

No 4



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JULY 1984 85p



**NEWS  
REVIEWS  
GAMES PROGS**

**MERSEY BYTE!**  
The Computer Knives Are Out!

# DON'T JUST SIT THERE - PLAY SOMETHING!

## FORBIDDEN FOREST

Forbidden Forest is more of a quest than just a game! The action takes place in a four dimensional scrolling forest landscape which many have entered, but none has returned. Yes, I did say FOUR dimensional, do you take it right in the arctic (uhhh) The quest is to seek out and destroy the Demogorgon, mystic ruler of the Forbidden Forest. Before you can even set eyes on him you will have to contend with his army of fearsome creatures, including mutant goblins, showers of giant frogs, snakes, dragons, skeleton soldiers and more! You have only your trusty bow and arrows to depend on!



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manner of treacherous traps and hidden pits - an epic test of your courage and cunning. Aztec Challenge features no less than seven totally different screens - here are just three of them - each of which presents a brand new challenge. We hope your joystick can stand up to it!



55019

## SLINKY


Slinky, the spring, was having fun hopping about when suddenly he came upon a pile of coloured blocks, so he thought he'd play around on them for a while. Much to his amazement he found that they changed colour when he landed on them. Well! But unknown to him, the blocks belonged to the 'Wicked Wizard, who sent his friends along to tease our poor hero. Slinky is a real fun package with ninety-nine levels, amazing reward displays, level action replays. Where else could you meet such charming characters as Ducky the duck cloud, Marge the magnet, Ralph the random rooster, and Lorenzo the chameleon hopper!



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## THE SCREENS ARE ALIVE...

**SOUND IS** probably the most neglected aspect of computer games — witness the meekly howling of the nation's top-selling titles: the Spectrum. Even on other machines, programming musical notes can defeat even graphics experts. In **BARGE**, it's a chore.

But this is changing (see p.60). Stars on the Amstrad and Enterprise tell their own story. Now we have **MISS** — a sort of aural **MSX** — to help you make your notes talk to synthesizers, and keyboards. It's clear that the days of the tin-eared are numbered. From the top, now ...  
**TONY TYLER**



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"Water — that's a horse in my soup!" p.62



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Don't you know a game when you see one? **MUSIC SPECIAL** p.62



Which software could rival to read this? p. 58

PSYCLAPSE

BAUNDER & SNAATCH



## SUPERPUTERS OFF TO SHAKY START

ALL THE HYPE about super computers in the "affordable" home computer market, manufacturers in Britain and the USA would just be having a change of heart — it isn't a matter of when, but whether, according to industrial industry sources.

Of the two super-computers, the British one is now up and running — and attracting excellent reviews despite the hump-up with the "designer" that attended its real-time (as opposed to programmed) launch date. However the last hump that grew up as a result of late delivery has not gone away

while the irritation over the large sizes of money lately available (at rates interest to Britain) throughout the waiting period has now materialised into active consumer rejection.

As for the USA, the Flat is still looked to appear next month — after delays caused by problems with the multi-cased software. These delays are widely seen as having affected Esacorp's chances short-term — though if the machine lives up to its specific claims it could still attract a

market over here.

Of the British White House, only the Acornbit CPU 486 ultra-size machine, with its superfast (RAM) and other features, has actually appeared on lines and to promised.

The American Crayone data, launched in 1989 though not delivered until early next year, 1990 has been dropping its selling reviews and good looks (especially in the USA, where it came), and currency are now all of its pending with doubt from the market. All right Atari have still talked to

make substantial inroads into the UK market with their XL series, and are now more than ever committed to the AtariSoft project (launched on 160 computers like Spectrum and still runs the Commodore).

Meanwhile the standardisation of operating systems in the UK — the long-term Japanese MSX project (aimed to revolutionise the domestic computer scene — say here — in such a way as to have very little room for home-grown competition. We'll keep you posted.



## WHO'S DA MUG, MUGSY?

BY NADINE in Fife, I'm a cop. Things had been pretty quiet till they got the usual crop of homicides — and muggings. Then the call came — the guys at B&K had problems. I walked over to their office. They were right.

A couple of criminal-looking types had taken over the joint. By their clothes they looked like ageing ex-members of the crew of "Mugsy". Fella no, quite shabby, the works. They carried victim cases but didn't look like building Stefan Coppola's.

One flung up the window. "Nice size of glass ya got here, mate. Real shame if sumthin' happened to it — bang way down, see. Ain't that right, Jerry?" His partner grabbed my arm and reached for his victim case.

My hand gripped the heater. The next option, inside there was no job, no victim, just dozens of copies of a game called Mugsy.

"Da Boss Lady wants yeh should involve the supports now. Support games. An' she wants yeh should say how things about it, dig?" So saying the creep forced a cassette into the covering B&K staff. "Mugsy is da crime," he said. "It's new an' it's real an' we don't want nothin' gonna come back an' tell yeh about it again, gosh?"

I summed up the situation instantly. It was the Malborough House Mob, already wanted for covering crimes against good game. Moments later Boss Lady had a new game she wanted people to know about and had told these two goons to put the pressure on the press, something that nobody but nobody gets away with. I took their statements for backing. The game stayed at B&K. They might even review it — voluntarily.

There are eight million tales of Software Indiscretion — this has been one of them.

## ZAPPING ON THE RATES

WOT ON the heels of that Tour of the Universe (see page 75) comes news of a high-tech Theme Park on the rates!

One as-yet-unrealised venture occurred in the north of England has employed a firm of leisure consultants to find out just what they could put in such a park. Computerised simulations and less-than-games that you walk through it are high on the list of possibilities. A bank of arcade games two scores in size is also mooted. It would take every game as it comes onto the market. The park might also provide as a museum for great computers and games that you have found. "Several games magazines crafted by electronic leisure specialists," are also promised, whatever these are.

When B&K campaign down which council can afford such splendour you'll let you know. . .

Smash the rate, OK!



Who's this? M. SMITH completing the Mugsy screen of Positively Obsessive Mugsy (P.O.M.), just one of the P.O.M. (O.M.S.) celebrating the release of the Palace Software game of the same name on CDROM.



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## NO REGRETS, SAY ATARI AT NEW GAMES LAUNCH

"THERE WILL be no compromise for the sake of cost," said Atari International's U.K. Marketing Director of the much commented upon high price of Atari software in the British market. The remark was made at the launch of a new range of Atari computer and video game software in May. Though prices still remained high (compared to most other companies) some movement downwards was noticed on the prices of the new games.

*Milipede* and *Crystal Castles* are the latest to be added to appear in the VCS format, at £26.99 and £19.99 respectively. *Qwak's Dash Away*, based on TV's *Tesarna Street*, comes in for the nippers at £79.99.

*Milipede* also appears — as a ROM cart for the Home Computer System, along with *Moore Patrol* — at £24.99 each.

The second wave of AtariSoft releases brings more arcade classics to multi releases.

*Auto Position* appears in cassette-based versions for Spectrum 486 and BBC at £14.99 each and as a ROM for the Commodore 64, £14.99. *Robotman 2000* comes in Spectrum 486, BBC and Electron editions at £9.99 each, with the Pac-Man in Beeb and Electron formats at £12.99.

*Dig Dug* is available in the BBC version now and should hit the Electron market next month, both £9.99. That just leaves *Donkey Kong Jr.*, swinging into the Spectrum 486, at £14.99.



AtariSoft's Crystal Castles

## GARBAGE IN, GARBAGE OUT

by The Shadow

WHICH MAJOR Liverpool software house, introducing the first issue slated earlier this year by CEO Rupert Hoelzel for 800pc tapes... And which CEO Hoelzel was adding his "reflexive flash response" from another head major Liverpool software house?... Great town, Liverpool... The Shadow knows all, for he walks by night.

Truly Understanding Part No. 34 sends many major companies second files to look down on the mighty IBM. The Shadow's colleagues at Big K actually del. Physically, that is, through's belly up above Lomax's South Base gives them a Garbage's eye view of neighbouring Big Blue offices... Get your head off, sir... The Shadow sees all, for he flies by day.

Comp's 100000 is a Steve Keaton, who conquered the social laws and his silicon land for afloat for long enough to qualify as a Fair Play for programmer (2nd place, actually) at a recent AtariSoft job to launch new games... Despite being opposed by two other firms, Keaton's compliance unit, since his price was a slow but functioning (and

recently called Atari Digital Clock, while the joystick first programmer now finds himself constrained to a final design of Silverstone... 1985, Super Boss, continued our previous. Department of unhappy Commodore, even while an Atari boycott was being publicly and cheerfully optimistic about the future of the dedicated videogame machines you know, those things without keyboards), another nail was being driven into the coffin of the aging format by Wagle Games Centre's announcement that no longer will they be generalist operations in... (garbage) and... and systems... it's a tough old world.

Compare to Silversoft for a fleeting, witty-if-often-banal new concept in *Money Money Money* at the Spectrum 486; you have to keep a cargo ship going while both good and... Nice graphics, good, good, — but the best (such is that) the game consists of locking cases (due to limited K). Do *Wavelength* have something the Shadow doesn't?... Course not... Logging off...

## CHEAPO SOFTWARE—MAKERS WORRIED

(Overheard on a "cessed line")

**SOFTWARE HOUSE BIG 0407:** ... (ing terrible) What really got us up my nose is we wanted to do it first.

**2ND SOFTWARE HOUSE 060 SHOT:** Yeah, I know. All those whinging waffles...

**0405:** — Backstreet software...

**0405 (2):** ... Complaining and raising your prices back up.

**0405:** Now these Macintosh...

**0405(2):** Macintosh, you mean.

**0405:** Yeah. Cleaning up like we should've. Under two quid a copy and they shifted over 250,000 units in the first month.

**0405 (2):** Makes you want to weep.

**0405:** Yeah, then along comes Atlantis or whatever they're called...

**0405 (2):** Atlantis Software. They're well in too, I hear.

**0405:** I hate them. Any-one would think the punters really wanted cheap software... did you see something?

**0405 (2):** Mat No.

**0405:** Must be something wrong with the line.

**0405 (2):** 'Sire! You don't think...

(end of tape)

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## The Game: ACORN NIXED BY BEEB LINK?

AFRICA THE BEB means Acorn are now fairly heavily involved in game marketing for the Games Technology TV's interactive satellite game questionnaire but exclusively reported three months ago by B&N.

But it now appears unlikely that Acorn will produce their *Beetlemania* Machine One 48888 in time to fit the bill.

Industry say that Yorkshire TV must first test the waters of the Independent Broadcasting Authority — who visited an ITV news when the deal first came up last November. And that there's the whole point of the Acorn TV "interactivity".

New Year Data Technologies can make the BBC think that an IBMPC — including The Graphics for IBM PC (IBM multi-puter) you can use the PC version of the BBC DOS operating system along with the BBC OS.

A licensing deal means that Acorn will both sell and support the product. A software solution for the Acorn Electron will make the latter the cheapest BBC PC clone on the market — for under £1,000 a-heck — and this is just the machine that ITV want, with the proviso that a machine can be expanded in the same way without losing the price over £1,000.

Obviously TV want to start in one of those BBC microc in the market place Acorn are keen to help. All they need now is a real front end.

## FROM RUSSIA WITH LOVE

A COMMERCIAL microcomputer called *Agatha* is being made by Agate in Russia. It will need for the computer itself. Agate will be an extension of Moscow's first computer that looks like a real machine.

The Soviet Union has produced a version of the Apple II, called *Commodore* which contains an "Agatha" but which is allegedly more than twice faster. That's because it employs high speed versions of the basic 8080 chip called *8080C* providing for the advanced *CMOS* mode of making chips.

Businesses act all. The entire deal was to participate in a research plan to build the next generation

BY THE TIME next year, as many as one in three computer owners may possess a disc drive or some similar form of fast-access mass storage.

And in recognition of this growing trend, more and more games programs are now putting their eggs in the fast-access basket.

Acorn, of course, have for long made their games software available on both disc and cassette, reflecting the dual choice of disc systems (Acorn's own, Ferret, Gemini, still for the Model 8 machine). The huge popularity of the Commodore 64 has also stimulated demand for C64's own rather than disc systems — as recognized by E.Tal, who recently devoted his Commodore disc family continuing to issue on cassette (normal) and several other computers.

In the USA, where disc drives cost (relatively) less, cassette systems are considered primitive,

## NO DISC? THEN YOU'RE A WALLY!

and certainly devices; and it is from the UK experience that out of 5 computer owners apparently an ideal that British companies are now moving towards the superior — but far more expensive — system.

We firmly believe that this choice can be the winning thing, certainly long-term — and we intend to be seen as a long-term operator — a 5 Tal spokesman told B&N. The company's philosophy is that, since a computer owner has bought his machine, he need make purchase will be a disc system — "and we want to do this really enjoying".

In addition to the high-speed loading and saving time associated with discs, other advantages are that the large amounts of storage possible can effectively increase the "virtual RAM" of a machine. These participatory adventures — still the fastest-growing type of game in a world

popularly terms — where at any given location the next stage of a long program has to be stored in RAM can be auto-loaded, with special variables being transferred from one stage of the program to the next.

Advers to the disc pack is of course price, whose impact and how Crown-Microcops systems is nearly as fast as most discs, and considerably less expensive. Another problem for the UK hardware man is that while cassettes, etc., are mass-produced here, most disc standards are imported from — you guessed it — Japan. A third factor is the standard currently being agreed between the standard 5.25 floppy disk, and the new micro-disc made by Sony (5 1/4 inch double density 5 1/4) which can almost match the larger disc size in storage-capacity and access time.

A nice format you? We'll keep you posted...

## LETTER FROM MOSCOW By Our Special Correspondent

I am writing to give you updates on progress with our own computer. As you are probably aware, Comrade G. is conducting negotiations with that "free trader" that represents all of our devices, and so we better better you!

Old Comrade Perlov is still with us this weekend (18 years), I am told, and still in the same comfortable position (I) and he is working on a revolutionary transmission system.

In a line of international dog, each holding tail of next dog between teeth, Comrade J. has managed to get to show their mutual agreement that we represent all of our devices (I) and he is working on a revolutionary transmission system.

Comrade K. is still with us this weekend (18 years), I am told, and still in the same comfortable position (I) and he is working on a revolutionary transmission system. In a line of international dog, each holding tail of next dog between teeth, Comrade J. has managed to get to show their mutual agreement that we represent all of our devices (I) and he is working on a revolutionary transmission system.

Comrade L. is still with us this weekend (18 years), I am told, and still in the same comfortable position (I) and he is working on a revolutionary transmission system. In a line of international dog, each holding tail of next dog between teeth, Comrade J. has managed to get to show their mutual agreement that we represent all of our devices (I) and he is working on a revolutionary transmission system.

Comrade M. is still with us this weekend (18 years), I am told, and still in the same comfortable position (I) and he is working on a revolutionary transmission system. In a line of international dog, each holding tail of next dog between teeth, Comrade J. has managed to get to show their mutual agreement that we represent all of our devices (I) and he is working on a revolutionary transmission system.

Comrade N. is still with us this weekend (18 years), I am told, and still in the same comfortable position (I) and he is working on a revolutionary transmission system. In a line of international dog, each holding tail of next dog between teeth, Comrade J. has managed to get to show their mutual agreement that we represent all of our devices (I) and he is working on a revolutionary transmission system.

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Comrade P. is still with us this weekend (18 years), I am told, and still in the same comfortable position (I) and he is working on a revolutionary transmission system. In a line of international dog, each holding tail of next dog between teeth, Comrade J. has managed to get to show their mutual agreement that we represent all of our devices (I) and he is working on a revolutionary transmission system.

Boris



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# ZIP

# CODE

## How Hawkeye fixed Atari's liver...

WIFE (I sat for the Korean War, Atari might be out of business today).

Fellow closely because of his involvement as a freelance writer, a doctor wrote a fictionalized account of his Korean experience. Whereas his book wasn't exactly a blockbuster, it did become a very, very successful movie.

In turn, the movie began an even more successful television series.

The series was M\*A\*S\*H, and it named Alan Alda into America's biggest and most trusted star.

Throughout M\*A\*S\*H's seven-year run, Alda decided to exploit his trust by purchasing to produce endorsements, other than for his own motion pictures. But when at a nanosecond after abandoning M\*A\*S\*H — i.e., last summer — Alda signed a lucrative contract, selling his considerable credibility to Warner Communications for what is selling Atari's skin.

### DEFERATION

For Atari was in deep trouble. The company lost \$528 million and laid off over 2,500 employees last year. Then they managed to pull off the near impossible: they actually lost a fortune on merchandising items based upon the movie P.T. and Raiders of the Lost Ark. Of course, they were losing money on lots of other game carts as well.

Faced with competition from Coleco, sales of the 5200 were in a deep slump

and retailers were closing out units at about \$50.00 (\$29.00). Their all-new Atari 5200 proved to be an initial disappointment — it had a tough launch, a limited software catalog, and its games were no better than those made for the Atari 400. But the 400 was also in the bargain-basement line, selling for about one hundred dollars less than the 5200. With Commodore selling their 64s by the truckload and Coleco's forthcoming Adam looking like the Volkswagen, Atari had to find the future — and then find a way to sell that future to a doubtful public.

### TRANSFUSION

Wanted Alan Alda, Mr. Credibility, Mr. (Ironically) And, as far as television was concerned, a commercial virgin. Atari dumped its fledgling line of new computers (the 1200, the 1400, and the 1450) and concentrated on two new machines: the 800 and now 800. These micros were everything the previous Atari machines were not: they were well designed, very family oriented, extremely useful, and played games like nobody's business. Most important, they used the software already written for the 400 and the 800. And with Alda's clever commercials behind them, they quickly became the computers for families that couldn't afford Apples or IBMs. Most families, in other words.

Atari also cleaned house.



They hired a new boss, James Morgan, who made a lot of extremely smart moves.

After straightening the company's chaotic management structure, Morgan put a lid on new product announcements. Hereafter, Atari was no longer in the business of getting gamers excited about stuff they would never see.

That's smart, because as a game reporter, I myself am still waiting on Atari's 3-D game system and on their wireless 2600. I played prototypes of both, of course; but it is much easier to make a prototype of something than it is to make a marketable production model. Just ask Coleco.

### POST OP

Atari's got something between seven and ten million 2600s still operating in American homes, so there will be a market for their game software for quite some time. The 5200 has finally taken off with a great deal of top-notch software support. Atari has taken a lot of intimidation and Coleco gamers and brought them back into the Atari fold.

Their future lies in the success of the new micro — if Atari blows it, they won't get

a second chance. The field is simply too competitive.

Atari isn't out of the water yet, but at least they can sight land.

## STATESIDE CHATTER...

Commodore's alleged 264 and 364 might not make it — the former was unveiled at the Winter Consumer Electronics Show by a lot of head scratching and general befuddlement; many folks think it is inferior to the original Commodore 64. As of this writing, retailers have seen neither hide nor hair of the 364. If Commodore is going to stay in the low-end micro market, they're going to have to come up with something, and it better play games, and it better be good.

Coleco announced an Adam disc drive — now we'll have to see if they can deliver. Of course, they just laid off 1,200 workers after posting a \$26-million loss for the last three months of 1983. Wednesday they'll learn the truth: you can't produce an adequate number of good games for several semi-compatible systems (the Coleco, the driving module, the sports module, the roller controller, and the Adam).

