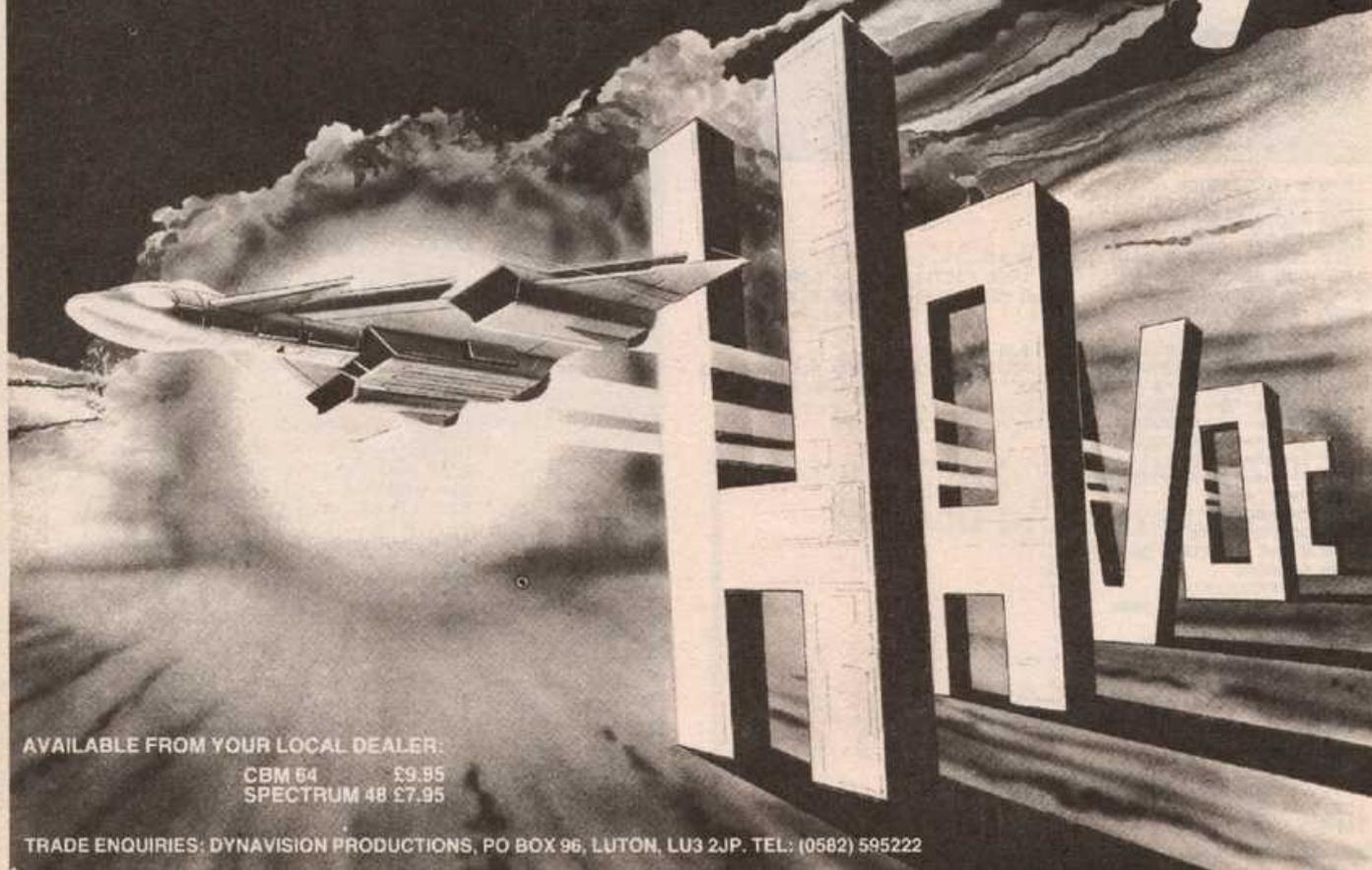
2560 ENDPROC
2570 DEFPROC ARC
2580 PROCROSS
2590 GCOL0,2
2600 MOVE VX,VY
2610 FORA=0 TO 1.59 STEP 0.05: DRAW V%+SIN(A)*((X%-V%),
W%+COS(A)*((Y%-W%)):NEXT
2620 DRAW X%,W%
2630 PROCROSS
2640 ENDPROC
2650 DEFPROC GRID
2660 PROCROSS
2670 GCOL1,1
2680 FORFX=0 TO 1023 STEP 16: FORGY=0 TO 1280 STEP 16: PLOT69,G%,
FX:NEXT/NEXT
2690 PROCROSS
2700 ENDPROC
2710 DEFPROC MOVEGRID
2720 PROCROSS
2730 GCOL2,2
2740 MOVE0,1023:MOVE0,0
2750 PLOT05,1279,1023:PLOT05,1279,0
2760 PROCROSS
2770 ENDPROC

```



## EXPERIENCE THE STUNNING 3-D REALISM OF

## DYNAVISION



AVAILABLE FROM YOUR LOCAL DEALER:

CBM 64 £9.95  
SPECTRUM 48 £7.95

TRADE ENQUIRIES: DYNAVISION PRODUCTIONS, PO BOX 96, LUTON, LU3 2JP. TEL: (0582) 595222

# CURRAH $\mu$ SPEECH



## Speech Synthesiser for ZX Spectrum

The **CURRAH  $\mu$ SPEECH** is ready to talk immediately on power-up, has an infinite vocabulary and outputs speech and ZX Spectrum sound through your TV speaker. There is no software to load with  **$\mu$ SPEECH** — sophisticated Gate Array technology means you can just plug in and start constructing words and sentences like this:

**LET SS = "sp(ee)k (nn)(oo) (ee)vll"** will say "speak no evil"! Further commands control the "voicing" of keys as they are pressed, and an intonation facility allows you to add expression to the speech.

**$\mu$ SPEECH** is fully compatible with ZX Interface 1 and may be used with the **CURRAH  $\mu$ SLOT** Expandable Motherboard, allowing easy expansion of your ZX system.  **$\mu$ SPEECH** and  **$\mu$ SLOT** will also be compatible with the **CURRAH  $\mu$ SOURCE** unit when it arrives later this year, allowing you to write **Assembler** and **FORTH** statements directly into your **BASIC** programs!

Top selling games like **ULTIMATE'S Lunar Jetman** feature  **$\mu$ SPEECH** voice output — watch out for other titles from Bug-Byte, CDS, Ocean, Quicksilva and PSS.

**$\mu$ SPEECH** is available from COMET, W.H. SMITH, WOOLWORTHS, GREENS, BOOTS, JOHN MENZIES, SPECTRUM STORES and good dealers nationwide — or use the form to order the **CURRAH  $\mu$ SPEECH** — winner of the CTA 'Product of the Year' award 1984.

# CURRAH

To: MicroSpeech Offer, P.O. Box 1, Gateshead, Tyne & Wear, NE8 1AJ

Please Supply ..... **MicroSpeech** unit(s) at **£29.95** each incl. VAT & P & P

..... **MicroSlot** unit(s) at **£14.95** each incl. VAT & P & P

Name (please print) .....

Address (please print) .....

Postcode .....

I enclose a cheque/PO payable to 'MicroSpeech Offer' value £ .....

or debit my Access/BarclayCard No.

Cardholder Signature .....

Credit Card Hotline 091 - 482 4683 Please allow 28 days for delivery. Offer valid UK only.

See us at the PCW Show Stand 329

PCW 4

$\mu$ Speech,  $\mu$ Slot and  $\mu$ Source are trademarks of Currah Computer Components Ltd.  
ZX, ZX Spectrum and ZX Interface 1 are trademarks of Sinclair Research Ltd.

# TURBO CHARGE YOUR SPECTRUM



## Outperforms any Spectrum interface

The unique Turbo interface from Ram gives you all these features – and more – in one unit:

- \* A variety of interfaces including: Rom cartridges, two 9-way D plugs for standard joysticks, PLUS full expansion bus at rear.
- \* Compatible with Kempston and Protek protocols.
- \* Works with latest Quickshot Mk II auto rapid-fire joysticks!
- \* Choice of Rom cartridge or tape cassette software.
- \* Instant program loading with cartridge software.
- \* Built-in power safety device – unique to Ram Turbo.
- \* Full one year guarantee.
- \* Immediate availability – 24 Hr despatch on receipt of P.O./ credit card details (cheques – seven days).
- \* Incredible value – only £22.95.

So don't wait around – simply complete the coupon and send it to us today.



Or call our credit card hot line on 02514 25252. (Access and Visa welcome).

Ram Electronics (Fleet) Ltd, 106 Fleet Road, Fleet, Hampshire GU13 8PA

Please send me:

\_\_\_\_\_ Spectrum Turbo Interface(s) at £22.95  
+ £1 p+p (overseas orders £3 p+p)

\_\_\_\_\_ Quickshot II Joystick(s) at £9.95  
(Only when purchased with Turbo – normally £12.95 + £1 p+p)

I enclose cheque/postal order or charge my Access/Visa for: £ \_\_\_\_\_



Name \_\_\_\_\_

Address \_\_\_\_\_

Tel \_\_\_\_\_

To: Ram Electronics (Fleet) Ltd, 106 Fleet Road, Fleet, Hampshire GU13 8PA

24 Hr  
despatch for  
credit cards and  
postal orders

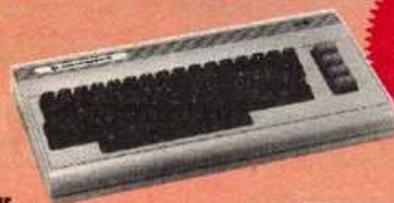
Trade and export enquiries welcome.

# PHONE YOUR BIG "===== " DEALER

## FOR DETAILS OF THE COMMODORE COUP



A sensational portable colour computer with a powerful 64K RAM memory, a detachable full-function keyboard and a built-in colour monitor and disk drive



CBM64

Colour sophisticated ROM/RAM user, UHF/Composite video, high resolution graphics



1701  
COLOUR  
MONITOR

A great value colour video monitor.

COMMODORE  
SX-64  
PORTABLE

A top quality disk drive offering quick-access mass data storage

1541  
DISK  
DRIVE



A high-quality dot matrix printer with excellent graphics capability. Accepts tractor feed paper. 50 c.p.s.

MPS801  
PRINTER

"Other Commodore products in stock include the:  
CBM 1530 C2N Cassette,  
CBM 1525 Printer,  
CBM 1526 Printer,  
CBM 1520 Plotter,  
CBM 1311 Joystick,  
and DPS 1101 Printer."

Up to £1000 instant credit  
- write for details  
Micro Management, 16 Princes Street,  
Ipswich, Suffolk, IP1 1QT

Phone your nearest dealer for the most competitive prices

### Bucks

Citybench  
2/4 Eaton Place  
Marlow  
06284 75244

Micro Land  
Weatherburn Court  
Brunel Centre  
Blitchley  
Milton Keynes  
0908 368018

Cambridge  
G.C.C. Cambridge Ltd  
66 High Street  
Sawston  
Cambridge  
0223 835330

### Cornwall

Computivision  
4 Market Street  
St Austell  
0726 5297

### Derby

First Byte Computers  
10 Castlefields  
London Road  
Derby  
0332 365280

### Devon

Computer Systems (Torbay)  
35 Hyde Road  
Polignou  
0603 524284

Roy Hart Computer Services  
10 Fore Street  
Tiverton  
0884 253468

### Dorset

Solent Micro Systems Ltd  
25 Bargaes  
Christchurch  
0202 470468

### Durham

General Northern Computing  
8 Whitworth Road  
South West Ind. Estate  
Peterlee  
0783 860314

### Essex

Essex Computer Centre  
216 Moultonham Street  
Chelmsford  
0245 358702

Focus Computer Systems  
140A Hathaway Road  
Grays  
0375 79717

County Computer Stores  
50 West Square  
Harlow  
0279 414692

The Home Computer Centre  
261 Victoria Avenue  
Southend-on-Sea  
0702 43068

### Glouce

The Model Shop  
22 High Street  
Stroud  
04536 5920

Solbe Consultants Ltd  
103 High Street  
Tewkesbury  
0684 298666

### Herts

County Computer Stores  
95a South Street  
Bishops Stortford  
0279 566611/2

Hobbyte  
153 Grove Road  
Wippsenden  
0567 3542

### Lancs

Amal Computing  
57 Franks Gate  
Preston  
0772 561952

### London

Henry's Computer Shop  
404 Edgware Road  
London  
01-402 6822

Miracle Computers  
245A Coldharbour Lane  
London  
01-274 7700

### Greater Manchester

Entertainment in Leisure  
88 The Rocks  
Bury  
061 797 3463

Control Technology  
184 Market Street  
Hyde  
061 366 8223

### Midsexes

Entel Communications Ltd  
135 High Street  
Ponders End  
Enfield  
01-805 7772/7434

### N. Humberside

Beverley Computer Centre  
1 Windmill Passage  
35 Lurgate  
Beverley  
0482 881911

### S. Humberside

Ashby Computer Centre  
247 Ashby High Street  
Scunthorpe  
0724 871756

### Kent

Taligate Computers  
249 Beaver Road  
Ashford  
0233 37187

Data Store  
6 Chattenan Road  
Bromley  
01-460 8991

Canterbury Software Centre  
9 The Friars  
Canterbury  
0227 53031

North Kent Computer Centre  
52/54 Bellingrove Road  
Welling  
04-301 2677

Twinstar Computers  
17 Regina Road  
Southall  
01-574 5271

J.E.L. Computers  
7 Windsor Street  
Uxbridge  
0895 54815

### W. Midlands

Impulse Computer World  
60 Harford Street  
Coventry  
0203 27711

Wolverhampton  
Computer Centre  
12/19 Lichfield Street  
Wolverhampton  
0902 29967

### Norfolk

Abacus  
12a Rothergate  
Norwich  
0603 61441

Viking Computers  
Ardney Rise  
Colton Grove Road  
Norwich  
0603 45209

### Somerset

Snowflake Computer Services  
Corporation Street  
Taunton  
0823 57526

### Staffs

Eric Reynolds Ltd  
86 High Street  
Burton-on-Trent  
0283 65086/65869

Town Computer Store  
30 Town Road  
Haley  
Stoke-on-Trent  
0782 287540

### Suffolk

Brainwave  
24 Crown Street  
Ipswich  
0473 50966

Micro Management  
32 Princes Street  
Ipswich  
0473 59181

### Surrey

Concise Computer  
Consultants Ltd  
1 Carlton Road  
Bighton  
01-481 6842

### E. Sussex

Gamer  
24 Gloucester Road  
Brighton  
0273 696424

### W. Sussex

Orchard Business Systems Ltd  
34 East Street  
Hove  
0403 68461

Worthing Computer Centre  
32 Liverpool Road  
Worthing  
0903 210861

### Tyne & Wear

Video & Home Computers Centre  
3 Boxborough House  
Park Avenue  
Whitley Bay  
0632 534725

### N. Yorkshire

Skipton Computer Systems  
14 Swadford Street  
Skipton  
0756 68192

### W. Yorkshire

Thoughts & Crosses  
37 Market Street  
Healdtown  
0924 402 337

### N. Ireland

Everyman Computers  
80 Charlotte Street  
Ballymoney  
Co Antrim  
02656 62116/62658

### Wales

Automation Services  
42 Dunraven Place  
Bridgend  
Mid Glamorgan  
0656 3550

### Scotland

Micro Store  
38 The Arcade  
King Street  
Stirling  
Central Region  
0786 64571

### Belgium

Micro Management  
Belgium  
Bollenstraat 75  
2018 Antwerp  
Belgium  
03-238 9284

### Holland

Micro Management  
Netherlands  
Road Huisstraat 98 2406  
Ah Alphen-aan-den-rijn  
01720 72580

### Holland

Micro Management  
Netherlands  
Road Huisstraat 98 2406  
Ah Alphen-aan-den-rijn  
01720 72580

### Holland

Micro Management  
Netherlands  
Road Huisstraat 98 2406  
Ah Alphen-aan-den-rijn  
01720 72580

### Holland

Micro Management  
Netherlands  
Road Huisstraat 98 2406  
Ah Alphen-aan-den-rijn  
01720 72580

# Now AVAILABLE for any SPECTRUM THE INTELLIGENT PRINTER INTERFACE

from  **CAMBRIDGE  
COMPUTING**

## Features:

- Compatible with **ALL** Centronics Printers and Plotters.
- Recognises **LLIST** and **LPRINT**.
- Recognises copy to produce screen dumps on any graphics printer — in up to six sizes and three styles, including grey scale, shading and colour (subject to printer capability).
- Down loadable user definable character set to allow widest possible range of print styles.
- Software is in **ROM**, so does not need to be loaded from tape every time the interface is used. The special software allows the interface to recognise the functions of the printer in use and allows the style of printing or copying to be easily altered.
- Changing from one printer to another is readily accomplished by a quick and easy-to-use menu programme.
- All inclusive price of **£45.00**

**AVAILABLE NOW BY MAIL-ORDER OR FROM YOUR  
LOCAL STOCKIST.**

 **CAMBRIDGE  
COMPUTING**  
Research Limited

61 DITTON WALK,  
CAMBRIDGE CB5 8QD  
Tel: 0223 214451

TRADE ENQUIRIES WELCOME

Please send me ..... Printer Interfaces at £45.00 each. Total £.....

PCW

I enclose cheque/Postal Order for the above total. Made payable to Cambridge Computing Research Ltd.

Name .....

Address .....

.....

.....

 **CAMBRIDGE  
COMPUTING**

Please allow 28 days for delivery.

## Sound advice

Colin O'Neill explores the possibilities of sound on the new Amstrad CPC 464 micro

The program is a utility which enables the user to explore the complex sound possibilities of the Amstrad. The program is designed to be used in conjunction with the manual, and the variable names used in chapter 6 of the manual have been used as far as possible.

However, as the volume envelope parameters are so extensive, the numeric keypad keys 1-9 have been used. The top row

controls the first three parameters, the second row the following three, and the third row the third set. The two remaining volume envelope sections are unused, but could easily be added if required. Please note that use of the volume envelope will automatically change the duration of the note.

The envelope controls have been kept as simple as possible; entry of the first section

of the envelope will automatically set the second as a reverse of the first, the final three sections are unused but could be added if required.

To change the parameters, hold down the required key and the up or down arrow key to increase or decrease the values. The note will sound during this procedure so the effect of the change can be monitored. The values of the parameters will be displayed on the screen simultaneously; these can be written down when an interesting sound is generated for subsequent use in other programs.

The program makes use of some of the interesting features of Amstrad's Basic, such as windows and *While/Wend* loops.

```

10 REM *****
*****
20 REM ***** SOUND EXPERIMENT PROGRAM
FOR AMSTRAD CPC464 *****
30 REM ***** (c) COLIN J. O'NEILL AUG
UST 1984 *****
40 REM *****
*****
50 '
60 s#=" ghijklmuv789456123"
70 MODE 1:BORDER 1:INK 0,13:INK 1,0
80 LOCATE #0,8,22:PRINT#0,"SOUND EXPERIM
ENT PROGRAM"
90 LOCATE #0,8,24:PRINT#0,"(c) Colin J.
O'Neill 1984"
100 '
110 g=1:h=200:j=7:i=10:'
**** SET UP INIT PARAMETERS
120 '
130 REM ***** SET UP WINDOWS *****
*****
140 '
150 WINDOW #1,1,23,1,8:PEN #1,0:PAPER #1
,1:CLS #1
160 WINDOW #2,22,40,1,8:PEN#2,1:PAPER #2
,2:CLS#2
170 WINDOW #3,10,30,10,13:PEN #3,2:PAPER
#3,3:CLS #3
180 WINDOW #4,1,40,15,19:PAPER #4,1:PEN
#4,2:CLS #4
190 '
200 REM ***** PRINT MENU *****
*****
210 '
220 GOSUB 1230:GOSUB 1350:GOSUB 1470:GOS
UB 1600
230 '
240 REM ***** WAIT FOR KEYPRESS *****
*****
250 '
260 WHILE a#("&e"
270 WHILE a#""
280 a#INKEY#
290 a#LOWER(a#)
300 WEND
310 '
320 REM ***** BRANCH TO SUBROUT
INE *****
330 ON INSTR(s#,a#) GOSUB 1550,400,490,:
70,650,730,790,860,940,1030,1120,1690,1:
80,1870,1960,2050,2140,2230,2320,2410
340 IF a#("&e" THEN a#=""
350 WEND
360 '
370 REM ***** PROGRAM END *****
*****
380 CLS:END
390 '
400 WHILE INKEY(52)=0:'
**** SOUND CHANNELS
410 IF INKEY(0)=0 THEN g=g+1
420 IF INKEY(2)=0 THEN g=g-1
430 IF g<1 THEN g=4
440 IF g>4 THEN g=1
450 GOSUB 1230
460 WEND
470 RETURN
480 '
490 WHILE INKEY(44)=0: IF INKEY(0)=0 THE
N h=h+10:'**** TONE PERIOD
500 IF INKEY(2)=0 THEN h=h-10
510 IF h<0 THEN h=4095
520 IF h>4095 THEN h=0
530 GOSUB 1230
540 WEND
550 RETURN
560 '
570 WHILE INKEY(35)=0: IF INKEY(0)=0 THE
N i=i+1:'**** DURATION
580 IF INKEY(2)=0 THEN i=i-1
590 IF i<-32768 THEN i=32767
600 IF i>32767 THEN i=-32768
610 GOSUB 1230
620 WEND
630 RETURN
640 '
650 WHILE INKEY(45)=0: IF INKEY(0)=0 THE
N j=j+1:'**** VOLUME
660 IF INKEY(2)=0 THEN j=j-1
670 IF j<0 THEN j=15
680 IF j>15 THEN j=0
690 GOSUB 1230
700 WEND
710 RETURN
720 '
730 WHILE INKEY(37)=0:IF INKEY(0)=0 THEN
k=k+1:'**** VOLUME ENVELOPE
740 IF INKEY(2)=0 THEN k=k-0
750 GOSUB 1230
760 WEND
770 RETURN
780 '
790 WHILE INKEY(36)=0:IF INKEY(0)=0 THEN
l=l+1:'**** TONE ENVELOPE
800 IF INKEY(2)=0 THEN l=l-0
810 GOSUB 1580
820 GOSUB 1230
830 WEND
840 RETURN
850 '
860 WHILE INKEY(38)=0:IF INKEY(0)=0 THE
M m=m+1:'**** NOISE
870 IF INKEY(2)=0 THEN m=m-1
880 IF m<0 THEN m=15
890 IF m>15 THEN m=0
900 GOSUB 1230
910 WEND
920 RETURN
930 '
940 WHILE INKEY(51)=0:IF INKEY(0)=0 THEN
t=t+1:'**** ENT STEP COUNT
950 IF INKEY(2)=0 THEN t=t-1
960 IF t<0 THEN t=239
970 IF t>239 THEN t=0:CLS#2
980 GOSUB 1580
990 GOSUB 1350
1000 WEND
1010 RETURN
1020 '
1030 WHILE INKEY(55)=0:IF INKEY(0)=0 THE
N u=u+1:'**** ENT STEP SIZE
1040 IF INKEY(2)=0 THEN u=u-1
1050 IF u<-128 THEN u=127
1060 IF u>127 THEN u=-128
1070 GOSUB 1580
1080 GOSUB 1350
1090 WEND
1100 RETURN

```

continued over the page

```

1110 '
1120 WHILE INKEY(59)=0:IF INKEY(0)=0 THE
N u=u+1:' ***** ENT PAUSE TIME
1130 IF INKEY(2)=0 THEN u=u-1
1140 IF u<0 THEN u=255
1150 IF u>255 THEN u=0
1160 GOSUB 1500
1170 GOSUB 1350
1180 WEND
1190 RETURN
1200 '
1210 REM ***** PRINT SOUND PA
RAMETERS *****
1220 '
1230 LOCATE #1,1,1:PRINT#1,"SOUND:=":PRI
NT#1,"G: Channel "g
1240 PRINT#1,"H: Tone "h
1250 PRINT#1,"I: Duration "i
1260 PRINT#1,"J: Volume "j
1270 PRINT#1,"K: Vo. env "k
1280 PRINT#1,"L: Tone env "l
1290 PRINT#1,"M: No. se "m
1300 GOSUB 1550
1310 RETURN
1320 '
1330 REM ***** PRINT ENT PARA
METERS *****
1340 '
1350 LOCATE #2,1,1:PRINT#2,"TONE ENVELOP
E:="
1360 PRINT#2,"T1: Step count"t
1370 PRINT#2,"U1: Step size "u
1380 PRINT#2,"W1: Pause time"u
1390 PRINT#2,"T2: Step count"t
1400 PRINT#2,"U2: Step size "u
1410 PRINT#2,"W2: Pause time"u
1420 GOSUB 1550
1430 RETURN
1440 '
1450 REM ***** PRINT KEYBOARD
INS *****
1460 '
1470 PRINT#3,"<SPACE> - Sound note"
1480 PRINT#3,"< E > - End"
1490 PRINT#3,"< "CHR$(240)" > - Increa
se"
1500 PRINT#3,"< "CHR$(241)" > - Decrea
se"
1510 RETURN
1520 '
1530 REM *****THE LINE THAT SOUNDS
THE NOTE*****
1540 '
1550 SOUND g,h,i,j,k,l,m
1560 RETURN
1570 '
1580 ENT -i,t,u,w,t,-u,v:RETURN
1590 '
1600 REM ***** PRINT VOLUME ENVELOPE
CONTROLS *****
1610 '
1620 LOCATE #4,1,1:PRINT#4,"VOLUME ENVEL
OPE"
1630 LOCATE #4,1,2:PRINT#4,"Num keys 1-9
control the 1st 3 paras"
1640 GOSUB 2520
1650 RETURN
1660 '
1670 REM ***** ENU CONTROLS FOLLOW **
*****
1680 '
1690 WHILE INKEY(12)=0
1700 IF INKEY(0)=0 THEN p1=p1+1
1710 IF INKEY(2)=0 THEN p1=p1-1
1720 IF p1<0 THEN p1=127
1730 IF p1>127 THEN p1=0
1740 GOSUB 2520:GOSUB 2550
1750 WEND
1760 RETURN
1770 '
1780 WHILE INKEY(11)=0
1790 IF INKEY(0)=0 THEN q1=q1+1
1800 IF INKEY(2)=0 THEN q1=q1-1
1810 IF q1<-128 THEN q1=127
1820 IF q1>127 THEN q1=-128
1830 GOSUB 2520:GOSUB 2550
1840 WEND
1850 RETURN
1860 '
1870 WHILE INKEY(3)=0
1880 IF INKEY(0)=0 THEN r1=r1+1
1890 IF INKEY(2)=0 THEN r1=r1-1
1900 IF r1<0 THEN r1=255
1910 IF r1>255 THEN r1=0
1920 GOSUB 2520:GOSUB 2550
1930 WEND
1940 RETURN
1950 '
1960 WHILE INKEY(20)=0
1970 IF INKEY(0)=0 THEN p2=p2+1
1980 IF INKEY(2)=0 THEN p2=p2-1
1990 IF p2<0 THEN p2=127
2000 IF p2>127 THEN p2=0
2010 GOSUB 2520:GOSUB 2550
2020 WEND
2030 RETURN
2040 '
2050 WHILE INKEY(12)=0
2060 IF INKEY(0)=0 THEN q2=q2+1
2070 IF INKEY(2)=0 THEN q2=q2-1
2080 IF q2<-128 THEN q2=127
2090 IF q2>127 THEN q2=-128
2100 GOSUB 2520:GOSUB 2550
2110 WEND
2120 RETURN
2130 '
2140 WHILE INKEY(4)=0
2150 IF INKEY(0)=0 THEN r2=r2+1
2160 IF INKEY(2)=0 THEN r2=r2-1
2170 IF r2<0 THEN r2=255
2180 IF r2>255 THEN r2=0
2190 GOSUB 2520:GOSUB 2550
2200 WEND
2210 RETURN
2220 '
2230 WHILE INKEY(13)=0
2240 IF INKEY(0)=0 THEN p3=p3+1
2250 IF INKEY(2)=0 THEN p3=p3-1
2260 IF p3<0 THEN p3=127
2270 IF p3>127 THEN p3=0
2280 GOSUB 2520:GOSUB 2550
2290 WEND
2300 RETURN
2310 '
2320 WHILE INKEY(14)=0
2330 IF INKEY(0)=0 THEN q3=q3+1
2340 IF INKEY(2)=0 THEN q3=q3-1
2350 IF q3<-128 THEN q3=127
2360 IF q3>127 THEN q3=-128
2370 GOSUB 2520:GOSUB 2550
2380 WEND
2390 RETURN
2400 '
2410 WHILE INKEY(5)=0
2420 IF INKEY(0)=0 THEN r3=r3+1
2430 IF INKEY(2)=0 THEN r3=r3-1
2440 IF r3<0 THEN r3=255
2450 IF r3>255 THEN r3=0
2460 GOSUB 2520:GOSUB 2550
2470 WEND
2480 RETURN
2490 '
2500 REM ***** PRINT ENU PARAMETE
RS *****
2510 '
2520 LOCATE #4,1,3:PRINT#4,"P1:"p1,"O1:"
q1,"R1:"r1:PRINT#4,"P2:"p2,"O2:"q2,"R2:"
r2
2530 PRINT#4,"P3:"p3,"O3:"q3,"R3:"r3
2540 RETURN
2550 ENU i,p1,q1,r1,p2,q2,r2,p3,q3,r3:
=p1+r1+p2+r2+p3+r3
2560 GOSUB 1230
2570 RETURN
2580 '

```



