Computer Magazine of the Year 1983

POPULAR Computing WEEKLY

Customer's QL reviewed

40p

17-23 May 1984 Vol 3 No 20

BRITAIN'S BEST-SELLING MICRO WEEKLY

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SEE PAGE 51

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★STAR GAME
Vic Connection on Vic 20
see page 10

News Desk

Palace raises the spirits

PALACE Software will release its first game—*The Evil Dead* for the Commodore 64—on June 15.

The game is based on the plot of the low-budget horror film *The Evil Dead* which is distributed by Palace Software's sister company, Palace Video. The film in which a group of teenagers become posessed by the spirits of the undead and finish each other off was the top—selling video of 1983.

The computer game of the film will sell for around £7.50 and the Commodore 64 version will shortly be followed by versions for the Spectrum and BBC micros.

Palace is the first film company to move into software. It plans a range of games developed from successful feature films. Palace has the video rights to David Bowie's *Merry Christmas Mr Lawrence*, the thriller *Diva* and a number of other horror picutres, including *Basket Case*, *Halloween* and *Chainsaw Massacre*.

The video of *The Evil Dead*

continued on page 5 ▶

A new Dragon for Boots?

BOOT'S—the high street retail chain— may well pull out of selling the Dragon 32 computer at the end of the Summer.

Boots and Dragon have been negotiating over the future of the machine and it seems likely that the Dragon 32 will be replaced by a new Dragon home computer before Christmas.

Commented Dragon's chief executive Brian Moore, "To make a stark statement that Boots will not stock the Dragon 32 is to present only one piece of the equation. We are talking to them about replacing it with another machine which we have."

Althouth Boots is to stock the new machines from Amstrad and a selection of Japanese MSX micros, it will deinitely continue to support the Dragon 32 with software and also sell the Dragon 64. Said Boot's Peter Frost: "Dragon computers will continue to feature in our range—whether that is with the 32 or not I cannot say. We are aware of new products from Dragon 32."

Only a month ago British Home Stores decided to discontinue sales on the 32.

This Week

● **Reviews** *Includes a detailed look at* Heathrow *by Hewson Consultants on page 13* ● **Exclusive Review** *Beyond preproduction: Andrew Pennell with the first critical review of a Sinclair customers QL on page 16.* ● **Networking** *David Lawrence introduces a new series on page 26.* ● **Commodore 64** *Adrian Warman discusses registers inside the SID chip. See page 34.* ● **New Releases** *This week's software includes* Battle Planet *from ISP Marketing and* The Pink Pearl *from Astrosoft. Page 56.*

Sinclair ZX Microdrives and ZX Interface 1

The affordable alternative to floppy discs...

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The unique ZX Microdrive system sets the ZX Spectrum apart from all other computer systems.

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Your first Microdrive is connected to Interface 1 by a Microdrive lead. Then, up to 7 more Microdrives can be added using Microdrive connectors. That gives you a minimum of 680K bytes of on-line capacity.

With memory like that, the possibilities are limitless – stock control, word-processing, even huge adventure games!

With each Microdrive, you'll receive a Microdrive connector and Microdrive demonstration cartridge. Blank Microdrive cartridges cost £4.95 each. They are available in packs of 4 (with a free cartridge wallet) or singly.

ZX Interface 1 – the multi-purpose controller. £49.95

ZX Interface 1 is a multi-purpose device. It controls up to 8 Microdrives. And it adds file-handling and communication facilities to your Spectrum.

So in one low-priced unit, you also get these two built-in features:

- **RS232 interface** This industry standard interface allows you to link your Spectrum with full-size printers, communicate with other computers employing RS232, and transmit data over telephone lines via modems.
- **The ZX Net** Now you and your friends can transfer programs and data on a local area network – or even play computer games together.

The ZX Net makes it easy, and fast!

It links between 2 and 64 Spectrums, transmitting at 10,000 characters per second. (So a full screen is transferred in around 3 seconds!) With the ZX Net, only one person need type in a program. And a Microdrive or printer can be shared by everyone in the network!

ZX Interface 1 offers you all these facilities, and retains the same peripheral port as the Spectrum itself.

With each ZX Interface 1, you'll receive a connecting lead for the first Microdrive; a ZX Net lead with jack plugs; plus a comprehensive manual.

An RS232 lead is available as an optional extra at £14.95.

Available from: larger branches of Boots • WH Smith Computer Stockists • Greens Computer Centres • Spectrum Computer Stores • and larger branches of John Menzies • Dixons • Laskys • Currys • John Lewis Partnership • Rumbelows • British Home Stores • House of Fraser and many other good computer stockists nationwide.

Find out more – in your local shop!

The best way to evaluate ZX Microdrives and Interface 1 is to see them for yourself.

There is a full range of ZX peripherals – including ZX Interface 2 for joystick and ROM Cartridge capability, alongside the only computer that supports them – the ZX Spectrum!

For more information, telephone Sinclair Research Ltd, on 0276 685311.

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POPULAR Computing WEEKLY

17-23 May 1984 Vol 3 No 20

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How to submit articles
Articles which are submitted for publication should not be more than 3,000 words long. The articles, and any accompanying programs, should be original. It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted.

Accuracy
Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

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Editorial

What's so great about the Japanese MSX standard for home computers? It's got a Z80 chip and 64K of memory. Rather like a Spectrum with a bit more Ram — and that is now two years old.

Yet go to the bar at any micro show and you will find directors and programmers from software houses talking about it. Why?

Because the world's largest electronics companies — Sony, Hitachi, Canon, Sanyo, Fujitsu and Yamaha — are all producing MSX machines and everyone is frightened. Frightened to ignore it. Frightened to be the one to say MSX isn't the best thing since sliced bread. And frightened to be left out.

Yet MSX is disappointing. Imagine the Japanese car manufacturers getting together and all producing vehicles based on the Ford Prefect.

The Japanese electronics companies are desperate to enter the home computer market and so between them they are attempting to artificially impose a standard. Unfortunately it isn't one to set the world alight. But they do have the marketing clout to make a big splash with MSX — just wait till the Sunday supplement ads and billboard posters go up.

Standards bring their own problems, though. What choice will there be but to establish yet another 'standard' in a few years time when MSX is technically even more old hat? By then though it will have served its purpose and sold a million.

Next Thursday

Next week's star game is Fruity for Commodore 64 by Lee Turner — eat the fruit but avoid the mushrooms.

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the LLAMA has LANDED!

. . . . . and it's breeding fast.

Once upon a time, only Commodore owners could experience the thrill of playing an original game by Jeff 'Awesome' Minter. Lesser mortals could only sit and stare in wonderous rapture at the furry arcade action brought to you by Llamasoft.

BUT NOW THERE IS HOPE.

Dragon owners were the first to see the light of day, but now Salamander Software is pleased as punch to announce that selected titles

ARE NOW AVAILABLE FOR THE 48K SPECTRUM.

Yes that's right, Salamander is now producing titles for the Spectrum, and the first of these are two great arcade games. . . .

METAGALACTIC LLAMAS BATTLE AT THE EDGE OF TIME

On a forlorn observation post at the edge of the galaxy, the Metallamas wait for a sign of Zzyaxian spaceships. Suddenly the alarm claxons blare, and the furry friends of freedom rush to the fore only to find that there are no attacking spaceships, and that they are under attack from Cyborg Arachnid Mutants and Disgusting Weeviloids. . . .

This classic arcade game, originally developed by Jeff 'Awesome' Minter of Llamasoft, features 1 and 2 player options, spitting Llamas, Cyborg Arachnid Mutants, Disgusting Weeviloids, 99 levels of play. Joystick recommended. Supports Spectrum ZX Interface 2 and Kempston joysticks.

48K SPECTRUM

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Game originally developed by Jeff 'Awesome' Minter of Llamasoft. Joystick recommended. Supports Kempston and AGF joystick interfaces.

In space, only the camels can hear you scream.

What some famous people have said . . .

"What's an arcade game"	Aristotle
"Awesome"	Jeff Minter
"I prefer elephants"	Hannibal
"Don't shoot me, I'm only the piano player"	Elton John
"Boing"	Zebedee

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DRAGON 32 TITLES Gridrunner £7.95 • Laser Zone £7.95

GSH

SELECTED TITLES AVAILABLE FROM: John Menzies WHSMITH Boots

Evil Dead

◂ continued from page 1

has had a controversial history. It was granted an '18' certificate by the British Board of Film Censors. Subsequently the film title has been among those branded a 'video nasty' by the press and police—a charge hotly dened by Palace founder Pete Stone.

He says, "The Evil Dead is a horror film—it is there to shock—but it is definitely an

entertainment film and not a video nasty. It could not be put in the same category as real video nasties like *Driller Killer* and *I Spit on Your Grave*.

"While *The Evil Dead* computer game is a horror game, we have gone out of our way to make sure there is nothing nasty about it. And it certainly doesn't set out to deprave or corrupt—far less in fact than other forms of media—comics, for example. In the game you have to defend yourself against some rather friendly-looking ghouls.

"I don't think there will be any controversy about it when people see the game."

The release of *The Evil Dead* computer game comes at a time when parliament has broadened the scope of the Bright Bill—designed to curb video nasies—to include video games. Under the Bill, video games which contain 'acts of gross violence' may have to be submitted to a video game equivalent of the British Board of Film Censors.

"Under the Bill, X-rated films will be banned on video and for computer games the situation will be even crazier." says Pete Stone, "Where do you draw the line—is *Space Invaders* an act of gross violence? The problem is that the people pushing these laws through have no idea what the video and computer games industries are about."

Record sales for CBM

COMMODORE International has announced record sales for the third quarter and nine month period ending March 31, 1984. Net income and earnings per share are also at an all time high.

Irving Gould, Commodore's chariman, said that the record figures resulted from continuing strong sales of micros in the business, educational and home market. Sales gains of the Commodore 64 were a major factor.

●Commodore's founder Jack Tramiel, who resigned suddenly from the company in January, has bought a seven per cent stake in a California-based medical computer company, Adac Laboratories.

Jack Tramiel is now a director of Adac and is thought to be looking to play an executive role in the company.

New offer from CGL

NEW buyers of the CGL Sord M5 home computer will be able to take advantage of CGL's latest offer.

The Starter Pack now includes a data recorder—valued at £38.95, in addition to the machine itself, Basic 1 Rom Cartridge, Basic 1 manual, users' guide, mains adaptor and tv connector cable. Yes the price stays the same £149.95.

Acorn lights up

ACORN is in the process of taking over Cambridge-based Torch computers.

Torch uses the BBC circuit board as the basis for its micro. It also makes the Torch Z80 disc pack CP/M compatible second processor unit for the BBC micro.

Last year a take-over of Torch by GEC collapsed at the last moment and Torch founder Martin Vlieland-Boddy was forced to resign as chairman.

Acorn's plan for Torch to become a wholly-owned subsidiary of Acorn apparently has the full support of Torch shareholders.

●Only two weeks ago Martin Vlieland-Boddy announced that his new company Data Technologies would launch an IBM-compatible 8088 second-processor unit for the BBC micro. Called The Graduate, it offers the 8088, 128K Ram plus either one or two disc drives for £600 and £869, respectively.

Mobile phone

RACAL Vodafone—a division of the Racal communications company—this week announces a revolutionary new computerised telephone system.

The company will announce a hand-held push-button radio telephone designed to be used on the move anywhere in the country—on foot, in a car or train.

The telephones will communicate with a nation-wide network of new computerised receiving stations conected to the conventional telephone service.

The computer controlling the system monitors the signal strength from each portable telephone; if the strength falters, the computer will automatically sample adjacent base receiving stations and switch the telephone to any station giving a stronger signal. In this way any moving telephone is kept in touch as it moves across the country.

Racal plans the system to be operational in early 1985.

Flexing the Dragon

COMPUSENSE'S implementation of Flex on the Dragon is at last available.

The disc operating system will run either on the Dragon 64 or an expanded Dragon 32 and comes complete with an *Editor/Assembler* package at £86.25.

Under Flex 48K Ram remains free to the user (16K more than with Dragon Data's OS9) and a 51 × 24 screen is presented which the user can define independently. Flex can run on any 5¼ inch disc drive, and can format single- or double-sided, single- or double-density discs.

Flex should be available through dealers within the next month.

Further details from Compusense, 286D, Green Lanes, London N13.

Speak your command

JCB Microsystems is working on a sophisticated speech recognition system for the Commodore 64, Spectrum and BBC computers.

The system, which will cost around £50 including a built-in microphone, will be the first low-cost speech recognition unit for a home micro capable of responding to a vocabvulary of more than a few words. It can be taught to recognise the voice of its user speaking over 100 words. These spoken commands can then be used to trigger responses from a computer program. Since the package also includes a programmable speech synthesiser, in theory at least, conversations will be possible. It should be in production by the end of the Summer.

JCB has also finished work on the Commodore 64 version of its Dragon speech synthesis unit. The 64 version will be on sale next month, priced at £34.95.

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Letters

Loss of memory

Re Peek and Poke, May 3-9 1984, to the question headed 'Two Bytes Missing', Mr Rogers answer is incorrect.

The ?FRE(0) statement does not take up any user memory as room is allocated for it (as with any other Basic statement) in non-user memory — in fact, the Basic Input Buffer.

The Vic counts free memory as that between the end of arrays (pointer locations 49-50) and the start of string shortage (pointer 51-52).

When the Vic is switched on, 51-52 point to 7680, while 49-50 points to the byte directly after the end of the Basic program. But this is actually at 4097 rather than 4097 on the unexpanded Vic. This is due to the Basic program containing two bytes which one might not expect. These are the end link addresses, which are present in all Basic programs and signify the end of the program.

The end link address is always two zero bytes (0,0). These are present in memory even when no program is present and this is where T Multon loses the two bytes.

I hope this brief explanation is useful.

Mike Davies
The Waverley
79 Rhosmaen Street
Llandeilo
Dyfed SA19 6HD

Bleep booster

With reference to Philip Venables, program (Key Bleeper in issue 17 Vol 3), there are many disadvantages to using this. Firstly, and most importantly, is that all programs no longer work! This is because the routine disrupts the multiple VDU calls. Thus, the command *Mode 2* which should be sent as *VDU 22,2* by the Basic Rom, is sent as *VDU 7,22,7,2* causing a beep, a change to *Mode 7*, and will turn the printer on!

Many other examples can be found such as *Print Tab(x,y)* and all printer codes. Also, the routine beeps whenever *any* character is printed on the screen. So, if your program has a lot of *Print* statements in or even if you are just *Listing* a program, cover your ears! On top of this, the program is Disc incompatible.

The accompanying program overcomes all these problems, and beeps only when a key is actually pressed.

The routine can be switched off by ★*FX 13,2* and on again

```
10 REM Key Bleeper -
   The REAL version
20 REM By Piyush Patel
30 REM
40 FX=&A00
50 [ OPT 3
60 PHA
70 LDAE7
80 JSR &FFEE
90 PLA
100 RTS
110 ]
120 ?&220=&00
130 ?&221=FX DIV 256
140 *FX14,2
150 *BASIC
```

by ★FX 14,2. The beep channel can be changed by ★FX 211,(channel), the pitch can be changed by ★*FX 213,(pitch)* and the duration can be changed by ★*FX 214,(duration)*.

It works by using the keypressed event. When a key is pressed, the computer first indirects via *&220* and *&221*, which normally points to a *RTS* in Rom. However, if we change this to point to our new routine, the routine will be executed each time a key is pressed (regardless of what else is happening). *FX* in line 40 may be changed to relocate the code to another address.

Piyush Patel
119 Abbs Cross Lane
Hornchurch
Essex RM12 4XR

Too expensive

Why is it that computer buffs who are selling their computers (presumably because they have acquired new ones) try to recoup the buying price? I was after a Vic 20 for my son and thought I would buy a second hand one. As we already had software, magazines etc, I hoped I would be able to pick up the computer and cassette for £70-£80. Boy, was I wrong! The cheapest quote I could get from a private seller was £110.00 — without any guarantee. Needless to say, I bought a new one, and for just under £140 I got the Vic, cassette, four games, two cartridges and the Basic guide, part one.

The huge second hand prices asked for seem a bit odd — after all, you wouldn't expect to recoup the buying price on your car or stereo etc. I also believe that those people who try to sell second hand cartridges at around £5-£6 should note that if you buy one for £9.99 in a certain High Street shop, you get three free.

James Tosh
16 Glenlyon Road
Leven
Fife

Disgusted and appalled

After reading Mr Hickman's letter in *PCW* Vol 3 No 17 I found myself forced to wonder what kind of irresponsible person he is — firstly, his attitude to Mel Croucher in a previous letter (*PCW* Vol 2 No 51) was one which quite disgusted me. He seemed to be condemning Mr Croucher's noble course of producing non-violent and highly enjoyable games.

Then he has the nerve to make an attack on the moral decency of the nation — is he so naive that he thinks that the move to censor computer software was the work of do-gooders alone? I am assured that the move to include software in the 'video nasties' bill was met with considerable approval from the popular press (well the *Sun* anyway).

"Christopher Robin went down with Alice . . ."

I am both appalled and disgusted by the apparent lack of concern shown by Mr Hickman towards young children today, who need to be protected from violence in their early stages of development.

In Mr Hickman's earlier letter he claimed that all aggression was related to frustration, which is a fact I do not contest. But, he further suggests that playing computer games relieves frustration — we all know that this is not the case. How many cups of coffee have hit the wall when the aliens finally destroy your last ship and how many times have nasty words to the innocent resulted from a failure to pass 'mutant telephones'?

Jamie Purves
27 Grass Walk
Welford Road
Northampton

Chemical balance

Firstly, thank you very much for printing my chemistry program in your magazine (No 17). I would, however, like to point out some small printing errors in the write up to the program. When it says: 'As it is, the balanced equation is:
2 C4H10 + 13 02 = 8 CO2 + H20
There should be a *10* in front of the *H20*, otherwise it is unbalanced.

At the bottom of the page, when an example was given, CO2 was missed off the product inputs and instead two *H20s* were printed.

At the top of the page, on the right, a line is printed as:
H2S + SO2 = H20
It should read *H2S + SO2 = H20 + S.*

Robert Crook
N. Devon

Apologies to our readers for any problems caused by our printing errors. These corrections should solve them.

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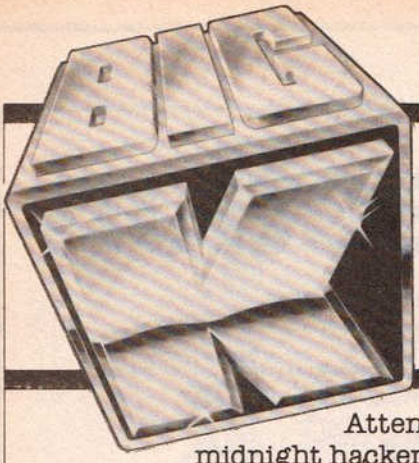


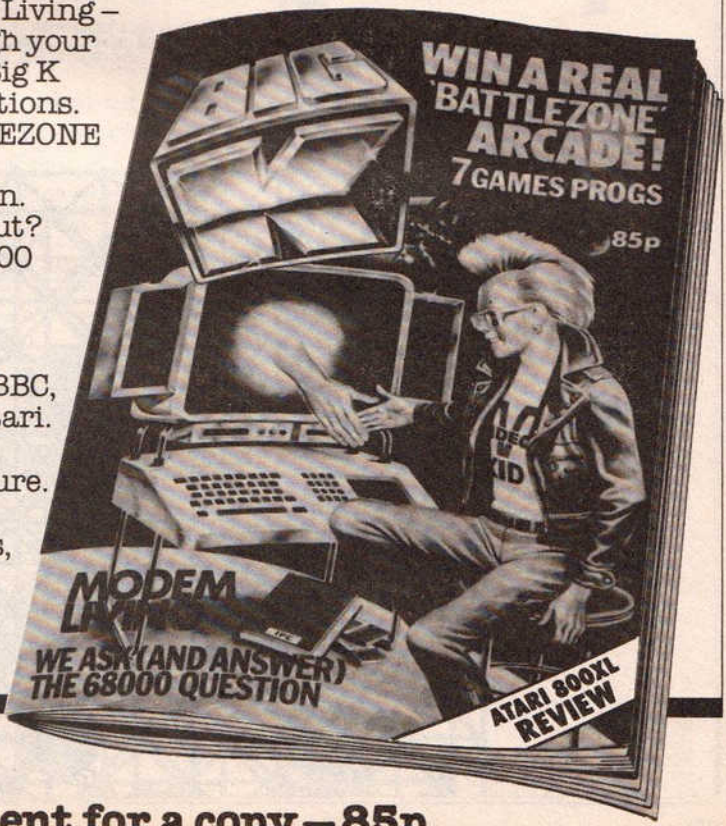
THE NEW COMPUTER GAMES MAGAZINE THAT BREAKS ALL THE RULES

Attention all you pixel-packers, midnight hackers and binary-bustin' bozos! Gorf's gift to gamesville has just hit the streets. Big K's the name and Big K's the game – it's a new magazine that's going to be music to your micros. Whatever Big K gets in its sights – technical, tactical or just plain old topical, don't expect anything typical. Big K **plays** it different and **says** it different. We're not afraid to shoot from the hip – and we're always hip when we shoot! We've a no-holds-barred approach to arcade strategy and adventure that'll have your CRT's tingling. Key in to Big K now for a magazine that puts news, reviews, programs and hardware under your fingertips. **After your first byte of Big K... the game will never be the same.**

THIS ISSUE: Modem Living – access the world through your micro and telephone – Big K makes the right connections.

- Win a full-sized BATTLEZONE arcade game in Big K's extravagant competition.
- What's all the fuss about? Big K examines the 68000 wonderchip.
- Atari 800XL review.
- 7 games programs for Commodore 64, Vic 20, BBC, Spectrum, ZX81, Oric, Atari.
- Atari graphics – read Big K's special feature.

Plus – Arcade Alley, dozens of games reviews, expert technical features, lots of fun and lashings of colour.



Third amazing issue on sale 17th May

Ask your newsagent for a copy – 85p

Vic Connection

A new game for Vic20 by Ian Craighill

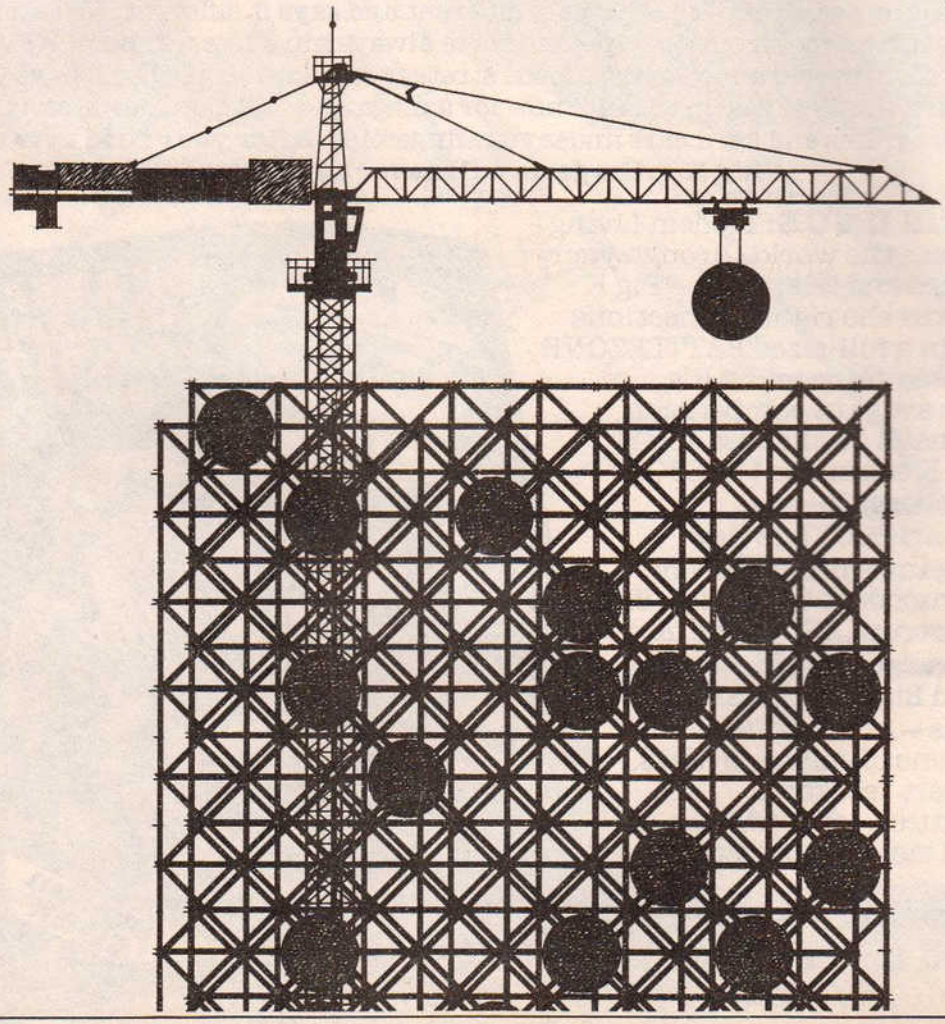
This game, for the unexpanded Vic 20, is a version of *Connect 4* for two to four players. The idea of the game is to place your beads (by pressing *Return*) to make either a vertical, horizontal or diagonal line of four. When this is accomplished, the Vic will automatically play a fanfare.