More next month.



```

300 DATA 10.150,0.150,0.171,150,0.120,
120,42,150,150,10,90,120,0,170,0,0,0,
0,0
300 DATA 2,150,0,0,150,0,0,150,0,0,
10,0,1,150,0,0,207,0,0,207,0,0
310 DATA 21,40,0,213,04,0,213,04,13,
113,04,03,01,0,120,20,0,202,170,0,
170
320 DATA 170,140,0,230,124,0,103,112,
0,120,120,0,100,120,0,170,120,0,
100,120,0
330 DATA 00,04,0,00,04,0,00,04,0,00,
04,0,01,04,0,00,00,0,00,00,0,0
340 DATA 01,40,0,213,04,0,20,04,0,213,
00,0,21,0,0,0,0,0,0,170,0,0
350 DATA 170,120,0,270,020,0,0,00,127,
270,200,120,120,100,140,200,171,
120,40,100,120
360 DATA 0,00,04,0,01,04,0,00,04,0,04,
04,0,01,04,0,00,04,0,00,00,0,0
370 GOTO 1000
380 POKE V,200:POKE 2040,0
390 POKE 2041,10
400 IF #=2042 THEN FOR N=1 TO 400
SET @:NEXT @
410 POKE 2040,@:FOR @=0 TO 60:POKE @
POKE 2041,@:NEXT
420 POKE V+1,@:POKE V,100
430 POKE V+2,@:POKE V+1,@
440 FOR @=0 TO 60:READ @:POKE 2040,@
NEXT FOR @=0 TO 60:POKE V+1,@
NEXT
450 POKE V+1,@:POKE V,200:POKE V+1,@
460 POKE V,200:POKE V+1,@:POKE 2040,0
POKE 2041,@
470 @=0:DOUNT 0000 IF @=0 THEN @=
60:END UNTIL
480 IF @=0 THEN @=0:GOTO 1700
490 PRINT @:GOTO 1,0:GOTO 450
500
510 REM ALL FOLLOWING DATA NEED NOT
BE ENTERED EXCEPT LINE 500
520
530 DATA SWAMI HARRIS,14,150

```

```

550 DATA 10,100,0,10,100,0,0,200,0,1
04,0,10,100,0,10,100,0,10,100,0
560 DATA 42,170,0,40,170,100,42,100,
120,40,170,120,40,100,0,42,120,0,
170,200,0
570 DATA 171,100,0,171,100,0,174,100,
0,100,100,0,200,100,0,200,10,0,21,
0
580 DATA 10,200,0,10,100,0,7,210,0,1,
04,0,10,100,0,0,100,0,10,200,0
590 DATA 40,100,0,41,200,0,41,100,0,
42,120,0,40,120,0,42,100,0,170,100,
0
600 DATA 170,100,0,170,100,0,170,100,
0,170,100,0,170,100,0,10,0,21,
21,0
610 DATA GLASHTON,0,700
620 DATA 00,200,0,00,00,0,00,044,40,
01,04,100,01,04,200,10,0,01,40,120,
100
630 DATA 40,200,0,170,140,0,170,100,0,
170,200,0,171,100,0,12,100,0,00,
100,0
640 DATA 200,100,0,40,100,0,10,00,0,
10,00,0,10,00,0,20,00,0,00,000,0
650 DATA 00,000,0,00,00,0,00,044,0,01,
04,0,01,04,0,10,0,0,42,100,0

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000 DATA 40,100,0,40,100,0,40,100,0
100 DATA 40,100,0,40,100,0,40,100,0,40,100,0
1200 DATA 40,100,0,40,100,0,10,20,0
20,30,0,20,30,0,20,30,0,30,20,0
1400 PRINT "*****"
1440 PRINT "*****"
1450 PRINT "*****"
1460 PRINT "*****"
1470 PRINT "*****"
1480 PRINT "*****"
1490 PRINT "*****"
1500 PRINT "*****"
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1590 PRINT "*****"
1600 PRINT "*****"
1610 PRINT "*****"
1620 PRINT "*****"
1630 PRINT "*****"
1640 PRINT "*****"
1650 PRINT "*****"
1660 PRINT "*****"
1670 PRINT "*****"
1680 PRINT "*****"
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1890 PRINT "*****"
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1910 PRINT "*****"
1920 PRINT "*****"
1930 PRINT "*****"
1940 PRINT "*****"
1950 PRINT "*****"
1960 PRINT "*****"
1970 PRINT "*****"
1980 PRINT "*****"
1990 PRINT "*****"

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0700 DATA "*****"
1710 DATA "*****"
1720 DATA "*****"
1730 DATA "*****"
1740 DATA "*****"
1750 DATA "*****"
1760 DATA "*****"
1770 DATA "*****"
1780 DATA "*****"
1790 DATA "*****"
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1920 DATA "*****"
1930 DATA "*****"
1940 DATA "*****"
1950 DATA "*****"
1960 DATA "*****"
1970 DATA "*****"
1980 DATA "*****"
1990 DATA "*****"

```



# charts

MP - Spectrum, AC - Amiga, BA - Commodore BA,

key

V26 - Vtg 26, 81 - 2D 81, DR - Dragon 32, DR - Data 1

## TOP 30 GAMES

(cont)

	MP	AC	BA	V26	81	DR	DR	Price
16 JET SET WILLY								£5.95
17 FIGHTER PILOT								£7.95
18 ATC ATAC								£5.50
19 MANIC MIBER								£7.95
20 DREAMWORLD FLAG								£8.95
21 HUNCHBACK								£8.90
22 BLUE THUNDER								£8.95
23 SCUBA DIVE								£8.95
24 POGO								£8.95
25 ANT ATTACK								£8.95
26 LUMAR JETMAN								£9.90
27 FRED								£9.95
28 NIGHT RUNNER								£9.95
29 FLIGHT SIMULATION								£7.95
30 CODE NAME MAT								£9.95
31 ZACMAN								£5.95
32 REVENGE OF THE MUTANT CAMELS								£7.50
33 SMOGGER								£8.95
34 THE HOBBIT								£14.95
35 WHEELIE								£5.95
36 CHINESE JAGGLER								£8.90
37 POOL								£5.95
38 THE SNOWMAN								£5.95
39 SPACE SHUTTLE								£8.90
40 TRASHMAN								£5.95
41 THE ALCHEMIST								£5.50
42 TWIN KINGDOM VALLEY								£5.95
43 BUGABOO								£7.95
44 DEFENDA								£5.95
45 STOMERS								£5.50

Compiled by MFB Computer

## VIDEO GAMES

(continued)

110	FOUL POSITION (Acad)
111	SPACE SHUTTLE (Associated)
112	SUPERCROSS (Parker)
113	WRECK (Activision)
114	WARG BROTHERS (Acad)
115	POPEYE (Parker)
116	BEYOND (Acad)
117	ENDURO (Activision)
118	DEATH STAR BATTLE (Parker)
119	4-BROT (Parker)
120	ROBERTO (Activision)
121	GALAXIAN (Acad)
122	PROXIA (Acad)
123	BATTLE 2088 (Acad)
124	FRIGGERS (Parker)
125	DOOMER (Acad/Color)
126	WARRIOR VS THE RED BARON (Acad)
127	DE DUIS (Acad)
128	MOON PATROL (Acad)
129	PETAL (Activision)
130	PAC MAN (Acad)
131	BEYOND 650 (Acad)
132	RIVER RAC (Activision)
133	TUTANKHAM (Parker)
134	COLOSS MONSTER MUNCH (Acad)
135	SPACE INVADERS (Acad)
136	JUNGLE HUNT (Acad)
137	EXTINCT (Acad)
138	SMURF'S (Acad/Color)
139	ROBOT TANK (Activision)

Compiled by MFB Computer

also selling well  
in mail order...

ATC ATAC  
(Ultimate)  
BUMPING BUGGIES  
(Bubble Bus)  
CHUCK-E-EGG  
(M&P Software)  
COLDITZ  
(Pippin Associates)  
CYLON ATTACK  
(M&P Software)  
FIGHTER PILOT  
(Digital Integration)

FLIGHT PATH  
(Animag)  
THE FOREST  
(Pippin Associates)  
FLYING FEATHERS  
(Bubble Bus)

JET PAC  
(Ultimate)  
KRAKATOA  
(Abbex)  
FLYING FEATHERS  
MEGAWARZ  
(Paramount)

NIGHT RUNNER  
(Digital Integration)  
OUTBACK  
(Paramount)  
PILOT 94  
(Abbex)  
RALLY SPEEDWAY  
(Adventure International)  
SPACE PILOT  
(Animag)  
TEST MATCH  
(CRL)

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...Pole Position gives a very strong sense of speed as you hurtle round the track. The super-realism of the three-dimensional effect adds a lot to the game. It is a great graphics demo.

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Brilliant!

WHICH MICRO? AND SOFTWARE REVIEW

...a terrific version of the arcade motor racing game...graphics are superb...sound, too is very good as brakes screech and engines rev-up.

PERSONAL COMPUTER GAMES.

Exciting, exhilarating, excellent, Pole Position takes the lead as the best Atari race game around.

PERSONAL COMPUTER NEWS.

What can we say?

ROAD TO OUR FUTURE



We're overwhelmed. Though we should just add that with Atarisoft, you can now play Pole Position<sup>®</sup> on the Commodore 64, BBC and Spectrum computers, as well as on all Atari<sup>®</sup> systems. Oh, and we're giving away free a Grand Prix kit and full colour wall chart with every game.

**POLE POSITION**  
from ATARISOFT™

IT MAY seem a long time ago now, but in 1984 there seemed to be quite a lot going for the city of Liverpool.

I'm not talking about the city itself. As someone who grew up there I remained convinced that Liverpool was, and most likely still is, a slump of the first magnitude (but we won't go into that). What I'm referring to is the famous explosion of pop (or soft) called it ('pop') talent, which twenty years ago immediately distinguished the 'Pool as a city with a talent for the unexpected — just as everybody else, included, was writing it off.

These days we find the great and gangy city beside the lawless Mersey to live with its own very special brand of Gold-fish) sense more widely down on its back. Unemployment, always high, is now critical. The city

itself are at loggerheads (not half) with Westminster. By the time you read this Liverpool may be officially bankrupt. It's a gloomy picture.

Except for one small thing. From the astonishing achievements of Liverpool it's a strange, alien, multi-cultural land (it's creeping. And another! And two more! They push in glowing electronic waves but are clearly thriving, growing fast. There is an exciting breeding ground and new set of possibilities of tomorrow established in Venus Fly Trap-like conditions. The earth begins to vibrate.

Yes! Yes! It's... it's... it's... Software!

And how!

Although there are at least half a dozen games designing operations now under way in Liverpool, this report concentrates on

only the three biggest, the major legs of a single tripod (assuming you like metaphors). They are Bug-Byte, the original Liverpool games company and the wellspring of the other two; Imagex, who meet the introduction (forming); and the newest of the three, Software Projects, formed out of breakaways from the first two, while the second had itself been formed by people breaking away from the first. There is, in a word, a close and vital relationship between the three Merseyside games companies, but despite this, they don't appear to like each other very much. There are dark sayings, and unwhispered doubts as there exists the Mersey; and even darker rumours. Yet with all the barga-bite (bargains) and poisoning of each others' soup, there is still a lot to be proud of.

The Mersey  
Riverfront  
imagery  
was used for  
the record  
album *Big  
Bang*.

## MERSEY BYTE!

Liverpool — where the echoes of the Mersey Beat sixties have given way to the sound of machine code. TONY TYLER returns to his roots to check out the Big Three in 'Scousesoft'...

### WHEN THE BUG BIT BACK

IN 1981 beginning there was Bug-Byte.

Well, actually, in the real beginning there was University College, Oxford, and its computer science graduate there was Tony Baden and Tony Milner, meeting Chemistry.

And so, on a day the man Baden said is the man Milner, I have an idea, Tony, and the man Milner said, Great, Tony, whereby the man Baden said, let us go into the world, you with your Acorn Atom and me with my ZX81 and make a great deal of money, for verily, I have laid it to the teeth with the Stronk Lab and three ridiculous games.

And the man Milner said, just what I was thinking, Tony, and he spoke the truth.

And on a day they three two departed the city of the dreaming spires and went into the world with a total capital of a tenner; with great they agreed to split on a single classified ad in Computing Today, and they chose Baden's home town Liverpool as their base, instead of was greatness, for the orders came pouring in.

Well, it was more or less like that. The names are true, as is the capital of £10.00, and the Acorn Atom ZX81 — as was

the fact that in those days (May 1980) Bug-Byte had no duplicating facilities, so that each order requirement meant a BAVE (save) to the printer.

Throughout their first year Mad Order was the name of the game, with the two roles gradually assuming into Milner (the programmer) and Baden (the marketing man). Throughout 1981 they took on staff, man by man; and apart from occasional hiccups — almost all of those of a personal rather than product kind — they just grew and grew, like many another software company during the previous two or three years. Their first real hit was *Marble for ZX81* written by Don Peattie, now with SG Systems, and — unusually — they were into that first game early on too, with editors' assistance, a dissemination and the like all available. And Spectrum founders came along to greet the sellers, as did Spectrux, designed by one Dave Lawson.

**UPWARDS AND OUTWARDS**  
Within a year of this they had severely outgrown their original office, so they bought themselves to Carrington Place, next the docks. Party-five Big Ones into the filling out of what was now Liverpool's largest and fastest-growing software house; and at

the same time, bearing in mind all those BAVES, they inaugurated (soon), their own duplication service (later called their own) in a suit, while up went their productivity.

The programmer Dave Lawson left in July 1982 — rather



The Mersey  
Riverfront  
at work.

unexpectedly, one gathers. Two months later Mark Butler, another Bug-Byte programmer, had followed Lawson (which puzzled Baden at the time, since in his estimation Butler had harbored unkind thoughts about Lawson), and the first, and greatest, of Bug-Byte's profits had appeared. Imagine Software. As for the same time the Department author of *Planescape* did as well, and in the same direction.

#### [EXIT THE MINER]

Bug-Byte faltered slightly at the sudden loss of talent, but recovered swiftly. By the following April they had yet another potential star working for them in a freelance basis: Matthew Smith. Smith's first effort for Bug-Byte was *Obit*, which all sides admit bombed out. And then Smith produced *Magic*

enough, I'd like to know what it is."

How was fantasist Smith able to take the Miner with him? Didn't he signed the old boy away? "There was a clause in our original contract," explained Baden, "which, due to a comma in the wrong place, or a missing comma, isn't remember which, was a bit ambiguous. Rather than spend a lot of time and money fighting it in court, we agreed to let him take the game with him. At the time, you see, Matthew was a minor, and our legal people told us that against a minor in open court nobody has a chance."

Baden is "reusable" about the idea of more and more software operations setting up house in Liverpool. He also carefully avoids negative feelings concerning Imagine and SP, as far as he can.

# FERRARI 'CROSS THE MERSEY

IF IMAGINE didn't exist, somebody would have to invent them.

This company has a national — never mind local — image as well as a high one. *Imagine* is a fair description. They have even (in *Mac* jargon) succeeded in making themselves into minor national figures. One of the founder-directors rides a 175 mph superbike and has serious ambitions concerning the title of Man-IT. Eugene Evans is the boy-wonder programmer even the *Daily Telegraph* has heard of. And, parked all over yellow lines outside the company's business-district offices, is a constantly rotating assoc-

work, which on the face of it seems reasonable enough. Imagine has their own so-called *MagGames* in a secret, non-franchised state (or three, more in a moment). They do it as a private press operation but themselves do little to help. They are surrounded by rumour.

#### THE 'A' TEAM

The company was formed slightly less than two years ago by two former Bug-Byte employees, programmers Steve Lawson and Mark Butler. They were closely afterwards joined by a third, younger Bug-Byte programmer, Eugene Evans, but for unexplained reasons Evans was never invited to sit on the Board and remains a jockey, if not a game designer. Since then Imagine have steadily looked back. Smith's has been staggering — among their many satisfying hits being *Evans' new Assault for Spectrum* and now *AI*, a ground-based shoot-'em-up with unendingly bloody encounters. It has sold hundreds of thousands of copies.

There are more recent hits, too. *Wasteland's* *Alchemist* is a remarkable and again definitive piece of work, an 'Artillery' with rich coloration and a fitting pace. And John Gibson, a fellow of Imagine's 'A Team', has recently produced a shrewd mix of tactical and strategic programs, *Attack*. He is, upon joining *MagGames* ("We've found a way of very considerably enhancing the power of the personal computer." — Bruce Howard, an ex-former Psycholab and *Bandwagons*).

#### OPEN SPACES

Their offices — formerly of an Arab shipping line — are immense, the only possible word. Seemingly hundreds of feet apart — a 200' walk away — all the programmers in teams of



them. More eggs on more than this game, seemingly, than attends US-Soviet relations. There are claims and counter-claims, all exacerbated by the fact that Matthew Smith has of course now also left Bug-Byte, and is one-third of the several company Software Projects. *Wasteland* takes the rights to *Marie Miner* with him, the same game has now been in the charts under the latter's old and new. This is avoided by angry comments from both sides.

"I know what Matthew's been saying, that he didn't get enough from *Marie Miner*," says Baden. "But I can't see how he got £30,000 cash from that one game while we sold it, and if that isn't

The first of all the 'Football' houses has now progressed from the *Marie Miner* affair, as they have from other affairs, and with Trevor Hall now spearheading their active teams, are continually developing new and high-quality software. At the time of writing, the *Computer Cookbook* is being researched — an obvious way to get all those legions of housewives hooked, overnight. The *Block* and the *Item* (not what you think, and now *Arctic*), or the by 10-year-old Adrian Sherman. Bug-Byte have what they call *MagGames* in the pipeline, chiefly *Star Wader*, which they call an 'Adventure'. They might support *Enterprise* and *Armed* ("Depends how they sell") and will "probably" support the *GL*.

ment of fast and expensive sales symbols of the four-wheeled kind) or *Avion*, a BMW or two; the world-famous *Lotus Spirit* belonging to the scarcely less renowned Eugene Evans.

They also make very good computer games and were a lot of money from them. Who the *John Gibson* designer? They do what they like with their dough? (I would) So what if their Operations Director is, in his opinion, a dead tiger for all *Wasteland*'s sake? The *John Gibson* Texas executive, he gets things done and is not really (verbally) slow on the draw. In this he's like everybody you meet at Imagine. They all have total confidence in their corporate future; they feel they're going places.

#### SECRETIVE

They are also to use an old (Napp) word) *interference*. By which I mean there's a lot of "No, you can't peek in someone else's" and "You wouldn't go in that room". Fiddling isn't (but closely supervised) with a Macintosh, your reporter accidentally accessed a memo and felt very strongly that he was within a millimeter of getting his fingers snapped. *Interference* inhabits the walls ("These machines have been put here by Dave Lawson and MUST NOT BE TOUCHED"). Getting into Imagine is also not easy, due to the electronic security system. This is all to protect their





# 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 await for a sign of Zayaxian spaceships. Suddenly, the alarm clocks 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 Anachroid Mutants and Disgusting Werenoids. . . .

This classic arcade game, originally developed by Jeff 'Awesome' Minter of Llamasoft, features 1 and 2 player options, spitting Llamas, Cyborg Anachroid Mutants, Disgusting Werenoids, 70 levels of play, Joystick recommended, Supports Spectrum ZX Interface 2 and Kampton joysticks.

## MATRIX: GRIDBUNNER II

It is ten years after the infamous Grid Wars, and humanity is once again threatened by the evil droids, only this time they're back in force with new weapons and new allies.

The awesome sequel to the best selling Gridrunner, Matrix features all the old favourites like Droids and Zappers, but increases the game quotient by adding Disposal waves, Cosmic Gamebois, Energy defensors, the Switch and more.

Game originally developed by Jeff 'Awesome' Minter of Llamasoft. Joystick recommended, Supports Spectrum and MGF joystick interfaces. In space, only the camels can hear you scream.

## What some famous people have said . . .

- |   |             |
|---|-------------|
| "What's an arcade game"                     | Arnold      |
| "Awesome"                                   | Jeff Minter |
| "I prefer elephants"                        | Hansel      |
| "Don't shoot me, I'm only the plane player" | Dino, John  |
| "Booy"                                      | Zelover     |

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WHISMITH



HE WROTE ONE...

# MAN IN THE CROWD

LIKE HIS CONTEMPORARIES of the eighties, Liverpool-based Mike Singleton has turned his back on the Soccer Haze in favor of the bright lights of London-based Beyond Software. Though then he has unleashed his "Epic" fantasy game *The Lords of Midnight*.

Mike has a dictionary. He has looked up the word "epic." "It describes a certain genre in the history of a nation," he says. Well, that's part of it. In *DO* 8's dictionary it means something on a pretty large scale — and that just about sums up Mike's approach to writing computer games.

Mike started off in a "small way with *Starlord*, a play-by-mail game that just grew and grew. After the 500th player had joined the game, Mike decided that it was time to give up his teaching job to concentrate on running *Starlord*, along with a few other projects he had in mind.