# Be the master of 49,152 pixels.

Get all your pixels on your Spectrum completely under your control. Dominate their existence. Mastermind their every move. And do it all in machine code, so they move fast to produce exactly the amazing displays you really want.

Here's a great new book from the Sunshine people, all about machine code sprites and graphics on the Spectrum.

Read it, understand it, and then start to move those pixels. And remember, with this new book you'll discover the secret of the shrinking window!

Look out for the Sunshine range in W.H. Smith's, Boots, John Menzies, other leading retail chains and all good bookshops. Dealer enquiries: 01-437 4343.



Please send me Machine Code Sprites and Graphics for the ZX Spectrum at £6.95 plus 50p p&hp.

I enclose a cheque for £\_\_\_\_\_ payable to Sunshine Books.

I enclose a postal order for £\_\_\_\_\_ payable to Sunshine Books.

Please charge my Visa Access card No. \_\_\_\_\_

valid from \_\_\_\_\_ expires end: \_\_\_\_\_

Signed: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Send to: Sunshine Books,  
12/13 Little Newport Street, London WC2R 3LJ.

## SPECTRUM & BBC POOLS PREDICTOR

WITH 11,000 MATCH DATABASE

Now in its 3rd successful season, Mayday Software's Pools Predictor has been made even more powerful with a new and unique 11,000 match database. SEVEN separate forecasting techniques have been combined to give you the best forecasts yet. And just as easy to use is our new racing analyser. This uses the racecard from your daily paper to analyse any horse race — and it's yours at no extra charge!

MAYDAY SOFTWARE 181, PORTLAND CRESCENT  
STANMORE, MIDDX, HA7 1LR

## FREE RACING ANALYSER

BOTH PROGRAMS  
FOR ONLY

£8.99

## Spectrum 48K Historical Wargaming

**AUSTERLITZ £9.50**

This game is a re-creation of Napoleon's famous victory at Austerlitz. You are Napoleon!

The computer provides a highly sophisticated opponent with 90% of the program written in machine code.

All the mechanics of wargaming, such as movement, combat, terrain effects, reports etc., are taken care of by the computer. The game is for one player only with 3 levels of difficulty and is played on a physical map of the battlefield.

**PACIFIC WAR £6.00**  
**MIDWAY £5.25**

Refight the aircraft carrier battles of World War 2. The player controls the American forces, your computer the Japanese. Full screen display of task forces and aircraft movement. Includes airsearches, airstrikes, fighter defence of ones own carriers and allows the player to control the detailed activities of each aircraft carrier from within its own status display.

Cheques or Postal Orders to:—

KW SOFTWARE  
155 Ringinglow Rd., Sheffield S11 7PS

# TITANIC

*The Adventure Begins...*

With Currah Micro Speech

FREE on Side 2  
a mini-epic in high energy rock  
TITANIC (The music)



FOR 48K SPECTRUM

R&R Software Ltd, 5 Russell Street, Gloucester GL1 1NE. Tel: 0452 502819

**NOW AVAILABLE  
ONLY £7.95**

Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed.

## 3-D Graphics

on Spectrum

This program demonstrates very well the powerful Draw command. Normally it just draws a line between the current position

and the two parameters specified, however if you add a third parameter you can specify the degree of curvature of the line.

The program asks you to input the X,Y coordinates of the centre of the sphere, and then the radius, (make sure it will fit on the screen.) The resolution is a measure of the

number of steps when drawing the sphere, 4 gives a fairly low resolution whilst 16 or 32 give a nice high resolution effect.

### Program notes

Line 30 Set up screen colour (chosen to shimmer at the moment)

Line 30-60 Input data as described above

Line 1000- Actual routine, may be compacted down to 1 line if to be used in another program

### Variables

c Degree of curvature on current line

mx,my Centre of sphere

Rad Radius of sphere

```
10 REM '3D' image of a sphere
10
30 BORDER 2: PAPER 4: INK 2: C
LS
40 INPUT "enter centre coordin
ates, x y ", mx, " and ", my
50 INPUT "enter radius of spher
e ", rad
60 INPUT "enter resolution PI
", res: LET res=PI/res
70 GO SUB 1000
75 STOP
80 GO TO 40
999
1000 REM draw circle
1000
1010 FOR c=-PI TO PI STEP res
1020 PLOT mx-rad,my
1030 DRAW 2*rad,c,c
1040 PLOT mx,my+rad
1050 DRAW 0,-2*rad,c
1060 NEXT c
1070 RETURN
```

### 3-D Graphics

by Chris Davison

## Microradio

GW6JJN



### User groups

This week Microradio turns the spotlight on the two radio computing users groups, the Sinclair Amateur Radio Users Group (SARUG) and the user group for people with non-Sinclair computers, RAMTOP.

Both amateur radio and CB are hobbies in their own right and both pastimes have many thousands of followers. Amateur radio for example has been in existence for as long as radio transmissions have been possible. Although it is a technical hobby, the majority of

amateurs are non-technical and find radio a welcome change to their normal occupations.

As technology advanced and became inherently more complex, many found it difficult to begin to understand what happened inside the black box of transceivers available today. This is a pity because the tradition of amateur radio is involvement in the technology at whatever level, hopefully even the building of equipment. Microelectronics seemed to have put an end to that involvement for many people. Then something wonderful happened — the home computer.

The micro made it possible for amateurs to transmit data, TV, Morse, RTTY and many other things, and more exciting still, led to involvement and programming. Simple interfaces are possible and the sense of real achievement has returned.

Radio computing as a hobby is with us in a big way as the response to Microradio has shown and to cope with this hobby, user groups were formed. The first is the Sinclair group, SARUG of 3 Red House Lane, Leiston, Suffolk. (Please send an SAE if contacting User Groups.)

Behind SARUG is Paul Newman, G4INP. Paul publishes an excellent newsletter containing projects and programs every couple of months and it is something I wouldn't miss.

Paul is an extremely competent programmer who often assists group members with difficulties as well as publishing his programs along with members with difficulties as well as publishing his programs along with members contributions in the newsletter.

At the moment I am building an interface for RTTY which was published in the SARUG newsheet. Members of SARUG

hail from all over the world so the input is terrific. If you have a Sinclair computer and an interest in communicating then get in touch with SARUG.

RAMTOP, the group for non Sinclair machines, is at Great Billing Rectory, Great Billing, Northampton. Run by the Rev. Richard Butcher, RAMTOP is younger than SARUG and has also a fine newsletter including projects and programs. In the latest RAMTOP newsletter is news of a Beeb Packet Radio System, so hurry.

Please mention Microradio if you contact User Group and please, don't forget the SAE.

Ray Berry GW6JJN

This series of articles is designed for radio and microcomputer enthusiasts alike. If you have any queries that you want answered, hints and tips to share, or topics that you would like to see covered, write to: Ray Berry, Microradio, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.

## Moles

on Vic20

This program is also written for the unexpanded Vic20 or Commodore 64 but again it could be easily adapted for any other

machine. It calculates the number of moles in any given quantity of a substance — a technique frequently used in chemistry.

### Program notes

1-60 Introduction  
70-160 Input state of substance.  
1000-1510 Calculates moles if the substance is a gas.  
2000-2030 If substance is in solution.

3000-3030 If substance is a solid or a liquid.

### Variables:

T Delay loop.  
AS Input choices.  
V Volume.  
M Molarity.  
RMM-relative molecular mass.  
MA Mass.

```

1 REM 'MOLES' BY SARAH COTTON
10 PRINT "MOLES ":POKE3687
9,27
20 PRINT "THIS PROGRAM WILL"
30 PRINT "CALCULATE THE NUMBER"
40 PRINT "OF MOLES IN ANY"
50 PRINT "GIVEN QUANTITY OF A":PRINT "SUBSTANCE."
60 FORT=1TO4000:NEXT
70 PRINT "PLEASE INPUT THE"
80 PRINT "NUMBER OF THE STATE"
90 PRINT "OF THE SUBSTANCE:"
100 PRINT "1. GAS"
110 PRINT "2. SOLUTION"
120 PRINT "3. SOLID/LIQUID"
130 GETA$: IFA$<"1"ORA$>"3"ORA$="" THEN130
140 IFA$="1" THEN1000
150 IFA$="2" THEN2000
160 IFA$="3" THEN3000
1000 PRINT "INPUT VOLUME (CM+
3)"
1010 INPUT "V":
1020 PRINT "IS THE GAS AT:"
1030 PRINT "1. ROOM TEMPERATURE"
1040 PRINT "2. AND PRESSURE"
1050 PRINT "1. STANDARD "
1060 PRINT "TEMPERATURE AND "
1070 PRINT "PRESSURE."
1080 PRINT "CHOICE ?"
1090 GETA$: IFA$<"1"ORA$>"2"ORA$="" THEN10
90
1100 IFA$="2" THEN1500
1110 PRINT "NO. OF MOLES "
1120 PRINT "V/24000:END
1500 PRINT "NO. OF MOLES "
1510 PRINT "V/22400:END
2000 PRINT "MOLARITY": INPUTM
2010 PRINT "VOLUME(CM+3)": INPUTV
2020 PRINT "NO. OF MOLES "
2030 PRINT "V*M/1000:END
3000 PRINT "RMM": INPUTR
3010 PRINT "MA": INPUTMA
3020 PRINT "NO. OF MOLES"
3030 PRINT "MA/R:END
4000 REM PROGRAMMING INSTRUCTIONS (NO NE
ED TO TYPE THESE IN)
4010 REM "S"=CLR
4020 REM "R"=CRSR RIGHT
4030 REM "D"=CRSR DOWN
4040 REM "C"=RED
4050 REM "P"=PURPLE
4060 REM "B"=BLUE
4070 REM "K"=BLACK
    
```

Moles

by Sarah Cotton

## Arcade Avenue



### Japan success

To start off this week I have a few more *Sabre Wulf* scores to put into the Hall of Fame. J. Dodd and his or her brother of Halesowen have completed the game, but are keeping their score secret for now — they advise that it is vital to make a map, as does Mr N.C. Barker of Weston Super Mare who has a high score of 91445 in only 63% of the maze. He has also finished *Atic Atac* with a score of 99% (remember I am also keen to hear of low percentages for these games).

Colin Graig of Kirkcaldyn has completed *Wulf* with 117540 and 83% "after seven

hours of intense concentration at 6.45 on Tuesday June 26th."

Now on to pastures new — Richard Couchman of Huntingdon has sent in some marvelously original pokes for the *Horace* series of games. With *Horace goes Skiing*, *Poke 30027,0* *Poke 30644,0* ensures that there is no ski charge. *Poke 2009,0* and *Poke 29045,0* removes the cars from the frogger stage and *Poke 30762,0* means that there is no ambulance fee.

*Pokeing 27680,0* on *Horace and the Spiders* gives only one life (for masochists maybe? Perhaps some different numbers would be better) and *Poke 24960,0* and *25142,0* allows you to skip the first stage which suits me as I find it a boring impediment to the main game. Richard also offers the technical tip that he gets a better *Save* using the Ear socket of his Spectrum.

R Blake of Rayleigh in Essex, my old stamping ground, sent in some comments about the

best of the new Sinclair games. Concerning *Match Point* it is easy to miss the graphics of the trophy as you must give a key press to view the screen and another press to continue. unless you give a light, quick tap the computer reads it as two key presses and moves straight on.

On to *Stop The Express*: "Talk about addictive — the day I bought the game I spent eight hours before finally managing to stop the train! Could the fact that it was written in Japan explain the message "Congratulation! You Success!" which accompanies the graphics of the train's engine?"

Well, I had always given them the benefit of the doubt and assumed the wacky spelling to be deliberate (unless no one at Sinclair could finish the game to check it) but I must agree it is one of the best for the Spectrum. Although not really technically breathtaking, it has been so well designed that it could almost pass as a true

arcade game.

Finally, there can be few Commodore programmers regarded with more respect than Jeff Minter, yet the reception of his games when converted to the Spectrum has been very iffy. Somehow they lose their legendary awesomeness in transit. In part this is due to the weedy Spectrum sound, but it is also due to the fact that conversions to date have been old Vic20 games which look poor against the likes of *Ultimate*. The good news is that we can soon expect a conversion of the more ambitious and wonderful CBM 64 game *Hoverver Bovver*. **Tony Kandle**

The Arcade Corner is a new section for anyone who enjoys playing arcade games. If you have any comments, from playing tips on difficult games or programs you'd particularly like to praise (or blame!) then write to: Tony Kandle, Arcade Avenue, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

# ATTENTION! ATTENTION! ALL VIC & CBM USERS!

Do you use tapes? Are you sick and tired of waiting for your programs to be Loaded/Saved from on the tape? Then you need a **TORNADO!!** Tornado allows you to Save/Load/Verify your Basic/machine code programs faster than a CBM 1541 disk drive does!! Due to popular demand! Tornado now comes with new and more powerful commands plus extra instructions to assist you in making fast versions of your existing machine code/Basic programs. Tornado is available on tape for CBM 64 and 8K + Vic 20.

Do your Run/Stop and Restore keys often fail? Do you want to come out of those crashes?! Or come out of those unbreakable loops?! Then what are you waiting for, get yourself a **BREAKER!!** Reset switch and let your computer know who is the boss!! Breaker can be connected to your machine in seconds. Connecting directly to the serial port of the CBM/Vic20/1540-1 MPS 801 etc. included with the Breaker reset switch is a basic recovery program. Breaker is now available for any CBM 64 or Vic 20.

Available for CBM 64 and the Vic 20 now is the NEW EDITION! Now combining Vic 20 & CBM 64 **ROM-FILE**. Containing a complete disassembly of CBM 64 & Vic 20 Basic & Kernal Rom with comments! As well as a complete description of all 6502/6510 instructions and addressing modes + a complete listing of a machine code monitor.

Please make cheques/PO payable to:

**BSF COMPUTER SERVICES LTD.**  
DEALERS AND GENERAL ENQUIRIES  
TEL: 0293 510020



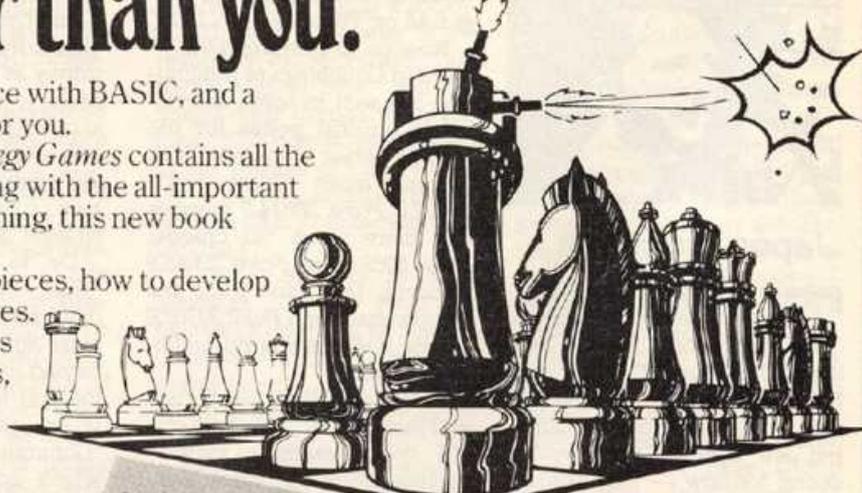
**D** Please send me..... Tornado at £9.95 + my free! Breaker  
Please send me..... Breaker at £7.95  
Please send me..... Rom-File at £7.95  
I enclose cheque/PO/cash to the sum of £.....  
Name..... Computer.....  
Address.....  
.....  
Please use this form and block letters only. All prices are inclusive of p&p (mail order only, add £2 if outside UK). Please post to:  
**BSF CSL, 82 FURNACE DRIVE, CRAWLEY, W. SUSSEX RH10 6JE**

# Use your intelligence to write a game that's more clever than you.

If you've a Commodore 64, a nodding acquaintance with BASIC, and a love for real games of strategy, here's the book for you.

John White's latest book, called *Writing Strategy Games* contains all the techniques for intelligent games creation. Starting with the all-important theory, both behind the games and the programming, this new book also details the practicalities involved.

You'll discover how to set up a 'board', move pieces, how to develop standard openings and a variety of endgame moves. If you want to write a Grandmaster-beating chess program, or a four-dimensional game of draughts, then buy this book. Order today from your local bookshop, computer dealer, or by post direct from Sunshine, using the order form.



Look out for the Sunshine range in W.H. Smith's, Boots, John Menzies, other leading retail chains and all good bookshops.

Dealer enquiries: 01-437 4343.

Please send me *Writing Strategy Games* on the Commodore 64 at £6.95 plus 50p p&p. I enclose a cheque/postal order for £..... payable to Sunshine Books.  
 Please charge my Visa/Access card No. .... valid from ..... expires end: .....  
Signed: \_\_\_\_\_  
Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
.....  
Send to: Sunshine Books, 12/13 Little Newport Street, London WC2R 3LD.

# THE BEST SOFTWARE IN AGES

C-64  SPECTRUM  BBC  ELECTRON



## FANTASIA DIAMOND

Delve deep into the age of fantasy with a host of intriguing characters that may help or hinder your exploration of this dream world.

Retrieve the magnificent Fantasia Diamond recently stolen and rescue Boris the master spy from the imposing fortress and its evil guardian. Talk to the Robot, Violinist and other characters to illicit their help. An enthralling and sophisticated graphic adventure by Kim Topley for the Spectrum 48K, Commodore 64, BBC Model B\* and Acorn Electron\*.

SRP £7.95

\*No graphics on these versions.



## HEATHROW ATC

Your challenge in the age of technology is to direct the incoming aircraft at the world's busiest international airport, Heathrow. Monitor the stack displays of altitude, heading, velocity and aircraft type. Scan the radar for blips and trails. Develop your skills to tackle emergencies, rogue aircraft, radio and instrument failure. A highly acclaimed simulation of one of today's most demanding jobs, by Mike Male for any Spectrum, Commodore 64, BBC Model B and Acorn Electron.



SRP £7.95

**HEWSON CONSULTANTS**

568 Milton Trading Estate, Milton, Abingdon, Oxon. OX14 4RX



## 3D LUNATTACK

Do battle with the Seiddab in a futuristic age. Pilot your Z5 Hoverfighter over the craters and around the mountains of the luna landscape. Equipped with the latest iridium lasers, duodec missiles, radar, navigation and shields penetrate the Seiddab defences and head towards their command base. Destroy the Seiddab Dab Tanks, Aerial Mines, missile silos and Hoverfighters, you must not fail in your mission to drive the Seiddab from their luna base. A stunning 3D Graphic Presentation by Steve Turner for the Spectrum 48K and Commodore 64.

SRP £7.95

As part of our continuing development of innovative software we are always happy to evaluate software sent to us with a view to publication.

Selected items available from Centresoft Dealers and all leading computer software retailers.

WHSMITH

Rumbelows

John Menzies

TIGER TRADER

spectrum

LASKYS

HMV

# ANIROG

AT LAST 1 TAPE 2 MACHINES

COMMODORE 64 VIC 20

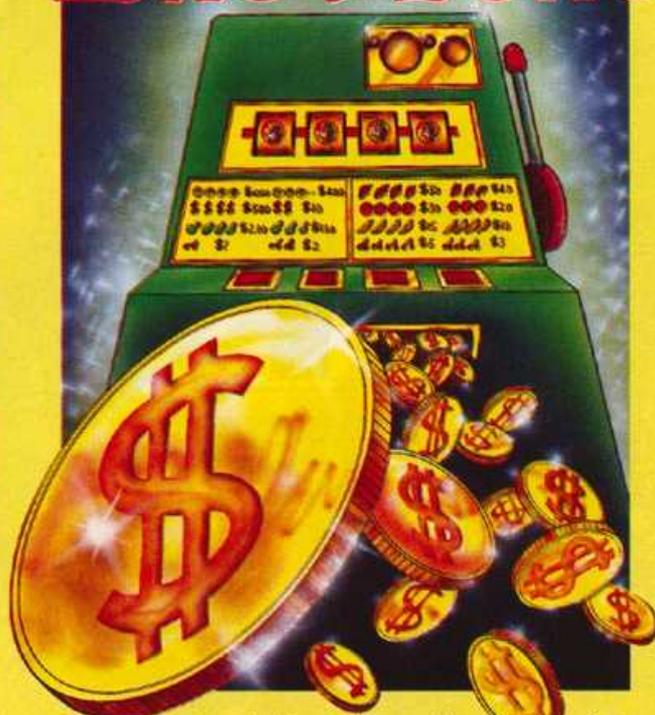
## LAS VEGAS



### MINIPEDES

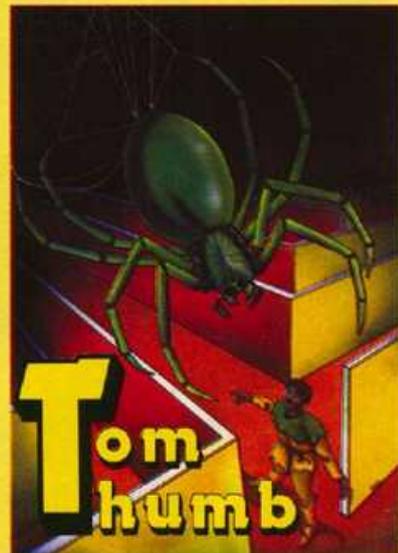
It is the height of summer and the garden is buzzing with bees and bugs. Minipede, a mutant mushroom monster advances relentlessly towards you, devouring everything in its path. 15 screens of fast and furious action make Minipedes a real challenge to the arcade enthusiasts.

Commodore 64 - VIC 20 16K  
J.S. or K.B. £5.95



Experience the thrills of the gambling centre of the world from the comfort of your own armchair. Both versions include features such as spinning reels, hold, number-feature nudges, gamble/collect, spin score and hi-score. The Commodore 64 version has additional features, nudge, reward lucky 3, step-a-win and hi-score tables.

