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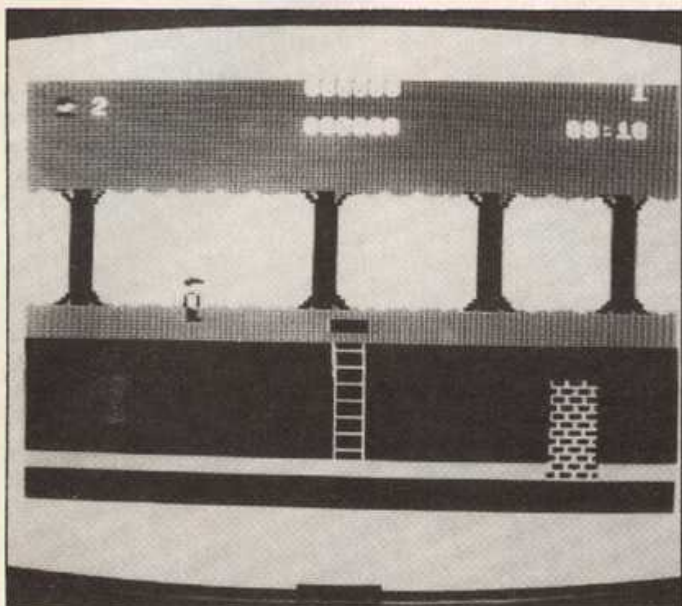
Computing

WEEKLY

19-25 July 1984

the best selling weekly

Vol 3 No 29

Microdeal's *Cuthbert in the Jungle*

Microdeal in court battle

TEN software houses are this week taking action in the High Court against a commercial software piracy racket, in an attempt to prove that software is copyright.

Cornwall-based games company Microdeal unearthed a tape piracy racket involving thousands of pounds worth of Dragon software being sold through classified advertisements in computer magazines.

Games such as Softek's *Ugh!* and Microdeal's *Frogger* and *Cuthbert* series were being copied on a large scale and

offered to Dragon owners at a fraction of the retail price.

Dr Mohammed (a medical doctor) and his fourteen-year old brother T Mohsan, it is alleged ran a tape copying operation from four different addresses in the Blackburn area, selling not only sets of 35 games on a single C90 tape, but also utilities such as *Kopy-key* program copier and the *Text-star* word processor.

"Other companies apart from Microdeal and Softek who had games copied included on page 5 ▶

Dragon moves to Spain

THE future of Dragon Data, which has been in receivership for over five weeks, now looks settled.

The Port Talbot manufacturing plant will be closed, and a Spanish company, Eurohard SA, who exchanged contracts with Dragon Data two weeks ago, will take over manufacture of the Dragon machines. Eurohard operate from a site in Extre Madura near the Portuguese border, a Spanish development area. Details of the deal are to be finalised this week.

Eurohard was set up with Spanish government aid specifically to build up the Spanish

hardware industry. Before the receiver was called in to Dragon Data, Eurohard was negotiating with the company to gain a licence to manufacture Dragons in Spain.

Not all Dragon employees will lose their jobs, however. A new company, Touchmaster, is being set up headed by Brian Moore, ex-managing director and former marketing director Richard Wadman. Touchmaster will provide after sales services and software support in this country.

GEC will continue the marketing of the Dragon machines in the UK.



Richard Wadman



Brian Moore

Commodore sues

COMMODORE International is suing four of its former engineers — now working under Jack Tramiel at Atari. The suit, against former engineering director Shiraz Shivji and three others, Arthur Morgan, John

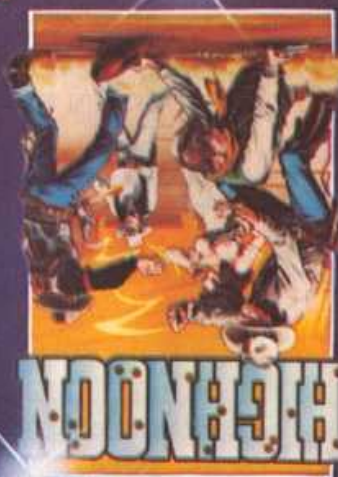
Hoening and Douglas Renn, was filed in Chester County, Pennsylvania on Tuesday, July 10th. The judge granted Commodore's request for a temporary injunction.

continued on page 5 ▶

INSIDE > TURF LUCK > CUT-PRICE KINGS > HOUSE OF USHER

Summer '84

The real winners
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new games... new horizons!



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Imagine always flew by the seat of its pants. And now it's gone.

It would be easy to say it failed because of bad management, imprudent financial decisions and internal wrangling. These may have all contributed, but none would have led to Imagine's downfall if were it not for the present state of the home computer software industry.

To say it's quiet would be an understatement. Software just isn't selling. Christmas was disappointing, and the first six months of this year have been disastrous.

It is not for nothing that software houses have suddenly started taking a serious interest in questions like piracy. Who cares in a boom time? Things are different now. Why do you suppose that some companies are joining the budget software bandwagon?

Why are others selling off their back catalogue at heavy discounts?

Nothing has moved since January.

The sensible companies battered down the hatches in March and conserved their resources waiting for the expected up-turn in September.

If things don't pick up dramatically in the Autumn then we shall see many more casualties.

And the companies which fail will not necessarily be those with poor games. It will be the small innovative houses which will go to the wall. Lumbering giants like Thorn EMI, and CBS will be around to pick up the pieces.

Breaks your heart, don't it?



SUNSHINE

POPULAR Computing WEEKLY

Vol 3 No 29

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> Futures...

A cypher system to protect your Commodore 64 software... How to verify your QL microdrive programs... An interview with a new software house Triptych trying to make programs that actually *do* something... And Star Game is *Deathcap* for the Commodore 64.

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ABC

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Microdeal

continued from page 1

ded Tandy, Cable, Dragon Data, Morrison Micros, Programmers, Guild, Romik, Quicksilver and PSS," said Microdeal managing director John Symes.

At a private hearing on Monday, July 9, Microdeal obtained an Anton Piller search order and on Friday, July 13, Mohsan and Mohammed's house at 24 Irving Place, Blackburn was raided and a number of boxes of tapes and duplicating equipment were seized.

An injunction also obtained by Microdeal to prevent Dr Mohammed from continuing to sell and advertise pirated tapes has been extended until a court hearing is held at the High Court in London on Friday, July 20. An application on Monday, July 16 for a similar extension to cover T Mohsan was refused.

Commodore

continued from page 1

The suit covers alleged theft in May and June, referring to secret material about a business machine based around the Z8000 chip planned by Commodore for next year.

The action is seen as part of the increasing bitterness between Commodore and its former founder Jack Tramiel, whose company, TTL, has taken over Atari. Several former Commodore senior executives are now working for Tramiel, including David Harris, a former Commodore vice-president, now sales vice-president at TTL.

Mastertronic takes over Carnell

MASTERTRONIC has come to the rescue of Carnell Software, who went into liquidation last month, (see PCW, 21 June).

It has set up a new company, Innovision to market Carnell's *Wrath of Magra* and *Black Crystal* games. It is not yet known if Carnell's *Volcanic Dungeon* is also included in the deal.

The two games will be sold at their original price — £11.95 for *Magra*, with the book inclu-

BBC stays with Acorn

A NEW four year contract has been signed between Acorn Computers and the BBC.

The agreement means that Acorn can continue to use the

Acorn is planning to expand its manufacturing and distribution of the Model B machine. It has also begun an export drive to sell the machines in the US and



Left to right: Hermann Hauser and Chris Curry of Acorn, Bryon Parkin and Bill Cotton of the BBC

BBC name on its top selling product — the BBC Model B micro computer.

The signing also ends months of speculation that the BBC might take the opportunity presented by the expiry of Acorn's existing agreements to include other manufacturers.

A number of companies including Sinclair and Dragon have in the past shown interest in gaining the lucrative BBC contract.

Following last week's signing

the Germany and Benelux areas of Europe. Manufacturing facilities are being set up in Australia, India and China.

"Acorn is planning to develop more power add-ons for the BBC to take it into the 16-bit and 32-bit computer range," said an Acorn spokesman.

"The BBC contract has become a very significant one for Acorn — in the beginning the Model B was seen as a fairly minor machine."

Robin Hood on the Spectrum

THE legend of Robin Hood has been turned into an adventure game by Nottingham software house Runesoft.

Robyn Hode has over 400 locations, set in Nottingham and Sherwood Forest.

"We did a great deal of research to make the locations as authentic as possible," said John Flack of Runesoft.

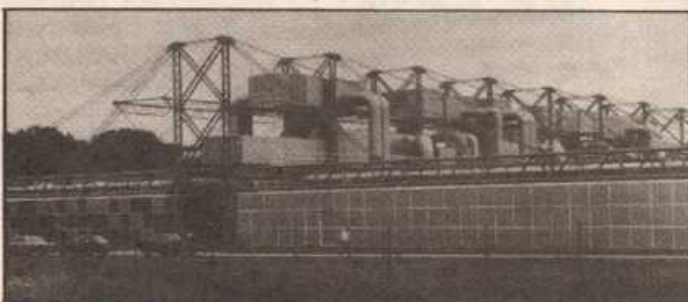
"The city library had some

maps, although none prior to 1610, so we consulted the Domesday Book to see how the land would have looked."

The game uses landmarks apart from Sherwood Forest — part of the adventure takes place in the cave system underneath Nottingham castle.

Robyn Hode for the 48K Spectrum costs £9.95.

Thorn EMI buys stake in Inmos



THORN EMI has paid £95m for a 76 per cent stake in Inmos, the government supported microchip company.

Imagine in hands of Receiver

THE Official Receiver has now been called in at Imagine Software.

The company was wound up on Monday, July 9, at the High Court in London, after Imagine failed to pay creditors VNU, Business Publications £10,000 within a seven day time limit.

A creditors meeting has yet to be arranged, but until a receiver has been appointed, the Official Receiver in Liverpool is standing in.

But there is a long list of other creditors still waiting to be paid by Imagine including Kiltale, a Gloucestershire duplication plant, Marshall Cavendish, still waiting for payment in the region of £250,000, Liverpool City Council, printers Henry Matthews and Son, United Arab Shipping, who own Tithe-barn House, where Imagine occupied offices, Scatchards, a Liverpool wine merchant, where Imagine had an account and G D Studios, which produced cassette labels and artwork for the company. The total of debts from these companies is put at over £300,000.

Former Imagine directors Dave Lawson and Ian Hetherington — together with several ex-Imagine employees — are believed to be still continuing development of the two Megagames, for which they now own the copyright.

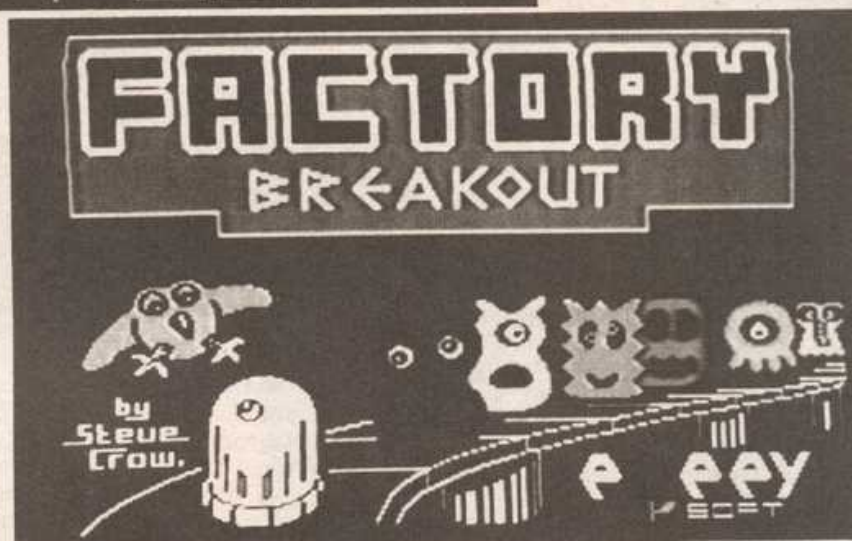
Bruce Everiss is in negotiations with an unnamed, non-software company in Liverpool, regarding employment of other former Imagine staff.

It may also buy the remaining 24 per cent, currently held by the company's three founders and its employees.

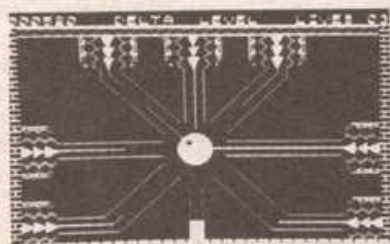


For the 48K ZX Spectrum

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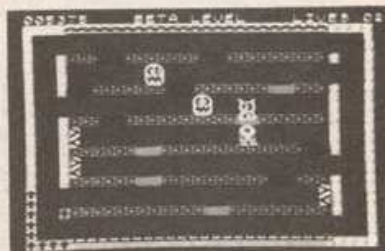
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Strong offence

While I have great respect for Boris Allan, I found his Ziggurat in Vol 3 No 25 incredibly biased and inaccurate.

As a computer journalist that has written reviews for over 80 software packages and books and know a large number of similar reviewers, I take strong offence at the laissez-faire attitude he believes that we take when performing our work.

I agree with him that all reviews should have the reviewer's name assigned to them, but cannot agree with his comments that most reviews fall into his Fab (front and back) category, where the reviewer just reads the title page and the back cover copy. My feeling is that Boris is unsportingly smarting still from reviews of his latest book on the QL.

Come on now, Boris, don't let some sour grapes spoil what is otherwise an excellent vineyard of articles from your pen.

Clive Gifford
18 Edward Way
Ashford
Middx

Variable names

I felt I must reply to Julian Skidmore's letter in the June 28 issue about the 'latest' Spectrum bug.

Yes, Julian deserves a 'silver' medal for noticing the bug in the way the Spectrum (and the ZX81) gets confused over variable names that have 'embedded space characters'. For example

LET ANSWER=1
PRINT ANSWER JULIAN
which gives 1

So what is the problem? Well, the space character is taken to mark the end of the variable name: and if there is already a variable that matches exactly then its value is used — Oh dear!

For those that are interested, look carefully at Page 142 (8 lines from the bottom) of *The Complete Spectrum Rom Disassembly* by Dr Frank O'Hara and myself.

I would like to hear from

anyone with other 'new bugs'.

Ian Logan
Skellinthorpe
Lincoln

PS. Reassure Graham Taylor that QL Quill really works, this letter is actual proof!

Never again . . .

As a subscriber to your excellent paper I would like to draw attention to the editorial in the June 28 issue which states "This magazine does not carry adverts for tape copiers..." Yet on page 50 there is a half-page advert from a company called Micro Centre which includes a large section on back-up tape copiers.

It seemed to me rather inconsistent. You should practise what you preach.

Wishing your application every success.

James Turner
Little Barn
Longcross Hill
Arford Headley
Hants

Needless to say we have received a considerable volume of correspondence on this subject. Our editorial policy stands: we do not carry ads for tape copiers. The offending advert to which you refer will not be carried again in that form.

A mixed blessing

Thank you for noting our timely arrival at Rumbelows. I would like to point out that



"Isn't that Barry Norman's signature?"

the RRP of the games/educational stuff is £7.95 — and that *Electro Freddy* has been done an injustice at £4.95 on Page 54 of Issue 26.

To be given in your news piece an accolade in the same breath as the lamented — and nearly mythological — Dragon (who now also appear to have produced the "Dragon 36" (sic)) is perhaps a mixed blessing. Maybe you would cheer us all up by noting that IBM too has a reputation for delivering when it says it will.

Congratulations to the Grauniad of Little Newport Street. It's quite comforting to know of others who make the occasional typo too. Valhall indeed! Yuors sincerely,

William Poel
Amsoft
Brentwood House
169 Kings Road
Brentwood
Essex

What's happening?

I've now been buying your magazine for two years, and have seen it change from a user's magazine to more of a games mag, for people who like playing video games on their computers.

I've noticed this with most magazines. What's happening? Has the country gone video games mad? Games adverts, joysticks, cartridges, games reviews etc. It's nothing but games, games and stupid, boring games. If people want games then why don't they buy Atari VCS's or other equivalents — not computers.

Not that I'm implying that people who buy computers must program, they can do what they like. But why do others who want to do something constructive with their machine have to suffer by purchasing magazines and not being able to find the information other than games listings and adverts.

I was also disappointed at this year's Earl's Court Computer Fair. On paying three pounds I entered an arcade. I left regretting I had ever entered, with explosions and laser sounds still buzzing in my ears. Why didn't they rename it 'Vi-

deo Games Fair', because that's all there was.

Christopher Owczarek
Feldon
Cock Lane
High Wycombe
Bucks

Crosser and crosser

Just though I'd write and tell you how angry I am after reading your June 28 issue. Yet another chemistry symbols program! Why? It makes me seethe.

Have you not published enough of these tried and (yawn) tested programs. It makes me angry. So angry I could break my pen in half.

Mr Angry
15 Whiterose Avenue
Dalton
Huddersfield
Yorkshire

Deserved success

The QL is here! I ordered it in the middle of February and received it on the 22nd of June (promised delivery date of end of June). It came with the revised AH operating system stored internally (ie, no Eprom) and seems to have most bugs corrected. The Basic and microdrive access seems to have been considerably speeded up. (Quill (80K) loads in 30 secs compared with two minutes for the pre-production model). It came with a comprehensive User Guide with beginners guide and keyword dictionary.

One tip that I've found is that pressing CTRL & F5 during listing acts as a stop/start toggle. I've managed to interface my Brother EP-22 with built-in RS-232C with the QL — it requires OPEN #3,seric and BAUD 300 to print to Channel 3.

Superbasic highlights structure and puts BBC Basic in the shade — I was also impressed by the speed of the graphics and flexibility of their syntax. The Psion packages seem to be tremendously good value, utilising power with a good user interface.

All in all, the QL, in my view, deserves all the success it will no doubt receive.

R Snowden
6 Bousfield Crescent
Newton Aycliffe
Co Durham

New from

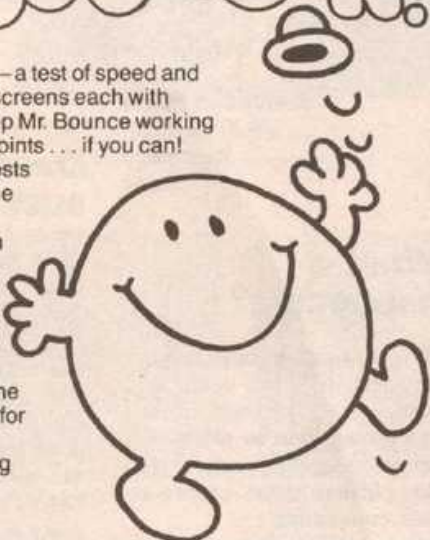
MIRRORSOFT

Watch out for HI BOUNCER!

leaping your way—a test of speed and tactics with four screens each with eight stages. Keep Mr. Bounce working hard and score points... if you can!

HI BOUNCER! tests reflexes and game tactics to the limit. It's so tough that a separate 7-level practice program for kid brother (or dad!) is included.

On cassette for the BBC B (versions for the CBM 64 and Spectrum coming soon). £6.95



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a versatile, easy-to-use sprite editor for the Commodore 64 which also demonstrates animation sequences on-screen.

With a choice of joystick, lightpen or user-definable keyboard control Go-Sprite has an icon-driven command system for ease and speed of use.

Go-Sprite can handle up to 32 HiRes or Multicolour sprites and produce overlays up to seven layers.

Sprite data files can be made on disk or tape and two accompanying programs enable you to produce data and arrays for use in your own programs.

For the Commodore 64, on cassette £9.95; or disk £11.95.

All prices are inclusive of VAT. Mirrorsoft programs are available from larger branches of Boots, John Menzies and W.H. Smith and from other leading software stockists.



Go hunting with CAESAR THE CAT

Help Caesar clear the larder of mice. Hunting along crowded shelves you guide Caesar as he chases persistent mice which are devouring plates of food. Widely praised when launched on the CBM 64, acclaimed on the Spectrum, Caesar is now here for BBC B owners.

On cassette for BBC B and Spectrum £6.95 and CBM 64 £8.95.

Cuddle your own CAESAR



We have had so many requests for a soft-toy version of Caesar, the lovable black and white cat featured in our much praised program Caesar the Cat, that we have had some made. He is cute and cuddly, with a body length of approx. 12 inches. He is yours (mail order only) for £8.50 (inc. p&p), while stocks last.

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Turf luck

You can bet Neil Watson's horse racing game for the 48K Oric will be a winner

If you have ever wondered what attracts people to the atmosphere of the race course then this is your chance to find out. *Turf luck* is a two stage horse race program for the 48K machine. During the first stage you are given details of horses' names, ages, starting prices and of the race course (name, going). From these details you must decide how much of your money to bet and on which horse to place your bet. Your ultimate aim is to break the bank.

During the second stage you must sit back and watch your horse run against its nine rivals in the race. Your horse is identified by its colour being different from the rest. After the race has finished your money is updated and you are able to try again in the next race if you have any money left.

