

# PERSONAL COMPUTER

*weekly* **NEWS** JULY 7 • 1984 • No 68 50p

**SPECTRUM CONTROL**  
The hidden extras  
of Interface 1

**ORIC PROGRAM...**  
... drums up a beat  
in Basic

**PCN SCOOP!**  
**PCN SCOOP!**  
**PCN SCOOP!**

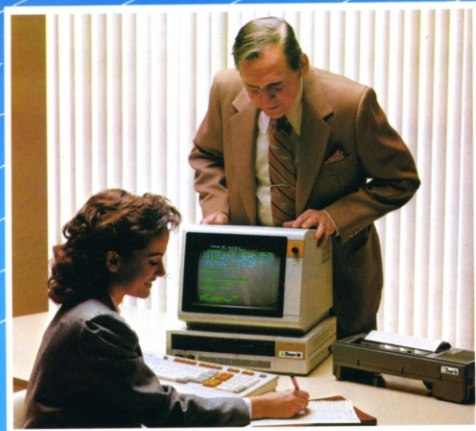
**TANDY POWERS IN**  
Full review of a go-faster  
MSDOS desktop

**SOFT SELECTION**  
New packages for IBM PC,  
CBM 64, Dragon & Spectrum

**Is there a gap for  
Osborne's Encore?**



# Duet-16



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System expansion Unit

- Disks** 2 x 720 Kbyte floppy disk  
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IEEE-488 BOARD

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Street: \_\_\_\_\_ Phone: \_\_\_\_\_ PCN I

Other products: low-cost peripherals - printers, plotters, monitors and floppy-disk drives. Now available. Please enquire.



## REGULARS

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# MENU

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No 68



Cover picture by Howard Kingsnorth

## COVER STORY

### Osborne again

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Osborne Computer is once more set to take centre-stage of the lap-held scene with the Encore. Stuart Cooke was first in the stalls for the preview of this possible show-stealer featuring a built-in disk drive.

### Hobbit help

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Hints on getting out of tight spots for Hobbit adventurers, plus a nudge in the right direction for you Urban Upstarts.

## HARDWARE



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Tandy's new IBM-compatible has taken the popular MSDOS trail: Stuart Cooke found that its other features make it stand out as an attractive buy.

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Kenn Garroch experiences a taste of joystick interfacing for the Electron from First Byte.

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Acorn's Z80 second processor is on the streets at last. Simon Horner investigates.

## SOFTWARE

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We relay first impressions of the packages that arrived in PCN's offices during the last week.

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A 64 version of Pascal which is a full implementation of the original with some extra features to exploit the Commodore 64.



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Four frantic games to keep you finger-flicking happy.

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## PROGRAMS

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A programmable drum machine from your Oric 1.

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49

System resets for Basic programmers.

# Watchdog watches QL

Sinclair Research could be in very hot water over a disclaimer published in the QL manual, according to David Tench of the Consumers Association.

The disclaimer says that Sinclair Research and Psion will in no circumstances be liable for any losses the user sustains arising from 'any error, defect or failure of the QL hardware or the software supplied with it.'

According to Mr Tench this disclaimer may prove invalid under the Unfair Contracts Terms Act of 1977, as it purports to take away rights that the buyer has under the law.

The fact that it does so could be an offence under the Fair Trading Act of 1973.

The documentation of the QL has hitherto been the system's least controversial feature, but it seems

now that no aspect of the QL will escape critical discussion.

The fact that the disclaimer is in the manual that's in the box that's in the post some time after customers have actually made their contract of sale with Sinclair Research also makes it look distinctly flimsy. You can't unilaterally alter the terms of a contract that's already been made without consulting the other party first.

From the point of view of the user, though, the reasons for inserting the disclaimer are probably more serious than the disclaimer itself. It's not something that's been found necessary in connection with previous Sinclair machines, so what's so special about the QL? Is it liable to eat spreadsheets? When it puts two and two together do you get 68008?

A Sinclair spokesman said that he

In no circumstances will either Sinclair Research Limited or PSION Limited be liable for any direct, indirect, incidental or consequential damage or loss including but not limited to loss of use, stored data, profit or contracts which may arise from any error, defect or failure of the QL hardware or the software supplied with it.

Sinclair Research has a policy of constant development and improvement of their products. Therefore, the right is reserved to change manuals, hardware, software and firmware at any time and without notice.

**Dodgy disclaimer: No validity, says the Consumers Association.**

believed the disclaimer was standard practice, although he conceded that such things hadn't previously been Sinclair's practice. He was unaware of any legal problems connected with it.

But even on the new cleaned-up AH operating system (Issue 66) there are a few oddities, some of which might qualify as bugs. The print separator, which is a comma on the QL, should print characters to the screen in every eighth position, but will not do so on

column 32 even if there's room. The PAN command, which is used to scroll the screen, won't operate in single units.