As with any arcade machine the odds are stacked against you!  
Commodore 64 - VIC 20 16K  
K.B. £5.95



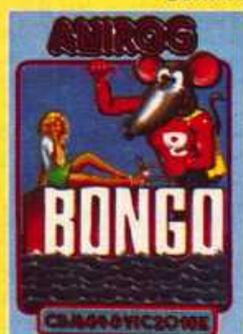
### TOM THUMB

Tom is trapped in a scrolling maze populated by loathsome creatures, guardians of the lost treasures of the Magezam. Six separate screens, five levels of difficulty and four player option provide an exciting challenge for the whole family. Another stunner from the author of **BONGO!** (1 to 4 players)

Commodore 64 - VIC 20 16K  
J.S. £5.95



J.S. AND KEYBOARD  
£7.95



J.S.  
£7.95



J.S. AND KEYBOARD  
£5.95



J.S. or KEYBOARD  
£7.95



J.S.  
£7.95

COMMODORE 64 VIC 20

TRADE ENQUIRIES: ANIROG SOFTWARE LTD. 29 WEST HILL DARTFORD KENT (0322) 92513/8  
MAIL ORDER: 8 HIGH STREET HORLEY SURREY 24 HOUR CREDIT CARD SALES HORLEY (02934) 6083  
PAYMENT BY CHEQUE P.O. ACCESS/VISA 50p POSTAGE & PACKAGING

## Pacman's Revenge

on BBC

Pacman's Revenge, is a delightfully (I hope) simple game. All you have to do is catch

Super Ghost III, (the one with a big bite) who is lurking underneath you. (In case you might not know who you are, you are the 'C' shaped character.)

This program consists of two parts; the

loader program, and the game itself. It was designed for the BBC B but will also run on the Acorn Electron if the *Mode 7* commands are changed to something suitable. It is a pretty good program for its size.

```
10 *KEY10"OLD:MRUN:IM"
20 ONERRORRUN
30 MODE7
40 PRINT:PRINT:PRINT:PRINT          Pac-Man's Revenge!!!"
50 PRINT:PRINT          By Nilesh Ramrattan"
60 PRINT:PRINT:PRINT"You are Pac-man, And you are seeking ""Revenge on the
D:readed and mindless ""Supa-Ghost III ,but there is a slight""Problem."
""You have 150 moves to make the most""of your mission.""Z=LEFT X=LEFT"
70 PRINT          :=UP          /=DOWN""
90 PRINT"Hit a key then start the tape recorder"
90 A$=GET$
100 IF A$<>"0" THEN CHAIN"PACMAN"
10 *KEY 10"CLS:MOLD:MRUN:IM"
20 ONERRORMODE7:PRINT:PRINT:PRINT"Another Go (Y/N)":GOTO 290
30 MODE7
40 VDU 23;8202;0;0;0;
50 A=5:B=A:C=15:D=C
60 FOR T=0 TO 150
70   GOSUB 330
80   COLOUR1:PRINTTAB(3,0);"Moves Used":T
90   COLOUR 6:PRINTTAB(C,D);CHR$240
100  COLOUR 3:PRINTTAB(A,B);CHR$241
110  G=RND(10):H=RND(10)
120  IFG<5THENC=C+1
130  IFG>5THENC=C-1
140  IFH<5THENH=D+1
150  IFH>5THENH=D-1
160  R$=INKEY$(2000)
170  IFR$=":" THEN B=B-1
180  IFR$="/" THEN B=B+1
190  IFR$="Z" THEN A=A-1
200  IFR$="X" THEN A=A+1
210  IF C<0 OR C>20 THEN C=10
220  IFD<0ORH>30THENH=15
230  IF A=C AND B=D THEN MODE7:PRINT:PRINT:PRINT"YOU DID IT....."
";PRINT"Another go (Y/N)":GOTO290
240  IFA<0ORH>20THENA=4
250  IFB<0ORH>30THENB=7
260  NEXT T
270 CLS
280 MODE7:PRINTTAB(0,10);"YOU FAILED.....!":PRINTTAB(0,11);
"Another go (Y/N)"
290 INPUTA$
300 IFA$="Y"THEN RUN
310 IFA$<>"Y"THEN MODE7
320 END
330 VDU 23,241,24,126,127,240,240,127,126,24
340 VDU 23,240,124,182,254,254,254,254,170,170
350 CLS
360 RETURN
```

Copyright (C) 1984 N. Ramrattan

Pacman's Revenge  
by Nilesh Ramrattan

# COMPUTER PRINTOUT FILE

for 4" (102mm) to 4 1/2" (115mm) wide paper

Keep your listings, records, etc. available for immediate recall  
**BUSINESS — STUDY — PLEASURE**

## PROBIT FILE

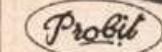
Fitted with 30mm capacity 4-ring mechanism and compressor bar. Leather grain effect vinyl cover. Postage & VAT included each

**£4.45**

## PROBIT PRINTOUT POCKETS

To fit PROBIT FILE. Specially designed to hold printout paper in position. Clear vision both sides. Postage & VAT included. 10 pockets

**£1.99**



Cheques/P.O.S. to:  
**PROBIT**, Dept PC, PO Box 11, Pontypridd, mid-Glam, CF37 3DZ tel: 0443-790684

| SPECTRUM                |             | COMMODORE 64            |             | SPECIAL OFFER               |           |
|-------------------------|-------------|-------------------------|-------------|-----------------------------|-----------|
| NAME                    | APP PRICE   | NAME                    | APP PRICE   | NAME                        | APP PRICE |
| DAVEY THOMPSON DEATHWON | 4.95 5.25   | SEATTLE 3000            | 4.95 5.25   | SOFTWARE PACKAGE MONTH      | 1.95 2.00 |
| BEACHHEAD               | 1.95 2.00   | STRIP POKE              | 4.95 5.25   | AMPHIBIOUS TYPE BULLETPRICE | 1.95 2.00 |
| WHITE LIGHTNING         | 14.95 15.50 | BLACK HOLE              | 7.95 8.50   | GAMESTORY 1/2/3/4           | 11.95     |
| SPINLOCK WOLVES         | 14.95 15.50 | RETRON 88               | 7.95 8.50   |                             |           |
| ROBERT                  | 9.95 10.50  | ARTIC                   | 4.95 5.25   |                             |           |
| MUCK                    | 9.95 10.50  | AMBI                    | 4.95 5.25   |                             |           |
| MONEY                   | 9.95 10.50  | MRINDOCT                | 4.95 5.25   |                             |           |
| SAMMY BOLT              | 9.95 10.50  | YOBEL                   | 4.95 5.25   |                             |           |
| LINDSEY WINDMILL        | 9.95 10.50  | TALES OF ARABIAN NIGHTS | 7.95 8.50   |                             |           |
| AVIACS                  | 4.95 5.25   | ONLY THOMPSON DEATHWON  | 7.95 8.50   |                             |           |
| JACK'S SEABEAT          | 1.95 2.00   | LOOT                    | 7.95 8.50   |                             |           |
| MICRODOLPHINE           | 9.95 10.50  | SEARCHHEAD              | 4.95 5.25   |                             |           |
| REYTRON                 | 7.95 8.50   | ASTRO CHASE             | 4.95 5.25   |                             |           |
| COCKNEYHAT MAP          | 4.95 5.25   | ALL LAMASOFT            | 9.95 10.50  |                             |           |
| HARRIER ATTACK          | 9.95 10.50  | DEATHWON                | 4.95 5.25   |                             |           |
| SCUBA DIVE              | 4.95 5.25   | FLIP AND FLOP           | 4.95 5.25   |                             |           |
| SILLAGAR SOLD           | 3.95 4.50   | SCUBA DIVE              | 4.95 5.25   |                             |           |
| CIVIL WAR OCEAN CRUISE  | 3.95 4.50   | PITFALL                 | 1.95 2.00   |                             |           |
| SCUBA DIVE              | 3.95 4.50   | MONTY MILES             | 1.95 2.00   |                             |           |
| BLUE THUNDER            | 3.95 4.50   | ALL BARRAGE AT          | 7.95 8.50   |                             |           |
| WAR OF THE WERLICE      | 3.95 4.50   | ALL INTERCEPTOR AT      | 7.95 8.50   |                             |           |
| TORNADO LOW LEVEL       | 3.95 4.50   | SOLO FLIGHT             | 14.95 15.50 |                             |           |
| TRAMMANN                | 3.95 4.50   | TRASHMAN 85             | 7.95 8.50   |                             |           |
| ALL WARRING             | 3.95 4.50   | TRASHMAN 84             | 7.95 8.50   |                             |           |
| POINTER PLUT            | 7.95 8.50   | VALHALLA 85             | 7.95 8.50   |                             |           |
| GET SET GO!             | 3.95 4.50   | VALHALLA 84             | 7.95 8.50   |                             |           |
| QUICKBOLA WILDS         | 9.95 10.50  | DEATHSTAR INTERCEPTOR   | 9.95 10.50  |                             |           |
| IF 85 TYPES ONLY        | 4.95 5.25   | EYE DEAD                | 7.95 8.50   |                             |           |
| PERFECTACROSS           | 9.95 10.50  |                         |             |                             |           |
| CAESAR THE CAT          | 9.95 10.50  |                         |             |                             |           |
| MELLOMINE               | 9.95 10.50  |                         |             |                             |           |
| WORLD CUP               | 12.95 13.50 |                         |             |                             |           |
| CLASSIC ADVENTURE       | 14.95 15.50 |                         |             |                             |           |
| VALHALLA                | 14.95 15.50 |                         |             |                             |           |
| FOOTBALL MANAGER        | 9.95 10.50  |                         |             |                             |           |
| POOKY                   | 14.95 15.50 |                         |             |                             |           |
| MURRIS                  | 14.95 15.50 |                         |             |                             |           |
| MONEY HOLE              | 14.95 15.50 |                         |             |                             |           |
| MARAC MIBER 85/84       | 9.95 10.50  |                         |             |                             |           |
| HALL THROTTLE           | 9.95 10.50  |                         |             |                             |           |
| MATCHPOINT              | 9.95 10.50  |                         |             |                             |           |
| OLYMPIAN                | 9.95 10.50  |                         |             |                             |           |



### COMMODORE 64

| NAME                    | APP PRICE   |
|-------------------------|-------------|
| SEATTLE 3000            | 4.95 5.25   |
| STRIP POKE              | 4.95 5.25   |
| BLACK HOLE              | 7.95 8.50   |
| RETRON 88               | 7.95 8.50   |
| ARTIC                   | 4.95 5.25   |
| AMBI                    | 4.95 5.25   |
| MRINDOCT                | 4.95 5.25   |
| YOBEL                   | 4.95 5.25   |
| TALES OF ARABIAN NIGHTS | 7.95 8.50   |
| ONLY THOMPSON DEATHWON  | 7.95 8.50   |
| LOOT                    | 7.95 8.50   |
| SEARCHHEAD              | 4.95 5.25   |
| ASTRO CHASE             | 4.95 5.25   |
| ALL LAMASOFT            | 9.95 10.50  |
| DEATHWON                | 4.95 5.25   |
| FLIP AND FLOP           | 4.95 5.25   |
| SCUBA DIVE              | 4.95 5.25   |
| PITFALL                 | 1.95 2.00   |
| MONTY MILES             | 1.95 2.00   |
| ALL BARRAGE AT          | 7.95 8.50   |
| ALL INTERCEPTOR AT      | 7.95 8.50   |
| SOLO FLIGHT             | 14.95 15.50 |
| TRASHMAN 85             | 7.95 8.50   |
| TRASHMAN 84             | 7.95 8.50   |
| VALHALLA 85             | 7.95 8.50   |
| VALHALLA 84             | 7.95 8.50   |
| DEATHSTAR INTERCEPTOR   | 9.95 10.50  |
| EYE DEAD                | 7.95 8.50   |

ALL PRICES INCLUDE P&P  
QUICKSHOT 2 ONLY £6.95  
CLUES PLEASE NOTE IF YOUR ORDER  
EXCEEDS £50 YOU GET  
10% FURTHER DISCOUNT  
SEND CHEQUE/PO TO  
GOODBYTE PCS  
84 LEATHER LANE, LONDON EC1  
PLEASE STATE WHICH MICRO

| SPECIAL OFFER          |           | SPECIAL OFFER               |           |
|------------------------|-----------|-----------------------------|-----------|
| NAME                   | APP PRICE | NAME                        | APP PRICE |
| SOFTWARE PACKAGE MONTH | 1.95 2.00 | AMPHIBIOUS TYPE BULLETPRICE | 1.95 2.00 |
| GAMESTORY 1/2/3/4      | 11.95     |                             |           |

| SPECIAL OFFER               |           |
|-----------------------------|-----------|
| NAME                        | APP PRICE |
| AMPHIBIOUS TYPE BULLETPRICE | 1.95 2.00 |
| GAMESTORY 1/2/3/4           | 11.95     |

| SPECIAL OFFER               |           |
|-----------------------------|-----------|
| NAME                        | APP PRICE |
| AMPHIBIOUS TYPE BULLETPRICE | 1.95 2.00 |
| GAMESTORY 1/2/3/4           | 11.95     |

# POPULAR Computing WEEKLY

## Back Issues

Almost all the copies of PCW that you missed can still be bought as back issues for only 50p, including postage and packing.  
An index of the contents of the 36 issues published in 1982 is now available from the Publishers for only £1.20. It includes full details of all the programs, routines, reviews and news that you might have missed.

Please send me the following back issues at 50p each:

\_\_\_\_\_ Total £ \_\_\_\_\_

Please send me a copy of the 1982 PCW Index at £1.20

I enclose a cheque postal order for £ \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

Please return to Back Issues, PCW, 12-13 Little Newport Street, London WC2R 3LD.

# Subscribe to Popular Computing Weekly

I would like to subscribe to Popular Computing Weekly.  
Please start my subscription from the \_\_\_\_\_ issue

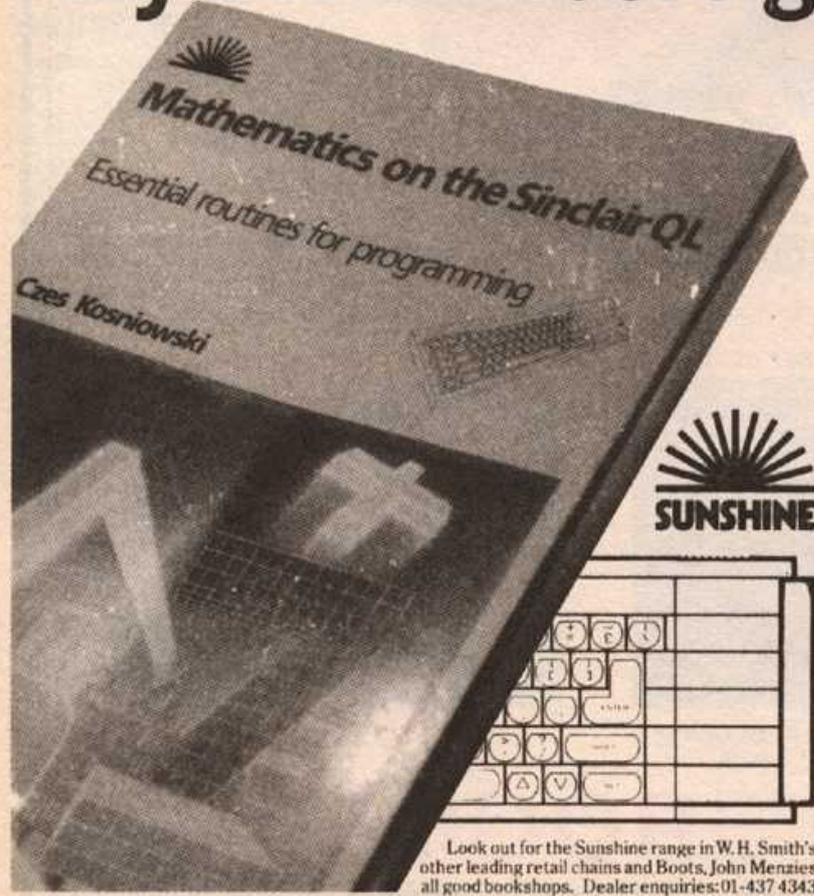
UK Addresses  26 issues at £18.70  52 issues at £19.95  
Overseas Addresses  26 issues at £18.70  52 issues at £37.40  
Please tick relevant box  
I enclose my cheque to Popular Computing Weekly for \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

Please send this form, and cheque, to Popular Computing Weekly, Subscription Dept, 12-13 Little Newport Street, London WC2R 3LD.

# Play the numbers game on your QL.



Here's all the help you need to make sense – and good use – of all the mathematical utilities on your Sinclair QL. You can make good use of QL maths to ease the writing of particularly difficult programs. You can develop encryption routines, you can define probabilities, and produce statistical analyses.

Czes Kosniowski's new book, written specifically for the Sinclair QL and its powerful microprocessor, explains all these maths features. It illustrates how to use them to your best advantage, usually with short programs that you can easily adapt and slot into your own routines. You'll also discover all you need to know about random and prime numbers, about arrays and matrices and trigonometry and logic.

There's a great deal of valuable information in this Sunshine book, all written to aid you to get a great deal out of your QL. Order a copy today from your local bookshop or computer dealer, or complete and send the order form.

Please send me Mathematics on the Sinclair QL at £8.95 plus 50p p&p.

I enclose a cheque for £ \_\_\_\_\_ payable to Sunshine Books.

I enclose a postal order for £ \_\_\_\_\_ payable to Sunshine Books.

Please charge my Visa/Access card No. \_\_\_\_\_ valid from \_\_\_\_\_ expires end: \_\_\_\_\_

Signed: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Send to: Sunshine Books, 12/13 Little Newport Street, London WC2R 3LD.

# Tony Bridge's Adventure Corner



## Alien teeth

**T**he Vic20 lives on. Despite the new machines arriving on the market, one of the oldest still has its devotees; one of which is Brenda Beresford of Tilehurst, Berkshire.

"My Vic20 is in need of your help — no, not with Scott Adams (I've solved all five and great they were). I'm stuck in *Arrow of Death Part 1*. In fact, everybody I've spoken to is having the same problem — how do you enter the Giant's building and live to carry on? *Nosferatu* from Terminal Software is also a problem — where is the key to the shed? I rate Scott Adams 10/10. *Rescue from the Castle Dread* (Terminal again) 10/10 (although there is no congratulatory message). *Magic Mirror* is also good. *The Colonel's House* is quite easy. *Curse of the Werewolf* is a pain from beginning to end, I hate random adventures. *Trader*, not hard but I enjoy the colour and very good graphics — shows what the Vic can do. About to tackle *The Golden Baton*."

And from Mr L J Wilson of Newcastle: "I've been stumped for over eight months in *Golden Baton* for my Vic20. How do I take the quartz from the magic room — typing *Help* reveals that "I need Magic", but I can't work out what this means. Wearing the helmet and waving the staff doesn't help. Any ideas? Incidentally, I noticed that Nick Walkland, in the Corner of 12-18 April had completed it, and I hope that, between you, you can give me some help. My adventuring to date: *Adventureland* — a good solid

adventure. *Golden Baton*, see above. *Arrow of Death Part 1* — stuck in the same place as Nick Walkland. *Into the Labyrinth* — can't get past the Hydra to get at Ankh (there are some nice touches in this adventure). *The Colonel's House* — a pleasant change from "heroic" adventures, but not difficult."

So, Brenda and Mr Wilson are having trouble with the same adventures, and are in agreement with others. Nick Walkland, mentioned last in that corner of 12-18 April, was stuck in *Arrow of Death*, but I have since heard from him that he has finished the adventure. So, Nick, let us all know the answer to this problem. In the meantime, he has also finished *The Golden Baton*, *Perseus and Andromeda*, *Wizard of Akryz*, the Level 9 adventures, *The Hobbit*, *Mountains of Ket* and *Temple of Vran*, *Urban Upstart* — quite a list there, which includes some of the real toughies. If you're stuck in these, Nick will gladly answer your queries — write to him at 84 Kendal Road, Hillsborough, Sheffield, Yorkshire, including an SAE.

Staying with the Vic20, Gwynne and Ian Harper (of 97 Vivian Road, Sketty, Swansea West Glamorgan SA2 0YN) have some more questions about adventures that they are playing on their Vic — but first, a critical list of adventures they have completed: "*Wizard and the Princess*" (unexpanded, Melbourne House): 4/10 — not really an adventure, and it shows. Reasonable graphics, and a good 3D maze, but otherwise poor. *The Dungeons* (16K, Anirog): 4/10 — again, good graphics, but you merely wander about a maze killing randomly-placed monsters. If you reach the finish before you die of boredom, then you are greeted with the prompt "Congratulations — now load *The Dark Dungeons*." There's nothing else on the tape, but an Anirog advert shows that *The Dark Dungeons* is now sold separately. *Alien* (8K, Mac) 7/10: This is more like it, although it is not a true adventure. True to the film, though — graphics are good, and careful strategy is needed to avoid being caught by the alien in a dead end. Your death, at the teeth of the alien, is entertaining. The instructions (all 8K of them!) are an experience in themselves.

"*Zok's Kingdom* (16K, Anirog) 7/10: This one needs lateral thinking and fast reactions — the graphics are neat and well done.

"*Quest of Merravid* (19K, Martech) 4/10: took us 45 minutes to do! It creates a nice

atmosphere occasionally, but this doesn't make up for the lack of any real puzzles. *Into the Labyrinth* (16K, Abacus) 7/10: Many puzzles, quite hard unless you think logically. We didn't like the *Help* command — they weren't cryptic clues as befit an adventure, but, rather, step-by-step instructions. *Rescue from Castle Dread* (16K, Terminal) 8/10: An excellent adventure. It has an extensive map when completed, and it took the creative talents of both my brother and I to finish it. Marilyn Boyce (The Corner, 31 May) should take the talisman with her in the balloon, as it is used to bribe the demon (you can only carry one thing in the balloon, or you'll lose high and crash!). To get past the warrior (same issue, G Shaw) is a long-winded affair." [I suggest you try writing to the Messrs Harper — see their address above].

"*The Pyramid* (8K, Mogul) 8/10: Considering that it is for the smaller memory, very good indeed. Some of the locations are very difficult, and there are several odd inhabitants, like an aardvark (they like Ants!) and a mummy (any D&D fan knows that you have to burn them). Also, put objects in your knapsack, you can then carry up to nine.

"*Hitchhiker's Guide to the Galaxy* (16K, Supersoft) 9/10: Superb! This was written for the Pet, but we converted it to run on our Vic20, so I suppose it counts. This was our first adventure, and to my mind nothing else comes close.

"Of the Scott Adams', we've completed *Pirate Cove* (the most fun), *Mission Impossible* (the easiest) and *The Count* (the hardest). We are now in the process of doing *Four Gates to Freedom* and can supply the loader code as well as various clues.

"Now, are there any versions of the Classic Adventure for the Vic? If *Pimania* fits on a 16K ZX81, why not a Vic? What about Brian Howarth's adventures?"

Thanks for a very interesting letter, Harpers. I hope you don't mind your address being broadcast! If anyone wishes to write — please include a SAE.

To answer those last questions — no, I don't think there is a version of Classic Adventure available for the Vic; is *Pimania* actually available for the ZX81? Anyway, Automania seems only to be interested in Sinclair machines (with the occasional foray into Dragonland); Howarth's *Mysterious Adventures* are, I'm afraid, not available for the Vic.

## Adventure Helpline

Going bananas? If you are stuck in an Adventure with nowhere to turn do not despair — help is at hand.

Fill in the coupon, explaining your problem,

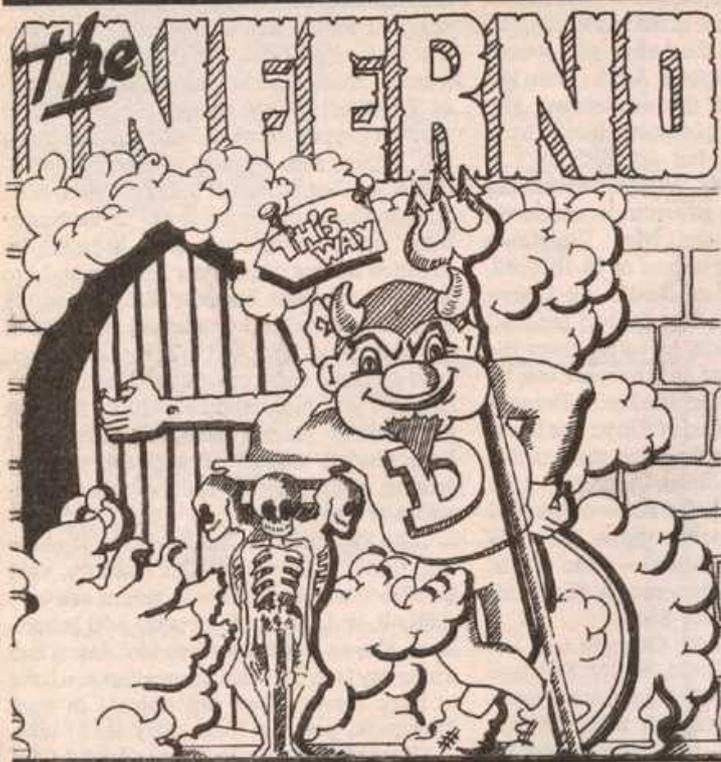
Adventure Problem ..... on (micro) .....  
Name .....  
Address .....

send it to us, and a fellow adventurer may be able to help.

Remember — the system only works if those adventurers who have solved the puzzles get in touch. Every week is Save An Adventurer Today (SAAT) week!

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So, if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further write to: Tony Bridge, Adventure Corner, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.

... NOW AVAILABLE ...  
... NOW AVAILABLE ...