Line comments

0001 - 0005 Set up horses' names
0006 - 0010 Set up constants

0020 - 0040 Set up odds and ages
0048 - 0115 Set up screen 1
0120 - 0130 Bet and chosen horse routine
0165 - 0330 Race handling routine (screen 2)
0335 - 0360 Decides race winner and displays name
0370 - 0430 Calculates and outputs winnings
0440 Check if bank is broken
0500 - 0530 Calculates and outputs losses
0540 Check if you are broke
0700 - 0750 Decides which race course
0760 - 0820 Decides going for the race
0900 - 1000 Redefine characters routine
1010 - 1300 Sets colour of your horse to red
0210 Set up sound channel 1
0328 Play sound channel 1 with envelope 6

Program notes

lines 1-15 Initialise variables
lines 20-40 Routine for set up ages and odds of horses
lines 48-165 Betting shop routines
lines 170-330 Race course routines
lines 335-365 Decide winner routine

lines 366-545 Winnings calculations
lines 641-820 Race course and going subroutine
lines 900-960 Define characters subroutine
lines 999-1006 Initialise horse vertical positions
lines 1010-1050 Set colour of chosen horse to red

Variables

D(6)	Horse horiz. coordinate
M(51)	Horse vert. coordinate
HIGHEST	Bank's limit
M	Your money
A(10)	Horses' odds
H(10)	Horses' odds
W(10)	Horses' ages
LS	Name of race course
GS	Going
HS(10)	Horses' names
B	Your bet
CS	Horse's code
I	Loop variable
N	Winner's vert. coordinate
T	Winner's horiz. coordinate
QS	Winner's code
W	Your winnings
A	Data loop variable
SS,UU	Random number variables




```

0 REM **ITV SEVEN....N.WATSON..1983**
1 H$(1)=" A BLUE BOY " : H$(6)=" F GOOD LUCK "
2 H$(2)=" B NEW EXPRESS" : H$(7)=" G LINCON "
3 H$(3)=" C YOUNG INCA " : H$(8)=" H DAYLIGHT "
4 H$(4)=" D QUICK WORK " : H$(9)=" I NEW WOOD "
5 H$(5)=" E HEARTWOOD " : H$(10)=" RED RUM "
6 CLS:GOSUB900:GOSUB999
7 PRINT
8 DIMD(60)
9 HIGHEST=INT(RND(9)*100000)+1
10 M=2000:DIMH(10)
15 PRINTCHR$(17);CHR$(6)
20 FORI=1TO10
25 A(I)=INT(RND(1)*9)+1
27 W(I)=INT(RND(1)*15)+2
30 H(I)=INT(RND(1)*9)+1
35 IFH(I)=1THENH(I)=2
36 IFA(I)=H(I)THEN25
40 NEXTI
48 PRINT
50 PRINT"YOUR MOEY _";M" BANKS LIMIT _";HIGHEST
51 PRINT:PRINT"YOU NEED _";HIGHEST-M" TO WIN"
52 GOSUB700
53 Q$="D"
60 PRINT:PRINT:PRINT:PRINTL$;" RACE COURSE..
GOING ";G$
65 PRINT
70 PRINT"CODE NAME"SPC(10)"ODDS AGE"
80 PRINT
90 FORI=1TO10
100 PRINTH$(I)SPC(3);H(I)"/";A(I);" ";W(I)
110 NEXTI
115 PRINT
120 INPUT"PLACE YOUR BET _";B
125 IFB>MTHENPRINT"NO MONEY REPLACE BET":GOTO12
130 INPUT"ENTER HORSES CODE:";C$
165CLS
170 PRINTSPC(10);L$
180 PLOT0,1,0
200 GOSUB 1010
210 SOUND1,8000,0
211 D(1)=2:D(6)=2:D(11)=2
212 D(16)=2:D(21)=2
213 D(26)=2:D(31)=2:D(36)=2:D(41)=2
214 D(46)=2:D(51)=2
250 FORI=1TO38:PLOTI,1,"z":NEXTI
251 FORI=1TO38:PLOTI,22,"z":NEXTI
252 PLOT35,21,"(":PLOT35,0,"("
253 PLOT6,21,"(":PLOT6,0,"("
280 FORI=1TO50STEP5
285 PLOTD(I),M(I)," "
290 D(I)=D(I)+INT(RND(1)*2)+1
320 IFD(I)>35THENN=M(I):T=D(I):GOTO335
325 PLOTD(I),M(I),"!")
326 NEXTI
328 PLAY1,0,6,200
330 GOTO280
335 Q$="A":PLAY0,0,0,0
336 IFN=2THENF=1:Q$="A"
340 IFN=6 THENF=3:Q$="C"
350 IFN=20THENF=10:Q$="J"
355 IFN=8 THENF=4:Q$="D"
360 IFN=10THENF=5:Q$="E"
361 IFN=12THENF=6:Q$="F"
362 IFN=14THENF=7:Q$="G"
363 IFN=16THENF=8:Q$="H"
364 IFN=18THENF=9:Q$="I"
365 IFN=4THENF=2:Q$="B"
366 PLOT10,10,H$(F)
367 WAIT150
368 IFC$<>Q$THEN500
370 W=INT((H(F)/A(F))*B)
380 W=W+B:M=M+W
390 WAIT150
400 CLS
410 PRINT:PRINT:PRINT:PRINT:PRINT
420 PRINT,"YOUR WININGS ARE:";W
430 PRINT,"YOU HAVE NOW _";M
440 IFM>HIGHESTTHENPRINT"YOU HAVE BROKEN
THE BOOKES!! YOU HAVE WON"
:END
445 WAIT150:CLS
450 GOTO20
500 M=M-B
505 CLS
510 PRINT:PRINT:PRINT:PRINT:PRINT:PRINT
520 PRINT,"YOU HAVE LOST _";B
530 PRINT,"YOU NOW ONLY HAVE _";M
540 IFM<0THEN END
545 WAIT150:CLS
550 GOTO20
641 IF F<>5 THEN J(X)=0:X=X+1
700 UU=INT(RND(1)*4)+1
710 IFUU=1THENL$="SANDOWN"
720 IFUU=2THENL$="CHESTER"
730 IFUU=3THENL$="RIPON"
740 IFUU=4THENL$="GOODWOOD"
750 IFUU=5THENL$="HEREFORD"
760 SS=INT(RND(1)*4)+1
770 IFSS=1THENG$="FIRM"
780 IFSS=2THENG$="GOOD"
790 IFSS=3THENG$="GOOD TO FIRM"
800 IFSS=4THENG$="SOFT"
810 IFSS=5THENG$="GOOD TO SOFT"
820 RETURN
900 DATA#3F,#3F,#12,#12,#12,#12,0,0
905 DATA#1C,#14,#1C,8,8,8,8
909 DATA 2,2,3,6,#3F,#0F,#14,#22
910 DATA #0C,#0E,#37,#0F,#3C,#38,#14,#22
920 FORI=47056TO47087
930 READ A
940 POKE I,A
950 NEXTI
960 RETURN
999 DIMM(51)
1000 M(1)=2:M(6)=4
1001 M(11)=6:M(16)=8
1002 M(21)=10:M(26)=12
1003 M(31)=14:M(36)=16
1004 M(41)=18:M(46)=20
1005 M(51)=22
1006 RETURN
1010 PAPER3:INK0
1011 FORI=1TO50STEP5
1012 F$=CHR$(65+G)
1013 IF F$=C$ THEN PLOT 0,M(I),1:
PLOT34,M(I),0
1020 G=G+1
1030 NEXTI
1040 G=0
1050 RETURN

```


Taking no chances

Graham Taylor talks to the kings of budget software, Mastertronic

If you buy software you cannot fail to have noticed the fact that Mastertronic is doing rather well.

The reason has something to do with — but is not explained by — the fact that Mastertronic games cost £1.99.

The company's rapid expansion suggests that people like the programs but the company remains controversial — its pricing policy received a hostile reception from the rest of the industry.

I talked to its director Martin Alper and he put up a spirited defence of the company and its objectives. "There's no doubt that we are pretty unpopular amongst the software houses trying to sell their titles at £5.95 — they say that we set a dangerous precedent and that if all software houses were forced to drop their prices to similar levels by our actions it would reduce the amount of innovation and experimentation.

"But it's simply untrue. From the profits we make a large amount will be 'put back' to be used as investment capital on new projects — Mastertronic is just the start."

You can see where criticism comes from though. For a long time the commonly held belief (and magazines are as much to blame as anyone) was that issuing games at £1.99 was simply a way of getting rid of fairly poor quality material.

When I finally go around to looking at some Mastertronic games it was something of a revelation — none of them were awful and some were actually very playable. At £1.99 they were excellent value. The problem so far as the press is concerned that 'good value' pure and simple is not really something that inspires great reams of enthusiastic prose — being neither a wonderful technical achievement nor an appalling waste of money is the best way to

on £1.99 rather than going elsewhere and getting a share of £5.95 — the reason is simple we sell many more copies and our distribution is worldwide." Its American distribution takes in 6,000 outlets including hifi, computer and video shops. The video link is particularly interesting. You can't go into a video rental shop these days without seeing the Mastertronic range.

Mastertronic see the American market as particularly important. "We're are moving half of our operation to the US and we will be bringing out souped-up versions of some of the range there on disc." In America Martin also hopes to repeat the success of the British operation in getting the games into supermarket chains like BHS, Asda and Tesco. "The problem with the conventional retail outlets," he says, "is they don't encour-



rage the impulse purchase — supermarkets are much better at that."

Financial success means that Mastertronic are now in the market for acquiring software houses. Their timing couldn't have been better with many companies in a precarious position after disappointing winter sales and so far a disastrous summer. Mastertronic has already taken over Galactic software and a deal with Carnel Software is currently being finalised. "What we are buying is talent — plenty of companies have failed not because they lack programming expertise but simply because they had no marketing skills — we can put that right."

If Martin is right, Mastertronic could end up having an incredible hold on the market. Which is either wonderful or awful depending on your degree of paranoia. I put the case for the paranoids and asked whether the £1.99 price tag didn't put an end to 'big projects', the *Hobbits* of this world that come complete with manual and box.

"It's certainly true that you can't do expensive packaging for a £1.99 game and

it's also true that at the moment we aren't doing technically earth shaking stuff but there will be other companies we run other than Mastertronic which will be different. The keynote will always be excellent value for money, but we are planning, for example, a company doing discs for about £5.99 which would allow for packaging and more sophisticated programs — the next few months will prove that we can now put out games as good as anyone else's for £1.99. There won't be any element of apology anymore — they'll be cheap and excellent.

"People say we aren't taking any chances as though it were a crime, well it's true we don't take chances — before we put out a new title we do market research and we do that research on a worldwide basis." According to Martin that research tells him that, amongst other things, MSX is going to do well. "We are certainly doing MSX material, there may be some doubts about what happens to MSX in this country where the computer buying habits are probably less conservative. But everywhere else there is a vast untapped market of potential computer buyers who will be reassured by a name they know like Sony, or JVC."

"... cheap and excellent"

You will not be surprised to learn that the MSX working party are rather interested in Mastertronic. MSX is likely to end up wherever the company brand names are stocked — hifi shops, electrical retailers, chains. And who is already in there? Mastertronic — draw your own conclusions.

I never have liked the idea of a small number of large companies dominating markets but then I am always a foolish romantic on these matters anyway. What is undeniable is that a lot of kids can afford £1.99 who can't afford £5.95 or more and now they can buy a lot more programs for their machine (instead of copying them from friends). If Martin is right about the market, Mastertronic games could get better and better. Also if Mastertronic succeed at this then a lot of likeable and talented people are going to go out of business — all part of capitalism's rich tapestry.

Martin Alper wants to have his cake and eat it — he wants to sell you whatever you want to buy as cheap as he can whilst still making a large profit. But he is a man with ideas. "Did you know that in the far east they have Roms that can handle far more than 32K? — more like 100K in fact. Everyone thinks that 32K is the limit for a Rom but it's only the large degree of capital investment in tooling up required to produce bigger Roms that is holding things up. Supposing I could produce games which came in Rom form and used 100 or more K for, say, £9.99. Really wonderful, complex games, do you think people would buy them?"

I think they probably might.

"... up the quality"

ensure you get no press coverage at all.

"It has been a problem," admitted Martin "but we're going to change all that — we've made some money now and we're going to up the quality."

Four new games are on the way — still at £1.99 — *Chiller* for the 64, *Psycho Shopper* on the Vic, *Thunderball* on the BBC and *Alcatraz Harry* on the Spectrum. Martin says each is equal to anything currently available at full price on their respective machines. *Alcatraz Harry* is a complex game mixing arcade, adventure and strategy — it has dozens of different screens of — action and *Chiller* is loosely based on *Thriller* by Michael Jackson.

With their current success Mastertronic can now afford to push up the quality "A good programmer can easily make more money by coming to us and getting a royalty

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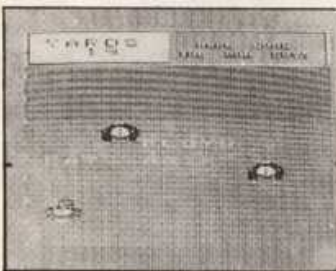
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Redskins v Raiders

Program *Superbowl* **Price** £6.95 **Micro** Dragon 32 **Supplier** Cable Software, 52 Limbury Rd, Luton, Beds LU3 2PL.

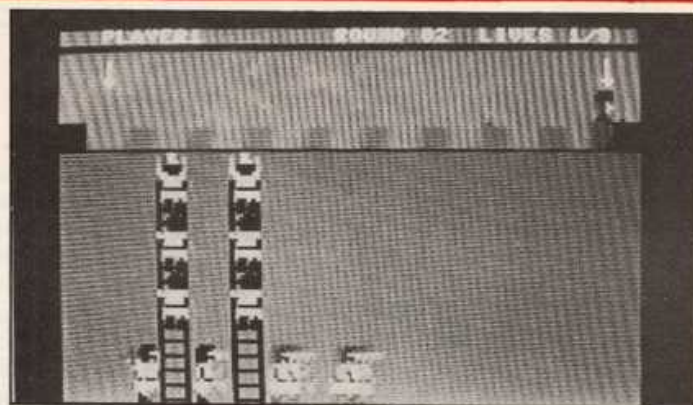
This is an arcade game based on American football. The player controls Floyd presumably a Raider, Redskin, Rowdy or some such animal, going for the touchdown. Each play ends when four stops have occurred, each of which is either a successful touchdown or a tackle which has brought Floyd down. At the end of the play the score is displayed as yards run, average yards run, number of touchdowns and missed catches.



The graphics are quite good, representing an overhead view of the field with Floyd running up the screen and the opposition appearing from the top. The yard lines come down the display as he continues his run. The game is controlled by one joystick and a speed-up option is available.

Essentially, *Superbowl* is a variation of *Space Invaders* with a sports overlay. The interest depends on a knowledge of American football so that the scoring has an imaginative impact making players feel that they are simulating a favourite sport. My son, who enjoys arcade games a lot, found this one disappointing because it was very simplistic compared with other offerings on the market. There is no secondary screen or other challenge. It rather looks as though it is so close to an arcade game that the play runs for as short a time as possible before it needs another coin. Despite its good graphics, this lack of variety will limit the length of one's interest.

Derrick Trueman



Waves of attackers

Program *Orc Attack* **Micro** Commodore 64 **Price** £7.95 **Supplier** Thorn EMI, Film House, 142 Wardour Street, London W1.

In *Orc Attack* from Creative Sparks you find yourself in the role of Sir Eric the Brave, who has to defend the battlements of his castle against the attacking hordes of Orcs.

The attackers come in waves, each one more determined than the last. Most of the Orcs attempt to scale the castle walls and set about Sir

Eric with their daggers. However, a few remain on the ground and fire their lethal crossbow bolts at him. Sir Eric can defend himself by dropping rocks on his attackers, or by beating them off with his broadsword, or by pouring down burning oil.

Quite an entertaining game, but all the attack waves are basically the same and all the action occurs against the background. It soon becomes rather repetitive; the graphics and sound are OK, but lacking any real variety. This game is unlikely to become a favourite.

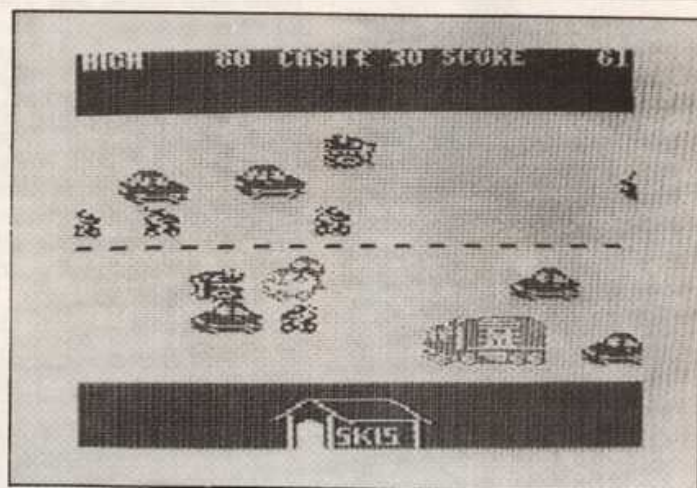
Richard Corfield



Downhill slalom

Program *Horace goes Skiing* **Price** £5.95 **Micro** Dragon 32 **Supplier** Melbourne House, Church Yard, Tring, Herts HP23 5LU.

Hungry Horace has arrived on the Dragon 32 and is off on another challenge. This time he sets off with £40 in his pocket with which to go skiing. He has first to cross a busy road to hire his skis at £10 a time and cross back over the road to the ski slope. It will cost him another £10 in ambulance fees if he gets knocked down. Once back safely to the ski slope, he has to negotiate a downhill slalom course. Points are lost for failing to stay within the flags, and if he hits too many trees on the way down, his skis are broken and he has to cross the road again to hire new ones. If he is successful, more points are awarded and he must then cross the road to the next, more diffi-



cult, slope. The game ends when he runs out of money.

This is an excellent game with superb graphics. Obviously, it is basically a mixture of *Frogger* and the 'steering through obstacles' type games but it is packaged excellently. The use of colours on the Dragon is fresh and bright and the images (particularly the cars) and sound very good.

There is, however, a cheat factor. Points are gained for crossing the road, of course,

but they can also be gained by a run out into the traffic and back again to the start point. The astute player can work wonders with his score with that. The game is long enough and varied enough for enjoyment to last; the graphics are excellent and it seems to have been put together with that little extra flair that makes it instantly attractive.

Derrick Trueman



Capture the answer

Program *Frac Attack* **Price** £6.95 **Micro** BBC B **Supplier** Shards Software, Roycraft House, 15 Linton Road, Barking, Essex.

If you cringe (as we did) at Islogans like 'Fractions need never be boring again' keep reading: *Frac Attack* makes it true. Honestly!

Shards have come up with a real winner in this part of their 'Fun to Learn' series. There are six games — yes games, not exercises — to help you practise fractions. All six load up at once so you move rapidly by a menu from one to another. Each offers different levels of difficulty and the top ones are really tough. The company say this is for 9-15 year olds but we know plenty of over-21s who would learn from this package.

The best game is *Frac Attack* itself, where in a minia-

continued over the page

ture 'Rocket Raid' type scene you have to work out a fraction, then bomb two wrong answers and capture the right one. The screen scrolls very quickly and getting the answer right is the easy bit — hitting your targets is much harder.

The silliest game is *Hungry Radish*. He will eat the person of your choice... if you choose the larger of two fractions correctly.

There's lots of colourful screen action in the Mode 7 scenes, blips, boops and a nice tune when you succeed. A running score tells you how well you're learning — in case you'd forgotten the purpose of the fun, as well you might. Too noisy for schools perhaps, but superb for the home.

Dave & Jan Waterson



Correct choice

Program *Readright Micro*
BBC B **Price** £9.95 **Supplier**
Daco Software, 59 Mackenzie
Road, Moseley, Birmingham
B11 4EP.

Hallo. That's the friendly greeting at the start of this educational package. You can find this spelling in a dictionary, but it is not the one in everyday use. Unfortunately a minus mark for an otherwise good educational package for parent and primary school child working together.

Someone who can read has to help the learner by checking that he or she is correctly pronouncing the words offered. *Readright* will check whether the words are used properly in simple sentences. If the choice is correct a smiling face appears, happy notes are played and the word is nudged into its place in the sentence. If the choice is wrong a sad face appears, miserable music plays and the word is booted off screen.

The way the words are built up is the key to the *Readright* approach. The words are assembled from phonetic groups giving the child practice in the sounds of each letter.

Readright is structured, sensible and very effective.

Dave and Jan Watterson



Break the code

Program *Operation Safras*
Price £7.95 **Micro** Dragon 32
Supplier Shards Software,
Roycraft House, 15 Linton Rd,
Barking, Essex

Here is a game to drive you crazy — the follow up to *Pettigrew's Diary* using the same format. *Operation Safras* is an adventure game in three sections featuring secret agent Pettigrew who this time has to save his fellow agents who are in terrible trouble all over the British Isles, then rescue the legendary Safras sword and finally return it to its rightful place in the Safras caves. No progression can be made anywhere until the current problem is solved. But these are not just maze problems. Far from it.

In the first section some 'animated' graphics set up a challenge, then a password has to be found to avoid drowning. This is followed by a memory test and a further code pro-

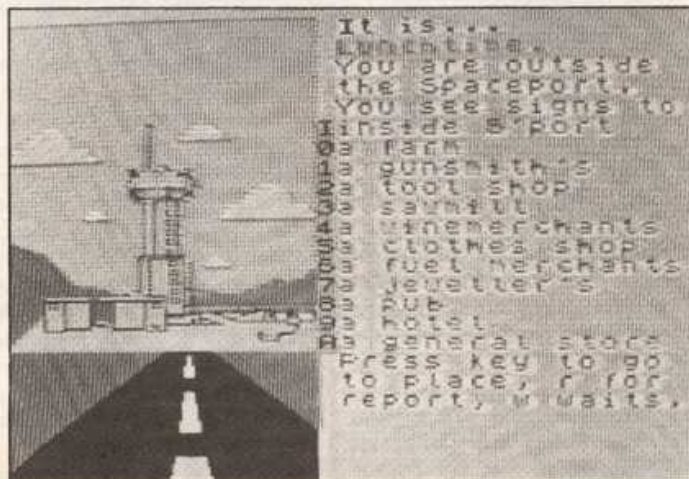
blem. Failure causes recycling back to an earlier position with no little frustration. The second section, which is text only is an 'Against the clock' part and involves locating and rescuing five agents scattered somewhere in Britain armed only with a geography lesson from the program. All this leads eventually to the rescue of the sword. The third section is split into eight separate challenges graphically presented with each preceding by a text screen until the world is saved once more.

Planet to planet

Program *Star Trader Micro*
48K Spectrum **Price** £6.95
Supplier Bug-Byte, Mulberry
House, Canning Place, Liver-
pool.

Strategy games got off to a bad start for the first year and a half of the Spectrum's life. They were mostly badly written, unexciting Basic games.