## CROWD SCENES

But like a Sir Richard Attenborough of the software world Mike is capable of things other than heavy crowd scenes. He's had his moments with the old arcade style game as too. *Snake Pit*, *Shadowfax*, *3 Deep Space* (the one that made your eyes go funny) are all his. Now he's going for the Big One.

*The Lords of Midnight* is difficult to tag. Beyond that, many seem overly fond of the term "Epic" when describing it. More accurately it could be termed an interactive multi-player computer game utilizing adventure and wargaming themes (wow, maybe "Epic" is a little shorter). It can be played as a traditional quest, a tactical wargame or a generally impressive trip through some advanced computer graphics.



Singleton by name but not by nature. MIKE SINGLETON, master of the multi-player game, is the man behind those enigmatic ads — "Who Are The Lords of Midnight?" RICHARD BURTON talks to another salon of the Liverpool software boom.

It is those graphics that are a key to the whole game. Mike has come up with a process he calls "landscaping" which, every time you move, will rotate the landscape around you in proper perspective, making any changes necessary. As you move forward distant peaks will recede into mountain ranges, with for-

ests and castles if need be. Lakes, frozen wastes, ridges, stacks, armies and other elements can be added or taken away as required — all at random. Beyond claim a staggering total of 32,000 different locations for this game.

This is important because the player views the scene through the eyes of the main character, Lucas, and three others (as well as a possible 32 others, but that's another story). Each can be in a different part of the Land of Midnight thus giving an ever-changing number of viewpoints.

Game objective, very simple, is to defeat the evil Doomdark, played by the computer (game's a loss, game's a loss). You are the hero, Lucas the Moonprince, Lord of the Free (game's a yay, game's a yay) and, by virtue of the Moon Ring you can control other characters that

are loyal to you. You can move them through the realm of Midnight and see through their eyes. Some are intelligent, some are cowards of some — you get the army thrown in.

There are two methods of using Doomdark and his horde: the wargaming method of sending armies to capture his citadel; or the adventure method of sending one character off on a quest to locate the Ice Queen, master of Doomdark's power. You can tackle each of these separately or together to form the complete "Epic" game.

*The Lords of Midnight* is a very complex interactive game which requires far more space than is available here. It fully exploits all its features — besides we're looking forward to giving it a full review very soon. So, you might think, such a game must've been some time in the making. Not so.

According to Mike it all began to come together towards the end of last year. Perfecting the "landscaping" routine was the cornerstone of the project. In September Mike brought the idea to Beyond's Terry Pratt.

The next major steps were the establishment of the map of the Land of Midnight and the story which forms a prelude to the game, both of which appear in the game's manual. "I tried not to be influenced by Tolkien," said Mike, "but some aspects of his work were bound to creep in, as in most other fantasy-based games."

Work proper on the programming started only in January of this year and was 99 per cent complete within three months — not bad going when you consider how much has been packed in the Spectrum's memory.

Comparisons with "warg adventures" like *Habit* and *Vandalia* are bound to be drawn, as *DO* 8 originated the debate by asking Mike his thoughts on adventure games in general.

"I'm not really an adventure games player," he quickly admitted. "I came into computer gaming through wargames. I find most adventure games to be 'bland', allowing only one possible route to completion. *The Lords of Midnight* is an 'open' game using intelligent play by the computer. Routes aren't dictated by the programmer in advance nor is all the scenery pre-rendered and locked into the computer's memory. You are in control of the main character and their ultimate destiny."





# A fine day for tennis on your Spectrum

This is Wimbledon.  
The home of British tennis, enjoying Britain's  
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But this summer things will be different. If  
rain stops play on court, you'll be able to carry on  
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**sinclair**

# RAVE from the GRAVE

## COMING SOON TO A SCREEN NEAR YOU GHOULS



Remember Killer Gorrilla? Well Ghouls is better. In fact it's probably the best game I've seen for the BBC. The graphics are superb, the sound is brilliant and above all it made me laugh. It's full of nice touches that give it a real professional feel. You even have the option of music while the game is loaded and the screen change between levels has to be seen to be believed.

Ghouls is set in a haunted mansion and you have to run through four rooms in the house, avoiding paranormal entities, avoiding spiders and contracting Revenants to rescue the power grids. All this is accompanied by spooky background music and if you lose a life something suspiciously like ghostly laughter floats from the mainframe. There are four rooms in all and each one is packed with features. You can bounce off springs, travel along moving platforms and leap onto sliding floors. There's so much going on it's unlikely you will lose interest for some time.

An original idea, beautifully implemented and an absolute must for any gamer who's — E.A.

**Game:** GHOULS  
**Maker:** BIRDY POWER  
**Machine:** BBC  
**Format:** cassette  
**Price:** £7.99  
**Rating:** KKK



## Reviews

STEVE KEATON  
 NICKY SKILLINA  
 TREVOR SPALL  
 KIM ALDIS  
 TONY TYLER  
 RICHARD BURTON  
 RICHARD COOK



## This Jack's Alright

### COMING SOON TO A SCREEN NEAR YOU JET POWER JACK



Really doesn't seem likely to describe Jet Power Jack. Only at four of the legs will you be reduced to a shuddering wreck who had to be physically restrained from getting a head through the screen. It's one of those games where you control a little man with a jet pack. Now Jet Jack has been caught by traps, the terrain and progressively damaged in a quiet game.

You have controls for left, right and down to go up and you manoeuvre him around, avoiding the ever-vigilant Baa Goggles, picking up fuel packs to take back to his spaceship. Sounds easy? Not a bit of it. The walls are all electrified and touching them means instant incineration. The idea here very often is to move around in and the make it an absolute nightmare. I spent hours creating the offspring Jet into each and I really game.

When you're a limited game freak, you'll seem like television when the lamp is switched back — E.A.  
**Game:** JET POWER JACK  
**Maker:** PROGRAM POWER  
**Machine:** BBC  
**Format:** cassette  
**Price:** £7.99  
**Rating:** KK

## TROOPA TRUCK

Whoever invented Troopa Truck should be put in a truck of his own design, taken out into the desert, and dumped. Never has a game benefited so much by so few attempts to play it.

Let's start with the action. You are a truck. Like in the popular arcade games you have to move across the screen, blast 'em boulders and jump 'em over any obstacles in your path. You are also plagued by airborne stuff which must be eliminated before they blast holes in your tyre. It quickly became apparent to me that if I held down the fire button continuously, I could simultaneously eliminate the boulders and the flying stuff. So there I sat, never using any speed so that I could see what was coming. That's it. You carry on, steadily melt on buttons, until you get capped, which you always do. For some obstacles are simply insurmountable. So you fall victim and the performance starts all over again.

Good points: When the truck is destroyed, the chassis collapses and sinks to the ground. The wheels fall off and scatter, making a rattling good 'thumping-sounding' sound. The truck never itself is really great — sounds just like the brick clip-clop of a horse. (Though Troopa knows why a truck wants to sound like a horse.)

All this for crystalline against a background of everything as a plate full of mud. Flat layers of colour form a landscape designed by a kindergarten impressionist. If I could spell what a raspberry sounds like, I'd blow one back. — M.S.

**Game:** TROOPA TRUCK  
**Maker:** BARRIT  
**Machine:** COMMODORE 64

**Format:** cassette  
**Price:** £9.99  
**Rating:** K





# GREAT GAME, BUT...

Jackie Wiley visited us at the IBC to offer his thoughts about *SW*. In preparation you might see all the more sophisticated graphics. However, this set the more powerful look showing in some of the earlier, a video number. On both sides of a lot of the game starts. (Again that really depends on the system, will you feel it will be a waste?)

So, for the few who really wanted to know that you were using a great *Wizard*, they are the best experience of *Wizard*. Wiley, from his own story about the *Wizard* software. Please request Wiley.

Wiley was the report responses on the issue of *SW*. Wiley has been the most professional-looking quality. *SW*, by the way, is a very impressive title. The review, I think, is that Wiley has been doing well for the time he has spent in *SW*. Wiley that he has fought hard a long time and those the make it special.

Theater's own and Wiley were in real life but not still for the hardware needs to select

more game and better off in the museum before to get the.

The idea is not to Wiley to take off a number amount through the management of *Wizard* (both available now) because there are more *SW* a comprehensive number of moving things, sound and music. In this respect it is better than *Wizard*. All you have to do is get Wiley moving and try to jump over any impediments. You can't see forward it's the fact that the time for you, my friend.

The major disappointment is the way the art of *Wizard* (both *SW* and *Wizard*) "look like a cartoon" (see what I am saying) Wiley from the first person who visits it. *SW* and the game, all that includes the most interesting things about the game. Wiley has the best of moving and the graphics (both) look on *SW*. I do not see why you are not more interested.

The art, or *SW* Wiley is really someone's idea. *SW* The graphics, animation and sound are as good as, if not better than the original *SW*.

the hardware requires simply showed. There are the regular *Wizard* Wiley approach the most and the best game on moving impediments the need to be a new solution.

Yes, completely out of the way... it's all about the *Wizard* system. *SW* Wiley.

Between companies are always going to fight the marketing problem in any way you can and support them in the light, but the hardware system is a *SW* (I don't think anybody) a great, important one containing *SW* (I don't think anybody) can't get any more. *SW* (I don't think anybody) can't get any more. *SW* (I don't think anybody) can't get any more.

It's not the best game on the market, but it's a good one. It's not the best game on the market, but it's a good one. It's not the best game on the market, but it's a good one.



Game: **JERRY WILES**  
Maker: **SOFTWARE**  
Platform: **IBM PC**  
Price: **\$49.95**  
Rating: **CCC**

### Too Late... Too Pricey!

USE A **CRASH** later for his new party *Pac-Man* finally arrives on the Spectrum scene.

Yes, folks, the genuine, fully authorized, uncut-throat, original *Pac-Man* is here. *Pac-Man* is yellow. Have been looking for a genuine like the *Wizard* of *Pac-Man*. This is it!

The best complaint that can be put to *Pac-Man*'s Spectrum edition is *Pac-Man* is that it is an extremely faithful reproduction of the original arcade incarnation. All the ingredients that make the game a classic (lights, power-ups, fruit, etc.) are rendered in easily recognizable graphics form.

In fact about the only thing that shows up on the Spectrum's limitations is some good animation. Sound, however, is very good and manages to retain the characteristic "wacko break sound" of the game.

A high score table, screen maps, keyboard shortcuts and a nice "introduce" screen each time screens round off a generally high quality presentation — which is to be expected of an Atari product.

The big problem of course is



that *Pac-Man* has already been done to death. Atari has attempted to show the game official style close with the *Wizard* in the game.

Even those who haven't already got some form of the classic *Pac-Man* game in their collections will be hard put to enough up nearly £10 for each console-based edition. *SW* seems to be killed to the realization of the software market in this country. However, had there perhaps some time support on their corporate side there before lack of overnight commercial success *Pac-Man* game is more than half in a state of *Pac-Man* console-based — *SW*.

Game: **PAC-MAN**  
Maker: **ATARI**  
Platform: **SPECTRUM**  
Price: **\$14.95**  
Rating: **CCC**

## Pitching and Punching

The first two releases for the Commodore game system designed to make full use of the Super Action Controllers, have received some excellent... Compared to *SW* (which is not a game for the Atari, they are living proof that what Commodore do, they do better) *SW* (which is not a game for the Atari, they are living proof that what Commodore do, they do better) *SW* (which is not a game for the Atari, they are living proof that what Commodore do, they do better).

*Pac-Man* represents the best of the best of your computer! The *Pac-Man* represents the best of the best of your computer! The *Pac-Man* represents the best of the best of your computer! The *Pac-Man* represents the best of the best of your computer! The *Pac-Man* represents the best of the best of your computer!

Even better is *SW* (which is not a game for the Atari, they are living proof that what Commodore do, they do better) *SW* (which is not a game for the Atari, they are living proof that what Commodore do, they do better) *SW* (which is not a game for the Atari, they are living proof that what Commodore do, they do better).

Forward: **RTM**  
Price: **\$10.95** (for *Baseball*)  
Platform: **SPECTRUM**  
Rating: **CCC**

Game: **SOCCER**  
Maker: **SOFTWARE**  
Platform: **SPECTRUM**  
Price: **\$14.95**  
Rating: **CCC**

**E** = Could Be Better  
**EX** = Could Be Worse  
**XXX** = Unsurpassable

## VLADS AND VLASSIES

There are FATES WORSE than DEATH! It's vlad's the computer must "TRAINING." We strongly recommend this game be played with the lights on, "admission-free" nonstop. This allegory "Space Adventure game" for the BBC micro, "is in fact a lot of a mess. It's not a bad idea, with a "music" while you play" interrupt loop. It's not a bad idea, with a "music" while you play" interrupt loop. It's not a bad idea, with a "music" while you play" interrupt loop.

It's not a bad idea, with a "music" while you play" interrupt loop. It's not a bad idea, with a "music" while you play" interrupt loop. It's not a bad idea, with a "music" while you play" interrupt loop.

Perhaps next time. Monogal. — A.G.

**Game:** VYAMPOR CANTOR  
**Maker:** MICROGAL  
**Machine:** BBC B

**Format:** cassette  
**Price:** £7.95  
**Rating:** E

## Woodman! Save that Tree!

Woodman Tree is a text-only adventure for the feet. The action takes place in Mode 1, and heavy use is made of the telnet features: color, fishing and double fight bit.

As it's written in machine code, the delay between commands and action isn't noticeable. The local analyzer (word processing) routine is an adequately real-time job. Like GO FISH... GET BRICK, but nonetheless the feature descriptions give the game some charm and character. The text is compressed, allowing a

much larger and complex game than with most methods (B.C. and C.A.T.'s adventure series, for example). The instructions are adequate, and the only real fault is that the computer's logic — all — traditional. Game involves local inhabitants — here called upon to "release" the "emphatic land" from tyranny!!

However, it's bright and neat and fun — well worth checking out. — A.G.

**Game:** WOODLAND TREKING  
**Maker:** MICROGAL  
**Machine:** BBC B  
**Format:** cassette  
**Price:** £7.95  
**Rating:** EX



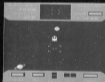
## BEEF

There's a beef! Colonel... Beef is a game for the feet. The action takes place in Mode 1, and heavy use is made of the telnet features: color, fishing and double fight bit.

There's a beef! Colonel... Beef is a game for the feet. The action takes place in Mode 1, and heavy use is made of the telnet features: color, fishing and double fight bit.

There's a beef! Colonel... Beef is a game for the feet. The action takes place in Mode 1, and heavy use is made of the telnet features: color, fishing and double fight bit.

## Raiders of the Lost Cylon



A 3D space battle. A "F" key pushes objectives a bit to call this game "3D". But they've got the space done off to a "F" there in mode 3, the game's fairly colorful and very fast.

From a Star Trek-like main display that scrolls in five dimensions you've got to avoid the enemies by staying there against stationary counterparts. The process is slightly complicated by the fact that the enemies are hunting towards you! They appear to be suicidal (perhaps on account of so many lost relatives in space incidents) and unless you hit them first, they'll plough right into you. If you get too damaged, you can duck with your yellow motion ship.

You've only limited shield energy and fuel, and the boss has to have time to regenerate after every five shots. The animation is pretty good, except on the title sequence.

As you turn and accelerate, stars and other stellar debris (you know, an occasional Tardis, the odd binary star) fly past the main viewport, giving the game a good feel. Level one is manageable, but level two is impossible. — A.G.

**Game:** CYLON ATTACK  
**Maker:** APT  
**Machine:** BBC B

**Format:** cassette  
**Price:** £7.95  
**Rating:** EX

## KISS ME, HARDY

TRAMP! TRAMP! — a simulation of the great naval battle. General... (There's just one circulation.) Ship's sink. (Flags are struck and...)

Two opposing lines of ships face up to each other. You select an... of your and the enemy's ship. You then proceed to try and... (There's just one circulation.) Ship's sink. (Flags are struck and...)

You give the vibration of the cannons, after seeing the wreckage... (There's just one circulation.) Ship's sink. (Flags are struck and...)

**Game:** TRAMP! TRAMP!  
**Maker:** OPTIC  
**Software:** OPTIC  
**Machine:** BBC B

**Format:** cassette  
**Price:** £9.95  
**Rating:** E

## HOMWORK

"There was no escape" by. The... (There's just one circulation.) Ship's sink. (Flags are struck and...)

The animation becomes quite good... (There's just one circulation.) Ship's sink. (Flags are struck and...)

The screen has you with simple... (There's just one circulation.) Ship's sink. (Flags are struck and...)

So, graphically stunning and fast... (There's just one circulation.) Ship's sink. (Flags are struck and...)

**Game:** VORSTEC  
**Maker:** SOFTWARE  
**Software:** INVADED  
**Machine:** BBC B  
**Format:** cassette  
**Price:** £7.95  
**Rating:** EX

## The Orbiter Arbitor



A flight simulator for the Atari VCS, you've got to be kidding! Now, you also get the only flight simulator for the Orbiter Arbitor — the Space Shuttle simulator.

Incredible! Again! In general, each Space Shuttle mission into a video game has a purpose: to illustrate a flight lesson (your average kid, a research game system will work).

One effort that's the best is the Orbiter Arbitor, probably the most of its kind. You take control of the Shuttle, you've got to be kidding! In particular, you take control of the Shuttle, you've got to be kidding! In particular, you take control of the Shuttle, you've got to be kidding! In particular, you take control of the Shuttle, you've got to be kidding!

There is the partial matter of simulating a superior technical 3D flight simulator. The Orbiter Arbitor is a flight simulator for the Orbiter Arbitor. The Orbiter Arbitor is a flight simulator for the Orbiter Arbitor. The Orbiter Arbitor is a flight simulator for the Orbiter Arbitor.

Before the Orbiter Arbitor, you've got to be kidding! In particular, you take control of the Shuttle, you've got to be kidding! In particular, you take control of the Shuttle, you've got to be kidding!

Now it's for the Orbiter Arbitor. You've got to be kidding! In particular, you take control of the Shuttle, you've got to be kidding! In particular, you take control of the Shuttle, you've got to be kidding!

**Genre:** SPACE SHOOTER  
**Maker:** ATARI  
**Machine:** Atari VCS

**Format:** ROM  
**Price:** \$29.95  
**Rating:** KCC

## SENTENCED TO HARD LABOUR

Forget I know just what the Orbiter Arbitor is for. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor.

For those that want to be the Orbiter Arbitor, it's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor.

Let the Orbiter Arbitor, "Orbiter," on your left, become apparent. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor.

Whether that's right, also — and extending only — that it's the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor.

Whether that's right, also — and extending only — that it's the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor.

Whether that's right, also — and extending only — that it's the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor.

## SALTY SEADOG

These dogpaddlers over the door had almost software for the unimpaired, unimpaired VCS would be well to check out the video game from the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor.

**Genre:** FIGHTING  
**Maker:** MSX  
**Machine:** VCS

Three special levels add a lot of variety and challenge to the game. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor.

The action goes as fast as my gun was too hot. — B.K.

**Format:** cassette  
**Price:** \$10.00  
**Rating:** KCC



## YOU SAY TOMAYTO

I haven't seen a child young child in weeks. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor.

Usually it's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor.

Usually it's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor.

**Genre:** SHOOTER  
**Maker:** MSX  
**Machine:** SPECTRUM  
**Price:** \$10.00  
**Rating:** KCC

## BUCK ROGERS and the PLANET OF BLAH



Disappointing translation of an arcade game for the Commodore Amiga, it comes in the form of a Commodore Amiga cassette. Basically, it's a video game for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor.

It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor. It's for the Orbiter Arbitor.

**Genre:** SHOOTER  
**Maker:** MSX  
**Machine:** SPECTRUM  
**Price:** \$10.00  
**Rating:** KCC







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points - good value for money! 4.5/5

There's still plenty of light left in the Commodore South of the red sea, so let's go for a little graphics based. One of the players



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## MEGAWARZ

Genre: MEGAWARZ  
 Makers: PARADOX/COPT SOFTWARE  
 Machine: COMMODORE 64  
 Format: cassette  
 Price: \$7.95  
 Rating: ICE

MegaWarz is a cracking game derived from Asteroids. To return to Earth you have to visit seven planets. Each has its own, increasingly determined nasty alien hordes to contend with. I hate to admit it, but I only got as far as Neptune. And it wasn't for lack of trying. It takes a lot of skill to maneuver the sensitive spacecraft, without sending it flying into collision with a Baddie. That's my excuse and I'm sticking to it. Pure addiction — I loved it! — N.X.