**RICHARD SHEPHERD SOFTWARE**

**THE MEGASAVE FANTASTIC SAVINGS**

| SPECTRUM             | SPECTRUM          | PITFALL           |
|----------------------|-------------------|-------------------|
| BEACH HEAD AVAILABLE | BLUE THUNDER      | JACK/BEANSTALK    |
| BEACH HEAD NOW       | GIANTS REVENGE    | QUO VADIS         |
| 6.85                 | CODE NAME MAT     | MONTY MOLE        |
| SABLE WULF           | MICRO OLYMPICS    | ZAXXON            |
| 6.30                 | WHITE LIGHTNING   | SPITFIRE ACE      |
| PSYTRON              | FRANK N. STEIN    | NATO COMMANDER    |
| 5.95                 | WORLD CUP F'BALL  | S-15 STRIKE EAGLE |
| JACK & BEANSTALK     | FULL THROTTLE     | P.C. FUZZ         |
| 4.95                 | QUILL             | ZARGA MISSION     |
| FIGHTER PILOT        | FACTORY BREAKOUT  | CATACOMBS         |
| 6.25                 | PSYTRAXX          | HIGH NOON         |
| TORNADO LOW LEVEL    | 3D LUNAR ATTACK   | FALCON PATROL II  |
| 4.75                 | WORST T.H. AT SEA | BATTLE FOR MIDWAY |
| MISSION I            | STOP THE EXPRESS  | STRIP POKER       |
| 6.85                 | MATCH POINT       | ASTRO CHASE       |
| LORDS OF MIDNIGHT    | 3D TANK DUEL      |                   |
| 8.50                 | CURRAH SPEECH     |                   |
| KOSMIC KANGA         |                   |                   |
| 4.95                 |                   |                   |
| MONTY MOLE           |                   |                   |
| 5.85                 |                   |                   |
| AD ASTRA             |                   |                   |
| 5.85                 |                   |                   |
| NIGHT GUNNER         |                   |                   |
| 5.75                 |                   |                   |
| TRASHMAN             |                   |                   |
| 4.75                 |                   |                   |
| MOON ALERT           |                   |                   |
| 4.95                 |                   |                   |
| ANTICS               |                   |                   |
| 5.75                 |                   |                   |
| DECATHLON (DALEYS)   |                   |                   |
| 5.85                 |                   |                   |
| CAVELON              |                   |                   |
| 4.95                 |                   |                   |
| RAPSCALLION          |                   |                   |
| 5.85                 |                   |                   |
| AUTOMANIA            |                   |                   |
| 5.75                 |                   |                   |
| STAR TRADER          |                   |                   |
| 5.85                 |                   |                   |

FREE POST PLEASE STATE WHICH MICRO FAST SERVICE SEND CHEQUE/P.O. TO:

**MEGASAVE Dept 1, 76 Westbourne Terrace, London W2**

**PRINTER BARGAINS**

JUST PLUG IN AND GO

INTERFACE/CABLE VAT & CARR. INCLUDED

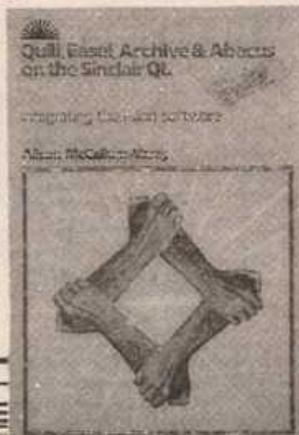
|                                                    | QL  | BBC Spec | Vic     |
|----------------------------------------------------|-----|----------|---------|
| Seikosha GP50A/S 40cps 40 column                   | 129 | 109      | 99 135  |
| Seikosha GP100A/AS/VC 30-50cps                     | 169 | 169      | 169 145 |
| Seikosha GP500A 50cps Graphics                     | 199 | 178      | 199 205 |
| Seikosha GP250X 50cps Para & Ser                   | 215 | 215      | 215 245 |
| Seikosha GP550A 50cps Correspondence               | 247 | 229      | 247 255 |
| Seikosha GP700A 7 Colour 50cps                     | 365 | 347      | 365 370 |
| Shinwa... CP80 80cps Friction/Tract                | 225 | 208      | 225 235 |
| Canon... PW1080A 160cps-Draft 27cps-NLQ            | 339 | 325      | 339 348 |
| Epson... RX80T 80cps Traction                      | 269 | 257      | 269 288 |
| Epson... RX80FT 80cps Friction/Traction            | 299 | 287      | 299 309 |
| Daisy step 2000 18 CPS Daisy Wheel                 | 275 | 255      | 275 285 |
| Interface/cable Miracle Syst. Etc.                 | 39  | 12       | 39 45   |
| Monitors Phillips V7801 - E92 Fidelity CM14 - £219 |     |          |         |
| GP700A (Demo models)                               |     |          |         |
| 2 only, 12 months guarantee                        | 290 | 275      | 290 299 |

**STRONG COMPUTER SYSTEMS**

Bryn Cottage, Peniel, Carmarthen, Dyfed  
Telephone: 0267 231246 for full price list & specs.

You've got your QL hardware. You've got your Psion software.

Now get your Sunshine book.



Just released from Sunshine is the latest book from the highly acclaimed QL Classics series - and it's called *Quill, Easel, Archive & Abacus on the Sinclair QL*. All these packages, which are included with every QL sold, are recognised as powerful in their own right, but when working together with one another, they become highly effective problem-solving tools for business.

Alison McCallum-Varey's book introduces you to all the four packages, but, most importantly, shows you exactly how to run them as a complete system. This book, essential for every QL Owner, will expand the day-to-day use of your QL, letting you run Quill and Archive in tandem for instance, and then outputting the results for graphic interpretation by the Easel package. If you've Quill, Easel, Archive and Abacus on your Sinclair QL, then you need *Quill, Easel, Archive and Abacus on the Sinclair QL*.

Please send me *Quill, Easel, Archive & Abacus on the Sinclair QL* at £5.95 plus 50p p&gp. I enclose a cheque/postal order for £

payable to Sunshine Books.

Please charge my Visa/Access card No.

valid from \_\_\_\_\_ expires end \_\_\_\_\_

Signed: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Send to: Sunshine Books, 12 Little Newport Street, London WC2R 3LJ. Look out for the Sunshine range in W.H. Smith's, Boots, John Menzies, other leading retail chains and all good bookshops. Dealer enquiries: 01-437 4341.

# SYSTEM 15000

*THE REAL TIME GAME*

*BEAT IT !!*

**SYSTEM 15000** The different game with the **NEW "TOTAL REALISM"** concept developed by **AVS** sets you firmly in the middle of an International conspiracy where you have to use your computer together with **SYSTEM 15000** to recover **\$1,500,000**. The game is a 'real time' investigation that realistically captures the excitement of accessing computers by telephone and breaking their codes to obtain vital information.

**AVAILABLE NOW — CBM 64-BBC B SPECTRUM 48k**

Also available — The No. 1 chart success **FLIGHT ZERO-ONE FIVE (VIC20)** and the Helicopter Action Game — **WHIRLWIND ONE-FIVE (VIC 20)**

---

---

**CRAIG COMMUNICATIONS**

---

---

P.O. BOX 46 BASINGSTOKE HANTS RG21 1HA PHONE 0256-55462

TELEX 86736 SOTEX G (CRAIG COMMUNICATIONS)



AND LEADING COMPUTER  
STORES

2<sup>ND</sup> EDITION



NOW  
3RD  
GREAT  
YEAR!

# HIRE SPECTRUM 2X81 and COMMODORE 64 TAPES

**HUGE RANGE!**

ADVENTURE  
GAMES  
ARCADE and  
SIMULATION GAMES  
BUSINESS  
and PRACTICAL  
PROGRAMS  
UTILITIES  
M/C COMPILERS  
EDUCATIONAL  
FROM OVER  
60 TOP SUPPLIERS

**SPECIAL OFFER!**  
YOUR FIRST TWO  
TAPES FREE

IF YOU USE THIS COUPON!  
or send £1 for magazine & details.  
Props: ALEC FRY ARPS, FRSA and  
ERNA FRY, BA

**FREE**

ILLUSTRATED  
QUARTERLY  
MAGAZINE WITH  
TIPS, NEWS,  
REVIEWS,  
DISCOUNT OFFERS

**LIFE  
MEMBERSHIP**  
£5.00  
TAPE HIRE FROM  
50P  
INCLUDING VAT

OVER  
3,000  
DELIGHTED MEMBERS!

■ The first true software library to be set up in the world—and still the largest ■ Unrivaled tape stock, as you'd expect from our head start ■ Run by a 16-bit computer (2 million bytes of program and data on disk!) with the help of six less able but more friendly mere humans! ■ Often imitated (sometimes almost to the letter—flattery indeed!) but never equalled ■ Friendly, helpful service—at the end of a phone if needed ■ Free membership of our Discount Club: pounds off peripherals and top-of-the-chart tapes ■ Any loading problems (rare!) automatically credited ■ Shop now open (next to Post Office) for rental and discount sales of tapes and peripherals ■ Branches throughout the world ■ No complicated schemes, no commitment to quantity—rent what and when you like ■ Printed, illustrated magazine "Computerchat" packs in more than any mere typed newsletter ■ Keenest-ever rates ■ ACCESS holders can join by telephone on 0730 892732 ■ NO RIVAL can offer all this....

To: SOFTWARE LIBRARY, Farnham Road, West Liss, Hants GU33 6JU.

NAME..... Machine.....  
ADDRESS.....

THE  
ORIGINAL  
SOFTWARE  
LIBRARY!

Special offer from this issue: LIFE MEMBERSHIP £5

(normally £9.50). Overseas (Europe only) £10, or join local branch in W. Germany, France, Holland, Belgium, Scandinavia, South Africa, Ireland—send Int. Reply Coupon and we'll forward your enquiry. All software supplied with publishers permission.



## HIGH SPEED

**commodore**

COMMODORE 64 owners, at last the long wait is over — FASTBACK allows multipart software to load around ten times faster and run independently of the utility. For example 'The Hobbit' loads in 150 seconds with FASTBACK.

Supplied on tape with full instructions  
ONLY £9.95

**AMSTRAD**

SPEEDMASTER is here. Allows choice of save speed. Approx. 2 x faster.

ONLY £7.95

## TAPE TO DISK TRANSFER UTILITIES

Transfer games etc. to disk. Supplied on tape with full instructions for:—

BBC ..... £9.95

ATARI (All models) ..... £9.95

COMMODORE 64  
NEW IMPROVED VERSION DISCO

No user knowledge required.  
We guarantee this is the best available. **Still only £9.95**

All prices include VAT,  
Post & Packing. Cheques, P.O.  
or Phone your Card Number to:

## EVESHAM MICRO CENTRE

Bridge St, Evesham, Worcestershire  
Tel: 0386 49641

NEW SHOP NOW OPEN - Micro Centre,  
1756 Pershore Rd, Cotteridge, Birmingham Tel: 021-458 4564

TRADE AND OVERSEAS ORDERS WELCOME

## The name of the Game...



..IS COMING!

## MELLOW SOFT

48K Educational/Family Software for the

## ORIC-1 & ATMOS

Can you count? £3.95

3 very colourful screens full of things for young children to count

Can you spell? £3.95

The program called "superb" by PCN and "great fun" by this magazine, for children aged 3-8

Launch pack only 50p

A sample demo tape containing scenes from all these programs  
Look before you buy!

Plus:-

Spell-a-rhyme for young kids  
Tables Test for all ages  
Play Maths for ages 4-10  
Hangman for all ages

MELLOWSOFT

23 Dalford Court, Hollinswood, Telford, Shropshire

# 3D COMPUTERS

THE HOME COMPUTER SPECIALISTS

## SEPTEMBER BARGAINS

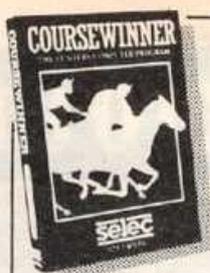
**BBC MODEL B  
WITH 5 SOFTWARE  
CASSETTES  
£345.00 INC. VAT**

**ACORN ELECTRON,  
WITH PLUS 1  
INTERFACE  
£229.00 INC VAT**

230 TOLWORTH RISE SOUTH  
TOLWORTH  
SURREY  
KT5 9NB



TEL: 01-337 4317



## COURSEWINNER

The Punters Computer Program

COURSEWINNER allows you to use the power of your computer to get the edge on the bookmaker.

- COURSEWINNER contains a database full of detailed information on all English and Scottish flat courses. The ten leading jockeys and trainers, and effect of the draw is detailed for each course.

This information can be displayed on the screen at any time.

- The program analyses these factors combined with the results of the last three outings, starting price and weight carried.

- COURSEWINNER is simple and quick to use, yet very powerful.
- Boxed with detailed instruction booklet.

**Price £12.50 all inclusive** IMMEDIATE DISPATCH (RETURN OF POST)

Available for:

SPECTRUM (48K), BBC (B), COMMODORE 64, DRAGON, APPLE II/IIe, ATARI (48K).

## POOLSWINNER

The Ultimate Pools Prediction Program

- POOLSWINNER is the most sophisticated pools prediction aid ever produced. It comes complete with its own massive database.
- Can be used for Scoredraws, Draws, Aways and Homes.
- The database contains over 20000 matches (10 years league football). It updates automatically as results come in.
- The precise prediction formula can be set by the user. This allows development of your own unique method.
- Package is complete with program, database and detailed instruction booklet.

**Price £15.00 all inclusive** IMMEDIATE DISPATCH (RETURN OF POST)

Available for: SPECTRUM (48K), ZX81 (16K), BBC (B), COMMODORE 64, DRAGON, APPLE II/IIe, ATARI (48K).

Available from dealers or direct (return of post) from:

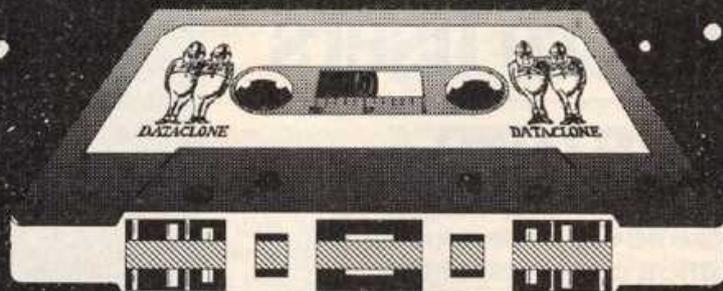


# selec

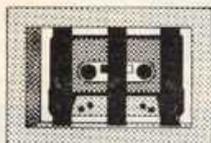
SOFTWARE



37 Councillor Lane, Cheadle, Cheshire. Phone: 061-428 7425



## AN IMPORTANT ADVANCE IN DATA DUPLICATION



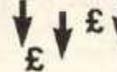
### Added security against pirates

Power Load is a software controlled system that makes copying extremely difficult, either by audio or bit copying, or by code breaking. Moreover, conversion routines are **altered regularly**, so no permanent deciphering system can be successful.



### Very fast loading

Loading time on the Commodore C64 is over three times faster than a normal cassette; Sinclair Spectrum is over twice as fast.



### Reduces costs

Using Power Load, a Commodore C64 cassette can be reduced from C30 length to C10 – a substantial cost saving. Available for C64; Spectrum. (BBC and Electron under development).



DATACLONE

The Specialists in Software Duplication

DATACLONE, Unit 1, Roslin Square, Roslin Road,  
London W3 8DH. Tel: 01-993 2134. Telex: 21879.

Licensed exclusively to  
DataClone by Incentive  
Software Ltd.

# For BBC Micro and Electron Users

## functional forth for the BBC computer

Understand your computer through Forth

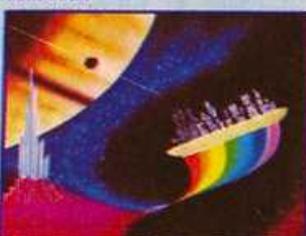
boris allan



## graphic art for the BBC computer

turtle graphics and art

boris allan



## programming for education on the BBC computer

a handbook for primary education

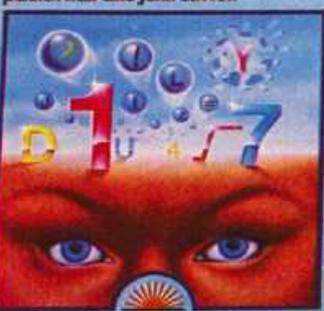
john scivven and patrick hall



## programming for education on the electron computer

a handbook for primary education

patrick hall and john scivven



## DIY robotics and sensors with the BBC computer

practical projects for control applications

john billingsley



## making music on the BBC computer

a musician's guide to programming

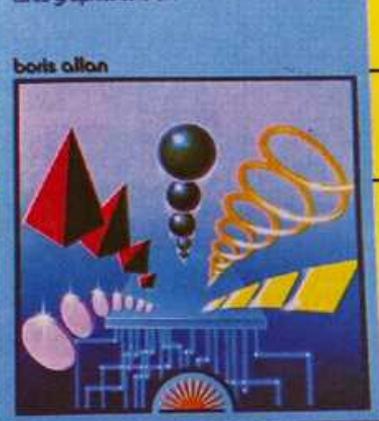
ian wough



## graphic art for the electron computer

turtle graphics and art

boris allan



## They turn micro users into big operators.

Sunshine's great books for the BBC and Electron help you make your favourite micro into a mighty machine.

Read, and discover how to program, to create music, to draw graphics, to do maths, to produce robots and even how to give your micro artificial intelligence.

Sunshine's best-sellers are at all good bookshops now. Or order, using the coupon here. And transform you, and your micro, into something special.

## Sunshine books Direct Order Form

### Books for the BBC Micro

|                           |       |
|---------------------------|-------|
| Functional Forth          | £5.95 |
| Graphic Art               | £5.95 |
| Programming for Education | £5.95 |
| DIY Robotics and Sensors  | £6.95 |
| Making Music              | £5.95 |

### Electron Books

|                           |       |
|---------------------------|-------|
| Programming for Education | £5.95 |
| Graphic Art               | £5.95 |
| The Working Electron      | £5.95 |

### BBC Micro & Electron books

|                         |       |
|-------------------------|-------|
| Artificial Intelligence | £6.95 |
| Essential Maths         | £5.95 |

Send to: Sunshine Books, 12/13 Little Newport Street, London WC2R 3LD

Please send me the following books:

Book \_\_\_\_\_

Book \_\_\_\_\_

Book \_\_\_\_\_

I enclose a cheque for £ \_\_\_\_\_ payable to Sunshine Books.

I enclose a postal order for £ \_\_\_\_\_ payable to Sunshine Books.

Please charge my Visa/Access card No. \_\_\_\_\_ Valid from \_\_\_\_\_ expires end \_\_\_\_\_

Signed \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

Look out for the Sunshine range in W.H. Smith's, Boots, John Menzies, other leading retail chains and all good bookshops. Dealer enquiries: 01-437 4343



## File creation

Glen Pearsons of Redditch Worcs, writes:

**Q** I own a Vic20 and recently have transferred all my names, addresses and telephone numbers on to computer tape. The program I used for this is the example in the manual, suitably amended.

My question is, how do you create a file which you can write to at any time? By this, I mean write to it without having to type in all the information that was previously stored on the tape?

**A** As you have discovered, cassette tape is not a suitable medium for the handling of filed data. In order to update your file it will be necessary for you to read it in to your program first, make the necessary insertions, amendments or deletions, and then write the whole thing back to cassette. Normally a different cassette is used, so that if a tape error occurs you don't actually lose everything.

## Statement lost

T M Birkett, Blackpool, writes:

**Q** I require help on two recent games published in your magazine. In *Gone Fishing* (vol 3 No 22), after entering the first three lines and RUN, I get the error 'Statement Lost' every time.

In *Cobra* (vol 3 No 24) after entering the four lines in program 1 and Running, I am unable to input the data in a way the computer will accept. Can you help?

**A** REM statement in line 1 (of *Gone Fishing*) must be typed in exactly as it appears in the listing, or at least contain 25 or more characters. This is because the machine code statements (in the DATA statement on line 3) are *Poked* into the REM. If the REM statement has less than 25 characters in it, when line 2 is executed it is corrupted by the *Poke* it contains.

In *Cobra*, the instructions given are not very clear. What you should do is type in program 1 (four lines), Run it, and each time you are prompted for 'data' enter the next number in the list above. Eg, the first 10 numbers you should type in are: 60 60 60 60 60 60 60 33 33 (first 8 from line A =, last two from line B =).

You will have to continue entering the data in this way, one number at a time, until the program stops prompting. You should then Save your graphic characters, by *SAVE "udg" CODE USR "A", 168*. You can then type in the main program (without *Newing*) and run by using *GOTO 9998*.

## Copy onto cartridge

R M Jones of Yelverton, Devon, writes:

**Q** I feel, in common with others an urgent need for Microdrive versions of Spectrum machine code programs. Is it not possible for us to be given the necessary instructions to copy on to cartridge ourselves; I want to load *Vu-File* on to Microdrive.

I require to file statistics on staff daily for a month, and need to use an array of  $x(31,25,12)$ . This statement is promptly thrown out on the grounds of insufficient memory. How can this be overcome?

**A** I agree with you that means should be provided to enable Spectrum owners who have microdrives to put all their software onto microdrive cartridges. Unfortunately, these facilities are not being made available. Also, a lot of Spectrum software (*Vu-*

*File* included) is incompatible with microdrives because of the memory locations they use. Short of rewriting these programs there is nothing you can do.

It is difficult to make constructive suggestions regarding your array problem, as I don't know what the subscripting represents. One possibility that comes to mind is that you file your statistics on a daily, rather than monthly basis. (I guess that is the significance of the subscript 31).

If you think of it, an array of the size you require would occupy 93,000 bytes. The equivalent array in character form would only take 9,300 bytes (Spectrum numbers are stored in floating point form). If you, therefore, stored your data in character form and converted it to numeric form when you wanted to use it (using *Vals*), you might be able to squeeze your program in.

## Saving to tape

B C Wartier of Christchurch, Dorset, writes:

**Q** I have a CBM 64 computer and have been experimenting via a Data statement. I can remove all the Basic statements, leaving just the machine code in memory, but I cannot find any means of saving the machine code to tape. Can you advise me please?

My second question concerns the use of memory limitation to protect user defined graphics from being overwritten. Many writers use *Poke 52,48:Poke 56, 48* which immediately sets the upper limit of memory available to Basic to 12288. Why should this very high amount of memory be lost to me?

**A** A fairly simple way to save machine code programs on the CBM is to use the

following direct commands:

```
PRINT (start address/256 - INT (start address/256))*256
PRINT (INT(start address/256))
PRINT (end address/256 - INT (end address/256))*256
PRINT (INT(end address/256))
```

We can now enter:

```
POKE 43,v1: POKE 44,v2: POKE 45,v3:
POKE 46,v4:
SAVE "program name", L1
```

The values for v1,v2,v3 and v4 are obtained from the four print statements.

The reason that location 12288 decimal is normally used as the start address for UDG's is due to the fact that the Vic chip can only access 16K at any one time (of memory that is). Thus, if you located your UDG's higher up in memory, you would have problems in accessing them.

## Pixel by pixel

Howard Jones of Bracknell, Berkshire, writes:

**Q** I am writing to ask if you know of a sideways scroll routine which scrolls the bottom two thirds of the screen pixel by pixel. I am only just starting in machine code so I could not write such a routine myself. Also, can you recommend a book for arcade game programming which covers sound, graphics, special effects, etc?

**A** Unfortunately, you have forgotten to tell me which machine you have, so all I can do is list a few books which cover the subjects you mention.

*Supercharge Your Spectrum*, published by Melbourne House. *Advanced Graphics with the BBC Microcomputer*, published by MacMillan. *Commodore 64 Sound and Graphics*, published by Melbourne House, and *Sprites and Sound on the Commodore 64*, published by Duckworth.

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Phil Rogers and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke, PCW, 12-13 Little Newport Street, London WC2R 3LD*

# CLASSIFIED

Semi-display — £6 per single column  
Lineage — 25p per word

CALL DIANE DAVIS ON 01-437 4343 FOR SEMI/DISPLAY ADVERTISING

## FOR HIRE

**TO HIRE** a computer from Spectrum 48K upwards, please phone or write to Business & Computer Services, 294a Caledonian Road, London N1 1BA. Tel: 01-607 0157.

## WANTED

**FAIR DEAL?** Why accept a relatively small sum for a program that might earn you many thousands of pounds. We pay high royalties. You retain copyright! We give free appraisal and marketing assistance. Don't hesitate! Send tape and instructions to: 4th DIMENSION, Unit 4, 4th Avenue, Bluebridge, Halstead, Essex.

## VISIONARY VOLTAGE

Requires M/C arcade and adventure game program for Commodore 64, VIC 20, Spectrum and BBC Electron. Also programmers capable of translating between the above (based in London Area/Midlands.) Please send cassettes with loading instructions, and details to:  
**Visionary Voltage**  
34, Bendemeer Rd,  
Putney  
London SW 15



is seeking authors for new titles to add to its highly original and successful book range. Experienced and first time authors are invited to submit manuscript, ideas or fields of interest. Full details of what we can offer from David Lawrence, Book Editor, Sunshine, 12-13 Little Newport Street, London WC2R 3LD.  
Sunshine Publishers of Popular Computing and Dragon User.

## CLASSIFIED ADVERTISING RATES:

Line by line: 25p per word, minimum 20 words.

**Semi-display:** £6 per single column centimetre, minimum length 2 cm. (Please supply A/W as PMT. Or supply rough setting instructions.)

**Conditions:** All copy for Classified section must be pre-paid. Copy date 7 days before publication.

If you wish to discuss your ad, PLEASE RING Diane Davis 01-437 4343.