Now here comes *Star Trader* from Bug-Byte. The idea behind the game, is that you move from planet to planet, buying goods where they are cheap, and trying to sell them at a profit. As with other strategy games, this part is fairly simple, with rather few variations. There is, though, the added excitement of an occasional arcade-type interlude. (I mean a real arcade game, unlike the so-called arcade game in *Mugsy*). In this, the graphics are good, the action fast, and I



have yet to win.

There are several features, though, which spoil what is an otherwise good game. When you earn much more than 100,000 credits, (which, with practice, does not take more than about an hour), the computer ends the game — not because you have won, or because you have done something wrong but because of a revolution somewhere in space, with which you are totally unconnected. Yet you are killed — end of game. This really does seem unfair and it removes the incentive to do as well as you can.

Surprisingly for Bug-Byte, the character set is not redefined and, in a game like this, that would be quite an improvement. Sound, too, is all but nonexistent.

Nevertheless, this game is of more lasting interest than almost any arcade game that I can think of, simply because, to play it, you need your mind as well as your reactions.

David Lester



PETTIGREW. RUPERT JAMES. BORN
STEVENAGE ENGLAND 1/3/1955 TO
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The problem with these games is that once the problem is solved, it's over and there is no more to be done with it. But the time involved in solving this one and the variations in the types of problem presented, let alone the quality of the graphics and sound, make this one worth having. They are even giving away a free music tape. Pettigrew needs your name and address!

Derrick Trueman



No throw!

Program Athlete Micro 48K Spectrum **Price** £5.50 **Supplier** Buffer Micro Road, 310 Streatham High Road, London SW16.

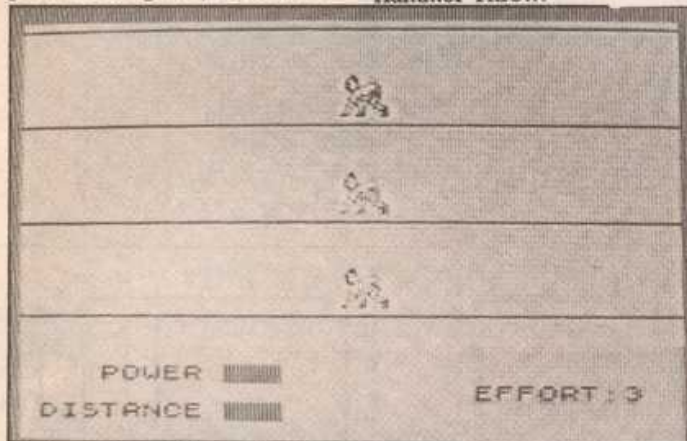
Running, hurdling and throwing the hammer are all part of a day in the game of life of an *Athlete*. The game is different and for that reason alone it should deserve a place in the dedicated Spectrum owner's library. Unfortunately, though, there are problems that will put off many potential buyers.

To start with, the good points. The game, a blend of

computer game, giving you a fixed store of energy, and allowing you to decide how fast you will use it. Go too fast, and your athlete collapses exhausted; too slow, and you finish last!

Sadly, however, the game is not bug free: it got into one endless loop at the Menu stage, and suffered a system reset during the events themselves. Possibly this was in disgust at my 'No Throw' in the Hammer, but I think it is more likely to be a software problem than game feature.

Lastly, the Menus are long and involved, and the events limited: 100m and 400m along the flat and hurdles, and the Hammer Throw.



Basic and machine-code, has good graphics and generally works well. I liked especially the way the runners' movement was done. The author has done well to turn a physical sport like athletics into a

Athlete is a good try, but if the problems can't be sorted out it will have to rank as an also ran.

Simon Springett



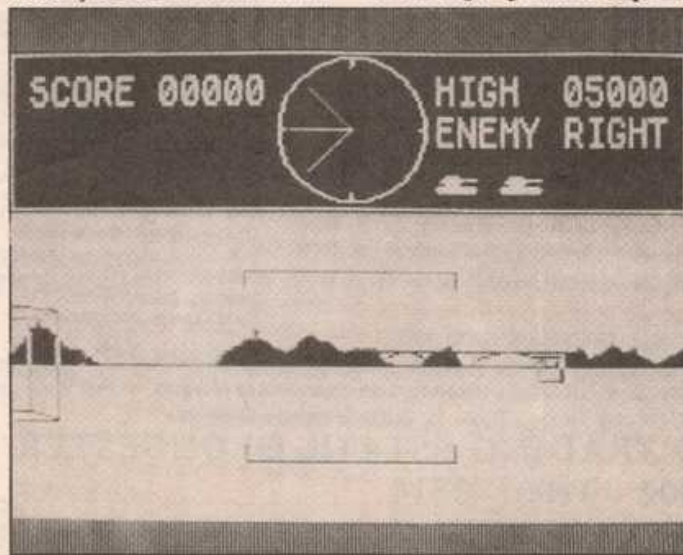
Kamikaze pilot

Program Supercode II Micro 16/48K Spectrum **Price** £9.95 **Supplier** CP Software, 17 Orchard Lane, Prestwood, Great Missenden, Bucks HP16 0NN.

3D TANK DUEL provides exactly what you would expect from its title — a version of the arcade game *Battle Zone*.

The game shows the view from inside your tank looking out on the line-drawing features of flat plain, with the odd smoking volcano in the background. A turret radar shows the location of the opposing tank, and you are given subtle

hints (like "Enemy Left") just in case you still don't know



Straight flush

Program Poker Micro Commodore 64 **Price** £5.95 **Supplier** Tom Pinone Puzzles, 14 Granby Avenue, Harpenden, Herts.

It is debatable whether computerised card games



work — why not just get a pack of cards and play the game for real?

However, playing the computer at *Poker* does have some advantages — not least you do not play for real money. This version of poker, by Tom Pinone, is set in a Western saloon, and your six opponents are given suitable names: Matt Dillon, Billy the Kid and Black Jake.

The deal rotates round the seven players and the screen shows the cards being dealt

face down in front of each person. When the deal is complete your cards are turned over for you to see. The game then follows the rules of poker with each player taking it in turn to raise, stick or throw in the hand. The computer plays for your opponents, and will occasionally bluff, although it never cheats. You have to make your own deci-

sion, but you can always ask the barmaid Moll for advice (by pressing a function key).

The graphics and sound are simple but perfectly adequate for the program. Instructions are provided including a brief explanation of the rules of poker.

This is really quite an enjoyable game and could provide a financially painless introduction to poker.

Richard Corfield



where to go next. The idea is to manoeuvre your own vehicle to the right place to zap the

other tank, and then look out for the next one.

Difficulty is increased by the various objects scattered across the area which act as barriers to your fire — and as your score increases the enemy tanks adopt the tactics of sitting behind these barriers and only emerging to take pot shots at you. At irregular intervals a rocket-shaped UFO controlled by a Kamikaze pilot skims across the plain towards you adding to your problems.

There's not much more you can say about *3D Tank Duel*. I would recommend it as a very good version of the original, but I don't think you'll get addicted.

Simon Springett





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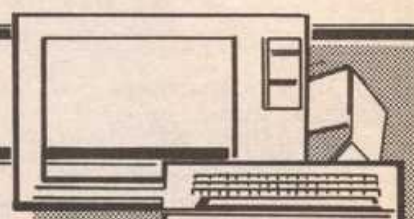
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Message to screen

Alan McDonald shows you how to print information to the screen in Part 2 of his machine-code adventure series

As week we looked at how a mini adventure can be designed. We also wrote the database section of the adventure. This week we shall look at the 'printing to screen' routines. If you remember from last week, we had three types of data:

- 1) Locations,
- 2) Objects,
- 3) Messages.

Each of the data is handled differently, therefore we need three different routines.

Routine 1. Print message to screen.

Since this routine is the easiest we shall look at it first. Refer to last week's issue and see how the messages were stored in memory.

```
MTABLE DEFB 255 ; separator.
        DEFM "message"
        DEFB 255
```

and so on.

If you look at the first five messages in the message table you will see.

- 1) Ok.
- 2) You can't do that.
- 3) You can also see..
- 4) Nothing.
- 4) What now?

Let's say we wanted to print message three to the screen.. (You can also see). All we would do is:

TLD B,3; The B register points to message three.

CALL PRINT; The print message routine is called.

The actual 'Print' routine is not too difficult to understand. Remember each message is separated by a '255' — Therefore we count 'B' '255's' ie, if B=3 then we count 3 '255's'. The following flow chart should clarify things. Also you should closely study this week's assembler listing.

The other routines work in a similar way. If you recall we used the variable X to store the current position of the player; ie, if the player is at location 5 then X would equal 5.

Routine 2. Print location to screen

Each location in the database is followed by a '255' and 6 other bytes, which represent the directions which can be moved to. Each time a location is printed these values will need to be copied into their correct positions in the variable area. (NOR to DOW). Again study this week's assembler listing, pay special attention to the print location routine PLOC.

Routine 3. Print objects to screen

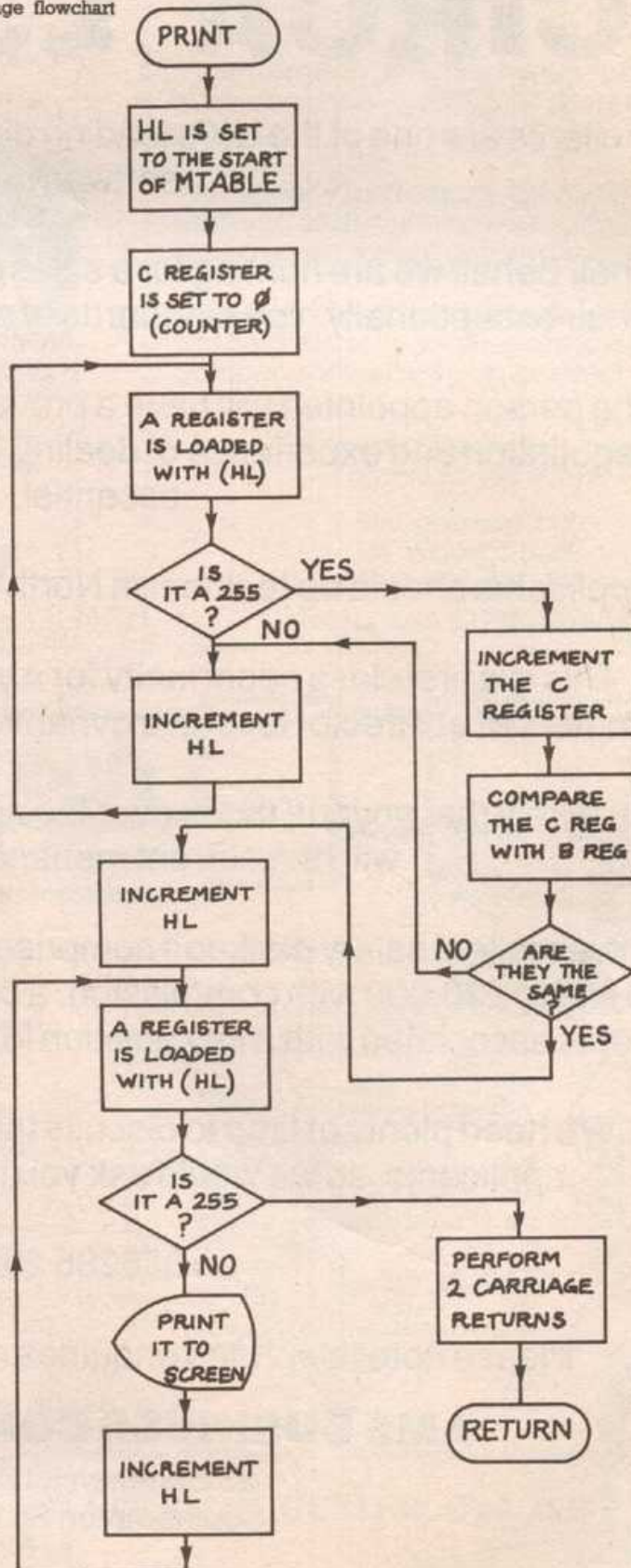
The print objects routine is the most complex of all three routines. Each time a location is printed, any objects which are visible there must also be printed. Therefore the print object routine must do the following..

- 1) A loop is started. 14 objects = 14 passes.
- 2) If the object is not at the current location then consider the next object.
- 3) Can the object be printed; ie, is the

existence 0 or 2 (see last week's issue.) The flowchart depicts the situation as does the assembly listing.

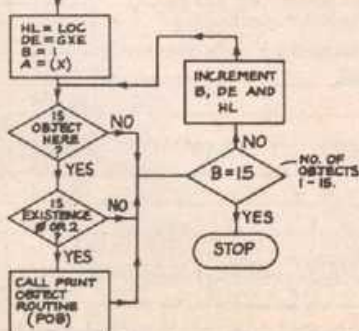
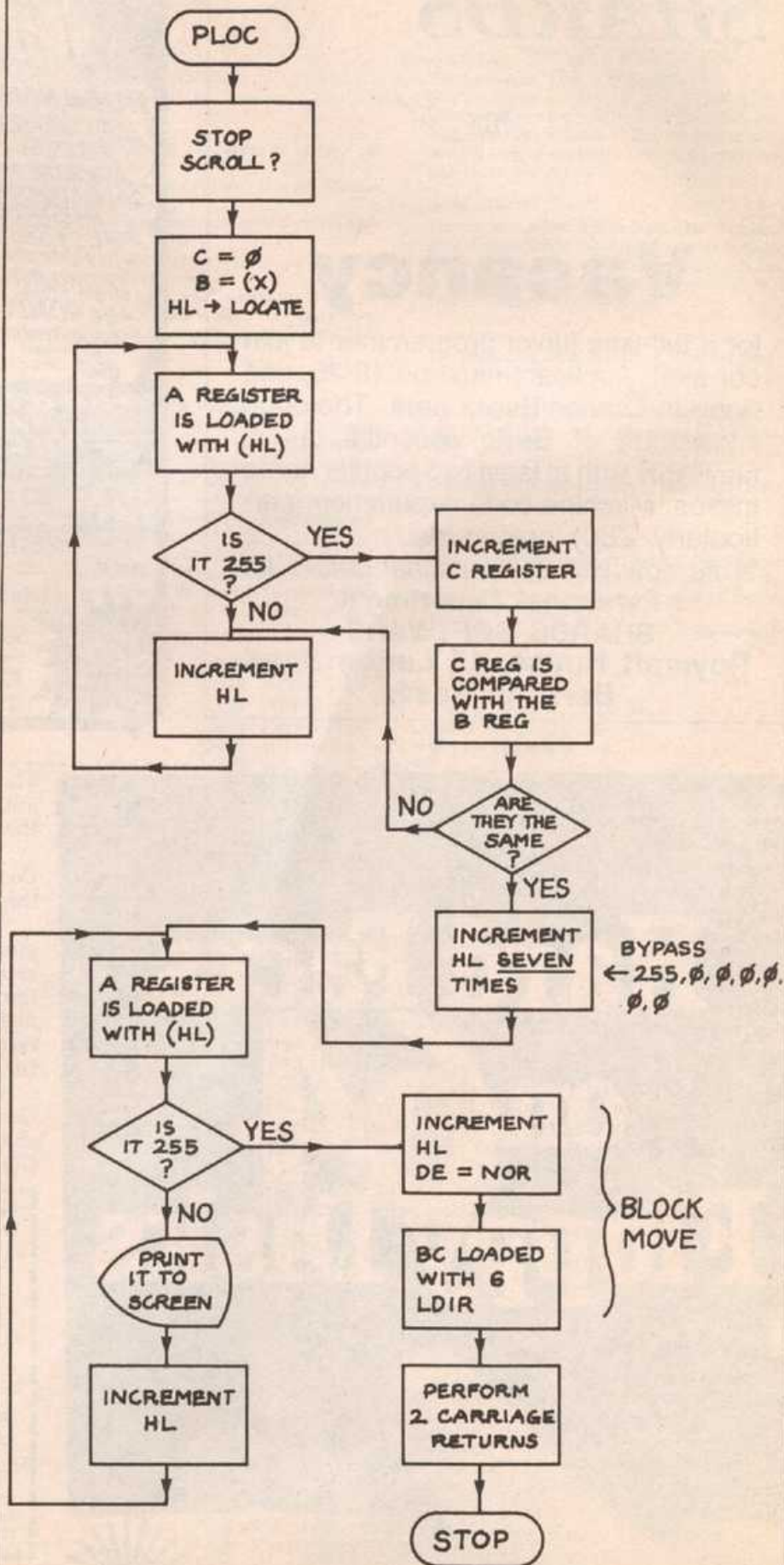
Next week we shall look at input and string manipulation.

Print message flowchart



[illegible]

```
PRINT      LD      HL,MTABLE  
LOOP_     JC      BRANCH  
          INC     HL)  
BK        DEC     SS  
CHECKIT   JRC    HL,LOOP_  
          JMC     CARRY  
          PRINT  
PRINT     LD      HL,  
LOOP1     JC      BRANCH  
          INC     HL)  
          DEC     SS  
          OUT6  
          INC     Z  
          JRC    LOOP1  
OUT6      RET  
          END
```

[illegible]

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Round the clock

Ian Logan presents a clock program that demonstrates a large number of the features of Superbasic

The Superbasic of the QL is very different from the popular Sinclair Basic found in the Spectrum; and it will take some time for a new owner of a QL to become fluent in its use.

The following program produces both 'analog' and 'digital' clocks and shows a large number of the features of Superbasic. Initially, you might think that the listing is more like one for the BBC microcomputer; and with respect to the manner in which Superbasic allows the use of named procedures, you would be correct. But, Superbasic allows a lot more than just the use of procedures.

So, taking each section of the program in turn:

Lines 160-290:

The procedure Set is defined. Mode 4 — the high definition mode — is selected so as to take full advantage of the QL's potential.

WINDOW 412,256,0,0 — creates a window of maximum size.
BORDER 30 — creates a border within this window of width 30 pixels.
CSIZE 3,1 — selects the largest of the standard type sizes.
CURSOR 0,100 — moves the cursor down 100 pixels within the available window.
SDATE 1984,6,1,h,m,s — this program cheats by using the function Dates to store the current time; and this line sets Dates to the required time (on 1 June, 1984).

Lines 310-560:

The procedure Face is defined.
SCALE 200,-150,-100 — this line 'scales' the output window to give it 200 graphic-lines (instead of 100) on its vertical scale. The origin of the bottom left corner is given the coordinates -150,-100 (so as to make the centre of the clock face be 0,0).
The screen is then cleared and three circles are drawn to represent a clock face.
The For a — End for structure in lines 400 to 530 uses the 'turtle graphics' of the QL to draw minute marks on the clock face at the required positions. The numbers are added to the clock face after first

setting the print cursor to a suitable position (line 530).

Lines 580-680:

The procedure Time is defined.
This procedure contains a Repeat — END REPEAT structure (lines 610-670) from which there is no exit. And, if the value of Dates is found to be changed — as it will be every second — the procedures Watch and Digital are called.

Lines 700-790:

The procedure Watch is defined. This procedure determines which hands of the clock face are to be re-drawn. If a hand is to be moved, then it is first overdrawn with white ink, before being re-drawn at its new position with black ink.

Lines 810-890:

The procedure Hand is defined. This procedure requires three parameters; i — the colour of ink to be used,
r — the angle Turned at the centre of the clock
l — the length of the hand to be drawn.
The hands are drawn using the 'turtle graphics' of the QL.

Lines 910-960:

The procedure Digital is defined. This simple procedure prints the appropriate slice of the Newtimes; after first suppressing an initial zero in this string of characters.

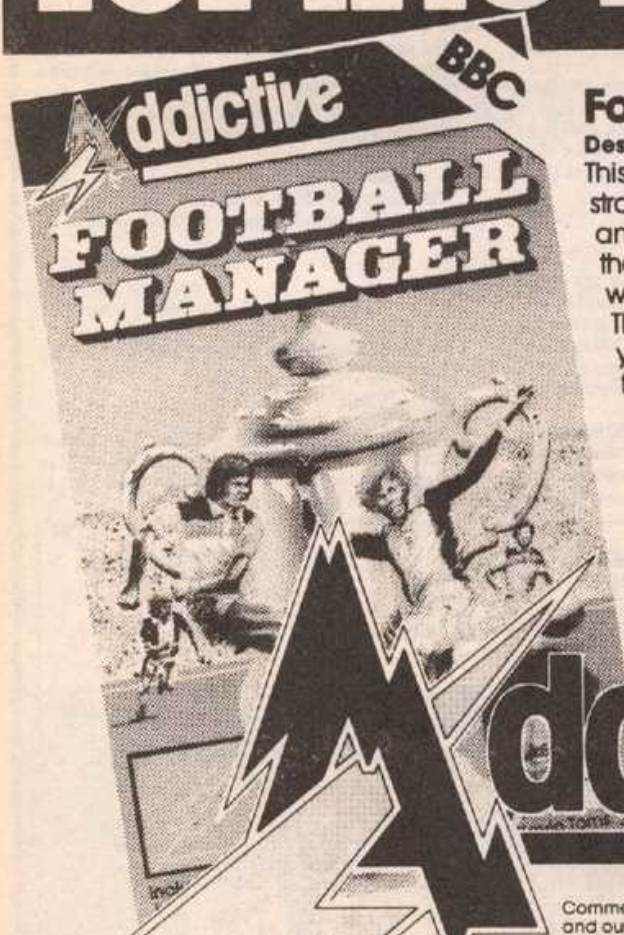
```

100 REMark      QL CLOCK
110 set
120 face
130 time
140 STOP
150 REMark .....
160 DEFINE PROCEDURE set
170 MODE 4
180 WINDOW 512,256,0,0
190 PAPER 0
200 INK 7
210 CLS
220 BORDER 30
230 CSIZE 3,1
240 CURSOR 0,100
250 PRINT "Enter"
260 PRINT "Hours. Minutes. Seconds"
270 INPUT h,m,s
280 SDATE 1984,6,1,h,m,s
290 END DEFINE
300 REMark .....
310 DEFINE PROCEDURE face
320 SCALE 200,-150,-100
330 BORDER 0
340 PAPER 7
350 INK 0
360 CLS
370 CIRCLE 0,0,85
380 CIRCLE 0,0,52
390 CIRCLE 0,0,4
400 FOR a=59 TO 0 STEP -1
410 LINE 0,0
420 TURNTO a*6
430 PENUP
440 MOVE 46
450 PENDOWN
460 INK 0
470 MOVE 2+3*NOT(a MOD 5)
480 END FOR a
490 FOR a=330 TO 0 STEP -30
500 n=3-a/30+12*(a/30>2)
510 x=60*COS(a*PI/180)
520 y=63*SIN(a*PI/180)
530 CURSOR x-9*(n>9)+4*(n>11),y
540 PRINT n
550 END FOR a
560 END DEFINE
570 REMark .....
580 DEFINE PROCEDURE time
590 s1=99: m1=99: h1=99
600 oldtime$=""
610 REPEAT update
620 newtime$=DATE$
630 IF newtime$=oldtime$ THEN NEXT
update
640 watch
650 digital
660 oldtime$=newtime$
670 END REPEAT update
680 END DEFINE
690 REMark .....
700 DEFINE PROCEDURE watch
710 s=newtime$(19 TO 20)
720 m=.5*(s>29)+newtime$(16 TO 17)
730 h=INT(5*(m/60+newtime$(13 TO 14)
740 IF h1<>h THEN hand 7,h1,25
750 IF m1<>m THEN hand 7,m1,40
760 hand 7,s1,15: hand 0,s,15
770 hand 0,m,40: hand 0,h,25
780 s1=s: h1=h: m1=m
790 END DEFINE
800 REMark .....
810 DEFINE PROCEDURE hand (i,r,l)
820 LINE 0,0
830 TURNTO -6*r+90
840 PENUP
850 MOVE 5
860 PENDOWN
870 INK i
880 MOVE l
890 END DEFINE
900 REMark .....
910 DEFINE PROCEDURE digital
920 digit$=newtime$(13 TO)
930 IF digit$(1)="0" THEN digit$(1)=""
940 CURSOR 40,220
950 PRINT digit$
960 END DEFINE
970 REMark .....