## Tri-Zapper

An attractive, smooth-running arcade-style game that's simple enough to lure you inwardly yet complex enough to give you a run for your money after a level or so (which usually is all you ever managed). You grapple first with what appear to be a mutant bunch of those tried and true Invaders, the space warriors of the video game and home, appropriately enough, dubbed "Invaders". This task is complicated by the gradual release of four slow and disconcerting bouncing bombs. Proceed to the ensuing bonus stage which entails some tricky maneuver-



ing of a "Tank Class Cruiser" before destroying some small and perfectly defensible white dots. Finally you must pilot another ship through swarms of enemy craft and paralytic comets in order to dispose of a hostile spy satellite.

Thereafter it all repeats, but with more Wallons, bouncing bombs, enemy craft, comets, spy satellites, and of course small, defensible white dots.

Controls are pleasantly simple, graphics neat if a little flat and unimpressive. A game where calm and method count far more than flash and fireworks which at first made me think my pleasure was subtle, but left me wondering whether they were merely shallow. —P.N.

Genre: TRI-ZAPPER  
 Makers: TINSPOFF  
 Machine: C64/2 40K  
 Format: cassette  
 Price: \$6.95  
 Rating: ICE



## THOSE...

A witty and inventive "Paranoid Fantasy" — to be truthful, it seems, because "THEY" are hell to get you. Sure, that just gives it something in common with about 95% of other arcade games, but in this one "THEY" are Baddie indeed: taunting demons, bombing bombs and — worst of all — question marks that follow you around. Add to this some (available) awkward controls — USB for up-down, left-right movement; anything else is further help for shields and bullets — and it all adds up to the kind of game that can send you scurrying off to your first nervous breakdown. In short, it's horribly difficult.

Good job, then, that it's got a sense of humor. You, for example, are a dope-looking smiley face. The question mark's a laugh too. So is the rather melodramatic fourth stage (actually, like the second, a bit of a dud) in which you're trapped on a "Conveyorbelt To Doom", like a scene from an old Vincent Price movie, until you blast the "lightmare" in the fine-honored fashion, from the 9th level, when you must match up pairs of funny bones with yet more smiley faces, looks like it might be a gaggle but I've only got them a few times and am thus still thrust into a state of panic and confusion whenever I do. —G.R.

Genre: THOSE...  
 Makers: TINSPOFF  
 Machine: C64/2 40K  
 Format: cassette  
 Price: \$5.95  
 Rating: ICE

WHO  
 DUG  
 THIS  
 UP?



What's that? Digger? Sounds like an Australian down a coal mine. Let's head it out! (See Keyboard Kit's says the screen, then. The title page shows the controls so I know what to do. Up, down, left, right and pump. Pump? Nothing here about mounting punches (I've read minimal instructions on package). Ah, it seems there's this garden plagued by things called Fozats and Puters which are highly explosive being pumped up with saltwater. They tend a tendency to explode. I'm sure I would too. Fozats can breathe fire and gamma rays which is no good for the tomatoes so it's up to you to do something about it.

It only took a couple of goes to form an opinion about Digger. The sound was like the wind going out of a rubber duck. The graphics were slow and jerky with some glitches left on the screen when the Baddie explodes and the program crashed once for no reason and had to be reloaded.

In a recent forget I have. — K.A.

Genre: VISIONS  
 Makers: TINSPOFF  
 Machine: C64/2

Format: cassette  
 Price: \$6.95  
 Rating: ICE



# PADLOCK

Keep unauthorised fingers off your BBC micro with this useful utility. **KIM ALDIS** opens the door to secure progs . . .

HAVE YOU EVER come home after a heady night and a less than invigorating bus journey and found someone has the cat sat on your BBC, oblivious of unswitching except the prohibition of any alien staff enough to stick his head round the screen? If you had the foresight to build the BIG 8 EPROM Programmer then this could all change because now you can hardware lock your computer with Padlock.

Padlock is a short machine code routine which you can store into an EPROM and place in one of the sideways ROM sockets of your computer. When inserted it stops anyone using the computer without a password.

The accompanying listing contains the Padlock routine along with a BASIC utility so that you can easily set up the sort of display you want and your own personal entry code.

First of all type in the listing. Before you do anything else save the tape. If you don't and you've made a mistake you may find the system will crash and you'll have to start all over again. It wouldn't hurt to have a friend to check through it with you as well. Remember that the only real test for bugs in the assembler listing is when the code is downloaded into the EPROM.

When you run the program will present a prompt asking you to input the display message which

will constraint you when you switch on how might wish to display your name and address in case the machine is stolen. The program allows you to include carriage returns so you can format the display in any way you wish but you can only have 255 characters. There is a small display in the top right corner indicating how many characters you have left. It's useful to remember that the SHIFT function keys will insert control characters so that you can have returns in the display.

When finished press the **RTAB** key and you will be asked to input the entry code. The same rules apply as before but don't make the code too complicated if you forget it you won't be able to use your own machine! Remember that Padlock will also expect any space or control characters that you enter here.

You will now be asked whether you want the routine assembled with the test addresses or EPROM addresses. You would be well advised to test the routine first so press 1. The program will call Padlock three times. First as though it were a valid start and finally as from BASIC, you will have to type 'Q' to get your program back (this routine is not really to test your display but more as a means of checking for bugs in the machine code).

Now you know that the program works you can run it again

and assemble it with the EPROM addresses. The program will now save the buffer for you ready to load into the buffer area of the EPROM programmer.

After the EPROM is blown it can be placed in any of the sideways ROM sockets but it must have a lower priority than BASIC (i.e. in any socket left of BASIC). A word of warning about this one. If you don't feel confident about playing around inside the computer then get someone who knows to do it for you. Clocked boards and tape you may also want to be serviced!

You can also call Padlock with 'LOCK' at any point in a BASIC program, useful if you want to keep that first boarding game

This is set up by PROChecker and contains information like jump instructions for the service and language entry points and the title and copyright strings of the EPROM.

The three service calls that we need to intercept are Break, HELP and unrecognised operating system command ("" commands). These will enter into the ROMs at the service entry point ('service') with the numbers 1, 9 and 4 respectively in the accumulator and if you load an area 270 to 280 you can see that the first thing we do is to check for these numbers and branch to the appropriate subroutines if they are detected. If not the ROM is deleted.

If a Break is detected control is passed to the subroutine 'break'. This gives the registers and then calls two further subroutines, 'padlock' and 'base'. The 'padlock' routine prints the display message to the screen and waits for the correct entry code after which 'base' clears BASIC after finding out what socket it is in.

If the user hits in you, by the way I have saved an unrecognised command, control goes to 'command' which checks if the command was 'HELP'. If it was the only code to call BASIC after the entry code has been input since we want to return control to the users program, so only subroutine 'padlock' is called after which the ROM is deleted.

Finally, if 'HELP' is issued then 'help' prints out the title of the EPROM as held in the information block at the beginning of the chip and then leaves the chip.

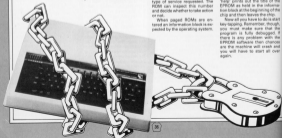
Now all you have to do is start key-tapping. Remember, though, you must make sure that the program is fully debugged. If there is any problem with the EPROM software then chances are the machine will crash and you will have to start all over again.



you've been working on away from power!

There are several ways of writing (paged) ROMs on the BBC Micro, but the method we are interested in is known as 'Service Call Entry'. Under certain conditions the ROMs are paged with a number in the accumulator according to the type of service requested. The ROM can inspect this number and decide whether to take action or not.

When paged ROMs are entered an information block is completed by the operating system.





# 68000 ASSEMBLER

Part 2 of BERNARD TURNER'S examination of this year's 'wonderchip'

1100 is the second in a series of articles on the Motorola 68000 Microprocessor Unit, a silicon chip that has gained star status by virtue of being selected for the 8-bit gain by Sir Oliver's Heavy Metal to grace the London O2.

It should not be overlooked that this very useful chip has been around for quite some time and is now appearing in computers such as Apple's Lisa, Macintosh and Fortune 10/20.

The 68000 has evolved from the Motorola static from the 6800 through the 6801, finally to its present fine implementation which has 10 times the relative processing performance of its original ancestor.

## HIGH-LEVEL

As is the case with any other form of doing anything, it is particularly common for the use of 68000 language processing one might argue that high-level languages would be relatively faster than the 6-bit ancestor, by way of benefitting from the chip's high-level language support philosophy. You could also get forward the view that, generally, high-level languages are more productive from a time taking point of view. Again I would agree with you — but point out that an assembly language program would be faster and more efficient during processing. I would also point out that if you write variables and address thought for software in a high-level language then it, too, can be difficult to debug. One prime high-level language can come in its own right, should it be necessary to use another machine using the same high-level language — but we all know what happens in practice! This is where assembly language very often fails. Due to its nature it is often dependent on the hardware for which it has been written. Often it is necessary to have a thorough understanding of the hardware to make the best use of the machine, this may still obtaining, reading and using instructions from chip manufacturers' Data Sheets is difficult. It is fortunate that the language you describe can be a mixture of features for someone familiar with assembly language program a fast time interactive as the style given in 68000. It, too, would use it to program a report on insurance

programs with sub-totals. But then, it's naturally boring.

If you have programmed in a high-level language (presumably BASIC), you may still have known what is actually happening. Generally in interpreted BASIC, you have typed in a program and given the computer the command 'RUN', oblivious of the fact that simply to print the letter 'A' the program has had to read what byte you have pressed, convert that to ASCII, store that in memory, compare your command, then decide where on the screen to print — and, if applicable, what byte make up the image of an 'A' character when printed — finally returning to a routine that waits for your next key press.

The above may sound like a lot of work — and it is, but that is only an overview of what machines can do. Take the point above about 'validate your command'! What this entails is analysing your instruction, determining what is required to be done and doing nothing at the machine level to achieve that. By using assembly, you can see where the software has finally, really, reached the hardware.

## READ AND WRITE

BASIC and other languages reside in memory (usually a RAM) so that they can be changed as required. When you run a program you do not think too much about where it is placed (located) in memory, similarly you never think twice where, and in what form, variables are located. When programming in assembly language, that you become your own boss. To help you, manufacturers usually provide a 'memory map' of the machine. This normally gives you information such as what address the program starts and what address it ends at. In addition, by the way, is only another word for 'location'. It also useful addresses given usually gives you regarding system areas used, ROM locations, and, if the company is helpful (generally), starting points (entry points) to useful machine code routines such as reading the keyboard and writing to the screen. It part of the machine you choose to modify areas from a high-level language in the microprocessor itself. It is not part of the main

ry (see Fig 1) and then you simply read from it or write to it from a high-level language) is normally reserved. Its contents are called registers which can be manipulated by machine code instructions (given code by using an assembler).

## REGISTERED BITS

The 68000 contains two main types of registers — Data Registers and Address Registers. There are 31 of each and 31 of each available. They have names rather boring (such as D0 to D31 for the Data Registers and A0 to A31 for the Address Registers). They are all 32 bits wide (i.e. can hold a four byte value). There are three more registers in the 68000 and they are called the Program Counter, the Stack Pointer and the Status Register. The Program Counter holds the address of the next instruction to be processed from memory. The Status Register serves as an indicator to what has occurred in the machine. The Stack Pointer is used to contain the next free address in memory for the stack. The stack can be located in a very temporary form (where information can be placed and retrieved). The Stack is not a Register itself and is not contained in the MPU but is assigned (located) in area of memory in which it can expand and contract. (Much more about the stack later).

Usually there is a register that is read-only available and sometimes not. We have already mentioned it under stack pointer (MSP) the point of the matter is that A7 and the Stack Pointer Register are the same and same thing. But just to complicate everything it has an alias! There are in fact two Stack Pointers of which one only is available at a time. These two A7's both have names, the 'Stack Pointer' and the 'Supervisor Stack Pointer'. What determines which one is accessed is the state of a bit in the Status Register. At one time, however, can be used for a 'locking' '1' or a '0'. It cannot be both. Therefore it is either one Register (e.g. User Stack Pointer) or the other. In this example the

Supervisor Stack Pointer. (See Fig 2).

What has just been discussed is often termed 'the internal architecture' of a chip (it is fast to copy the instructions as well). The external architecture is the memory and support chips and how these are arranged. In the 68000 MPU series the program counter and addressing of memory must occur on an even boundary (see Fig 3). It does not! Thus an exception occurs in condition that the program must attend to as quickly as possible.

The Motorola 68000 Microprocessor Unit (MPU) is the basis of a series of chips based on the same architecture. Its design philosophy is based on providing a simple, yet powerful, compact, yet useful instruction set and facilities for hardware and software to enable it to be produced in the vast quantities we'll make a start on some machine code.

Figure 1



Figure 2



Figure 3





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## A LA CARTE

### Variables used

- |         |   |
|---------|---|
| CV      | —coordinates of waiter during the game            |
| I       | —current level                                    |
| LS      | —total score                                      |
| HS      | —high score                                       |
| Q       | —quandaries shown on the tables                   |
| Q(4,0)  | —meats on order                                   |
| MC      | —meal you are carrying used for main line trolley |
| W(4,W3) | —number of meals delivered                        |
| PI      | —picture of waiter (with or without a meal)       |
| A       | —ATTR of place you want to move to                |
| Q       | —used for loop in the main game                   |
| Q(4,1)  | —used for saving the old CV values                |
| Q(4,W3) | —general purpose variables                        |

```

2000 GOTO A CHARACTER DATA
2010 GOTO 0
2020 GOTO 0
2030 GOTO 0
2040 GOTO 0
2050 GOTO 0
2060 GOTO 0
2070 GOTO 0
2080 GOTO 0
2090 GOTO 0
2100 GOTO 0
2110 GOTO 0
2120 GOTO 0
2130 GOTO 0
2140 GOTO 0
2150 GOTO 0
2160 GOTO 0
2170 GOTO 0
2180 GOTO 0
2190 GOTO 0
2200 GOTO 0
2210 GOTO 0
2220 GOTO 0
2230 GOTO 0
2240 GOTO 0
2250 GOTO 0
2260 GOTO 0
2270 GOTO 0
2280 GOTO 0
2290 GOTO 0
2300 GOTO 0
2310 GOTO 0
2320 GOTO 0
2330 GOTO 0
2340 GOTO 0
2350 GOTO 0
2360 GOTO 0
2370 GOTO 0
2380 GOTO 0
2390 GOTO 0
2400 GOTO 0
2410 GOTO 0
2420 GOTO 0
2430 GOTO 0
2440 GOTO 0
2450 GOTO 0
2460 GOTO 0
2470 GOTO 0
2480 GOTO 0
2490 GOTO 0
2500 GOTO 0
2510 GOTO 0
2520 GOTO 0
2530 GOTO 0
2540 GOTO 0
2550 GOTO 0
2560 GOTO 0
2570 GOTO 0
2580 GOTO 0
2590 GOTO 0
2600 GOTO 0
2610 GOTO 0
2620 GOTO 0
2630 GOTO 0
2640 GOTO 0
2650 GOTO 0
2660 GOTO 0
2670 GOTO 0
2680 GOTO 0
2690 GOTO 0
2700 GOTO 0
2710 GOTO 0
2720 GOTO 0
2730 GOTO 0
2740 GOTO 0
2750 GOTO 0
2760 GOTO 0
2770 GOTO 0
2780 GOTO 0
2790 GOTO 0
2800 GOTO 0
2810 GOTO 0
2820 GOTO 0
2830 GOTO 0
2840 GOTO 0
2850 GOTO 0
2860 GOTO 0
2870 GOTO 0
2880 GOTO 0
2890 GOTO 0
2900 GOTO 0
2910 GOTO 0
2920 GOTO 0
2930 GOTO 0
2940 GOTO 0
2950 GOTO 0
2960 GOTO 0
2970 GOTO 0
2980 GOTO 0
2990 GOTO 0
3000 GOTO 0

```

```

3010 IF DIMEV THEN GO TO 3040
3020 CLR PRINT "YOU CANNOT GET
3030 THE MEAT UNTIL YOU HAVE
3040 YOUR OWN MEAT ON THE
3050 TABLES."
3060 PRINT "YOUR POINTS
3070 WILL BE AWARDED IF YOU WASH YOUR
3080 HANDS AT THE SINKS."
3090 GOTO 3010
3100 PRINT "THE MEAT YOU ARE
3110 TRYING WILL BE AWARDED IN THE
3120 CENTER OF THE TABLE."
3130 PRINT "WASH YOUR HANDS AT THE
3140 SINKS."
3150 PRINT "YOUR POINTS WILL
3160 BE AWARDED IF YOU WASH YOUR
3170 HANDS AT THE SINKS."
3180 GOTO 3010
3190 IF DIMEV THEN GO TO 3010
3200 CLR PRINT "IT IS THE
3210 MEAT YOU WANT TO GET."
3220 PRINT "YOUR POINTS WILL
3230 BE AWARDED IF YOU WASH YOUR
3240 HANDS AT THE SINKS."
3250 GOTO 3010
3260 PRINT "THERE ARE MEAT ON
3270 THE TABLES. DIFFERENT MEATS
3280 ARE AWARDED AT DIFFERENT
3290 TABLES."
3300 PRINT "YOUR POINTS WILL
3310 BE AWARDED IF YOU WASH YOUR
3320 HANDS AT THE SINKS."
3330 IF DIMEV THEN GO TO 3010
3340 RETURN

```



## No. 3 RIVER RAID (Activision)

YOU CAN usually imagine professional fighter pilots turning pale and describing excuses when faced with Carol Shaw's *River Raid*. On the face of it, a suicide mission if ever there was one. This is a one-way river of right.

You are, collectively and individually, the pilot(s) of five low-flying, heavily armed marine attack aircraft, and your mission is to fly at nought feet up an endless branching ford filled with the paraphernalia of war: Battleships steaming to and fro; fuel tankers; tanks; helicopters; jet aircraft; and, of course, a series of bridges, each of which you must take out before you can continue your break-neck low-level mission.

Your mission is, simply, to blast as much as you can. Isn't it always?

Naught feet is very low. You can fly over nothing and when objects in your path — like oddily nimble battleships — move to intercept you, you must either dodge or blow them away — because if you don't you'll smack into the side, jet, and that's where you lose one of the five-man team. Other hazards include mobile AA that shoots at you from the banks and bridges — the width of the banks varies amazingly, the River getting narrower the further you ascend it — and the unexplained appearance, after about Bridge 7, of phantom-like jet fighters.

Later still you get the first helicopter gamelets.

### TRAPPED AT ZERO FEET

You measure your ascent by bridges. These are the only regular feature in a land endlessly into islands and sub-waterways, some of these very narrow (at least, I suspect) into these channels will be filled by enemy vehicles; at other times they will be empty save for the striped fuel tanks.

The fact, embarrassingly, is collected by flying over it. (Oh well.) You keep track of your tank state by means of a gauge, and bells sound when the fuel gets low.

And get this. No matter what gets in your way — what unlikely or totally credible combination of enemy war machines should appear — you can never rise above nought feet. So to help you manoeuvre out of what can look like impossible situations, your

## ONE WAY DOWN THE RIVER OF DEATH



attack plane has massive air brakes that enable it to pull in-G turns, as well as afterburners for that often-needed two-minute burst of speed.

Your armament, thankfully, seems infinite. A regular stream of ammunition rockets pours away with satisfying speed. Warships, tank-like wandering helicopters, stationary fuel dumps... all disintegrate on the instant when obliterated by these magnificent air-ground missiles, so powerful that even bridges disintegrate on impact.

The earliest bridge-to-bridge killing zones are the easiest. Ships lie stationary and choppers hover dully, the bored flies. All fall prey to your jinking low-level fighter, flap full on, pulling in-G tightens from bank to bank, blasting the enemy's property into scrap, and flying bilobely through the tumbling ruins. Fuel dumps are common as much, and as your fuel is still high you blast these carelessly, content to collect the few lousy points they represent. The first bridge can be taken out at leisure — you even have time to pick off a couple more helicopters before flying through into the next open reach of river.