## WANTED

Second hand Spectrums and Commodore 64's — 10% discount on all 48K Spectrums in July and August only.

**NEWELL DATA SERVICES LTD.,**  
114, Fortress Rd.,  
London NW5.  
01-267 9037

## BBC and ELECTRON PROGRAMS WANTED

I will give you royalties and initial payment for your marketable and original programs for BBC or ELECTRON.

I am particularly interested in marketing your educational, business or games programs. Send your program or description for confidential evaluation or advice to—

### WILLOW SOFTWARE

The Willows, Wrington Lane, Congresbury,  
BRISTOL BS18 5BQ

## AGENTS WANTED

To supply hardware/software to clubs, homes, schools, etc. up to 25% commission. £20.00 worth of free software with your first accepted order.

Send for details to Home Base Micro Supplies: 4 Queenswood Avenue, Northampton.

## MAGAZINES



## DRAGON USER

To make the most of your Dragon you need **Dragon User** — the independent magazine for Dragon owners. To make sure that you receive a copy of Dragon User regularly subscribe direct to us. A year's subscription costs £10 for 12 issues (overseas rates available on application). Send a cheque or postal order made payable to Dragon user, and accompanied by your name and address, to Dragon User, Subscription Department, Oakfield House, Perymount Road, Haywards Heath, Sussex. RH16 3DH.

## SOFTWARE

### SAVERS

**COMPUTER COMMUNICATION (UK) Ltd.**  
9 Martins Close, Blackwater,  
Camberley, Surrey. GU17 0AH.

|                |       |       |
|----------------|-------|-------|
| MATCH POINT    | Spec  | £6.90 |
| SABRE WOLF     | Spec  | £7.99 |
| ALTO MANIA     | Spec  | £8.25 |
| CHEQUERED FLAG | Spec  | £8.20 |
| CRAZY KONG     | Vic20 | £5.35 |
| CHARIOT RACE   | Vic20 | £5.90 |
| BEACHHEAD      | CBM64 | £7.99 |
| MANIC MINER    | CBM64 | £8.85 |

SAE for lists of all MicroSoftware Books, Peripherals, State Micro.

**HOTLINE for ORDERS 0276 33852.**

## SPORTING FORECASTS PROGRAMS

by Professor Frank George for Commodore 64, BBC, Electron, Spectrum, Dragon. Football Forecast, Poolperm and Horse Forecast now available. Details from Poringware, PO Box 161, Brundall, Norwich.

## UNIT TRUST INVESTORS 48K SPECTRUM PROGRAM

Review, update, analyse your holdings. Printer and Microdrive options. £12 inc. p&p SAE for details  
**Michael Slatford Software,**  
Dept. PCW, 3 Campden Road,  
South Croydon, Surrey, CR2 7EQ

## JOYSTICK ART

A multi-coloured drawing program for Commodore 64. Turn your Joystick into a high-res graphics pen. Create pictures & games background to match your imagination. Save and use them in your own Basic programs. Circles, squares, triangles, lines, letters, fill, erase, freehand, and more.  
On Cassette £8.95  
Cheques/p.o. to:  
**INNAH, 1 Lynton Close**  
Woodley, Reading,  
Berks RG5 3SF

## SPORTING FORECASTS PROGRAMS

by Professor Frank George for Commodore 64, BBC, Electron, Spectrum, Dragon. Football Forecast, Poolperm and Horse Forecast now available. Details from Poringware, PO Box 161, Brundall, Norwich.

**48K SPECTRUM:** Two massive M/C adventures, plus three original M/C hi-res Arcade games. £3.99. D. Booth, 31, Parliament Street, Bury, Lancs. **CBM 64 S/W** to swap: Many titles (originals). Tel. 01-302 0531 between 7-9 pm.

**GAMES, UTILITY & EDUCATIONAL SOFTWARE** — Large range for BBC, Dragon, Commodore, Spectrum etc. at low prices. SAE for details. Dineley Computer Services, 39 Bankier Road, Banknock, Stirlingshire, FK 4 1JT.

**SPRITE MAGIC** for Dragon 32 £10.00 also other software (some half price). Write N.J. Macarthur, Middleton P.O. Isle of Tiree, Argyll PA77 6XH.

**'O' LEVEL** technical drawing. Ten 16K programs on one cassette. For any Spectrum £5. Clarke, 37 Arundel Close, New Milton, Hants BH24 5UH.

## COURSES

**PRACTICAL COMPUTING SERIES OF 1 DAY COURSES**  
Beginners; Business applications; programming. £25 per day (lunch inc.)

**DETAILS**  
**COMPUTER WORKSHOP**  
TEL: 01-778 9080

## COMPUTER COURSES

**TAKE A MICRO-BREAK AND COME TO BOURNEMOUTH**  
Mid week and weekend courses from beginners to advanced basic, M/C code and assembler courses available on request maximum 16 persons per course. Commodore 64's and BBC 'B's used or bring your own micro and we will adapt our courses to your machine.  
for further info write to:  
**THE MICRO-LEARNING CENTRE**  
Saint John's Lodge Hotel,  
10, Saint Swithin's Rd. South,  
Bournemouth.  
TEL: (0202) 290677

# Here's my classified ad.

(Please write your copy in capital letters on the lines below.)

|  |  |  |  |
|--|--|--|--|
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Please continue on a separate sheet of paper

I make this ..... words, at ..... per word so I owe you £ .....

Name .....

Address .....

Telephone .....

Please cut out and send this form to: Classified Department, Popular Computing Weekly,  
12-13 Little Newport Street, London WC2R 3LD.

## UTILITIES

**BBC 'B'** with prism modern micronet rom, speech synthesiser, lightpen and interface, opus, 100K disk and many games. Worth £1,000. Offers or swap. Tel: 061-224 1888 (eves).

## JOYSTICKS FOR QL

Plugs straight into control port 1 or 2. **NO INTERFACE REQUIRED.** £7.99 each or 2 for £15.00. Add 50p p&p.  
**QL DISASSEMBLER** £14.95 (inc. p&p).

**COMPUTER SUPPLIES,**  
 146, CHURCH Rd, BOSTON,  
 Lincs. PE21 0JX



## ARROW MICRO SERVICES

20 Portmeadow Walk  
 London SE2

**ARROW TRANSFER**  
 Transfer your favourite games to disk both multi part and Audio Runs, works with most software. £7.00

**ARROW DISK-DOCTOR**  
 Now you can recover scratched files easily, edit any byte on any block in Hex or Alpha, alter programs, edit the directory, format disks... £9.00

**ARROW MICRO SERVICES**  
 - Commodore 64 -

**ARROW TURBO-SAVER**  
 Fed up with waiting for those programs to load. Well you need Turbo-Saver, easy to use and faster than the 1541 disk drive, programs reload independent of Turbo-saver. £7.00

**ARROW DISKOPY**  
 This selective disk copier will copy both PRG and SEQ files faster than 1541 back-up and you don't need to copy all the disk, very user friendly and easy to use. £7.00

## SOFTCELL'S DISCO

For the Commodore 64

This is the most powerful tape to disc transfer utility you can buy. No program rewriting is necessary! Why put up with second best? A must for all 1541 disc owners.

Only £9.95 and 50p p&p

Available from:

**THE SIX-FOUR SUPPLIES CO**  
 PO Box 19  
 Whitstable, Kent  
 CT5 1TJ

ACCESS/BARCLAY CARD ORDERS on:  
 (0277) 266289

## UTILITIES

Several utilities for the Q.L. including multi format, single/multi file copy, selective save & more. Also includes the following procedures suitable for use as boot programs: 69 file directory (also displays K free on cartridge), easy load/delete & clock set. All this for only £12.50 (or £7 if you send your own cartridge). From...

P. Sykes, 40 Grange Rd.,  
 Thornaby, Cleveland TS17 6LU  
 (Tel: 0642-612187)

**AMSTRAD synthesiser.** Amatrud CPC464 sixteen mode synthesiser program. Only £2.50 including p&p. Cheques to J. Fawbert, 70 Park Avenue, Shoreham, Sussex.

## Q.L. UTILITIES

4 programs on microdrive for Sinclair Q.L. to prevent D.I.Rectory overflowing the screen, provide single key L.O.A.Ding or D.E.L.E.T.ing of files, repeat F.O.R.M.A.T.ing of cartridges and back-up C.O.P.Y.ing of whole or part of a cartridge. £10 from:

**W.D. SOFTWARE**  
 Hilltop,  
 St. Mary,  
 Jersey,  
 Channel Islands  
 Tel: (0534) 81392.

## ACCESSORIES

### BLANK CASSETTES

10 C10'S for £3.65: 100 for £23.00  
 10 C20's for £4.00: 100 for £25.00  
**FULLY GUARANTEED.** Inc. P&P  
 C.O.D. add 65p. Immediate Despatch.  
**U.K. HOME COMPUTERS**  
 82, Churchward Ave, Swindon, Wilts.  
 24 HR Order Phone 0793-695034

### SAVE £££'s ON CBM DISKS

\*\*\*\*\*  
 You can have 1328 blocks on disks-usually 664, no extra material required, full instructions supplied, very easy to modify + FREE hints on how to copy programs + cheats for music + chess players. All for only £1. Send Cheques/P.O.'s to: C. Keane, 24 Wiseman GONG, Boston, Lincs.

## JOYSTICKS

|             |        |             |        |
|-------------|--------|-------------|--------|
| QUICKSHOT 1 | £9.95  | QUICKSHOT 2 | £10.95 |
| THE BOSS    | £13.95 | RED BALL    | £21.95 |
| 3-WAY       | £24.95 | KEMPSTON    | £13.95 |
| TAC-2       | £17.95 | ARCADE      | £14.50 |

P&P FREE SOFTWARE AT DISCOUNT PRICES FOR: BBC, ELECTRON, SPECTRUM, COMMODORE, ATARI, AMSTRAD  
 WRITE FOR FREE LISTS, CHEQUES/P.O. TO:  
**MICRO COMPUTER WORLD 1 LANE CLOSE LONDON NW2 6QZ**

## ZX SPECTRUM METAL CAR BADGE

By kind permission of  
 Sinclair Research  
**BBC MICRO CAR BADGE**

© BBC 1983  
 Lic. by BBC Ent. Ltd.

£4-25 each inc. p&p from:  
 Hawthorne,  
 90 Victoria St., Hyde, Cheshire.

**DESIGNER dust covers.** Soft P.V.C. Spectrum £1.95, Cmdr £2.95, BBC £3.95 inc p & p. Dream covers, Lowhay, Stoke St. Gregory, Taunton, Somerset, TA3 6JA.

### Replica Loud Firing Colt 45

Automatic, 23 shot  
 As used by US Army, ideal stage prop, with ammo  
 £5.25 carriage 50p



**Replica 44 Auto Magnum,**  
 the gangsters favourite, with  
 ammo £4.35 carriage 50p



**Colt Python 357**  
 As used by Police and  
 screen heavies, with ammo  
 £4.45 carriage 50p



Ideal for video film making. (Mail order only.) Send PO or cheques to:  
 Razzamattazz, 80 Selhurst New Road,  
 London SE25

### SPECIAL OFFER Amstrad Computers:

|                              |         |
|------------------------------|---------|
| GREEN                        | £219.90 |
| COLOR                        | £299.90 |
| QUICKSHOT II JOYSTICKS       | £3.50   |
| SPECTRUM 487 + 130.5 MW      | £119.90 |
| BROTHER HRS PRINTERS         |         |
| (CENTRONICS OR RS232)        | £147.50 |
| CURRENT SPEECH & SYNTHESISER |         |
| (ZX SPECTRUM)                | £27.50  |
| KEMPSON JOYSTICK I/F         |         |
| (SPECTRUM)                   | £9.95   |

P&P free  
**COMPUDEC**  
 135-137 Glasgow Rd Glasgow G69 6TA  
 Tel: 041-771 0674 We're the cheapest!

## SPECTRUMS SERVICE AND REPAIRS

MAIL ORDER OR CALL IN  
**HUGE**

selection of software and full range of accessories. SAE for lists.  
**Enfield Communications,**  
 135, High Street,  
 Ponders End, Enfield, Middx.  
 TEL: 01-805 7434.

**Book your Classified or Semi-display advert by Credit Card**

**Call Diane Davis on 01-437 4343**



**VISA**

## SERVICES

WHY DO SPECTRUM USERS FROM LONDON, DEVON, ESSEX, & CAMBRIDGE SEND THEIR MICROS TO US FOR REPAIR?

- Average price £15
- Only Co. in all U.K. offering while-you-wait service.
- or 24 hour turnaround every micro insured for return journey.
- phone or send for free estimate enc. £1.60 UK, I.O.M., Eire, C.I.
- No hidden handling charges.
- special rates for schools.
- please phone for dept.



MANCOMP LTD. (dept. PCW)  
Printworks Lane, Levenshulme,  
Manchester M19 3JP  
Tel: 061 224 1888

**COMMODORE REPAIRS.** By Commodore approved engineers. Vic 20 Modulators £6.50. Vic 20 from £14.50. CBM64 from £18.00. C2N from £7.00. printers, disc, etc. for more details write or tel. G. C. Bunce & Son, 36 Burlington Road Burnham, Bucks. SL1-7BQ Tel: (06286) 61696.

### SINCLAIR COMPUTERS

EXPERTLY REPAIRED and thoroughly overhauled by professional computer engineers using only top grade components.

All modifications recommended by Sinclair are fitted and all units soak tested and fully guaranteed for six months.

#### MP ELECTRONICS

The Laurels, Wending, Dereham, Norfolk NR19 2LZ  
Spectrum £20 ZX81 £12.50 Spectrums 2 & 3 Upgraded to 48K £32.50

### SPECTRUM REPAIRS

We expertly repair Spectrums for £15 inclusive of parts, labour and return postage. Spectrums upgraded to 48K for £24 including post.

R.A. ELECTRONICS, 50 Kimberley Road, Lowestoft, Suffolk.  
Tel: (0502) 66289

## MICRO SERU

The home computer repair specialist in Scotland

BBC, SPECTRUM, VIC 20 AND ALL PERIPHERALS. 3 MONTH WARRANTY ON ALL REPAIRS.

UNIT 4, Denny Workspace, Denny, Scotland, FK6 6DW.  
Tel: Denny (0324) 823468

**REPAIRS — ZX81 — SPECTRUM** out-of-guarantee repairs by our computer dept. Engineers have had three years experience servicing Sinclair computer products. Price including p+p ZX81 — £11.50; 16k Ram — £9.95; Spectrum — £18.75. Send with cheque of P.O. to: TV service of Cambridge Ltd., French's Road, Cambridge CB4 3NP. Tel: (0223) 311371.

### HEMEL COMPUTER CENTRE LTD.

For fast reliable repair service, send your 16/48K Spectrum computer to us.

We will repair and return for £18 + £1.60 p.p. Also BBC, Commodore, Atari and Dragon service

Hemel Computer Centre Ltd.  
52, High St,  
Hemel Hempstead,  
Herts.  
HP1 3AF  
Tel: 0442 212436

### BBC SPECTRUM REPAIRS

★ Spectrum repairs £18.50 inc. parts insurance and p.p.  
★ BBC B repairs £18.50 + parts, insurance and p+p.  
Send your computer with cheque or P.O. for £18.50 and description of fault to:

SUREDATA (PCW)  
Computer Service  
45 Wychwood Avenue, Edgware,  
Middx.  
Tel: 01-951 0124

## GAMES SOFTWARE

### THE TRIAL OF ARNOLD BLACKWOOD

A NEW CONCEPT IN ADVENTURES FOR THE

## AMSTRAD 64

(ALSO AVAILABLE FOR DRAGON 32) £5.50 INC.  
NEMESIS, 10 CARLOW RD., RINGSTEAD, KETTERING, NORTHANTS NN14 4DW

### X-CERT

#### THE MUCH TALKED ABOUT X-CERT SOFTWARE

The sauciest game ever released for the 48K Spectrum, is available now, but only by mail order. Written entirely in machine code the game consists of 4 waves of SHOCK, HORROR and SCANDAL, featuring the ugliest to the most beautiful of girls, in which you have to..... CENSORED.....also you must..... CENSORED.....all the time. For your copy "Gissa Kiss" (code name, Smut) discreetly packaged, send £5.00 to Titan Programs Ltd., 46 Market Place, Chippenham, Wilts. SN15 3HU.

#### OVER 18's ONLY

... BUY NOW BEFORE IT'S BANNED!

### up to 50% off!

write to:

CLUBSOFT  
Unit 18, Wye Industrial Estate  
London Rd. High Wycombe

### ADVENTURE PLAYERS

Find the Golden Mask and claim the prize. Over 100 locations.

RAMP SOFTWARE  
For 48K Spectrum 19 Burn Lane  
Tape £4 Newton Aycliffe  
M/Drive £8.50 Co. Durham

### PHOTO-FINISH (Spectrum 48K)

At last! A genuinely taxing horse-racing game. Stockpile enough money through beating the bookmaker in the eventual hope of owning the Derby winner. 3 separate games, 5 skill levels, form display, as horses improve or tire. Realistic graphics.  
This game requires patience, skill, concentration, and extraordinary judgement ONLY £5 inc.  
To: P. KERN,  
15, Norwich Rd., Northwood Hills, Middx.

## CLUBS

### THE INTERNATIONAL ADVENTURE CLUB

For full Membership details and an application form, write to:

I.A.C. Membership Dept  
10 Ennis Close  
Harpden HERTS AL5 1SS  
Or Prestel Mailbox number:  
58278663

### INDEPENDENT

## AMSTRAD MICRO USERS CLUB

Newsletter, software  
S.A.E. for details

John Noyce  
PO Box 450,  
Brighton, BN1 8GR  
(Tel. 0273-602354)

## DUPLICATION

### Q.L. SPECIAL

New, fantastic "Hangman" program for your QL with over 450 words, 14 categories. This program uses the features of this great machine.

ONLY £9.95 inc. P&P on microdrive cartridge.

Also: Mastercode — an addictive and exciting program for the QL, using skill and logic, with various levels of play and incorporating fantastic graphics. The computer will choose from over 37,000 code permutations for you to break. This game is really addictive and fun for all the family.

ONLY £9.95 inc. P&P on microdrive cartridge.

SPECIAL OFFER — both programs on one microdrive cartridge for ONLY

£14.

from: P.R. SPROSTON

QUANTUM SOFT

MARLOES, BORROWBY

THIRSK, N. YORKS YO7 4QP

Please state which program(s) you require. (Dealer enquiries welcome)

"DATATAPES" for highest quality blanks and data duplication, call now for a sample quote. You will find us VERY competitive. The Midland Railway Grain Warehouse, No 2, Derby St, Burton Upon Trent, Staffs. (0283) 38199.

### DATA DUPLICATION

#### M.G. COPIES

Burntwood, Walsall, West Midlands.  
0543-480887 or 05436-75375 (24Hrs)  
Data duplication, quality cassettes, printing, distribution to customers with competitive prices and fast turn around. Price lists and samples on request.

Dear Reader, my name is Simon Stable, I specialise in real-time data duplication for most cassette based micros. Disc copying for BBC 40-80 (protection available) Dot-matrix printed labels/ blanks. Blank cassettes.  
FAST TURNAROUND 0869 252831 COMPETITIVE PRICES  
P/L, FREEPOST, 48 WESTWOOD, LAMINGTON, OXON OX6 8JZ

js records  
COMPUTER PROGRAMS  
REAL-TIME or (Slow) HIGH SPEED Professional Cassette Duplication and Blanks from 1 to 1,000+. Computer printed Cassette Labels, etc. Fast Security Delivery service.  
js records — a division of FILTERBOND LTD, 19 Sadlers Way, Hertford SG14 2DZ.  
0932 — 551188

### HIGH-SPEED CASSETTE DUPLICATION

- \* Full-colour laminated inlay card
- \* Cassette labels,
- \* Artwork
- \* Blank cassettes;

A comprehensive range of professional services at probably the lowest prices in the U.K.  
High-speed loading of programs at up to 10 times the normal speed available for some computers at no extra charge.  
Write or telephone for full details.

LOGICOPY  
GOLDSTAR HOUSE  
198/200 QUEEN'S WOOD DRIVE,  
LEEDS LS6 3ND.

## FOR SALE

QL latest model. Hardly used, £399 o.n.o. Tel: 01-602 0814.

ZX81 cassettes each £3. See PCW Vol 3 No 31. M.Payne, 5 Bassett Road, Coundon, Coventry, W. Mids. CV6 1LF. BBC B for sale. 7 Months old any reasonable offer accepted. Phone (0926) 499013.

FOR SALE: Sinclair Q.L. with printer cable, unused, immediate delivery, £400 — Tel: York 769262.

LET "Saucy Sally" Reveal her four greatest assets to mature, over 18 year olds; "Sex," "Drive," "Fun, pt 1" and "Fun, pt 2". Only £2.99 each! £4.99 any two, £5.99 for three, and only £6.99 for all four! Available for all popular computers now! Prices must rise before October 31st. Send cheque/PO/(in Sterling) to: Triple-SSS, Windermere, Cherrymood Road, Loughlinstown, County Dublin, Ireland..

AQUARIUS urgently require good games or education programs. Good royalties or purchase in bulk. Please contact Kawi Company Limited, 92 Parinayok Road, BKK 10200, Thailand.

SOFTWARE/SOFTWARE for Atari, BBC, Acorn, VIC-20, Commodore 64, Genie, Oric, Memotech, etc. Send large s.a.e. to: T.D. Hastick, 13 Mablethorpe Road, Fulham, London SW6 6A.

DRAGON for sale, cartridge, 10 original games plays many others, Boc and manual, Joysticks, dust cover, £125. — Phone 0484 665251 after 5 p.m.

SPECTRUM REPAIRS £14 including parts, P&P etc. ZX81 £11. Fast reliable service (average repair 24 hours) by qualified engineers. — Tel: 0772 634897.

DISC DRIVES Any make re-alignment and full test. Old or new 5 1/4 in., Bin., £30, plus VAT and delivery. Fully guaranteed. — Chouchflow Ltd, Commercial House, 19 Station Road, Bognor Regis, W. Sussex.

TI-99/4A Sloopy's Christmas, Extended Basic, Stereo Cassette players, ask for Musiload version. Either £5.50. — Gamesware, 54 Wycliffe Avenue, Newcastle upon Tyne NE3 4RA.

VIC-20 16K switchable RAM Pack, complete with instruction books, introduction to Basic One, Joystick + 40-column screen converter + 8 games including Cyclons, Skramble, Arcadia. Programmers Reference Guide + mags. Sell for £180 o.n.o. — Tel: 0480 69072

ACORN ELECTRON £140, OKI Micro-line 80 printer, £100. Signpoint printer interface, £30. Cassette player, software books etc. Tel: Oxford 770730.

## THIS SPACE FOR SALE

# £18

TELEPHONE:  
PCW CLASSIFIED  
01-437 4343 Ext 206

ORIC/ATMOS programable Joystick Interface. Simply plugs into expansion port. Compatible with all software. £29.95. — Leven Electronics, 10 Harker Close, Yarm, Cleveland.

## BECOME A PROGRAMMER

Improve your prospects in the industry of the 80's. We'll develop your skills more quickly and more professionally with our home study Programming Course, based on Spectrum. Write for free brochure.

### IDEAL SCHOOLS

Ref: CW1 Freeport  
Glasgow G1 4BR  
Tel: 041-248 5200

## AUCTIONS

# MICRO COMPUTER AUCTIONS

NEXT AUCTION — FRIDAY, 28th SEPTEMBER AT:  
AUCTION ROOMS, 27, KING STREET, LONDON  
WC2.

ENTRIES AS SOON AS POSSIBLE PLEASE;  
CATALOGUES 50p EACH OR £3 P.A.  
TO:

Micro Computer Auctions (PCWK)  
Northington House  
59 Grays Inn Road  
London WC1X 8TL  
Tel: 01-242 0012 (24 Hours)

## UTILITIES

### Friendly Face

#### Microdrive Utility

Add these menu-driven loop routines to your programs for quick and easy cartridge file management. Self-duplicating "run" routine to load or erase any program on cartridge.

Separate routines, ready to merge with MASTERFILE and TASWORD TWO, for trouble-free, daily professional use with Microdrives or cassette backup, including erase and catalog loop subroutines.

Including over 10K of basic routines, and 5000 word instruction manual.

NEW Masterfile ACTION and MEMO formats, free with cartridge version.

MEMO is a free-form, notepad format for ordered, referenced notes.

Cassette £6.95, Cartridge £12.95 incl. VAT. Order NOW to Monitor Ltd. Box 442, Mill Hill, London NW7 2JF.

Write or call 01-959-1787 for leaflet.

## SOFTWARE

### SOFTWARE BARGAINS

| SPECTRUM           | CBM 64                |
|--------------------|-----------------------|
| Automania 5.60     | Arabian Nights 5.60   |
| Full Throttle 5.60 | D.T. Decathlon 6.15   |
| Monty Mole 5.60    | Monty Mole 6.20       |
| Match Point 6.75   | Football Manager 6.75 |
| Lords of Mid. 7.70 | Valhalla 10.95        |
| Sabre Wolf 7.95    | Games '84 12.45       |

S.A.E. for lists. Tel: 0274 672702  
Mail Order Software, 9 Knowle Lane, Wyke, Bradford, BD 12 9BE.

### PLUS-ONE SOFTWARE

Programs that are enjoyable and Educational  
adventurous and strategic for spectrum/ZX81.

#### Special offer

£5 plus free program of your choice

#### LUNAR BEACH

Supreme challenge on a voyage of exploration across a lunar landscape avoiding meteors and fighting off aliens in search of a desert explorer!