By a charitable interpretation you may consider these and other peculiarities as eccentricities rather than bugs, but they are certainly not the last word in user-friendliness.

Finally, a message to those of you who rip open the box of a new machine, plug in and press Control/Alt/7 together — don't, as you're liable to hang the machine...

## Sinclair ducks ROM issue

Sinclair has pleaded ignorance to the charge that issue 1 Spectrums will not work with the latest releases of the Interface 1 and Microdrives.

Some users claim to have detected an incompatibility between their systems and peripherals, apparently due to differences between the original Interface 1 ROM, where there was a problem, and the latest version.

Sinclair said that it had not encountered the problem, but a

spokesman said that any users in difficulties should return their kit to Sinclair to have it inspected and, if faulty, replaced.

The incompatibility could be exacerbated by Sinclair's revolutionary repair and return service; users sending in issue 2 or issue 3 Spectrums for repair might in theory find an issue 1 machine returned. But the company said that the likelihood of this was slight, pointing out that there are only a few thousand issue 1 Spectrums in circulation. The only issue 1 machines around are the systems that originally went out by mail order.

## Software prices spiral

Pocket money software has received a new boost with several companies announcing games that undercut conventional prices.

Scorpio Software (061-834 2294) has reduced the price of its first four titles for the Spectrum to £1.99.

Two of the games, Ruby Runabout and Code Book Caper are graphic adventures.

Another cheap game for the Spectrum is Froot Loop from NTD Software (01-736 9009). Offering 60 levels of play it will sell for £3.

Phoenix Software has squeezed its twin-cassette packages onto a single tape. Side one of the tape features the arcade game which provides the clues for running the adventure game on side two.

As a result the cost of the twin game package has come down from £9.99 to £6.99.

Low-cost software from the US is also on the way. Video Vault says that it soon hopes to import software from around the world with prices starting at £3.95.

## Apple opus

Musical Apple users have a new means of turning their scales into symphonies; Greengate Productions (0442 3496) has launched its DS3 system.

In words of several syllables the DS3 is a digital sound sampling sequencer. For the Apple II and IIe, DS3 comes as a circuit board (for slot 5 in the motherboard), a starter kit, a manual and an applications guide, for £250.

For another £450 you can add a five-octave keyboard with interface and extra software. The system requires at least 48K and a disk drive.



Apple — now a virtuoso.

## Psion switch



**The Organiser — Psion makes a bid for the public's pocket.**

Software house, Psion, is branching out into the hardware business with a 'pocket computer' costing £100.

It is also releasing the integrated packages given away free with the QL in versions to run on the IBM PC and other 16-bit micros.

Looking more like an overweight programmable calculator, the Organiser Pocket Computer is British-designed and British-made.

It features a 16-character, single-line LCD screen and 36 calculator style keys. Inside the box is a Hitachi 6301 8-bit processor driving 4K of ROM and 2K of RAM.

The small amount of memory is misleading. The power of the machine comes from the plug in 'datapaks' that Psion likes to describe as solid-state drives. They are in fact plug-in Eproms.

The user can write data to the Eproms, and by the simple expedient of telling the software to ignore certain data it is possible to delete it.

When a datapak becomes full it has to be 'formatted', ie erased in a formatter either at your local dealer or in your own formatter costing £45.

The operating system has a built-in database facility making the system ideal for storing information like names, addresses and telephone numbers.

In addition, off the shelf software is available with 16K program packs for Finance, Mathematics, Science and Engineering. These packs cost £20.25 each.

You can also program the machine using POPL, a programming language with four simple commands and a range of arithmetical functions.

The machine is available now on mail order and should be in small retailers by August.

Exchange is the collective name for the QL packages to be released at the end of August for other machines including the IBM PC, Apriori and Sirius. In the late autumn the list will be extended to include the Apple Macintosh and DEC Rainbow.

Using the same names as on the QL, Exchange currently consists of four programs: Quill (word processing); Archive (database); Abacus (financial planning); and Easel (graphics).



# Acorn rings changes

By Ralph Bancroft

Amid rumours that Acorn is working on a model C version of the BBC micro comes news of changes to the models A and B that suggest that something might be up.

For the model A it is a death sentence. The machine will no longer be sold from September. For the model B there is a promotional push, with a free data recorder and five free programs, total value £80, given away with every purchase made during July.

The model A's days were numbered from the time it was brought out. Its smaller memory and fewer features compared to the model B virtually guaranteed a low level of sales. The launch of the lower priced Acorn Electron at the end of last year ensured its demise.