By now the defences are waking up and things are starting to happen. A great cruiser pulls into your path just as you approach; a swift salvo and he

vanishes in flame, but now here is a helicopter doing the same. A quick shot — he goes down — and he never past another chopper... a shot at a fuel dump... another, which misses, at a battleship — and you're past the first wave of defences and faced with a choice of routes.

The arm on the right is narrower, and involves a tighter turn to enter, but is relatively free from enemy, and moreover possesses few unguarded fuel dumps. (We are beginning to need fuel.) The one to port is wider, but more thickly populated with enemies.

### SCORES, AWARDS AND MORE...

You hesitate too long, attempt the right-hand arm of the river, blow the turn, and pop into the island side. One down.

Next man starts from the last bridge passed. Pretty soon you are at Bridge Seven, and the enemy jets have showed up.

They come in fast, from left to right (or the other way around), pale blue ghosts that come right at you and can only be downed by good deflection shooting — and if not downed must be dodged by skilled flying. Avoiding them, you come into range of the banks, where mobile AA starts firing. They get your range very quickly, so if you're there landing salvoes ahead but in line... change your line fast. If you see them on the bridge, blast the bridge.

You can score very highly indeed at *River Raid*. There are reports of a mission being scored. Certainly Carol Shaw's game, designed for and marketed by the US company Activision, has all the ingredients of compulsiveness. It is one of the very best — if not the best — of the vertical scrollers, the Defenders of Up-and-Down Land.

The game appeared originally in the UK early last year as an Atari VCS ROM, having already won countless awards from the US Game industry. Last Christmas it turned up as a ROM for Atari computers.

It is, of course, as we said, and as they always are, a suicide mission. Sooner or later your fuel gives out, or you misjudge a tight turn, and fly smack into something. Then it's over and you're left with a score which won't go halfway to telling the full story of all the sweat and terror of your last mission up the River of Death.

TONY THORN



# NOT EXACTLY YOUR GARDEN OF EDEN

Does the Coleco Adam live up to its hype? TONY TYLER tells all!



THE COLECO ADAM SYSTEM was launched with a tremendous amount of hype at last summer, at the Chicago Consumer Electronics Show. Easily the most hype of all the inevitably glibly staid, the Coleco operation featured half-hour showings inside a smoke-filled booth where teams played over face and body of a whole team of florists who each delivered a unique card. Every time and again, said florists would delicately touch a slim, elegant ivory-colored keyboard with a single red-pointed key.

This, we were told (at half-hour intervals), was the Coleco Adam. The IBM-affiliated machine, having in the previous two years wiped the floor with the dedicated videogame opposition, was now surviving its all-in-one machine designed to clean up the Babbage home computer market.

What was we're looking at was a mistake—nothing new in that of course. And hey! (it's a look processor) Business DataLink keyboard, revised stringy-floppy data storage system, AND a printer. We never saw the data storage doing its stuff, and we

never got to see or hear the printer in operation. But who cared? The whole package was going to retail before late autumn at about \$800. At that price, and if everything worked, within 18 months or so the Adam would undoubtedly be THE system for the US domestic computer situation.

It was also games based, you could actually use ColecoVision ROMs as well as stringy-floppy versions of tape-cassette games.

Time passed. Adam didn't arrive on schedule. Again, nothing new in that, as we all know. But even here we began to hear rumors. Coleco, it was said, had blown it badly. The system was late, the price was now considerably higher (above \$1000) and, worst of all, there were major deficiencies in the package.

So, it had looked good. This writer at least reserved judgment.

Well now. The system of Adam we here at EIC finally received was like a whole different animal, different to the standard Adam machine as the package — data storage, keyboard and SmartWriter

printer — comes as a plug-in expansion to the existing Coleco videogame console. As a result its keyboard is truly colossal.

Switching on — the main power switch is sensibly placed behind the printer — puts you into electronic typewriter mode. Pressing the ESCAPE key gives you the built-in wordprocessor.

Taking these first, the keyboard is great looking and placed at a pleasant angle. The keys themselves are chunky and positive. In fact, the only really irritating fault is the lack of an LED to tell you when Shift or Control Lock is on (into the weird duplication of keys, such as Backspace and Cursor-left, which perform identically so far as use goes). The real trouble is with the software and the printer.

Typing in electronic typewriter mode is an awesome and infuriating business, made unbearable by the unbearable noise of the daisy-wheel printer. I've heard it described as "like corn-tap beating". To me, it closely resembles the evening song of the AOK's as the Drive and Final stage machines blast the notes out of each other in Babel. Living with this printer in your home would be a nightmare. And it's SLOW, when you're online (in typewriter mode) the print-out of each printer strike comes about half a second after you've typed the character in question, which is fantastically delectating.

Moving into wordprocessor mode, you see on-screen the entire document and a red cursor tells you your working area (embodied by six labels each

representing a function for the six function keys) is constantly redefined — rather like Apple's microscreen but not half so elegant. However, useless alternatives aside (like changing the colour of the screen from black to Marbled) it does work, even if it's slow and tedious. In fact, it's a pretty good job of wordprocessor.

Adam is a Dope Machine in terms of built-in languages. SmartBasic (for which read AppleSoft) leads in via the usual high-speed (it says basic stringy-floppy arrangement) eventually it appears and you can start programming. As I said, so surprised with the basic stuff, its pretty comprehensive and at least halfway to being structured. Maximum four-byte character resolution is 200\*300 (HD) with four lines of text, HD) without. Which is not exactly satisfying — but by using MSF routines I assume you can boost a higher degree of resolution than that.

Coleco are pure Coleco — don't try to say fast, and quite easily accessible with the CDS-DR — state-in-it. The full package is 18, which is better than most.

What is profoundly irritating is the lack of user RAM in Coleco. BGL, you've heard? Well, sure that must mean at least a genuine 64K Load Basic, type PRINT PREDI and you get 32 and a half K's to play with. Again, not bad compared with some machines, but far, far less than advertised.

## VERDICT

ONE DOESN'T want to come down too heavily on this computer. Unfortunately you can't always have what you want. Define plus points are the keyboard, which in the main is elegant, easy to use and well-furnished with dedicated keys, including six function keys. Commands like PRINT, DELETE, etc. can be handled via these keys, usually involving a planned

Screen display in wordprocessor mode. Monitor is not included in the Adam package.



The infamous SmartWriter. Six positions is achieved.

# LET'S GET FIZ-ICAL...

**RICHARD TAYLOR gets to grips with Picoentral Peripheral's disc drive for the 486 Spectrum.**

I SUPPOSE if I WAS inevitable that someone, sooner or later would come up with a proper disc drive for the Spectrum. It may then (I'm sure) have been invented from various manufacturers, its limited lack of availability from being a mere access speed compared to a real disc system. I have presented it, domination of the Spectrum disc storage system market.

There's something of a price gap, however, because the real disc system, under construction here will set you back nearly £200, close to the cost of low new 486 Spectrum. The only model this drive will work with.

The **FD** system (Floppy Disc Drive and Interface for the ZX Spectrum), would you believe comes in two parts, the drive itself and, controlled by Micro of silicon cables, the interface box which plugs into the back of the Spectrum.

The interface contains quite a large assortment of chips protected by an anti-voltage regulator — there is also the fact on the Spectrum's already protected and over-heated internal regulator. The drive, and its support for those who may know has a separate mains connection, so you may need a 2-way mains adaptor if you're suffering from "plugged-in" memory problems... and what better not those chips! The 486 plug from the Spectrum's own parent neatly goes into the back of the interface box, and the socket being controlled by the interface.

Labels on and the also refers may life, instead of the usual silicon copyright line the proper drive with the maximum **FDC 321/321-4 OPERATING INSTRUCTIONS** (see **Microcentral Systems Ltd**). There's no copying or saving of the **FD** (Disk Operating System) from tape as the necessary software is held in an EPROM. Of course, up the contents of the EPROM is transferred to the tape of the Spectrum's RAM. With a further 48 being used by the **FD** for temporary storage, the use of Picoentral's interface is not possible.

This could've been a major drawback to the system, making access many programs that they will not be for certain functions, however, Picoentral supply a formatted disc that carries a special program called "loader".

The program is called up by the command disc, plus the instruction **PRINT USB** also transfers the **FD** from high to low memory. Pretty neat.

The **FD** itself relies heavily on BASIC variables and **USER** calls. After switching on the Spectrum the variables **aa**, **bb**, **cc**, **dd**, **ee**, **ff**, **gg**, **hh**, **ii**, **jj**, **kk** and **ll** are initialised to the

100000 of machine code readings in the **FD**. For instance, **PRINT USB** also gives a list of what is on the disc — as well as an indication of the amount of machine code and the main disc file. The **USB** statement returns the number of any error that might have occurred and there is a comprehensive and helpful set of error codes.

The **FD** has facilities to save and load BASIC programs, machine code programs and a database facility for machine code and arrays. It is also possible to format new discs, write files or make back-up copies of other programs loaded to others. This is done by assigning the BASIC variable **ff** with the name of the program in the **FD** statement. For instance, **LET ff="Graph"**; **PRINT USB** to copy a BASIC program into a disc called "Graph". The commands are beautifully as well as programs as they do an direct command.

The drive uses single-sided, single density discs, machine code of 128K or user code of 256K storage. A disc is formatted using the **FD** command.

One of the 40 tracks on the disc is used by the **FD** to store the directory, leaving the user with 39 tracks, each one with a capacity of 256K user bytes. One of the disc's features of the system is that a file will occupy at least a complete track even if it is only a few bytes in length — therefore giving a maximum limit of 39 files per disc.

The actual operation of the drive was extremely fast and reliable. The documentation, although brief, was adequate and well presented.

The **FD** system represents value for money if you use your Spectrum for program development or for some form of data handling. I suspect, however, that the majority of users do not desperately need the added flexibility and speed of a proper disc system and would probably do better with a Microcentral.

The system will come into its own when more software is available to run on it. Some games material is available but, as I said, the price tag makes the **FD** a games system on the "budgetary" class. Picoentral have recently announced a word processing disc based on the old "Screen-W" and have an assembly in the works.

**FD** costs £249.95 from Picoentral Peripheral Ltd, 89 Howe Road, Buxley, Derbyshire S12 6LP. The interface unit can be bought as a separate item for use with other disc drives, price £79.95.

sequence of strokes with an abundance of ARE YOU SURE? spin and at each stage. The operation of the Coloco keypad simulator is same as a numeric keypad is electronic. Though the Atari is heavy colour scheme and the get track of the game-computer don't go too well together (and the joystick is virtually impossible to use when clipped down). The keyboard is detachable.

Another's about it on the plus side.

Against the machine are the awful RAM (which when compared with what should be available, that is, the labelatively greatly priced), the slowness of the data storage unit — especially those like the fact that the fact as can use you can't clear the screen in basic without writing off all in basic I must be writing about this but the manual was no help. Associated with this is the way in which a JUST command, in graphics mode, only gives you two lines at a time. To see the rest you have to clear out the graphics, and to do this you're got to read. (That one I'm sorry Coloco.)

All in all the Coloco Atari is a major disappointment. Final price for the standard version had for long of writing not been fixed, but seems likely to be in the £200-250 range. That is just simply too much when you consider that for the same money you could have a 486 3 plus disc drive plus one of the cheaper monitors.

What Coloco did do after was the "main centre" approach, with as many pieces in one budget package as possible. The same idea has clearly occurred to Amstrad, who now offer a genuine 486, a monitor and optional cassette storage for half the Atari's price.

Without vice has it than the Atari is beating out in the price, it's not surprising I'd be in my team ever here! I'd be very surprised indeed if it did.

See us ...



# TAYLOR -MADE GRAPHICS

By  
**RICHARD  
TAYLOR**



THE SPECTRUM MANUAL makes no mention of animation or movement, as if it is an area of computer science so unimportant and trivial that it is beneath notice. Anybody who has seen any arcade-type games on the Spectrum would obviously realize that this is not the case: quite the reverse. Animation and character movement is probably the most important function of any microcomputer — let alone our trusty friend the Spectrum. What would all those Space Invaders, Pac Man and so on be like if they were utterly motionless?

The movement that can be achieved by the use of Sinclair BASIC can hardly be any competition to the marvellous groups of frame stores elegantly transported around the screen with the use of breathtakingly fast Z80 Machine Code. Fear not because BASIC can keep you with some quite respectable animation if used to its full potential.

By using every last microsecond and short cut of BASIC for the sake of pure speed it is possible to produce animation programs written solely in BASIC which do not shriek too highly of its slow speed.

The biggest problem with BASIC is that it does not possess any commands specifically designed with movement in mind. To emulate such commands requires a strange and complicated assemblage of PRINT commands, perhaps with the inclusion of the odd colour statement or two.

The usual method of creating movement while using BASIC is to print the object on the screen, wait a while, erase the object by overprinting it with a space character, update its position in a certain way and then go back to the first stage — rather cumbersome but the only real solution. A simple program to perform such a task is as follows:

```
10LET x=0:REM initial column
20PRINT AT 10,0;" " ; REM Print Character
30PAUSE 10:REM Wait a bit
40PRINT AT 10,x;" " ; REM Erase character
50LET x=x+1:GO TO 20:REM Update position
```

An asterisk prints along horizontally from the right to left and eventually disappears off the screen leaving the computer to impatiently wait with the error message "It's out of range".

By changing the value of the PAUSE statement residing at line 30 it is indeed possible to change the speed at which the object moves. Removing it altogether gives the asterisk a full amount of speed, but remember we are only moving one object and not doing anything else besides that one trivial task. The next step routine because a ball (or rather the letter "O") around the screen — a more interesting movement.

```
10LET x=10:LET y=11
20LET a=0:LET b=0
30PRINT AT y,x;"O"
40PAUSE 3
50PRINT AT y,x;" "
60LET x=x+a:IF x<0 OR x>8 THEN LET a=-a:GO TO 60
70LET y=y+b:IF y<0 OR y>8 THEN LET b=-b:GO TO 70
80GO TO 30
```

Here the updating section is a lot more complicated and involves checking if the object has violated the boundaries of the screen and, if so, changing its direction.

You may notice the flicker that is beginning to creep into the program. This results from the fact that the object is blanked out and therefore not present on the screen for a comparatively long time due to the added complexity of the position updating part of the program. To overcome this problem it is best to make the program remember the old position of the object before finding out what the new one is going to be. Then the old position can be blanked out just before the new one is printed, giving the impression of continuous motion.

Not yet have come to something a little more tricky, moving most stars over objects around the screen at a time. Below is a modified version of the bouncing ball routine which is able to cope with the stars of such animation.

```
10INPUT "Number of objects";num
20DIM array(0:0)DIM array2
30DIM array3(0:0)DIM array4
40FOR i=1 TO num
50LET array(i):LET array2(i)=1
60LET array3(i)=RND(32):LET array4(i)=RND(32):NEXT i
70FOR i=1 TO num
80LET array3(i)=array3(i)-yrd
90LET array4(i)=array4(i)-if array2(i) OR array3(i) THEN LET array3(i)=array3(i)+20
100LET yrd=yrd+5000:if y<0 OR y>8 THEN LET array3(i)=array3(i)+20
110PRINT AT array3(i),array4(i)
120PRINT AT yrd,array3(i)
130NEXT i
140GO TO 70
```

This program utilizes arrays to store the co-ordinates and direction of each of the objects and uses a FOR/NEXT loop to update the positions of each of the objects in turn. Notice how the old position of each object, in turn, is held in *array3(i)* while the new position is calculated. The old position can then be overprinted immediately before the object is re-printed, avoiding any flicker. You can demonstrate the sluggish speed of BASIC if you enter a sluggish number when the computer prompts you for the number of objects that are to be moved.

One of the biggest problems with Sinclair BASIC is that you are restricted to printing in the character grid of 32 columns and 25 rows. To produce smooth moving graphics you need to be able to make full use of the Spectrum's high resolution capabilities and to be able to print anywhere on the high resolution grid of 256 x 192 pixels. Next month it will be presenting a short machine code program to do just that. It'll also be looking at much more complicated subjects such as acceleration and complex movement patterns.



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# FIGHTER



```
140 PRINT:PRINT:PRINT:PRINT:YOUR SCORE
141:SC
150 PRINT:PAUSE:PRINT:PRESS: 'R' TO PLAY
AGAIN
155 PRINT:PC(14)= "M" TO Q10"
160 REPEAT:DE=KEY$UNTIL:DE="Y"OR:ESC="W"
165 IF:DE="Y" THEN:GOTO:Q14
END
END
END
170 FOR:J=40:TO:704:Y=3:REAR:FOR:K=1:TO:MP
171 DATA:0,0,0,0,0,0,0,0,0,0
172 DATA:0,3,3,0,0,0,0,0,0,0
173 DATA:0,40,40,0,0,0,0,0,0,0
174 DATA:12,12,12,12,0,0,12,12,12
175 DATA:0,0,0,0,12,12,12,12,12
176 DATA:0,0,0,0,12,12,12,12,12
177 DATA:3,30,12,12,0,0,0,0,0
```

```
1440 DATA:0,1,0,0,0,0,7,1
1449 DATA:12,12,0,10,33,33,33,33
1450 DATA:0,32,0,0,0,0,0,0,0,0
1451 DATA:12,12,30,10,30,0,0,0,0
1452 DATA:7,0,0,0,0,0,0,0,0
1453 DATA:0,0,0,0,0,0,0,0,0,0
1454 DATA:0,0,0,0,0,0,0,0,0,0
1455 DATA:0,0,0,0,0,0,0,0,0,0
1456 DATA:0,0,0,0,0,0,0,0,0,0
1457 DATA:0,0,0,0,0,0,0,0,0,0
1458 PRINT:PRINT:PRINT
1459 PAUSE:END
1460 PRINT:SPC(12):GOTO:141:CHR(127):MP(14)
1461:PRINT:GOTO:141
1462 PRINT:PRINT:SHOOT DOWN AS MANY EN
MY AIRCRAFT
1463 PRINT:AS YOU CAN BEFORE YOU RUN OU
T OF FUEL"
1464 PRINT:MISSILE=
1465 PLOT:0,0,"CONTROLS"
1466 PLOT:12,14,"UP... GO"
1467 PLOT:12,17,"DOWN... 121"
1468 PLOT:12,18,"RIGHT... 122"
1469 PLOT:12,19,"LEFT... 123"
1470 PLOT:12,20,"PRESS SPACE BAR"
1471 PLOT:10,20,"PRESS SPACE TO START"
1472 END:END
1473 END:END
1474 GOTO:1470
```

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# ALL YOU NEED IS

CURRENTLY causing much consternation on the Big K campus is a deceptively tricky adventure called *Mountains of Ket*, from Inventive Software, which runs on aMSX Spectrum. This traditional text-only epic is the first of a proposed trilogy set in the mythical land of Ket, a familiar-sounding subtext full of Orcs, Gnomes and other routine Yggoblines.

the work, it seems, of a band of mad, marauding mooks. You've been summoned by the Lords of Ket to sort these buggers out. Some task! To ensure that you at least try to complete this hazardous mission, the Lords have kindly grafted Edger, an assassin bug, into your neck. Try and do a bunk and the little devil will sink his poisoned pegs into your tender parts.

Despite the standard Sword & Sorcery format, Ket offers up a number of refreshing twists. Take the opening sequence: I'm a novice. As you saunter into the local village it's a fair bet that most players, conditioned by the senseless slaughter of similar games, will draw their swords and begin hacking away at the earliest opportunity. Here, however, such antisocial behaviour reaps its own rewards. The inhabitants will, as a man, sit about you with ill-disguised glee. Better by far to sheathe your sword and attempt to barter.

There are a number of items that can be bought, all of which will prove of use once you've entered the mountains. Although it must be said that with what appears to be a village inhabited solely by grumpy pensioners ("Speak up sonny, I'm a

little deaf!" and "I've no time for idle chatter!" being typical replies) it's extremely tempting to swing that sword and remove a few heads.

Although primarily a puzzle adventure the game features an effective combat routine based on the Dungeons and Dragons slugging system. Upon starting the game you'll be allocated points for Power, Energy and Luck, and these, come a punch-up, are compared against the statistics of your opponent. The 'winner' then plays out the battle in a series of rounds. You're given a running commentary on the slashes and thrusts along with opportunities to either dodge or run. It's an effective and well-presented routine that adds considerable punch (no pun intended) to the proceedings. As a general rule it's best to avoid crossing swords with those with a higher prowess rating. Just swallow your pride and do a runner; that way you'll get to see more of the game.