To avoid arguments, caused by accidentally placing a bead in the wrong column, there's a "check" key (*Space*) which helps to determine the position of the marker in relation to the beads. A bouncing routine is also included in the program.

Notes

The most difficult part of the game to program was checking the number of beads (lines 700-750). If the computer wanted to find a horizontal line, it would use *Peek* to count left and right of the orginal bead. If the answer was three, then there was a line of four.

0–7	Rem statements
30–40	Data for National Anthem
310–317	Variables
320–340	Set screen
400–490	Movement options
500–520	Bead drop
700–750	Check lines
800–910	Fantare
1010–1020	Players option
1100–1130	"Check" Bar
1500–1520	Bounce routine
2000–2094	Instructions
2095–2100	Tune



```
 0 REM*****************
 1 REM*                *
 2 REM*VIC CONNECTION*
 3 REM*                *
 4 REM*    BY(C)       *
 5 REM*IAN CRAIGHILL *
 6 REM*                *
 7 REM*****************
 10 RESTORE
 20 DATA1,22,21,23
 30 DATA215,1,215,1,219,1,212,1.5,215,1,219,1,223,1,223,1,225,1,223,1.5,219,1,21
5,1
 40 DATA219,1,215,1,212,1,215,1,-1,0
 300 POKE36879,25:POKE36878,15:PRINTCHR$(8)CHR$(142)"■"
 305 GOSUB2000
 310 BA(1)=81:BA(2)=87:BA(3)=42:BA(4)=43:C(1)=5:C(2)=3:C(3)=0:C(4)=6:AR=7703:CO=
30720
 315 Y=7703:NM$(1)="■GREEN CIRCLE":NM$(2)="▙ CYAN CIRCLE ":NM$(3)="■ BLACK STAR
"
 317 NM$(4)="■ GREEN CROSS"
 320 FORP=7746TO8053:POKEP,91:POKEP+CO,2:NEXT
 330 FORP=7680TO7701:POKEP,160:POKEP+CO,6:POKEP+374,160:POKEP+374+CO,6:NEXT
 340 FORP=7680TO8054STEP22:POKEP,160:POKEP+CO,6:POKEP+21,160:POKEP+21+CO,6:NEXT
 350 REM *************
 360 REM * MAIN LOOP *
 370 REM *************
 380 GOSUB1000
 400 FORT=1TOW
 410 POKEY,BA(T):POKEY+CO,C(T)
 420 GETA$:IFA$=""THEN420
 430 POKEY,32
 440 IFA$="X"THENY=Y-1
 450 IFA$="M"THENY=Y+1
 460 IFA$=CHR$(13)THEN500
 465 IFA$="C"THENPOKE36879,27:PRINT"■":END
 467 IFA$=" "THEN1100
 470 IFY=7702THENY=7722
 480 IFY=7723THENY=7703
 490 GOTO410
 500 E=Y+44:IFPEEK(E)<>91THENPOKE36876,220:POKE36876,0:GOTO410
 510 POKEE,91:POKEE+CO,2:E=E+22:IFPEEK(E)<>91THENE=E-22:GOTO530
 520 POKEE,BA(T):POKEE+CO,C(T):FORP=1TO50:NEXT:GOTO510
 530 Q=1:GOSUB1500:E=E-22:Q=0:GOSUB1500:E=E-22:Q=0:GOSUB1500:E=E+22:Q=0:GOSUB150
0:E=E+22
 532 Q=1:GOSUB1500:E=E-22:Q=0:GOSUB1500:E=E+22
 535 POKE36876,220:POKE36876,0:POKEE,BA(T):POKEE+CO,C(T)
 540 FORP=1TO4:GOSUB700:NEXTP:RESTORE
 550 NEXT:GOTO400
 700 READA:D=E
 710 D=D+A:IFPEEK(D)=BA(T)THENSC=SC+1:GOTO710
 720 A=A*(-1):D=E
 730 D=D+A:IFPEEK(D)=BA(T)THENSC=SC+1:GOTO730
 740 IFSC=3THEN800
 750 SC=0:RETURN
 800 POKE36879,24+C(T)
 805 FORP=8164T08185:POKEP,99:POKEP+CO,C(T):NEXT
 807 PRINT"■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■"LEFT$(NM$(T),1)"■■■■■■■"NM$(T);
 810 Z=135:FORP=1TO40:R=INT(RND(1)*8):Z=Z+2.5
 820 POKEE+CO,R:POKE36876,Z
 845 D=E
 850 D=D+A:IFPEEK(D)<>BA(T)THENPOKE36876,0:GOTO870
 860 POKED+CO,R:POKE36876,0:GOTO850
 870 D=E:A=A*(-1)
 880 D=D+A:IFPEEK(D)<>BA(T)THEN900
 890 POKED+CO,R:GOTO880
 900 A=A*(-1):NEXT
 910 FORP=1TO300:NEXT:RUN
 1000 PRINT"■■■HOW MANY PLAYERS (2-4)"
 1010 GETA$:IFA$<>"2"ANDA$<>"3"ANDA$<>"4"THEN1010
 1020 W=VAL(A$):PRINT"■■■                                    ":RETURN
 1100 E=Y+44:Z=241:IFPEEK(E)<>91THEN410
 1110 POKEE+CO,1:E=E+22:Z=Z-5:POKE36876,Z:IFPEEK(E)=91THEN1110
 1115 E=E-22
 1120 POKEE+CO,2:E=E-22:Z=Z+5:POKE36876,Z:IFE=Y+22THENPOKE36876,0:GOTO410
 1130 GOTO1120
 1500 Z=PEEK(E):POKEE,BA(T):POKEE+CO,C(T):FORP=1TO50:NEXT:POKEE,Z:POKEE+CO,2
 1510 IFQ=1THEN:POKE36876,220:POKE36876,0:RETURN
 1520 FORP=1TO25:NEXT:RETURN
 2000 PRINT"■  INSTRUCTIONS-(Y/N)":PRINT"■ ──────────────────"
 2010 GETA$:IFA$<>"N"ANDA$<>"Y"THEN2010
 2020 IFA$="N"THENPRINT"■":RETURN
 2030 PRINT"■■    INSTRUCTIONS":PRINT"■      ──────────"
 2040 PRINT"■DROP THE BEADS DOWN":PRINT"▙THE GRID TO FORM A":PRINT"■ROW OF 4"
 2050 PRINT"■EITHER VERTICALLY,":PRINT"■HORZONITALLY OR":PRINT"■DIAGONALLY"
 2060 PRINT"■USE 'CRSR'DOWN TO GO":PRINT"■LEFT,'CRSR'RIGHT TO GO"
 2070 PRINT"'▙RIGHT,'RETURN' TO DROP":PRINT"■■AND 'SPACE' TO CHECK"
 2075 PRINT"'C' ENDS THE GAME"
 2080 PRINT"■■■■■■■■■■■■■■■■■■■
```

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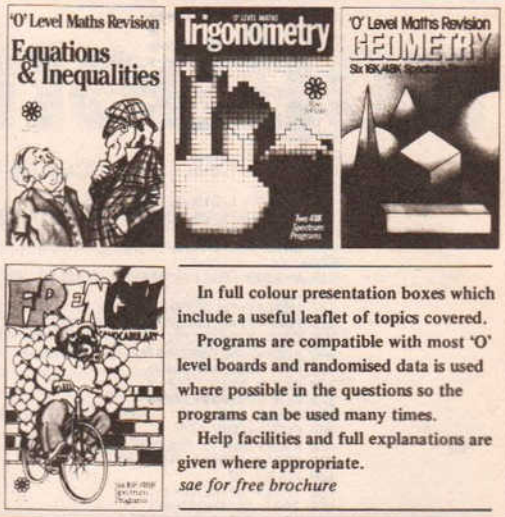

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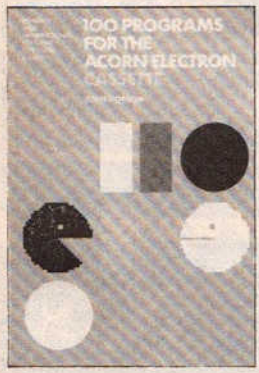
When I first saw this package my mind went back to Christmas as a child, receiving attractive boxes containing compendiums of games.

One hundred programs for just over £10 is very good value. At 10p per program you would expect quite a lot of programs which exist purely to make the number up. However, apart from the odd one or two, the games represented excellent value for money.



The programs are presented in eleven sections, eg, Maths, Graphics. I cannot see how anyone could fail to find a wealth of material which he or she could not either use directly or take as the basis for development of a new program.

Section 1 seemed the weakest of the eleven. It is more a familiarisation exercise with the Electron than anything else. Section 2 covers the basics of games writing in a way which could form the basis for useful game development by amateur program writers. I particularly liked the *Business* and *At Home* sections which practically give you everything you want from a computer in business, and everything you want at home — from birthdays to investment and back. I couldn't help at this point wishing for a disc version as a lot of this section's programs were in file form.

Moving on, there are sections on *Mathematics, Painting on the Screen; Data Handling; Recreation,* The Science Lab (most of it behind me with volumes of solids, colour codes for resistors, moments of inertia etc), *Graphics routines,* and, finally, *For the School.*

If you are looking for a collection of routines to get you started on your Electron, and introduction to a variety of games you can develop, how to check up on your tax, VAT or investments, help in the kitchen or drawing pretty pictures then this could be for you.

One point: as a dabbler in programming I would have liked the accompanying descriptive book to give listings of the programs. Still, with one hundred programs to list I suppose it is only natural they print that as a separate book at a separate charge.

Fred Short
Program *100 Programs for the Electron* **Price** £11.50 **Micro** Electron **Supplier** Prentice Hall International, London.

Spectrum Programming

This combined book and cassette set in the Dr. Watson Computer Learning Series is sub-titled *Beginners Basic for the Spectrum.* But it falls between the two stools of getting the real beginner started and helping the more experienced programmer to go further.

The book gives its rationale as being to show how complete programs can be written, rather than duplicating the Spectrum manual's admirable cover of specific commands. While it is a worthwhile task, major disappointment about the set is that it spends far too much time going over ground already well dealt with in the ZX manual.

The book has thirteen chapters, twelve of which each develop an original idea for a game through to the finished program. This is where the tape provided can give you a shortcut, as it contains the final versions of the programs developed in these chapters. Although it may be a help to a reviewer hard pressed for time I do think it is more of a gimmick than of much practical use. Most of the programs are simple enough to type in yourself.

The final game developed is an adventure game, and this is the only one long enough to justify the inclusion in the set of a pre-recorded tape. The unfortunate thing here was that I couldn't get it to work, as it first stopped with an error message referring to a non-existant line, and then tied my Spectrum into a knot. Switch off, and try again.

The book covers very little that isn't covered in the Spectrum manual, and it leaves out many of the micro's possibilities.

Simon Springett
Program/Book *Spectrum Basic Programming Course* **Price** £10.50 **Micro** Spectrum **Supplier** Honeyfold Software, Standfast House, Bath Place, Barnet, London.

Heathrow

Early in *Close Encounters of the Third Kind* a scene at Indiana Air Traffic Control in the unreal glow of radar screens shows tight-eyed men watching appalled as an unauthorised craft tracks through their airspace. To discover for yourself how they felt, spend a day peering at your VDU deciphering tiny white shapes on a screen — running *Heathrow.*

Being in charge of planes as they come in to land is like playing 3D chess while driving a dodgem car. Living under a flight path for Heathrow Airport did not help my nerves while I strained to learn the skills of an Air Traffic Controller. Mike Male — the author of the program — is, however, a good teacher. He wrote this program based on his own job at the world's busiest airport.

This simulation takes several hours to come to terms with. There are — thank goodness — comprehensive sleeve notes with the cassette and the program has a 15 minute demonstration section running through a sequence of actions on screen while the notes explain what is happening.

There are several levels of activity in addition to the demonstration. Each gets progressively busier in the air and the last three include emergencies for you to panic about as the clock ticks steadily on. Thank goodness for a chance to freeze the program and relax — a luxury denied to the real controllers.

The program displays on request a page assessing your progress so far based on safety, handling of emergencies and the efficiency with which you get the craft down. It is important to funnel planes in as closely as possible to the real Heathrow's incredible 90 second average gap between landings.

This kind of program depends totally on the quality of screen display. *Heathrow* packs in three sections of information: radar screen, radio instructions and status board. Even with a monitor I found it hard to follow tiny aircraft on the blue radar screen — especially when the code letters they display look similar. Maybe this is why air-traffic controllers in movies tend to wear glasses.

As a veteran of several flight simulators on the BBC B, I expected to pick up *Heathrow* very easily. It is not that kind of program. Indeed there is nothing for the zap, bang instant response wizards in it. Even a nasty crash is unspectacular. But assuming you pay your good money to get the lasting satisfaction of a real challenge — then enjoy this one.

Dave and Jan Watterson
Program *Heathrow* **Price** *£7.95* **Micro** *BBC/Electron* **Supplier** *Hewson Consultants, 56b Milton Trading Estate, Milton, Abingdon, Oxfordshire.*

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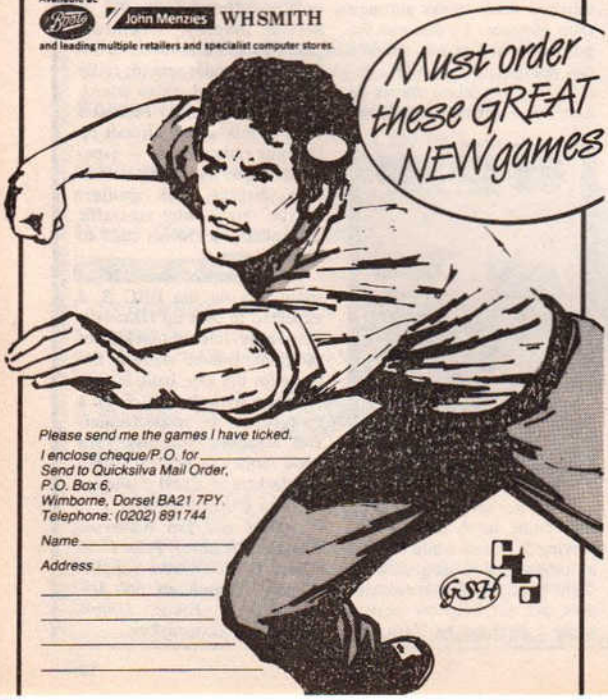

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Quark, strangeness and charm

***Andrew Pennell** takes the first critical look at a production run Sinclair QL computer — one of the first machines to be received by a Sinclair customer earlier this month*

The QL is here, and a few lucky people around the country now actually have one.

At the launch, some four months ago, the QL was hailed as the first of a new generation of home micros, with an amazing specification. Since then the worst delivery delays since the BBC micro have tarnished both the image of the computer and that of its designers, Sinclair. Now that the machine is at long last in production — the big question must be, is it worth the wait?

Although it's been published many times before, it is worth going through the machine's basic specification again. It has 128K Ram, 40K Rom, a real keyboard, very high resolution graphics, and a pseudo 32-bit processor. As well as all this, two Microdrives are included for mass storage, and four professional programs supplied by Psion. All for a paltry £400.

The machine doesn't really look that sophisticated from the outside. Its not very large or heavy and, once again, Sinclair has keys are non-standard, and the *Ctrl* key is where you would expect the *Shift* key. Also, it is a real pain to have to hold *Shift* together with "—" to obtain underline, which is a very important character on the QL being used as part of the syntax of many commands. To delete characters two keys have to be pressed, but as they are adjacent you soon get used to it.

It makes a change for a Sinclair machine to have a large number of sockets for various connections, even if most are non-standard. On the left of the keyboard is a blanking plate concealing a very large hole, called the expansion slot. Peering into this reveals a large 64-way socket, containing all the necessary hardware signals. Into this slot will plug any extra hardware, such as Ram packs, printer interfaces and disc controllers. If you want to plug more than one such item in at a time then you will have to get the QL Expansion Module, which is a sort of motherboard. It is not yet available, but I think I saw some prototypes in Psion's labs during a visit not long ago. At the back of the case on the left is the *Rom* cartridge socket, originally intended to take up to 32K of external Rom. However, memory restrictions forced the engineers to commandeer half of this space for the Basic, so the first customers have ugly little black boxes sticking out, containing some 8K of the Basic in Eprom (see *PCW*, April 26). When the final Roms are ready this "bodge-BASIC in Eprom (see *PCW*, April 26). When the final Roms are realy this "bodge-board" will not be necessary but, until that time, no other *Rom* cartridges can be plugged in. This unforseen design modification has also meant that when the Eprom is incorporated into the main board it will still only be possible to plug in a maximum of 16K bf Rom via the socket — half the intended amount.

Next to the Rom port along the back are two so-called joystick sockets. Instead of using the industry standard 9-pin D-type socket, as used by most joysticks, the designers deliberately chose a very unusual type of connector just to make life difficult. If you actually want to plug a joystick in, you will have to fork out extra cash for a special adaptor. The cost and availability of this adaptor is, naturally, not known at this time. The type of socket used is mechanically the same as that found on the new British Telecom telephones, but electrically different.

Next to the joystick sockets are two RS232 ports, for the connection of most other peripherals such as printers or a modem. Unfortunately, most printers nowadays are Centronics or parallel connection types, so you will need an adaptor of some sort. Apparently a suitable interface will be available from Sinclair, but I wouldn't recommend you hold your breath waiting for it.

There are also sockets for the domestic tv, black-and-white monitor and RGB colour monitor, at standard voltage levels, with an almost-standard socket.

There are also two network sockets, for connection to other QLs or Spectrums, and a blanked off extension Microdrive socket.

Lastly, at the front of the QL on the right are two small slots, into which the famous (or infamous) microdrive cartridges go. Opening the case revealed a surprisingly neat circuit board, with absolutely no modifications on it. Populating the board are fewer chips (excluding Ram) than in the ZX80 — two processors, 16 Ram chips, two custom ULAs, two Eproms and a few TTL chips.

On powering up the QL, you are greeted with a 1983 copyright message (showing just how late it is), together with a request to press function key *F1* or *F2*, depending on

which kind of display device you use.

If you are using a monitor, the screen is divided into 3 windows, with 80 characters per line. If you are using a TV, it changes into 40 character mode, with two of the windows superimposed. Each of the three 'windows' is a self-contained section of screen, each with independant position and attributes.

When you type in a line it appears in the five-line window at the bottom of the screen. Program listings appear in the top left, and printouts from programs which have been run appear on the top right windows. Unfortunately, if on power-up you choose the tv display option, rather than monitor, the list and print windows are displayed one on top of the other which makes things very confusing.I was not very impressed with the display quality on my own JVC telly, which was a bit fuzzy, and had the annoying habit of flicking to black-and-white.

The screen has two modes, either medium-or high-resolution. In medium resolution there are eight colours available on screen, with hardware flashing. The resolution is 256x256 pixels, with none of the colour clash problems of the Spectrum or the serial attribute problems of the Oric. Unlike the Beeb, the fact that the screen uses a whopping 32K of RAM is not very significant, and it still leaves over 90K to the user.

In high-resolution mode, there are four-colours, at a resolution of 512 x 256 pixels. The full range of 32, 40, 64 or 80 characters per line are available, again in single- or double-height, but with no *Flash*.

Typing in Basic programs is not really as easy as it could have been, as the so-called syntax checker is awful. When you hit *Enter* after typing or editing a line, the machine checks the line for obvious mistakes, and if it finds one it rejects it with the message "bad line". Regrettrably, there is no way of retrieving the bad line to edit the mistake — the whole thing has to be re-typed. It doesn't really syntax check anyway, so a line mistyped as

```
10 PRINY A
```

is accepted, as it assumes you could be about to define a procedure called PRINY. I prefer no syntax checking at all to the way the QL does it.

The Basic is one of the reasons for the long delay in finishing the machine, and is still the weak link in it. It originally had such a good specification that it all proved too difficult and time-consuming to complete. As a result, some of the commands referred to in the Provisional Manual have been dropped, while other easier-to-implement commands have been supplemented.

Superbasic itself initially proved tricky for me to use, as the sections of the manual describing it are not yet ready and the machine was sent out without a Basic manual.

It has all of the structured programming commands of the Beeb — namely *Repeat*, Procedures, multi-line functions, and a *Select* statement, an improvement over Pascal's *Case*. The best part of Superbasic is its graphics, which are mind-blowingly fast. It can plot points, draw arcs, circles and ellipses, pixel scroll parts of the screen in any direction, and fill shapes extremely quickly. Although the *Fill* algorithm is not very complex, it is very fast, and plotting off the screen no longer produces the annoying "Integer out of range" response — as on the Spectrum. There is also a *Recol* command, to simulate a colour pallettes. To obtain more colours, the QL uses stipples, which are patterns of colours, to obtain different shades.

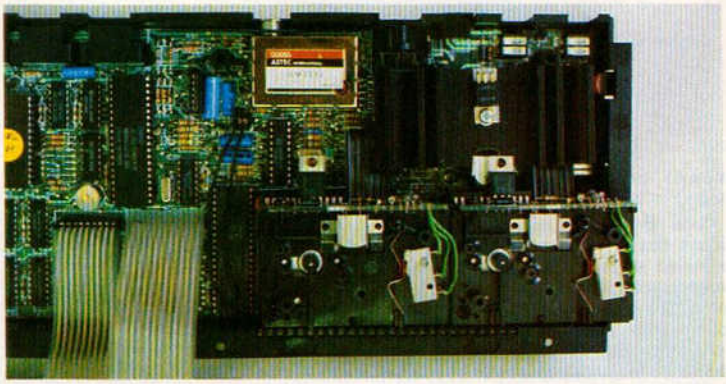
Curiously, there is no way of reading the colour of pixels or characters from the screen (ie, *Point* and *Screen$* on the Spectrum). The Beep command has many parameters, and good sound effects can be obtained. The output level is thankfully better than the Spectrums, but not as loud as the Beeb or the deafening Oric. Since there is no audio output socket on the QL, you can't pipe the sound through your monitor speaker, or any amplifier for that matter. Accessable using the *Dates* command is the internal clock. It not only stores the time, but the day, month and year. Unfortunately, the value of the clock is not preserved when the power is removed. Nice features sorely missing from previous Sinclair dialects are integer variables, arrays starting at 0, *Auto*, *Renumber*, binary operations, double and quadrouple *Peek* and *Poke*, and line delete.

A major QL feature is windowing, and works by defining different streams to different screen sections. Such 'windows' can be used to good effect, but are not up to concurrent CP/M or Lisa standard. One much advertised feature of the QL is multi-tasking, but this remains untested. As no technical information on QDOS — the QL microdrive operating system — is yet available, nothing can be said about it. The only known feature of QDOS is that it can recognise external peripherals, such as disc drives, and that most machine-code on the QL has to be postition independant. In addition, networking to a Spectrum proved to be almost impossible as the protocols do not seem the same.

As the QL uses one of the latest state-of-the-art processors, the 68008, I was expecting the Basic to be very fast. After running the standard benchmarks, however, I was rather disappointed, though it is thankfully faster the Spectrum. The QL is around one and a half times slower than the Beeb and the Amstrad, except when number crunching. Only one benchmark was faster, and it involved a lot of maths functions. It would appear that the priority when writing Superbasic was elegance.

After all the changes, Superbasic is still good — if disappointingly slow. It has all the features of the previous best, namely BBC Basic (except the Assembler), with lots of additions. I personally mourn the demise of the *When* and *Trace* commands from the original QL spec though.

Most sceptics seem to think the weak link in the QL's design is its use of Microdrives, and I used to agree with them. However, QDOS handles them so cleverly that they are almost as good as true discs. Their speed is faster than some disc systems, namely the notorious Apple and Commodore ones, and equals many others. Unlike the ZX variants, they can handle random-access. Only time will tell about reliability, but their predecessors, the ZX Spectrum ones, have now proved themselves, and my Microdrives are far more reliable than my Apple discs. As if to prove this, after typing half this review into my Apple the disc drive decided to crash, losing all my text, so I have re-typed it into my more reliable Spectrum with *Tasword*, and saved it on Microdrive. The Microdrive's only (easily curable) fault is the cartridge cost. Four pounds 95p is simply extortionate for 100K of media, and the price must come down.