```


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* ZX81 Chart
Home Computing Weekly 21/2/84

Comments about the game from press and our customers

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originator, Addictive Games, certainly deserve the name." Rating: 19/20 (Practical Computing – August 1983).

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"(Personal Computer Games – Summer 1983)

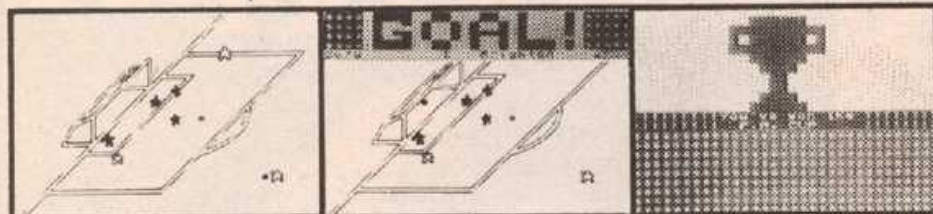
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Character designer

Mark Lawrence provides a two part machine-code program to help you define graphics on the BBC

Most home micros now have the facility available to define your own graphics, but this usually involves sitting down with a piece of graph paper, designing your character and then calculating the relevant numbers that have to be stored in a place in memory, set aside for such a purpose. This character generator will relieve you of

this tedious task since it allows you to develop and modify your designs and then save them to tape for later use.

The program offers the following facilities as well as the actual designing of the character:

Rotate clockwise 90 degrees, Mirror character, scroll character (up, down, left or

right), invert, save to tape and load from tape.

To keep the program compact and to add speed I have written it in machine code. Unfortunately, since it uses a Mode 1 screen, 32K ram is required which means it will not work on an unexpanded Model A.

Before entering the first part of this two-week program switch the machine off, then on and enter `page=page+3000`. Now enter the program and save it.

The second part of this graphics utility will be printed next week.

```

10FORN $\times$ =0TO2STEP2
20P $\times$ =&E00
30[OPTN $\times$ 
40.START JSR SET
50LDA #1
60STA FLAG
70LDA #4
80STA Y1
90STA X1
100LDA #4
110LDX #1
120JSR &FFF4
130.LOOP JSR CURS
140LDY#0
150LDX#0
160JSR AT
170JSR &FFE0
180BCC OV1
190CMP #&1B
200BNE OV1
210LDA #&7E
220JSR &FFF4
230JMP RETN
240.OV1 CMP #139
250BNE OV2
260JSR UP
270.OV2 CMP #138
280BNE OV3
290JSR DO
300.OV3 CMP #136
310BNE OV4
320JSR LE
330.OV4 CMP #137
340BNE OV5
350JSR RI
360.OV5 CMP #90
370BNE OV6
380INC FLAG
390LDA FLAG
400AND #1
410STA FLAG
420.OV6 CMP #81
430BNE OV7
440JSR PUT

```

```

450.OV7 CMP #73
460BNE OV8
470JSR INVERT
480.OV8 CMP #80
490BNE OV9
500JSR PICK
510.OV9 CMP #89
520BNE OV10
530JSR UPS
540.OV10 CMP #66
550BNE OV11
560JSR DOS
570.OV11 CMP #71
580BNE OV12
590JSR LS
600.OV12 CMP #72
610BNE OV13
620JSR RS
630.OV13 CMP #82
640BNE OV14
650JSR ROT
660.OV14 CMP #77
670BNE OV15
680JSR MIR
690.OV15 CMP #76
700BNE OV16
710JSR LO
720.OV16 CMP #83
730BNE OV17
740JSR SA
750.OV17
760JMP LOOP
770.RETN LDX #0
780LDY #0
790JSR AT
800LDA #4
810JSR &FFF4
820 RTS
830.SET LDA #22
840JSR &FFEE
850LDA #1
860JSR&FFEE
870LDX #2
880LDY #4

```

```

890JSR COL
900LDX #3
910LDY #6
920JSR COL
930LDX #129
940LDY #3
950JSR IP
960LDX #4
970JSR PSPC
980LDX #131
990LDY #0
1000JSR IP
1010LDX #10
1020JSR PSPC
1030LDX #130
1040LDY #3
1050JSR IP
1060LDX #17
1070JSR PSPC
1080JSR GRID
1090JSR ALP
1100JSR LI
1110LDX #131
1120LDY #0
1130JSR IP
1140RTS
1150.COL LDA #19
1160JSR &FFEE
1170TXA
1180JSR &FFEE
1190TYA
1200LDY #4
1210JSR &FFEE
1220DEY
1230BNE COL+12
1240RTS
1250.PSPC LDY #40
1260.L0 LDA #32
1270JSR &FFEE
1280DEY
1290BNE L0
1300DEX
1310BNE PSPC
1320RTS

```


1330.IP LDA #17	1890LDA #227	2430RTS
1340JSR &FFEE	1900JSR &FFEE	2440.CURS LDY Y1
1350TXA	1910JSR SWAP	2450LDX X1
1360JSR &FFEE	1920RTS	2460JSR AT
1370LDA #17	1930.AL LDA #9	2470JSR SWAP
1380JSR &FFEE	1940JSR &FFEE	2480LDY #131
1390TYA	1950DEY	2490LDX #2
1400JSR &FFEE	1960BNE AL	2500JSR IP
1410RTS	1970RTS	2510LDA #228
1420.CHAR LDX #9	1980.ALP LDX #0	2520JSR &FFEE
1430LDA STORE-1,X	1990LDA #31	2530LDX #0
1440JSR &FFEE	2000JSR &FFEE	2540JSR IP
1450DEX	2010LDA #22	2550JSR SWAP
1460BNE CHAR+2	2020JSR &FFEE	2560RTS
1470RTS	2030LDA #6	2570.PLUP LDY Y1
1480.SWAP LDX #56	2040JSR &FFEE	2580LDX X1
1490DEX	2050.L4 TXA	2590JSR AT
1500PHP	2060CLC	2600JSR SWAP
1510LDA STORE+9,X	2070ADC #224	2610LDA #224
1520LDY &C00,X	2080JSR &FFEE	2620LDX X1
1530STA &C00,X	2090LDA #32	2630LDY Y1
1540TYA	2100JSR &FFEE	2640CPX #4
1550STA STORE+9,X	2110INX	2650BEQ 01
1560PLP	2120CPX #32	2660CPX #13
1570BNE SWAP+2	2130BEQ OUT	2670BNE 0
1580RTS	2140TXA	2680LDA #226
1590.GRID JSR SWAP	2150AND #7	2690CPY #12
1600LDY #0	2160CMP #0	2700BEQ 01
1610LDX #131	2170BNE L4	2710CPY #3
1620JSR IP	2180JSR &FFEE7	2720BEQ 01
1630LDA #31	2190JSR &FFEE7	2730JMP 02
1640JSR &FFEE	2200LDY #22	2740.0 CPY #3
1650LDA #0	2210JSR AL	2750BEQ 01
1660JSR &FFEE	2220JMP L4	2760CPY #12
1670LDA #5	2230.OUT JSR &FFEE7	2770BNE 03
1680JSR &FFEE	2240RTS	2780CPX #13
1690LDX #8	2250.L1 LDA STORE+57	2790BEQ 01
1700.L1 LDY #4	2260CMP #127	2800LDA #225
1710JSR AL	2270BEQ OUT	2810JMP 02
1720LDY #8	2280CMP #0	2820.03 LDX FLAG
1730.L2 LDA #224	2290BNE 0U	2830CPX #1
1740JSR &FFEE	2300JSR CHAR	2840BNE 02
1750DEY	2310JMP 0U+3	2850LDA #228
1760BNE L2	2320.0U JSR &FFEE3	2860JMP 02
1770LDA #225	2330INC LI+1	2870.01 LDA #32
1780JSR &FFEE	2340LDA LI+1	2880.02 JSR &FFEE
1790JSR &FFEE7	2350CMP #0	2890JSR SWAP
1800DEX	2360BNE LI	2900RTS
1810BNE L1	2370INC LI+2	2910.AT LDA #31
1820LDX #8	2380JMP LI	2920JSR &FFEE
1830LDY #4	2390.OUT LDA #INT((STORE+57)/256)	2930TYA
1840JSR AL	2400STA LI+2	2940JSR &FFEE
1850.L3 LDA #226	2410LDA #((STORE+57)-256	2950TXA
1860JSR &FFEE	*INT((STORE+57)/256)	2960JSR &FFEE
1870DEX	2420STA LI+1	2970RTS
1880BNE L3		2980.UP LDX X1

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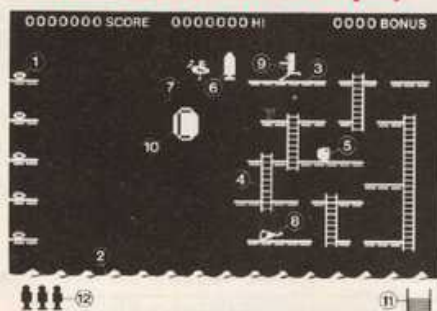
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| 2. Sea | 6. Rocket | 10. Bubloid |
| 3. Platforms | 7. Vulture | 11. Fuel Gauge |
| 4. Ladders | 8. Leg of Lamb | 12. Men Remaining |



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You have a Rocket Pac to help you (a Vulture on higher levels) but you must rush around the platforms and ladders collecting cans of fuel (legs of lamb with the Vulture) and cursing that weird Bubble. Once you have enough fuel then it's Chocks Away!

Oh... but don't run out of fuel on the way - otherwise it's SPLASH!

The aim is to collect all the diamonds from the far left hand side of the screen, whilst avoiding the rampant Bubloid. These emerge from the sea and are hell-bent on returning to their watery habitat with you in tow. Sooner or later you are going to end up in the drink - The idea is to make it later!

By belting round the system of platforms and ladders, cleverly avoiding the Bubloid, you collect the fuel cans which appear in random positions, until you consider that your fuel gauge indicates sufficient in the tank. Now you can go and collect your rocket. With the rocket-pack strapped to your back you can fly across the expanse of sea to collect the diamonds... but don't run out of fuel or your rocket-pack will simply disappear and you will wind up in the drink!

There are six stages with six different platform layouts. On stages 1-3 the Bubloid, which floats in front of the platforms with uncanny ease, gets an ever increasing ability to home in on your position, making the task of staying alive more demanding with each stage. On stages 4-6 you once again start with the easiest Bubloid (which is a blessed relief!) but the fuel cans are replaced by legs of lamb which you must collect to feed your vulture, and once it has enough energy (or you think it has!) you must flap across the water on its back to collect the diamonds.

Extra men are awarded for every 10,000 points - but ONLY once you have collected all the diamonds and so completed each particular stage.

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Coat of many colours

S Rodgers demonstrates a multi colour sprite generator program

Multisprite is a multicolour sprite generator for the Commodore 64.

To achieve rapid colour changes, I have used extended background mode — a little used facet of the 64.

The program can develop up to 64 sprites and the data for all of these is incorporated into user programs using a novel method, without recourse to merge programs or pencil and paper.

Program Notes

0 Go to start of program.
1-6 Routine to generate data statements for any number of sprites
100-199 Copywrite message
210 Line=0:Column=0:V=VIC chip
220 Cursor array: Set cursor to asterisk
230 Elements array: N.B. EL\$(0) are SHIFTED SPACES
310 Location 2 is normally unused
410 Opening screen: Set up screen
1010 Memorise character under cursor
1020 SM = Screen memory: Toggle F flag
1030 Poke screen with either '*' or memorised character
1040 Get from keybd

1050-1080

1090

1100

1110

1120

1130

1140

3010

3020

3030-3040

3050

3060

3070

3080

4010

4020-4030

4100-4110

4200-4210

4300-4310

5010-5020

5030

Move cursor

Odd numbered Function keys

Even numbered

Home cursor

Next sprite (cntrl 'N')

End Program (cntrl 'E')

Re-loop

Move printing to relevant position

Print relevant element

Calculate current byte and bit pair

Switch-off first bit in bit pair

If new bit pair is 10 or 11 then switch on again

Switch-off second bit

If new bit pair is 01 or 11 switch on again

Determine which set of registers

Change background #1 and

sprite-multi #1

Change background #2 and sprite

colours

Change background #3 and

sprite-multi #0

Change background and border colours

Transfer data to relevant block above

49152

Update sprite counter

10010

Background, border to red: printing to yellow

10020-10090

Print details

10100

Wait for keyboard

20010

Title of page

20020

Read in example sprite

20030-20150

Print magnified example and details

N.B.

.. Shifted spaces ... normal spaces ...

.. Shifted. ... Shifted. ... Normal. ...

Normal. ...

Copy 20030

... Shifted. ...

... Shifted. ... Shifted

Copy 20070

Shifted

Normal

Shifted

20160

Switch on multicolour, select colours

20170

Expand #1 and #3 in Y direction; #2 and

#3 in X.

20180-20210

Set all 4 sprites to yellow, Pointers to

block 13 Arrange sprites vertically to left

of screen

30010

Restore standard colours, switch off

sprites and ext. bckgrnd.

30020-30140

Print instructions to use data generator

30150

Wait keyboard

30160

Clear screen, list lines (end)

60010-60060

Data for initial sprite

```
0 GOTO200
1 INPUT "LINE NUMBER";LI:AD=49152
2 IFAD=49152+PEEK(2)*64THENEND
3 PRINT "J";:FORI=0TO7:PRINTLI+I*10"D#";:FORJ=0TO7
4 PRINTSTR$(PEEK(AD+I*8+J))";";
5 NEXT:PRINT"|| ||":NEXT:PRINT"LI="LI+100":AD="AD+64":GOTO2
POKE631,19:POKE198,10
6 FORI=0TO8:POKE632+I,13:NEXT:END
9:
100 REM*****
110 REM*
120 REM* MULTICOLOUR SPRITE GENERATOR *
130 REM*
140 REM* (C) 1984 S.P.RODGERS *
150 REM*
160 REM*****
199:
200 REM-----
201 REM>>> VARIABLES <<<
202 REM-----
210 LI=0:CM=0:V=53248
220 DIMCU(1):CU(0)=42
230 DIMEL$(3):EL$(0)="|||":EL$(1)="||":EL$(2)="|":EL$(3)="."
299:
300 REM-----
301 REM>>> SET SPRITE COUNTER <<<
302 REM-----
310 POKE2,0
399:
400 REM-----
401 REM>>> START PROGRAM <<<
402 REM-----
410 GOSUB10010:GOSUB20010
499:
999:
1000 REM-----
1001 REM>>> MAIN LOOP <<<
1002 REM-----
1010 CU(1)=PEEK(1111+LI*40+CM)
1020 SM=1111+LI*40+CM:F=F+1:IFF>1THENF=0
1030 POKESM,CU(F)
1040 GETR$
1050 IFR$="||"ANDLI<20THENPOKESM,CU(1):LI=LI+1:GOTO1010
1060 IFR$="|"ANDLI<80THENPOKESM,CU(1):LI=LI+1:GOTO1010
1070 IFR$="||"ANDCM<21THENPOKESM,CU(1):CM=CM+2:GOTO1010
1080 IFR$="||"ANDCM<1THENPOKESM,CU(1):CM=CM-2:GOTO1010
1090 IFR$="||"ANDR$<"||"THENGOSUB30010:GOTO1010
1100 IFR$="||"ANDR$<"|"THENGOSUB40010
1110 IFR$="||"THENPOKESM,CU(1):LI=0:CM=0:GOTO1010
1120 IFR$="|"THENGOSUB50010:GOSUB20010:GOTO1010
1130 IFR$="||"THENGOSUB50010:GOTO30010
1140 GOTO1020
```

```
1999:
3000 REM-----
3001 REM>>> PRINT ELEMENT <<<
3002 REM-----
3010 PRINT "J";:FORI=-1TOLI:PRINT "J";:NEXT:FORI=-6TOCM:PRINT
"J";:NEXT
3020 PRINTEL$(ASC(R$)-133)
3030 BY=832+(LI*3)+INT(CM/8)
3040 BP=3-(CM-(INT(CM/8)*8))/2
3050 POKEBY,PEEK(BY)AND(255-2*(2*BP+1))
3060 IFR$="||"ORR$="|"THENPOKEBY,PEEK(BY)OR(2*(2*BP+1))
3070 POKEBY,PEEK(BY)AND(255-2*(2*BP))
3080 IFR$="||"ORR$="|"THENPOKEBY,PEEK(BY)OR(2*(2*BP))
3090 RETURN
3999:
4000 REM-----
4001 REM>>> CHANGE COLOURS <<<
4002 REM-----
4010 R=ASC(R$)-137:ONRGOTO4100,4200,4300
4020 X=PEEK(V+34)AND15:X=X+1:IFX>15THENX=0
4030 POKEV+34,X:POKEV+38,X:RETURN
4100 X=PEEK(V+35)AND15:X=X+1:IFX>15THENX=0
4110 POKEV+35,X:FORI=0TO3:POKEV+39+I,X:NEXT:RETURN
4200 X=PEEK(V+36)AND15:X=X+1:IFX>15THENX=0
4210 POKEV+36,X:POKEV+37,X:RETURN
4300 X=PEEK(V+32)AND15:X=X+1:IFX>15THENX=0
4310 POKEV+32,X:POKEV+33,X:RETURN
4999:
5000 REM-----
5001 REM>>> TRANSFER DATA <<<
5002 REM-----
5010 AD=49152+64*PEEK(2)
5020 FORI=0TO62:POKEAD+I,PEEK(832+I):NEXT
5030 POKE2,PEEK(2)+1
5040 RETURN
5999:
10000 REM-----
10001 REM>>> OPENING SCREEN <<<
10002 REM-----
10010 POKEV+32,2:POKEV+33,2:POKE646,7
10020 PRINT "*****MULTICOLOUR SPRITE GENERATOR**"
10030 PRINT "*****USE KEYS AS FOLLOWS:"
10040 PRINT "*****
10050 PRINT "***** F1-F3-F5-F7 TO BUILD SPRITE"
10060 PRINT "***** F2-F4-F6-F8 TO CHANGE COLOURS"
10070 PRINT "***** 'CONTROL N' FOR NEW SPRITE"
10080 PRINT "***** 'CONTROL E' TO END PROGRAM"
10090 PRINTSPC(10);"*****ANY KEY TO CONTINUE"
10100 GETR$:IFR$="||"THEN10100
10110 RETURN
19999:
20000 REM-----
20001 REM>>> SET UP SCREEN <<<
20002 REM-----
```



```

20010 PRINT "MULTICOLOUR SPRITE GENERATOR--SPRITE
"PEEK(2)"
20020 RESTORE:FORI=0T062:READD:POKE832+I,D:NEXT
20030 M$=".....":FORI=0T01:
PRINTSPC(7)M$:NEXT
20040 M$=".....":FORI=0T05:
PRINTSPC(7)M$:NEXT
20050 M$=".....":FORI=0T01:
PRINTSPC(7)M$:NEXT
20060 PRINTSPC(7)M$:NEXT
20070 M$=".....":FORI=0T01:PRINTSPC
(7)M$:NEXT
20080 M$=".....":FORI=0T05:PRINTSPC
(7)M$:NEXT
20090 M$=".....":FORI=0T01:PRINTSPC
(7)M$:NEXT:PRINT"
20100 POKEV+17,91:POKEV+34,0:POKEV+35,7:POKEV+36,3
20110 PRINTSPC(32)"X0F1 = "
20120 PRINTSPC(32)"X0F3 = "
20130 PRINTSPC(32)"X0F5 = "
20140 PRINTSPC(32)"X0F7 = X0SPACE"
20150 PRINTSPC(10)"X0X0X0F2 - F8 TO CHANGE COLOURS"
20160 POKEV+28,15:POKEV+37,3:POKEV+38,0
20170 POKEV+23,10:POKEV+29,12:POKEV+21,15
20180 FORI=0T03
20190 POKEV+39+I,7:POKE2040+I,13
20200 POKEV+I*2,30:POKEV+I*2,60+I*40
20210 NEXT
20220 RETURN
29999 :
30000 REM-----
30001 REM>>> END PROGRAM <<<
30002 REM-----

```

```

30010 POKEV+32,14:POKEV+33,6:POKEV+21,0:POKEV+17,27
30020 PRINT"SPC(13)"END OF PROGRAM"
30030 PRINTSPC(5)"YOU HAVE"PEEK(2)"SPRITES IN MEMORY"
30040 PRINT"THE PROCEDURE TO INCORPORATE THE DATA"
30050 PRINT"FOR THESE SPRITES INTO YOUR PROGRAM IS"
30060 PRINT"AS FOLLOWS:"
30070 PRINT"1. TOUCH ANY KEY (WHEN READY).,"
30080 PRINT"2. WITHOUT CLEARING THE SCREEN, LOAD
YOUR PROGRAM,"
30090 PRINT"3. INCORPORATE LINES 1-6 (AS LISTED)
INTO YOUR PROGRAM,"
30100 PRINT"4. TYPE 'RUN', THE PROGRAM ASKS FOR A
LINE NUMBER TO START";
30110 PRINT" WRITING DATA."
30120 PRINT"X.N.B!! CHOOSE A LINE NUMBER CAREFULLY AS"
30130 PRINT" EXISTING PROGRAM LINES MAY BE DELETED"
30140 PRINTSPC(13)"TOUCH ANY KEY"
30150 GETR$:IFR$=""THEN30150
30160 PRINT"LIST1-6
39999 :

```

```

60000 REM-----
60001 REM>>> EXAMPLE SPRITE DATA <<<
60002 REM-----

```

```

60010 DATA21,2,160,21,2,160,64,72
60020 DATA8,64,72,8,64,72,8,64
60030 DATA72,8,64,72,8,64,72,8
60040 DATA21,2,160,21,2,160,0,0
60050 DATA0,0,252,0,0,252,0,3
60060 DATA3,0,3,3,0,3,3,0
60070 DATA3,3,0,3,3,0,3,3
60080 DATA0,0,252,0,0,252,0,000

```

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Blitz on New York

Jason Orbaum and Geoffrey Campbell begin a new short series on Dragon assembly programming

The idea in this new series is to develop a complete game program written in assembler. We decided on one where not many things happen at once, and settled on *Blitz*, which is relatively easy to program, whilst still demonstrating quite a few useful routines.