I'm currently stuck before a wall which I'm told is in 'mint condition'. The clue here is presumably 'Polo', so obviously (??) there's a hole in the wall somewhere. Just a question of sussing out where, I guess....

NOW SHOULD you be dead of all this D&D style adventuring? Salamander Software offer an entertaining alternative in the shape of *Wings of War* (which runs on the Dragon 32/64). Set in France, circa WW2, you get to play an officer in some sort of secret task force who's been volunteered to infiltrate an occupied chateau. Apparently the locals (no offense chaps) have developed a secret weapon and the Brits want it. The mission begins with a descent by parachute



It boasts both a commendably strong plot and a pot full of puzzles that run a gamut of difficulty. Apparently Ket, long troubled by feuding warlords and the like, has been thrust into uncharacteristic unity by some attacks from beyond the mountains;



into the wood near the chateau. Unfortunately a rough landing scatters your equipment as you land. Not the best of starts.



# JOB'S: Now the

**STEVEN JOBS**, along with a partner, founded Apple Computer ten years ago. Today he's worth a quarter of a billion dollars. **PAUL WALTON** spoke to the Man behind the trail-blazing Macintosh.

STEVE JOBS said his IBM Searcher and cancelled a visit to India last in '76 to start Apple Computer with his mate, a boffin called Steve Wozniak (featured in April issue of *EG*). It paid off. Apple's now a billion-dollar company and he owns about a quarter of it.

While it was Wozniak's ideas to build the Apple II — that's since sold two million around the world — Jobs came up with the real bright idea. He's the man credited with bringing video games, multiple window screens and icons — or visual representations of objects first to the Lisa and now to the cheaper Macintosh.

"I believe in giving people great products as cheaply as possible," bubbles Jobs, as he outlines the 'goodies' up-and-coming from Apple in the near future. (See the box.)

Steve is twenty-eight years old, spends most of his life playing his tennis, or improving on college to seek to India where he was 18 and is a vegetarian. Oh, and by the way, he's worth about an *hoo* (\$20 million dollars).

You'd only get to listen to the things he says to know that Steve Jobs doesn't care what people think. Thanks to his success, he doesn't have to...

About promoting the Mac? "If we could get a picture of the Queen using one, hell, I'm sure they'd sell. We're not a slogan company. Mac is supposed to be the computer for the rest of us, but royalty might help..."

**IBM want to crush us — they want us dead!**

About IBM's new trade? "If it wasn't for us IBM would own all the PC market, though they don't deserve to. IBM just want to crush us — they want us dead!"

On computers generally? "Most are just a load of junk. The game in computers is now over — software, games and leisure software, business packages, graphics... that's where it's at today. I wouldn't build an Apple II today. I'd write a real piece of software."

"We think there have been too standards in our industry — and that's all. The Apple II in '77 and the IBM PC in '81. The whole industry is converging on those two. We think that the Apple II operating system is a standard. There are a million others out there that are other computer in the world."

As you know, last year we achieved approximately \$1000

million revenue. That was primarily Apple II. But if we're going to be the major contributors in our industry and remain that throughout this decade — which we absolutely want to do — then we'll need \$10 billion.

"We're aren't going to need ten billion dollars worth of Apple II's a year. The next major growth is going to be the Mac and then top of very advanced machines."

"We want to sell tens of millions of computers per year. Per year" he emphasized. "These PCs won't resemble those we see today. They'll be sold for a few hundred pounds, will have immense storage and processing power and great graphics... but the software's going to cost

a fortune. Expect to pay twice as much for a good package as you do today."

But Jobs doesn't think that most other computer suppliers will be around anyway. He thinks that by next year there'll only be the Apple II or the IBM PC selling in volume for most masses, or for the US home market. And then we'll see the eye of the dragon machine, the hi-Mac, which after something a little different.

**Most computers are a load of junk**

The end of the PC as we know it, in 1989? "Sure. Other people just get together some random hardware, go buy an operating



LEFT: Macintosh. RIGHT: Jobs. "There's the 68000. There's the memory. The video section is over there. This is the 04K of ROM"... and here's the millionaire.



# Good news...

system from this or that person, languages from that same guy. They get a piece of junk. Which is what everyone's computer is. So IBM's going to kill those everybody and them. Between them and there won't be anything that is stronger than...

IBM puts this all down to money — being able to spend vast sums in developing and building cheap PCs. Remember that Apple are a \$1000 million corporation — so are IBM — in terms of personal computers. And there are things that major corporations can do that other people can't. Like we are spending over \$100 million this year on marketing, about \$100 million on R&D. As is IBM.

So if we all agreed that money really has to do with going to catch up with the IBM or relative developments IBM has? They're not. So you see both companies are accelerating their investments in these two areas, not pulling back. And all this money, all these PCs already sold, show Apple and IBM to do something unique.

**SOFTWARE.** On the ability to control its production, "will be critical in 1984," says Jobs. "You have to convince hundreds of software-developers to write for your computers. Now these products have the resources to write software for everybody's machines. So they're going to pick-up on two. If they make the wrong decision — they'll be out of business.

So how do they make their decision? One simple criterion — installed base. And make sure what it is today, but what will it be in a year. It's like only watched the US auto market. There are only two computer companies that have installed bases, IBM and Apple.

What does all this mean for James House? Jobs reckons that it means a choice between the mass-market, and ultimately



cheaper name-brand machines which IBM and Apple will buy in the millions. Other people aren't going to be able to run the software that's developed for our machines — it'll be very difficult. People don't quite realize it yet, but it's going to be quite apparent this year," he said.

There isn't much love lost between Apple and IBM. "The IBM PC was the fourth personal computer they developed. So it that was the best of four... IBM has never been a product innovator. Their strategy is to corner the marketplace in what they do best — which is service, support and maintenance.

In the States there's a battle for hearts and minds that's going on between Apple and IBM. They just want to keep us off the face of the earth. I think that that's not going to happen. They could buy us — but we're not for sale. We've been having too much fun. We're the only ones

that are going to survive IBM — I really do think that! They're just going to crush everybody else."

## We're not for sale — we've been having too much fun

So, how does Apple plan to stay ahead? "We don't design products that market research studies say we should design, that's for sure," says Jobs. "That's ridiculous. That's the IBM way."

He said that if we shipped 15,000 Macs in the first 100 days we'd be doing very well. It's been 85 days now — how many Macs do you think we've shipped? We've shipped over 40,000 — it's unbelievable. No computer start-up's ever been like this, ever, ever, ever," enthused Jobs.

But what's the reception been like in America? And does he see a future?

"My problem is that I have a Mac at home — but I'm never there. You can't tell how many sales of something in store days without some real use for it. It doesn't happen. We sell 'em \$2500 retail, so that's \$80 million — over a million dollars a day."

"What Apple did with Macintosh was to build a practical machine cheaply, one which works by having clients around the screen rather than juggling basic commands in memory."

Jobs is so proud of his Mac that, half-way through the interview, he wrings out the motherboard and gives SIG R, a technical, guided tour... "This is the complete Macintosh digital system," he explains. "This is the complete 30-bit graphics processing digital computer on one board."

There's the 80080. There's the memory. The video system's over here. This is the RAM control of ROM. A lot of custom ICs in these ROMs. We also have a custom VLSI Disc Controller chip. This is an incredible serial chip which gives us 2 megabits per second serial channels out of the back. Here's the extra disc port. We have a full serial port, and a serial keyboard. We have a clock arbiter with parameter memory that is battery backed-up. We have four voice sound and speech built into the product.

"I mean, it's incredible what's on this board. And this is 28 per cent of the parts of an IBM PC. An IBM PC has five times the number of parts and is far less powerful. It does not include many of the features of this board.

"You add up all these things, and the number of components that can do all these things — or even half of them — is only one. That's IBM. And the question is, when will they do it? The answer is, I don't know. I think it'll be two or three years away."

## APPLE'S NEXT PRODUCTS

This year Apple will launch new members of the Apple II family (We're spending as much on R&D for the Apple family as we are on the Mac in 1982), as well as major peripherals and software.

Auggable Apple II is coming. "Really hot stuff" — something to keep ACT up nights, with 200k of memory to utilize \$1,500. But that's just the beginning for the so-called 800 Series. There is a 128K Apple II being built with future extended Apple DOS

which will be truly portable, due for release in 1983.

The Apple II is getting more of the Mac II-like features, or windows and icons, to go with the mouse cursor just added. "We can give Apple II users a taste of what is to come, and it will be fun."

It has also been rumored that Steve Wozniak, lately returned to Apple, is working on a project code-named Apple V — a hard core Apple II to match the IBM PC XT.

In times there'll be a fully portable Mac. "I want to put Macintosh inside a book in

three pages, or better, with a flat screen display, three memory chips... that's one of the reasons we chose a three and a half inch disc drive. It's very small, uses less power, it weighs less. The whole thing might as well fit into a shirt pocket."

There will be a portable laser printer for under \$5000 (or around \$3000), for the first time being "intentional" and capable of working with any make of PC, which Jobs describes as "an incredible breakthrough in laser printing". It prints anything to high definition at a speed

nigh 48 pages a minute. It's just awesome."

And there will also be the launch of APPLEBUS, Apple's local area network.

"And on the software front?" "We have two programming languages that we're working on — also be out in the summer — Pascal and Basic," said Jobs. "You'll see windows, be able to incorporate graphics in your program. Universities have been going wild at that. Microsoft has been over Basic output — corn is substantially better. You can write a whole bunch of programs at once."





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```

1440 POKE 54277,129:POKE 54278,129
      POKE 54279,32:PRINT(POK119)125>
1470 POKE 54275,7:POKE 54276,8
1480 POKE 54276,0:RETURN
1490 POKE 54296,3
1500 POKE 54277,129:POKE 54278,129
      POKE 54279,32:PRINT(POK119)1250
      19124
1510 POKE 54275,7:POKE 54276,8
1520 POKE 54276,0:RETURN
1530 L=0:G=0:IF L=0 THEN L=1
1540 PRINT"*****"
      G=L/25:FOR H=1 TO LV
      PRINT L#:NEXT
1550 PRINTG:G:RETURN
1560 C=0:G=0:PRINT(POK119)125
      POKE 2040,14:POKE 4421,2:W=200
1570 POKE 44250:POKE 442,80
      POKE 44141:POKE 44141,81
1580 POKE 4421,3:PRINT"*****"
      PRINT(POK119)1250
1590 PRINT"*****"
      BY 104:G=0
1600 FOR H=1 TO L=LV/2
      G=1/2:WID=48:H=1:DOGS=1700
      1610 G=4500/50000:IF G=1/2 THEN 161
      1620 NEXT H:W=4441/10:IF W=0 THEN W=200
      1630 DOGS=2200:IF 1=1 THEN DOGS=1400
      POKE 44250:POKE 442,80:G=0
      G=0:G=0
1640 IF G=1 THEN 1640
1650 POKE 442:POKE 441-2:POKE 442,
      4441/2:IF 4441/2=0 THEN 164
      1660 G=0:G=0
1670 PRINT"*****"
      * RETURN
1680 PRINT"*****"
      * RETURN
1690 PRINT"*****"
      * RETURN
1700 PRINT"*****"
      * RETURN
1710 FOR 441:DOGS=2000:W=200
      POKE 444:DOGS=2200
1720 FOR 440:TO 100:POKE 441:WID=1
      RETURN
1730 G=0:G=0
1740 FOR H=1 TO 140:POKE 441:WID=1
1750 PRINT"*****"
      1250:G=0
1760 POKE 442,0:POKE 441,0:POKE 442,2
      POKE 4424,0:POKE 441,170
      POKE 442,170:POKE 442,1
1780 POKE 2040,0:POKE 2041,10
1790 FOR H=1 TO 150:POKE 442,
      4441/2+1:POKE 442:POKE 441
      PRINT(POK119)119
1800 IF 1=4 THEN POKE 2041,11
1810 IF 7=0 THEN POKE 2041,11
1820 NEXT POKE 442,0:FOR 441 TO 1000
      NEXT
1830 POKE 44250:POKE 442,20
      POKE 44141:POKE 44141,81
      POKE 4425,0:POKE 442,0:RETURN
1840 DATA 2420000000,2,100000
1850 DATA 3,40,0,3,184,0,2,171,0,2,
      106,132,1,70,40,0,94,200,0,00,84
1860 DATA 90,181,0,60,104,0,21,80,84,
      96,171,0,0,170,112,81,244,12,0,2,22,
      87
1870 DATA 10,600,10,74,40,10,20,0,130,
      20,7,0,20,12,0,3,20,0,200,60,120
1880 DATA 3,40,0,3,184,40,2,188,40,2,
      110,11,17,60,51,10,24,13,160,80,70

```



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 plus  
 A trip to the Kennedy Space Centre!

We'll be waving  
 all next month. In the meantime ...

**WATCH THIS SPACE AND ORDER YOUR NEXT MONTH'S COPY OF BIG K NOW!**

```

3125 DATA 60,161,10,60,104,7,60,60,50,
      80,190,7,40,160,60,60,244,7,21,100,
      80
3130 DATA 2,160,0,10,40,0,20,0,4,20,0,
      3,20,0,0,0,20,0,200,60,130
3135 DATA 21468,2,300000
3140 DATA 0,0,0,20,0,0,40,100,0,40,
      240,0,20,200,0,2,144,0,50,90,0,240
3145 DATA 100,0,200,100,0,40,170,0,
      250,150,120,250,174,120,200,240,24,
      251,247
3150 DATA 120,10,160,40,10,60,12,40,
      10,0,40,10,0,40,10,0,60,13,0,60,
      100,250
3155 DATA 0,0,0,10,0,0,41,100,0,41,
      100,0,10,200,0,2,144,0,50,90,0,240,
      0
3160 DATA 0,250,160,0,250,175,250,100,
      177,130,200,200,0,250,240,0,250,
      104,0
3165 DATA 10,100,0,41,100,0,40,10,0,
      40,10,0,40,0,120,60,3,130,60,240,
      100
3170 DATA 0,0,1,1

```



As regular graphics begin to reach their limit on existing microcomputers, creative hackers given to whistling in the bath are turning en masse to the growing potential of computerized music. And the technologies are coming together, too. 'Q' — BIG E's own mystery musician — brings us up to date with the new creative possibilities (and raps our knuckles when we don't learn our scales).

All together now . . .

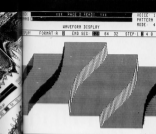
# Music, Maestro, Please!



If YOU'VE ever tried to make music with your micro you probably know that it's OK for squashing "Happy Birthday" but there's just no way it can be used for making 12 inch re-mixes. This is

"Q" posing with Yamaha and "Neuro Zapp" sheet poggles. Lenses are optional.





The Arts Also Drive... with the Shape of Music! Some of the screens from the Prophet 5.

because most mixes only use sound to enhance games.

The good news is MIDI which stands for Musical Instrument Digital Interface, and what it means is that music-making with your micro has jumped into horsepower.

Within the next year new MIDI-compatible hardware is going to hit the streets, and in comparison with the cost of Prolight's and Synclavier's (more 'bout them later) at \$25,000-\$40,000 a piece, this hardware is going to be relatively cheap (prices start around \$400). This means that you'll be able to create music on your micro by using MIDI in affordable hardware and that you will be able to also be able to run your micro with the 80000 systems and take advantage of all the latest hardware—drum, drum!

More good news is that some of this new hardware is already available. If you've got a Commodore 64 (hopefully adapted for Spectrums, Trigon etc) and it is MIDI interfaced, you'll be able to use a number of MIDI compatible synths on the market.

The problem is that there does not seem to be a lot of software around at the moment so all you hackers out there had better start writing some! Another problem is that not all hard-

ware manufacturers seem to actually know what's going on! Some people have started making MIDI interfaces for some popular synths so that you can hook them up to each other and to micros. The people to

contact with regard to this are Spoo Systems — see address at end of article. Hopefully some of you bright sparks will design a bit of hardware which Big M's readers could build cheaply while interfaces for popular micros are still thin as the ground.

**2700M ANSWERS** falls into various categories. The first (historically speaking) is the knob-twiddlers' analogue stuff which uses oscillators to create sounds, and modifies them with filters and such like. These synths are either Mono or Polyphonic (single or multiple 'voice'). Most of the older equipment is unable to store made up sounds in a memory, but most of the new

For the foot-kicking drummer who wants to drum a drum — the Drumulator from J.M.S. Systems. It's the drummer's dream of a drum machine (but does it really?)



The Roland MSQ-700 Digital Synthesizer. More digital than a watchmaker, more durable than a hammerhead. Making use of its particular design, the Roland Upper Oscillator (UO) can produce a wide variety of sounds with varying timbre. Form, Andia, is what makes it.

synths like the Prophet 5 enable you to make up sounds and store them and some even have cassette interface for large-scale storage.

The makers of the Prophet 5 Sequential Circuits were one of the driving forces behind the original MIDI concept, and they have now made a MIDI controllable analogue synth. Analogue synths produce most of the 'sawtooth' types of sound and are relatively easy to operate, but also (with the exception of strings) tend to produce a 'synthy' sort of sound which some artificial to a lot of people. Analogue synths (with their keyboard designated soundings) are the first generation of mass appeal music machines.

### Built-in

Some of the newer popular synths have built-in drum machines and most manufacturers produce drum machines for their own range of models, but there can be problems when trying to hook up the sequencer section of a synth to another manufacturer's drum machine (often the control voltages differ greatly). In this area the new MIDI compatible equipment will be much easier to use though problems are still being sorted out because the standard is so new. So always check equipment before buying.

The vast of equipment outlined — while not producing the most astounding of sounds — will (when MIDI compatible) enable you and your micro to make some very respectable-sounding music.

The second category of synths are the digital synths and they tend to be very expensive at the moment. This is because of the big memory that is required to store and manipulate sounds digitally. Drum sounds are short, and so digital drum machines are relatively cheaper than music-making digital synths.

One of the first of this type of machine was the Linn Drum and most of the machines on the market seem to follow similar principles of design. The sounds are stored on EPROM and a microprocessor enables you to program sequences. The



**MUSIC MASTRO  
PLEASE  
Continued**

The all-Australian **Yamaha Fairlight** rather more sophisticated than your average synthesizer. It "samples" sounds that reproduce them digitally, after which, using special digital software, it "rears" them. Photo, though.



**ABOVE:** Yamaha Fairlight Programmed Algorithms Set

advantage of these machines over their cousins (analogous drum machines) is that the sound chips are digital recordings of real drums and since many new machines have great "pitch control" some really amazing sounds can be created and programmed.

Programs may also be stored on cassettes. Although many use various sync systems to enable them to be played with some types of synth not many are of present MIDI interoperable, though this should change quite soon.

**Digital**

Other major types of digital synths are those that sample (i.e. record) and manipulate sounds digitally. One of the most popular is the Emulator . . . that's the one you tend to hear most of on Top of the Pops. Basically these synths digitally record (using microphones or direct input) any sound and transcribe it to a keyboard in either mono or polyphonic mode. They also enable you to create your own library of sounds on floppy disc. Less more advanced are the **Yamaha Synthesizer and Fairlight** — instruments that enable you to digitally record sound and then to manipulate and combine sounds with the aid of special software. These synths also enable you to compose by storing sequences of notes and allow you to edit these sequences together.



These machines are the most advanced and thus the most expensive but since most will be MIDI compatible it will be possible to write a program for a piece of music on your mixer — and then be able to interface your mixer with these "super" synths in a recording studio. These are the instruments that are now being used extensively to create the new, clean, heavily produced music that is in the pop charts. When used with the latest digital disks and tape machines, truly amazing sounds can be created. It is worth noting that very few records have real drummers anymore and that lots of really "natural" horns, strings and even human voices are being produced by these new digital machines.

Another category of sound creation that is now available is called the Synthesizer. This system is being developed by Yamaha for their new range of synths, and while being more complex to use (because the parameters of sound creation are larger) produce very "clean" sounds that are often very "natural" sounding. They use ROM plug-in cartridges for sound storage. These new Yamaha synths are MIDI compatible but beware! Many players used to the advantages of instant sound modification of analogue synths find sound creation on these new synths a bit laborious; so try before you buy. As well as these keyboard synths Yamaha are bringing out a more specific-

**LEFT:** The Roland MC-302 Synthesizer. Using the MIDI computer interface — a sort of musician's MIDI Basic — all these projects (and another idea yet to write out completely) for studies with your average elementary school. (Yes, . . . get your head out, Aussie Power!)

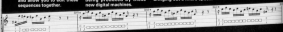
ally aimed at music making which uses the same plug-in ROM as their keyboards.

If you've been watching TV lately you will have noticed a thing called a Fairlight CM (computer musical instrument). It's been featured in a number of music related programmes. This beauty is in a class all of its own (though some might argue otherwise!) so I thought we'd go into some more detail on this lovely (and a little expensive) bit of Australian hardware.

**Australian?** Yes, that's right. The Fairlight comes from Down Under and has had its first around 1979-1978 two young hackers were working on a little guidance computer when they decided that they could also use the machine to make music. . . well, they left their music-guiding and had their first Fairlight on the market by 1978.

The design philosophy on this machine is such that it is constantly software and hardware updatable and to this end they have a huge staff working on software (which is remarkably big) and have updated hardware periodically.

Continued on page 11





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# THE DEADLY TUNNELS OF ZARNON



by Micheal Beaton for SPECTRUM





for COMMODORE 64  
by RICHARD FREEDY

And at the last fence it's 2-Player Game from Choose a Horse out of a List of 8. Place a Bet is coming up strongly on the outside of Up To 1000 Per Game. Also making a good showing is After Players' Selection only a nose in front of Race Starts. Barlow Movement fell at the start of the seven-jump course.

1 PRINT"0" P=1000 O=1000  
 4 POKE 53281:9 POKE 53288:9  
 6000 300  
 8 B=1304:8#1204 C=0344  
 9 B#1304:8#1424  
 10 PRINT"00 THE NATIONAL BY R. L.

FREEDY

11 PRINT"

12 PRINT"\*\*\*\*\* UNDER STARTERS

14 PRINT"0"

16 PRINT"0"

20 PRINT"\*\*\*\*\*

\*\*\*\*\*

30 PRINT"000"

0

40 PRINT"000"

0

50 PRINT"000"

0

60 PRINT"000"

0

70 PRINT"000"

0

80 PRINT"000"

0

90 PRINT"000"

0

100 PRINT"000"

0

110 PRINT"\*\*\*\*\*

\*\*\*\*\*

120 PRINT"000"

0

130 PRINT"000"

0

140 PRINT"000"

0