The July promotion for the model B is, in the words of Peter O'Keefe, Acorn's sales director, 'designed to stimulate new purch-

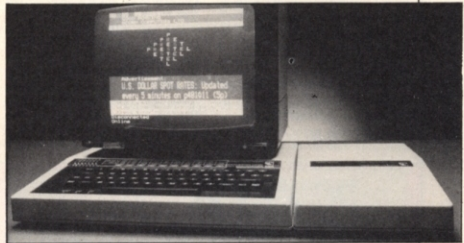
ases in what is typically a relatively quiet period for consumer sales throughout the computer industry.'

It may be bad for the home computer business as a whole but it is perhaps even worse for Acorn. The most recent PCN chart shows the BBC B sales slipping compared to its competitors.

In the past Acorn has studiously avoided the price wars and special promotions run by other companies for the simple reason that it could sell every machine it produced. So the special promotion may be a sign that Acorn is finding the going a bit tough.

As for the rumours, Acorn is saying nothing. Its contract with the BBC is coming up for renewal and a new model with an enhanced performance may be just the thing to seal the new contract.

An alternative theory is that the model C is, in fact, a reworked model B board that will be the basis



BBC B — at the centre of an Acorn re-shuffle.

of the soon to be announced Acorn Business Machine. Insiders are predicting that this machine will come with integral colour monitor, Z80 second processor running CP/M and built-in modem.

And if that sounds familiar you would be right. It is the same

specification of the original micro from Torch, the micro manufacturer which was recently bought by Acorn.

Which all adds to the confusion over what Acorn's marketing strategy is. All should be revealed soon.

## Post-Tramiel defections spread to Commodore UK

Commodore UK's marketing manager John Baxter is to leave the company within the next three months.

On an extended holiday, Mr Baxter was not available for comment last week. A company spokesman could say only that he was leaving 'to do something exciting with somebody else', and that his departure was definitely not connected with the company's impending

move to a site in Corby.

In the absence of Mr Baxter ('He's on two weeks holiday and this is the third week,' said a secretary) there can only be speculation about his move. He is thought to be a Jack Tramiel fan, and if so could be the latest Commodore defector in a growing line since Mr Tramiel's departure from Commodore in the US earlier this year.

## Oxford Blues

By David Guest

The Commodore systems software specialist Oxford Computer Systems (OCS) has ceased trading.

The axe fell at OCS last Thursday (June 28) after negotiations with a venture capital organisation had fallen through. A spokeswoman said: 'We had no alternative but to cease trading.'

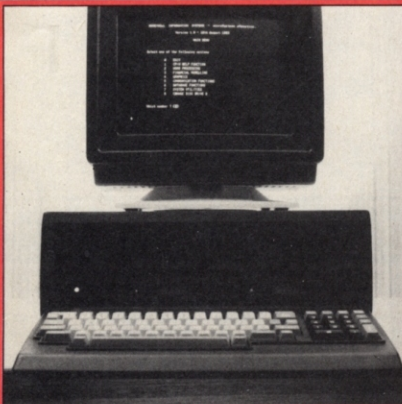
The next step could depend on OCS's bankers; as PCN went to press no receiver had been appointed and the company could try to tread water while it calls in debts. The level of its own debts is not thought to be high, and with luck the company could struggle through.

But there is no doubt that it hit a cash crisis, and venture capitalists are rarely willing to fund companies that have outstanding liabilities. OCS's spokeswoman said that the company had needed cash partly to fund developments and partly for day-to-day running. She could not comment on the short or long-term

prospects for OCS staff and products.

OCS was founded in 1978 by Alan Wyn Jones, its managing director, and Tony Wilkes, technical director. Petspeed was its first product, for the Commodore 8000. It later produced for the 64 a compiler which Commodore took on itself. One of its most successful products has been Interpod, and it has acquired a strong reputation for compilers, cross-compilers, and generators. If it goes under several thousand Interpod users will need technical support.

In April this year it established a trading company, Limbic Systems, in the US. Then at the Commodore User Show (Issue 65) it launched Turbo-64, its first game and the first product of a suite of games designing tools. Only a few weeks before OCS had revealed a number of products (OCS Pascal — see page 39) and plans at an open day. The general reaction to last week's news was astonishment.



**HONEYWELL** — Mainframe manufacturer Honeywell has followed Burroughs' example and looked to a third party for its latest micro. The Honeywell microSystem aExecutive has been designed jointly by the US multinational and Future Technology Systems. Its main memory can rise to 896K, and 64K more is devoted to the control of 800 by 400 pixel graphics. The machine will run CP/M and PCDOS applications, Honeywell says, and it is concurrent to the extent of supporting three jobs at once. Prices start at £2,500, and deliveries will begin in August.

## Radofin drives floppy bargain

A £119 disk system that will work with the Spectrum or the Aquarius has been unveiled by Radofin Electronics, Aquarius maker.

Called the Quickdisc, the unit holds twin Hitachi Maxell 2.8in disks, with a capacity of 144K unformatted and 102K formatted on each.

The unit, with its own DOS,

attaches to the Aquarius and the Spectrum through the systems' printer ports.