Other programs cover Maths English etc. Titles include: Pentagrams, Story-teller. Ordering

SAE for catalogue to P.O.S., 35 Sandal Road West, Holcombe Breck, Nr. Bury, Lancs, BL8 35V

## PERIPHERALS

### TOSHIBA HI-RES 14" COLOUR MONITORS

2nd user but excellent condition. TL input, RGB sync. No-case, £119.50 inc. carriage paid.

Tel: Lucas  
(0482) 702999/701437

## Ataris for sale

ATARI disks software, the next step by on-line (32K) £9. Does standard and four colour characters, also writes basic routines for your program. Contact Gary after 6pm, 04023 40543.

ATARI VCS 1600 with joysticks, paddles, mains unit and also video touchpad and cartridges. Perfect order, guaranteed until December 1984. Accept £55 ono. Consider p/exch. what have you? (0244) 675717.

ATARI 400 with full size keyboard, 48K cassette recorder basic cartridge, manuals, light pen, joystick and original software £125 ono. Phone Jeremy (01) 363 1578 after 7pm or weekends.

ATARI VCS + £250 of s/w (all top names). Originals only v.g.c. inc. joysticks, paddles, power adaptor, £180 ono. Tel: Dorking 887619 (after 6pm).  
ATARI 600XL + 10 pen recorder + joystick £200 w/s/w. Sell £250. Tel: Romford 69591.

ARARI 600XL, 1010 program recorder, two joysticks, lots of magazines, software, books, manuals. Cost me £245+, yours for £170 ono. Phone Ashbourne 428679 after five, and ask for Stephen.  
ATARI VCS and/or Atari 400 with extra h/ware + s/ware. VCS package includes 17 games + all types of controllers. Atari 400 package includes cassette recorder (opt. disc drive) + many educational programs. How much? Tel: Weybridge (0932) 55203.

ATARI MACRO assembler diskette, vgc £40. Also Chess and Missile Command ROMS, £10 each. Pool cassette £5. Call Redhill 61612 evgs. Ask for Chris.

ATARI 400 c/w joystick, cassette player basic package and chess cartridge. Immaculate condition. Need BBC for work reasons, therefore swop plus cash or accept any reasonable offer. 521 2382 after 4pm.

ATARI VCS, 27 cartridges, accessories. Sell £120. Tel 01 573 6421.

ATARI 400. Full size keyboard, 48K cassette recorder, basic cartridge, manuals, light pen, joystick. Original s/w. £125 ono. Tel 01 363 1578 after 7pm.  
ATARI S/W for sale. All originals. Cartridges, cassettes, disk. Fantastic prices. Tel: Mark (0225) 742777.

DEFENDER FOR ATARI VCS. Hardly used like new. £11. Tel: 0704-20447.

48K ATARI 400 + 410 recorder + Quickshot joystick, basic cartridge + manuals, books, + £150 or original s/w. Inc: Defender, Pac Man, Soccer. Offers. Tel: 041 6490037 after 5pm.

ATARI 600XL + date recorder, lots of s/w inc: Pole Position, Tennis, Celon and Boxing. As new £200 ono or swop IBM 64. Tel 01-387 7350 (eves).

ATARI 400 16K good condition, cassette recorder, joystick, Basic, Donkey Kong, Miner 2049ER, Preppie, Pac-Man, Leggit, Invitation Prog.1, manuals, mags. Cost £470, want £200 ono — Boxed. (021) 373 4404 won't split.

ATARIDISKS, £8 each, threshold, Zork 1, Mouska Attack, Preppie, £6 each. Shamus, Airstrike, Crossfire, Action Quest, ROM Centipede £12. Contact Gary after 6pm. Ingrebourne (04023) 40543.

ATARI COMPUTER, cartridges for sale. Assembly/editor £15 (£40 as new) Music Composer £15 (£36 as new). Both have manuals. Tel: Martin Aytie on Henley-on-Thames 573371.

## Tandys for sale

IBM 64, cassette recorder, joystick, £100 of original s/w i.e: International Soccer, Solo flight. 7 months old. Very good condition £350 ono. Tel: Dunstable (0582) 864507.

PRINTER TANDY CGP 115. Four colour plotter with cover, spare paper etc. As new, nine months old £100. Tel. 021 382 3106 suits most computers.

TANDY CGP-115, colour, graphics printer + Dragon lead. Cost £167, sell for £95. Tel 01-300 3443.

TANDY TRS 80 16K level II computer. Includes Tandy high res upgrade and original software, business and games plus books. Worth £500+ only £175. Will barter. Phone 021 779 6877.

TANDY 2MP100, DDF metric printer, cable for dragon 32, for 1200. Tel: 0604 29622 ext 3317 (day) evs 0604 412077.

AQUARIUS + cartridges + recorder cassette £60. Tel: 01 301 1152.

TANDY PC4 portable, 1K RAM, printer, T/Interface, recorder, charger, manuals in briefcase. Swop for Dragon d/drive or Centronics RS232 printer. 01-908 0519 evenings.

TANDY TRS-80 model 1 level 2 48K internal memory, anti-glitch, lower case, numeric keypad, joystick, port, printer interface, books, manuals, etc. Worth £350+, bargain £180. Tel: (05827) 68663 after 7pm.

## ZX81s for sale

ZX81 Assorted bits hi-res board, lightpen, graphic ROM and toolkit, IKZX fitted D/kronics key board, manuals, some books etc. Offers or W.H.Y? Tel: 0299 403132 Steve or Andrew after 5 pm.

ZX81 machine code monitor/debugger £4.00. Tel 01 272 3341

ZX81 s/w all top games 1/2 price. Please ring 01 337 9194.

16K ZX81 + printer, original s/w inc: 3D Monster Maze + Riders and all leads. Manual, perfect condition £60.00. Tel: South Shields (0632) 553158.

16K ZX81 with leads, manual etc. + games, magazines and ?book £25 ono, also Spectrum software. 021-558 4644.

ZX81 18K user definable graphics DK Tronics keyboard screen inverter games utilities, many books, mags etc. Suit M/C programmer or the novice £80 ono. Telephone Cambridge (0223) 213687 after 6pm.

## Acorns for sale

BBC B + DISC Interface 1.2 O/S. Joy sticks over £200 of s/w. (Original cassette recorder + leads, books, mags. All perfect condition. £315 offers. Tel: 01 898 2644 (eves).

BBC MICRO Model B. 1.20 O.S. excellent condition, plus books, games, magazines. £300 ono. Tel: 0292 263823 after 5.30 pm.

ACORN ELECTRON for sale. Only £260. Includes joystick, interface and over 70 games titles. Phone (05827) 5232. Ask for Ian.

BBC Printer cable (parallel) new £5. Atari sound graphics book. £5. Paul 021 422 4167 evening.

APPLE IIe with disc drive, green screen monitor (KAGA), books, some software, D.O.S. and Prodos, mags. Tow months old £850 ono or swop BBC 'B' + disk + cash. Phone Aylesbury 748142 (eves).

## Computer Swap 01-437 4343

Free readers entries to buy or sell a computer.  
Ring 01-437 4343 and give us the details.

## For sale

COMMODORE 64 software for sale, Hobbit £8, Pedro £3, Attack of Mutant Camels, £3.50, Acost £4, Arcadians £3.50, Hungry Horace £4 all originals in excellent condition. Tel: Bradford 0274 677183.

DRAGON 32, Cumana DS 500, disk drive, Joysticks, Tape recorder, ten books, lots of software inc Edith Cartridge. All excellent condition £450. Phone 0703 559594 evenings. Ask for Ian.

TOP QUALITY Spectrum software for sale: Chuckie Egg, The Prize, and Atic Atac. Only £3.50 each. Or £9 for all three. Tel: Middleton-on-Sea 2126 (after 6pm).

FOR SALE ZX48K Spectrum, Fuller Master unit, Printer, Interface 2 and Cartridge. Kempston interface and joystick tape recorder. Keyboard overlays. Loads of mags and software. Bargain £260.00 ono. Phone (021) 552 1160.

SHARP MZ-80A home computer, built-in monitor and cassette deck. Original software plus professional games, manual and book £240.00 ono. Tel: Oxford 340651 after 6pm. (Steve).

FOR SALE VIC 20, tape recorder, super expander, books, lots of software, tapes + cartridge. Joystick + paddles. Phone Swanley 68217 ask for John £110 only. May split.

ORIC 148K computer for sale plus Oric colour printer-cassette recorder, £100 software joystick + interface books mags. £240 ovno. Tel: 07373 59853.

SUPERIOR TELETYPE ASR 33 RS232 £50 unit with two 8" floppy drives £50 Sharp PC 1211 pocket coputer and cassette interface £30 TRS 80 Ram + disk circuit boards (need finishing) £40 01 451 0520.

FOR SALE TRS 80 computer 16K extended Basic. £100 complete. Letchworth 76332.

AMBER 2400 PRINTER. 20 rolls of paper and spare ribbons. Cable to suit Dragon 32/64. £50. Also ZX81 + 16K Ram. Mazogs and other software. £35. Tel: Billinge (0744) 894686.

SCISYS CHESS CHAMPION MK6 complete, MK5 + MK6 upgrade modules (World Micro Chess Champion), manuals, boxed. Estimated BCF Grade 175. Also portable, powerful executive chess free! Cost £410+, sell £189 ono. 01 531 2892.

JET SET WILLY £4 Hunter Killer £6.50. Both for £10 both originals. Telephone Eardisley (05446) 202 ask for Ian after 5pm.

## For sale

**FOR SALE**, Mattel Aquarius Home Computer, 3 months old V.g.c. with manuals and leads, sell for £38 or swap for Currah Speech synthesiser. Or Cheeta Sweet Talker. Contact: Steve 804 7306.

**CURRAH SPEECH UNIT** for sale £15.00 Dk Tronics Joystick interface plus Kempston joystick £15.00 W.H. Smith Data Recorder £20.00 All unwanted presents contact J. Barrett 84 Riverside Gardens, Hammersmith, London W6 9LF.

**Dysan 5 1/4" SS/SD floppy diskettes brand new unused. 100 only £10.00 for 10 or £95.00 the lot. Also ZX printer brand new unused £20.00. No offers. Tel: 0268 evenings w/ends.**

**PSION SCRABBLE** on sale for 48K Spectrum. Brand new and hardly used. Complete with box and manual. Will sell for £10. Also for sale computer magazines. Phone Staines 57086 and ask for Farley.

**VECTREX COMPUTER** game system with built in screen, superb Vector graphics, Two months old, boxed, guaranteed. Two games cartridges 'Berzerk' and 'Rip Off' £40.00 the lot. 'Minestorm' (Asteroids) included, Sheffield 336533.

**MICRODRIVE AND INTERFACE** one plus two cartridges plus Mastering Your Microdrive book cost over £90.00 only £70.00 the lot or ono. Call Austen on Croydon 01-6830963 out of office hours.

**POCKET COMPUTER:** Casio FX80ZP + FA3 cassette interface, built in printer, 1568 steps memory, charger, manual, program book. Worth £110 only £50 phone 0422 75366, evening.

**LYNX 48K** hardly used in perfect condition still under guarantee boxed and gathering dust. Give away bargain for £99. Tel: 01 337 2694.

**ONE 40 CHANNEL CB SWR** meter transformer leads antenna, car/home. Cost £130+ swap for Atari 800XL or CBM 64 write R. Ingram Irelands Goose Green Warnham Horsham West Sussex RH12 3RS.

**LYNX 48K** for sale with £60 software, cassette recorder, joystick interface and all leads etc. £150 Tel: (061) 439 6198 No reasonable offer refused.

**48K LYNX** c/w cassette unit and software. Hardly used. Also issues 1-5 Nilug News including info on interfacing, games etc. £110 ono the lot. Phone Roy on Farnham Common (Slough) 2756.

**MEMOTECH MTX 512.** 64K little used and still as new. Some software and all documentation included. £250. Telephone Steve 061 485 4360.

**ZONX SOUND** Generator for ZX81 in box as new £15. Tel: Ray (0253) 27753.

**T199/4A SOFTWARE.** Ex-Basic + joysticks + Soccer, Invaders, video games, Tombstone City, Cartridges, the lot for £65 ono. Tel: Blackpool (0253) 301031 evenings.

**DK'TRONICS SPECTRUM** keyboard with wired in Joystick £25.00 ZX-printer with spare roll of paper £20.00 Large amount of Spectrum software please phone for details. Phone Pontefract (0977) 795904.

**ZX PRINTER** for sale (£30) or with 4 rolls of paper (£38) or will swap for a CHURRAH MICRO SPEECH UNIT and £15: Please write or phone: Mr K. Burton, 6 Westbourne Terrace, Barnsley, South Yorkshire (0226) 292118.

**LIGHT PEN** (Trojan) for Spectrum £10. Also plug in modules for speak and spell. 5 for £20 (new cost over £8 each). Tel: 06286 62843.

**T199/4A, BOOKS,** tapes, cassette recorder, all leads and P.S.U. offers considered or will exchange for moped or motor bike preferred MOT/taxed in running order. Tel: John on Telford on Telford 587 545 anytime.

**NAFSCOM 2** microtype case, Zeap 2-1 32K Ram 3amp PSU Port Probe excellent condition Tel: Uttoxeter (08893) 4660 around £230.

**LYNX 48K,** excellent condition in original box, leads, manual and Lynx user mags. Will sell for £125 ono. Tel: (01) 561 4653 after 5pm.

**PHILIPS G7000** boxed with four cartridges Laser War, Munchkin, Cosmic Conflict and The Famous Quest for the Rings. Only £110. Tel: 502 2334 will sell cartridges separately. Great condition.

**CURRAH MICRO SPEECH** unit for Spectrum. Easily produces speech and amplifies Spectrum Sound through TV speaker. Still boxed. Good condition. £20. Tel: 04867 81117.

**EG3003 GENIE I** with extended Basic. Integral cassette. Basicode interface fitted. Fair amount of software and books £75 Tel: (Carnforth) 733278 after 5pm.

**DK TRONICS** light pen £12 Stonechip fully programmable interface £15 Quickshot 11 joystick £7 Tel 01 409 2211 extension 204 10am till 6pm.

**CUMANA 100K** disk drive with P.S.U. 6 months old BBC Cable plus 10 disks and s/w £110. Tel: 0962 883965.

**PB700 CASIO,** brand new from Japan, as yet unavailable in U.K. Multi-line display, 16K highspeed Ram, 32K Rom, Pocket size, unbelievable features. Only one, £180. Phone 01 531 2892.

**MATTEL INTELLIVISION** + seven carts inc. Starstrike and Tron. All boxed only £90 ono Tel: Garry 0933 76849 please!

**FOR SALE:** Stonechip programmable interface plus pointmaster Joystick (For Spectrum) £22.00 ono. Phone 061 928 8354.

**FOR SALE** near complete set of Home Computing Weekly and Popular Computing Weekly asking £6 ono For each set. Ask for Satvinder on 736 7714.

**NEWBRAIN AD.** plus manuals, demo, tapes and software £170. Sanyo Green monitor 12" £75 or £220 the lot. Delivery negotiable. Phone Fischer Worcs (0905) 620098.

**FOR SALE** Electron French Mistress level A from Kosmos. Norm. £9.95 only £5 unused from Stephen (0703) 767580 weekdays only.

**PRISM VTX 5000** Modem, good condition £85 ono or will swap for i/facn one. M/drive and cartridges. also user to user s/ware. Free. Phone 031 334 4065 anytime.

**MEMOTECH MTX 500.** Boxed, only 3 months old, including tape recorder and three games. £230. Owner wants BBC to ease software compatibility. Ring Manchester 061 273 3844 Phil. Fiat 22 Room 3.

**DUAL 100K** cumana disc drives with PSU's for BBC. VGC including cable user guide and format disc £265 ono Watton (0953) 883611.

**TOMYTRONIC TRON** electronic game from USA works with 9V d.c supply (Spectrum power pack) or four "C" size batteries. 3 games in 1. Excellent condition, boxed, with instructions £10 04867 81117.

**ORIC LOKI** game by Joe the Lion, never used (unwanted prize in competition) for sale. Offers to John on Upminster 25819.

**ORIC 1 48K,** software books Joystick interface unwanted gift £90 ono. Tel: 0226 765812.

**NEWBRAIN SOFTWARE** 3 Brainwave software tapes. Pages telephone word worker £80 of tapes offers 0502 66289.

**QUIZMASTER DATA CASSETTES.** All sorts of quizzes. All ages. Each quiz has 40 questions. Send SAE for list and details to: Scott Pack 21 Nevada Road, Canvey Island, Essex SS8 8EX.

**KEMPSTON JOYSTICK** and interface for sale in superb condition. Cost me £28, Asking £16. Spectrum only. J. Earle, 138 Cavendish Ave, Harrow, Middx.

**48K LYNX** (boxed) four months old. Have lost interest, so any reasonable offer accepted. Phone Malcolm on (01) 553 0349 after 7pm or (01) 377 0020 X229 days.

**MODEM 1000** hardware for Prestel and/or user comms. Brand new unused cost £70 will accept £50 ono. Please ring Benjamin on 01-205 2174 evenings after 6pm.

**ORIGINAL SINCLAIR** keyboard for Spectrum working order (changed to Fuller keyboard hence sale) easy to change £12.50 including postage one only cheque + SAE Smith 94 South End Road, Rainham, Essex RM13 7XJ.

**48K ORIC I** £50 of s/w 2 programming books. Quickshot joystick. Guaranteed. £95.00. Tel: Crayford 527 049.

**ORIC I** as new with leads, manuals software and 8mths guarantee. £125 ono. Tel: Uffington (Oxon) 244 or write to T. Matthews. Pacxers Forge — Uffington, near Faringdon, Oxon 7RP.

**C1520 PRINTER,** boxed as new used once + voice box. Both C64 and Vic 20. Tel: 01 385 4216.

**ROMS FR** The Beeb, disk drive £20. Forth £20. Pascal £35. with manual, also book, 6502 programmes, 6502 s/routines. 68000 prog-eleven. £8 each. Tel: 01 348/9841.

**T1994A EDITOR** assembler, manual £9.00. T1 writer £60.00. T1 cassette recorder £25.00 3 modules. £8 each. All new £100 the lot. Tel: 0782 627561.

**SHARP CE125** micro cassette, printer interface inc. printer paper s/w manual. + carrying case. £85.00 ono. Tel: 01 521 1058.

**FULLER FOS** programmable keyboard, £40.00. Tel: Windsor 53483 after 6pm.

**SHARP MZ 80K,** 48K excellent condition. Boxed. Green screen. Loads of Arcade Adventure games. Extended Basic, books etc. Cost £600. nearest offer to £280 (0302) 840708.

**CASIO MT45 EXCHANGE,** Spectrum hardware. Tel: 809 2841.

**BLOCKHEAD,** Juniors Revenge. Lunar Robot Patrol, Frogger, Cuthbert goes digging, Cuthbert in the jungle, Cuthbert goes walkabout, £50. Tel: Ponty Dodkin 771521.

**GM5** 4 games cartridges & 3 Basic cartridge, Integer-Science graphics, sound, joy pads. 4 cassettes, incl. Graphic Designer worth £290. Sell £200 or best offer. Tel: Swindon 782748.

**MUSSY-TRL,** 3 line Thunder, Jack & The Beanstalk, Jet Set Willy & more. Original games £4 each or all for £23. Tel: 0455 39127.

**CURRAH MICRO SPEECH.** G.c. Original box, guaranteed. £20 o.n.o. Tel: Nottingham (0602) 384126.

**TELE TEXT** adaptor for BBC Micro £180. Tel: 01-459 3194.

**VIC 20 16K C2N** Cassette recorder joystick into to basic 1 & 2 over £60 software many magazines still guarantee £140 o.n.o. 0535 603325.

**ORIC-1 48K** + £150 of S/W and cassette recorder for £230 o.n.o. Buy collects Tel Bradford (0274) 732089.

**ITT 2020 48K** twin apple disk drive plenty of books Q S/W £300 only tel: after 6pm Boston (0205) 59513.

## Spectrums for sale

**SPECTRUM** Software for sale print 'N' plotter paintbox + wye valley compiler both originals sell at £12 o.n.o. Tel 0900 62895 and ask for John.

**48K SPECTRUM** Boxed good condition Kempston Interface. C.Pro Joystick Sound Amplifier, Tape recorder Mags. Potters Bar 45127.

**ZX SPECTRUM 48,** 3 games, Hobbit, sheer Panic, Horace Q the Spiders. All Manuals + lead lots of mags. hardly used still boxed £70. Tel: 021 443-1303.

**48K** Issue 2 Spectrum, with over £200 of original S/W Inc: Quill, Scrabble, Hobbit, flight many mags, £150 or swap for CBM64. Tel: 01-602 1530.

**NEW SHARP MZ-700** Colour computer 64K Ram built in cassette recorder and Printer Plotter, software two joystick all cables and manuals cost £400 + sell £250 Tel Austen Croydon 01-683 0963.

**SPECTRUM 48K** - Box and manuals £400 of best selling S/W (all originals £100 of mags: Date Recorder, Joystick + Switchable Interface. 1350. ono Tel: 061-748-0157

**48K SPECTRUM** With interface 1, two microdrives and four cartridges boxed with all leads, cassette recorder and £75 worth of software £250 phone: Lee Valley 763521

**FOR SALE** Nearly new summer games from America £15.00 for CBM 64 Disk phone 0268 682719.

**PRINTER** For sale centronics 737 80-column Drain Daper, Hi-Res block and text, tractor feed 100cps 1000 sheets of daper leads technical manual offers around £200.00 to Austen 01-6830463 evenings only.

**£14** Worth of discount vouchers micro deal and interface micro sell separately or swap separately for VIC -20 games sell whole possibly swap whole phone Scott Canvey Island 092307.

**COMPATABLE** Compatible cassette recorders. Panasonic RX 1850 stereo Radio cassette. Olympus S901 Pearl-corder, PSU, tapes. £80 each new, accept £40 (ono) each. Both Acron and Sinclair compatible Tel Ruby 73595 (Eves)

**SPECTRUM** Software sale or swap Half R.R.P. Jack + Beanstalk Kong Zoom Black Crystal MTS of Ket Oracles cave train game pyramid + others wanted: Psytron the Forest Phone Baltonsboro (0458) 50517.

**48K SPECTRUM** DK Tronics keyboard, Joystick and interface, tape recorder, £115 of software, mags. All worth over £350 sell for £200 o.n.o. Tel 01- 851-1365 (after 5 p.m.)

**SPECTRUM 48K** + £300 of software + all leads and manuals + books guarantee April 85 £160 + 100 magazines free if wanted contact j0234) 66755 (Anytime) ask for Time or Simon.

**SPECTRUM** Software for sale pascal £15.00 softec compiles £5.00 each game designer £7.00 melbourne draw £4.00 worth £5.00 tel 01-6830963 after 4 p.m.

**SPECTRUM** Software for sale conv. 1. conv.2 Blind Alley £1.50 each. Dungeon Master £3.00 Galaxy Conflict £3.50 trader £400 Speakeasy £2.00 spectrumsound music making program £3.00 tel 01-6830963 after 4.p.m.

**NOVEMBER** With cassette recorder and over £200 worth of software also £50 worth of magazines. Total value: £400 will accept cowden 574 evenings only.

**SPECTRUM SOFTWARE** Quill, scuba dive, flight simulation, 3D Compact Zone, ATIC ATAC Spuerchess II, £30 All Originals Tel: (0376) 43543 Brain-tree after 7 pm ask for Stuart.

## Commodores for sale

**COMMODORE 64** — £125, C2N tape — £20, Simons Basic — £30, joystick — £3, Paddles — £6, P.R.G. — £5, £200 + worth of s/w inc. Soccer, F/Forest, Revenge, Hunchback, Mr. Wimpy, Lazarian, H/Bover £100 Ring: 593-6579. **CBM/PET COMPUTER**, integral screen, cassette unit, software plus CBM 3022 tractor printer. Including leads, manuals etc. £325 ono. Could deliver. Would consider P/exch. Tel: (0244) 675717.

**VIC 20 PIRATES** Cove adventure and Sargon II Chess cartridges for sale both hardly used £5 each or the Two for £8 — Phone Luton (0582) 574097.

**COMMODORE 64** software including Manic Miner, Hobbit, Hulk, Splat and Hunchback, £4.00 each or £30 for all Phone 01-959 8499.

**VIC 20 FOR SALE** still boxed under guarantee lots of software Introduction to Basic Part I C20 Database unit books + mags Exe condition £120 Ballshill 745962.

**COMMODORE PET** model 3016, 16K. New keyboard type with separate cassette recorder. High resolution graphics board. Basic teaching tapes £150 ono. Tel: Penkridge 4209 evenings.

**VIC 20 + TAPE** recorder, joystick, 3K Rampack. Zargon chess and other games — £100.00 Tel: Tunbridge (0732) 361920.

**COMMODORE 64**, C2N cassette unit, joystick, dustcover, 4 games, books, & mags. Worth £300 bargain at £195 Tel: (01) 571-3051. Also offers required for 1525 printer Tel: (01) 574-8583 or 571-3051.

**VIC 20, C2N**, switchable Ram pack, piles of games, dust cover, + joystick, Games Designer, Tel: 055932 2405 offers.

**VIC 20 + C2N** + mother board + machine code monitor + 16K Intro Basic Part 1 + £50 worth of books + £180 worth of software + d/cover all for only £240.00 Phone Canvey Island (0268) 684980 after 4pm.

**COMMODORE 1541** disk £125 Isis Printer £100 300 Baud modem inc. RS232 £50 VIC + C2N £75 32K switch £25 Wordcraft 20 + 8K £40 Stack lightpen £15 Quickshot II £7 etc etc Phone Royston (Herts) 47050 other goodies.