The only problem I found with the QL

drives was the curious way in which the write-protect tab functioned. When writing to a protected cartridge, instead of getting an error, nothing happens. You are given the impression that your file was saved successfully, when in fact it wasn't.

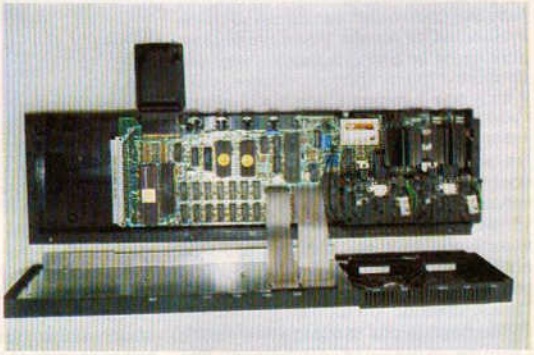
For many, the major attraction of the QL is the four applications programs supplied with it, written by Psion. Each is supplied on a microdrive cartridge, and four blank cartridges are also supplied on which back-ups should immediately be made. The first part of the provisional manual says the *Exec* command should be used to load them, but it only results in the machine crashing. Further on in the manual the correct loading instructions are given, but the misprint is sure to cause a few customers to immediately return their QLs because "they won't load anything". The manual also says they take "a few seconds" to load. In fact, the fastest any loaded in was a minute.

Once loaded, the program cartridge always has to remain in Drive 1, with a formatted cartridge in Drive 2. This is because 128K Ram is insufficient, and they sometimes have to load in particular sections for some options. In addition, *Quill*, the word processor, also seems to use the second cartridge as some form of temporary storage. All the programs share a similar on-screen format, with helpful screen prompts, selectable character widths, and a *Help* facility available at any time by pressing function key *F1*.

Of the four programs, Quill will probably be the most useful to the average user. As world-processors on home micros go, it is almost certainly the best, though it does have some strange omissions. It uses the what-you-see-is-what-you-get principle, (or WYSIWYG), and performs all justification, margin setting and selection of typefaces while you type, very neatly. Changing any of the attributes is very easy using the prompts and you can change the number of characters per line to suit a TV or a monitor. Forty-column mode is useless on a tv, because you can't see the edges, while 64 is ideal, and 80 is fine for a monitor. There is a printer configure program on the *Quill* cartridge, with a limited choice of printers at the moment — either Epson FX80, or anything else. If you don't have an FX80 (or an RX80) then you have to define your printer control characters for different functions — in a similar way to *Tasword* on the Spectrum. I feel the major omission in *Quill* is the limited control characters you can send to your printer.

The manual refers to a *View* facility that enables you to see very wide documents on the screen, but it seems to have been removed from the program without anybody telling the manual's author. Apart from QDOS problems that I shall mention later, the only bug I found was pressing *Esc* to terminate printing actually caused the machine to lock up — a bug that surely should have been corrected long ago.

Easel is the graphics package, which represents data in graphical form, using bar charts or pie charts. It is dead easy to use — you just type in your data (or import it from another of the four packages), and it immediately draws the graph. If you don't like the format chosen, it can be changed, though pie charts are very slow to draw. Assuming you have typed in your data and got the graph you want, what can you do with it? The easiest way to get an image of it would seem to be to photograph the screen, and the manual tells you how best to go about it. The alternative is to dump the graph to your printer but, if you haven't got an Epson FX/RX 80 then too bad! Luckily I have an RX80 with RS232 card, so I was able to test the facility, and it works really well, if a little slow. Each screen colour is printed as a different shade, giving a very clear output. If you plotted your graph in 8-colour mode, it gets converted to 4-colour before printing.



Abacus is the spreadsheet, which the average user is likely to leave well alone, just as I did to start off. That's because you may think that they are only useful for financial forecasting. After reading the examples in the manual, though, you soon realise how useful a spreadsheet can be for all sorts of things. I used it to store benchmark times for the QL and three others machines and then got it to calculate first the ratios between them all, and then the averages.

The most complicated of the four Psion programs is *Archive*, the database. It is similar, if not better than *Dbase 2*. Supplied with it is a demonstration file, containing a gazeteer of over 150 countries, which is a useful example. Simple use of *Archive* enables you to search for combinations of any attributes. For more complex uses, *Archive* supports a language similar to Basic, in which programs can be written to update and investigate any number of data files. Because of its sophistication it is not as easy to use as the other programs, but that is unavoidable.

I did experience alarming problems when doing certain input/output operations from all the applications, which leads me to think that there are still problems in QDOS. Files saved on cartridge often refused to completely load back, and the machine would just hang up in the middle of loading. It would also seem that Psion do not use as much of QDOS as they should

In conclusion, the QL is pretty damn good. With a few modifications, though, it could have been superb. The machine and the applications programs together represent excellent value for money, but the Basic is a little disappointing. I hope when Sinclair upgrades Eprom customers it will take the opportunity to improve some of the Basic features, particularly the "syntax checker".

The good points of the QL far outweigh the bad, but it does have its disadvantages — a cartridge cost of £4.95 and problems of machine availability being but two. The incompatible joystick "sockets" are an outright con, and a joystick adaptor should have been the "free" gift, and not an RS232 lead.

And one question still remains unanswered — why was it launched six months before it should have been — when the design was still far from complete? What excuse is there for such a premature announcement which has led to adverse publicity for the machine and much ill-will from potential customers?.

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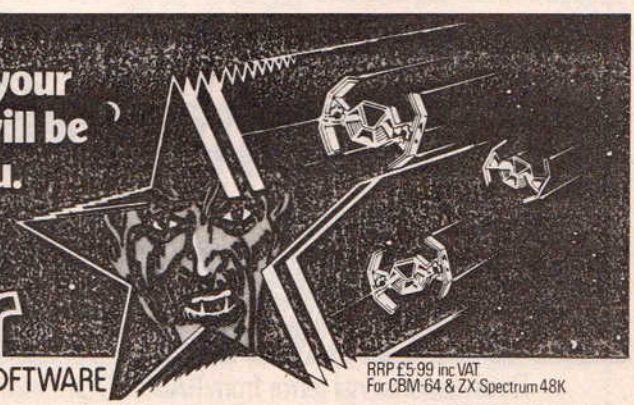

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PCW concludes the education series with a review of Commodore software, programs for use in secondary schools on the BBC, and a section on software for the disabled.

It all adds up

***David Lawrence** looks at the latest education programs from Commodore*

With a comparative hush hanging over the software market recently, one of the few areas that continues to attract attention and a great deal of investment is education. Most of the larger book publishers are heavily promoting ranges of educational programs and not to be outdone, Commodore have turned their attention to a new range of ideas for the 64. All the programs, as you would expect from the makers of the machine, show a good awareness of the 64's outstanding sound and graphics capabilities, though some show signs that they were rushed out when a little more thought could have improved them.

Number Puzzler is a case in point. Originally created by A.S.K., the title has been bought by Commodore and altered slightly for the 64.

Within one program are a set of extremely well worked out number games based on noughts and crosses or magic squares (where all the lines, in any direction, add up to the same total). In the simplest noughts and crosses version, you are presented with a 3 x 3 grid of single digit numbers. Each of the two players (the 64 will play you if you want) is presented with two numbers that are either on the grid or can be added up to form a number on the grid. The player responds by saying whether the numbers are to be taken separately or added together. As a result, either one or two numbers on the grid are changed to the player's colour. When a player completes a line in his or her colour, that round of the game is over and when one player wins five rounds the game ends.

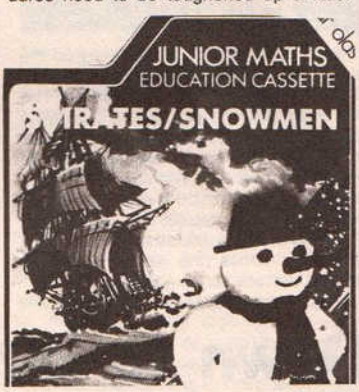
Tester Barny (aged seven) soon realised the need both to plan ahead and to ensure that the numbers were examined separately and when added together. In other words the game succeeded in making him think and calculate, which is more than can be said of many. The 6 x 6 game, with numbers up to 99 involving addition and subtraction, would be a challenge for anyone.

For all that, the program was marred by two features. Firstly, whenever one of the five forms was entered, it appeared impossible to return to the main menu. In other words, to access one of the other games, the tape had to be loaded again. Hardly an attractive feature at seven minutes a time. In fact, instructions for later games revealed that it was possible by use of the Control/B keys, but the omission of this from the instructions will spoil the package for many. The other flaw, common to many programs, is that programmers normally work on high quality monitors which are capable of doing justice to the range of colours the 64 produces. Not all domestic sets can, since colour bleeds from left to right on the screen, losing delicate shades on strong backgrounds. We found the change in colour in the numbers of one player, from white to light yellow on a brown background, almost impossible to distinguish. As a package, we enjoyed *Number Puzzler*, but as I say, I can't help thinking that a month later it might have been much more impressive.

Spirates and Snowmen was an immediate hit. Both the games are competitions for two players where success depends upon the ability to answer questions quickly and accurately. In all such games the success or otherwise of the idea depends upon how it is dressed up. In *Snowmen* you answer questions in the middle of a blizzard, and all the time your question goes unanswered, your opponent's snowman grows. The game has 18 levels of play, nine for addition and nine for multiplication, allowing a fair balance to be struck between two players of almost any age group. *Spirates* doesn't have the same flexibility in terms of levels of play, but the scene is an enjoyable one nevertheless, with two pirate ships loosing off cannon balls at each other across the bay, with success depending upon quickness and accuracy in answering.

Let's Count, another ex-ASK package which consists of beginners' counting and number matching games set in such unlikely places as treasure islands, space stations and funfairs was excellent in every way. The graphics and sound were superb, with imaginative use of sprites throughout and the ideas, which seemed a little naive to me, intrigued Barny even though most were a little young for him. What impressed me most of all, however, was that at three and a half years old, tester Tom found the simpler games gripping and possible to play, a tribute to the range built in.

All in all, high marks for these first packages in the new series but I can't help thinking that Commodore's testing procedures need to be toughened up a little.



Supplier	Game	Age	Price
Commodore Business Machines 675 Ajax Avenue Slough Trading Estate Slough Berkshire	*Number Puzzler* *Spirates and Snowmen* *Let's Count* (two-cassette package)	5-11 5-11 5-11	£4.99 £4.99 £9.99

Making faces

***Keith and Steven Brain** survey a selection for the 64 from independent publishers*

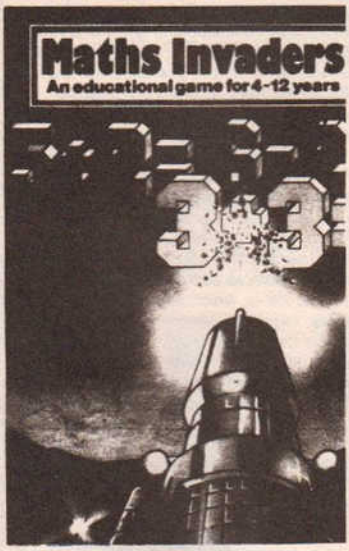
Commodore have recently put a great deal of efforts into getting the Commodore 64 into schools so it is obviously interesting to see what sort of educational software is available.

Fun to learn on the 64 from Shards Software is a compendium of five different educational games. This is a very long program and loading seems to take forever, thanks to the incredibly slow baud (or should read "bored"?) rate of the Commodore cassette interface, but eventually you are requested to enter your name and a menu of six options puts a particular letter on the screen a variable number of times, and asks you to count how many copies are present. Obviously pretty basic stuff, but at least they have made it more useful by telling you whether you were close or not, and rating your response time. Obviously pretty basic stuff, but at least they have made it more useful by telling you whether you were close or not, and rating your response time. There is a great temptation in the end to just guess rather than bothering to count! The whole package is well integrated so that there is ample opportunity to get back to the main menu when you tire of any particular game. None of the options are impressive in their own right, but put together on one tape they cover several different educational con-

continued over the page ▸

cepts and probably represent reasonable value for money.

Identikit from Stell is a very polished and entertaining affair from a company specialising in educational software. The game



revolves around building up faces on the screen in 'identikit' fashion from a selection of alternatives displayed on the screen. The first stage is to select a feature (eg, eyes) and then select a particular shape for this feature from the list provided. At the start of the program you can also call up a 'colour' option which allows you to specify any of 15 colours for each feature, as it is selected. Once the choice is made that feature slides smoothly across the screen into the appropriate position on the face.

Only two keys (spacebar and return) are used by the face creation program, so that it is suitable for even the youngest child, and it is claimed that 15,000 different faces can be created (although we don't like the look of some of them!). Once a face has been created it can be animated so that it smiles, frowns, winks, wiggles its ears, or even moves everything at the same time with hilarious results. You can also choose to try a memory test which shows you a face for 30 seconds, and then allows you one minute to recreate the same face. It is billed as 'an entertaining introduction to the computer for 2-8 year olds' rather than making any particular educational claims, although it obviously teaches shape recognition and pattern matching. A very professional package.

Maths Invaders is another impressive program from Stell which combines arcade-style machine-code graphic action and sound with learning your maths. Rows of invaders containing maths questions (the ultimate weapon?) move down the screen in traditional style and you can only stop them by loading your gun with the correct answer and firing it at the corresponding alien. A mother ship scurries back and forth renewing the ranks and there are a total of three waves, each of 15 questions in each game. Addition, subtraction, multiplication and division can be selected separately or in any combination, and you can even choose different skill levels for each type of question!

This certainly puts some fun into learning maths, but the complete absence of any method of scoring points is rather a disappointment. Successfully zapping all the answers just takes you back to the title pace. If parents can stand the noise then the kids will certainly enjoy this way of learning.

Typing Wizard from Severn Software is rather different in that it is an undoubtedly educational but very serious aid to learning to type. An introduction to the system is provided and then there are six different lessons dealing with the various areas of the keyboard, a lesson dealing with the entire keyboard, and finally a speed test. An accurate picture of the keyboard and the position of your fingers is provided, together with a series of suitable exercises at each stage. The F7 key is used to step through the program (if you can find an eleventh finger). The ability to touch type is obviously useful and this well-designed package provides a painless way of developing the skill.

Supplier	Program	Age	Price
Shards Software 189 Eton Road Ilford Essex	*Fun to Learn on the 64*	6-12	£6.95
Stell Software 36 Limefield Avenue Whalley Lancashire BB6 9RJ	*Identikit* *Maths Invaders*	2-8 4-12	£7.95 £7.95
Severn Software 5 School Crescent Lydney Gloucestershire	*Typing Wizard*	general	£8.50

Down to business

***John Scriven** discusses BBC software for use in secondary schools*

In the last review I looked at a selection of the software that was available for younger users of the BBC micro. This week I shall be looking at those packages designed for older users, although the boundary between these two groups is of course, very flexible.

There is more provision for programs that model computers in the real world than there used to be, but it is still an area that is to some degree lacking. There are database programs offered in both the primary and secondary MEP packs, and these are useful in many ways. If children build up their own databases of traffic surveys or census returns, they not only learn about databases but can also tackle subjects that would be too complicated or time-consuming using traditional methods.

One of the more enterprising programs in this week's selection is *DBS*, a database package from MUSE. Anyone who is at all interested in educational computing would find joining MUSE (Micro Users in Secondary Education) an excellent investment, as the range of software they can supply covers most disciplines and all age ranges. They have 300 titles in their catalogue on cassette and disc, and these are written for ZX81s, Spectrums, 380Zs, Apples and Pets, as well as BBC machines. MUSE also offer courses in different aspects of educational computing.

DBS is a full feature database program that goes a lot further than *DBASE* in the MEP pack (which schools acquired along with their subsidised BBCs in the DES scheme in 1982 and 1983). *DBS* is split into several subprograms that are loaded from the disc as and when they are required. The menu program allows you to choose whether to initialise a new data file, edit or sort existing files or search for an entry. A 100K disc can contain about 400 records, each of up to eight fields of up to 25 characters. When you edit the file, you are allowed to add, delete, list, find or alter each record, and the display shows clearly the limits within which you can operate. Sorting allows you to choose the field, unlike some inferior programs, eg, if you were sorting names, addresses, towns and telephone numbers, you could sort in alphabetic order of names, or in order of the towns.

When it comes to searching the database, you can specify in great detail the requirements of the search. Using the previous example, you could ask to see all

the records that contain names beginning with A but not ending in S that live in London and Liverpool. Files can be stored in their new forms and the results can be sent to any parallel printer. The documentation is adequate, and the whole package would be useful in both the classroom and in administration.

The secondary programs from MUSE are also of a high standard, and include several written by Adrian Oldknow, including *Games* and *3D*. *Glass* is an elementary CAD program (computer aided design) that allows the user to design a drinking glass. Coordinates are entered on one side of a graph, and when the drawing mode is selected, the whole glass appears in three dimensions. The shape can then be altered by changing or adding other coordinates.

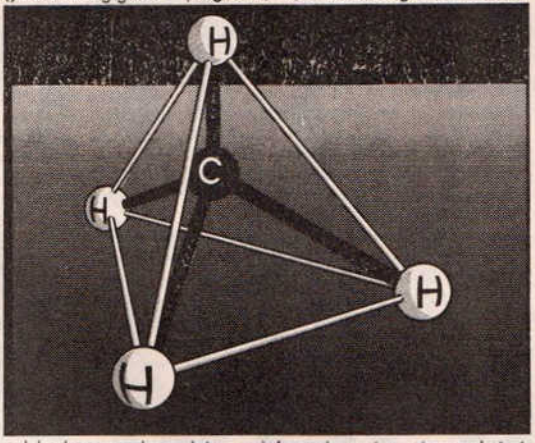
The second program, *3D*, also relies on graphics, and shows how a design can be rotated, reflected, enlarged, stretched, sheared and viewed from almost any angle. Objects to be viewed include a variety of polyhedrons and a house. As the program is menu-driven from a text window at the base of the screen, it is easy to see the effect of different commands in a way that would be impossible without a computer. My one complaint about the program is that there is no way to enter your own data for objects, partly due no doubt, to the limited amount of memory left by the BBC in high-resolution modes.

Although many ambitious science departments already use the BBC micro in experiments, there is some ready-made software available. *Pendulum* from MUSE allows the movement of a simple pendulum to be shown on the screen. The making of the pendulum is described in the detailed notes and this is attached to a potentiometer that is connected in turn to the A/D socket on the BBC. A graph of amplitude against time is drawn, and the length of the arm can be varied and the differences in frequency noted. This program would be ideal for both teachers and pupils coming to computers in control for the first time.

One area that seems well-off for software is that of chemistry. *Forensic* from MUSe applies basic chemical analysis to a murder enquiry. You are presented with four suspects, and you have to analyse substances found on their shoes. You can carry out flame tests, see what happens when you add hydrochloric acid, silver nitrate etc, as well as seeing the results of paper chromatography appear in front of you.

Safety is an important consideration in science, and the Health and Safety regulations now make it impossible to carry out many traditional experiments in the laboratory. This must be a good idea, as I remember with a certain amount of horror crowding round the front bench to watch oxygen burning in an atmosphere of hydrogen. Computers can come into their own in the field of simulations, and this fact is used by Acornsoft in some of their programs.

Chemical Simulations contains three programs, *IR*, *PH* and *Organal*. *IR* simulates an infra-red spectrometer, and starts off by giving basic facts about IR spectra, including a table of the sort of peaks to be expected with different compounds. Next, a compound is selected at random, and its spectrum drawn.



PH plots titration curves between strong and weak acids and bases and also tests you on calculations through a series of multiple choice questions. The last program, *Organal*, is a detailed simulation of an organic analysis, and is similar to *Forensic*, but considerably more complex. There are three sections, basic reaction tests, revision of reactions, and the actual simulation. After being given an unknown compound, you perform tests and the results are recorded in a laboratory notebook. You can check up on reactions at any time, and eventually enter your guess at the identity of the compound. The documentation is first class, and includes pupils' notes.

Another set of simulations aimed at students comes from Hama software.

As an example, I have been looking at *Stock Control*, which consists of two cassettes and an accompanying booklet. The first program demonstrates the calculations necessary to make sure that you order a sufficient number of units without overstocking. Graphs of order size against cost are drawn, and the results of changing any of the parameters are instantly seen. Various factors such as cost of insurance, labour, material and spoilage need to be taken into consideration as well as transport and the cost of using up valuable storage space.

Running a business is shown to be far from simple, and the program offers a safe way to learn the ropes. (Computer bankruptcy is comparatively painless!) The second program enables the user to simulate seasonal variations in a similar program, and this is extended to cover a 48 week year. As well as giving a theoretical background to the problem, the documentation gives many examples and makes a complex subject reasonably comprehensible. The programs could even be given figures from a real life situation to provide the answers to "what if" questions that would usually only be available from spreadsheet programs. This type of business program is usually only available for business micros, which may explain the high price, but colleges may find the usefulness justifies the initial outlay.

This review has only covered a small selection of the software available for the BBC. I have avoided those programs such as Adventures, and logic games from *Connect Four* to *Chess*, which are far more "educational" than many bearing that title. It is clear that there is a move away from merely using the computer as a teaching machine, something to be admired.

Supplier	Program	Price
Acornsoft c/o Vector Marketing Denington Estate Wellingborough Northants NN8 2RL	*Chemical Simulations* *Chemical Structures*	£13.80 £13.80
MUSE PO Box 43 Hull HU1 2HD	*DBS* (disc) *3D* *Glass* *Pendulum* *Forensic*	£20.00 £10.00 £10.00 £7.00 £7.00
HaMa Software 44-48 Magdalen Street Norwich NR3 1JE	*Calpax Twin Programs* *Stock Control* *Network Analysis* *Business Stats*	 £43.00 £43.00 £28.00

(Unless otherwise stated, all software is available on cassette, but disc versions are usually available).

Simply ingenious

***Robert Dawson** scans a range of software and peripherals for the disabled*

Feeling rather spoilt for choice with this selection I started by loading the Ega Beva *Catalogue* and was shortly greeted with a very enthusiastic looking beaver wearing a mortar board and a toothy grin. The remainder of the tape contains a catalogue of the S.E.S.S. product range with price list and includes an overview, with aims, of each of the educational programs.

In an attempt to capture the interest of my wayward two and a half year old daughter I immediately went on to the *Snap* series, "for the pre-reading child". The object is to respond to a matching situation. *Colour Snap* has seven graded games that present a variety of coloured shapes in various combinations (carefully avoiding shape/colour association) with a reward presented for selecting a matching colour when it appears alongside.

In any educational situation the reward for correct learning and response must be totally appropriate. The blend of skills of the S.E.S.S. staff as teachers and programmers became apparent at once. The rewards to correct selections make full use of the BBC's sound, colour and graphics in the most delightfully entertaining way. Familiar nursery rhymes and popular tunes are associated with bold, colourful and easily identifiable pictures.

To make response easier for the younger or less able child who has not yet grasped the relationship of all the keys on the keyboard, all actions are entered by pressing the space bar. That being the largest and most obvious key available, this in itself is typical of the care running through the whole suite of programs.

My daughter was by now jumping up and down on my knee, thrilled by the dog wagging its tail (to the tune of "How Much is That Doggy in the Window") and disappointed by the computer equivalent of a gentlemanly raspberry at her mistakes.

My next attempt to gain her interest in the screen and keyboard met with less success (due mainly to the jump in appreciation) but left me very impressed with what can be achieved using the BBC sound facilities. This cassette was the *Nursery Rhyme* collection.

I found the counter point harmony (or maybe it was descant) in *Twinkle Twinkle Little Star* quite captivating and I am sure that it will be a family bedtime favourite.

I would however level one of my few criticisms of the review at the loss of opportunity of having the words either changing colour, flashing or having a little dot marching along them as a cue.

To digress briefly, I recollect a "craze" at school for those plastic sliding block puzzles that had numbers or a picture on them.

Ega Beva have taken this principle and applied it with tremendous success to the computer screen in their *Sliding Block* and *Jigsaw Puzzles*. It starts by presenting a picture (or you can use one of your own creation) and then after you have had time to memorise it, splitting it up into a matrix, jumbling the pieces and blanking the bottom right hand corner. The dimensions of the matrix depend on the level that has been selected.

However, it is one of the most absorbing programs that I have come across and is much loved by handicapped children. Apparently, even mentally handicapped children will concentrate for nearly an hour (which is normally very difficult to achieve) to sort out the pieces and get the reward of a complete picture of a steam engine and a verse of "She'll Be Coming Round the Mountain When She Comes".

It encourages dialogue in groups of children, special awareness in the mentally handicapped and hand-eye coordination in the physically handicapped in manipulating the cursor control keys (or whatever device is used to replace them). It is a brilliant concept.