It is expected to be available towards the end of August. Radofin is currently looking for dealers to distribute the drive. It can be contacted on 01-205 0044.

■ The Aquarius II is Pro-Tested in PCN Issue 71.

# AT&T steps up the pace

US telecommunications giant AT&T surprised nobody with its launch last week of an Olivetti-built PC-compatible micro (Issue 67), but as the originator of Unix it is forcing the pace of the operating system in the UK.

AT&T's entry into the IBM PC field had been widely predicted. Its PC 6300 runs an 8086 rather than an 8088, and has more capacity for expansion than the PC and a better

display — in other words, an Olivetti M24. AT&T owns 25 per cent of Olivetti.

But one mild surprise is that AT&T has left Unix, originally the product of its subsidiary Bell Laboratories, off the PC6300. Unix is probably the most widely discussed operating system of the day, and IBM has announced its own version — PC/IX — for its PC line.

But this week in London AT&T

and Olivetti are due to reveal plans to promote Unix far more vigorously in the UK than they have done so far. Unix System V is likely to be the product in question — rumours of a System VI are not yet beyond the unconfirmed stage.

Until recently Unix has seemed more like a subject for discussion than an actual operating system. But in the past few weeks, notably at Software 84 early last month,

Unix-based applications packages have begun to accumulate, and with them the possibility of running fully-functioning Unix software systems.

AT&T won't rely on a PC-compatible micro and a portable operating system to take on the mighty IBM. Last week it also announced an information systems architecture, intending to begin the installation of networks next year.



**DONKEY WORK** — Busy executive on the move? Then you might need this compact (ie small screen) Casio lap-held portable micro. The helpful people at Casio have written a useful range of software covering forecasting, scheduling, inventory control, spreadsheets and advanced mathematics. There is just one catch. The software comes in booklet form and you will have to type the source code listings in yourself! Fortunately, Kuma Computers and Micros for Managers have also produced software which comes on the more conventional cassette. The FP-200 will be Pre-Tested in nextweek's issue.

## Roll up, roll up for prizes!

The closing dates of a number of competitions are looming up: if you fancy your chances of winning cash, hardware or BMX bikes get on your bike now.

These are the contests in progress now or coming up soon:

Organiser	Closing date	Prizes	Details
Lion (01-580 7383)	July 8	£20,000 of various Acorn/Mirror-soft products	Raffle
Ashton-Tate (0908) 568866	July 15	£15,000	Three categories for the best dBase II applications
BSC (01-6370471)	July 18	LSI Octopus	Quiz 84 — national quiz for schoolchildren
Walls (01-631 1008)	July 28	25 BBC micros	Open to UK schools — write a game featuring ice lollies
CCS (01-858 0763)	October 4	£2,000 £250 — runners-up 25 Cases complications	Write a simulation, strategy or adventure game
Bostik (01-486 9021)	October 31	Commodore starter Five BMX bikes	Instructions on Blu-Tack packets

## SOFTWARE

### The new releases



**Bonzo — vicious monsters.**  
**Games**

**Commodore 64:** 'Some of the most vicious monsters ever devised' is how Audiogenic (0734 595647) aims to whet your appetite for a new game called Bonzo. On cassette, it costs £5.95. Audiogenic has also launched Burnin' Rubber at £6.95 for the 64 — a feature of this game is that nimble players can fly their cars over obstacles (Ain't nobody can fly a car like Audiogenic). US Gold (021-520 7591) is a relatively new supplier which has announced The Dallas Quest, a kind of soap-adventure which is also available on disk for Atari systems. Creative Sparks (0252

543333) has produced a new version of Ore Attack for the 64 — it comes on cassette for £7.95.

**Spectrum:** US software for the UK's favourite micro is now available from Cheetahsoft (01-833 4733) — the first two titles are Moon Sweeper and Dragon Fire. They are due to be ready in early August, priced at £7.95. At the same price CRL (01-533 2918) is selling The War of the Worlds — versions for BBC, Electron, Oric and Commodore machines should be released soon, followed shortly by an MSX adaptation.

**BBC:** Not one but two BBC micros can be used in Magic Software's (0359) 40940 Galaxy's Edge. On side 1 there is The Discovery and on side 2 for two players is Escape from Solaris. The £7.45 tag also gives you an RS 423 utility.

**Atmos:** Arcadia (0792 403363) has adapted three games for the Oric-1 to run on the Atmos. They will cost £6.95 each, but if you have the earlier version the trade-in will cost £1.50.

**Spectravideo:** The manufacturer of the SV318 and 328 has launched

seven arcade games and four home/business applications. The games, for £6.95 each, are Old Mac Farmer, Tetra Horror, Tele Bunny, Turboat, Sasa, Ninja, and Kung Fu Master. The serious software, for £4.95, includes Spectra Diary, Spectra File Cabinet, Financial Calculator, and Address Book. Spectravideo is on 01-330 0101.