For all those who have not heard of *Blitz* (both of you!), you pilot a plane that is running out of fuel, flying over New York. As you are running out of fuel, you must clear a landing space on the ground beneath by bombing the buildings and successfully land.

The first part of the *Blitz* program will be published next week, and for now we'll look at how the game was developed. A flow diagram is shown in Fig. 1.

The initialisation routine comes round first after the start — divided into two boxes. They are split like this because some of them are at the beginning of each new wave and the rest, for example the score, are only reset at the beginning of each new game. The next stage is to clear the screen, and then the buildings are constructed. We will explain the workings of the various routines when the listing is published.

Next, the program checks the coordinates of the plane. If it is in the bottom right hand corner — the position after successfully landing — the program flow is diverted to set up a new wave. Otherwise it carries on and moves the plane across one position. A check is then made to see if the plane has crashed. If it has, then the score is presented, and the game pauses until a key is pressed. If this key is the apostrophe (shifted seven) then the program returns to Basic (or the assembler if it is being run from there). If not a new game begins.

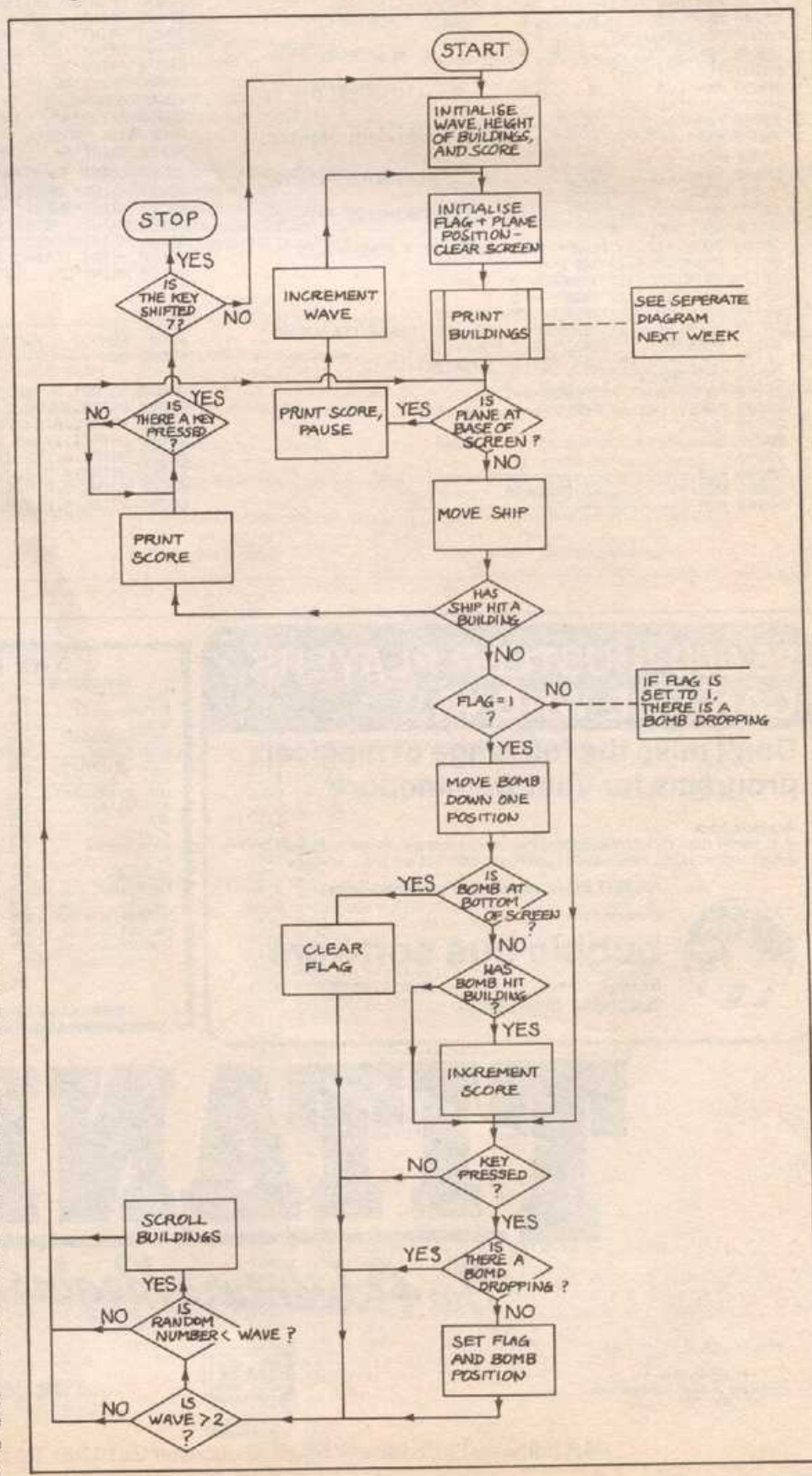
If the plane has not crashed or landed, the program must check to see if a bomb is dropping. If so, the bomb must be moved one space down, checking to see if the bomb has hit a building or reached the ground, and taking the appropriate actions.

The keyboard is now read, using a method that will be discussed later, and if a key is depressed and there is not a bomb already dropping, a new bomb is released.

Now we come to the unusual feature for this version of the game — buildings that grow. If the wave is greater than three, and a random number is in the desired range, the buildings (provided they are not in the row beneath the plane) scroll up one position.

This explains the flow chart in broad terms, and we will look at the first of the routines in detail next week.

If you reckon you can't wait till next week for the listing, try writing part of the game using the flow diagram as the basis and see how you get on.





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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.

Shoot A Star

on Vic20

Shoot-a-star is for the unexpanded Vic 20. You may have thought that controlling 4 ships in an unmentioned Vic game was hard

enough, but this is it. You must have supreme control of SEVEN laser bases, with which you must save the Earth from marauding mutated Martian Elephants.

For bonus points, hit the planet(s) of Mars itself. You control your seven ships using the number keys 1 to 7 for firing each one (1-Left to 4-middle to 7-Right). Unfortunately, when an elephant reaches Earth it

chooses a random Laser base and blasts it into a bit of space-junk (making it unuseable in the process). Beware, when all laser bases have been lost, the Earth has no defences, and the planet is doomed to be trodden on.

Program notes

Lines 10-48 Set up screen
Lines 70-96 Laser bases-Has 1-7 been pressed?
Lines 1030-1160 Laser base kaputt
Lines 2000-2040 The Earth has been trodden on...
Lines 3000-3070 Loop to check for basses kaputt.

```

10 K=1000:SC=0:POKE36879,106:POKE36878,15:PRINT"*****SHOOTING STARS*****":I=0:V=
0
15 IFPEEK(197)<>64THEN15
16 FORQ=1TO7:N(Q)=9:NEXT
20 B$(1)=" | | | | | | | | ":PRINT"PRESS SPACE TO START.":E=30720
25 PRINT"PRESS RETURN TO END."
30 GETA$:IFA$=""ANDAS$<>CHR$(13)THEN30
31 IFA$=CHR$(13)THENPOKE36879,27:PRINT"X":END
32 IFPEEK(197)<>64THEN32
33 TI$="000000":PRINT"J":B$(2)=" * * * * * "
35 PRINT"*****";FORQ=1TO3:PRINTB$(Q):NEXT
36 FORQ=0TO6:IFN(Q+1)=Q+1THENPOKE38819+Q*3,0:POKE38841+Q*3,0
37 NEXT
40 PRINT"SCORE *****"SC"HSCORE"HS"**:T=VAL(RIGHT$(TI$,3)):POKE36877,0
41 IFSC>HSTHENHS=SC
45 PRINT"FUEL *****"K"TIME *****"T
46 IFK=0THENPRINT"*****FUEL"K:GOTO2000
47 IFT>=200THENPRINT"*****"K"TIME *****"T:GOTO2000
48 IFI=1THEN55
49 G=INT(10*RND(1)+1):IFG=5THENPOKEA,32:A=INT(350*RND(1)+7724):POKEA,42:POKEA+E,
1
51 IFINT(20*RND(1)+1)=10ANDI=0THENX=INT(22*RND(1)+1):I=1:X=7724+X:DI=0:POKEA,32
52 IFI=0THEN60
55 DI=INT(3*RND(1)+21):POKEA,32:IFX+DI>8141THEN1800
56 X=X+DI:POKEA,94:POKEA+E,7
60 F=PEEK(197):W=255
70 IFF=0ANDN(1)=9THENFORQ=8077T07705STEP-22:POKEQ,30:POKEQ+22,32:POKEQ+E,5:GOTO3
000
75 IFF=56ANDN(2)=9THENFORQ=8080T07708STEP-22:POKEQ,30:POKEQ+22,32:POKEQ+E,5:GOTO
3010
80 IFF=1ANDN(3)=9THENFORQ=8083T07711STEP-22:POKEQ,30:POKEQ+22,32:POKEQ+E,5:GOTO3
020
85 IFF=57ANDN(4)=9THENFORQ=8086T07714STEP-22:POKEQ,30:POKEQ+22,32:POKEQ+E,5:GOTO
3030
90 IFF=2ANDN(5)=9THENFORQ=8089T07717STEP-22:POKEQ,30:POKEQ+22,32:POKEQ+E,5:GOTO3
040
93 IFF=58ANDN(6)=9THENFORQ=8092T07720STEP-22:POKEQ,30:POKEQ+22,32:POKEQ+E,5:GOTO
3050
96 IFF=3ANDN(7)=9THENFORQ=8095T07723STEP-22:POKEQ,30:POKEQ+22,32:POKEQ+E,5:GOTO3
060
100 GOTO40
1000 POKE36877,W:W=W-7:IFPEEK(Q-22)=42THENSE=SC+10:X=1:GOSUB2030:RETURN
1010 IFPEEK(Q-22)=94THENSE=SC+20:X=1:I=0:GOSUB2030:RETURN
1020 RETURN
1030 IFX=1THENPOKEQ-22,32:POKEQ,32:X=0:Q=7705
1040 NEXT:POKE7725,32:POKE8099,93:POKE38819,5:GOTO3070
1050 IFX=1THENPOKEQ-22,32:POKEQ,32:X=0:Q=7708
1060 NEXT:POKE7728,32:POKE8102,93:POKE38822,5:GOTO3070
1070 IFX=1THENPOKEQ-22,32:POKEQ,32:X=0:Q=7711
1080 NEXT:POKE7731,32:POKE8105,93:POKE38825,5:GOTO3070
1090 IFX=1THENPOKEQ-22,32:POKEQ,32:X=0:Q=7714
1100 NEXT:POKE7734,32:POKE8108,93:POKE38828,5:GOTO3070
1110 IFX=1THENPOKEQ-22,32:POKEQ,32:X=0:Q=7717
1120 NEXT:POKE7737,32:POKE8111,93:POKE38831,5:GOTO3070

```



```

1130 IFX=1 THEN POKE 0-22,32:POKE 0,32:X=0:Q=7720
1140 NEXT:POKE 7740,32:POKE 8114,93:POKE 38834,5:GOTO 3870
1150 IFX=1 THEN POKE 0-22,32:POKE 0,32:X=0:Q=7723
1160 NEXT:POKE 7743,32:POKE 8117,93:POKE 38837,5:GOTO 3870
1800 T=TI$:FORZ=1 TO 7:READ P:POKE 36875,P:FORL1=1 TO 200:NEXT:POKE 36875,0:RESTORE
1801 DATA 195,207,215,225,215,207,195
1805 V=V+1:IFV=7 THEN 2000
1810 U=INT(7*RND(1)+1):IFN(U)=U THEN 1810
1850 N(U)=U:I=0:TI$=T$:GOTO 35
2000 POKE 36879,46:PRINT "*****GAME OVER*****":PRINT "PRESS F1 TO START"
2005 FORS=128 TO 255:POKE 36874,S:NEXT:POKE 36874,0
2006 IF PEEK(197)<>64 THEN 2006
2010 GETA$:IFA$<>" " THEN 2010
2020 GOTO 10
2030 POKE 36876,220:FORL=15 TO 0 STEP -1:POKE 36878,L:FORM=1 TO 30:NEXT M:NEXT L:POKE 36876,0
2040 POKE 36878,15:RETURN
3000 GOSUB 1000:GOTO 1030
3010 GOSUB 1000:GOTO 1050
3020 GOSUB 1000:GOTO 1070
3030 GOSUB 1000:GOTO 1090
3040 GOSUB 1000:GOTO 1110
3050 GOSUB 1000:GOTO 1130
3060 GOSUB 1000:GOTO 1150
3070 K=K+20:GOTO 40

```

Shoot A Star
by M Valentine

Screen

on Dragon

How many times have you seen the output you need disappear off the top of the screen? Here is a set of simple *Basic* subroutines which will memorise the screen for you and banish such problems forever.

To incorporate the routine in your program, set N as the number of lines to be copied and if necessary, reset M, the start of the memory to be used, then *Gosub* 360. Copy as few lines as possible at each stage, since the program is fairly slow, then clear the screen. On recall, using *Gosub* 480, the complete set of recorded lines will be reproduced page by page, in an interesting highlighted fashion. The speed-up *Poke*

65495, O may be added if it is compatible with your machine.

Program notes

100-140	Demonstration screen.
180	Initialise variables.
220-270	Select memorise or recall.
310-340	Input number of lines.
350	Store line total.
360-440	Memorise.
480-520	Recall first page.
530-560	Next page routine.

```

10 *****
20 * RECORD SCREEN *
30 * AND RECALL *
40 * (C) 1984 *
50 * BRIAN HATTON *
60 *****
70 *****
80 * DEMONSTRATION *
90 *****
100 CLS
110 PRINT@43,"DATA RECALL"
120 PRINT@75,"*****"
130 PRINT@96,"THIS PROGRAM SHOWS HOW OUTPUT TO THE SCREEN CAN BE MEMORISED AND RECALLED."
140 PRINT@192,"IT CAN BE ADDED TO AN EXISTING PROGRAM AS SUBROUTINES."
150 *****
160 * SET VARIABLES *
170 *****
180 S=0:T=0:M=19999
190 *****
200 * SELECTION *
210 *****
220 PRINT@448,"PRESS M TO MEMORISE"
230 PRINT@480,"OR R TO RECALL"
240 I$=INKEY$:IF I$="" THEN 240
250 IF I$="M" THEN GOSUB 290
260 IF I$="R" THEN GOSUB 460
270 GOTO 200
280 *****
290 * MEMORISE *
300 *****
310 PRINT@480,"";
320 PRINT@448,"HOW MANY LINES TO MEMORISE";
330 INPUT N
340 IF N<0 THEN RUN
350 T=T+N
360 PRINT@448,"PLEASE WAIT"
370 FOR I=1 TO 32*N
380 IF I>448 THEN T=T+N+14:RETURN
PR 390 P=PEEK(1023+I)
400 IF P<64 THEN P=P+96:GOTO 420
410 IF P>95 THEN P=P-64
420 POKE (M+32*(T-N)+I),P
430 NEXT
440 RETURN
450 *****
460 * RECALL *
470 *****
480 FOR I=1 TO 448
490 IF I+448>32*T THEN PRINT@480,"";:PRINT@448,"ANY KEY TO RES"
500 P=PEEK(M+I+448*S)
510 POKE(1023+I),P
520 NEXT
530 PRINT@480,"";:PRINT@448,"ANY KEY FOR NEXT PAGE";:EXEC 41194
540 PRINT@448,"";:EXEC 41194
550 CLS:S=S+1
560 GOTO 480

```

Screen
by Brian Hatton

Origami

on BBC

This simple graphical program produces random black and white patterns similar in appearance to origami models. The whole program is random so to achieve the results

you want just keep re-running the program by pressing escape.

If you like a pattern then press any key and it will stop until you press a key again.

```
100N ERROR RUN
20K=RND(-TIME)
30V=RND(500)
40MODE4
50GCOL4,1
60VDU29,640:512;
70MOVE0,0:MOVE1,1
80REPEAT
90X=RND(V)-(V/2)
100Y=RND(V)-(V/2)
110XC=XC+X
120YC=YC+Y
130IFXC>640 THENXC=640
140IFXC<-640THENXC=-640
150IFYC>512THENYC=512
160IFYC<-512THENYC=-512
170PLOT85,XC,YC
180A=INKEY(0):IFA<>-1THENA=GET
190UNTILFALSE
```

Origami
by P Venables

Arcade Avenue

Dragon review

Following recent hiccups in the fortunes of the Dragon some machines can be picked up for as little as £60. Such bargain prices will mean that a lot of new Dragon owners will be interested in what games are worth buying. As with all home micros, the quality of software has been increasing, but there is only time for a quick review of some of the best here. As with the Spectrum and Vic, apparent hardware limitations are overcome or made unimportant by good programming and games design. Thankfully, we are also starting to get away from the all pervading green backgrounds that made reviewing Dragon games such a headache.

I get a huge amount of mail about A&F's *Chuckie Egg* and one day soon I will devote a whole avenue to the various high scores and dips. This ladder-climbing, hole-jumping game has smooth graphics and a good keyboard response which makes it very playable. Available on a range of micros, it should not be mis-

sed. I can guarantee its lasting appeal.

Hungry Horace, an old Spectrum chestnut from Melbourne House, is a *Pac-man* derivative that continues to reappear on other machines. It's worth a look, as is *Mined Out* by Quicksilver, another old and simple Spectrum game that keeps some lasting appeal due to the need for a degree of logical thought and strategy.

Arcadia and *Leggit* are two evergreen Imagine releases, the first a straightforward zap game that despite graphics and sound that are less than amazing these days, somehow has a lasting charm. *Leggit*, which is *Jumping Jack* on the Spectrum, is a furious and maddeningly addictive game where you frantically run around several platforms, trying to jump up through moving holes to reach the top of the screen.

Ocean's *Hunchback* appears to be their only game available for the Dragon but this is the peak of the arcade game copier's art and contains all the screens of the original game with high

quality graphics.

Hewson Consultants' three games in the Seiddab series, *3D Space Wars*, *3D Seiddab Attack* and *3D Lunattack*, are available for the Dragon as well as the Spectrum. These games are very clever but get a mixed reaction from people who play them. Personally I think they are very good, but you may be advised to see them for yourself before buying.

Ugh! by Softek is a very colourful and fun game set in prehistoric times with cave-men and various dinosaurs to avoid. It has proved so popular that it is actually being converted to other machines such as the cbm 64 (an amazing step up for a Dragon original).

Slightly out of my field but well worth mentioning is a war strategy game from Beyond called *Kriegspiel* that is supposed to be very good. For further information on this as well as adventures for the Dragon, I suggest you read *Micro Adventurer*.

Finally, but possibly most importantly, is *Microdeal* of St. Austell (who I think also pro-

duce Tom Mix software). They have so many good games that I cannot begin to mention them all. They are perhaps best known for their Cuthbert games, most of which are well worth buying, but look out as well for their arcade copies of *Frogger*, *Skramble*, *The King* (a very good *Donkey Kong*) and *Eightball* (*Video Pool*). *Danger Ranger* should be good because it is also being released for the Atari and the Commodore. Because it is supposed to be one of the best Dragon games available, *Buzzard Bait*, new from Tom Mix, was chosen to be the first game with the 'dongle' anti-pirating device. Unfortunately, we could not get it to load. However, *Touchstone*, another very recent release is, I hear, extremely good. Check it out.

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.

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Tony Bridge's Adventure Corner



Game savers

The Quill has a lot to answer for – now it is no longer the horrendous job of coding that will put budding authors off writing their magnum opus, merely lack of imagination! But the first of the Adventures that we look at this week is not Quill'd.