The *Abacus* program in the *Maths Pack* deserves a special mention. It is based on two big brightly coloured abacii with colour coded beads. It teaches adding and subtracting by moving the beads from one to the other and prompting for a manual 'carry over' with the space bar.

The Micro Mike

The *Concept Keyboard* made by Star Microterminals Ltd is a data input keyboard which is widely used in educational establishments for the handicapped. It consists of an A4 sized wipe clean membrane with an 8 by 16 matrix of touch sensitive switches beneath it.

This matrix is totally software decoded within the computer and can represent anything from 128 ASCII coded keys down to one or two sensitive blocks of keys. This, with the appropriate overlays, makes it suitable for use by anybody with either the finest or the most gross of movements. An A3 sized keyboard is now available to increase the range of application.

The *Micro Mike* is basically a CB microphone with a small amplifier that plugs into the analogue to digital convertor port on the BBC. That in itself is not outstanding but the software written to run with this is of the same quality and displays the same creative thought as the remainder of the Ega Beva range. The sight of a stalwart member of the medical profession lying on the floor and bellowing "GO,GO,GO" into the microphone to control his boat speeding up a rock infested river is testimony to the absorption that can be induced by this combination.

Simple fascination was the response to talking into the microphone and producing a city skyline on the screen formed from a speech volume/time graph in a variety of colours.

All of these voice operated games could be recommended for teaching coordination to people with speech impairment.

The *Utilities Pack* contains six useful routines that can be included in a variety of programs.

These include the routines to configure the BBC to operate with the *Concept Keyboard* and to interface the *Micro Mike*.

The *Micro Mike* and *Concept Keyboard* with their associated programs are a first class way of bringing educational entertainment to the physically or mentally handicapped child.

Overall, this is a suite of programs that would come in for a lot of use in any imaginative educational situation for the young or disabled.

Supplier	Program	Age	Price
Ega Beva Software (S.E.S.S. Ltd)	*Colour Snap*	pre-school	£11.95
Central Trading Estate	*Nursery Rhymes*	pre-school	£9.95
275-277 Bath Road	*Jigsaw Puzzle*	primary	£9.95
Bristol	*Sliding Block Puzzle*	primary	£9.95
BS4 3EH	*Maths Pack*	5-11	£11.95
	Utilities Pack	general	£7.95
Star Microterminals	*Concept Keyboard*	general	
22 Hyde Street	(A4)		£74.75
Winchester	(A3)		£109.25
Hants	(lead)		£9.20
Ega Beva Software (S.E.S.S. Ltd)	*Micro Mike*	general	£28.75

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Someone, somewhere

***David Lawrence** presents the first in a series of articles about networks and bulletin boards*

Long distance communication exercises a fascination for human beings. From pen pals to amateur radio, there seems to be something irresistible about the idea of talking to people without seeing them face to face. Now, with the spread of the low cost micro, increasing numbers of people are discovering the fascination of a new form of communication known as "telephone networking", human beings talking to human beings through the medium of computers, or simply human beings talking to computers.

Next week I shall talk about some of the practical requirements that I have found, as a complete beginner, to be necessary to embark on networking. In this first article we shall take a look, not at the technicalities, but why people are talking via computers.

As I write this, it's Sunday afternoon in Oxford. Before I go any further I'm going to make up a little file on the word processor, consisting of the following:

"I'm writing a short article for *Popular Computing Weekly* on the joys of networking. This is a test of how quickly I can get responses to messages from around the country. Could anyone reading it please leave a short acknowledgement."

Having done that, I'll leave the article for a while, to make a few short phone calls — the time is 1340.

Intermission

It's now later in the day. Earlier, I spent about five minutes leaving the message in three different locations around the country, one in Liverpool and the other two in London.

Locations? Well, the country is increasingly dotted with either altruistic or just plain crazy people who run what are known as "Bulletin Boards" — computer systems which answer the phone and allow the machine at the other end to access their information or to send information. All of these are totally free to the users and allow them to leave private or public messages or to read the messages left by others.

If that sounds fairly dull, what it means is the opportunity to exchange information with a large number of people for the cost of one or two short phone calls — simply leave your message, either addressed to everyone or to a named individual, and you can get a response to most problems. To ensure that messages are seen by those who will be interested in them, most Bulletin Boards divide the messages that come in into "Special Interest Groups", covering the whole range from useful technical information on popular machines to one board in London which carries users' reviews of good places to eat.

The Bulletin Boards are simplicity itself to use, once you have the experience of a couple of calls behind you. Having dialled the number and switched on the "modem" that allows your micro to communicate with the one at the other end of the line, it is as if someone is running a program on *your* machine. Menus appear on the screen, allowing you to make choices between the different facilities, like this one taken from a board in the London area (see Fig 1).

Not all networking concerns the amateur Bulletin Boards, however. With a decent modem and the right software, there are powerful systems like British Telecom's Prestel, with a host of facilities and local telephone numbers covering most of the country. Organications like Micronet, which is accessed through Prestel, provide facilities specifically directed at micro owners at remarkably low cost. With every week that passes there is more at the end of a telephone line for those with a limited amount of equipment to play with.

Anyway, the time is now 2030, so it's time for me to phone around the three boards and see what the result of the message earlier was ... in all, I have 11 replies, simple messages like Figure 2 which was left in the Liverpool Mailbox, and Figure 3 which came to me from London.

If I had asked a technical question there might not have been so many replies so quickly, but they would have come. That's the joy of telephone networking. My three calls cost me around 25p in total but if I left the messages on the three boards for a few days, that 25p would mean them being read by perhaps hundreds of people from all over the country. And even if they can't help, it's always nice just to hear from someone!

Figure 1

```
Bulletin Board Main Menu
------------------------

<R>ead ... Read Msgs on TBBS board
<Q>uick-scan Msgs on TBBS board
<L>eave ... Leave Msg on TBBS board
<M>ail ... Electronic Mail Section
<S>IGS ... Special Interest Groups
<T>ime ... Elapsed Time
<G>oodbye ... Terminate Session
<I>nfo ... System Information
<D>ownload Programs
<#>Upload ... Submit programs
<F>ormat ... Reconfigure terminal
<X>pert ... Change user level
<C>hat ... Talk to SYSOP
<P>assword ....  Change your password

Command: g
```

Figure 2

```
Msg#: 4761 *TBBS*
04/29/84 16:21:49 (Read 1 Times)
From: WALT DAVIDSON
To: DAVID LAWRENCE
Subj: REPLY TO MSG# 4759 (NETWORKING)
Hi David.  Read your message with interest
here in Swansea.  Willlook out for your
article.  Regards, Walt (GW3NYY).
```

Figure 3

```
Msg#: 5380 *GENERAL*
04/29/84 17:32:53 (Read 2 Times)
From: DAN O'BRIEN
To: DAVID LAWRENCE
Subj: REPLY TO MSG# 5376 (NETWORKING)
Sure thing.  An incredible one-hour
delay for a message from Chelmsford,Essex
And they said it was just a puerile hobby...
```

Figure 4

```
Logged on at 23:46:14
Logged off at 23:53:27

Thanks for calling the Bulletin Board
Please Hang Up Now
```

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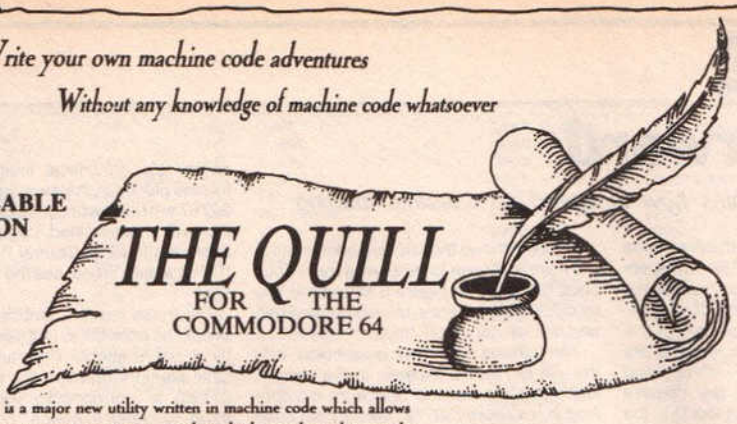

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MIKRO-GEN

Fast forward

***Alan Turnbull** explains how to speed up cassette loading*

This article introduces two machine code routines for use on the 48K ZX Spectrum which enable the user to operate the cassette interface at a speed of approximately 4500 baud as opposed to the normal 1500 baud. The two routines are essentially copies of the *SA—BYTES* and *LD—BYTES* routines (see Ian Logan's *Spectrum Rom Disassembly*) found in the 16K Read Only Memory (Rom) but with certain 'timing constants' altered.

Figure 1 shows the relevant addresses in the Rom that have to be altered for various baud rates, whilst Figure 2 shows the two modified Rom routines, moved up into Ram and set up for 4500 baud.

The routines have been assembled, with the use of Hisoft's *Devpac*, in the 'expansion' Ram area of the Spectrum memory map at addresses 32768 onwards because of a technical detail which causes the malfunction of machine code routines which rely on critical timing. Any such routine placed in the memory area 16384–32767 will fail to work correctly because the Ferranti Uncommitted Logic Array (ULA) interrupts the Z80 Central Processing unit (CPU) while it processes the video information.

For those readers ambitious enough, it should be possible to program a 128K (16K by 8 bit) Erasable Programmable Read Only Memory (Eprom) (for example, Intel 27128) to permanently provide a 4500 baud cassette interface, correct the existing errors in the Spectrum Rom and provide a few extra commands.

Figure 1:

ADDRESSES OF LOCATIONS TO BE ALTERED IN THE ZX SPECTRUM ROM AND VALUES TO PROVIDE VARIOUS BAUD RATES FOR THE CASSETTE INTERFACE

ADDRESS	1500 BAUD	3000 BAUD	4500 BAUD
04F8	3B	1E	14
0519	42	21	16
051F	3E	1F	15
052E	31	19	10
05A6	B0	58	3B
05C7	B2	59	3B
05CF	CB	66	44
05D4	B0	58	3B
05E8	16	0B	07

```
*HISOFT GENS3M ASSEMBLER*
      ZX SPECTRUM

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Pass 1 errors: 00

                10 * Machine-code routines for the
                20 * 48K ZX Spectrum to provide a
                30 * 4500 Baud cassette interface.
                40 *
                50 * Alan Turnbull 1984.
                60 *
                70 *
                80 *
                90 *
               100 * 4500 BAUD SA_BYTES ROUTINE
               110 *
               120 * (IX) = START ADDRESS
               130 * (DE) = LENGTH
               140 *  (A) =   0 = HEADER
               150 *  (A) = 255 = DATA
               160 *
               170 *

8000           180         ORG  32768
8000 213F05    190 L04C2   LD   HL,#053F
8003 E5        200         PUSH HL
8004 21801F    210         LD   HL,#1F80
8007 CB7F      220         BIT  7,A
8009 2803      230         JR   Z,L04D0
800B 21980C    240         LD   HL,#0C98
800E 08        250 L04D0   EX   AF,AF'
800F 13        260         INC  DE
8010 DD2B      270         DEC  IX
8012 F3        280         DI
8013 3E02      290         LD   A,#02
8015 47        300         LD   B,A
8016 10FE      310 L04D8   DJNZ L04D8
8018 D3FE      320         OUT  (#FE),A
801A EE0F      330         XOR  #0F
801C 06A4      340         LD   B,#A4
801E 2D        350         DEC  L
801F 20F5      360         JR   NZ,L04D8
8021 05        370         DEC  B
8022 25        380         DEC  H
8023 F21680    390         JP   P,L04D8
8026 062F      400         LD   B,#2F
8028 10FE      410 L04EA   DJNZ L04EA
```

```
802A D3FE       420          OUT   (#FE),A
802C 3E0D       430          LD    A,#0D
802E 0637       440          LD    B,#37
8030 10FE       450 L04F2    DJNZ  L04F2
8032 D3FE       460          OUT   (#FE),A
8034 010E14     470          LD    BC,#140E
8037 08         480          EX    AF,AF'
8038 6F         490          LD    L,A
8039 C34580     500          JP    L0507
803C 7A         510 L04FE    LD    A,D
803D B3         520          OR    E
803E 280C       530          JR    Z,L050E
8040 DD6E00     540          LD    L,(IX+0)
8043 7C         550 L0505    LD    A,H
8044 AD         560          XOR   L
8045 67         570 L0507    LD    H,A
8046 3E01       580          LD    A,#01
8048 37         590          SCF
8049 C36380     600          JP    L0525
804C 6C         610 L050E    LD    L,H
804D 18F4       620          JR    L0505
804F 79         630 L0511    LD    A,C
8050 CB78       640          BIT   7,B
8052 10FE       650 L0514    DJNZ  L0514
8054 3004       660          JR    NC,L051C
8056 0616       670          LD    B,#16
8058 10FE       680 L051A    DJNZ  L051A
805A D3FE       690 L051C    OUT   (#FE),A
805C 0615       700          LD    B,#15
805E 20EF       710          JR    NZ,L0511
8060 05         720          DEC   B
8061 AF         730          XOR   A
8062 3C         740          INC   A
8063 CB15       750 L0525    RL    L
8065 C25280     760          JP    NZ,L0514
8068 1B         770          DEC   DE
8069 DD23       780          INC   IX
806B 0610       790          LD    B,#10
806D 3E7F       800          LD    A,#7F
806F DBFE       810          IN    A,(#FE)
8071 1F         820          RRA
8072 D0         830          RET   NC
8073 7A         840          LD    A,D
8074 3C         850          INC   A
8075 C23C80     860          JP    NZ,L04FE
8078 063B       870          LD    B,#3B
807A 10FE       880 L053C    DJNZ  L053C
807C C9         890          RET
                900 *
                910 *
                920 * 4500 BAUD LD_BYTES ROUTINE
                930 *
                940 * (IX) = START ADDRESS
                950 * (DE) = LENGTH
                960 *  (A) =   0 = HEADER
                970 *  (A) = 255 = DATA
                980 * CARRY RESET= VERIFY
                990 * CARRY SET  = LOAD
               1000 *
               1010 *
807D 14         1020 L0556   INC   D
807E 08         1030         EX    AF,AF'
807F 15         1040         DEC   D
8080 F3         1050         DI
8081 3E0F       1060         LD    A,#0F
8083 D3FE       1070         OUT   (#FE),A
8085 213F05     1080         LD    HL,#053F
8088 E5         1090         PUSH  HL
8089 DBFE       1100         IN    A,(#FE)
808B 1F         1110         RRA
808C E620       1120         AND   #20
808E F602       1130         OR    #02
8090 4F         1140         LD    C,A
8091 BF         1150         CP    A
8092 C0         1160 L056B   RET   NZ
Pass 2 errors: 00

L04C2 8000   L04D0 800E   L04D8 8016   L04EA 8028   L04F2 8030
L04FE 803C   L0505 8043   L0507 8045   L050E 804C   L0511 804F
L0514 8052   L051A 8058   L051C 805A   L0525 8063   L053C 807A
L0556 807D   L056B 8092   L056C 8093   L0574 809B   L0580 80A7
L058F 80B6   L05A9 80D0   L05B3 80DA   L05BD 80E4   L05C2 80E9
L05C4 80EB   L05C8 80EF   L05CA 80F1   L05E3 810A   L05E7 810E
L05E9 8110
Table used:   385 from   500

8093 CD0E81     1170 L056C   CALL  L05E7
8096 30FA       1180         JR    NC,L056B
8098 211504     1190         LD    HL,#0415
809B 10FE       1200 L0574   DJNZ  L0574
809D 2B         1210         DEC   HL
809E 7C         1220         LD    A,H
809F B5         1230         OR    L
80A0 20F9       1240         JR    NZ,L0574
80A2 CD0A81     1250         CALL  L05E3
80A5 30EB       1260         JR    NC,L056B
80A7 069C       1270 L0580   LD    B,#9C
80A9 CD0A81     1280         CALL  L05E3
80AC 30E4       1290         JR    NC,L056B
80AE 3EC6       1300         LD    A,#C6
80B0 B8         1310         CP    B
80B1 30E0       1320         JR    NC,L056C
80B3 24         1330         INC   H
80B4 20F1       1340         JR    NZ,L0580
80B6 06C9       1350 L058F   LD    B,#C9
80B8 CD0E81     1360         CALL  L05E7
80BB 30D5       1370         JR    NC,L056B
80BD 78         1380         LD    A,B
80BE FED4       1390         CP    #D4
80C0 30F4       1400         JR    NC,L058F
80C2 CD0E81     1410         CALL  L05E7
80C5 D0         1420         RET   NC
80C6 79         1430         LD    A,C
80C7 EE03       1440         XOR   #03
80C9 4F         1450         LD    C,A
80CA 2600       1460         LD    H,#00
80CC 063B       1470         LD    B,#3B
80CE 181F       1480         JR    L05C8
80D0 08         1490 L05A9   EX    AF,AF'
80D1 2007       1500         JR    NZ,L05B3
80D3 300F       1510         JR    NC,L05BD
80D5 DD7500     1520         LD    (IX+0),L
80D8 180F       1530         JR    L05C2
80DA CB11       1540 L05B3   RL    C
80DC AD         1550         XOR   L
80DD C0         1560         RET   NZ
80DE 79         1570         LD    A,C
80DF 1F         1580         RRA
80E0 4F         1590         LD    C,A
80E1 13         1600         INC   DE
80E2 1807       1610         JR    L05C4
80E4 DD7E00     1620 L05BD   LD    A,(IX+0)
80E7 AD         1630         XOR   L
80E8 C0         1640         RET   NZ
80E9 DD23       1650 L05C2   INC   IX
80EB 1B         1660 L05C4   DEC   DE
80EC 08         1670         EX    AF,AF'
80ED 063B       1680         LD    B,#3B
80EF 2E01       1690 L05C8   LD    L,#01
80F1 CD0A81     1700 L05CA   CALL  L05E3
80F4 D0         1710         RET   NC
80F5 3E44       1720         LD    A,#44
80F7 B8         1730         CP    B
80F8 CB15       1740         RL    L
80FA 063B       1750         LD    B,#3B
80FC D2F180     1760         JP    NC,L05CA
80FF 7C         1770         LD    A,H
8100 AD         1780         XOR   L
8101 67         1790         LD    H,A
8102 7A         1800         LD    A,D
8103 B3         1810         OR    E
8104 20CA       1820         JR    NZ,L05A9
8106 7C         1830         LD    A,H
8107 FE01       1840         CP    #01
8109 C9         1850         RET
810A CD0E81     1860 L05E3   CALL  L05E7
810D D0         1870         RET   NC
810E 3E07       1880 L05E7   LD    A,#07
8110 3D         1890 L05E9   DEC   A
8111 20FD       1900         JR    NZ,L05E9
8113 C3EC05     1910         JP    #05EC
```

Printing by numbers

***Roger Walton** presents a machine code graphics printer dump for an Epson printer*

Anyone who uses a microcomputer for any "serious" purpose soon realises the benefits of having a printer. Hard-copy makes the development of programs much easier. People preparing for examinations in computing often have to provide printed examples of their work. The Dragon 32 provides the *Print #–2* and *Llist* instructions for transfer of text to a printer, but these cannot be used for printing graphics. The following program provides a graphics dump which will print *PMode 4* graphics on an Epson printer.

Listing 1 gives a Basic program for the dump routine. When loaded and run, this program stores a machine code subroutine at the top of user Ram. This routine may be called when necessary using *Exec &H7F30*. The graphics will be dumped to the printer in a matter of seconds. A similar program, written entirely in Basic, takes about 20 minutes.

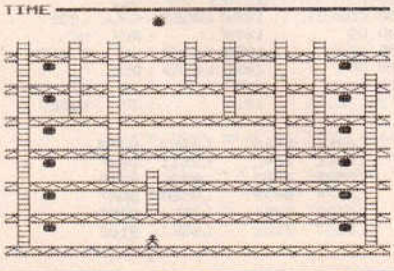
Listing 2 gives the assembly language version of the program. This, together with the following tips, should make it clear how the program works and enable readers to adapt it to their own requirements.

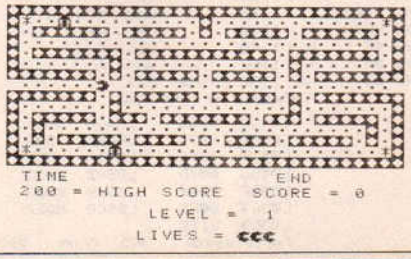
The *Pmode 4* screen is arranged in 24 lines of 32 bytes per line. Thus the top, left-hand pixel is turned on by setting the msb (most-significant bit) of the relevant byte, which is *&H600*. The Epson printer uses 8 wires which are addressed vertically, the top wire corresponding to the msb. This means that each byte sent to the printer gives information about 8 pixels vertically above one another. The screen is read and printed in sections 8 lines deep, 1 bit at a time. When a full line has been read, the process repeats from the left-hand edge of the screen. In all, 24 sections must be read and printed.

Sample printouts are included to illustrate the program in use.

Listing 1

```
10 '*********LISTING 1************
20 ' Graphics dump for DRAGON
30 ' to Epson printer
40 ' dumps MODE 4 graphics
50 ' Tested using MX-80F/T
60 '
70 ' Roger Walton, Feb. 1984.
80 '
90 CLEAR 200,&H7F2F
100 FOR I=&H7F30 TO &H7FFF
110 READ A$
120 A$="&H"+A$
130 N=VAL(A$)
140 POKE I,N
150 T=T+N
160 NEXT
170 IF T<>20978 THEN CLS:PRINT"DATA ERROR":STOP
180 END
190 DATA 20,08,12,12,12,12,12,12
200 DATA 12,12,86,1B,BD,80,0F,86
210 DATA 40,BD,80,0F,86,1B,BD,80
220 DATA 0F,86,41,BD,80,0F,86,08
230 DATA BD,80,0F,86,0D,BD,80,0F
240 DATA 7F,7F,36,7F,7F,35,7F,7F
250 DATA 37,8E,06,00,BF,7F,38,7F
260 DATA 7F,32,86,1B,BD,80,0F,86
270 DATA 4B,BD,80,0F,86,00,BD,80
280 DATA 0F,86,01,BD,80,0F,C6,80
290 DATA F7,7F,33,86,80,B7,7F,36
300 DATA BE,7F,38,7F,7F,34,A6,84
310 DATA B4,7F,33,8D,4D,30,88,20
320 DATA 7C,7F,34,F6,7F,34,C1,08
330 DATA 25,EC,B6,7F,37,BD,80,0F
340 DATA 7F,7F,37,F6,7F,33,54,F7
350 DATA 7F,33,C1,00,26,CD,BE,7F
360 DATA 38,30,01,BF,7F,38,7C,7F
370 DATA 32,B6,7F,32,81,20,26,B6
380 DATA 86,0A,BD,80,0F,BE,7F,38
390 DATA 30,89,00,E0,BF,7F,38,7C
400 DATA 7F,35,B6,7F,35,81,18,26
410 DATA 86,39,34,06,81,00,27,0E
420 DATA B6,7F,36,F6,7F,36,FB,7F
430 DATA 37,F7,7F,37,20,03,B6,7F
440 DATA 36,44,B7,7F,36,35,06,39
```