### Education

**BBC:** Beamscan from Beamscan Computer Software (01-202 8656) is an applications package with teaching potential. If those who can do, and those who can't, teach, those who can will probably be architects and engineers; Beamscan is a design tool used interactively, and as such could have a role in the teaching of structural mechanics. For the BBC it costs £40 on tape.

### Business

**IBM PC:** A US integrated package called Incredible Jack 2 is being distributed in the UK by Hytek (0777 708555). For £355 you get a database, word processing, spread-

sheet functions, and graphics. Available for the Sirius as well as the PC is a development by Orac Information Systems (0635 66011) that will help your payroll preparation if you use a Cardkey MD 1000 device; by ACT Pulsar's payroll program the Orac software interface will let you use the Cardkey's data. P&P (0706 217744) is now offering single and multi-user versions of Shoebox, a US package designed to handle time management and expense accounts. Shoebox 1 is £95 and Shoebox 2 £255.

**BBC:** As a preparation for business, Cases Computer Simulations (CCS — 01-858 0763) has launched its management game program Manage for the BBC Model B, for £6.95. Success in the game, and thus presumably in business, depends not on luck, CCS stresses.

**Apple:** Spicer and Pegler has produced six programs for the Apple IIe and II+ to help expose you gently to the mysteries and perils of business management. Each item costs £28.75, and the full set is £172.50.



# ACT's bumper harvest

By Ralph Bancroft

With all the brash razzmatazz it could muster, ACT last week unveiled not one but four new microcomputer systems.

At the Royal Albert Hall launch the services of Ned Sherrin, Ronnie Corbett, Ian McNaught-Davis and two teams of disco dancers were employed in a multi-media extravaganza to hype up the new products.

Pride of place went to the Apricot portable and a new low-cost Apricot called the F1.

Also under the technicolour spotlight were the Point 7, a cluster system running multi-user Concurrent CP/M, and Point 32, networking system for the Apricot.

Hand-in-hand with the new hardware came a host of new features including voice recognition, Windows Icons Mouse Products (WIMPs), 720K capacity disks, 80 column by 25 line LCD screens and infra-red linked keyboards and mice.

As with the Apricot, ACT has gone for unconventional styling with the portable. Looking like nothing else you have seen it weighs in at 13lb with a price tag of £1,695.

Many users will be disappointed that ACT has not produced a lap-held portable. Not only will you require a desk or other working surface to set up the machine, a conveniently-situated mains socket is another essential.

On the plus side you will get an 8086-based machine with 256K RAM and a single 720K microfloppy disk that is software-compatible with the rest of the Apricot range.

The Apricot is probably the first machine in the world to feature a full sized LCD screen with 640 by 256 graphics. The viewing angle can be adjusted under software control.

Another innovative feature is the



ACT's portable Apricot — first sighting of a 25 line LCD screen.

detached keyboard. Like the IBM PC jr, it uses an infra-red link to communicate with the micro.

For difficult environments, ACT provides a fibre optic 'light pipe' to connect keyboard and micro.

Similar technology is used with the mouse which can also be used upside down as a trackerball — a nice touch for those people who habitually lack the clear desk space required by a conventional mouse.

ACT is claiming another first with speech recognition. A vocabulary of 4,096 words is available of which 64 can be used at any one time. Two software packages provided with the machine, ACT Diary

and ACT Sketch, have been designed to make use of speech input.

The other software bundled in with the portable includes SuperCalc, SuperWriter and SuperPlanner.

Peripherals launched with the Portable were a 10Mb hard disk and a printer.

Prices for the F1 (for First One) start at £795 for the F1E. A cut-down F1, it has 128K of RAM, a



Heat-seeking mouse — infra-red connection and twin functions in a device that can be a mouse from one angle and a trackerball from another.

single 315K microfloppy and the same cordless keyboard as the Portable. Included in the price is CP/M-86, DR Logo and Personal Basic.

The full F1 has 256K RAM (expandable to 768K), 720K microfloppy and optional cordless mouse.

The bundled software includes MSDOS and other software provided with the Portable.

Colour graphics at resolutions up to 640 by 256 are included as a standard feature.

ACT is employing a dual approach to the issue of networking. The Point 7 is based on an enhanced version of the Apricot xi with 512K of RAM, a 10Mb hard disk and a 720K microfloppy.

The cluster controller allows Apricot, Sirius and IBM PCs to be used as micros in their own right or as intelligent workstations running under multi-user Concurrent DOS on the host machine.

Up to six terminals can be attached to the cluster controller. A typical four-user system would cost under £7,000.

Both the Portable and the F1 should start to appear in the shops in September.

The sub-£800 Apricot F1 due for the shops in September, according to ACT managing director Roger Foster.