**CBM 64 C20** wanted swap for a complete radio control flying system. 3 Models complete with engines radio control McGregor. Value £200+ [NO ADDRESS]

**COMMODORE VIC 20 + C2N** + joystick + software (£200 worth) including Gridrunner, Bewitched, Amok etc. Lots of books and magazines all for £120 Phone (0925) 810061 ask for James. **VIC 20, 3K, C2N** cassette unit Intro to Basic, 4 games, Quickshot joystick, all £120 or will swap for 48K Spectrum. Buyer must collect, Tel: Brio (0262) 77552; for Neil.

**VIC 20 C2N** 16K switchable, speech synthesiser, Quickshot II all in original boxes. Lots of software including Jetpack, Matrix, K/Kong also many mags, and books inc Vic Revealed. £180 Tel: Shrewsbury 860454.

**COMMODORE 64 PLUS** C2N plus Program Reference guide plus £200 games software sell for £250 Tel: Biggleswade 314997 evenings.

**COMMODORE 1520** printer/plotter + pens + paper £80 Vickit II £20 Vic-20 Snooker £5 + other games half price. Joystick £5 Phone eves Garston (0923) 676477.

**CBM 64, CASSETTE**, mint condition 4 months old, £180 ono. Tel: 01-310 1832.

**VIC 20 OWNERS!!** Urgently wanted: "Starting Forth" by Leo Brodie, Commodore's "Superlander", Atari's "Defender". For sale: "Mission Impossible" bargain at only £6.50, Rabbit's "Escape MCP" £2.50. "Arcadia" only £2.50 0558 822509.

**VIC 20, 16K, C2N**, machine code monitor, mother board, £40 of books. £180 of software, dust cover. All £220 ono. Tel: Canvey Island (0268) 684980 after 4pm.

**CBM/PET SYSTEM**. Ideal hobby or business. Comprising: 3032 computer, 3040 floppy disks, 3022 tractor printer. All leads, manuals, software etc. All perfect order. Bargain: £650 ono the lot! (0244) 675717.

**COMPUTER MAGS** for sale. Your Computer, PCW, C&VG, Sinclair User/Projects/Programs, Crash, ZX Computing, all half price. Will separate issues. I want a friend to swap programs with. Phone Staines 57086.

**CBM 64** — 6 months' old + C2N cassette unit + cover — £185. Programmer's reference guide — £7. 2 games + 3 books — £15. Tel: 01 777 5725.

**VIC 20 SOFTWARE** cassettes for sale. All originals, 16K and unexpanded. Top titles including Flight Path 737 and Games Designer. Prices from £3 to £5. Phone 0633-860193.

**BOOKS FOR VIC 20** half price Get More From The Vic 20 £3.00 Mastering the Vic 20 £3.00 Start with Basic £2.00 Getting The Most From Your Vic 20 £3.00 Tel: 01-529 2748.

**32K VIC, C2N**, 1541 Disk-drive, 1515 printer, R5-232, modem, joystick, mother board, discs, printer paper & books etc & more complete system £450 ono may split. Phone 0763 47050 evenings.

**VIC 20 16K** Rampack, C2N tapedeck, Quickshot joystick, Intro to Basic, 3 Roms. educational, utilities and games programs, manual, mags, books. Still boxed. Sell for £175 Tel: Derby 81145.

**COMMODORE VIC 20** with C2N cassette unit, Pointmaster joystick, all boxed, 16K Ram, super expander, several games cartridges, approx 200 games on tape instruction books manuals £200 ono Telephone 01-467 8589 after 6pm.

**CBM 64 AND VIC 20** tapes for sale (originals only). Over 30 in total. £2 each. Minimum sale £4. Tel: Stevenage (0438) 811634.

**VIC 20, C2N**, 16K Ram (Switchable) plus many blank tapes, games, books, mags. Also 'O' level chemistry, biology, geography, Intro to Basic 1, joystick and three cartridges. All boxed. £200 ono Phone: (0429) 761982 after 4pm.

**VIC 20, C2N** tape deck, 16K switchable Rampack, £60 worth software (including Pirates Cove, Flight Path 737, Skramble), books (including Reference Guide), dust covers — all for £160 Tel: 0546 3330.

**COMMODORE 64 HALF** price software including Hobbit, Wimpy, Hunchback, Loco, Blagger, Scramble, Kong, Revenge Mutant Camels, many more. Discounts for two or more. Tel: Bury St. Edmunds 703575 (all originals).

**COMMODORE 64 + C2N** + joystick + game and book, £200 only. Excellent condition, buyers to collect. For a quick sale Phone A. Saggan on (01)-574-8583 or (01)-571-3051. 1525 printer for sale also.

**16K VIC 20** cassette deck, new Quickshot II joystick £150 of software, 200 magazines and books. Software includes Radar Rat Race and Sargon II Chess. All for £110. Phone Crawley 33061.

**VIC 20, 16K** switchable Ram, C2N cassette player, joystick, three cartridges, £110 original software, books. All for £140. (Chigwell/Romford area) Phone after 5pm (01) 501 3250. Ask for Alex.

**VIC 20 C2N RECORDER** 16K switchable Ram Pack joystick dustcover for VIC and C2N lots of software tape and cartridges all mint condition £110 Telephone Formby 74755 and ask for Adrian.

**VIC GAMES FOR SALE**, large range, tapes and crtdg's, plus super expander phone Dorking (0306) 881509 and give an offer for any.

**CBM 64 + SIMONS** Basic + Intro to Basic + vast quantity of software + 2CN cassette deck + Pro-am joystick. Need quick sale £165. Telephone 0493 661024.

**VIC 20, C2N, 16K** switchable Ram, Intro Basic I, Programmers Ref Guide, Quickshot I joystick, £50 + assorted s/w inc Jet-Pac, Computer War, Mission Impossible, Games Book. Boxed. Excellent condition. £110. York 702218.

**VIC 20 SOFTWARE** for sale. Gridrunner, Krazy Kong, Alien Blitz, Cosmic Battle, Nightmare Park, Vicgammon, JetPac, Myriad, Nightcrawler, The Alien, Andes Attack, Amok — cost approx. £80 new. Sell lot for £40 (will not split). Tel: 673-5819 (all originals. No copies).

**VIC 20 PLUS C2N** tape deck plus joystick plus 16K Ram Pack plus six games cassettes plus Prog Ref Guide £120 joystick (0704) 4230509 after 5.00pm.

**PARTIALLY WORKING** VIC 20 £15 ono will sell PSU and RF modulator separately super expander £15 or Watson assembly language book £3.50 Vic 20 reference guide £5.00 Tel: Antrim 60709.

**CBM 64, 1541 DISK**, C2N, Simon's Basic, Quickshot joystick, Prog Ref Guide, Prog utilities package, Easyscript, manuals, £150 software, mostly top games, all for £500 ono Ring Torquay 313283.

**VIC 20 PLUS ROM** games 16K memory 3K super expander, cassette games Intro to Basic 1 and 2 Prog Ref Guide various items inc mother board swap for 64 equipment Tel: 061-794 7905.

**VIC 20 + C2N** + 16K cartridge + joystick and lots of s/w inc JetPack only 10 months old Phone Kevin on 759-0336 evenings.

**VIC 20, C2N, 16K, 8K**, super expander, 4-slot m/board, two joysticks, £850 worth of software. All worth over £1000. Offers around £450 or will split Tel: (0362) 4497 (no time wasters!).

**VIC 20 + C2N 16K** Ram super expander mother board 4slot switchable all boxed as new much software Krazy Kong Pharaoh's Tomb JetPack games and utilities only £175.00 will split items Worthwich 782475.

**CBM 64 DATABASE** — "Magpie". Brand new. Only £80 (or nearest offer). Tel: 0224-321 432.

**VIC 20 + SWITCHABLE** 64K, mikro assembler speech synthesis 40 column screen cassette motherboard Intro Basic Part 1 + VIC books 4 games cartridges + cassettes £165. Tel: Sudbury 70388.

**COMMODORE VIC 20** + 16K stack storeboard, C2N tape deck, over £150 of software including 5 cartridges and loads of unexpanded and expanded cassette games. Ring Jonathan on 051-924 6657. Sell for £120.

**COMMODORE 64** £170 Single Floppy Disk clone 1541 with easy script £160 Vic 20 + cassette recorder £40 of S/W £80 01-659 2098.

**COMMODORE 64 CASSETTE** Interface to allow normal recorders to be used. Quickshot II joystick or Seveshot joystick and quality software (original) for the 64 i.e. Revenge of MC, Aztec Challenge, China Miner, Hobbit, etc. Phone 051-733-0090 after 4 Richard. **COMMODORE VIC 20** + cassette unit. Also many programs, including Matrix, Krazy Kong and Kaktus. Complete with leads and magazines, manuals etc. All for only £110 ono. Tel: Canterbury (0227) 58529.

**VIC 20 + 16K SWITCHABLE**, programmers Reference book loads of cassette games Chess cartridge book of 60 games. Joystick cassette magazines sell lot for £200 ono worth £264 Phone Campsneath [??] 381419.

**VIC 20 STARTER** pack complete. Worth £135 will accept £80 ono phone 061-626-2740 between 6pm-8pm. Simon. Buyer collects please.

**VIC 20 + 8K, C2N**, Programmers Reference manual + software worth £180 inc. all 5. Scott Adams Commodore adventures & Sargon II Chess. Total worth £350, sell for £140. Tel: Culcheth 3188 (eves).

**COMMODORE 1520 PRINTER** plotter as new seen London or Yeovil £80 Yeovil 75122 Mr. Higgins.

**VIC 20 STARTER PACK**, 3, 8, 16K Rampack, manuals, 16 tapes, 2 cartridges, dustcover, 2 joysticks, 5 year extra guarantee, 1 year old bargain £150 ono includes P+P. Telephone Cardiff (0222) 616357.

**VIC 20, UTILITIES** machine code, monitor programmers Aid, Graphics Aid etc. all on Rom. Also 8K Ram Pack. £15 each. Phil Sheffield 662225 (day).

**C 1525 PRINTER** — compatible with VIC 20, + COM 64, boxed, manuals, hardly used + paper. £150 ono. Tel: 38141 Carlisle: after 6pm.

**VIC 20, EXTRA MEMORY**, 3A + 8K, 3 cartridge games, joystick, cassette recorder + s/w. £170 ono Tel: Fareham 230956.

**COMMODORE PET 32K**, 4000 series £200. 2031 Floppy disk £220. Vortrax speech unit £40. various tapes/books, etc. Tel. 01 — 805 0603 (evenings).

**VIC 20 16K** Starter pack + portable joystick, chess matrix plus product 5 tapes — £150 Tel: 0357 20947.

**COMMODORE 64 WITH** Datalcassette Quickshot joystick II, Introduction to Basic Part 1, three games, dust covers hardly used 5 months old extra 12 months warranty £250 ono 051 339 7044.

**CBM C2N** cassette + joystick, nearly new £30. Tel: 01 841 — 2153.

**CBM 64 + C2N** cassette, 3 months old, mint condition, hardly used, Owner going oversea's, £150 ono: Tel 01-310 1832.

**8K VIC 20** for sale + tape recorder, manuals, demo tapes various games, one cartridge joystick as new only £150 o.n.o. Tel: 0244 336040.

**VIC 20 C2N**, cassette recorder, quickshot joystick, 16K switchable rampack, introduction to Basic Part 1, software, magazines 2 cartridge worth £400. Sell at £135. Tel Immincham (0469) 72854.

**16K VIC 20 + C2N** 5 cartridges adventur land, pirates cove, voodoo castle, jelly monsters, star battle £163 of software one joystick and one book + O'level Geography Tel 23578.

**COMMODORE VIC 20** C2N cassette unit, programmers reference guide 2 cartridges and other software £90 o.n.o. phone Fleet 3665.

**EXPANDED VIC 20(21K)** with cassette player, wide screen program + word processing package + games etc £140 Tel: Bristol 710335 (eves)

# COMPUTER SWAP

Computer Swap entries are limited to 30 words. Either fill in the accompanying form and send to: Computer Swap, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD or telephone 01-437 4343.

All software offered through computer swap must be in original condition and for private sale only.

It cannot be swapped.  
Warning: It is illegal to advertise pirated software.

# COMPUTER SWAP

Please write your copy in capital letters on the lines below.

|  |  |  |  |
|--|--|--|--|
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Name.....  
Address.....  
.....  
Telephone.....

## ADVENTURE HELPLINE

**Snowball on Commodore 64.** How do I get through the Security Door? Howard Seymour, 37 Waterford Green, Welwyn Garden City, Herts.

**Hobbit on Commodore 64.** Cannot get past the black river. Cannot get into the Goblins Caves.

**Quest on Spectrum.** Cannot get out of the forest or feed Dragon. Allan Churrn, 43 Stafford Street, Derby DE1 1JL.

**Aztec Tomb on Commodore 64.** How do I climb the cliffs or get to the land from the boat? Christopher Stamp, 22 Fir Rigg Drive, Marske, Redcar, Cleveland TS11 6BT.

**The Count on Vic 20.** How do you get the matches or the torch to go down the passage, and how do you tell the waiter to lower the oven? Shaun Calladine, 39 Grammer St, Denby Village, Derbyshire DE5 8PQ.

**Pharaoh's Tomb on Vic 20.** How do you get across the moat? Andrew Tate, 85 Argyle Way, Dunblane, Perthshire FK15 9DY.

**Inca Curse on Spectrum.** Which objects do I need to get through the porthole? How do I get through the slightly open panels? Chris Kissack, 30 High View Road, Douglas, Isle of Man.

**Castle Colditz on Spectrum.** Have collected torch, rope, pencil, chisel, lifebelt. Cannot light torch, open locked door, nor get out of barred window. Mrs R M Batham, The Whisperings, Sandhills Lane, Virginia Water, Surrey.

**Golden Voyage on Ti 99/4A.** How do you lose the Stone Goddess and how do you get off the staircase? Ben Thurley, 55 Beech Avenue, Bourne, Lincs.

**Voodoo Castle on Vic 20.** How do you get the Ju-Ju Bag and how do you remove the wooden boards up the chimney. Ian Murray, 18 Sakombe Drive, Hunts Cross, Liverpool.

**Valhalla on Spectrum.** I cannot find the second object, (Drapnir). Lee Graves, 114 Shakespeare Ave, Hayes, Middx UB4 0BW.

**Hobbit on Spectrum.** Can get treasure, but cannot get past the pale bulbous eyes. N. Goulding, 13 Repe Lea Estate, Droitwich, Ware.

**Adventureland on Vic 20.** How do you get past the bear and keep the honey? Miss K White, 44 Tenterden St, Bury, Lancs BL9 0HQ.

**Nosferatu on Vic 20.** Money for bus behind locked door. Where is the key? F Taylor, 53 Northumberland Cres, Southend-on-Sea, Essex.

**Espionage Island on ZX 81.** How to take boat downstream; what to do when native woman is reached. Tony Coxon, Bestwood Park Estate, Nottingham.

**Voodoo Castle on Vic 20.** Can't open safe, or get through crack. Also cannot understand when medium says B96. Stephen Gardiner, 14 Courtfleet Drive, Erith, Kent.

**Urban Upstart on Spectrum.** Can't get out of jail and avoid police. Kevin Finn, Bridge House, The Grove, Barnby Dun, Dorchester.

**Hobbit on Spectrum.** Having arrived in clearing with the ring and Thorin, how do I get through the Magic Door ... if indeed I have to! Neville Wright, 10 Deane Road, Edgehill, Liverpool.

**Pimania on BBC B.** Getting past the Ultimate Gate of PI in the Ivory Caverns. Robin Williams, 9 Mordean Rd, Blackheath, London SE3.

**Hobbit on Spectrum.** How do you get out of the Goblin's Dungeon; also, how to get into the barrel after you get out of the Elves Dungeon? Nadeem Zafar, 63 District Rd, Sudbury Town, Wembley, Middx HA0 2LF.

**Hobbit on Spectrum.** How do you get through the Magic Door when you are in the Elves Dungeon and have 3 keys? Matthew Hodges, 39 Birthfield Rd, Kidderminster, Worcs.

**Nosferatu on Vic 20.** How do you get into the hut on the lawn? Miss K White, 44 Tenterden St, Bury, Lancs.

**Espionage Island on Spectrum.** Gone round in circles, unable to go downstream, unable to use boat. Nicholas & Andrew Bartlott, 17 Abbey Close, Crapstone, Yelverton, Devon PL20 1PX.

**Ship of Doom on ZX Spectrum.** I can get the key from the case, but cannot open the Computer Room door with it. Mark Stokes, 3 Theadore Gdns, Scunthorpe, S Humberside.

**Circus on Spectrum.** Is the snorkel there for a reason? If so, what do you do with it? Liz Stafford, 24 Bridgewater Drive, Chester CH3 5LS.

**Time Machine on Spectrum.** At the Sphinx — pull lever — then what? Liz Stafford, 24 Bridgewater Drive, Chester CH3 5LS.

**Inca Curse on Spectrum.** How do I get down the port hole, and what do I need to do so? Jeff Rogers, 53 Bridesland Rd, Tile Cross, B33 0BJ.

**Valhalla on Spectrum.** When you have got the key, and open the chest and cupboard, what is the keyword to look inside? John Griffiths, 7 Redruth Ave, Wigston, Leicester.

**Smugglers Cove on Spectrum.** Can't get started, no matter what I try. Martin Kane, 56 Rosemount Cres, Carstairs Village, Lanarkshire, Scotland ML11 8QD.

**Inca Curse on Spectrum.** I cannot get past the fire and find any treasure. Martin Harris, 151 Dawlish Drive, Seven Kings, Ilford, Essex.

## Diary

| Event                                                        | Dates                                                   | Venue                                                                     | Admission                          | Organisers                                     |
|--------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------|------------------------------------------------|
| <b>Personal Computer World Show</b>                          | Sept 19-22<br>10.00am-7pm<br>Sept 23<br>10.00am-5pm     | Olympia 2,<br>Hammersmith Rd,<br>London W6                                | £3.50                              | Monbuild Ltd<br>01-486 1951                    |
| <b>ZX Fair</b>                                               | Oct 6<br>10.00am-5.00pm                                 | Padsey Civic Centre<br>Padsey<br>W Yorks                                  | 75p adults<br>50p children         | Northern Premier<br>Exhibitions<br>0533 652884 |
| <b>Livingston Computer Fair</b>                              | Oct 6-7<br>10.00am-5.00pm                               | Peel House<br>Ladywell<br>Livingston<br>W Lothian                         | £1.00 adults<br>50p children       | Bec/W Lothian<br>Computer club<br>0506 39046   |
| <b>Computer Graphics 84 (over 18s only)</b>                  | Oct 9, 10<br>10.00am-6.00pm<br>Oct 11<br>10.00am-4.00pm | Wembley Conference<br>Centre                                              | Free in advance<br>£5.00 on door   | Online Conferences<br>01-866 4466              |
| <b>Apricot and Sirius Show North</b>                         | Oct 16-18<br>10.00am-6.00pm                             | New Century Hall<br>New Century House<br>Corporation Street<br>Manchester | Free in advance<br>from organisers | 16 Bit Computing<br>Magazine 01-241 2354       |
| <b>Computer Games and Systems Retailer Show (trade only)</b> | Oct 17-18<br>9.00am-5.30pm                              | Novotel<br>London W6                                                      | Free                               | Macro Exhibitions<br>0992 469566               |

**ZX81**

|    |                       |                |
|----|-----------------------|----------------|
| 1  | (1) Alien Raid        | (CRL)          |
| 2  | (3) Planon Raider     | (Novus)        |
| 3  | (2) Krypton Ordeal    | (Novus)        |
| 4  | (4) Walk the Plank    | (Novus)        |
| 5  | (8) Scrabble          | (Quickstiva)   |
| 6  | (7) Flight Simulation | (Psion)        |
| 7  | (10) Hopper           | (PSS)          |
| 8  | (10) Mothership       | (Psion)        |
| 9  | (-) Espionage Island  | (Psion)        |
| 10 | (10) Black Crystal    | (Mastertronic) |

Two titles tied for 9th position  
(Figures compiled by Boots/Websters)

**Vic20**

|    |                           |                        |
|----|---------------------------|------------------------|
| 1  | (4) Flight 018            | (Craig Communications) |
| 2  | (9) Snooker               | (Visions)              |
| 3  | (5) Chariot Race          | (Micro Amics)          |
| 4  | (8) Crazy Kong            | (Interceptor)          |
| 5  | (1) Duck Shoot            | (Mastertronic)         |
| 6  | (-) Phantom Attack        | (Mastertronic)         |
| 7  | (6) Sub Hunt              | (Mastertronic)         |
| 8  | (2) Wizard & the Princess | (Melbourne House)      |
| 9  | (7) Vegas Jackpot         | (Mastertronic)         |
| 10 | (-) Undermine             | (Mastertronic)         |

(Figures compiled by Boots/Websters)

**Commodore 64**

|    |                    |                      |
|----|--------------------|----------------------|
| 1  | (6) BMX Racers     | (Mastertronic)       |
| 2  | (-) Gyropots       | (Taskset)            |
| 3  | (-) Spacewalk      | (Mastertronic)       |
| 4  | (4) Heistik        | (Mastertronic)       |
| 5  | (1) Beach Head     | (Centrosoft)         |
| 6  | (-) Super Pipeline | (Taskset)            |
| 7  | (10) Squirm        | (Mastertronic)       |
| 8  | (-) Snooker        | (Visions)            |
| 9  | (-) Arabian Nights | (Interceptor Micros) |
| 10 | (-) Room Lord      | (Paramount)          |

(Figures compiled by Boots/Websters)

**BBC B**

|    |                      |              |
|----|----------------------|--------------|
| 1  | (7) Aviator          | (Acornsoft)  |
| 2  | (1) Fortress         | (Pace)       |
| 3  | (6) Spitfire Command | (Superior)   |
| 4  | (-) Wallaby          | (Superior)   |
| 5  | (4) Ghouls           | (Micropower) |
| 6  | (8) Frenzy           | (Micropower) |
| 7  | (-) Smash and Grab   | (Superior)   |
| 8  | (-) Test Match       | (CRL)        |
| 9  | (10) Mr Wiz          | (Superior)   |
| 10 | (3) Stock Car        | (Micropower) |

(Figures compiled by WH Smith and Son, London)

**Books**

|    |                                                     |                 |
|----|-----------------------------------------------------|-----------------|
| 1  | (1) Commodore Programmers Reference Guide           | (Pitman)        |
| 2  | (2) Discover your Spectrum                          | (Century)       |
| 3  | (4) Introducing Commodore 64 Machine Code           | (Prentice-Hall) |
| 4  | (-) Teach yourself Computer Programming on CBMS4    | (Modder)        |
| 5  | (-) DIY Robotics & Sensors on the Commodore 64      | (Pan)           |
| 6  | (3) 80 Programs for the Commodore 64                | (Pan)           |
| 7  | (-) Machine code Sprites & Graphics on the Spectrum | (Sunshine)      |
| 8  | (-) Inside your Spectrum                            | (Sunshine)      |
| 9  | (7) Computer Programming for Beginners              | (Fontana)       |
| 10 | (-) Commodore 64 Graphics & Sound                   | (Granada)       |

(Three titles tied for 8th position)  
(Figures compiled by Websters)

**Atari**

|    |                       |                           |
|----|-----------------------|---------------------------|
| 1  | (1) The Hulk          | (Adventure International) |
| 2  | (6) Ace               | (English)                 |
| 3  | (1) Bruce Lee         | (Datascop)                |
| 4  | (-) Hideous Encounter | (Novagen)                 |
| 5  | (-) Zaxxon            | (Datascop)                |
| 6  | (-) Mach 65           | (OSS)*                    |
| 7  | (-) Preppie           | (Adventure International) |
| 8  | (-) Basic XL          | (OSS)*                    |
| 9  | (-) Helicat v Ace     | (Microprose)              |
| 10 | (-) Warlock           | (Calisto)                 |

\*Cartridge 132K cassette 648K disc  
(Figures compiled by Calisto Computers, Birmingham 021-632 6458)

**Spectrum**

|    |                            |                           |
|----|----------------------------|---------------------------|
| 1  | (6) Match Point            | (Psion)                   |
| 2  | (1) Jet Set Willy          | (Software Projects)       |
| 3  | (3) Tornado Low Level      | (Beyond)                  |
| 4  | (5) Jack and the Beanstalk | (Thor)                    |
| 5  | (-) Fighter Pilot          | (Digital Integration)     |
| 6  | (7) Elmo Thunder           | (Foundry Systems)         |
| 7  | (4) Lords of Midnight      | (Beyond)                  |
| 8  | (-) Zaxxon                 | (Starzone)                |
| 9  | (-) The Hulk               | (Adventure International) |
| 10 | (10) Sabre Wulf            | (Ultimate)                |

**Dragon 32**

|    |                              |                   |
|----|------------------------------|-------------------|
| 1  | (-) Chuckie Egg              | (A&F)             |
| 2  | (-) Cuthbert in Space        | (Microdeal)       |
| 3  | (-) Hunchback                | (Ocean)           |
| 4  | (8) Chocolate Factory        | (Minit)           |
| 5  | (5) Ring of Darkness         | (Wintersoft)      |
| 6  | (-) Dragon Chess             | (Oasis)           |
| 7  | (-) Hungry Horace            | (Melbourne House) |
| 8  | (7) Dragonfly 2              | (Hewson)          |
| 9  | (8) Mr Digg                  | (Microdeal)       |
| 10 | (-) Mystery of the Java Star | (Sharde)          |

Titles tied for 2nd and 8th positions.  
(Figures compiled by Boots/Websters)

## LUNACY

*Programming your Commodore 64* is a classic example of a book that has, in this country, no reason for its existence whatsoever.

The book has been imported from the USA and so consequently costs £12.55 rather than about £6.95. Whilst some American computer books have a definite edge in terms of, for example, originality, style (well sometimes) and accuracy, they also have disadvantages in terms of the difference between the two markets.