Listing 2

```
7F30                    30      PRT $0C
7F30                    31 ********LISTING 2************
7F30                    40 ********************************
7F30                    50 *   Dragon Microcomputer      *
7F30                    60 *   Graphics Dump.            *
7F30                    70 *                             *
7F30                    80 *   Designed for Epson        *
7F30                    90 *   MX-80F/T Printer          *
7F30                   100 *                             *
7F30                   110 *   Roger Walton Feb. 1984    *
7F30                   120 ********************************
7F30 2008              130      BRA @START
B00F                   140 @PRINTER EQU $B00F Dragon ROM printer routine
7F32                   150 @BYTEREAD RMB 1
7F33                   160 @BITTOTEST RMB 1
7F34                   170 @LINECOUNT RMB 1
7F35                   180 @SECSREAD RMB 1
7F36                   190 @PRINBIT RMB 1
7F37                   200 @PRINSTORE RMB 1
7F38                   210 @SCREENPOS RMB 2
7F3A                   220 ********************************
7F3A                   230 * Reset printer and set linespace
7F3A                   240 * to 8 dots per line.
7F3A B61B              250 @START LDA #27
7F3C BD800F            260      JSR @PRINTER
7F3F 8640              270      LDA #'@
7F41 BD800F            280      JSR @PRINTER
7F44 861B              290      LDA #27
7F46 BD800F            300      JSR @PRINTER
7F49 8641              310      LDA #'A
7F4B BD800F            320      JSR @PRINTER
7F4E 8608              330      LDA #8
7F50 BD800F            340      JSR @PRINTER
7F53 860D              350      LDA #13
7F55 BD800F            360      JSR @PRINTER
7F58                   370 ********************************
7F58 7F7F36            380      CLR @PRINBIT
7F5B 7F7F35            390      CLR @SECSREAD
7F5E 7F7F37            400      CLR @PRINSTORE
7F61 8E0600            410      LDX #1536
7F64 BF7F38            420      STX @SCREENPOS
7F67                   430 ********************************
7F67 7F7F32            440 @SECLOOP CLR @BYTEREAD
7F6A                   450 * Set bit image graphics, 256 dots/line.
7F6A B61B              460      LDA #27
7F6C BD800F            470      JSR @PRINTER
7F6F 864B              480      LDA #'K
7F71 BD800F            490      JSR @PRINTER
7F74 8600              500      LDA #0
7F76 BD800F            510      JSR @PRINTER
7F79 8601              520      LDA #1
7F7B BD800F            530      JSR @PRINTER
7F7E                   540 ********************************
7F7E C680              550 @LINELOOP LDB #128 set msb
7F80 F7F733            560      STB @BITTOTEST
7F83                   570 ********************************
7F83 8680              580 @BYTELOOP LDA #128 set msb
7F85 B7F736            590      STA @PRINBIT
7F88 BE7F38            600      LDX @SCREENPOS
7F8B 7F7F34            610      CLR @LINECOUNT
7F8E                   620 ********************************
7F8E A684              630 @BITLOOP LDA ,X point to first byte
7F90 B47F33            640      ANDA @BITTOTEST test bit
7F93 8D4D              650      BSR @INCPRINT
7F95 308820            660 @CONT LEAX 32,X point to next line
7F98 7C7F34            670      INC @LINECOUNT
7F9B F67F34            680      LDB @LINECOUNT
7F9E C108              690      CMPB #8 have 8 lines been done
7FA0 25EC              700      BLO @BITLOOP
7FA2                   710 ********************************
7FA2 B67F37            720      LDA @PRINSTORE print byte
7FA5 BD800F            730      JSR @PRINTER
7FA8 7F7F37            740      CLR @PRINSTORE then set to zero
7FAB F67F33            750      LDB @BITTOTEST
7FAE 54                760      LSRB
7FAF F77F33            770      STB @BITTOTEST check if a full
7FB2 C100              780      CMPB #0 screen byte has been read
7FB4 26CD              790      BNE @BYTELOOP
7FB6                   800 ********************************
7FB6 BE7F38            810      LDX @SCREENPOS point to next byte
7FB9 3001              820      LEAX 1,X          across the screen
7FBB BF7F38            830      STX @SCREENPOS
7FBE 7C7F32            840      INC @BYTEREAD
7FC1 B67F32            850      LDA @BYTEREAD
7FC4 8120              860      CMPA #32 check if full line printed
7FC6 26B6              870      BNE @LINELOOP
7FC8                   880 ********************************
7FC8 860A              890      LDA #10 linefeed printer
7FCA BD800F            900      JSR @PRINTER
7FCD BE7F38            910      LDX @SCREENPOS point to next8 line
7FD0 308900E0          920      LEAX 224,X          section on the screen
7FD4 BF7F38            930      STX @SCREENPOS
7FD7 7C7F35            940      INC @SECSREAD
7FDA B67F35            950      LDA @SECSREAD
7FDD 8118              960      CMPA #24
7FDF 26B6              970      BNE @SECLOOP
7FE1                   980 ********************************
7FE1 39                990      RTS
7FE2                  1000 ********************************
7FE2 3406             1010 @INCPRINT PSHS D
7FE4 8100             1020      CMPA #0
7FE6 270E             1030      BEQ @NOTSET
7FE8 B67F36           1040      LDA @PRINBIT
7FEB F67F36           1050      LDB @PRINBIT     set up appropriate
7FEE FB7F37           1060      ADDB @PRINSTORE bit to print out
7FF1 F77F37           1070      STB @PRINSTORE
7FF4 2003             1080      BRA @SET
7FF6 B67F36           1090 @NOTSET LDA @PRINBIT
7FF9 44               1100 @SET LSRA
7FFA B77F36           1110      STA @PRINBIT
7FFD 3506             1120      PULS D
7FFF 39               1130      RTS
8000                  1140 ********************************
8000                  1150      END
```

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Between the lines

***Adrian Warman** looks inside the SID chip and explains how to* Peek *some of the registers*

The Commodore 64 home computer has a device called SID (Sound Interface Device), which is used for providing sound effects, as well as obtaining paddle information. There are 29 registers within SID, of which the first 25 are of greatest interest to programmers. These registers are divided into four groups:

a) Registers controlling Voice 1
b) Registers controlling Voice 2
c) Registers controlling Voice 3
d) Registers controlling Resonance, Filtering and the Master Volume

Unfortunately, all these registers are designated as 'write-only' (the exact opposite of 'read-only'). This means that whenever you *Poke* data to one of these registers, it is accepted without difficulty — but if you attempt to *Peek* any of the registers, you will always get the value '0' returned, regardless of the actual contents of that register. Thus, 'reading' the registers has no effect.

There are a variety of ways of overcoming this problem. Using Basic for example, it would be possible to keep a 'master copy' of all the registers in an array (say, SID) — then, whenever information is transferred to a SID register, the corresponding element in the array is also updated. Unfortunately, this takes time, particularly when using the large numbers of *Pokes* required to program SID.

Adept machine-code programmers could write a routine to transfer data to a specified register, and at the same time update a copy of that register. Less experienced programmers, however, would find this more difficult. This program provides a simple and fast routine to do the job, and combines the capability and speed of machine code with the inherent simplicity of normal SID use. Normally, when programming SID from Basic, *Pokes* are used to locations 54272 to 54296.

This program provides an alternative area of Ram from $C047 to $C05F, which behaves as an exact copy of SID. *Pokes* made into this area will have precisely the same effect as corresponding *Pokes* into the genuine SID area. The advantage is that being Ram, *Peeking* these locations will return the current contents of the appropriate SID register.

The program works by altering the *Irq* activities. The routine simply copies the contents of the SID copy area into the SID itself. This updating occurs once every 60th of a second, and is completely transparent to the user.

To use the program, simply load and run the supplied Basic loader program. The program is then installed in the Ram from $C000 onwards. To activate the copy routine, use the instruction:

SYS 49152

Although no apparent effect will be observed (ie, the computer simply returns with the 'Ready' message), the *Irq* vector has now been modified. Any subsequent *Pokes* to the SID copy area will perform exactly as if the *Poke* had been made to the SID itself. Note that at any time, you can use the same command to entirely reset all registers within the SID chip, since this routine automatically clears all the copy locations to zero.

Hex	*Decimal*	*Function*	*Normal SID location*
CO47	49223	Freq Lo Voice 1	54272
CO48	49224	Freq Hi	54273
CO49	49225	Pulse Lo	54274
CO4A	49226	Pulse Hi	54275
CO4B	49227	Control	54276
CO4C	49228	Attack/Decay	54277
CO4D	49229	Sustain/Release	54278
CO4E	49230	As voice 1, but for voice 2	54279
CO54	49236		54285
CO55	49238	As voice 1, but for voice 3	54286
CO5B	49243		54292
CO5C	49244	Filter Cutoff Lo	54293
CO5D	49245	Filter Cutoff Hi	54294
CO5E	49246	Resonance	54295
CO5F	49247	Modes/Master Volume	54296

To disable the copying process, simply perform a warm start (ie, *Run/Stop-Restore*). You will find the table below useful.

Notes

(Please refer to the Assembly listing while reading these details).

1210–1260 This section will alter the *Irq* vector. However, a check is made to see if the vector already points to the copy routine. If so, no modification is necessary.

1350–1440 The *Irq* vector was found not to point to the copy routine, so this section of code alters the vector appropriately. Note that the old *Irq* vector is preserved, and when the copying process has been completed, the CPU jumps using the old *Irq* vector that was found.

1540–1590 Having modified the *Irq* vector (or not!), these lines ensure that the SID copy area is blank, and has no garbage bytes in it. Note that whenever this routine is run, the SID chip will be reset because all the zeroes will be copied across upon the next interrupt.

1700–1830 The copy routine itself. First of all, the A,P and Y registers are preserved, since they will be modified during the copying. This precaution is very important, since interrupt information is probably contained within the registers. After preserving the registers, the SID copy area is duplicated into the SID chip itself (lines 1740–1780). The registers are then restored back to their original values, ready to enter the normal *Irq* routine.

Note that in the Assembly listing, it appears that the chip will perform an *Irq* jump to location $0000 (line 1830). In fact, this address will be altered when the *Irq* vector is changed (lines 1370 and 1410).

```
1000 REM BASIC LOADER FOR SID-COPY PROGRAM.
1010 :
1020 REM BY A.WARMAN
1030 :
1040 ADDRESS=49152
1050 SUM=0
1060 :
1070 FOR LOC=ADDRESS TO ADDRESS+95
1080  READ DATUM
1090  POKE LOC,DATUM
1100  SUM=SUM+DATUM
1110 NEXT LOC
1120 :
1130 IF SUM<>7288 THEN PRINT "SUM ERROR."
1140 STOP
1150 :
1160 DATA 173, 20,  3,201, 49,208,  7,173
1170 DATA  21,  3,201,192,240, 24,120,173
1180 DATA  20,  3,141, 69,192,169, 49,141
1190 DATA  20,  3,173, 21,  3,141, 70,192
1200 DATA 169,192,141, 21,  3, 88,160, 24
1210 DATA 169,  0,153, 71,192,136, 16,250
1220 DATA  96, 72,  8,152, 72,160, 24,185
1230 DATA  71,192,153,  0,212,136, 16,247
1240 DATA 104,168, 40,104, 76,  0,  0,  0
1250 DATA   0,  0,  0,  0,  0,  0,  0,  0
1260 DATA   0,  0,  0,  0,  0,  0,  0,  0
1270 DATA   0,  0,  0,  0,  0,  0,  0,  0
```

```
1000 C000          *=$C000
1010 C000          !
1020 C000          ! SID ASSIST PROGRAM.
1030 C000          !
1040 C000          ! BY A.WARMAN
1050 C000          !
1060 C000          ! PROVIDES AN AREA IN NORMAL RAM
1070 C000          ! WHICH IS COPIED DURING A SYSTEM
1080 C000          ! IRQ INTO THE SID REGISTERS. THIS
1090 C000          ! MEANS THAT THE CURRENT SID REGISTER
1100 C000          ! VALUES CAN BE READ FROM THE RAM.
1110 C000          !
1120 C000          SID             =  $D400
1130 C000          !
1140 C000          ! MODIFY THE IRQ VECTOR TO PERFORM THE
1150 C000          ! ADDITIONAL TASK. A CHECK IS MADE TO
1160 C000          ! ESTABLISH WHETHER THE IRQ VECTOR IS
1170 C000          ! ALREADY POINTING TO THE COPY ROUTINE,
1180 C000          ! AND IF SO, THE VECTOR WILL NOT BE
1190 C000          ! ALTERED.
1200 C000          !
1210 C000 AD1403 REDIRECT       LDA $0314
1220 C003 C931                  CMP #<UPDATE
1230 C005 D007                  BNE MODIFY
1240 C007 AD1503                LDA $0315
1250 C00A C9C0                  CMP #>UPDATE
1260 C00C F018                  BEQ EXIT
1270 C00E          !
1280 C00E          ! THE IRQ VECTOR IS NOT POINTING TO THE
1290 C00E          ! COPY ROUTINE, SO MODIFY.
1300 C00E          ! NOTE THAT THE OLD IRQ VECTOR IS COPIED
1310 C00E          ! TO THE END OF THE ROUTINE, SO THAT
1320 C00E          ! ANY PRIOR MODIFICATIONS TO IRQ VECTOR
1330 C00E          ! WILL NOT BE 'DAMAGED'.
1340 C00E          !
1350 C00E 78       MODIFY       SEI
1360 C00F AD1403                LDA $0314
1370 C012 8D45C0                STA IRQEXIT+1
1380 C015 A931                  LDA #<UPDATE
1390 C017 8D1403                STA $0314
1400 C01A AD1503                LDA $0315
1410 C01D 8D46C0                STA IRQEXIT+2
1420 C020 A9C0                  LDA #>UPDATE
1430 C022 8D1503                STA $0315
1440 C025 58                    CLI
1450 C026          !
1460 C026          ! HAVING COMPLETED ANY NECESSARY CHANGES
1470 C026          ! TO THE IRQ VECTOR, THE COPY OF THE
1480 C026          ! SID REGISTERS IS RESET TO ZERO.
1490 C026          ! THIS HAS THE ADDITIONAL ADVANTAGE THAT
1500 C026          ! AT ANY TIME, RERUNNING THE REDIRECT
1510 C026          ! PROGRAM WILL 'SWITCH OFF' ANY SOUND
1520 C026          ! CURRENTLY PRODUCED BY THE SID.
1530 C026          !
1540 C026 A018     EXIT         LDY #$18
1550 C028 A900                  LDA #$00
1560 C02A 9947C0 CLRCOPY        STA SIDCOPY,Y
1570 C02D 88                    DEY
1580 C02E 10FA                  BPL CLRCOPY
1590 C030 60                    RTS
1600 C031          !
1610 C031          !
1620 C031          ! THE IRQ VECTOR POINTS TO THIS ROUTINE.
1630 C031          ! THE A,P AND Y REGISTERS ARE PRESERVED
1640 C031          ! ON THE STACK. THE INFORMATION IN THE
1650 C031          ! COPY OF SID IS COPIED ACROSS TO THE
1660 C031          ! SID LOCATIONS. THE A,P AND Y REGISTERS
1670 C031          ! ARE THEN RESTORED BEFORE JUMPING TO
1680 C031          ! THE NORMAL IRQ ROUTINE.
1690 C031          !
1700 C031 48       UPDATE       PHA
1710 C032 08                    PHP
1720 C033 98                    TYA
1730 C034 48                    PHA
1740 C035 A018                  LDY #$18
1750 C037 B947C0 COPYLOOP       LDA SIDCOPY,Y
1760 C03A 9900D4                STA SID,Y
1770 C03D 88                    DEY
```

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```
1780 C03E 10F7              BPL COPYLOOP
1790 C040 68                PLA
1800 C041 A8                TAY
1810 C042 28                PLP
1820 C043 68                PLA
1830 C044 4C0000 IRQEXIT    JMP $0000
1840 C047        !
1850 C047        !
1860 C047        ! AREA THAT CONTAINS VALUES TL BE COPIED
1870 C047        ! INTO SID.
1880 C047        !
1890 C047 0000   SIDCOPY    WOR $0000                  ! FREQ V1
1900 C049 0000              WOR $0000                  ! PW V1
1910 C04B 00                BYT $00                    ! CONTROL V1
1920 C04C 00                BYT $00                    ! A/D V1
1930 C04D 00                BYT $00                    ! S/R V1
1940 C04E        !
1950 C04E 0000              WOR $0000                  ! FREQ V2
1960 C050 0000              WOR $0000                  ! PW V2
1970 C052 00                BYT $00                    ! CONTROL V2
1980 C053 00                BYT $00                    ! A/D V2
1990 C054 00                BYT $00                    ! S/R V2
2000 C055        !
2010 C055 0000              WOR $0000                  ! FREQ V3
2020 C057 0000              WOR $0000                  ! PW V3
2030 C059 00                BYT $00                    ! CONTROL V3
2040 C05A 00                BYT $00                    ! A/D V3
2050 C05B 00                BYT $00                    ! S/R V3
2060 C05C        !
2070 C05C 0000              WOR $0000                  ! FILTER
2080 C05E 00                BYT $00                    ! RES/FILT
2090 C05F 00                BYT $00                    ! MODE/VOL


C02A CLRCOPY        C037 COPYLOOP       C026 EXIT          C044 IRQEXIT
C00E MODIFY         C000 REDIRECT       D400 SID           C047 SIDCOPY
C031 UPDATE
```


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Designer

on Spectrum

This program is for any Sinclair ZX Spectrum and enables the user to make complicated screen displays. The keys which are used are explained in the program. Be careful when using draw. If the draw statement is out of range you will lose your picture unless you either *goto* the next line number or press *continue*. The program also enables you to define your own grpahics by pressing 'C'. You are then asked which graphic is to be defined, you respond and put in the grpahic numbers, one row at a time. You are also able to *Save* the present screen string which you are working on. You can *Load* it back and you are also able to *Load* pre-defined graphics which you have *Saved* from the *Horizons* Character Generator.

The program is written entirely in Basic and parts of the program could, if you wanted to, be converted in to machine code. Although in Basic it is very fast at processing your command.

Program notes

10	Subroutine for introduction
20-100	Subroutine for user to communicate through computer.
110-235	Subroutine to place text on screen.
300-540	Subroutine to chose defined graphic.
550-750	Subroutine to print graphic on screen and to colour it.
760-850	Subroutine to *Draw* and to *plot* on screen.
900-980	Subroutine to define characters.
9000-9450	Subroutine for introduction.

When you have typed in the program Save it by using the self-start facilty. When it is run you will be greeted with the introduction and instructions.

```
  5 PAPER 7: INK 0: CLS
 10 GO SUB 9000
 20 LET x=1: LET y=1
 30 IF INKEY$="i" OR INKEY$="I"
THEN BEEP .1,01: INPUT "What in
k?(0-7)";ink: INK ink
 40 IF INKEY$="s" OR INKEY$="S"
THEN BEEP .1,01: SAVE "PICTURE"
CODE 16384,6912
 50 IF INKEY$="p" OR INKEY$="P"
THEN BEEP .1,01: GO SUB 110: GO
SUB 170: GO SUB 240
 60 IF INKEY$="g" OR INKEY$="G"
THEN BEEP .1,01: GO SUB 300
 70 IF INKEY$="v" OR INKEY$="V"
THEN BEEP .1,0.2: CLS
 80 IF INKEY$="L" OR INKEY$="l"
THEN BEEP .1,01: LOAD ""CODE
 90 IF INKEY$="d" OR INKEY$="d
THEN BEEP .1,01: GO SUB 760
 95 IF INKEY$="c" OR INKEY$="C"
THEN BEEP .1,01: GO SUB 900
100 GO TO 30
110 LET flash=0: LET bright=0
120 INPUT "Change ink colour?(Y
/N)";a$
130 IF a$="y" OR a$="Y" THEN IN
PUT "What ink?(0-7)";ink: INK in
k
140 IF a$<>"y" OR a$<>"Y" THEN
GO TO 150
150 INPUT "Y-cordinate?(0-20)";
y: IF y>20 OR y<0 THEN GO TO 150
160 INPUT "X-cordinate?(0-30)";
x: IF x>30 OR x<0 THEN GO TO 160
165 RETURN
170 INPUT "What?";a$
180 INPUT "Do you want it to fl
ash";b$
190 IF b$="y" OR b$="Y" THEN LE
T flash=1
200 IF b$="n" OR b$="N" THEN LE
T flash=0
210 INPUT "Do you want it brigh
t";c$
220 IF c$="y" OR c$="Y" THEN LE
T bright=1
230 IF c$="n" OR c$="N" THEN LE
T bright=0
235 RETURN
240 PRINT FLASH flash; BRIGHT b
right;AT y,x;a$
250 RETURN
300 PRINT #0;"ABCDEFGHIJKLMNOPQ
RSTU"
310 PAUSE 0: INPUT #1;"Which?(1
-21)";g
320 IF g=1 THEN GO SUB 120: GO
SUB 180: GO SUB 550
330 IF g=2 THEN GO SUB 120: GO
SUB 180: GO SUB 560
340 IF g=3 THEN GO SUB 120: GO
SUB 180: GO SUB 570
350 IF g=4 THEN GO SUB 120: GO
SUB 180: GO SUB 580
360 IF g=5 THEN GO SUB 120: GO
SUB 180: GO SUB 590
370 IF g=6 THEN GO SUB 120: GO
SUB 180: GO SUB 600
380 IF g=7 THEN GO SUB 120: GO
SUB 180: GO SUB 610
390 IF g=8 THEN GO SUB 120: GO
SUB 180: GO SUB 620
400 IF g=9 THEN GO SUB 120: GO
SUB 180: GO SUB 630
410 IF g=10 THEN GO SUB 120: GO
SUB 180: GO SUB 640
420 IF g=11 THEN GO SUB 120: GO
SUB 180: GO SUB 650
430 IF g=12 THEN GO SUB 120: GO
SUB 180: GO SUB 660
440 IF g=13 THEN GO SUB 120: GO
SUB 180: GO SUB 670
450 IF g=14 THEN GO SUB 120: GO
SUB 180: GO SUB 680
460 IF g=15 THEN GO SUB 120: GO
SUB 180: GO SUB 690
470 IF g=16 THEN GO SUB 120: GO
SUB 180: GO SUB 700
480 IF g=17 THEN GO SUB 120: GO
SUB 180: GO SUB 710
490 IF g=18 THEN GO SUB 120: GO
SUB 180: GO SUB 720
500 IF g=19 THEN GO SUB 120: GO
SUB 180: GO SUB 730
510 IF g=20 THEN GO SUB 120: GO
SUB 180: GO SUB 740
520 IF g=21 THEN GO SUB 120: GO
SUB 180: GO SUB 750
530 IF g>21 OR g<1 THEN GO TO 3
00
540 RETURN
550 PRINT FLASH flash; BRIGHT b
right;AT y,x;"A": RETURN
560 PRINT FLASH flash; BRIGHT b
right;AT y,x;"B": RETURN
570 PRINT FLASH flash; BRIGHT b
right;AT y,x;"C": RETURN
580 PRINT FLASH flash; BRIGHT b
right;AT y,x;"D": RETURN
590 PRINT FLASH flash; BRIGHT b
right;AT y,x;"E": RETURN
600 PRINT FLASH flash; BRIGHT b
right;AT y,x;"F": RETURN
610 PRINT FLASH flash; BRIGHT b
right;AT y,x;"G": RETURN
620 PRINT FLASH flash; BRIGHT b
right;AT y,x;"H": RETURN
630 PRINT FLASH flash; BRIGHT b
right;AT y,x;"I": RETURN
640 PRINT FLASH flash; BRIGHT b
right;AT y,x;"J": RETURN
650 PRINT FLASH flash; BRIGHT b
right;AT y,x;"K": RETURN
660 PRINT FLASH flash; BRIGHT b
right;AT y,x;"L": RETURN
670 PRINT FLASH flash; BRIGHT b
right;AT y,x;"M": RETURN
680 PRINT FLASH flash; BRIGHT b
right;AT y,x;"N": RETURN
690 PRINT FLASH flash; BRIGHT b
right;AT y,x;"O": RETURN
700 PRINT FLASH flash; BRIGHT b
right;AT y,x;"P": RETURN
710 PRINT FLASH flash; BRIGHT b
right;AT y,x;"Q": RETURN
720 PRINT FLASH flash; BRIGHT b
right;AT y,x;"R": RETURN
```

```
 730 PRINT FLASH flash; BRIGHT b
right;AT y,x;"S": RETURN
 740 PRINT FLASH flash; BRIGHT b
right;AT y,x;"T": RETURN
 750 PRINT FLASH flash; BRIGHT b
right;AT y,x;"U": RETURN
 760 LET a=0: LET b=0
 770 INPUT "X-Cordinate?(0-255)"
;a
 780 INPUT "Y-Cordinate?(0-175)"
;b
 790 IF a<0 OR a>255 THEN GO TO
770
 800 IF b<0 OR b>175 THEN GO TO
770
 810 INPUT "How long?(B-no/F+no)
";e
 820 INPUT "How long?(U+no/D-no)
";f
 830 PLOT a,b
 840 DRAW e,f
 850 RETURN
 900 PRINT #1;"Define charecters
"
 910 PAUSE 0
 920 INPUT "What graphic?(A-U)";
q$
 930 FOR j=0 TO 7
 940 INPUT "What no?(0-255)";ch
 950 POKE USR q$+j,ch
 970 NEXT j
 980 RETURN
9000 LET ink=0
9010 PRINT AT 0,8;"PICTURE-MAKER
"
9020 PRINT AT 1,8;"--------------
"
9030 PRINT : PRINT "S=Saves pres
ent screen$."
9040 PRINT : PRINT "I=Changes pr
esent ink colour."
9050 PRINT : PRINT "G=Enables us
er defined graphics"
9060 PRINT : PRINT "  to be used
"
9070 PRINT : PRINT "L=Loads a sc
reen$ or graphics."
9080 PRINT : PRINT "D=Enables yo
u to draw by you"
9090 PRINT : PRINT "  inputting
x and y cordinates."
9100 PRINT : PRINT "C=Character
definer."
9110 PRINT : PRINT "V=Clear scre
en."
9120 PRINT : PRINT "P=Places tex
t."
9130 PRINT #1;"   PRESS ANY KEY
TO CONTINUE"
9140 PAUSE 0: CLS
9150 PRINT AT 0,8;"PICTURE-MAKER
"
9160 PRINT AT 1,8;"--------------
"
9170 PRINT : PRINT "You can make
 your own defined"
9180 PRINT : PRINT "charecters b
y you making them"
9190 PRINT : PRINT "out first an
d then putting in "
9200 PRINT : PRINT "them in,when
 you are told."
9210 PRINT AT 11,11; INK 2; FLAS
H 1;"WARNING": FLASH 0
9220 PRINT : PRINT "If you put i
n a draw statement"
9230 PRINT : PRINT "which is out
 of range,you will "
9240 PRINT : PRINT "have to pres
s key C so you will"
9245 PRINT : PRINT "not lose you
r screen$."
9250 PRINT : PRINT "          PRES
S ANY KEY": PAUSE 0: CLS
9255 INK 0
9260 PRINT AT 0,1;"PICTURE-MAKER
--Hints for use"
9270 PRINT AT 1,1;"--------------
--------------"
9280 PRINT : PRINT "Use Graphic/
Text planning sheet"
9290 PRINT : PRINT "to set out p
icture."
9300 PRINT : PRINT "Work out eve
rything first to "
9310 PRINT : PRINT "make sure th
ere are no errors."
9320 PRINT : PRINT "as it is ver
y difficult to "
9330 PRINT : PRINT "correct with
out losing screen$."
9335 PRINT : PRINT "Make sure CA
PS lock is on."
9340 PRINT : PRINT : PRINT : PRI
NT : PRINT : PRINT "          PRES
S ANY KEY"
9350 PAUSE 0: CLS
9360 POKE 23609,50
9400 INPUT "What paper colour?(0
-7)";p
9410 INPUT "What ink?(0-7)";ink
9420 IF p<0 OR p>7 THEN GO TO 93
60
9430 IF ink<0 OR ink>7 THEN GO T
O 9360
9440 PAPER p: INK ink: CLS
9450 RETURN
```

Designer
by D Nation

Joystick Draw

on Dragon

This program shows how the joystick commands on the Tandy/Dragon can be used to draw intricate designs. The program uses the right hand joystick, and works as follows. If the joystick is moved upwards the X co-ordinate is decremented. If the joystick is moved downwards the X co-ordinate is incremented.

This is superior to the programs previously submitted for this purpose. These previous programs plotted the reading of the joystick ports multiplied by 2.

This can be used with the screen dump program and screens can be saved by pressing 'S'. The screen can be cleared by pressing 'C'.