Treasure of Meathos is written and marketed by J. Copland. The volcano of Meathos contains the tomb of the long-dead King of Natocriaq and his Queen... There is a monster, created by the evil Wizard, which is roaming around the complex where you start the Adventure. You are not alone – a constant friend is Boris Blackridge, who appears whenever you ask for Help, and will suggest a course of action (if you're lucky!).

I'm afraid that I have lost Mr Copland's address, but please write to me, and I will publish the information. Now to the Quill'd Adventure for this week! *It's a Myth-tery* is from Mythsoft, and the author is A J Roberts. Like all Mythsoft programs, this present adventure is offered at the very reasonable price of £3.00. At the start, the player is presented with a book – that's all, and it is up to him to find out the purpose and aims of the Adventure. As Mythsoft say, when reading a book, the reader would know nothing of what was to come. I can reveal, however, that the overall object is to free the Gods and Goddesses who are being held captive by The Mythologist.

There are only one or two of the obligatory spelling gaffes, but these are redee-

med by the touches of humour throughout the program. Whilst all the usual commands are recognised (and there's a new one that is usually only seen in games of much higher pedigree from the likes of Infocom; type *Exam Chrono*, and the game time is given), it's a pity that there is no Save Game facility. All in all, *It's a Myth-tery* is very capable adventure, and an excellent program with which to open a new catalogue. Their address is Mythsoft, 84 Elland Road, Brighouse, West Yorks HD6 2QR.

Classic Computing is another new name, and has just released their new adventure *The Curse of the Seven Faces* – I thought, at first, that its scenario might pay homage, somehow, to the old Agatha Christie novel, *The Seven Dials*, but no, it is the familiar plot concerning Dragons, Elf-Kings, Wizards and so on.

Classic have obviously thought hard about the appearance of their program, and the screen is very colourful, with cyan text on a black background, although the magenta used for input is rather difficult.

The descriptions of the various locations are very colourful, too, with, for instance, 'hideous faces', which 'appear and cackle loudly, before fading away before you.' Returning to many locations, but not all, means that an abbreviated description is returned, but the full text can be viewed again by typing *Look*.

Some 150 rooms or locations are included, and range from very small rooms, with not enough space to swing a cat (although I would advise trying it!), to mazes of rainbow-coloured rooms (only one of several mazes!) and Forests, Castles and Caverns. All the usual clichés are met, but dealt with in an ironic and, sometimes, mordant way.

The adventure plays very well, with sticky, but entirely logical problems which will succumb to hard, lateral thought.

But the feature that I like most, and is, as far as I know, absolutely unique, is the Game Save facility. Yes, I know most adventures include this but the one in *Curse* is rather different.

But how many times have you had to fiddle with the controls on the tape machine, prior to stepping into 'A Dark Cave from issues a low, animal growl'? How ma-

ny times have you then been subsequently killed, only to find that you connected the leads in the wrong way, and have to start all over again? If you're like me (impatient to get on with things!), you will know how infuriating this can be! Classic must have trodden this same path, because they have included, in *The Curse of the Seven Faces*, the option to Save a game, as normal to tape, or, and this is the interesting bit, to a 'buffer'. This means that you can simply select '2' from the Save Game menu, and your present position goes into memory only, thus freeing you from fiddling about with tapes and the various controls.

Alan McDonald and Peter Galbavy (along with able proof-reader Zoe Meeson) are to be congratulated for producing an extremely well-crafted Adventure. I recommend it very highly. Classic Computing, 21 Harewood Avenue, London NW1.

Fergus McNeill of Delta 4 Software has written a suite of three Adventures, using *The Quill*. Going under the overall title of *The Dragonstar Trilogy*, this tape seems very good value at just £4.95. It's the usual tale of Princesses, which have to be rescued, and Dragons, which have to be fought. The locations in the first part are easily mapped, and there are at least two or three dozen of them, taking the player on a guided tour of a range of snowy mountains, damp caves, a large forest and a giant plain.

The second program seems to contain rather more to do. Going on to the other parts of the Trilogy seems to be easy, with no code words being required, but I am sure that various objects and knowledge will be required from the previous part in order to properly play the following parts. As I said before, good value, and a good romp for old D & D'ers. Delta 4 Software, The Shieling, New Road, Swanmore, Hants.

The Devil to Pay is an Adventure by M J Balchin of Computascope for Fun. A nicely-drawn cassette inlay card is not backed up by the cheap type-written set of instructions. You have been chosen to enter The Tower and retrieve the golden Apple (whatever that is) – 'Many have Gone Before, but none have returned. Can you?'

Well I can't, at least, not without some sort of crib sheet! The descriptions of each location are quite atmospheric, which is always a good thing, but the program is badly let down by the terrible layout and even worse spelling.

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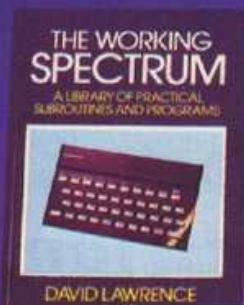
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P. 19:7



US currency

S M Walker of Newcastle-upon-Tyne writes:

Q I occasionally buy an American computer magazine and read all of the advertisements for the Vic20. I would like to know how to apply for this equipment, as obviously, the currencies are different.

A You can arrange to send US currency via your own bank. This is probably the most convenient method of ordering goods from the USA (or indeed any other country).

Vic20 modulator

Phil Whalley of Stanford-le-Hope, Essex writes:

Q I have just had to change my Vic20's modulator for the first time because it was faulty. I know of other people on their third or fourth. I wonder if there is a different more reliable make of modulator on the market that could fit to the Vic which would last longer. If you know of any, it would put me and many other Vic owners out of our 'silver box' misery.

A Nothing would please me more than to be able to say that I know of a reliable alternative modulator for the Vic. Unfortunately, I don't. It is an interesting fact that each of the popular home micros has its achilles heel. With the Vic it is the 'silver box'. With the Spectrum it is the keyboard. I am afraid that we have to ac-

cept that components will fail from time to time, and just hope it doesn't happen too often.

Frequency value

Richard Hyde of Bourne End, Bucks writes:

Q Do you know any formulae I can use to calculate the frequency and duration of a note needed for the Rom routine at 3B5H on the Spectrum, ie, given Beep 0.5,1 how can I work out the required frequency and duration values?

Secondly, how can I use the message routine at OCOAH.

A Probably the best formula I can give you is that used by the routine at 03F8H (the Beep command routine). This routine merely requires the pitch and duration of the note required to be put on the calculator stack, (pitch on top). This routine saves you having to worry about formulae and complex frequency conversions. I guess that what you want to do is use the ROM routines to produce textual screen displays. In that case I suggest that you set up the message to be printed, store an address of it in the A register, and call the routine at OC3BH (PO-Save), once for each character to be printed (incrementing the A register each time).

Scanning routine

Scott Ling of Kircaldy, Fife writes:

Q I have a 48K Spectrum and I am writing a game which uses the In function. My problem is when keys Q to T are held down this makes In 64510 take a value of 224. However, pressing any other key on the keyboard at the same time still gives the key the value 224.

For example: keys Q to T are pressed: In 64510 = 224. Key C is also pressed: In 65278 = 247.

Is this a fault on my Spec-

trum?

A Your problem is associated with the way that the keyboard scanning routines operate. If more than three keys are being held down at the same time it is possible for the effect you describe to occur. I managed to reproduce this effect twice in about fifty attempts. The other 48 times everything was OK.

You should try and avoid having to use more than three keys at any time in your program. To get round the problem you should keep the keys to be used well apart, ie, in different 'half rows'. That should at least ensure that you will be able to determine if any key in that half row has been pressed.

American voltage

Gregg Whitbread of Chadwell-St-Mary, Grays, Essex writes:

Q I am a proud owner of a Commodore 64. I am shortly going to America and I wondered if you could give me some advice? I would like to purchase some software, a 1541 disc drive and a modem while I am over there. Will any of these work on my faithful 64?

A I would think that software would not be a problem on CBM64. It is certainly possible to use UK software tapes on US machines, and I see no reason why the reverse should not apply.

As far as the disc drive is concerned, you will run into electrical problems here. The USA uses a different standard for electrical equipment from the UK. The same applies if you purchased a modem in the USA.

You could get round the problem by using a voltage transformer (to produce the electrical current required by

the US hardware) but by the time you have done that it probably won't have saved you any money.

Digital electronics

Steven Cox of Formby, Merseyside writes:

Q By mistake this week, my dad bought me a copy of *Sinclair Projects*, the hardware magazine. Even though what was explained inside was a little (a lot) beyond me, Digital Electronics really caught my imagination. Could you tell me of any simple books which you know of on this subject?

A There are quite a lot of introductory books — with at least half a dozen in the *Teach Yourself* series. Without going into too much detail any one would be a pretty good first step into this field. One other thing you could consider if you are a Spectrum owner interested in finding out how your micro works would be the *Spectrum Hardware Manual*, published by Melbourne House. It is a very useful little book.

On the market

S G Ruffell of Ogmire-by-Sea, Mid Glamorgan writes:

Q Could you tell me the best light pen on the market for around £20 to £30 for my 48K Spectrum?

A I am not going to risk my neck by saying which is the best — that would only be asking for trouble. But DK'Tronics make a quite nice light pen which retails at about £20. You can contact DK'Tronics at Unit 6, Shire Hill Industrial Estate, Saffron Walden, Essex CB11 3AQ.

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COMMODORE 64 Disc drive C2N datasette b/w t.v. £200 worth software blank discs/tapes 2 Joysticks dust cover, books, mags. £600 ono. 58 Mill Farm Crescent, Hounslow, Middx. after 7 pm.

VIC 20 computer — cassette deck, super expander, joystick, many games inc Arcadia, Bewitched, Super loader, worth £350. Any realistic offer accepted. Tel: (09747) 472

CBM 64 + disc drive + cassette unit + some discs. £335 or will split. Reading (0734) 23653

VIC 20 programmers reference guide £5.00 super expander £17.50. Jetpac (8K) Arcadia, Bewitched, Amok, Gridrunner, Cosmiads, A.V.I.T.W. all £3.00 each laserzone hell gate £3.50 each both +8K telephone evenings 02756 61234

COMMODORE 1520 four colour printer/plotter 2 months old £80. Phone John Brooks 09328 61181 x 19 8.30 to 4.30 weekdays

COMMODORE 1520 four colour printer plotter super expander cartridge and mutant hero cartridge plus 1540 disk drive with ten discs call Laurence after 5pm on (03744) 61116

VIC 20 with 16K switchable ram pack, c2n cassette recorder, Joystick, Intro to Basic 1 and 2, various games and books worth £100 ideal starter pack sell for £150 ono Dartford 26079.

FOR SALE Vic20 computer, datasette unit 8K Ram alien cartridge quizz cassettes. All excellent condition for only £100 ono Ring Basingstoke (0256) 56627 after 4.00pm.

Dragons for sale

DRAGON 32, cassette recorder, all leads, etc. 10 official programs, 7 books or programming + games, loads of mags. £15. Trigger command joystick,

light pen, manuals etc. £180 ono. Tel: Swindon 823867

DRAGON 32 Boxed as new, 2 joystick + cassette recorder £100 of s/w + mags + books £130. Tel: 01-748 3231 Colin

MODEM for Dragon 32 matlin modem complete with RS232 Interface + programs tape as new, complete and ready to use. £80 ono. Tel: eves 422 0941

DRAGON 32, 3 joysticks, lots of mags, one book, £150 of s/w (all originals) sell for £165. Tel: Hitchin 0462 812526

DRAGON 32 £200 of s/w ie: Joystick, cassette player etc. Excellent condition as new. Boxed. £200. Tel: Great Missington: 6339

DRAGON 64 s/w all originals £100+. Quick shot self centering joystick, dust cover, Dragon magazines. £200. Tel: Malcolm on Dartford 0322 25498

DRAGON 32 Dragon disc unit disc drive, discs, joystick, 2 cartridges, tapes + programs worth £415. Sell for £300. Tel: Windsor 51750 eves

DRAGON 32 cassette recorder. Joystick, books, lots of games, business software. Cost £700. Sell for £225. Tel: Luton 31331, after 6pm

DRAGON 64 + software inc. Scramble, Donkey King etc + books + 2 joysticks 2 months old. £150. Gainsborough 611620

DRAGON 32 as new worth over £300. S/w all originals. Enter the Dragon. Books, Joystick, Assembler/Editor, Cassette Recorder worth £500, sell for £180. Tel: 041942 3752

Acorns for sale

BBC B 8 months old. Some Games. Tel: 0760 338387

BBC Printer cable. Still boxed. Hardly used. £295. Micro vitex cub colour monitor. As new. £145 mcp 4 colour printer/plotter with BBC Printer Cable £60. Tel: 0344 886178 after 5pm

BBC s/w. Doctor soft, 747 £4.00. Mollerx dc10 £8.00; flight deck 767; £5.00; Hewsons Heathrow £5.00; F-Freddy £4.00; Zany Kong £3.00. Tel ono 0494 444827

BBC model B Acorn DFS, 100K disc drive star printer, graphics + disc doctor. Worth £1280, sell for £875. Tel: Rayleigh 770027

BBC model B, o.s. 1.2.3 months old, £320. Tel: Brecon 0874 611177

BBC B, disc interface lots of s/w. Cassette recorder £400. Tel: Mr Robinson 01-720 8246 (after 6pm)

ZX81 File 60 keyboard. Unwanted gift £35 ono. Tel: 0726 890473. Or willing to swap for Spectrum or Dragon s/w (utilities)

ACORN Electron, leads, cassette recorder, manuals, box, 4 games, worth £247. Sell only £175 ono. Or swap with C64 + C2N cassette recorder. Tel:

Harpden 235367 (after 6pm)
BBC Rom graphics rom £30. Ultracalc £70. Tool kit £20. Allgata disk upgrade £25. Gremlin £30. Each rom supplied with over £100 disc s/w. Tel: 05827 69152

BBC s/w for sale over 40 tapes + disc for many s/w houses. For sale at 60% of original cost (all original s/w only) Tel: 05827 69152

Ataris for sale

ATARI 800 48K + recorder, original packing + basic cartridge, micro soft, 2 basic cartridge, assembler editor cartridge, + computer disc. First offer over £200. Tel: 0327 42156

ATARI VCS, 7 cartridges, joystick, good as new. £65 ono. Will split cartridges ie: Missile Command, Asteroids, Space Invader £6.00 each. Tel: Ilkeston 327716 eves

ATARI 400, basic programming 16K £95.00 Tel: 01-778 0536. Stephen after 6pm

ATARI 800 48K + joystick, 1010 recorder + over 100 mags and games + books. Atari Computing I + II. 6 months guarantee. Excellent condition cost £330, sell for £200 ono. Tel: Earl (Epson) 23596 after 6pm

ATARI 400 inc basic kit users guide, manuals, 2 joysticks + aircraft cartridge. £80 Tel: (0375) 70138

WILL SELL or swap ATARI VCS, Pac, defender, + cash. Good CBM printer or disc drive. Cleobury Mortimer (0299) 270625

ATARI 800 XL 1010 recorder £35 of books, £140 of s/w. All 9 months guarantee worth £410, sell £300, or swap BBC B. Tel: Paul 021 622 4167 eves

ATARI VCS joysticks + paddles. Space invaders + combat cartridges. Hardly used. In good condition. All boxed. Contact Max on (0272) 28672

ATARI 800, with disc drive + joystick and paddles, s/w £320. Will not split. Tel: 0268 285406. Basildon — eves & w/ends

ATARI 400/800 software. Rescue at Rigel, Temple of Apshai, curse of Ra, Protector, £5 each. Scott Adams Adventure #12. £6. Phone Sunbury 82189 guaranteed no copies

ATARI VCS and dust cover and all controls, etc. Combat, Air, Sea Battle, Circus Atari, Video, Asteroids, Missile Command, Phoenix. Excellent condition. £230, sell for £80. Bourne End 23299.

ATARI GAMES. English software Diamonds, Batty Builders, never used (Mum got it wrong again). Cost £10 each, sell £5.95 each. I. Smith, 40 Trinity Road, Southend-on-Sea, Essex.

ATARI 800 48K, 10 months old with

cassette deck tapes, books and American magazines, £150. Watford 26838 evenings only.

ATARI 400, 48K and 2 programs, recorder, lots of s/w and books. £260. Tel: 01-524 6035, 9am-5pm for details.

ATARI VCS and 6 cartridges, 2 joysticks, 2 paddles, 2 Indy controllers and adaptor. Swap for other disc drive or Acorn. Tel: Nantwich 0270 628502.

ATARI 822 Thermal Printer for Atari Thermal Paster 3 rolls £100 Tel: 01-300 2455 after 6pm

ATARI 400/600/800 software star raiders pole position missile command defender centepede donkey kong cartridges £15 each French German Italian Spanish language courses 1/2 price also some other S/W Tel: Basingstoke (0256) 23199

ATARI 800, 16K Expansion £20. Also CMB 64 software to sell or swap phone Burntwood 3392 after 7pm

ATARI 400 XL cartridge for sale. Kaboom, Centipede, Missile Command, Quix, River Raid. £15 each. Tel: 0782 864831

ATARI 32K with cassette recorder basic cartridge + over £10 worth of books. Worth over £200 will sell for £120 ono. Tel: 0908 563482

ZX81s for sale

ZX81 + memotech 16K, manual + leads. Bks, mags, s/w worth £40. ie: Meteor Storm, Chess, 3D-Defender etc. Guarantee. Sell £40. Tel: Cirencester (0285) 2742

ZX81 16K rom. £40 games £30 ono. Tel: 0257 452336

ZX81, 9 cartridges, 16K rampack. £55 ono. Tel: 01-850 2759 (after 6pm)

SINCLAIR ZX81, 16K, reg board, games and books £65 ono. Excellent condition. Sell £50. Tel: 346 5076

ZX81 software half price 20 tapes must go phone Newquay (Wales) 560660 after 6 o'clock please

32K Ram pack for ZX81 £25 only. Tel: Andy on Leeds 759686 before 6pm

ZX81 16K ram maplin extended keyboard £200 software; manual; books etc. £75 ono Tel: 01-263 9802 after 6.30pm

16K ZX81 + fuller keyboard, tape recorder and v.v. Leval meter + programs, books + 5 games £50.00. Tel: 677 2094 Bob

16K ZX81, 19 cassettes £55.00 Tel: Reading 418192 after 6pm

48K ZX Spectrum + tape recorder + 20 programs (all originals) + numerous computer magazines. £170 Tel: Barlaston 3159

ZX81K-16K RAM + keyboard, Pss QL system £50 ono. Tel: Fyfield 436 after 6pm.

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.....

ZX81 64K Memotech rampack. Memotech keyboard over £50 books and software with modem (unused) £125. Without Modem £100 or swap for 48K spectrum. Tel: (0602) 756637 (Nottingham) deliver 30 mile radius.

ZX81 32K ram with tape recorder, books, Flight, Crazy Kong, Galaxians, Frogga, 2 Pac-Man games & mags. Best offer. Hayes 561-4900.

ZX81 16K ram over £200 of s/w (original). £60 o.n.o. Tel: 01595 9415 (after 6pm).

ZX81, 16K file sixty keyboard, recorder all as new & 8 games tapes, including Sea Wolf, £60 o.n.o. Tel: 0785 48338.

Tandys for sale

TANDY colour 16K + extended basic plus 3 cartridges and 3 cassettes. Also joysticks and manuals £100 ono. Tel: 01-688 0999 eves only

AQUARIUS 4K computer + two program books + over 60 magazines (PCW's). Will swap for Atari VCS + cartridges or will sell for £50 ono. Telephone Hornchurch 57487

AQUARIUS computer. Also Tron deadly disc's and advanced dungeons 'n' dragons cartridges plus cassette recorder lead. All boxed good condition. £40 tel Huddersfield (0484) 20118

TANDY CGP-11.5 colour graphics printer + dragon lead. cost £167, sell for £105. Tel: (01) 360 3443

TANDY DWP 410 Printer; Tractor feed, print wheels + ribbons. £500 ono. Also Epsom MX80 Grafix 80 £250 ono. Assorted Tandy S/W Tel: 031-667 3137 6-10pm

TANDY CGP 115 colour graphics printer and Dragon leads. Cost £167. Sell for £105. Tel: 01-360 3443

TANDY TRS80 mc-10 colour computer and 16K rampack, also few games cost £115 sell £60 ono or above + £70 for 48K Spectrum phone 061 653 5345 Mark will pay postage

CBM64 s/w for sale. Inc. tapes, disk and roms. (Originals) half price. 01-574 4122

VIC20 + cassette recorder 16K ram pack switchable, Spectrum video joysticks. Original gmes. Super expander, + bks. £150. Or swap for CBM64. Tel: Dartford 346470 eves, Martin

VIC20 + £700 of s/w. All originals. (100 items) 3 rampacks, joystick, books + mags, dust cover. Original packing. All in good condition. Worth £900. Offers, Ruislip (08956) 38564, after 4pm + w/e

ARCADIA and Bewitched for VIC20 £3 each. Tel: Reigate 07372 43279

VIC20 + C2N with games £99 + O levels Math tapes at £5. Tel: Burgess Hill 3146

C64 plus C2N cassette 2 joysticks £100 of s/w, books, mags £200 ono. Tel: Elland 0422 78522 (after 5pm)

CBM64 — easy script, word processor on disc. Unused £40 (p+p paid). Tel: Worksop (0909) 482844

VIC20 Programmers and cartridge £15. Commodore 64 Sword of Fergal Epyx. £6. Ring Wigan (0942) 212662

VIC 20 boxed, only 5 months old £70 ono. Tel: 443 1539 — 4pm

COMMODORE VIC20. Keyboard, ram pack, joystick, cassette + games £110 ono. Tel: 01-894 7062

16K ZX81, manual + leads. £40 of s/w (nine tapes). Good condition £45. Tel: Redhill 66911

Spectrum for sale

SPECTRUM s/w for sale ie: Skull, Eskimo Eddie, Softalk II all £3.00. Zoom, Barmy Circus, £2.00. Tel: 01-462 1913

SPECTRUM micro-prolog £18.00. Melbourne House; Super Change your Spectrum book £4.00. Hewsons 40

machine code book £4.00 Tel: Steve (02774) 53541 after 6pm

48K Spectrum: Mint condition. Quicks-hot joystick MKII and interface, amplifier and power supply. Excellent original games ie Jet Pac, Phoenix, Black Crystal, + more. PC weekly mags from Oct 82. All boxed; for £250. Tel: (01) 205 8503 after 7pm

16K Spectrum dk tronics keyboard £90. 32K ram pack £18.00. Printer £23.00. Microspeech £20. Light pen £11. Tape recorder £15.00 3 books £12.00. £80 of s/w going for £30. Tel: (0250) 20507

ZX Spectrum 48K Kempston joystick interface £20 of s/w £100. Tel: Dartford 333 720

SPECTRUM s/w. Worth £73.00. £2.40 for Arcadia. Cookie, Zoom, Airline. £2.70. Spectrum Armageddon, Schizoids, Lunar Rescue, Horace Spider, £3.00. Grand Runner, Chequered Flag, Starsine, Tel: Pete 0423 7119139

48K Spectrum, £75 of s/w, mags, sound cm also come out of TV, still boxed, good condition. £150. 01-203 0846 (after 7pm)

48K Spectrum, carry case, program-mable joystick, mags + books, £80 of s/w originals. £190. Tel: Epsom 29376

48K SPECTRUM, recorder, printer, joysticks, interfaces, stacks of games, manuals, mags, carry case, Hurg game, Designer, perfect order, printer paper. All you need £375 ono. 01-951 1681 Edgware.