For example the book suggests that you might want to buy the Commodore cassette unit since some games come on tape (really?). It goes on to suggest that if you can't use a disc drive because you can't afford it, you might like to 'by-pass it in favour of a printer' — this lunacy!

Other than that and similar stuff, it's pretty much your usual intro guide full of tables, programs and flow charts.

As I say, there is no reason to buy it whatsoever.

|                 |                                                                           |
|-----------------|---------------------------------------------------------------------------|
| <b>Book</b>     | Programming your Commodore 64                                             |
| <b>Price</b>    | £12.55                                                                    |
| <b>Micro</b>    | Commodore 64                                                              |
| <b>Supplier</b> | Prentice Hall<br>66 Wood Lane End<br>Hemel Hempstead<br>Herts.<br>HP2 4RH |

## OVERVIEW

As Christmas draws near, books tend to get bigger, more colourful and of course, more expensive.

Not only that but they get less and less machine-specific and more and more intended for a general, coffee table, market.

One reason is that a lot of aunts and uncles are going to want something to buy for Christmas presents.

*Choosing and Using Your Home Computer* is a big colourful book intended for people who know nothing about computers but who think they should find out something. It is easy to digest and very 'flick throughable'.

What you get, is an overview of the main computers which is reasonably up to date (includes QL), sections on various kinds of computer game, modems, graphics, binary, discs, printers etc etc etc. All well illustrated with diagrams, photos, etc.

If you don't expect it to teach you anything very specific about your computer but just want general overview, it could be worth looking at.

|                 |                                                                         |
|-----------------|-------------------------------------------------------------------------|
| <b>Book</b>     | Choosing and Using Your Home Computer                                   |
| <b>Price</b>    | £12.99                                                                  |
| <b>Micro</b>    | General                                                                 |
| <b>Supplier</b> | Orbis Publishing<br>Orbis House<br>20-22 Bedfordbury<br>London WC2N 4BT |

# This Week

| Program                    | Type | Micro        | Price  | Supplier     |
|----------------------------|------|--------------|--------|--------------|
| <b>Trial of Arnold</b>     |      |              |        |              |
| Blackwood                  | Ad   | Amstrad      | £5.50  | Nemesis      |
| <b>Fantasia Diamond</b>    | Ad   | BBC          | £7.95  | Hewson       |
| Sadim Castle               | Ad   | BBC          | £7.50  | MP           |
| <b>Valley of the Kings</b> | Ad   | BBC          | £7.50  | MP           |
| Art Designer               | Ut   | BBC          | £7.95  | Pica         |
| Define                     | Ut   | BBC          | £9.95  | Datapen      |
| Squash                     | Ut   | BBC          | £9.75  | Pica         |
| Chiller                    | Arc  | Commodore    | £1.99  | Mastertronic |
| Cricket 64                 | S    | Commodore 64 | £7.95  | CRL          |
| Golf 64                    | S    | Commodore 64 | £7.95  | CRL          |
| Basic Lightning            | Ut   | Commodore 64 | £14.95 | Oasis        |
| Machine Lighting           | Ut   | Commodore 64 | £29.95 | Oasis        |
| White Lightning            | Ut   | Commodore 64 | £19.95 | Oasis        |
| Starting Fractions         | Ed   | Dragon 32    | £5.95  | Wizard       |
| Touchdown                  | S    | Dragon 32    | £6.95  | Wizard       |
| Dismon                     | Ut   | Dragon 32    | £7.95  | Wizard       |
| Hangman                    | Arc  | QL           | £9.95  | Quantum Soft |
| Mastercode                 | Arc  | QL           | £9.95  | Quantum Soft |
| Avalon                     | Ad   | Spectrum     | £7.95  | Hewson       |
| Twin Kingdom Valley        | Ad   | Spectrum     | £7.95  | Bug Byte     |
| Mr Glup                    | Arc  | Spectrum     | £5.45  | Wizard       |

|                               |     |          |        |            |
|-------------------------------|-----|----------|--------|------------|
| <b>Pyjamarama</b>             | Arc | Spectrum | £5.95  | Mikro Gen  |
| <b>A Level Sociology</b>      | Ed  | Spectrum | £9.95  | Akadimias  |
| <b>Antony &amp; Cleopatra</b> | Ed  | Spectrum | £9.95  | Akadimias  |
| <b>Chaucer Prologue</b>       | Ed  | Spectrum | £9.95  | Akadimias  |
| <b>Tempest</b>                | Ed  | Spectrum | £9.95  | Akadimias  |
| <b>Tudor England</b>          | Ed  | Spectrum | £9.95  | Akadimias  |
| <b>Air Traffic</b>            | S   | Spectrum | £9.95  | Mikro Gen  |
| <b>Controller</b>             |     |          |        |            |
| <b>Hustler</b>                | S   | Spectrum | £6.99  | Bubble Bus |
| <b>The Highway Code</b>       | S   | Spectrum | £6.95  | Datek      |
| <b>Microdrive White Light</b> | Ut  | Spectrum | £19.95 | Dasis      |

**Key:** Ad — adventure/Arc — arcade/Ed — education/  
S — strategy-simulation/Ut — utility

This Week is a new section that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to: *This Week*, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

## Tape office

What the Mini is to the Rolls Royce. *Mini Office* is to integrate business software like Lotus 1-2-3.

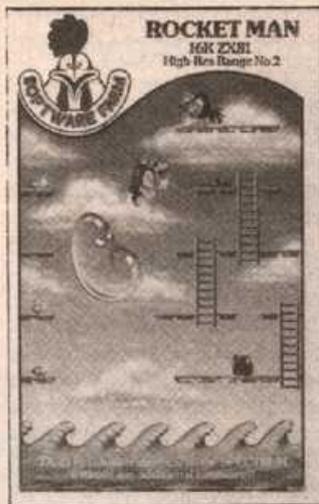
Mini Office for the standard 32K micro includes a database, wordprocessor, spreadsheet and simple graph program all on one tape. More than that, information can be moved from one program to the other so that, for example, information from the spreadsheet may be fed to the graph program.

The wordprocessor will count words, let you correct text with a cursor and produce double-sized letter and print out the end result. The database lets you set up simple files, of both text and numbers and add, list and examine records. You can replace strings, search fields and sort records into alphabetical or numerical order. The spreadsheet works exactly as a normal spreadsheet manipulating figures according to given mathematical rules. Finally the graph program draws simple bar graphs based on the figures.

Obviously none of the programs offer comprehensive facilities but all are genuinely functional. Being tape based is a problem but there is a disc version for those who have one.

At £5.95 it has to be worth considering.

|                 |                                                                              |
|-----------------|------------------------------------------------------------------------------|
| <b>Program</b>  | <i>Mini Office</i>                                                           |
| <b>Price</b>    | £5.95                                                                        |
| <b>Micro</b>    | BBC B                                                                        |
| <b>Supplier</b> | Database Publications<br>68 Chester Road<br>Hazel Grove<br>Stockport SK7 5NY |



## Bubloid

A new program has arrived from Software Farm — the company which has somehow managed to get high resolution programming from the ZX81 and produce games that have made the odd Spectrum owner jealous.

The game — *Rocket Man* — is basically of the platforms and ladders variety with plenty of other things thrown in. The aim of the game is to collect diamonds from one side of the screen with the aid of a freshly fueled rocket pack found on the opposite side.

To get the fuel you must run and jump along the platforms and up and down the ladders collecting the fuel pods necessary for the flight to the diamonds. However, your flight can become blocked by a rampant bubloid which does unpleasant things to you if it catches you.

Later screens have more complex mazes of ladders and replace the jet pack with a vulture (which requires legs of lamb rather than fuel for sustenance.)

Arcade fans who are still sticking to their ZX81 shouldn't miss this one.

|                 |                                                                        |
|-----------------|------------------------------------------------------------------------|
| <b>Program</b>  | <i>Rocket Man</i>                                                      |
| <b>Price</b>    | £5.95                                                                  |
| <b>Micro</b>    | ZX81                                                                   |
| <b>Supplier</b> | Software Farm<br>155 Whiteladies<br>Road<br>Clifton<br>Bristol BS8 2RG |

## Pick of the week

About *Deus ex Machina* there is almost too much to say.

It's like a breath of fresh air compared with 99% of the material I receive each week — all the colourful multi-screen collect the... and dodge the... but watch out for the... loony len, digger dan, furtive freddie and other alliterative nonentities which pass for inventiveness.

*Deus ex Machina* is different. About as different and as rare as a truly great pop song. It is a completely new computer experience.

Above all, *Deus ex Machina* brings drama to computer software (aside from a host of specific new ideas — of which more in a moment). Not the drama of the dreaded bulbous thwarks threatening your laser base (heavens!) or the snapping blimps which bounce a round the higher levels on the sixth screen (gosh!) but the drama of the widescreen epic. Not profound maybe, but still able to stir the emotions a little.

To specifics: *Deus ex Machina* is a package consisting of two tapes and a poster-come-script on which the words to the songs and the dialogue is printed. The first tape is around 80K of computer program, loaded, obviously in two sections. The second tape contains music, singing and dialogue and features notables like Ian Dury, EP Thompson, Jon Pertwee Dorna Bailey (OK, so she isn't all that notable but she should be) and, playing the baddie, Frankie Howard.

This tape is ingeniously synchronised to the computer tape via a counted intro by John Pertwee after which the whole music and animation drama unfolds. The plot, is part sf, part fairy tale, part bleak 1984 totalitarian vision and concerns itself with the constant Automata themes of non-violence, non-sexism, humour, irreverence and not least, determined unconventionality. It is the story of the creation of life by the

## Movie, movie

'central computer' from a quantity of mouse droppings deposited shortly before the death of the last mouse on Earth.

I have no idea whether the plot is profound or silly at the moment as I haven't had time to study it too closely but either, way, the computer graphics are just about as good as they could be on the Spectrum.

The computer 'movie' can be thought of as a number of very original and very abstract ar-



cade games strung together in a logical sequence. Since tape and computer are linked you never actually fail in the sense of 'game over' or succeed in the sense of 'making it to the final level' or whatever. What you can affect is the 'life' level — a percentage figure that changes throughout.

For example, in the initial section the first strands of DNA must be kept alive by your cursor — the baddies are, at all times, trying to prevent life forming. The screen displays beautifully detailed slowly turning strands, the music plays, and like some abstract version of plate spinning you move your cursor around. It's satisfying as an arcade game but quite different from the usual zapping experience.

If it has a fault it is only a doubt in my mind about whether you will want to play *Deus ex Machina* over and over — maybe it will suffer a similar fate to all those horrendous seventies concept albums. Whatever happens *Deus ex Machina* is a brave new idea.

|                 |                                                     |
|-----------------|-----------------------------------------------------|
| <b>Program</b>  | <i>Deus ex Machina</i>                              |
| <b>Price</b>    | £15                                                 |
| <b>Micro</b>    | Spectrum                                            |
| <b>Supplier</b> | Automata<br>27 Highland Road<br>Portsmouth<br>Hants |

## Stageplay

Hutchinson Computer Publishing is a section of the Hutchinson book publishing group shortly to release two programs for the Spectrum — similar in format but differing in plot — two programs for the Spectrum *Fire on the Water* and *Flight from the Dark*.

These are also Parts 1 and 2 of the Lone Wolf role-playing adventure books and the plot of both game and book is the same.

What you get, essentially, is the book but with all the decisions you make illustrated by animated graphics — the end result is superb, a little like *Valhalla* in some ways but quite original in its approach.

You begin in *Flight from the Dark* at a monastery where you decide how equipped for the adventure to come you will be. This takes the form of a fight with your master — there are keyboard controls for Thrust, Parry, Advance, Retreat etc and you battle it out with the Computer-controlled master. How well you do determines much of what will follow.

The monastery is attacked and you begin the adventure — half the screen becomes like the stage of a theatre you walk on and text describes the location and lets you choose from a

You find objects, baddies, goodies, shelter, danger, quests, a wide variety of weapons and hundreds of different screens of adventure. You get arcade spills and thrills by doing battle via the keyboard with a wide variety of odious looking monsters and you get the more cerebral pleasure by deciding what action to take at each point, as in an adventure. The programs complete with booklet and overlay will cost £6.95 which is definitely cheap. number of options. Whatever you choose the scene will change with 'curtains' opening and closing to shift the scene.

**Program** *Flight in the Dark*  
**Price** £16.95  
**Micro** Spectrum  
**Supplier** Hutchinson Computer Publishing  
Hutchinson House  
17-21 Conway Street  
London W1P 6JD

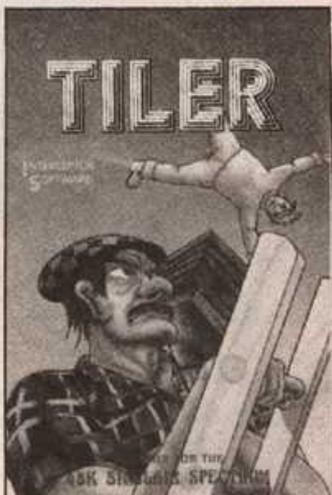
## Bouncing

*Tiler* is a high-resolution arcade game from Interceptor Micro's that gets a few extra brownie points for bizarreness whatever else.

The idea is to tile the roof of Rob Rubber (hey, guess what his chief quality is) getting the tiles from the garage via the garden and then fitting them in place.

Rob bounces around his house and gets in your way thereby making tiling extremely hazardous. And that's about it for the game really — you have stairs to climb and three screens of high-res house-complete with expensive looking sports car.

The graphics are nice and it's not a bad game in a lot of ways, though it's really only a grab and dodge game with good background graphics.

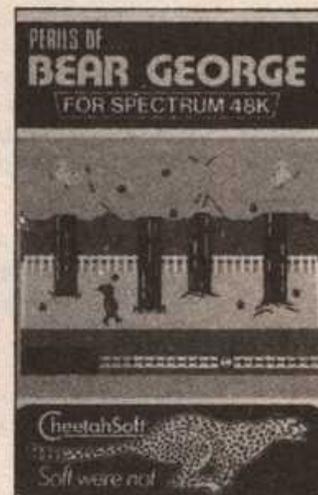


**Program** *Tiler*  
**Price** £5.50  
**Micro** Spectrum  
**Supplier** Interceptor Micro's  
Lindon House  
The Green  
Tadley  
Hampshire

## Bear boy

Cheetahsoft has released a number of games to tie in with the release of its new RAT remote control joystick. One of them at least stands in its own right as a good new Spectrum release — *Bear George*.

The game is divided into three parts spuriously linked by the fact that they all concern



the adventures of a bear called presumably, George.

George first has to stock up on apples to build up fat for the long winter's hibernation. This involves standing under trees with your mouth open) you being a rather nice large sprite of a bear) this is pretty difficult, somewhat akin to trying to throw smarkteis in the air and catch them in your mouth. Occasionally a squirrel drops nasty garden apples on you resulting in your losing a life.

The next screen involves trying to avoid skiers on the way to your cave (some nice scenery here) and the final action involves avoiding a number of spiders which are bobbing up and down on their threads, (Nothing spectacular here but some pleasing graphics and good sound effects).

**Program** *Bear George*  
**Price** £5.95  
**Micro** Spectrum  
**Supplier** Cheetah Soft  
24 Ray Street

## No strings

*Terrahawks* is the most recent program from CRL and is based on the recent puppet series by Jerry Anderson (responsible for the sublime *Thunderbirds* amongst many others). The company seems to be doing a number of games based on TV series — it has a *Magic Roundabout* program in progress also.

I must admit that I can't see that the plot of the game has much to do with the puppets, but then perhaps that doesn't matter very much.

The idea is to guide your

ship into a Black Hole, into which you've been sucked and search for a vortex which will, eventually lead you out through the various strata of the hole and into space once more.

The black hole is populated with huge green monoliths through which you must fly (unless you decide to blast them away). Radar can help you find the vortex but you will need your fuel and range metres since flying too high eats up energy quickly. Lower down, however, there are more monoliths.

Swings and roundabouts.

**Program** *Terrahawks*  
**Price** £6.95  
**Micro** Spectrum  
**Supplier** CRL  
CRL House  
9 Kings Yard  
Carpenter's Road  
London E15 2HD

## Monumental

*Havoc* is a pretty impressive new game for the Commodore 64 and, in a month or so, Spectrum. It's inspired by *Zaxxon* maybe, but graphically the game is fairly spectacular. You fly a delta type fighter through nearly ten minutes worth of the skyscrapers, roads, vast monumental columns of some strange almost deserted city. *Zaxxon* comes in with the viewpoint, edge on at around 45 degrees with the whole thing scrolling top right to bottom left across the screen.

The city is not completely deserted, of course, somewhere at the far end of your flight you might, but probably won't, manage to fight out what it is that is launching missiles and air mines towards you. But dangerous adversaries isn't really the major problem — your passage through the city is impeded by vast columns and giant brick walls through which, somehow, you have to manoeuvre — usually guiding the jet through the tiniest of gaps and holding your breath.

**Program** *Havoc*  
**Price** £9.95  
**Micro** Commodore 64  
**Supplier** Dynavision Production Studio  
PO Box 96  
Luton LU3 2JP



## Water importance

I recently came down to London to cover the launch, at a hotel in Knightsbridge, of some new software for microcomputers.

It looked as if I was going to be very early, but as Knightsbridge is next door to Hyde Park, I went via the park to see if they had moved the Serpentine.

I came upon a cafe next to the water's edge, to find that the floor of the cafe was being sluiced with copious amounts of water. Living in the North West, with dire warnings of the consequences of wasting water being an everyday part of life, I was shocked.

How, I wondered, can the GLC get away with the law in such a blatant manner? It was then that I realised: there is no water shortage in the South East of England.

The release of more computer software, however marvellous, was not going to have any impact on the car wash firms of the North West (banned from using water). The operation of the car washes might now be controlled by use of microprocessors, (I do not know), but without water there was nothing the car washes could do.

This is the basic problem with informa-

tion technologies which is summed up in the (apocryphal?) story of the trade union leader in the USA confronted by a production line manned by robots. Yes, he agreed, the robots were doing a grand job and did not need to have rest breaks, but "Do robots buy cars?"

It is a common, and correct, argument: the world does not exist for machines, it exists for people, and the needs of people have to be met before the needs of machines.

If, at any point, we start to put the needs of machines before the needs of people, then we start a process of dehumanization.

If we produce a world where all cars are produced by robot, (until the oil runs out), the numbers of cars purchased will decline because robots will be fabricating most industrial goods, and people will be out of work. The profits of manufacturing industries will therefore decline as more robots are used, and fewer and fewer people are working and therefore able to buy manufactured goods.

Managers will disappear. Once dealing with people is removed, management is easily automated. At the same time the infrastructure of our nation will be in tatters, and already it is beginning to get increasingly more tattered.

It is all a matter of priorities. For example, solving all the problems of maldistribution of water would probably cost less than all the money the Government is currently wasting on information technology.

Isn't having an adequate water supply more important than spending money on teaching people how to use computers?

Leave learning about computers to private initiative, and let the Government spend money on useful tasks.

Water is more important than the Fifth Generation.

Boris Allan

## Marathon jog

### Puzzle No 124

Ever since it was announced that the town councillors would be running in the local marathon, a number of these worthy dignitaries have been seen jogging around the gardens in front of the town hall.

The garden is rectangular in shape, and is bordered by a pathway around its perimeter. It also has two diagonal pathways, which run from corner to corner.

Now the Lord Mayor has it on good authority from the County Surveyor, that if a runner starts at one corner of the gardens, runs one circuit of the perimeter path, crosses the first diagonal, then runs the lengths of the longer side a second time, and finally runs along the other diagonal, the route will be exactly one mile long.

What are the dimensions of the garden if the length, width and diagonals are all exact numbers in yards?

### Solution to Puzzle No 119

From the information that we are given, we know that the width is between 9 and 100 feet, and the length — which is an exact multiple of the width is between 99 and 1000 feet. Further, these measurements and their product (the area), consist of the digits 0 to 9. Therefore, the area must have five digits.

```
10 FOR W = 10 TO 99
  20 FACTOR = 2
  30 L = W*FACTOR
  40 IF L<100 THEN GOTO 190
  50 IF L>999 THEN GOTO 210
  60 PRODUCT = L/W
  70 IF PRODUCT<10000 THEN GOTO 190
  80 IF PRODUCT>89999 THEN GOTO 210
  90 LS = STR(L)
  100 WS = STR(W)
  110 PS = STR(PRODUCT)
  120 TS = RIGHT$(LS) + RIGHT$(WS) + RIGHT$(PS)
  130 FOR N = 1 TO 9
  140 FORM = N + 1 TO 10
  150 IF MID$(TS,N,1) = MID$(FORM,N,1) THEN GOTO 190
  160 NEXT M
  170 NEXT N
  180 PRINT W,L,PS
  190 FACTOR = FACTOR + 1
  200 GOTO 30
  210 NEXT W
```

Note that lines 90-170 combine the three dimensions for duplication of digits. This reveals the solution: Width = 27 feet, Length = 594 feet, and Area = 16038 square feet.

### Winner of Puzzle No 119

The winner is: Paul Thomas, Heol-y-Forlan, Cardiff, who receives £10.

### Rules

If the puzzle prize can be sensibly solved using a computer then the winner will have included a listing of the program used to find the correct answer. The closing date for entries to Puzzle No 124 is September 29.

## The Hackers



You'll never dream a program  
could be this good!!!



# PYJAMARAMA

Join Wally in his nightmare

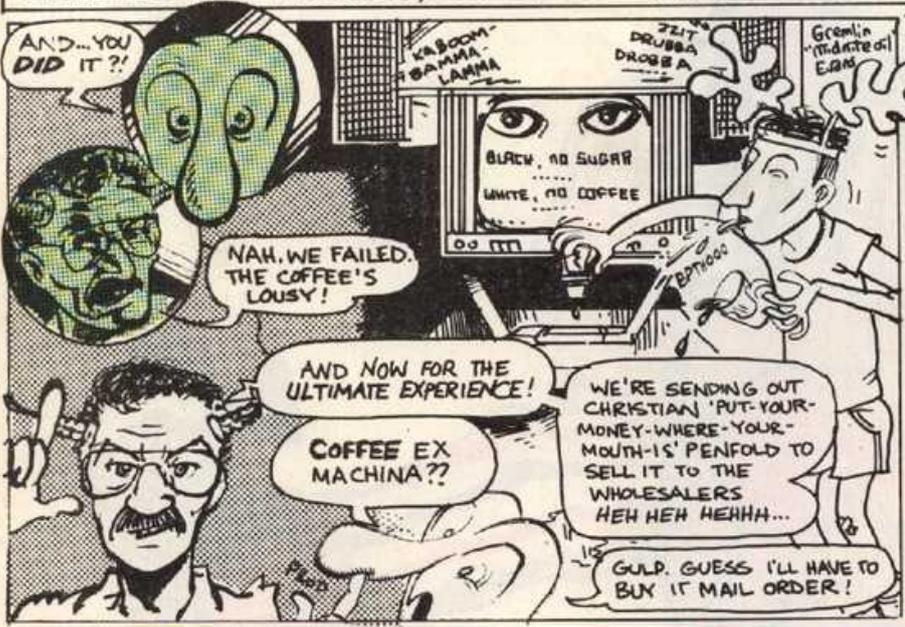
Sensational Software from

**MIKRO-GEN**

44 The Broadway, Bracknell. Tel: (0344) 427317

Available for Commodore 64 and Spectrum 48K

THE PLACE: AUTOMATA MISSION CONTROL (next to rain-barrel by the greenhouse)  
 THE TIME: TUESDAY EVENING AFTER TEA AND COMPULSORY PRAYERS  
 THE SITCH: MEL OUT-OF-HIS-TREE CROUCHER IS REVEALING ALL TO THE OTHER INMATES ABOUT THE MIND-BLOWING **DEUS EX MACHINA** PROJECT.



- |                                                                                                                    |                                                                                                    |                                                               |
|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| CRUSOE ..... 48K Spec £6 <input type="checkbox"/>                                                                  | DEUS EX MACHINA ..... 48K Spec £15 <input type="checkbox"/>                                        | PIMANIA ..... 48K Spec £10 <input type="checkbox"/>           |
| PI-EYED ..... 48K Spec £6 <input type="checkbox"/>                                                                 | GO TO JAIL ..... 48K Spec £6 <input type="checkbox"/>                                              | OLYMPIMANIA ..... 48K Spec £6 <input type="checkbox"/>        |
| PIROMANIA ..... 48K Spec £6 <input type="checkbox"/>                                                               | MORRIS MEETS THE BIKERS .. Any Spec £6 <input type="checkbox"/>                                    | PI-BALLED ..... 48K Spec £6 <input type="checkbox"/>          |
| PI-IN'ERE ..... 48K Spec £6 <input type="checkbox"/>                                                               | T-SHIRTS State Size ..... Price £5 <input type="checkbox"/>                                        | DARTZ ..... 48K Spec £5 <input type="checkbox"/>              |
| YAKZEE .. Dragon/48K Spec £5 <input type="checkbox"/>                                                              | 'BACKCHAT' Speech Synth. CBM64 with Software & Programming Book ..... £25 <input type="checkbox"/> | Piman's Stereo L.P. Cassette .... £3 <input type="checkbox"/> |
| PIMANIACS CLUB for 20% off all products, PI-Monthly Magazine. Annual Subscription U.K. £5 <input type="checkbox"/> |                                                                                                    | Overseas £7 <input type="checkbox"/>                          |

I enclose the right money, or debit my ACCESS/VISA Card. My Card number is .....

Card holders signature ..... Card holders name ..... My name .....

My address .....

..... Post Code .....

NO EXTRAS! All our prices include VAT and Postage & Package. 24 hr. -CREDIT CARD HOT LINE (0705) 735242.  
 Send your order and payment to: AUTOMATA U.K. LTD. 27 HIGHLAND ROAD, PORTSMOUTH, HANTS. PO4 9DA, ENGLAND.