```
10 REM **JOYSTICK DRAW 26/12/83**
20 REM **BY D.BRYAN ************
30 PMODE4:SCREEN1,1:PCLS
40 X=JOYSTK(0):Y=JOYSTK(1)
50 IF X<=20 AND XC>0 THEN XC=XC-1
60 IF X>=40 AND XC<256 THEN XC=XC+1
70 IF Y<=20 AND YC>0 THEN YC=YC-1
80 IF Y>=40 AND YC<192 THEN YC=YC+1
90 PSET(XC,YC,5)
100 A$=INKEY$
110 IF A$="S"THEN 140
120 IF A$="C"THEN PCLS
130 GOTO40
140 CLS
150 SCREEN0,1:INPUT"IS CASSETTE READY";Q
$:IF LEFT$(Q$,1)="Y" THEN 170ELSE 150
160 SCREEN0,1
170 PRINT"SAVING SCREEN"
180 CSAVEM"SCREEN",1536,7679,1536
190 CLS:INPUT"ANOTHER SCREEN";A$:IF LEFT
$(A$,1)="Y" THEN RUN ELSE 130
```

Joystick Draw
by D Bryan

Little Meanies

on BBC

The main idea of this game is to stop the invaders reaching the bottom of the screen. If they get there a small part of your defence is knocked away until eventually they reach a flashing white line and you'll die. Each time you fire you lose 1 bullet. About every 12 seconds a yellow ship comes down and gives you more bullets. If you shoot the ship then you lose bullets.

Program notes

70-110 Jump to other Procedures
130-150 Defines Characters and sets up the Game screen.
450-720; Main program prints invaders.
930-990 Moves Invaders
1150-1360 Prints out screens.

Variables

Score	Your Score
Bul	Bullets left
Eee	Energy ship
X, Y	Meanie 1
X1, Y1	Meanie 2
X2, Y2	Meanie 3

```
  0 REM ***** 15/3/84 *******
  1 REM **********************
  2 REM *      LITTLE        *
  3 REM *     MEANIES        *
  4 REM *                    *
  5 REM *        by          *
  6 REM *                    *
  7 REM *   ALAN WINSTON     *
  8 REM **********************
 10 MODE7
 20 *FX11 0
 30 ON ERROR GOSUB1030
 40 SCORE=0:BUL=15:EEE=0
 60 VDU23,1,0,0,0,0,
 70 PROCTABEL(2)
 90 MODE2
100 PROCSETUP
110 PROCPLAY
130 DEFPROCSETUP
140 VDU23,242,255,255,255,255,255,255,255,255
150 VDU23,243,0,0,128,224,252,128,0,0
160 VDU23,240,255,219,219,255,255,219,195,255
170 VDU23,244,0,0,1,7,63,1,0,0
180 VDU23,245,24,24,60,126,126,60,60,66
190 W=0
200 REPEAT
210 FORQ=0TO3
220 COLOUR2
230 PRINTTAB(Q,W);CHR$242
240 PRINTTAB(Q+16,W);CHR$242
250 NEXT
260 W=W+1:UNTILW=26
270 REPEAT
280 COLOUR2:IFW=27THENCOLOUR15
290 FORQ=0TO19
300 PRINTTAB(Q,W);CHR$242
310 NEXT
320  W=W+1:UNTILW=30
330 W=0
340 PRINTTAB(0,0)
350 ENDPROC
360 DEFPROCGUN
370 VDU4
380 VDU23,1,0,0,0,0,0,0,0,0
390 COLOUR2:PRINTTAB(4,6);CHR$243;TAB(15,18);CHR$244
400 COLOUR12:PRINTTAB(0,1);"SCORE=";SCORE;TAB(10,1);
    "BULLETS=";BUL;:IFBUL(10 T HEN PRINT" "
410 COLOUR2
420 IFEEE=0 THEN A=RND(1000):IFTIME>A+2000THEN PROCENER
430 VDU5
440 ENDPROC
450 DEFPROCPLAY
460 X=RND(600)+300:Y=1000
470 GCOL0,2
480 X1=RND(600)+300:Y1=1200
490 X2=RND(600)+300:Y2=1400
500 C=0
510 VDU5
520 REPEAT
530 GCOL0,1
540 MOVEX,Y:PRINTCHR$240
550 GCOL0,4
560 MOVEX1,Y1:PRINTCHR$240
570 GCOL0,5
580 MOVEX2,Y2:PRINTCHR$240
590 IFY<180 ORY1<180 OR Y2<180 THENPROCTABEL(0)
600 A$=INKEY$(1)
610 IFA$="Q"ANDTIME>T+100  ORA$="Z"ANDTIME>T+100
    THEN SOUND1,-10,100,3:BUL=BUL -1:PROCFIRE
615 FORDEL=0TO100:NEXT
620 MOVEX,Y:GCOL0,0:PRINTCHR$240
630 MOVEX1,Y1 PRINTCHR$240
640 MOVEX2,Y2:PRINTCHR$240
650 GCOL0,2
660 PROCMOVE
670 IFPOINT(X-10,Y)<>0 ORPOINT(X+54,Y)<>0
    THENPROCENDINV(0)
680 IFPOINT(X1-10,Y1)<>0 ORPOINT(X1+54,Y1)<>0
    THENPROCENDINV(1)
690 PROCGUN
700 IFPOINT(X2-10,Y2)<>0 ORPOINT(X2+54,Y2)<>0
    THENPROCENDINV(2)
710 UNTILL=1
720 GOTO460
730 DEFPPOCFIRE
740 IFBUL(0 THEN PROCTABEL(0)
750 T=TIME
760 A=0
770 IFA$="Q"THEN P=300:O=815:I=970 ELSE
    P=300:O=425:I=970
780 GCOL0,7
790 MOVEP,O:DRAWI,O
800 FORQ=310TO970 STEP30
810 IFPOINT(Q,O+3)=1THEN A=1 ELSE IFPOINT
    (Q,O+3)=4THEN A=2 ELSE IFPOINT(Q,O+3)
    =5THENA=3 ELSE IF POINT(Q,O+3)=3 THEN A=10
820 NEXT
830 GCOL0,0:MOVEP,O:DRAWI,O
840 PROCFFFIRE(A)
850 GCOL0,2
860 A=0
870 IFBUL(0 THEN PROCTABEL(0)
880 ENDPROC
890 DEFPROCENDINV(QQ)
900 GCOL0,0
910 IFQQ=0 THEN MOVEX,Y:PRINT" ":X=RND(600)+300:
    Y=1000 ELSE IFQQ=1 THEN MOVEX1,Y1:PRINT"
    ":X1=RND(600)+300:Y1=1000 ELSE MOVEX2,Y2:
    PRINT" ":X2=RND(600)+300:Y2=1000
920 ENDPROC
930 DEFPROCMOVE
940 A=RND(50)-25:X=X+A
950 A=RND(50)-25:X1=X1+A
960 A=RND(50)-25:X2=X2+A
970 A=RND(25)-50:Y=Y+A
980 A=RND(25)-40:Y1=Y1+A
990 A=RND(25)-30:Y2=Y2+A
1000 SOUND2,-6,230,5:SOUND3,-6,170,5
1010 IFEEE=1 THEN PROCME
1020 ENDPROC
1030 MODE7:IFERR=17 THENRETURN ELSE REPORT:
     PRINT" in line ";ERL
1040 END
1050 DEF PROCFFFIRE(A)
```

Open Forum

```
1060 IFA=0 THEN ENDPROC
1070 MOVEX,Y:GCOL0,0:PRINTCHR$240
1080 MOVEX1,Y1:PRINTCHR$240
1090 MOVEX2,Y2:PRINTCHR$240
1100 IFA=1THEN X=600:Y=1000 ELSE IFA=2 THENX1
     =600:Y1=1000 ELSEIFA=3THEN Y2=1000 X2=600
1110 IFA=10 THENVDU4:PRINTTAB(X%,Y%);"
     ";BUL=BUL-5:EEE=0:TIME=0:T=0:VDU5:ENDPRO C
1120 SCORE=SCORE+10
1130 FORQ=0TO3:SOUND1,-13,RND(50)+150,5:NEXT
1140 ENDPROC
1150 DEFPROCTABEL(NUM)
1160 IFNUM=2 THEN 1270
1170 VDU4:COLOUR12:PRINTTAB(10,1);"BULLETS=0"
1180 FORQ=1TO24:READD:IFD=0THENPROCREST
     NEXT ELSE SOUND1,-10,D,5:NEXT
1190 VDU22,7,23,1,0,0,0,0:RESTORE
1200 PRINT'''CHR$129;CHR$141;" LITTLE MEANIES"
1210 PRINTCHR$129;CHR$141;" LITTLE MEANIES"
1220 PRINT''"  Your score was ";SCORE
1230 IFBUL<0 THEN PRINT''" You had no bullets
     left" ELSE PRINT''"  The invade got you"
1240 PRINT''''CHR$130;CHR$136"   PRESS THE SPACE
     BAR TO CONTINUE":VDU23,1,0,0,0,0
1250 REPEAT:A=GET:UNTILA=32
1260 CLS:RUN
1270 CLS
1280 PRINT'CHR$157CHR$141CHR$129;" LITTLE MEANIES"
1290 PRINTCHR$157CHR$141CHR$129;" LITTLE MEANIES"
1300 PRINTCHR$157CHR$130;"       by ALAN WINSTON"
1310 PRINT''CHR$130;" Little Meanies is a
     game of skill.  ";CHR$130;"In which you have
     to shoot down enemy  ";CHR$130;"invaders."
1320 PRINT''CHR$133;"To do this you have 2 guns on
     each side";CHR$133;"of your defence."
1330 PRINT''"Keys for the guns are_ "'"0_UPPER GUN
     Z_LOWER GUN"
1340 PRINT''CHR$136;CHR$134;" PRESS THE SPACE
     BAR TO PLAY"
1350 REPEAT:A=GET:UNTILA=32
1360 TIME=0:T=0:ENDPROC
1370 DATA129,129,0,129,129,0,129,129,132,145,145,0,
     101,101,0,101,101,0,109,109,109,117,101,101
1380 DEFPROCREST:SOUND1,0,0,1:ENDPROC
1390 DEFPROCENER
1400 X%=RND(5)+7:Y%=0
1410 Y%=Y%+1
1420 EEE=1:ENDPROC
1430 DEFPROCME
1440 IFY%>25 THEN EEE=0:VDU4:PRINTTAB(X%,Y%);"
     ":VDU5:BUL=BUL+RND(3)+6:TIME=0:T =TIME:ENDPROC
1450 VDU4:PRINTTAB(X%,Y%);" "
1460 COLOUR3
1470 Y%=Y%+1
1480 EEE=1:PRINTTAB(X%,Y%);CHR$245
1490 SOUND4,-10,200,1
1500 VDU5
1510 ENDPROC
```

Little Meanies
by Alan Winston

Arcade Avenue

3D Graphics

Ever on the lookout for new twists on old ideas to make a game stand out, some software companies have exploited the growing interest in spectacular graphics, in particular 3D graphics, to breathe new life into many of our old arcade favourites. Possibly the first of this type onto the market was *Haunted Hedges* written by Derek Brewster for Micromega. It was a 3D version of Pacman for the Spectrum which presented a slightly angled perspective on the screen and had the ghosts partially disappearing from view as they ran around the maze walls. Further games soon followed which exploited similar ideas. *4D* (sic) *Terror Daktil* from Melbourne House was essentially a space invaders/galaxian variant with the monsters enlarging as they peel off from the ranks and fly towards you.

This was one of Melbourne House's less warmly welcomed programs because, although it was quite a nice idea and fairly well executed, there seemed to be something missing with regard to playability. In fact, this is often true of games in this category — despite the flashy screen displays something has been sacrificed in terms of the excitement and tension of the original games.

One exception to this rule must be *Android 2* from Vortex software which presents another 'angled perspective' but this time in a game rather like *Frenzy* or *Berzerk*.

Vortex had an earlier program known as *Android 1* which was a reasonable version of the original two dimensional format but in *Android 2* they have produced a game that improves on the excitement and difficulty as well as providing some of the best graphics seen on the Spectrum. It is certainly the most outstanding piece of software I shall mention this week.

Turning to other machines, *Jumping Jack* from Sumlock for the CBM 64 is a game that I confess I have not played, but the screen shots in the adverts look entertaining with sideways views of the trucks, crocodiles and the like in a 3D version of *Frogger*. For the BBC, MRM Software have just released a range of games which includes *Q Man's Brother*, essentially a *3D Painter* and, coming full circle, *3D Munchy* which is of course a *Pacman* game. Not surprisingly for the BBC, the graphics are good enough to make the tradeoff with pace and addictiveness less painful. These games are not at all bad and are reasonably priced, although I must admit that I preferred MRM's original game *Diamond Mine* which, although much simpler in concept and screen display, was much more fun, frustrating and addictive. Anyway, all MRM games have a screen shot on the cassette inlay so what you see is what you get.

In summary, with one or two exceptions, the prefix 3D on these games often means you are being asked to substitute game quality for a more complex screen display and you should be aware of that before you buy. However, I am sure that this is a successful hook for breathing new sales into an old game and will be around for a long time. Even in the arcades similar ploys are appearing — *Zaxxon* is little more than a 3D version of *Scramble*, but there is no doubt that it's a winning game, and for once the 3D is used to add to the difficulty and skill of playing.

Tony Kendle

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 Kendle, Arcade Avenue, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

Halley's Comet

on Vic20

This program first draws the sun and earth proceeded by the path of Halley's comet. It then draws a comet which proceeds around the path. To break you must press the space bar.

Program notes

0–185 Prints out path etc.
190 Read in data and checks if at the end
200 Sets up the place and colour of the comet
210–217 If comet reaches a point it . flashes comet
220–225 Print a dot after it has passed
1000– Data for positions

```
1 REM HALIES COMET
5 REM BY ANDREW LILLY
10 PRINT"■THE PATH OF HALIES
   COMET"
20 PRINT
25 PRINT"■ .. "
26 PRINT"■.■ ■ ."
30 PRINT"■.■ ■   "
40 PRINT"■. SUN ."
50 PRINT"■   ■■■. "
60 PRINT"■ .EARTH ."
70 PRINT" ■ .          "
80 PRINT"■    .        ."
90 PRINT"■ "
100 PRINT"■      .        ."
110 PRINT"       ↑"
120 PRINT"■ PATH   .        ."
130 PRINT"■                 "
140 PRINT"■              .  ."
150 PRINT"■             .   ."
160 PRINT"■            .    ."
170 PRINT"■          . .  ."
180 PRINT
185 PRINT" PRESS ■SPACE ■TO EXIT
"
```