48K SPECTRUM and fullsize keyboard and lightpen and joystick interface and tape recorder, 11 games. Computer and all boxed £250 ono. Buyer collects, telephone (983) 772. Ring after 5pm.

SPECTRUM books for sale: Introducing Spectrum machine code £6.50, the Spectrum Pocket Book £5, A Z80 Workshop Manual £2, all for £12. Tel: Southend (0702) 586841.

SPECTRUM 48K. Exchange Colossal Adventure and Adventure Quest for Lords Of Time and Snowball. Tel: Derby 550915

SINCLAIR SPECTRUM 16K, with computer cassette recorder and £50 worth of software. All unused. £100 only. Worth about £180. Tel: Otford 3518 anytime.

SPECTRUM software for sale. All originals Hurg, Vaihalla, Knights Quest, Jet-Pac, Cookie, Trans-Am, Horace and Spiders, Molar Maul. Many more at cheap prices. Phone Peter on 041-778 3426 evenings

SPECTRUM 48K Quickshot II joystick 2 interfaces, £120 of software including Hobbit, Scrabble, Jetset Willy, Superchess II, Ant Attack, Atic Atac, Manic Miner, Flight Simulator, Trans-Am, Vu-File, Vu-Calc. Guaranteed 9 months £150 Southwick near Brighton (0273) 5921369.

48K SPECTRUM, cassette recorder, Kempston joystick, interface, magazines £80 worth, software, carrying case £200 or swap for Commodore 64 and cassette recorder. Tel: (0273) 775518 eves.

SPECTRUM GAMES Alchemist, Chukie-Egg, Xadom, Timegate, Ant-Attack, Meteor-Storm, very good condition. £3.50 each. Phone 0743 31489 after 4.00pm.

SPECTRUM PRINTER. Very good condition, quick sale wanted. £45 ono. Phone 076 483 261 Alan.

SPECTRUM 48K, printer, five rolls paper, tape recorder, interface, books, 50 mags, lots of software, microdrive order form, all boxed, £240 Rayleigh 776416.

48K Spectrum, tape recorder, interface, manuals, and loads of S/W. All boxed as new will swap for CBM 64 and tape recorder. Must be in good condition.

Tel: (0224) 873997 (eves)

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ZX SPECTRUM 48K inc £125 of S/W. Mags £150. ZX Printer & 4 rolls of paper. £25.00 currah speech synthesiser £20. Tel: 021 358 1010

SINCLAIR ZX Spectrum 48K with tape — joystick interface & 2 joysticks over £200 of S/W. £220 or exchange for video recorder. Tel: Stevenage 314230

48K Spectrum 5 months old. Tape recorder, £150 of S/W 60 mags (P.C.W) £130.00 Tel: Battle 4574

48K Spectrum £300 of games, tape recorder joystick interface, lots of mags cost £450, sell £200. Tel: Upminster

SPECTRUM 48K all leads & manuals, S/W, tapes, jet pack, flight simulation, vu-3D & vu file & more. £110. Tel: 01 968 7556

48K SPECTRUM, cassette recorder, printer + 5 rolls, Vu Calc, Vu File + software intro manuals + leads. Mint unboxed offers phone 01-249 3355.

LOADS OF SPECTRUM software for sale. Send for full list. Tony Moran, 23 Egerton Road South, Chorlton, Manchester M21 1YP. Also few CBM-64.

SPECTRUM SOFTWARE — originals £2.50 ring (Bradford) 638107 for details.

SPECTRUM ORIGINAL s/w for sale or will swap 14 for ZX printer. Contact Eddie Earley at 65 Anner Rd, Dublin 8, Ireland.

SPECTRUM SOFTWARE All £3.00 each Jaws, Orbiter Escape, Destroyers Escape, Nightlife, Golf, Desert Patrol, Tubor, Sentinel, Jumping Jack, Airline, Kong, Mined Out, Death Chase, many more. Tel: Phil Newcastle 761396.

48K SPECTRUM, under guarantee, Tape Recorder, Dust Cover, Over £300. Games s/w (original) sell sep. £140 ono Tel: (0322) 524899.

48K SPECTRUM Guaranteed + games cassette £120. Tel: 01-854 7913. Room 423 Woolwich.

SPECTRUM 48K 2 months old, with joystick, speech synthesiser, cassette recorder and games. Also over 30 mags + books. Swap for CBM 64 or sell for £160. Tel: Bolton (0204) 53852.

ZX SPECTRUM FDS keyboard unused, unwanted gift £40.00. Buyer collects phone 01-673 3491.

SPECTRUM SOFTWARE for sale Mcode 2.8; Knights Quest, Phantasia, Nightlife, Transylv. Tower, Lunar Jetman, all £3; Tel: Weston-Super-Mare 413636; after 5pm.

48K SPECTRUM, Interface I, micro-drive, ZX printer, 5 rolls of printer paper, light pen, loads of tapes. Will split. Tel: 01-657 4999 after 6pm.

48K SPECTRUM issue II with leads + manuals + 3 original games + 7 blank cassette £80. Tel: Dldcot (0235) 815077.

48K SPECTRUM £100: with bks, mags, + £40 of s/w. Tel: West Drayton 444875.

SINCLAIR SPECTRUM, 3 computer games. Sinclair Litetune, guaranteed £99. Tel: 01-981 1902 after 5pm Morton.

48K SPECTRUM Interface I microdrive printer, Fox joystick interface, Quicks-hot joystick, 20 games cassette. £240. No split. Tel: 695-3468 Ashford.

FOR SALE FULLER FOS Spectrum keyboard £40. Including postage. Tel: Welwyn Gardens 24244.

SPECTRUM 48K + manuals + joystick + s/w. swap for Commodore 64 or sell for £150. Tel: 06614 2348.

SURF SPECTRUM software. Sabre Wolf, Hurg, Moon Alert. Phone John after 6pm. 01-476 8884.

SPECTRUM 48K with Kempston joystick, cassette deck and loads of s/w. 4

months old. (£110) sell. Tel: Woking 68093.

48K ISSUE 3 Spectrum, Kempston Joystick, Light pen, s/w. Price £220 ono. Tel: 01-443 0273 after 4.30pm.

SPECTRUM 48K inc: cassette recorder, programmable joystick interface. Sound amplifier, and 60 games (original) £175. Tel: 01-561 6410.

SPECTRUM 48K microdrive, interface I, Interface II. Quickshot 2 joystick, DK Tronics keyboard + Atari accessories valued at £200 upward. Will sell £250. Tel: 0432 760007.

48K SPECTRUM with speech synthesiser + Kempston joystick + interface + 75 original games £150 ono. D. Rimmer, Blackburn (0254) 49143 after 4.30.

48K SPECTRUM as new + joystick Kempston Interface, cassette recorder, dust cover, £100 original games, £30 of mags. £170 ono. Kimber (0384)

For sale

MODEM for sale: 1200 BPS, special features. Bargain at £65 ono. Tel: Coventry (0203) 471538

TEXAS Instrument T1 99/4, speech synthesiser. 12 plug in modules. ie: Adventure, Household Management, Music Maker, tapes + various books. £150 ono. Tel: Swindon (0793) 724531

S/W and books for sale, BBC + Electron education, utilities, games. Perfect condition. 1/2 price. Details. Tel: (0255) 814523

SHARP MZ80K computer, built in monitor. Tape recorder, manuals, various tapes + bks, good condition, boxed. £240.00 Tel: 0632 836110

QUMANIA 100K disc drive + power supply unit, £155 ono. Teletext adaptor £195 ono. Tel: 01-858 2449

SWAP over 400 worth of original BBC in tapes, disc + rolls for 48K Spectrum, with s/w or CBM64. Tel: 05827 69152

VECTREX computer, built in game. Mindstorm. Sell £60.00. 01-874 3645

S/W tapes for sale (Spectrum) 6. Pyramid, Sheer Panic, Zip Zap, Bugga Boo 600. £12 for all will not split. Tel: Warrenpoint 72473. Billy

MEMOTECH MTX512 as new. Unused £250. Tel: Paul 01-657 1779

CBM64 — Oric 20 — Cassette Interface. Plug in any mono tape recorders. Mike + air. Instructions £14.00. Write to Rughbirsingh, 84 Park Road, Kempston, Bedford. MK42 8NZ.

APPLE silent type III printer £100 ono. Tel: 021 350 3874

AQUARIUS 48K + 2 programs bks. Over 60 mags (PCW's) will swap VCS + cartridges or sell for £50.00 ono. Tel: Hornchurch 57487

600 CHANNEL CB + aerial + car aerial + power pack. Worth over £140. Swap for Interface 1 + Microdrive(s) and cartridges. Phone 01 857 3113.

FOR SALE: Protek Joystick Interface and Spectavision Joystick for Spectrum. Perfect working order. £15 ono. Write D. Scott, 26D Harden Place Hawick, Roxburghshire, Scotland.

LYNX 48K including Serial Printer Software, Manual, Newsletter, General info, and Lynx book. £130. Also Wordwise for BBC. £30. Phone: Coggeshall, Essex. (0376) 62630.

FOR SPECTRUM RGD Tracer £35, DKTronics Lightpen £12, Currah Microspeech £20. MCP40 Color printer £100; Software Fifth, Viewpoint, Toolkit, Forth £3 each. All perfect, includes postage. Phone Dennis 0203 385614 or 0993 830248.

QUALIFIED BOOKS Basic for students, with application £7.00. BBC Micro in science teaching £7.00. Programming Z-80 by R. Zaks £12.00. Osborne CPM Guide, T Hogan £10.00. Unwanted gift, H. Manaf 40 Hogarth

Road, SW5.

SHARP PC 1500 £90 ono for sale or exchange. Consider Atari Vic or Sinclair. Also keyboard + PSM. £90.00 ono. Tel: Preston 864599.

SWORD M5 Computer Basic 1, Basic 9 + sword cassette recorder, all leads + manuals. Only 4 months old. Cost over £220. New. Accept £135 ono. Harlow (0279) 38100.

EIGHTY COMPUTER magazines (mixed titles) from 1981 on. Lots of programs! £10 the lot. Buyer collects (too heavy to post). Tel: Potters Bar 52978.

HEWLETT PACKARD 82143A Thermal printer. Suitable for HP41C calculator, rechargeable battery, mains charger, manual, two rolls thermal paper, boxed. Would cost £300+ new but only £100 o.v.n.o. Tel: 0424 217170.

INTELLIVISION + 4 cartridges which are Advanced D and D, Pitfall, Tron, Soccer. All for £70. Ring Bristol 672110 after 4pm. Ask for Paul.

POCKET COMPUTER. Casio FX802P and FA3 cassette interface, printer (built-in) program library and case. Cost £115. £65 ono. Tel: Halifax (0422) 75366 (after 5pm).

TEXAS T1994A joystick, 4 models, ?? Chess & Munchman, cassette player & cards, £60 o.n.o. Tel: 01-586-8876 (after 6pm).

LYNX 48K S/W & mags. £180 o.n.o. Tel: Luton 570 336.

ORID 1 48K with over £50 of s/w inc Xenon I, Zorgan Revenge, Forth, Ultra. Leads + manual. Still g/teed. £100.00. Tel: (0635) 216818 (Newbury).

NEUBRAIN A0 with power supply, books and numerous s/w tapes. £120 the lot. Texas T1994A. Complete with power supply and 4 s/w cartridges. £80 the lot. Tel: 01628 3351 (day ex 469) 01-221 8783 (Derek).

LYNX 48K, manuals, leads, Lynx guide, dissembler, labyrinth + colossal adventure. £150.00. Tel: (0685) 877039 after 6pm.

THE QUILL, Lunar Jet man, Mister Wimpy, Will sell or swap for Adventure games. Tel: Huddersfield 45909. David Blackshaw.

PARTIALLY ASSEMBLED £100 system. Integrid case + power supply. Jade CP0, 64K Ram, 10 disc cards and most components. CPN. Full documentation £500 or offer. Tel: (04895) 82186.

TEXAS INSTRUMENT 99/4A + Joystick and Munch Man cartridge — 3 games tapes + magazines, books etc. £90.00 or swap Spectrum, Atari or Dragon. Tel: Chelmsford 266448. (eves).

48K ORIC with s/w + books 48K Spectrum — 01 989 8138 (eves + weekends).

48K ORIC with s/w + 3 books, 48K Spectrum. Tel: 989 8138. eves.

ORIC 1 48K will all leads + s/w. Perfect condition £110 ono. Tel: Turvey 777.

32K PET BOXED. Under guarantee, complete manuals. Dust cover + £100 of s/w. Offers. £325. Must sell. Tel: Earlswood 2143 after 6pm.

48K ORIC I all leads inc. Oric compute book £80. Tel: 01-845 3516. Northolt.

ORIC 1 48K for sale in original box with all leads. £100 of s/w inc. Earth + Money, games, several books included. £140 the lot. Cosham 4034.

S/W FOR SHARP MZ 80K-A. Adventure games + Arcade games between £3-4. Tel: 01-455 6641 after 4pm.

ZX MICRODRIVE, Interface 1, RS232 lead & 1 blank cartridge, £125; secondhand Spectrum software for sale; also wanted BEEBA Spectrum software. Reasonable prices paid. Tel: Jon, Towcester 51202 (between 6 and 9).

Wanted

WANTED for VIC 20 — Practicale Newtonhead, Mid Madness, CBM. Home finance. Uxbridge 70324

WANTED Tele Type — £50. Tel: John Chapman, 8 Wier Road, Rochdale. Tel: Rochdale 524228

SWAP 48K Spectrum, Kempston. Joystick + Interface, plenty of books + s/w for anything. Tel: Birmingham 524 1254

FOR SWAP ZX printer for ZX81. No s/w required. Tel: Northwood 28748

SWAP Spectrum for CBM 64. Tel: Dartford 33370

VIC 1525 Printer for £175 ono or swap for colour monitor. Call Mr Shalash — 01-735 6459

WANTED RTTY Program Interface or anything else to enable me to join the airwaves. Will buy or have many cartridges, consider barter. Tel: Staines 58707 after 6pm

WANTED 48K Spectrum no s/w needed. Tel: Langley Mills (0773) 763553

VIC 20 starter pack. 3 months old. Swap for 48K Spectrum or Oric one or sell £115.00 Tel: 01-635 0723

ANYBODY interested in swapping your BBC-B (S/W if possible) for my 48K Spectrum with joystick, S/W, magazines and my Atari VCS with six cartridges if so contact Somerby 418 (Leics)

WANTED. computer equipment, printers, disks, monitors etc, especially Commodore. Everything considered. Also large number of ZX81 programs and books worth over £70, asking only £35 tel: Ruthin 4078 after 5pm

SPECTRUM software wanted, arcade adventure and Util-ity no copies please. Send lists and prices wanted Plus an SAE to Richard Smith, 14 Henson road, March, Cambs PE15 8BA

WANTED Memotech RS232 interface for ZX81. Must have operating instructions. Telephone Hartlepool 68943 after 5pm, and ask for David

ZX printer wanted — swap for chess, intruders, missile, planetoids, h horace, androids, cruising, jackpot, derbyday, 1 tower meteors, 30-tanx, softalk 2, and sorcerers castle, or sell £3.00 each ring Rochdale 50246 after 6pm

WANTED Dragon disc drive interface. Tel: Leicester 866063

WANTED switchable 16K/8K/3K ram pack for Vic 20 will pay £20 tel: Hartlepool 870685 after 6pm

WANTED ZX80 £10.00 or less tel: 665092 (Sheerness)

WANTED original quill plus instructions (yours) swap Atic. Atac, penetrator, Heathrow (mine originals) All less than 1 year old please write to Damien

Murphy, 13 Glenbrook Park, Delgany, Co Wicklow, Ireland

WANTED Acorn Atom (working) no software necessary as long as it works! pay up to £45 and I pay postage Sunderland (0783) 283550 or write 91 Killingworth Drive, High Barnes, Sunderland

URGENT swap or sale! Atari and four cartridges defender, Asteroids, Circus and Combat £55 ono or swap for any computer (not ZX81) also train set. Layout for sale £35 ono phone Plymouth 334419

SWAP krazy kong, skramble, pharaoh's tomb, jetpac, panic, amok, catcha-snatcha, all originals. Andrew Tate, 85 Argyle Way, Dunblane, Perthshire FK15 9DY

T1 99 4A S/W required — Tel Coventry 596412

WANTED BBC B 1.205 will give between £200 and £300 depending on extras phone 01-950 6133

SWOP new 40 channel CB hand held and ZX81 16K, tapes lots of programs mags plus scalextrix wanted Spectrum or Oric 1 etc phone 01 485 8305 eves

WANTED the Quill — original copy will pay £7.50 or swap for Ocean Kong, Gulpman, Ship of Doom, and Space Raiders (all originals) phone Peter on 01-422 7583 evenings. (48K Spectrum)

WANTED CBM64 software/utilities mainly. Also want Vectrex cartridges pay £5 each. No rubbish please. London area. Phone 840 3610 after 4pm week days/any time on weekends

SWAP electron software. Phone Harpenden (05827) 5232. After 5pm. Ask for Ian

WANTED interface 1 and micro-drive for a new Atari 2600 VCS with Pac-man cartridge all boxed (as new) tel (0733) 237663 after 4 pm

SWAP Dragon 32: manuals, Ring of Darkness and Dragonfly II games. For Spectrum 48K or Oric-1 48K. Write: Paul, 4 Ridgway Road, Luton, Beds LU2 7RR or tel: 0582 421534 anytime

SWAP Rainbow writer + Dynafast for Dragon O.S. or will buy. Tel: 0793 812351 after 6pm.

SPECTRUM 48K swap software tapes include Valhalla, Pimania, Hungry Horace, Alchemist, Armageddon, Blade Alley. Phone (0721) 21586 after 6pm.

SWAP 48K Spectrum 100 games tape recorder for CBM 64. No C2N cassette unit needed. No s/w. Tel: Maidstone 673259. Jason.

WANTED for Atari 400 Basic cartridges + manuals. Also will swap ET VCS cartridge for any Atari 400 games cartridge. Tel: Castle Town (Caithness) 689.

DRAGON SOFTWARE, books, sale or swap. W.H.Y. wanted printer for Dragon. Reasonable price. Postal only. M. Bolshaw, 48 Ridge Park Drive, Halesowen, West Midlands, B63 2UZ.

48K SPECTRUM in immaculate condition with software/books. Pay £135 cash maximum. Will collect in London area. John Weller, 49 Haylett Gardens, Surbiton Crescent, Kingston, Surrey, KT1 2ER. Urgent.

SWAP VIC 20. The Count for Voodoo Castle. Bodmin 6085.

AQUARIUS 16K Expander, around £15 or near offer. 9 The Crescent, Market Harborough, Leics. Tel: (0858) 66321.

SPECTRUM LIGHT PEN with software. Willing to swap Binatone TV game with adaptor and reasonable cash sum. Phone: West Kilbride 822074 after 4pm. Ask for Allan.

SWAP PUCK MONSTERS and Race and Chase electronic games for any suitable computer. Ring Rickmansworth 720879. Michael.

ADVENTURE HELPLINE

The Golden Apple on Spectrum. How do I find and get the 13th and 12th objects? Nigel King, Haven Cottage, Woodlands, Gerrards Cross, Bucks SL9 8DD.

Perseus and Andromeda on Commodore 64. How do I get the Golden Helmet from the statue? David Appelbee, 73 Highmore Street, Westfields, Hereford HR4 9PG.

The Count on Vic 20. What do you do when you get into the tomb and how do you keep the stake after Drac's first bite? Jayme Carne, 35 Toltuff Road, Alverton Est., Penzance, Cornwall TR18 4QA.

Dennis Through the Drinking Glass on Spectrum. How do I help Dennis to escape from the bathroom? Also any other advice on getting a drink and escaping Maggie!! Robert FMcOmbe, 7 The Rowlands, South Benfleet, Essex SS7 1HF. (03745) 4144.

Twin Kingdom Valley on Commodore 64. How can I take the staff of gold from the witch in the Desert King's Castle? David Appelbee, 73 Highmore Street, Westfields, Hereford HR4 9PG.