# PCN CHARTS

# GAMES

NEW WEEKLY CHART! NEW WEEKLY CHART



	GAME TITLE		PUBLISHER	MACHINE	PRICE	
▲	1	2	Beach-head	US Gold	C64	£8.95
▼	2	1	Sabre Wulf	Ultimate	SP	£9.95
▶	3	3	Psytron	Beyond	SP	£7.95
▶	4	4	Code Name Mat	Micromega	SP	£6.95
▲	5	6	Mugsy	Melbourne House	SP	£6.95
▲	6	8	Trashman	New Generation	SP, C64	£5.95
▼	7	7	Fighter Pilot	Digital Integration	SP	£7.95
▼	8	5	Jet Set Willy	Software Projects	SP	£5.95
▲	9	12	Night Gunner	Digital Integration	SP	£7.95
▶	10	10	Solo Flight	Microprose	C64, Atari	£14.95
▶	11	24	Atic Atac	Ultimate	SP	£5.50
▼	12	9	Blade Alley	PSS	SP	£5.95
▲	13	20	Scuba Dive	Martech/Durell	SP, C64, OR	£6.95
▲	14	25	Chukkie Egg	A&F	SP, C64, AC, DR	£7.90
▲	15	—	TLL	Vortex	SP	£5.95
▼	16	11	Jack & The B'stalk	Thor	SP	£5.95
▼	17	30	Fortress	Amcom	AC	£8.95
▲	18	—	Hulk	Adventure Int	SP, C64, AC, AT, Apple	£9.95
▼	19	23	Lords Of Midnight	Beyond	SP	£9.95
▼	20	13	Hunchback	Ocean	SP, C64, DR	£6.90
▲	21	26	Football Manager	Addictive	SP, AC	£6.95
▼	22	18	Flight Path 737	Anirog	Vic, C64	£7.95
▼	23	15	Blogger	Alligata	C64, AC	£5.95
▼	24	—	Cavelon	Ocean	SP, C64	£5.90
▼	25	21	Chequered Flag	Psion	SP	£6.95
▲	26	—	Antics	Bug Byte	SP	£6.95
▼	27	22	Manic Miner	Software Projects	SP, C64	£5.95
▲	28	29	3D Lunar Attack	Hewson	SP	£7.95
▲	29	—	Arabian Nights	Interceptor	C64	£7.00
▲	30	—	Valhalla	Legend	SP, C64	£14.95

# MICROS

Top Ten over £1,000

Top Ten up to £1,000

TW	LW	MACHINE	PRICE	DISTRIBUTOR
▲1	2	IBM PC	£2,390	IBM
▼2	1	APPLE III	£2,755	Apple
▶3	3	ACT Sirius	£2,525	ACT
▲4	9	DEC Rainbow	£2,359	DEC
▼5	4	ACT Apricot	£1,760	ACT
▲6	8	Televideo TS1603	£2,640	TH
▼7	6	Kaypro	£1,259	Kaypro
▼8	5	Wang Professional	£3,076	WANG
▲9	—	Philips P2000 c	£1,484	MD,KDS
▶10	10	NCR Decision Mate V	£1,984	NCR

TW	LW	MACHINE	PRICE	DISTRIBUTOR
▲1	2	Spectrum	£99	Sinclair
▼2	1	CBM64	£199	CBM
▲3	5	Vic 20	£100	CBM
▶4	4	Electron	£199	Acorn
▲5	7	Oric Atmos	£175	Oric
▼6	3	BBC B	£399	Acorn
▼7	6	Memotech 500	£275	MTX
▶8	8	Dragon 32	£175	Dragon
▲9	—	Atari 800XL	£250	Atari
▶10	—	Oric 1	£100	Oric

These charts are compiled from both independent and multiple sources across the nation. They reflect what's happening in high streets during the week up to **June 28th**. The games chart is updated every week.

Neither mail order nor deposit-only orders are included in these listings. The prices quoted are for the no-frills models and include VAT.