```
190 READP:IFP=-1THEN RESTORE:GOT
0190
200 A=P+38400:P=P+7680
210 POKEP,90
212 POKEA,6
215 FORD=1TO500:NEXT
216 IFP=7911THENFORG=1TO100:PRIN
T"■■■
```

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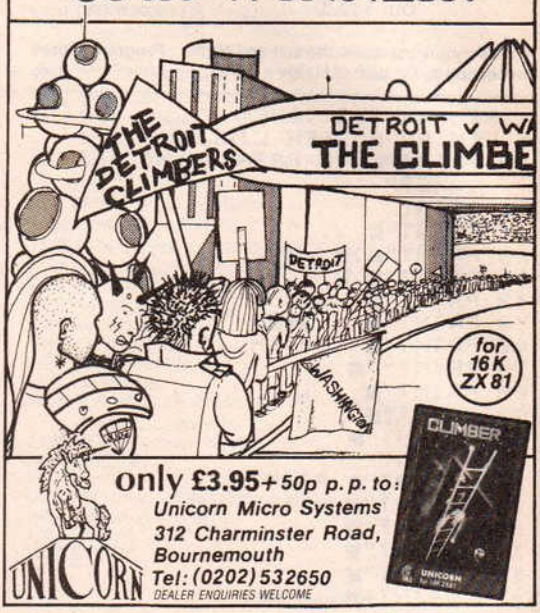

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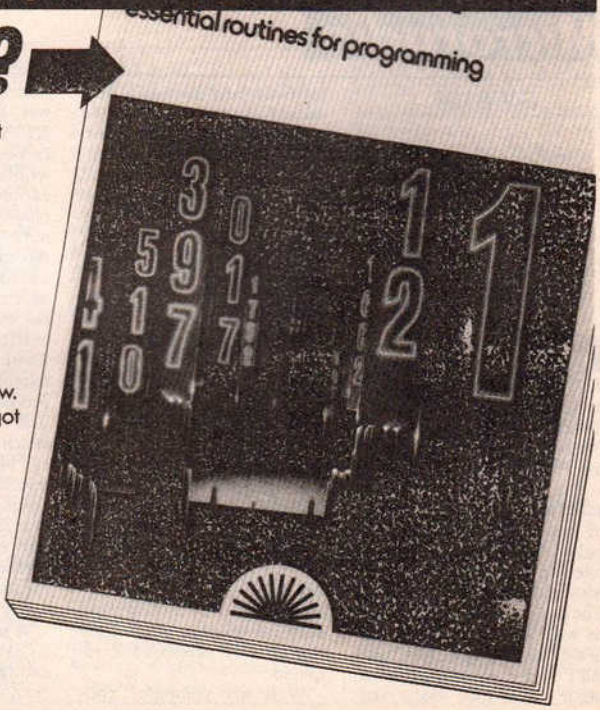

Tony Bridge's Adventure Corner

Valhalla revisited

MC Lothlorien is well known for its war simulations — and now for a successful adventure *The Stolen Lamp*. Written for the BBC, this text-only adventure has become a popular and worthy addition to the range available for the Acorn micro.

Mike Williams, of London N16, recently wrote to me with some tips for *Lamp*. I haven't got room enough, this week, to pass them all on, so let's concentrate on one area this week. First off, the coin:

BIUS/YRTE/HGEU/CIAR/REPD/ETTO

The message: you must *Read* this to get the day's password, which you will need:

★TOO/NFLL/YYOT/UHTE/DCOA/ORRP/SE!T

The sword may seem useful (you knock off a few people here and there), but will eventually prevent you from winning the game. You will find a column and a pillar in the entrance hall — there is an object in both of these, but, there is also a snag. Should you smash both of them, the ceiling will fall on you! From what I've told you so far, you should have an idea what to do. . . .

More Hints 'n' Tips from Mike's informative letter at a later date.

Hadrian Hudson, from West Yorkshire, writes asking for help in *Raaka-Tu*, on his TRS-80. He has a few objects with him — the coin, gold ring, chopstick, idol and jewelled lever, and he has a score of 20 out of a possible 50. Hadrian has to pass a statue in a triangular room, and to do so, has to give up the coin, thus losing 5 points. Is there another way of passing the statue?

Also, how does he get over the oriental rug, concealing a trap, in the second room? Does he need the sword after killing the dragon, and the candle after killing the gargoyle? Quite a few questions there, can anyone help? The problem with the statue sounds familiar from several other adventures — you may have to sacrifice the coin and try to retrieve it later by tempting the statue with a worthless bauble on your way back.

"Dear Tony, in view of the wide interest in the difficult and absorbing program *Valhalla*, will you please make urgent amends for your dreadful neglect of it in your pages? Best regards, Peter Jones, South Glamorgan."

"Dear Tony, where are all the *Valhalla* hints and problems? Surely a few million have been sold — is it so easy that no one has had problems, or have they just thrown it in the bin because of its difficulty?"

These letters, from G. Sim of Paignton, and Peter Jones, are just a couple of the many I've received about Legend's adventure. Mr/Ms Sim goes on to say: "My hint to find Ofnir is — You need Boldir's help. Another hint for Ofnir is:

AGNO/KNSW/HIAN/LKLR

I have to admit that I haven't mentioned *Valhalla* as often as other adventures, such as the Scott Adams series, *Knight's Quest* and *The Hobbit*. In fact, only twice (Vol 2, No 24 and Vol 3 No 10) to 12 Corners dedicated to *The Hobbit*. In some ways, this reflects my own feelings about *Valhalla* — if I have a few hours to spare, staring at the screen, then I go to *Valhalla*, and can only admire the graphics. But it is not my favourite program.

Actually, as I've said before, *Valhalla* seems more like a computer movie, whose proceedings can be influenced in some degree by the player. I find clues difficult to give, as each action depends so much on what the player has done before. In the space I have each week, I can't even begin to scratch the surface, so I'll draw your attention to this month's issue of *Popular's* sister magazine, *Micro Adventurer* (if you're a keen adventurer, you'll have taken out a subscription!), in which Mike Stackwell has written the definitive article on

solving *Valhalla*. Read this, and all should become . . . well, a lot clearer than it may be at the moment!

D. A. Booth has written with several very useful clues. "Hunt in the far-flung corners of the world for the key top success — befriend the iron man, he may have a crowbar — if you cannot get on with your valuables, trust a weak friend — befriend your enemy to make the top of hell ring — there must be give and take to find protection."

John Rumble from Aldershot has given me a couple of hints that might also be useful. He says: "A good move is to throw a fireball at Krank when in Krank's Hall. To get Drapnir:

DOAP/SEKN/SCAH/GEAS/TTOI/PNLI/ACCE/EWOA/FSNT/IERI/INNH/CEHL/E★SA/TN

Phew! I hope you can decipher that lot — as usual, starting from the *second* letter, read off every other letter, then return to the *first* and repeat the process. The slashes (/) are to break up the letters for ease of reading.

R. Smith, of Rushden has a couple of queries (accompanied by several maps of other adventures he has completed, for which much thanks. First of all, "What is the signficance of the various flags going up and down?" — I think that is probably just a bit of gratuitous animation, but maybe someone else knows better. "If a number is entered, the program responds 'there is no crown here'. No mention of a crown in the instructions". No, except that the crown is Norse currency!

Valhalla needs more space than I have this week — if someone, who has persevered more than I, and has completed a fair amount, would like to write and let me have a few more clues, particularly to later parts, I can pass them on. By the way, a version of Valhalla for Commodore 64 is now delayed until late May.

At the recent ZX Microfair at Alexandra Palace in London, Crystal Computing were showing the old favourite, *Halls Of The Things*. You may remember that I quite enjoyed this program some time ago — it's not strictly an adventure, but does contain some of the elements of fantasy "Troll-bashing". I'm glad to see that one fan thinks enough of the program to set up the *HOTT Appreciation Society*. For £1 membership, fellow fans will receive quarterly newsletters with hints on playing, special offers and so on. Sounds good! Write to:

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Kent
BR2 0PZ

(and tell 'em you read it here!)

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

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Peek & Poke

LEADING QUESTION

J. Mills of Bromley, Kent, writes:

Q Having a ZX Spectrum with Interface 1 and Micro Drive, can you please inform me if I purchased a RS232 Sinclair lead, would this make the Spectrum compatible with the Silver-Reed EX43 Electronic Typewriter/Printer, without purchasing their Memorymatic M40/44 or Interface I/F40?

A I don't actually know the device concerned but as long as it has a standard RS232 interface port then you will be OK.

If you are in any doubt as to the cables or extra interfaces that you may need, then I suggest that you consult Maplins (not the holiday camp) catalogue (available at most computer book shops and a number of high street retailers).

WAITING GAME

J. Roberts, Glenconner, Liverpool, writes:

Q May I please have your comments regarding the ethics of offering programs to software companies for evaluation?

The particular aspect I have in mind concerns the period of time elapsing between the companies' receipt of a program and its evaluation.

I sent a program to a company about 10 weeks ago. I received their acknowledgment by return post but since then I have heard nothing. I rang them about 2 weeks ago and the reply was that they receive many programs and each is dealt with in rotation. The inference I drew from this was that I would just have to wait.

My program is an adventure type, and the theme is one which as far as I can tell, has not been covered before.

I am therefore very anxious to get my program properly evaluated before someone else "thinks" of my idea.

Would you consider it right to offer a program to several companies within a few days and then to sit back and wait for the first acceptance?

A Although I think that it is unrealistic to expect any company to give a game a real evaluation in anything under 2 weeks, it is fair to say that 10 weeks is nothing short of disgraceful. You would be advised to demand the return of your game and not to have any more dealings with this company.

You don't say which computer your game is for but I suggest that you choose a company that has published adventure games for your machine and submit it to them. As to ethics, I personally would not submit a program to more than one company at a time. Two rejections a month are enough for anyone.

THERMAL PRINTER

Nicky Bell of Western Ave, Dagenham, writes:

Q Could you tell me if there is a six - inch plain paper thermal printer suitable for my Spectrum?

If so, what interface would I need to connect it?

A Epson have just launched something that sounds what you require. It's a plain paper thermal printer with a number of different printing styles that retails for £95.

There are two versions for both Centronics and RS232, although the latter is the one available first (around August). There are a number of different centronic interfaces from Kempston, Hilderbay, Tasman, etc. All cost around £45 and all can be recommended. For RS232, you could do worse than get an Interface 1—the official Sinclair interface. You will then need a lead to connect this to a five pin din which is the socket on the printer.

RIGHT TO LEFT

Philip Aston of Pensham, Perstore, Worcs, writes:

Q Please could you tell me how to make the screen on the 48K Spectrum scroll from right to left, as I need it for a game I am making?

A This is one of those questions where I could really go over the top. I mean, do I tell you how to scroll the screen left a pixel at a time, or a character at a time? Do you need to know how to scroll the attributes file similarly (*Ink, Paper* etc)? I think my best approach is simply to recommend an extemely useful book, *Supercharge Your Spectrum*, published by Melbourne House, which is full of machine-code routines to make the programmer's life easier.

It also contains all the routines necessary for screen-scrolling left or right.

NEW ASSEMBLER

Colin Eames of Queen's Drive, Swadlincote, Burton-on-Trent, writes:

Q As a novice machine-code programmer on my 48K Spectrum, I would very much like to purchase an assembler.

Can you give me the address of a low cost, easy to use assembler?

A If you really want to get into machine-code programming on the Spectrum, then I can recommend an assembler/monitor from Hisoft called Devpac. It is available from Hisoft mail order at 60 Hallam Moor, Liden, Swindon, Wilts SN3 6LS.

The price of £14.00 may seem high, but you are getting two programs, both of which you will need.

DISABLED DRAGON

Paul Bailey of Brynton Road, Macclesfield, Cheshire, writes:

Q Please, if possible, could you tell me how to disable the *Break* key and *Reset* button on my Dragon 32.

A To disable the *Break* key, enter the following Direct-mode:

Poke 411,228
Poke 412,203
Poke 413,4
Poke 414,237
Poke 415,228

Then, to "turn off" the Break key use:

Poke 410,236

COMPUTER GAMBLE

R Kidd of Stoke Park, Ipswich, writes:

Q I have seen people advertising their computer for sale by offering raffle tickets. Can I do this myself, ie, is it legal? If not, what is the best way of selling my computer?

A This is a complex one. We consulted our legal experts and the conclusion seemed to be that it is quite possible you would be infringing laws against Gaming and Gambling. A much better way of selling your computer is to put a free advert in our Computerswop column. You can ask for, and get, a reasonable price if your computer is in good condition.

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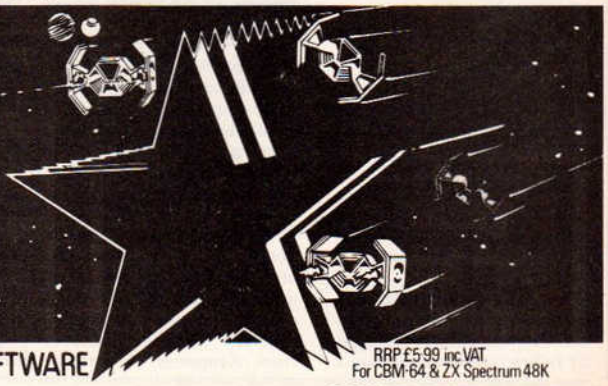

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19K RAM VIC 20 (switchable) plus C2N cassette. Several arcade type games (inc. Berzerk and Pacman) plus two graphic adventures. New Computapix Paintbox and lightpen. Reason for sale — upgrading. £195 for quick sale. Tel: (0352) 714082 between 6pm and 8pm.

VIC 20 UNEXPANDED Computer, C2N recorder, Introduction to Basic Part I, four cartridges and commercial games. One month old, still boxed. Worth £200, sell for £140. Tel: (0799) 41033 for details.

CBM 64 CASSETTE and 1541 disc drive and Easy-Script, joysticks, Hobbit, Pinball, Jumpman, Llamasoft, Programmers Reference Guide and many others worth £600. Quick sale for £450. Only 4 months old. Tel: 01-352 4137 evenings.

VIC 20, C2N Vixen 16K Ram Pack, joystick, £40 of s/w, £20 of books + mags. £150 ono. Tel: 0305-68672.

VIC 20 + T/Recorder — 3 Ram super Expander 8 Ram + 16 Ram cartridges. Tape games + cartridge games + joystick £200.00. Tel: 0783-288620.

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VIC 20 Switchable 16K Ram Pack cassete player super expander sound/synthesiser, 6 cartridges + Gorth + Omega Race. 20 s/w games, Intro to Basic. Guarantee £240.00. Tel: Southend 68904.

VIC 20 unused £75. Tel: 061 225 3742.

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VIC 20 state pack 16K Ram pack — hardly used, also Intro to Basic Part II and some programs. £125. 01-422 7142.

VIC 20, 32K switchable Ram pack + s/w inc: Cartridges £130 ono. Tel: 0655 82037.

VIC 20 + C2N tape deck, 16K expansion joystick + 50 games and s/w packages + 1 cartridge game + book. £145. Tel: Dungannon 22893 eves.

CBM 64 + disc drive + cassette unit disc and tapes — Word Pro — and filing systems as new. Worth £750. Want £500 ono. Tel: Luton 22614 eves after 7pm. Derek.

VIC 20, C2N cassette unit, magazines, book, some software including Matrix + Krazy Kong. Manual and all leads. £130 ono. Tel: Canterbury (0227) 58529.

CBM 64 + C2N, Quickshort joystick, manual, reference guide, books, Colossus Chess, Assembler, arcade games, blank tapes, dust cover. Cost £350 — want around £260. Contact Marc on 01-961 6032..

VIC 20 games for sale. Spiders From Mars, Shoplifter, Panic, AN8 Multi-Synthesizer, all for £35 or will sell separately. Please ring Colin 515 4696.

VIC 20, super expander, 16K Ram, motherboard, joystick & Cassette deck. Ten cartridges, twenty cassettes + books & many magazines. All v.g.c. + still guaranteed. Cost £350+, want only £90 or £120 including B/W TV. Phone Rick — 01-444 9132.

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.

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.....

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DRAGON DATA. Cyrus, Chess cartridge. Perfect condition, sell for £10 ono or exchange for other software. Pref cartridges. Phone Antrim 65345. Write 95 Donegore Drive, Antrim BT41 1DZ.

DRAGON 32. Boxed. Superb condition, joysticks, magazines, games, etc. Can sell for £130 ono. Swap for BBC Model A. Tel: Chester (0244) 671652.

DRAGON 32, with two joysticks, books, dust cover, magazines, light pen and over £220 software which includes the King, Cuthbert, Shuttle and many more. Cost £450. Will sell for £250. Phone Highcliffe 77515.

DRAGON OWNERS. Wanted Hi-Res cartridge for Meteoroids cartridge or three cassettes Pimania. Planet Invasion and Grid Runner or swap other software also wanted serious software. Tel: (0325) 283898.

DRAGON 32 with joysticks and Sanyo DR 101 cassette recorder plus 10 games worth £250 will sell for £175 ono or swap for Commodore 64 and C2N cassette. Will give plus cash. Paul 01-856 5123.

DRAGON 32 & S/W £100. Reason for sale, upgraded to 64. Tel: Leicester 866063.

DRAGON 32 S/W £3.50 each. PWS speech synthesis cartridge. £30.00. Tel: 061 620 7369.

DRAGON 64, £100 worth of s/w, quick shot s/c joystick, Hi-Res cartridge. Dust cover, Dragon's Magazines. Still in Box. Swap for BBC 'B' or sell for £300. Ring Malcolm on Dartford 25498 (evenings).

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DRAGON 32 boxed leads, 26 good games, Vic microdeal, 2 cartridges, 2 utilities, joystick. £185. Tel: 01-398 0815 (home), 903 8353 ext. 266 (office). Kevin Burnet.

DRAGON 32 computer and MCP40 printer also lots of software and magazines and books. Two joysticks printer, paper and pens. Printer slightly faulty. £250 ono. Phone 01-550 4311 after 7pm.

DRAGON 32K one year old. £70.00. Tel: Ascot 23275.

DRAGON 32K plus books, joysticks, light pen, over £260 software. Only year old, excellent condition. £275 ono. Ian. 01-904 4185 evenings.

DRAGON 32 with Mace assembler cartridge and other software. Sell for £125 ono. Tel: (0642) 552639.

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BBC MODEL 'B' with Acorn DFS. Lates spec. Completely mint and unused. Genuine reason for sale. £440 ono. Tel: Glos. 422109 evenings and ask for Rudy.

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BBC ORIGINAL SOFTWARE for sale over £1,300.00 including all best titles. Have upgraded to disc. Will sell all £475 ono or from £3.50 each. Pascal Rem £35. Tel: 051 420 3462.

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BBC TAPE RECORDER £17.00. View word processor £40.00. View printer driver £5.00. Printer sheets (double) 200 £3.00 all 4 months old. (Upgraded to disc). Tel: 01-452 0343 after 6.30pm.

ELECTRON AND BBC cassettes, all excellent condition, games and educational, over £73 value BBC and £60 Electron. Total offers ? or sell individually. Phone Phil 0255 814523 after 5pm.

BBC SOFTWARE for sale at half new price. Disc Doctor Rom, Beebcalc Rom, Record Keeper, Planetoid, Fun games, Music etc. Tel: 0865 64086.

BBC ORIGINALS, Fighter Pilot, Snowball £7 each. Dambusters, World Travel Game £5 each. £20 for lot or swap for Aviator. Tel: Rayleigh 779875.

ACORN ATOM 12/12K plus Via, PSV, FP an Utility Roms. Boxed incl. manual books and programs (Invaders, Lylon Attack Snapper etc). Latest keyboard £80 ono. Tel: 0324 71167 (Polmont nr. Grangemouth).

Wanted

48K SPECTRUM 5 original games. Interface II, manuals, leads, blank C90 written out programmes, note pad. Swap wanted for BBC model 3. Tel: Northampton, Simon Bebank 404 747.

WANTED 3BC B 1.2 o/s. Basic 2 Disc + extras required. Cash for light machine. Must be good condition. Tel: John (0258) 53075.

SWAP MY Atari games for yours. Over 50 titles also for sale. My 2049 ER £20. Preppie £12. Steeple Jack £7. All very good condition. After 4.30pm. Tel: Chesterfield 451 342 (Private sale).

SELL OR SWAP RS 232 — computer printer brother ET22 Inc: Correction typewriter mains or battery as new. £120. May exchange. What have you? Teletext dial loader equipment etc. Tel: St Austell 2563 anytime.

WANTED HX20 computer in good condition. Tel: 0276 28397 after 7pm (Camberley).

CBM 64 and Atari 400 software to swap for other titles. Also ZX Printer and interface for VIC 20 and CBM 64. £40. Tel: Burntwood 3392.

WANTED APPLE IIe with VDU, keyboard, disk drives and matrix printer in good condition. Darwen (0254) 72700 after 7.00pm.

SPECTRUM SOFTWARE sale/swap. Free m/drive form to first reply. I have Diddums, Orbiter, Centipede, Q/S Intruders, Ground Attack Arcadia, ZZOOM. Your list for mine. Richard, 5 Merton Street, Oxford.

WANTED FOR my VIC 20, Andes Attack £4. Matrix, £3.50. Meggagalactic LLamas, Battle at the Edge of Time, £30. Phone Dave, Birmingham (021) 777 5023 after 6.00pm. Complete only.

SPECTRUM SOFTWARE sale/swap. Free m/drive form to first reply. Wanted: Hobbit, Fighter Pilot, Lunar, Jetman, Tasword II. I have Arcadia, Diddums, Intruders, Ground Attack. Contact Richard, 5 Merton Street Oxford.

WANTED ZX80 £5. Telephone Teesdale 37386 after school hours.

WANTED, ACORN disk interface and/or disk drive. Will pay around £150 for the two. Tel: Canterbury (0227) 58529.

WANTED MICRODRIVE and Interface I (must still be under guarantee and work) and cartridges. Swap for ZX Printer, Valhalla, Mechanical Joystick and Red Baron. Phone 0465 682900 after 6pm.

WANTED 3BC B.1.2 o/s with pheripherals. Recorder discs etc. 01-672 8862.

WANTED VALHALLA or The Quill for 48K Spectrum. Will swap for Ship of Doom, Ocean Kong, Space Raiders, Gulpman (all original copies). Ring Peter 01-422 7583. Ask for Peter.

SPECTRUM SOFTWARE swap or sell; Laser Snaker, 3D Space Wars, Ant Attack, Compiler, English Literature (excellent learning aid). And Alchemist. Tel: (0272) 569599 (+ others).

TO SWAP JetPac, Pool Chest, Luna Crab, Jackpot, Cookie, Planetoids, Gobble A Ghost: will give 2 games for Scrabble, any two tapes. Phone 031 661 9333.

WANTED 2764 Eproms, Programmed or unprogrammed, unprogrammed preferred. Will pay up to £5.50. Tel: 01-202 63410 after 6pm. L Vekaria.

WANTED ATARI software for Spectrum plus Rescue By Ocean. Will swap for titles I have. Phone John on 01-476 8884.

WANTED ZX80 preferably with Ram pack. Must be in working order. Tel: 061 445 4081.

VIC 20 S/W Avenger plus Cosmic Cruncher plus Omega Race (all cartridges) for super expander or Vicmon. (0738) 52146 after 4.30pm.

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SWAP R/C aircraft plus controls and all the gear for flying for a CBM 64 plus cassette. Write Tim Stothard, 4 Southland Drive, Hykeham Road, Lincoln, Lincs.

WANTED ANY 48K ZX Spectrum with leads, manuals, and power pack if possible (no tape recorder needed) willing to pay £60-70. Tel: 061447 6865 ask for Alan after 4pm.

TO SWAP: Black Crystal, for the 48K Spectrum, for any text Adventure, preferably level 9. Phone Southend 43685.

SWAP VIC 20 Adventure Land cartridge for Jelly Monsters, Choplifter, or Outworld. Tel: 01-660 3329 after 6pm.

SWAP SPECTRUM s/ware. I have over 200 popular titles to swap. Send your list and get mine by return of post. (Eddie) 65 Anner Rd., Dublin 8 Ireland.

SWAP 40 channel CB, mag mount aeriel, mike, power pack for 16 or 48K Spectrum worth over £85. Tel: after 6pm 0531 4183 (Herefordshire).

AQUARIUS WANTED. Swap for 16K ZX81, software including Monster Maze, Mazogs, Defender, Raiders, Flight Simulation, plus one month guarantee (negotiable). Phone South Shields (0632) 553158 after five. Ask for Ian.

WANTED ORIC 48K without software. Ring Nuneaton (0203) 347426 evening.

WANTED VIC 20 or Spectrum. No s/w required. Only Basic manuals. Reasonable price. Tel: 0455 209197.

CBM 64 to swap inc: Revenge of the Mutant Camels. Tel: 021 556 0775.

SWAP CB3 GAMES. I have over 50 games! Tel: 01-840 5278 between 4-7.30pm.

ADVENTURE HELPLINE

Micro: *Vic 20*
Adventure: *Pirate Cove*
Problem: *I cannot escape from Pirate's Island. I would like to know how to open the doors and the chest.*
Name: *Gary Leaver*
Address: *14 Evenlode Close, Lodge Park, Redditch, Worcs BG8 7NA.*

Micro: *Commodore Vic-20*
Adventure:
Problem: *If there is a word processing chip in Vic + if there is a poke to get a beep every time you hit a key*
Name: *Karl Halton*
Address: *4, Etherow Brow, Broadbottom, Cheshire SK14 6AA*

Micro: *TI 99/4A*
Adventure: *Scott Adam's Golden Voyage*
Problem: *I cannot find a "lamp" or "torch" to enable me to see inside the "cave" or "passionway"*
Name: *Mr M.A. Gainey*
Address: *The Hill, Langport, Somerset TA10 9PY*

Micro: *Commodore 64*
Adventure: *The Hobbit*
Problem: *I cannot get through the large trap door in the elvenkings cellar. I am always thrown back into the dungeon. Please help me!!!*
Name: *Tim Appleyard*
Address: *453 Chester Road, Woodford, Stockport, Cheshire, SK7 1QP*

Micro: *Commodore 64*
Adventure: *The Hobbit*
Problem: *I cannot get through large trap door in the elvenkings cellar. I am always thrown back into the dark dungeon. Please help me!!!*
Name: *Tim Appleyard*
Address: *453 Chester Road, Woodford, Stockport, Cheshire SK7 1QP*

Micro: *Spectrum 48k*
Adventure: *The Lost Gnoms (Adventures of Eric Beam)*
Problem: *How can I awaken Snort the Gnome?*
Name: *D. Peberdy*
Address: *19 Oxgate Court, Coles Green Road, Brent NW2*

Micro: *48k Spectrum*
Adventure: *Hewson Consultants "Quest"*
Problem: *I can unlockthe castle door, but not open it*
Name: *Peter Harrison*
Address: *43 Cresent, Chester Moor, County Durham, DH2 3RT England*

Micro: *Commodore 64*
Adventure: *Hobbit*
Problem: *I can not get out of the Goblins dungeon I can not escape from the "pale bulbous eyes" and I would like to get the ring!*
Name: *Neil Phillips*
Address: *11 Lansdowne Cres, Werrington, Stoke-on-Trent, Staffs ST9 0LL*

Diary

Event	Venue	Dates	Admission	Organisers
Apple 84	Fulcrum Centre Slough	May 24-25 10.30am-5.30pm May 26 10.30am-4.30pm	£2.00 on door (free tickets in advance from organisers	Database Publications, 68 Chester Road, Hazel Grove, Stockport 061-456 8383
North Wales Computer Fair	Memorial Hall Bodhydfryd Wrexham	May 26 10.00am-4.00pm	50p adults 25p children £1.00 family ticket	Wrexham & District Computer Club
Cetex (Consumer Electronics Trade Exhibition) (Trade only)	Earls Court	May 27-30 10.00am-7.00pm	Free	Montbuild Ltd 11 Manchester Sq London W1 01-486 1951
5th International Commodore Computer Show	Novotel Hammersmith, London	June 7-8 10.00am-6.00pm June 9 9.00am-5.00pm	£2.00 adults £1.00 children £3.00 family ticket	Granard Communications, 4 Babmaes St, London SW1 01-930 6711
The Computer Fair	Hall D Earl's Court London	June 14 10.00am-6.00pm (trade and press only) June 15-16 10.00am-6.00pm June 17 10.00am-5.00pm	£3.00 adults £2.00 children & OAPs	Reed Exhibitions, Surrey House, Throwley Way, Sutton, Surrey 01-643 8040

For sale

PSION FLIGHT simulation, only tape left, sell for £6 ono. Spectrum 48K. Ask for Gary. Tel: Brookwood 80055.

TRS 80 colour computer, extended basic: computer cassette recorder, joysticks, manuals, books, lots of mags, over £200 software including Co-Ca Learning Lab, Art Gallery and Frogger, bargain at £200. Tel: M. Phelps, Bitton 5478.

SELL Paratrooper, Wacky Waiters, Amok and Wizard and the Princess, £4.50 each or swap three for an adventure cartridge or one for Flight Simulator by Ferranti. Offer taken. All new. Tel: Sean Taylor, Farnham Common 2922.

LANGUAGE Translator, French or German, only £4. Learn vocabulary the easy way. Post today. Send cheque, P.O. payable to Monksoft, Foxwood, Pearcroft Road, Stonehouse, Glos.

FOR SALE. Pat Prestel unit, complete in working order, offers? Absolutely unused, as new! Tel: Hugh Bridge, 01-735 1862.

ORIC 48K, perfect condition, cassette recorder, worth £100. Does any game, any speed, Inc. Hobbit, Treg, Chess, Ice-Chint, Altra, worth £300. Highest bid. Andy 443 1460 after 7pm only.

OSBORNE AND Disc Drive, monitor, s/w eg. Wordstar. Sell for £900. Bedford (0234) 214274.

PHILIPS VIDEO PACK 97000 computer with Terahawkes cartridge, brand new still boxed. £40. Tel: 01-567 8762.

ORIC I 48K Several games, manual, under guarantee swap for 48K Spectrum or sale £115 ono. Tel: Rushden 311429.

SORD MS and joypads and Basic G. Worth £210 will sell for £170. Tel: Birmingham 551 4577 after 6pm. Juggant.

VIC 20 S/W titles inc. Grid Runner, Arcadia and Vic pril £3.30 each inc. p&p or £10 the lot. Woking 70318.

CONTROL DATA 8 inch floppy disc drive good working order £99 or will swap for 48K Spectrum. 0672-810858.

ORIC 1, Manuals, over 45 s/w titles, tapes alone worth £250+. Bargain at £150. Tel: Jim — Stevenage (0438) 720624 anytime. Will not split.

PRINTER PAPER — £18.00 for 10 rolls. S/w under half price + various mags for sale. Offers Tel: 01-949 0225 after 4pm.

ORIC 48K with manual. Excellent condition. Tel: 0252 836410.

SHARP MZ80A 48K, £125 of s/w £230 ono. Tel: Tring 2037 (044282).

SHARP MZ80A 48K built in monitor and tape recorder. With Basic, Pascall, games amd manuals. V.G.C. Hardly used. £220 ono. Tel: Brentwood 224336.

TI99/4A, 3 months old + cassette case, all leads + boxed etc + manual + 2 joysticks, cartridge and s/w £65. Bargain. Tel: Hornchurch 42642. After 4pm.

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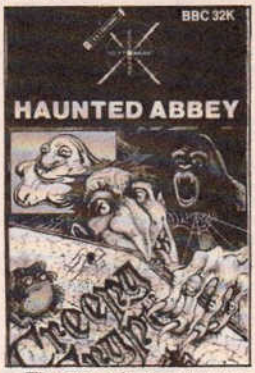
New Releases

PROTECTED

Haunted Abbey is the first of A&F's games to feature its new protection device designed by Jim Lamont.

It was deliberately chosen as the first program to feature the new protection, because it was of sufficiently high quality to ensure that people would (hopefully) want to buy it rather than just copy it from friends.



The game is an adventure where you must find Phibe's Book of Incantations and collect treasure from an abbey. The text is full of extremely bad puns and the kind of puzzles that keep Tony Bridges occupied for months. To add to the strictly intellectual problems, there are a large number of horrible monsters.

Program	*Haunted Abbey*
Price	*£7.90*
Micro	*BBC*
Supplier	*A&F Software* *Unit 8* *Canalside Industrial Estate* *Woodbine Street East* *Rochdale, Lancs* *OL16 5LB*

READ & WRITE

Acos+ is a utility program for the Commodore 64 by Melbourne House, usually known for more adventure orientated offerings.

Very unusual it is too. Partly it is pretty much your standard additions to Basic in sprite and sound but this is really a lesser aspect of it. More important is what *Acos+* enables you to do with the standard Commodore data recorder.

Firstly, it speeds up the tape operation. In addition it gives you a number of other facilities which let you use the recorder rather like a disc drive.

You can form a directory of various programs on tape and save and load using *Csave* and *Cload*. You can also open channels to Read or Write to and from the file.

Program	*Acos+*
Price	*£8.95*
Micro	*Commodore 64*
Supplier	*Melbourne House* *131 Trafalgar Road* *London SE10*

HIGH PRICE

Atari has finally released its authentic version of *Pacman* for the Spectrum — indeed it is the company's first Spectrum release.

And what you get is quite astonishingly accurate with even the sound effects derived from the Spectrum's pathetic bleeper sound true to the original.

If you haven't yet got a version of the game and are one of those poor souls horribly addicted to the ludicrous thing this would be the one to get if it wasn't for the unbelievable price — what do Atari think they're doing?

Program	*Pacman*
Price	*£14.99*
Micro	*Spectrum*
Supplier	*Atari* *Retail stores*

HI-SPEED

High Speed Dragon is a very useful utility that enables you to keep files of programs on a single long tape and access them quickly.

The secret of the system is that it uses the cassette recorder on fast forward to find the program required; how fast this runs — which varies from machine to machine — is the determining factor on access times.

It's a simple idea which a lot of home programmers could find useful and at £3.95 (with instructions that actually encourage you to copy the program) it's excellent value.

Program	*High Speed Dragon*
Price	*£3.95*
Micro	*Dragon*
Supplier	*Omega Systems* *44 Curlew Road* *Abbeydale* *Gloucester* *GL4 7TP*

ROMAN MAP

The Fall of Rome is a strategy game with a number of nice features making it more accessible to the ordinary player (ie, rather than the committed wargamer).

You control the Roman forces and attempt to rewrite history by marshalling your armies over the plains of Europe to defend the Empire from the assorted unwashed tribes.

You play against the computer deciding when and where

to move your forces and whether to concentrate on attacking or defending.

Although the program seems to be largely in Basic and is therefore technically unspectacular, features like the hi-res map of Europe and beautifully redesigned character set make it well worth looking at if you like this kind

Pick of the week

IN PERSPECTIVE

Battle Planet for the BBC is an excellent version of the arcade game which was, in some versions at least, known as *Buck Rogers*.

Although the game is essentially only an 'avoid everything for as long as you can as the odds gets more and more insuperable you lone heroic defender of the earth' arcade shoot em up (Molly Bloom eat your heart out) it has a number of features to lift it well above the run of the mill.

For one thing it is 3D — at least in the sense that at least one or more objects in the screen is drawn with some sort of perspective. In this case it is a trench, zooming through which is your lone defender of the free and . . . etc — the illusion of zooming is convincingly done.

The object of all this rushing about is to destroy a battle planet which is threatening earth — naturally it is aided and abetted by numerous

assorted baddies who must be either avoided or shot down. It's very addictive and graphically very impressive.

Program	*Battle Planet*
Price	*£6.95*
Micro	*BBC*
Supplier	*ISP Marketing* *Hampstead House* *New Town Centre* *Basingstoke* *Hants*

of tactical game.

Program	*The Fall of Rome*
Price	*£6.99*
Micro	*Spectrum/BBC/CBM 64/Atari*
Supplier	*Argus Press I Golden Square London W1R 3AB*

EVERY BYTE

Not one for the home user at £500 but of interest to small software houses is a tape protection device called *Rapid*.

What you get for your money is two Eproms that sit in the Spectrum expansion port and protect your program from all but the most hi-fi tape to tape copiers.

The system uses three different methods of protection: firstly it uses its own special loading routine, quite different from the one in Rom cracked by most of the copier programs.

It saves programs at twice the usual speed which is why most conventional tape to tape copying will not work — finally, it fills every byte of Ram, making programming techniques very difficult to copy.

With this and some other recent developments from A&F software, it looks like it's getting harder and harder to earn an honest, dishonest living.

Program	*Rapid*
Price	*£500*
Micro	*Spectrum*
Supplier	*Esprit 4 Little Poulton Lane Poulton Blackpool FY6 7ET*

PROVERBIAL

Educational software on the Oric is few and far between, and what there is tends to be pretty dull — as with the Spectrum until recently.

Story Book from Softbacks is slightly more successful than most, perhaps because it is very simple indeed.

The whole program works on the principle of filling in missing words. It offers a number of proverbs with gaps to be filled in by the child. The text is large and bold. Right and wrong answers are accompanied by, as appropriate, a smiling or frowning face.

You can enter your own stories and use them in the same way as the proverbs, asking the child to type in missing words.

Program	*Story Book*
Price	*£4.95*
Micro	*Oric*
Supplier	*Softbacks PO Box 257 Watford WD1 3LQ*

LIBERATOR

The Adventures of Robin Hood is an arcade/adventure for the Atari in which the well known Marxist wealth liberator steals bags of gold and is rejuvenated by a kiss on the imprisoned cheek of maid Marion.

Actually the game has very little to do with adventures at all; it's all about running up and down, firing arrows and avoiding the sheriff's men — but it's still good fun for all that.

As Tony Bridge has said before now, Atari programs have excellent graphics but always cost an arm and a leg. *Robin* is no exception by English software are by no means the worst offenders — £9.95 is not commonly excessive for a 16K Atari program.

Program	*The Adventures of Robin Hood*
Price	*£9.95*
Micro	*Atari*
Supplier	*English Software Box 43 Manchester M60 3AT*

BEWILDERING

Astrosoft are a new software house concentrating on the Spectrum market (which is asking for trouble).

Among its first releases are two adventures, *Thief* and *The Pink Pearl*. The latter is a text adventure in which you seek out the mysterious and valuable Pink Pearl fighting off baddies and solving clues as you go.

The program looks very neatly designed with some evocative descriptions and bewildering puzzles — another nice touch is that certain baddies can only be killed with certain weapons.

From the look of the program (and I could be wrong) I'd say it was written with the Quill and on the pre-production version of the game I have, there is no credit given. I assume it's an oversight.

Program	*The Pink Pearl*
Price	*£4.95*
Micro	*Spectrum*
Supplier	*Astrosoft 101 Church Road Ferndown Wimbourne Dorset BH22 9ET*

FLEXIBLE

Scope is a programming language originally developed for the Spectrum and now implemented on the Commodore 64.

Unlike programs like *Games Designer* you actually have to write a program with scope, rather than make choices from a menu. Scope consists of a number of commands held in Basic Rem statements. Although this may mean that the program is less easy to use than some of its competitors, it is, conversely, much more flexible.

Using the *Scope* language, which is no more difficult to grasp than Basic, you gain machine code speed of execution of graphics and sounds. The package includes some demo programs and an extensive manual which explains the language and contains listings of the Demo routines, so that you can steal them for your own use.

Program	*Scope*
Price	*£17.95*
Micro	*Commodore 64*
Supplier	*ISP Marketing Hampstead House New Town Centre Basingstoke Hants*

HALL OF FAME

There is, contrary to popular belief, Lynx software around, provided you know where to look for it and some of it is good — if unoriginal. A case in point is *Centipede* from Play It software.

Written in machine code, the game has all of the features of the arcade original, including a bouncing spider and a horticultural hall of fame. I liked the concise instructions which explained that the object was to 'shoot everything that moves and everything that doesn't'.

Program	*Centipede*
Price	*£5.95*
Micro	*Lynx*
Supplier	*Play It 79 Sleaford Road Boston Lincs PE21 8EY*

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.

Top 10

BBC★

1	(–)	Aviator	(Acornsoft)
2	(8)	Spooks and Spiders	(Software Invasion)
3	(2)	Eagle's Wing	(Software Invasion)
4	(5)	Adventure Quest	(Level 9 Computing
5	(10)	Education 2	(Golem)
6	(3)	Mr Wimpy	(Ocean)
7	(1)	Fortress	(Pace)
8	(4)	Snooker	(Visions)
9	(6)	Dambusters	(Alligata)
10	(9)	Swoop	(Program Power)

★ All model B
(Figures compiled by Micro Management Ipswich 0473 59181

Atari

1	(4)	Solo Flight	(Microprose)*
2	(–)	Saga 4 Voodoo Castle	(Adventure International)*
3	(5)	Warlock	(Calisto)
4	(10)	Savage Pond	(Starcade)
5	(–)	Pooyan	(Datasoft)
6	(1)	Zaxxon	(Datasoft)
7	(2)	Rally Speedway	(Adventure International)*
8	(–)	Circus	(Channel 8)
9	(–)	Sage	(Adventure International)*
10	(9)	A.C.E.	(English)

'Cartridge *48K Disc
(Figures compiled by Calisto computers Birmingham 021 632 6458)

Commodore 64

1	(–)	Manic Minner	(Software Projects)
2	(4)	Black Hawk	(Thorn/EMI)
3	(1)	Hunchback	(Ocean)
4	(6)	Space Shuttle	(Microdeal)
5	(–)	Pedro	(Imagine)
6	(–)	Space Pilot	(Amirog)
7	(5)	Slurpy	(Thorn/EMI)
8	(3)	Mr Wimpey	(Ocean)
9	(–)	Transylvanian Tower	(Richard Sheperd)
10	(7)	It's only Rock and Roll	(Microdeal)

(Figures compiled by Boots/Websters)

Dragon

1	(2)	Chuckie Egg	(A + F)
2	(7)	Pedro	(Imagine)
3	(4)	Ugh!	(Softek)
4	(5)	Kriegspiel	(Beyond)
5	(3)	Hungry Horace	(Melbourne House)
6	(–)	Scramble	(Microdeal)
7	(–)	Space Shuttle Simulator	(Microdeal)
8	(10)	SAS	(Peaksoft)
9	(8)	Up Periscope!	(Beyond)
10	(–)	Cuthbert in the Jungle	(Microdeal)

ZX81★

1	(1)	Krazy KLong	(PSS)
2	(3)	Scramble	(Quicksilva)
3	(5)	Mothership	(Softsync)
4	(2)	Chess	(Psion
5	(7)	Space Raiders	(Psion)
6	(10)	Asteroids	(Quicksilva)
7	(6)	Flight Simulation	(Psion)
8	(8)	Defender	(Quicksilva)
9	(4)	Football Manager	(Addictive Games)
10	(9)	Invaders	(Quicksilva)

★All 16K
(Figures compiled by Boots/Websters)

Vic 20

1	(6)	Krazy Kong	(Interceptor)
2	(2)	Submarine Commander	(Thorn/EMI)
3	(8)	Megagalactic Llamas...	(Hamasoft)
4	(3)	Tank Commander	(Thorn/EMI)
5	(10)	Jetpac	(Ultimate)
6	(4)	Tower of Evil	(Thorn/EMI)
7	(5)	Snooker	(Visions)
8	(–)	Tiny Tutor	(Marketing Micro)
9	(7)	Grid Runner	(Llamasoft)
10	(9)	Mine Madness	(Thorn/EMI)

(Figures compiled by Boots/Websters)

Spectrum*

1	(1)	Jet Set Willy	(Software Projects)
2	(—)	Blue Thunder	(Foundry Systems Ltd)
3	(7)	Lunar Jetman	(Ultimate)
4	(9)	Alchemist	(Imagine)
5	(6)	Pogo	(Ocean)
6	(—)	Escape from Krakatoa	(Abbex)
7	(3)	Scuba Dive	(Durell)
8	(—)	Gnasher	(Mastertronic)
9	(5)	Hunchback	(Ocean)
10	(8)	Atic Atac	(Ultimate)

*All 48K

(Figures compiled by W H Smith and Son, London)

Books

1	(6)	Creepy Computer Games, *Erskin et al*	(Osborne)
2	(3)	Commodore 64 Games Book, *Bishop*	(Granada)
3	(4)	Games for your ZX81, *Charlton*	(Virgin)
4	(7)	Easy Programs for the Commodore 64, *Stewart & Jones*	(Shiva)
5	(8)	Commodore 64 Exposed, *Bayley*	(Melbourne House)
5	(–)	Vic Innovative Computing, *Ramshaw*	(Melbourne House)
7	(–)	The Really Easy Guide to Home Computing, *Beasley & Clark*	(Century)
7	(2)	Space Games, *Issaman & Tyler*	(Osborne)
9	(5)	60 Programs for your Vic 20, *Erskine et al*	(Pan)
10	(–)	60 Programs for the Vic 20, Erskine et al	(Pan)

(Figures compiled by Bookwise)

Book Ends

INTRODUCTION

At first glance I thought that *The Sinclair QL Companion* by Boris Allan must be something of a waste of time.

I had just read through the very incomplete and very provisional manual hurriedly issued by Sinclair Research at the QL launch, and did not think that 'The Sinclair QL Companion' offered anything extra. On the whole this is still my view, but I have also developed another, more charitable, one; the book introduces several aspects of Sinclair SuperBasic to prospective (and waiting) QL buyers allowing them to begin to get to grips with the machine's facilities — in mind if not in reality.

So, what do you get for your money? The book actually covers quite a lot of ground but at a rather superficial level. Structured Basic is introduced and some very Spectrumish examples given of how to exploit the procedure and FuNction constructions. The book moves rapidly on (without even attempting to list the SuperBasic command set) to a discussion of turtle-graphics. The inclusion of this chapter is a stroke of genius, as when the book was written it was not known that Sinclair would include turtle-graphics!

Unfortunately, this is also the undoing of the book as there is now no need to set up your own procedure as Boris proposes.

The second half of the book discusses the two microprocessors, the M68008 and the supporting Intel 8049. I found these chapters more informative than those on programming.

The most amazing thing about the book is that it is here at all — being written from an incomplete and provisional manual. Having just borrowed one of the first QLs to be issued I can now check the accuracy of Boris' predictions of how SuperBasic works out in practice. The book examples are very simple, which is good, assuming the book's primary use is to introduce the language to beginners.

Another area which is curiously absent from the book is a discussion of the Psion applications software.

The Sinclair QL Companion is a valuable introduction tot he new machine if you can't wait for something better. When the QL actually arrives however this book will have outlived its usefulness.

Book *The Sinclair QL Companion*
Price *£6.95*
Micro *QL*
Supplier *Pitman Press, 23 Denmark Street London WC2*

This Week

Program	*Type*	*Micro*	*Price*	*Supplier*
Contract Bridge	S	Atmos	**£5.00**	Touchstone
Blockbuster	Arc	BBC	**£7.95**	Micro Power
Electron Invaders	Arc	BBC	**£7.95**	Micro Power
Frenzy	Arc	BBC	**£7.95**	Micro Power
Jet Power Jack	Arc	BBC	**£7.95**	Micro Power
McVid	Ut	BBC	**£14.95**	Pro Supply
Rubble Trouble	Arc	BBC	**£7.95**	Micro Power
Stock Car	Arc	BBC	**£7.95**	Micro Power
Tudoroll	S	BBC	**£7.50**	J Morrison
Bubble Trouble	Arc	BBC	**£7.95**	Micro Power
Sheep in Space	Arc	Commodore 64	**£7.50**	Llamasoft
Skramble	Arc	Commodore 64	**£5.99**	Rabbit
Mission Mk1	Arc	Dragon	£6.95	J Morrisson
Alice in Wonderland	Ad	Memotech	**£9.95**	Memotech
Blobbo	Arc	Memotech	**£6.95**	Memotech
Contenental Raiders	Arac	Memotech	**£6.95**	Memotech
Maths 1	Ed	Memotech	**£9.95**	Memotech
Mission Appiphatron	Arc	Memotech	**£6.95**	Memotech
Snappo	Arc	Memotech	**£6.95**	Memotech
Super Minefield	Arc	Memotech	**£6.95**	Memotech
Hunchy	Arc	Sharp	**£5.95**	Abacus
Blade the Warrior	Ad	Spectrum	**£5.95**	Cable
Bubble Buster	Arc	Spectrum	**£5.95**	Sinclair
Buffer Adventures	Ad	Spectrum	**£5.95**	Buffer
Chessmaster	Ed	Spectrum	**£15.95**	Serlin
Childsplay	Ed	Spectrum	**£9.95**	Polarsoft
Driller Tanks	Arc	Spectrum	**£5.95**	Sinclair
Editor Assembler	Ut	Spectrum	**£8.50**	Picturesque
Eric and the Floaters	Arc	Spectrum	**£5.95**	Sinclair
Hampton's Court	Ad	Spectrum	**£5.50**	B Sides
Hidden Secrets	S	Spectrum	**£1.95**	Eurosoft
Make Music	Ut	Spectrum	**£5.95**	Buffer
Mysterious Fairground	Ad	Spectrum	**£5.95**	Buffer
Restricted Zone	Arc	Spectrum	**£1.50**	Eurosoft
Revenge of the Tomatoes	Arc	Spectrum	**£5.95**	Visions
Ruby Runabout	Ad	Spectrum	**£6.95**	Scorpio
Spectrum Monitor	Ut	Spectrum	**£7.50**	Picturesque
Stop the Express	Arc	Spectrum	**£5.95**	Sinclair
Super Bridge	S	Spectrum	**£5.95**	Buffer
The Wrath of Magra	Ad	Spectrum	**£12.50**	Carnell
Which Tax Calculator	Ut	Spectrum	**£12.95**	Sinclair
Zipper Flipper	Arc	Spectrum	**£5.95**	R E D Sunshine
Pack A	Arc	ZX81	**£1.95**	Eurosoft
Pack B	Arc	ZX81	**£1.95**	Eurosoft
Pack C	Arc	ZX81	**£1.60**	Eurosoft

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.

Brought to book

As you well know, the US government is very worried about the leaking of high technology secrets to the USSR.

The British M16 department have managed to intercept this KGB missive. Before it found its way into the diplomatic bag, the KGB managed to obtain this information from breaking into the FBI's offices in Washington. The FBI had intercepted a microwave transmission from a satellite to the CIA's offices (also in Washington).

The CIA bugged the offices of a high technology publisher and its intelligence was in the form of a transcript of the conversation.

At some points, the implications for the transfer of high technology information in printed form are breath-taking in scope.

The information from M16 is made available for reproduction have by kind permission of a cleaner on Crewe BR Station.

This information should be presented to the public as a matter of public duty but, unfortunately the transcript seems rather incomplete.

Transcript Part 1

Publisher: Are you sure?
Author 1: I'm positive. There's nothing I can do about it.
P: So you can't understand the manual . . . It would help if you could you know. After all, if you're writing about the Hype computer you should be able to understand the manual.
A1: I know, but when I signed up to do this Hype book I expected to be able to do a manual re-write, add in a few old examples, and pretend it allowed you to *Make more of your Hype*. The manual's so bad that it's impossible to re-write it.
P: Will the punters be able to understand your book?
A1: No.
P: Right. In that case we'll call it the *The Advanced Hype*, so that if they can't understand it they'll blame themselves. And we'll add an extra quid on to the price.
A1: Anybody who buys a Hype has to be an idiot, will they be able to read?
P: Good thinking. . .We'll charge an extra two quid, they won't know the difference. Do you want to write a book on this new computer called the Con? You could write a games book, called *Con Tricks*. . .

Transcript Part 2

Author 2: Well, it's very simple. There's this thing called a 'disassembler', and what I do is leave it listing out the memory on a printer while I go to the pub. When I come back I rip off the listing, add a few words, a few standard bits about machine code, and call it *The Hype Rom*: *The Disassembly*. You use it as camera-ready copy, and it's dead cheap. As it's about the Hype we can charge a lot. . .There's this new micro called the Con. I could do it for that as well. Interested?
Publisher: Yes. Call it *Understanding the Con*. . .

Transcript Part 3

Publisher: Lots of people are interested in machine-code, because of the games. We need something on machine-code for the Hype — didn't you write a machine-code book for the Pancake?
Author 3: Yes, but it fell a bit flat.
P: It's the same chip isn't it?
A3: I don't know, but I suppose I could find out. . .Doesn't really matter what it is, it's all standard stuff. I'll search out the disc with the Pancake book on — I'll be able to use large chunks of it.
P: Good, that's settled. All you have to do is pretend that machine code is easy, and it's useful, and we can charge an extra quid 'cos it's machine-code. What chip does the Con use?

Transcript Part 4

Secretary: It's a just been on the news, Hype have crashed!
Publisher: [Expletive deleted]

Boris Allan

Change of address

Puzzle No 107

The middle-European principality of Nonentia is in a state of confusion. The good, but eccentric, King Umberto has declared that the country must go hexadecimal. Whether this is a result of the birth of his sixteenth child, or the present of a new computer — officially to keep the palace accounts, but supplied with lots of *Space Invader* software — isn't clearly known.

On 'H' day, the date arranged for the changeover, all addresses must be converted from decimal to hexadecimal. The only praise for the King's decision comes from the local brass works, who are doing a roaring trade in metal numbers for the house doors!

Not that all this affects old Bungo, the cobbler. He lives at number 53 and is quite pleased that all

he has to do is to re-arrange the numbers to make 35 — his new number — as 53 in decimal is 35 in hex.

If no address has more than three digits, what other numbers are the same as old Bungo's?

Solution to Puzzle No 102

One of the easier puzzles. Almost certainly it is better tackled on the back of an old envelope, rather than using a micro sledgehammer.

However, a program can be written to solve it like the one below. It tests all numbers from 10 upwards and points out those that form their reverse when added as described in the question.