Diary

Electron and BBC Alexandra Palace
Micro User Show London

July 19-21
10.00am-6.00pm
July 22
10.00am-4.00pm

£3.00 adults
£2.00
children

Database Publications
68 Chester Road
Hazel Grove, Stockport
061-456 8383

Sinclair Computer Essex Exhibition Centre
Users Exhibition Moulsham Street
Chelmsford Essex

July 21
10.00am-6.00pm

50p adults
30p children

Essex Exhibition Centre
Moulsham Street
Chelmsford
0245 25900

Scottish Personal Assembly Halls
Computer World George Street
Show Edinburgh

July 26-27
9.30am-8.00pm
July 28
9.30am-5.00pm

£1.50 adults
£1.00 children

Scottish Industrial and
Trade Exhibitions
8a Charlotte Square
Edinburgh EH2 4DR
031-225 5486

2nd Official Olympia 2
Acorn User Hammersmith Road
Exhibition London

Aug 16 (trade day)
Aug 17-19

£2.00 adults
in advance
£3.00 and
£2.00 on door

Small Enterprises
20, Orange Street
London WC2H 7ED

CROOKED CAT

Widgit software have released two educational games for the Spectrum, *Castle of Dreams* and *Adventure Playground*. The company has a good reputation for producing educational games that actually have some thought and purpose behind them.



Adventure Playground is actually two games in one — *Crooked Adventure* and *The Queen of Hearts*. Both have large graphics and text with plenty of colour. The actual games require a variety of skills like simple logical thought and strategy. *Crooked Adventure* has the child trying to move crooked man complete with crooked cat and mouse to their crooked house. *The Queen of Hearts* sets the task of recovering stolen tarts. Clever, nice graphics and fun for kids.

Program	Adventure Playground
Price	£7.95
Micro	Spectrum
Supplier	Widgit 48 Durham Road London N2 9DT

BOOTSTRAP LOADER

The first, to my knowledge, piece of independent QL software has arrived.

It's a collection of utilities supplied on a single micro-drive cassette.

There is nothing very drama-

tic here, of course — there couldn't be really, given the amount of time the QL has been out. On the other hand some of the utilities could be quite useful.

Boot is a bootstrap loader which displays directories in columns so that screen overflow can be avoided. It will load programs with a single key-press. *Qmark* does an automatic multiformat. *Qback* makes back up copies of cartridges and *Qprune* deletes nominated files from memory.

Given the horrendous price of microdrives £10.00 is probably not an especially rip-off price for these utilities, simple though they are.

In any event, many QL owners will be desperate for some independent software.

Program	QL Utilities
Price	£10
Micro	QL
Supplier	WD Software Hilltop St Mary Jersey Channel Islands.

WHITE NOISE

Micro Olympics is one of the many sport orientated games released recently. Mostly they are completely dire but this one — in its BBC form — has the virtue of having been to number three in the WH Smith chart.

The Spectrum version has now been released and it's not at all bad. Basically you have a choice between the three main areas of running, jumping or throwing. Within each of these there are quite a few choices —



Anirog's House of Usher has little to do with dear Edgar and a lot to do with Miner Willy — it's fair to say that the game owes a lot to Matthew Smith's eponymous program.

Nevertheless *House of Usher* is an excellent program with an opening graphics sequence that matches *Alice in Wonderland* for cartoon-like quality.

The game begins in the lobby of The House, where a leap is made into one of nine rooms each containing a different task. Tasks include collecting strawberries, dodging cannonballs, and avoiding getting squashed.

Each room is like a Miner screen requiring the familiar sense of timing and positioning of jump to be completed. The problem is you only get one chance at each room — fail and you are sent back to the lobby (Oh, no! Not the lobby).

If you manage to do all nine rooms then there are two more labelled X and Y which can be entered — wondering what's going on in them is quite an incentive to play again.

The graphics are entertaining and some of the fiendish

different distances for running, javelin or discus, hurdles or pole vaulting.

What's good about the program is the way you can choose your own keys for each section — the running sections, for example, require hammering away alternately on two keys and if your Spectrum keyboard is like mine you may not have many keys left that are up to such treatment. The graphics are reasonable but not staggering.

Less impressive, are the strange and interminable waits that crop up from time to time between stages and, on my copy at least, a couple of bugs that make the program hang up. Still, quite a lot of variety and a nice 'white noise' crowd effect if you do well.

NOT THE LOBBY!

thinking required to solve the rooms is well up to Miner standards. In fact, my only (very wimpish, admittedly) quibble is that even after playing for half an hour I came nowhere near doing even one of the rooms. Whether you



think that this reflects on Anirog for making the game a bit difficult or me for being a pathetic player is up to you.

Program	House of Usher
Price	£6.95
Micro	Commodore 64
Supplier	Anirog 29 West Hill Dartford Kent

Program	Micro Olympics
Price	£3.95
Micro	Spectrum
Supplier	Database Publications Europa House 68 Chester Road Hazel Grove Stockport SK7 5NY

SCREEN EDITING

For many people the Zeus Assembler is just about the best Assembler available for the Spectrum. Now the company that produced it, Crystal Computing, has produced Zeus for the Commodore 64.

What made Zeus the success it was was the excellence of its design — all commands are

single stroke, there is full screen editing and automatic line numbering.

The program includes a Monitor with 30 commands which enable you to inspect and alter the CPU registers and memory; these include *Disassemble*, *Trace* and *Tabulate*.

There is a brief manual that gives you enough information to use the package but will not teach you machine-code. This one is not for the beginner.

Program Zeus 64
Price £9.95
Micro Commodore 64
Supplier Crystal Computing
2 Ashton Way
East Herrington
Manchester
SR3 3RX

BAGS OF MONEY

Mogul is a company that seems to be pulling itself up the technical impressiveness ladder, ie, from the early naff games to the pretty impressive *Fire Ant*.

Now two more 'quality' games have been issued: *Zeta 7* and *Murphy*.

Murphy is a three screen maze game set in a mine. As is usual in such games you have to collect some things and dodge others but in *Murphy* it's done with much inventiveness and humour.

The unfortunate miner of the title roams through the old workings collecting bags of money and putting them in his wheelbarrow. To succeed he has to dodge a number of crooks who are also after the money (you can tell them by their stripy pullovers) and watch out for runaway carts. *Murphy* has some defence against these obstacles — he can jump up onto cross beams and jump into the cart rather than being bashed by it and he can biff the baddies with a pickaxe or drop money on them.

All this is neatly animated and is accompanied by a clever musical soundtrack. Playing the game for a while it became apparent that it's not all a matter of quick reactions — you also need quite a bit of strategy to figure out how to get

some of the bags. I liked it a lot.

Program Murphy
Price £7.95
Micro Commodore 64
Supplier Mogul
PO Box 4BT
35-37 Wardour
Street
London W1

EARTHLY PARADISE

Quest for the Garden of Eden is the latest of Phoenix's two-part Arcade/Adventure format games. And it's the first to be issued in a new style — the two programs on either side of one tape rather than two tapes in a large case.

The theme this time is go-back-in-time-to-stop-Adam-from-eating-the-famous-apple-and-thereby-maintain-the-earthly-paradise (yes, but what about original sin and free will, eh — surely some theological problem here).

The first program is a running and jumping game in which you must cross from one side of a bridge to another. This involves jumping over a spider using careful timing and watching out for a fish that spits at you. Make it to the other side and you can pick up some rocks and drop them on the fish. Rough justice?

Bop enough fish and you get the running code to begin the



adventure on side 2 of the program. This begins in the middle ages and using the usual adventure terminology of

Verb/Noun you must try to find your way back to the famous garden and save Adam from himself.

Program Quest for the Garden of Eden
Price £6.99
Micro Commodore 64
Supplier Phoenix Software
Spangles House
116 Marsh Road
Pinner
Middlesex.

BODY AND SOUL

Star Trader is a new program from Bug-Byte that seems to consist of every kind of games program ever designed all rolled into one. You could call it a Starventure, but it'd be better not to.

Your objective is to trade, buying and selling from planet to planet in the star system trying to make money and avoid pirates who will steal your goods (at the very least.) Pirate attack forms the main arcade section of the game — the screen shows the cockpit view and using shields and lasers you defend yourself from attack as best you can — there is a surrender option.

The graphics for the arcade section are very neat indeed, sprites and 3D logic making the whole thing very atmospheric. Apart from that, what you get is a fairly complex kingdom type game — you have to use planning and judgement to buy and sell goods at a profit whilst keeping body and soul together. This means eating, resting, etc, at appropriate times.

There's a good deal of thought involved aside from the arcade stuff, although I'm not sure that it can really be said to be much of an adventure. For arcade and strategy, though, it's very good.

Program Star Trader
Price £6.95
Micro Spectrum
Supplier Bug-Byte
Mulberry House
Canning Place
Liverpool

NUDGES AND GAMBLES

Quite honestly I've never been able to work myself up into much of a frenzy over computer simulations of fruit machines — I mean what's the point when you can't win or lose anything. Still, people keep producing them so I guess people sell them so I guess people like them.

If you want a fruit machine for the BBC then one of the best I've seen is *Superfruit* from Simonsoft. It's good partly because of its impressive hi-res graphics, but mainly because it has all the 'bits and bobs' that make fruit machine gambling what it is today, ie, nudges and gambles.

These extras, plus clever sound effects make it highly playable — maybe you can get a member of your family to take your money away for you just like the real thing.



Program Superfruit
Price £5.95
Micro BBC
Supplier Simonsoft
25 Tatham Road
Abingdon
Oxon OX14 1QB

New Releases is designed to let people know what software is coming on to the market. If you have a new game or utility which you are about to release send a copy and accompanying details to: New Releases, Popular Computing Weekly, 12-13 Little Newport Street, WC2R 3LD.

ZX81

- 1 (4) Krypton Ordeal (Novus)
- 2 (7) Black Crystal (Carnell)
- 3 (8) Planet Raider (Novus)
- 4 (5) Walk the Plank (Novus)
- 5 (10) Sabotage (Psion)
- 6 (-) Space Raiders (Psion)
- 7 (-) Flight Simulation (Psion)
- 8 (-) Chess 1K (Psion)
- 9 (-) Reversi (Psion)
- 10 (-) City Patrol (Psion)

All 16K except where indicated † 1K
(Figures compiled by Boots/Websters)

Vic20

- 1 (-) Computer War (Thorn EMI)
- 2 (-) Tank Commander (Thorn EMI)
- 3 (-) Chariot Race (Micro Antics)
- 4 (-) Snooker (Visions)
- 5 (-) Flight 015 (Ferranti Craig)
- 6 (-) Games Designer (Galactic)
- 7 (-) Wizard and the Princess (Melbourne House)
- 8 (-) Grandmaster Chess (Audiogenic)
- 9 (-) Duck Shoot (Mastertronic)
- 10 (-) Tower of Evil (Thorn EMI)

(Figures compiled by Boots/Websters)

Commodore 64

- 1 (-) Manic Miner (Software Projects)
- 2 (-) Beach Head (Centresoft)
- 3 (-) Solo Flight (Centresoft)
- 4 (-) Colossus Chess (CDS)
- 5 (-) Chuckie Egg (A&F)
- 6 (-) Snooker (Visions)
- 7 (-) Super Pipeline (Tasket)
- 8 (-) Megawars (Paramount)
- 9 (-) Chinese Juggler (Microsoft)
- 10 (-) Revelation (Softtek)

(Figures compiled by Boots/Websters)

Dragon 32

- 1 (-) Buzzard Bait (Microdeal)
- 2 (-) Cuthbert in Space (Microdeal)
- 3 (-) Hungry Horace (Melbourne House)
- 4 (-) Bug Diver (Mastertronic)
- 5 (-) Dragon Chess (Oasis)
- 6 (-) Mr Dig (Microdeal)
- 7 (-) Sprite Magic (Knight)
- 8 (-) Chuckie Egg (A&F)
- 9 (-) Transylvanian Tower (Richard Shepherd)
- 10 (-) Hunchback (Ocean)

(Figures compiled by Boots/Websters)

Books

- 1 (7) Creepy Computer Games (Usborne)
- 2 (-) Space Games (Usborne)
- 3 (-) Educational Directory (PJR)
- 4 (-) Ideas for Micro uses (Ladybird)
- 5 (-) Micros are Fun (Ladybird)
- 6 (-) Micro Knowledge (Usborne)
- 7 (-) Understanding Computer Graphics (Usborne)
- 8 (-) Projects and Programs (Ladybird)
- 9 (-) Choosing and Using a Micro (Fontana)
- 10 (-) Penguin Computing book (Penguin)

(Figures compiled by Bookwise)

BBC

- 1 (2) Aviator (Acornsoft)
- 2 (4) Overdrive (Superiorsoft)
- 3 (3) JCB Digger (Acornsoft)
- 4 (1) Pengi (Visions)
- 5 (7) Blagger (Alligata)
- 6 (-) Twin Kingdom Valley (Bug-Byte)
- 7 (6) Fortress (Pace)
- 8 (8) Eagle's Wing (Invasion)
- 9 (-) Football Manager (Addictive Games)
- 10 (-) 1984 (Incentive)

*All Model B.
(Figures compiled by Micro Management 0473 59181)

Atari

- 1 (2) Bruce Lee (Datasoft)†
- 2 (1) Incredible Hulk (Adventure International)
- 3 (8) Encounter (Movagen)†
- 4 (-) Sea Dragon (Adventure International)
- 5 (3) Slinky (Cosmi)
- 6 (5) Caverns of Kafka (Cosmi)
- 7 (7) Airstrike II (English)
- 8 (-) O'Reilly's Mine (Datasoft)
- 9 (6) Zaxxon (Datasoft)
- 10 (4) Rally Speedway (Adventure International)*

*Cartridge, † 32K disc, ‡ 48K disc.
(Figures compiled by Calsito Computers 021 632 6458)

Spectrum

- 1 (9) Match Point (Psion)
- 2 (1) Jet Set Willy (Software Projects)
- 3 (5) Fighter Pilot (Digital Integration)
- 4 (8) Blue Thunder (Foundry Systems)
- 5 (8) Sabre Wulf (Ultimate)
- 6 (-) The Hulk (Adventure International)
- 7 (3) Jack and the Beanstalk (Thor)
- 8 (-) Cricket Captain (Allanson)
- 9 (7) Trashman (New Generation)
- 10 (-) The Prize (Arcade)

*All 48K
(Figures compiled by W H Smith and Son, London)

LISTINGS

The Memotech MTX Program
Book is a book of listings. Ordinarily I would want to avoid such a tome. It's not that in this book the listings are particularly wonderful or radically different, it's just that the Memotech is really not a bad machine but hardly anyone is doing books/software for it. And it deserves a mention just because of that.

Book *The Memotech Program*
Price £5.95
Micro Memotech
Supplier Phoenix Publishing
14 Vernon Road
Bushey
Herts

FETCH CYCLE

If monadica operators you in a glitch (you can never find one when you want one) or if you thought that static storage allocation was waiting for a council house and, moreover, if you care about these things at all then you need *A Directory of Computing Terms* — recently published by Fontana.

It will explain all the above terms, and more. A total of over 25000 entries including explanations of such wonderful

terms as thrashing, refresh, infomatics (it has to be American) and fetch cycle (not an instruction).

I found it moderately entertaining but some may doubtless find it invaluable.

Book *A Dictionary of Computing Terms*
Price £2.95
Micro General
Supplier Fontana
8 Grafton Street

TRACER

Better than most books with similar titles is *Advanced Programming for the BBC Micro* by Mike James and S. M. Gee. Better because the 'advanced' information it contains is genuinely useful.

There are large sections on programming structure (particularly important in BBC Basic) and file and array handling — this latter being used in the development of a spelling checker (surely all BBC owners are perfect spellers already?). It ends, inevitably, with machine code, and has programs for a disassembler and an execution tracer.

Book *Advanced Programming for the BBC Micro*
Price £6.95
Micro BBC
Supplier Granada Publishing
8 Grafton Street
London W1X 3LA

This Week

Program	Type	Micro	Price	Supplier
Miner 2049er	Arc	Adam	£36.50	Micro Fun
Pit Stop	Arc	Adam	£29.50	Epyx
Sub Roc	Arc	Adam	£32.50	Sega
Time Pilot	Arc	Adam	£29.50	CBS
Star Commando	Arc	Amstrad	£8.95	Terminal
Dambusters	Arc	Atari	£5.50	NDSL
Machine Code Tutor	Ut	Atari	£14.95	New Generation
Missile Strike	Arc	BBC	£7.95	Superior
Mr Wiz	Arc	BBC	£7.95	Superior
Mutant Spiders	Arc	BBC	£6.95	Superior
Star Striker	Arc	BBC	£7.95	Superior
Chess	S	BBC	£7.95	Superior
Darts	S	BBC	£6.95	Superior
Hi Bouncer!	Arc	BBC B	£6.95	Mirrorsoft
Evil Dead	Arc	Commodore 64	£6.99	Palace
Jet Boot Jack	Arc	Commodore 64	£6.99	English
Jonny and the Jimpys	Arc	Commodore 64	£6.90	Ocean
Oracle's Cave	Arc	Commodore 64	£7.95	Dorcas
Spy School	Arc	Commodore 64	£5.95	Dimension 21
Stunt Bike	Arc	Commodore 64	£6.90	Ocean
Football Manager	S	Commodore 64	£7.95	Addictive
Machine Code Tutor	Ut	Commodore 64	£14.95	New Generation
Return of the Flag	Ad	Dragon	£9.95	Wintersoft
Zak'sson	Arc	Dragon	£6.95	Cable
Mr Wiz	Arc	Electron	£7.95	Superior
Chess	S	Electron	£7.95	Superior
Astromilon	Arc	Memotech	£6.95	Continental

Mission Alphas	Arc	Memotech	£6.95	Continental
Phaid	Arc	Memotech	£6.95	Continental
Star Command	Arc	Memotech	£7.95	Continental
Tapeworm	Arc	Memotech	£6.95	Continental
Atlantic	Ad	Spectrum	£6.95	M&J
Jolly Roger	Ad	Spectrum	£5.95	Video Vault
French & German is Fun	Ed	Spectrum	£12.99	CDS
Matching Pairs	S	Spectrum	£2.99	CCS
Spectrosim	Ut	Spectrum	£7.95	Shiva

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.



A changing world

Another software company — Imagine — has collapsed: this time the collapse is not only into financial disarray, but also into open disagreement.

Without bothering about the rights and the wrongs of the affair, and there will be rights and wrongs, the dispute has a rather more general relevance. At one time not so very long ago software houses like Imagine were thriving with so much money boosting the coffers that small disagreements would seem trifling.

That money is no longer coming in at a rate that will produce the enormously rich, with enormous cars, who were to arise from the ranks of the programmers. Unfortunately, writing programs is not that difficult a job, and there are many people who can do the job well: they cannot all be millionaires.

The problem with Imagine (and nearly every other software house) is a lack of imagination. It has been clear for a year (readers of Ziggurat will remember) that the software and hardware market was changing. Not the minor change to a *Jetset Willy*, or a *Sabre-Wulf*, or an *Alchemist*, but to an entirely new direction.

More people now seem to want serious software, useful software, and not Mega-games — though what counts as useful or serious can vary tremendously with the individual.

Leo Scanlan wrote (in *IBM PC Assembly Language*, 1983) "Intel made a quantum leap forward in 1978 by introducing the 8086". This is where the action is. The first 'quantum leap' in computing was the Intel 8086 chip. The Sinclair QL may or may not be the second but the point is that quantum leaps are the order of the day.

I believe that the public has more imagination than many of the firms trying to make money out of computing. It is discriminating: most computer publishers of books, magazines or software still seem to treat all machines and all individuals in a like manner. The "Don't knock a winning combination" attitude seems to rule.

The more perceptive realize that owners of BBC computers tend to be different type of person to the owners of Commodore computers. It is to be suspected that the owners of the QL will not be the same type of person as the owner of a Spectrum. Look at reviews of the QL, look at the books, hardware add-ons and associated QL paraphernalia. Does it come across that the QL is a distinct machine, with a new distinct philosophy? Just because a person has a wealth of experience with the Spectrum, and most people have, does this mean that he or she will have some special affinity with the QL as a machine?

Commentators seem unwilling to examine the ideas behind the QL (or any other machine) or do not understand that there is a philosophy. I will treasure for all time the comment of one young journalist that the most exciting thing on the QL was the real-time clock (this is true!).

The quantum leap did not arrive with the QL, it happened before. And there have been others since.

Unfortunately, few computing 'professionals' realise that their world is continually changing, and that new ideas *then* are old ideas *now*.

Boris Allan

Another brain teaser

Puzzle No 116

Bob, the printer, had another brain teaser for me the other day. He was printing a book and in numbering the pages, he had used as many pieces of type with the digit '1' as he had used '2's and '3's together.

1 2 3

As an example, if he had numbered from 1 to 12, he would have used five '1's, two '2's and one each of the other eight digits.

It was fairly slim volume, but the only information he would give me was that the highest numbered page was odd.

How many pages were there?

Solution to Puzzle No 111

As we know the sum is 13 and 17 — and must also be divisible by 221, the product of 13 and 17.

The program substitutes variables x, y and z for the missing digits, and divides the 'reconstructed' number by 221. If this results in an exact division, the result is printed.

```
10 FOR X = 0 TO 9
20 FOR Y = 0 TO 9
30 FOR Z = 0 TO 9
40 LET T = 7 * 1000000 + 1000000 + 86 * 10000 + Y * 1000 + 84 * 10 + Z
50 LET D = INT (D) THEN PRINT T
60 NEXT Z
70 NEXT Y
80 NEXT X
```

Of the possible solutions only one has the digit '3' as one of the missing digits, so this must be the answer: 75865543.

Winner of Puzzle No 111

The winner is: H D MacGregor, Ashtree Road, Frome, Somerset, who receives £10.

Rules

If the puzzle 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 116 is 3 August.

The Hackers



To Absent Friends

STARVED TO DEATH
by
WHOLESALERS' CREDIT

DIED AT BIRTH
CHOKED ON GREED

BORN 1981
DIED 1984
CRUCIFIED
By
ADVERTISING RATES
LITIGATION
and
MISMANAGEMENT

OUR GLORIOUS DEATH
fell in the Battle
of the Best-Seller
Ratings 1984
They could not
pay the Price
to get into
the Charts

Memorium
Honesty
Humour
Entertainment
Originality
Independence
THEIR NAME LIVETH
for EVERMORE

KILLED
by
PIRACY

AUTOMATA

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