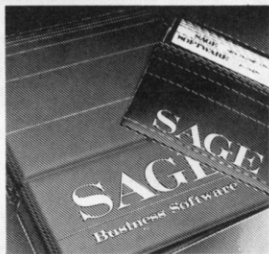
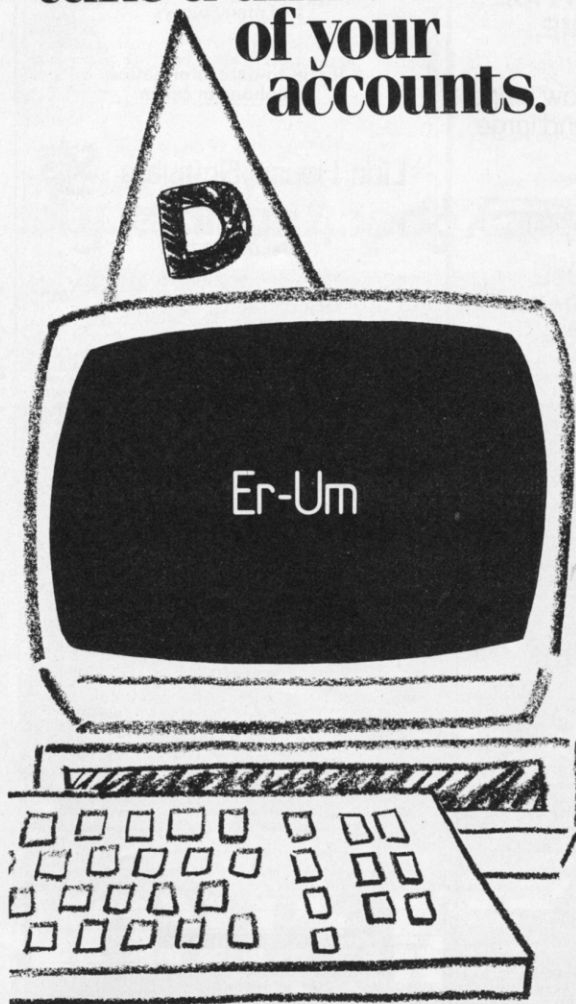
Information for the top-selling micros is culled from retailers and dealers throughout the country and is updated every month.

PCN Charts are compiled exclusively for us by RAM/C, who can be contacted on 01-892 6596.





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## Computer schools of thought

The computer revolution is happening now and only a stubborn fool would ignore it as another fad of an affluent society. Home computers are coaxing youngsters into computer literacy and even if they have not got it at home, many will find it in the classrooms. But what is computer literacy and is our present programme on the right track? Is it reasonable to embark on a programme for computer literacy, when the problems of illiteracy and innumeracy are far from solved?

If computer literacy is the ability to write an accomplished piece of software, be it games or serious applications, it is probably aiming too high. That demands a good command of a high-level language such as Basic as well as familiarity not only with the instruction set of the chip in question, but also with the machine's idiosyncrasies.

Is that sort of expertise necessary to make full use of the computer as an extremely flexible tool? If, however, the aim is to enable the youth to work with computers, is the teaching of computer programming in a high-level language such as Basic achieving that useful aim?

Computers are a new generation of tools that mankind has invented. It is revolutionary in that the same basic core of a machine can be used in diverse applications given different programs and interfaces. But its *forte* is also its Achilles' heel. A

### PCN £10 Star Letter



computer without a program is no more than silicon chips.

However, effective use is not limited to those who can program. How many secretaries know how a word processor program is constructed?

Is there any point to learning programming as a basic skill at school? The computer revolution is turning programming into a basic requirement of education.

A good programme of computer programming with the emphasis on cultivating the skills of problem-solving and logical thought should be the current thrust of computing in schools. Let the schools' computing programme dispel the mystique and let us use the computer to help develop the minds of the future.

Peter Au-Yeung,  
London SE5 8BA.

*And what about those older minds who need re-education? Can the adult education centres help? — Ed.*

# RANDOM



Would you like to see your name in print?  
Here is your chance on PCN's letters page.

## Newbrain needs more support

It never ceases to amaze me. Try this small test for yourself:

- Walk into almost any good computer store.
- Ask the proprietors their opinions about the Newbrain.
- Consider them carefully. It will probably be said that it was an excellent machine — eminently suited to the user who wanted a tool, rather than a toy. With CPM coming along it was to be the ultimate business machine in its price range — its editing system was unbelievable, indeed it was almost a dedicated word processor without needing to write or buy expensive packages (merely a printer and a screen dump). Most likely the proprietor will claim personally to have liked the machine, and will be unhappy about the sad demise of Grundy, its failure to launch CPM in time and the processor's virtual disappearance despite its apparent quality.
- Ask if the shop had stocked Newbrain. The usual answer is 'No'. Often, where a retailer stocked the product, it was not connected to a monitor or tape drive and (more often than not) was not even in such a position that potential customers could get the feel of the keyboard, look at the books and manuals or see the machine out of its box.
- Now ask why it's all but disappeared. The probable answer is that the marketing policies of Grundy left a lot to be desired, that CPM did not appear soon enough, there was an unbelievable shortage of programs and programmers, and few peripherals could be used because too little information was given to peripheral manufacturers about the expansion interface.

- Go home and think about what you heard.

I find most of what I hear from such suppliers quite amusing. It is likely the retailer will have blamed Grundy's marketing policies although the proprietor (with few exceptions) will have hindered sales of the machine by not allowing potential buyers to find out about the machine by playing with it.

By limiting the early sales in this way I believe it is possible that professional programming firms tended, naturally, to shy away. As a result there is a distinct lack of good material of all types for the machine.