```

150 PRINT "A"
160 PRINT "B"
170 PRINT "C"
180 PRINT "D"
190 PRINT "E"
200 PRINT "*****"
210 FOR L=1 TO 1000 NEXT
:PRINT "*****"
220 FOR L=1 TO 1000 NEXT
:PRINT "*****"
230 F0R6 A:222 F0R6 B:222 F0R6 C:222
:F0R6 D:222 F0R6 E:222
240 IF INT(RND(1)*6)=0 THEN A=A+1
:F0R6 A-1:100 IF FEEK(X)=220 THEN
:GOTO 250
250 IF INT(RND(1)*6)=1 THEN B=B+1
:F0R6 B-1:100 IF FEEK(X)=220 THEN
:D=1:GOTO 100
260 IF INT(RND(1)*6)=2 THEN C=C+1
:F0R6 C-1:100 IF FEEK(X)=220 THEN
:C=C-1:GOTO 270
270 IF INT(RND(1)*6)=3 THEN D=D+1
:F0R6 D-1:100 IF FEEK(X)=220 THEN
:D=1:GOTO 280
280 IF INT(RND(1)*6)=4 THEN E=E+1
:F0R6 E-1:100 IF FEEK(X)=220 THEN
:E=1:GOTO 290
290 IF FEEK(X)=220 THEN A=1000
:F0R6 A:222
300 IF FEEK(X)=220 THEN B=1704
:F0R6 B:222

```

```

310 IF FEEK(X)=220 THEN C=1744
:F0R6 C:222
320 IF FEEK(X)=220 THEN D=1704
:F0R6 D:222
330 IF FEEK(X)=220 THEN E=1824
:F0R6 E:222
340 IF FEEK(X)=134 THEN D10
350 IF FEEK(X)=137 THEN D20
360 IF FEEK(X)=142 THEN D30
370 IF FEEK(X)=137 THEN D40
380 IF FEEK(X)=147 THEN D50
390 GOTO 300
400 F0R6 A-2:100 PRINT "*****"
: IS OVER THE HURDLE
:GOTO 300
410 F0R6 B-2:100 PRINT "*****"
: IS OVER THE HURDLE
:GOTO 300
420 F0R6 C-2:100 PRINT "*****"
: IS OVER THE HURDLE
:GOTO 300
430 F0R6 D-2:100 PRINT "*****"
: IS OVER THE HURDLE
:GOTO 300
440 F0R6 E-2:100 PRINT "*****"
: IS OVER THE HURDLE
:GOTO 300
450 FOR L=1 TO 1000 NEXT
:PRINT "*****"
460 PRINT "*****"
:GOTO 515
470 PRINT "*****"
:GOTO 1000
480 PRINT "*****"
:GOTO 1000
490 PRINT "*****"
:GOTO 1000
500 PRINT "*****"
:GOTO 1000
510 PRINT "*****"
:GOTO 1000

```

L.I.  
TENS  
++  
++  
++  
++

```

A
B
C
D
E
+0
+1
+2
+3
+4
+5
+6
+7
+8
+9

```



050 PRINT "\*\*\*\*\*" AND "C" IS THE  
 HIGHER "10000 1400  
 060 PRINT " THE NATIONAL BY R.I  
 "FREEDY  
 070 PRINT "

080 PRINT " THIS GAME IS FOR TH  
 O PEOPLE!  
 410 PRINT "ENTER THE PLAYERS' NAMES  
 415 PRINT "PLAYER.1." INPUT A\$  
 420 PRINT "PLAYER.2." INPUT B\$ GOTO 700  
 430 PRINT "ON HORSE." INPUT P\$  
 435 PRINT "HORSE1." INPUT P1  
 440 IF P1=0000 THEN GOTO 470  
 450 GOTO 7

700 PRINT "P1 PLACE YOUR BETTING FOR  
 C THIS 1/20"  
 710 PRINT "THE HORSES FROM THE TOP ARE  
 1-4  
 720 PRINT "  
 730 PRINT "  
 740 PRINT "  
 750 PRINT "  
 760 PRINT "ON HORSE." INPUT P\$  
 770 PRINT "HORSE2." INPUT P2  
 780 IF P2=0000 THEN P2=0  
 790 PRINT "P2 PLACE YOUR BETTING FOR  
 C THIS 1/20"  
 800 PRINT "THE HORSES FROM THE TOP ARE  
 1-4

810 PRINT "  
 820 PRINT "  
 830 PRINT "  
 840 PRINT "  
 850 PRINT "ON HORSE." INPUT O\$  
 860 PRINT "HORSE3." INPUT O\$  
 870 IF O\$=0000 THEN GOTO 900  
 880 GOTO 7  
 890 FOR L=1 TO 2000:NEXT  
 PRINT " THE NATIONAL BY R.I  
 "FREEDY

1010 PRINT "  
 1020 IF P\$=O\$ THEN PRINT "BETTING N/0"  
 1030 IF P1=O\$ THEN PRINT "BETTING N/0"  
 1040 IF O\$=P\$ THEN PRINT "BETTING N/0"  
 1050 IF O\$=P1 THEN PRINT "BETTING N/0"  
 1060 FOR L=1 TO 2000:NEXT  
 PRINT " THE NATIONAL BY R.I  
 "FREEDY

1070 PRINT "  
 1080 IF P\$=O\$ THEN PRINT "BETTING N/0"  
 1090 IF P1=O\$ THEN PRINT "BETTING N/0"  
 1100 IF O\$=P\$ THEN PRINT "BETTING N/0"  
 1110 IF O\$=P1 THEN PRINT "BETTING N/0"  
 1120 FOR L=1 TO 2000:NEXT  
 PRINT " THE NATIONAL BY R.I  
 "FREEDY

1130 PRINT "  
 1140 IF P\$=O\$ THEN PRINT "BETTING N/0"  
 1150 IF P1=O\$ THEN PRINT "BETTING N/0"  
 1160 IF O\$=P\$ THEN PRINT "BETTING N/0"  
 1170 IF O\$=P1 THEN PRINT "BETTING N/0"  
 1180 FOR L=1 TO 2000:NEXT  
 PRINT " THE NATIONAL BY R.I  
 "FREEDY

1190 PRINT "  
 1200 IF P\$=O\$ THEN PRINT "BETTING N/0"  
 1210 IF P1=O\$ THEN PRINT "BETTING N/0"  
 1220 IF O\$=P\$ THEN PRINT "BETTING N/0"  
 1230 IF O\$=P1 THEN PRINT "BETTING N/0"  
 1240 FOR L=1 TO 2000:NEXT  
 PRINT " THE NATIONAL BY R.I  
 "FREEDY

1250 PRINT "  
 1260 IF P\$=O\$ THEN PRINT "BETTING N/0"  
 1270 IF P1=O\$ THEN PRINT "BETTING N/0"  
 1280 IF O\$=P\$ THEN PRINT "BETTING N/0"  
 1290 IF O\$=P1 THEN PRINT "BETTING N/0"  
 1300 FOR L=1 TO 2000:NEXT  
 PRINT " THE NATIONAL BY R.I  
 "FREEDY

1310 PRINT "  
 1320 IF P\$=O\$ THEN PRINT "BETTING N/0"  
 1330 IF P1=O\$ THEN PRINT "BETTING N/0"  
 1340 IF O\$=P\$ THEN PRINT "BETTING N/0"  
 1350 IF O\$=P1 THEN PRINT "BETTING N/0"  
 1360 FOR L=1 TO 2000:NEXT  
 PRINT " THE NATIONAL BY R.I  
 "FREEDY



1370 PRINT "  
 1380 IF P\$=O\$ THEN PRINT "BETTING N/0"  
 1390 IF P1=O\$ THEN PRINT "BETTING N/0"  
 1400 IF O\$=P\$ THEN PRINT "BETTING N/0"  
 1410 IF O\$=P1 THEN PRINT "BETTING N/0"  
 1420 FOR L=1 TO 2000:NEXT  
 PRINT " THE NATIONAL BY R.I  
 "FREEDY

1430 PRINT "  
 1440 IF P\$=O\$ THEN PRINT "BETTING N/0"  
 1450 IF P1=O\$ THEN PRINT "BETTING N/0"  
 1460 IF O\$=P\$ THEN PRINT "BETTING N/0"  
 1470 IF O\$=P1 THEN PRINT "BETTING N/0"  
 1480 FOR L=1 TO 2000:NEXT  
 PRINT " THE NATIONAL BY R.I  
 "FREEDY

1490 PRINT "  
 1500 IF P\$=O\$ THEN PRINT "BETTING N/0"  
 1510 IF P1=O\$ THEN PRINT "BETTING N/0"  
 1520 IF O\$=P\$ THEN PRINT "BETTING N/0"  
 1530 IF O\$=P1 THEN PRINT "BETTING N/0"  
 1540 FOR L=1 TO 2000:NEXT  
 PRINT " THE NATIONAL BY R.I  
 "FREEDY

1550 PRINT "  
 1560 IF P\$=O\$ THEN PRINT "BETTING N/0"  
 1570 IF P1=O\$ THEN PRINT "BETTING N/0"  
 1580 IF O\$=P\$ THEN PRINT "BETTING N/0"  
 1590 IF O\$=P1 THEN PRINT "BETTING N/0"  
 1600 FOR L=1 TO 2000:NEXT  
 PRINT " THE NATIONAL BY R.I  
 "FREEDY

1610 PRINT "  
 1620 IF P\$=O\$ THEN PRINT "BETTING N/0"  
 1630 IF P1=O\$ THEN PRINT "BETTING N/0"  
 1640 IF O\$=P\$ THEN PRINT "BETTING N/0"  
 1650 IF O\$=P1 THEN PRINT "BETTING N/0"  
 1660 FOR L=1 TO 2000:NEXT  
 PRINT " THE NATIONAL BY R.I  
 "FREEDY

1670 PRINT "  
 1680 IF P\$=O\$ THEN PRINT "BETTING N/0"  
 1690 IF P1=O\$ THEN PRINT "BETTING N/0"  
 1700 IF O\$=P\$ THEN PRINT "BETTING N/0"  
 1710 IF O\$=P1 THEN PRINT "BETTING N/0"  
 1720 FOR L=1 TO 2000:NEXT  
 PRINT " THE NATIONAL BY R.I  
 "FREEDY

1730 PRINT "  
 1740 IF P\$=O\$ THEN PRINT "BETTING N/0"  
 1750 IF P1=O\$ THEN PRINT "BETTING N/0"  
 1760 IF O\$=P\$ THEN PRINT "BETTING N/0"  
 1770 IF O\$=P1 THEN PRINT "BETTING N/0"  
 1780 FOR L=1 TO 2000:NEXT  
 PRINT " THE NATIONAL BY R.I  
 "FREEDY



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# M.A.C.H. 3 ALLEY

PAUL RAMBALI dons bone-dome and G-suit for some breathtaking air combat sequences



## FOXBATS WERE NEVER LIKE THIS...

FROM THE moment you drop the coins in the slot and literally feel the jet engines rumble to life, you know you are in for a ride.

Midstar Electronics' M.A.C.H. 3 is the most sophisticated, the most hopelessly gripping laser game yet — one that uses real-life footage to put you in the cockpit of a modern jet fighter. Ever wanted to fly a crack Israeli Air Force raid across the Golan Heights? Ever wondered what a victory roll feels like at 2,000 feet? All you have to do is scramble and go upstairs in this baby.

The hardware alone is impressive. Designed by Dave Pflafer, the vintageer controls and the special panoramic screen image intervals with the usual [and — I promise you — physical] sound effects to create a startling and highly effective fantasy. The engine throbs beneath you, cannons impact with a distant thud, and as the jet banks and rolls, you feel yourself leaning helplessly into the turns.

Select a game option to start: either over flying — i.e.,

looking straight down on what is in fact actual footage of San Diego in California, or flying through — with a view straight ahead as though from a real cockpit — a series of linked scenes probably filmed in the arid, rocky terrain of the American South West.

### THRILLS AND SPILLS LASER-STYLE

In both options, your unmarked Military Air Command Hunter jet is superimposed using computer graphics, battle first — over-flying — definitely lacks the excitement of the latter. It's much slower and, despite targets on the right, upside-down and industrial sites below, your attention is drawn to the mad-dash busyness of dodging enemy jets and rocks that barrel across the screen in the all-too-familiar pattern of games like River Raid.

Everyone but the M.A.C.H. 3 connoisseurs will opt straight away for the second game. Targets appear marked by con-



ons  
-suit  
-king  
aces



puter-generated "windtunnels" into which you react fire missiles as you hurtle across the landscape, soaring in low over rocky outcrops and banking hard into valleys to out-bank enemy rockets. A steep climb takes you high into clouds that hide helicopter gunships; diving down again, your target is a hydro-electric dam. A hair-raising turn takes you over some hills and into a heavily fortified ravine. Here the enemy gunners have heat-seeking rockets on their side, and many lives have been spent mastering the knack of killing these excavating projectiles before they intercept. The interminable, perilous (and costly) ravine finale opens out onto flatlands, with no target in sight and time for a well-earned victory roll.

Programmed by Chris Brewer and Fred Darvstadt, M.A.C.H. II is a real roller coaster—a loud, dizzy, high-speed, vertigo-inducing swirl of sights and sounds. Simply hanging on to the joystick and plummeting through the air is a thrill, never mind scoring any points. The clearest man-

oeuvre executed in the course of this 3D spectacle are a challenge for the strongest stomachs. So explosive is it that one reviewer even wrote that she heard verbal instructions advising which targets hit (or was I so caught up that I didn't?).

## ALONG COMES EASTWOOD

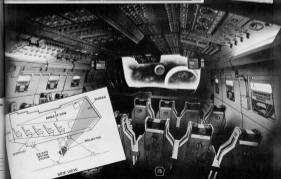
Like Teito's *Lower Grand Prix*—a Pole Position game super-imposed on actual footage of the Mount Fuji race circuit—M.A.C.H. II's real backgrounds are an eye-popping advance on Don Bluth's cartoon animation for *Dragon's Lair*. By the time you read this it will have been joined by Matt's *Phoenix*, incorporating footage from the Clint Eastwood film about stealing a Soviet jet. And it can only be a matter of time before you are sitting alongside *Knightrider* or even playing tennis with John McEnroe. Imagine the sound effects on that!



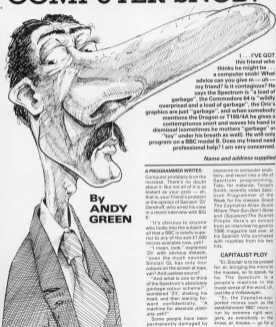
# RELAX-IT'S ONLY A VIDEO GAME



**ROLL OVER NINTENDO!**  
After the success of their T47 Flight Simulator (reviewed in EGG & No. 1), the mighty Bodiffusion company have turned their hand to lighter things. By the time you read this, the good citizens of Toronto, Canada, will be forking out their dollars for the privilege of a trip aboard the world's first Space Flight Sim — forty million dollars' worth. Up to 40 punters at a time get a guided tour round the Solar System — using aim techniques familiar from *Mariner* and *Voyager* probes. Even the inside of the capsule is equipped & is made, with warnings about vacuum, etc. Also featured: asteroids, Jupiter orbit, and near brushes with man-made debris. Can't wait.



# CONFESSIONS OF A COMPUTER SNOB!



By  
**ANDY  
GREEN**

I... I'VE GOT this friend who thinks he might be... a computer snob! What advice can you give me — uh — my friend? Is it contagious? He says the Spectrum is "a load of garbage", the Commodore 64 is "wildly overpriced and a load of garbage", the Ori's graphics are just "garbage", and when somebody mentions the Dragon or T199/4A, he gives a contemptuous snort and waves his hand in dismissal (sometimes he mutters "garbage" or "toy" under his breath as well). He will only program on a BBC model B. Does my friend need professional help? I am very concerned.

Name and address supplied

**A PROGRAMMER WRITES:** Computer snobbery is on the increase. There's no doubt about it, but not all of it is as blatant as your prob — ah, that is, your friend's problem or the opinion of Garrison "Zir" Danforth, who aired his view in a recent interview with BIG K.

"It's obvious to anyone who looks into the subject at all that a BBC is totally superior to any of the sub-£1,000 micros available now, yeh?

"I mean, look," explained "Zir" with obvious distaste, "even the much vaunted Sinclair QL has only four colours on the screen at tops, yeh? And useless sound?"

"And what is one to think of the Spectrum's absolutely garbage colour scheme?" wondered "Zir", shaking his head, and then leaning forward confidentially, "A machine for absolute peasants, yeh?"

Some people have been permanently damaged by

exposure to computer snobbery, and recall into a life of Spectrum programming. Take, for instance, Tavin Smith, recently voted Spectrum Programmer of the Week for his classic Shoot The Capitalist Alien Snob Where Their Son Don't Shine and (Squander) The Socialist Plopie. Here's an extract from an interview he gave to *TRIG* magazine last year, at the Spanish Villa purchased with royalties from his two hits.

## CAPITALIST PLOY

"Er, Sinclair is to be praised for, er, bringing the micro to the masses, so to speak, he he. The Spectrum is a people's machine in the truest sense of the word, ut, just like a Volkswagen.

"Er, the Capitalist supported micros such as the establishment BBC, more — run by extreme right wingers, as everybody in the know, er, knows — go for a

large profit margin to include the working class and the unemployed from their hard earned wages!" Tarquin told us, sipping from his dry Martini and taking a drag from his cigar. "Or, or, supplementary benefit," he added thoughtfully.

Some of the worst-offered computer smokes attained the height of their satirical pleasure by becoming software reviewers for magazines. When they grind a program into the dust and spit on its limp remains, some try to justify their actions by claiming they are weeding out the good programs from the staff.

Tom 'No Ki's' Hoffmann, variously described by experts in the field as a 'big-headed nerd', a 'york' and 'a snob' defends his reviews.

"Computers," he begins in his monotone voice, fingering his ear-lobe and looking away to one side, "are capable of much better.

"The main reason why games aren't very good at the moment is that one programmer can only do so much. Programs written by teams are going to be much, much better. Take The Hobbit, for example.

"Really, although it was good at the time, The Hobbit is a very simple adventure. Without graphics, as in the BBC version, it really isn't worth playing," he added.

"I don't know about you,

but arcade games simply bore me to tears," he yawned. "They're all the same. Once you've played Space Invaders, you've played them all."

However, some small retailers and software houses have been claiming that large software houses with massive necessary backing will be the death of them. Jack Fudge — who runs Cheap-Jack software from the backroom of a run-down fish and chip shop in Romford — agrees.

#### CORPORATE GREED

"Imagine," says Fudge, "An' Bug-Byte. And bloomin' Software Projects ... Pahl! Sperting like an honest bloke can't earn a decent livin'. Bloomin' Fawcetts, these what they is," he added, passing to pick out a chip from his desk and shove it gloomily.

"Least fancy packagin' 'not does it, yer mark me words, boy. Why us the customer knows what it's getting, know what I mean? Name of that fancy gold stuff — we wrap the cassettes in chip bags so as we can see jus' what yer's gettin' ... clean ones, mind you," he continued, pointing to a fern variegated box over in a corner spilling grass-poop of chip bags onto the floor.

Mr Fudge, whose company's bread and butter is the games tape 'One Thousand

Super Awesome One Line Games For The Jupiter Ace', claims that big companies are 'conspiring' to push the smaller companies out of the marketplace. He cites the instance that his tape for the Jupiter Ace was selling 'hens of units' a week until about six months ago, when for some reason he suddenly wasn't able to sell any at all.

"I's pretty obvious to me, yer know what I mean, that this was not unconnected, yer know what I mean, with Virgin Games bringing out a new batch of programs, are yer with me?" Fudge told BIG K, darkly.

But what can be done to help the certified snob? We asked Dr K.S. Verbiage, atrop specialist in the field, for some handy tips:

"Don't let him read an American magazine called BYTE — if necessary feed him BIG K intravenously.

"Make him use a Spectrum at least once a month at first, then with increasing frequency. If the case is very bad, start him off with just a simple a Spectrum keyboard for five seconds at a time.

"Burn any books by Lance Loveland or Rodney Jaks.

"Make him use tape recorders again instead of his new disc drive. Nothing humbles a hacker so.

"If none of the above works, shoot him. Or yee-saw!



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## CHANGING CHARACTER

**NIGEL FARRIER** continues  
his how-to series on  
Atari graphics . . .



**THIS MONTH** I intend to give you a brief overview of how to redefine the character set on the Atari 400 and 800. My eventual aim, after covering Arctic Made 4 next month, will be to use this to write a short game for you. As I have not written it yet myself your guess will be as good as mine as to how it will turn out!

### In-built characters

The Atari holds its own 256 characters in ROM or Read-Only Memory. It actually only holds half of them but who is counting? Because the characters are situated in ROM we hit our very first snag (and you thought that this was going to be easy!). You cannot write to ROM to change them. Fortunately Atari did give us location 756. If you PEEK (794) you will get back the number 224. What this number actually refers to is 'page' 256 in the computer's memory. As a page is 256 bytes long, page 224 is pointing to 224\*256 which (for those of you without a calculator) is 57344. Lo and behold this just happens

to be the first memory address of the ROM and it is the beginning of the data for the in-built character set.

This is therefore going to make our job simpler too—you were right, this is going to be easy after all. All we have to do is to POKE memory location 756 with another number and the computer will then believe that the character set is somewhere else and start using that one. You've probably guessed by now that we will point it to our own redesigned set.

Yet another point to remember here. Every time you executes a GRAPHICS statement, location 756 is reset to 224. You must therefore remember to POKE this location with the page number of where your character set resides. If not your display will not be quite what you expected.

### Relocating the character set

All we have to do now is to decide where to put said character set. The normal place for this is at the top of RAM, otherwise

known as MEMTOP. The location of MEMTOP is held in location 106. PEEKing (106) will give you different results depending upon whether your machine is a 100, 200 or 400 model. In order to stop our character set being written over by things such as a display list, we have to fool the Atari into thinking that it has less memory by POKEing location 106 with a number less than is already stored there.

As I will show you in a moment, we have to reserve 4 pages (i.e. 1024 bytes) at the top of memory for our character set. So naturally you would expect to enter the command POKE 106, (MEMTOP-4).

Wouldn't you? No —



FIGURE 1

unfortunately certain functions will overrun MEMTOP so we will have to lower the location by even more. Normally I take 8 off of it just to be on the safe side.

### How the character set is stored

Each character is stored as a series of 8 bytes. If we look at the character 'A' it is stored as 0,24,60,102,103,126,102,0. Figure 1 shows how this makes up the letter.

The character is on a grid of 8 by 8. Each of the right rows is used to calculate a number from 0 to 255 depending upon which square is filling in (i.e. shows on the screen) or not (i.e. background). Therefore, the second row set would have the binary number 00111100 (or 60 in decimal), and the sixth row it would be 01100110 (or 102 in decimal). One thing of note here. All characters have pairs of adjacent blocks filled in. You will not find a character with only one block on its own as this would give an artefact effect on the screen. We will be using that with great effect in our game if I hope!

There is only one more major stumbling block to overcome. That is, that, although the letter 'A' has an ATASCII code of 85, it is in fact the 33rd character stored in memory! Weird. But at least there is some sort of logic to it. Figure 2 shows that the first 32 graphics characters have been swapped so that they now run from



FIGURE 2

the 84th character in memory.

As you can see, if you intend only redefining the lowercase letters there is no problem as they are still in their correct place.

As each character is eight bytes of data long, to obtain the start of any lowercase letter we have to multiply its position by 8 before adding the result to  $POKE(756)*256$  — the location for the start of the character set.

Having waffled on for long enough let us get down to some programming.

### Your new character set

You now have a choice to make. If you are going to change only some of the characters then it pays you to copy — from ROM to your reserved place in RAM — the whole of Atari's set and then to change the ones you want. If you are not going to use any of them then this step will be pointless. We, however, will be using a large part of the original so our first step is to transfer it over. Our

program will therefore start:

```

10 MEMTOP=PEEK
1000: POKE 106,
MEMTOP-8:
GRAPHICS 0
20
POKESET=MEMTOP-
41956: FOR X=1 TO 1
023: POKE
ROCKSET=X, PEEK
(57344-X): NEXT X
30 POKE 756,
ROCKSET*256

```

Line 10 reserves our area of memory for us and gets rid of what was there by executing a GRAPHICS 0 statement. Line 20 is a FOR NEXT loop that looks at the values in ROM and POKEs these into our reserved area. Line 30 then tells the computer where our new character set resides. This whole process takes about 10 to 15 seconds and can be speeded up by using a machine code program. Space, unfortunately, does not permit that this time.

Now . . . all we have to do is to change the ones we want and we are in business. Just as an example for now I will show you how to change one of the characters. I am going to change the 'hash' symbol (the one above the 3) into a true British pound sign.

CHARACTER TYPE	ORDER IN MEMORY	ATASCII ORDER
UPPERCASE NUMBERS & PUNCTUATION	0 to 63	32 to 95
GRAPHICS CHARACTERS	64 to 95	0 to 31
LOWERCASE & SOME GRAPHICS CHARACTERS	96 to 127	96 to 127

FIGURE 3

First you have to map out on paper (graph paper is easiest) how it will appear. Then calculate the eight numbers you will have to POKE into memory. In Figure 3 I have designed a pound sign and done just that.

The hash symbol is the 32th character so, according to Figure 2, it will be the 3rd character in memory. We therefore need to  $POKE ROCKSET+(3*8)$  with the first number and so on. Our next few lines therefore look like:

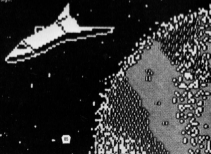
```

40 FOR X=0 TO
7:READ A: POKE
ROCKSET+(3*8)+
X,A:NEXT X
50 DATA
0,38,54,48,134,48,126,0

```

If you now RUN this program, every time you type SHIFT and 3 you will get a pound sign — and, that is, you type in GRAPHICS 0 without POKEing 756 with ROCKSET\*256!

Now I have got you all totally confused I will try and make it worse next month!



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## Letters to BIG K

### They Can Read Us ANYTIME . . .

IT WAS nice to read a computer magazine with a news section that didn't genuflect to all and sundry, but didn't automatically slag everyone off, either — and included the very interesting and perhaps potentially controversial Budapest Beasts story.

Also welcome was the inclusion of articles about computer PEOPLE rather than just computers, as well as equally rare topics like real flight simulators and computer crime — smart. Don't ease up in the features department (Paul Walton certainly gets around).

The software reviews were superb, I think probably the best I've seen — an opinion formed after reading every magazine around. Don't just review games, though. A word processor and a data base reviewed in each issue could be useful. I was also pleased to see that reviews weren't completely dominated by Spectrum programs: too many people forget that there's life after ZX, especially good (to me) was the sprinkling of Dragon reviews. It's a machine a lot of magazines tend to overlook, especially in the software area, and they seem to forget they could be losing about 150,000 potential readers.

The personality reviewer is a real touch but Charts don't really serve much purpose — by the time a game reaches the top, it's hardly necessary to trumpet it much more. Another major weakness is that Charts have an automatic bias towards machines which have sold most.

In the hardware department I really enjoyed Squaring Up. I mean, what's wrong with a bit of good-natured argy?

I played in *Demon Driver*. It was no worse than any I've entered from any other magazine and better than many, but really, no-one's really likely to play these pseudo-arcade games. Small utilities would be vastly preferable as well as leaving extra space for another Fabulous Feature or two, perhaps even an additional Razzie Regular or some more Heavenly Hardware.

The magazine's title is, well, terrible. It's a shame to spoil *Clash Contents* with a *Half Name*.

Last of all, a couple of personal questions:

1. Is Eddie Babbage any relation?
2. Richard Burton can't be, surely?

Keep up the good work. This is at least one copy you'll sell next month. In fact, I reckon you could find yourselves with a Big Classic.

Cameron M. Black, Glasgow.

### Cunning Blag

Your free gift in issue 1 was a brilliant CD cassette that worked very well. I was very disappointed to be unable to find anything as good in the shops. Could you please, please send me some Big K computer tapes, or tell me where I can buy one.

P.S. How your mag.  
J. Clark,  
Newnham upon Tyne.

We had a lot of compliments on our Big K cassette, which we here prefer to call a Data Blag. The hi-quality clear plastic . . . the little brass screws . . . the whole thing just oozed quality. And as it happens (perhaps to coincide and reveal coincidentally to the fact that we had to order them in the magazines section), there are still one or two left over. Stand by for an upcoming special offer.

Many thanks for your letter, Cameron. A Marvellous Messive. A Splendid Scored Post to Robert Abbott — as we have here by printing (scarily) all of it. Regarding reviews, we will continue to try and review stuff for as many machines as possible. On this subject of letters in BASIC — what do other readers feel? All magazines do it, and more of them feel they can stop doing it. What's the solution? Carry on as before, or do as Cameron suggests and start incorporating more utilities? We propose, in upcoming issues, to survey not a list in the direction of the letter . . .

To answer your personal questions . . .

1. Yes, Eddie Babbage is related to the legendary Charles Babbage, inventor of the looms. I mean, what's wrong with a bit of good-natured argy?
2. Richard Burton is NOT related to the legendary Welsh-born film — sorry, definitely and should we pay Eddie more as a result?
3. Richard Burton is NOT related to the legendary Welsh-born film — sorry, definitely. However, he doesn't even look like him. He doesn't talk like him. But to sure we play *Ata Ata* for any other (hooked) game! Write that him.

### CONGRATULATIONS!

Your new magazine Big K is absolutely excellent. Well done! It's good to see a magazine that not only lists computer programs but tells you which games are the best buy. I placed my order for No. 2 as soon as I had put down No. 1.

Warren Crawford,  
Newnham, Devon.

I think you have introduced a fabulous. Your reviews are excellent. Big K is also one of the most colourful magazines I've ever seen. Your magazine brings a new dimension to computers.

V. Shanner,  
Safford, Essex.  
That's nothing. You should see what the Editor can do with word shaving pen.

### CONGRATULATIONS!

Oh what for having the best computer mag out? Yes, I think Big K is the best in the known universe. All the reviews, news, features simply are great. And you don't put too many ads in, like so many other mags. Can I let you into a secret? I'm saying all these good things so that this gets printed. Dope! Sorry!

Bernard McKewen,  
Cambridge, Co Down.  
Thanks, Bern. Your cheque is in the post.

### Enterprising Reader

I HAVE heard rumours that the Enterprise will be able to accept and run both Spectrum and Commodore 64 programs. Please could you clarify these rumours, one way or the other?  
John Frost, Woburnhampton.

The good news: Enterprise will be launching two converters this September along with their computer. These will convert Sinclair and BBC Basic into Enterprise Basic.

The bad news is that games written in machine code are unadaptable to the converters. There are no prices available for Enterprise peripherals as yet, and even The Shadow has been unable to detect the slightest suspicion of a whisper that says there may be plans for a Commodore converter. We'll keep you informed.

### Electron Lust

Beautiful magazine—I'm impressed! I am soon to own an Acorn Electron and would like to know if you are going to list programs for it.  
David Wayne, Leeds.

Most BBC programs (other than those in *Electron*) run on the Electron while others need a few conversions to do so. However, you'll be transported with joy—at least as far as this — by the knowledge that the Electron has less here at Big K. We'll carry onlookers by leading to let anybody use with some delectable bargains.



### But Does He Have A Parrot?

I WAS very interested in Tony Tyler's review of the Atari 400 in Big K 1. To my knowledge, this is the first time a magazine has given it a machine a good review other than to praise the graphics and liken it to a video games machine. Can you recommend a good basic manual for the Atari?

Also, I take a Spectrum 48K to sea with me as it is easier to carry than the Atari. No-one on board has had any luck at all with Kalkula. We are getting desperate! Can you offer any ideas?  
A. C. Lewis, M.S. Expo Team, Scarborough at Sea.

The Editor writes: Well, hello sailor! This question of a decent reference manual for the Atari machines is a theory Chris Crawford — but basic BASIC (as it were) is incomprehensible, maths-obsessed and boring, or *Wileys Inside Atari Basic* by Bill Corwin — is probably the best bet. If used on it, approach.

As for Kalkula, none of us here have any clues at all. No doubt somebody out there can weigh in with a tip or two.

### Putting The 'A' Team On HOLD

I AM an LSI component specialist for a multinational electronics company and one of my hobbies is using my BBC 'B' computer. I was therefore interested in your *Screen Programmer* article 'FOUR A (GEMPAK 4800)' — (BIG K) April. However I would like to draw your readers' attention to the differences between a 2764 or 27128 and a 27664 and 277264.

The A versions are replacing the ordinary versions from some manufacturers and although totally compatible in read mode, are programmed entirely differently:

1. They are programmed at 10pp/12.5u, VCC600 to 2.
2. They do not use a fixed 268ns pulse.

Instead they use so-called 'intelligent' or 'adaptive' programming algorithms which apply a time pulse followed by a readiness cycle. Further 1ms pulses are applied until a driver verify occurs, and then an 'overprogram' pulse of three or four times as long as the total number of 1ms pulses is applied (manufacturers vary in their algorithms). After the complete EPROM is programmed, a verify at 10pp/12.5u is performed.

The intention of these algorithms is to speed up the programming time and also to ensure that every bit is programmed fully.

The duration of the pulses can total from 4 to 100ms and a fixed 10ms pulse is NOT permitted — it can corrupt other bits in the same column.

Typically the 2764 will program in one and a half minutes rather than 7 minutes (by doing a 27512 — now available — it could otherwise take 40 minutes!). The net effect of all this is that plugging an 'A' version into 271 will kill it!

Could I suggest a follow-up article to cover a programmer for 'A' versions? The 12.5u and 6u could easily be obtained from the 15u auxiliary power output of the *Beob* and the machine-side section of the program modified to allow these intelligent algorithms.

J.J.F. Cunningham, Tisbury, nr. Bishopstoke

ANDY GREEN writes: there are new chips, as you say, and aren't available in retail shops. The 15u games for you mention in the *Beob* is in fact 12u, and this would do very nicely as you say. Look out for an article online to convert the BBC B Chicago Epico to work with 12 versions soon. For now, see only the 2764 and 27128 versions with the programs.



### Wildly Underrated

BIG K is excellent — its only fault being its lack of a letters page and the coding system for games. For example, *Atic Atac* would be wildly underrated at 8.5K.  
Tom Hardy, Bishopsgate Stafford.

ambrosome, penny-anything-from-10 grid charts underneath each game — you need a calculator to solve some of these! We use our four-opcode rating system (don't forget the *Pro K's* option) in order to promote good writing from the reviewers. The figure that if the reviewer had a solid you just what you need to know in the 'top', then so railway timetable bookish under-neath it made you any sense. Inequality in that, for which you come down to it is subjective. What do other readers think!

The problem, Tim old boss, with starting a letters page is that if you haven't been in existence long enough to attract letters you can't print them! As for the Rating System, we felt that too many other magazines use

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The first machines allowed the sampling of sounds for up to three seconds with a variable bandwidth of frequency of up to 18k. They have recently improved the hardware (called "voice cards"), and this now means that sampling bandwidth goes up to 18k. As well as being able to sample sounds it is possible to modify and combine sounds by using the operating software. Much of the sound creating process enables the user to change the wave form of a sound with a light pen.

As well as transposing each recorded and created sounds to a keyboard the machine can record up to eight tracks of sequential information and store this in real time when the keyboard is played. Some of this recording can be edited in what is called the "Page 2 Mode" and it is the software which affords the musician such fantastic compositional scope.

### Different

All the sounds in a composition can be reprogrammed if required and can be played by a completely different set of sounds. This allows for pretty wild experimentation... as well as this, because the Fairlight has eight output ports each soundtrack can be treated differently as the recording takes place... control yourself, resist the temptation to jump on your Copic...

Now that the sampling of sounds is all the way up to 18k the quality of sound is pretty stunning and at £24,995 plus it's pretty expensive too. But remember, you don't have to buy me (you can hire them). So if you've composed something at home it won't be too long before you can use your skills to operate a Fairlight because they'll soon have MIDI interfaces (you'll probably still need a Fairlight programmer even they're complex machines).

The next step in the £600 000 Fairlight story is going to be the series 3 which will employ 50 bit (as opposed to a 16 bit microprocessors and will be able to operate as 16 track digital tape recorder as opposed to 8 at present),

also to sample sounds for 2 minutes.

Fairly as a result of the introduction of digital synths like PPGs, Fairlights, and Synclavier, synth programming has become something of an art and many top producers like Trevor Horn and Martin Rushent will not venture into the studio without their programmers. So while traditional skills of musicianship are still very relevant the situation is beginning to change. In the future a combination of musical and programming skills will be needed to make music. This is already evident on the new trendy labels like Trevor Horn's ZTT.

### Combination

MIDI makes possible many more combinations of synths and morns and thus serious music making will become possible for more hackers but it still means that you will have to have a rudimentary knowledge of keyboard playing (although other instruments can be used keyboards are still the big favourite).

But what if you can't play? Voice activated music programming is something undergoing a lot of research at the moment, but industry observers reckon that it will be at least 3-4 years before you'll be able to turn a tune into a micro-synth system and have it played with the sounds of your choice!

Sound data bases might soon be available and it looks like the price of Synclavier type technology seems sure to come down within the next few years.

A lot of software for writing music on popular micro's (using a keyboard) will have to be written and a lot more MIDI compatible hardware should be coming onto the market. Meanwhile, back on... and if you've got some related props, send them in. P.S. I would like to thank Phil Nicholas for his help in producing this article.

For information about products mentioned in this article, write to D at: S&S Music, IPC Magazines, Kings Reach Tower, Stamford St., LONDON SE1 1LS

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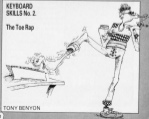
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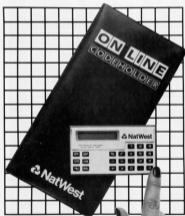
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