```
10 LET N = 10 20 LET T = N 30 LET N$ = STR$ N 40
GOSUB 200 50 LET N$ = STR$ T 60 GOSUB 200 70
LET M$ = "" 80 LET N$ = STR$ T 90 FOR M = 1 TO
LEN N$ 100 LET M$ = N$(M) + M$ 110 NEXT M 120 IF
VAL M$ = N THEN PRINT N, M$ 130 LET N = N + 1
140 GOTO 20 200 FOR M = 1 TO LEN N$ 210 LET T =
T + VAL (N$(M)) 220 NEXT M 230 RETURN
```

It finds only two solutions: 12 which is Chris's age and 69 which must be his grandfather's age.

Winner of Puzzle No 102

The winner is: Andrew Turek, The Vale, London NW11, who receives £10.

Rules

The closing date for entries to Puzzle No 107 is June 1.

The Hackers

.... but seriously,

AUTOMATA

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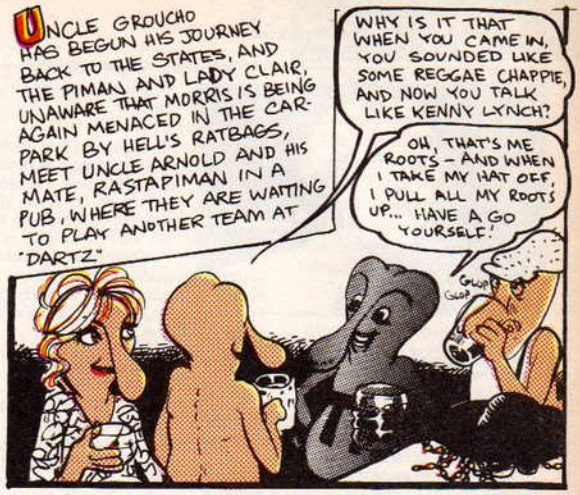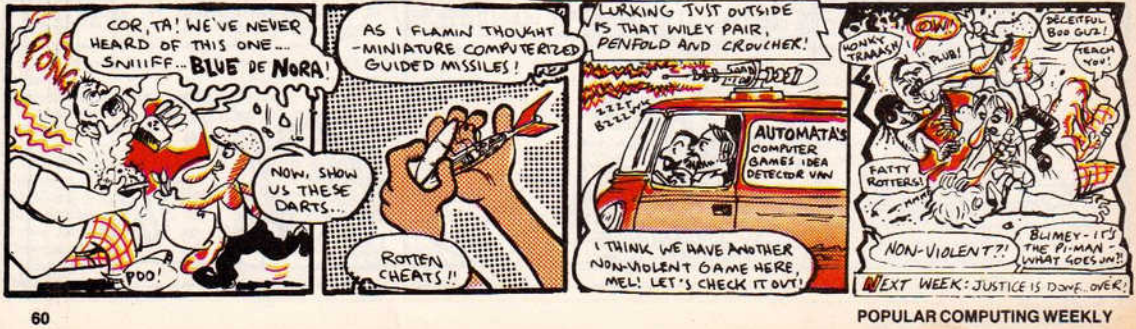
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