In the same way peripheral manufacturers were also put off. If Newbrain had been successful could we now expect to see an expansion interface and colour processing board to fit the expansion slot? I don't believe Newbrain could have achieved the success of the top sellers but I do believe the machine would have been a lot more readily available, that more literature would be available, that CPM would probably be easily available and the large number of current users who have been bitterly disappointed would now be very happy.

'Newbrain' still exists and will continue for a long time. It is important, though, to encourage users to push hard to persuade the current owners to continue development and supply to this country.

Newbrain users should send programs, hints, tips etc to magazines, software houses, me (SAE please!) — anyone who may be interested. If you don't promote your machine you will waste time, money and effort because the machine will vanish.  
D Day, 155 Hamilton Avenue,  
Tolworth, Surbiton, Surrey.

*But surely this can't explain the demise of Dragon, or Computers or or... Ed.*

## Compensation from Oric is possible

I did, albeit with great difficulty, manage to obtain compensation from Oric Products because the Oric I did not meet its advertised specifications.

My initial complaint was that the Oric I had no verify command, despite its inclusion in the specification list of the early advertisements, but after several letters to Oric Products I received only a terse denial of my right to a refund.

All my other letters were ignored and after contacting the Trading Standards Office I wrote, in desperation, to the Channel Four programme '4 What it's Worth'. They contacted Oric Products on my behalf and, as viewers of the May 22 broadcast of '4 What it's Worth' will know, Oric agreed I was entitled to compensation and offered me the purchase price of my Oric or a new Oric Atmos.

I accepted the new computer which, unfortunately, gave up the ghost after only a few hours use. Eventually, after three weeks and several angry phone calls to Oric Products, I received another Atmos which has, so far, worked very well.

My advice to anyone in a similar situation? Don't give up. Telephone the company regularly, always send letters by recorded delivery and keep copies. Above all try and involve the media. Bad publicity seems to be the only thing micro companies respect.

Phil Smith,  
Salisbury, Wilt.

*But contacting the press is no guarantee of a solution. We hear from so many people with micro problems we have no chance of replying to you all. We do what we can, where we can. — Ed.*

## Oric's behaviour is disgraceful

I am 12 years old and I have an Oric I computer. In issue 63, I Barrett told us where to upgrade our orics.

I think it is disgraceful that we have to pay for this service. Children are the main users in home computers but like me most cannot afford this. So I am now still stuck with my Oric I.

P Marston,  
Somerton, Somerset.

*Air your opinions, share your experiences or just point out our occasional blunders. If you have an impressive way with words you may gain £10 for the star letter.*

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VNU, Evelyn House, 62  
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**Write to:** Routine Inquiries, Personal Computer News, VNU, Evelyn House, 62 Oxford Street, London W1A 2HG.

## Laser 200 on French day trips?

**Q** Help! I have been driven virtually to insanity — can you save me? Since your Pro-Test of the Laser 200 in issue 24 I've been trying to get further information, and now I find that the supplier, Leisure Zone, no longer stocks computers, and that Computers For All, the distributor, has gone out of business. At this stage I need only information, but hopefully I'll soon be requiring an address. Can you help?  
*R C Thorpe, Great Bookham, Surrey.*

**A** As far as we know the Laser 200 currently has no UK distributor, and you'll have trouble getting any support for it in this country.

There must be a few unhappy people who've got one, and your motivation for wishing to join them puzzles us.

However, if that's what you want, and you fancy buying your software on day trips to Boulogne, the Laser is still available in France. The company you want to contact is Video Technology, which is Hong Kong-based, but does have a French subsidiary. Write to Video Technologie France, 19 Rue Luisant, 91310 Montlhéry, France.

You should be able to get some information from there, but you should make sure you ask about availability of UK TV standard machines, as the French system is incompatible. Add-ons, however, should be OK to use.

These, according to Video Technologie's advertising, include 'Paire de manettes de jeu avec son interface', 'Interface d'imprimante 'Centronic parallèle', 'interface disquette' and 'style optique', which are malheureusement (il frappe le front) still 'en preparation'. The ad mentions games and modems as well, but we presume the latter is 'en preparation'.

But be assured, if Video Technologie France is to be believed, the Laser 200 is 'vraiment tres etonnant'.

## Oric runs out of juice

**Q** The power supply on my Oric I developed a loose connection some time ago, making it totally useless. I've tried various means of finding out what to do about it, but with no success. Can you help?  
*Christopher Mullen, Amersham, Bucks.*

**A** If you return your power pack to Oric at Unit 11, Hampton Farm Industrial Estate, Hampton Road, Hanworth, Middx TW13 6DQ, you can get it replaced. If the fault is an electrical one, and no fault of you, the customer, then this will be done free of charge. If you've blown it through your own nefarious activities then it will cost you £7.70 including p&p.

## Apple Comal paper chase

**Q** Our school has an Apple II Europlus with a rather archaic Centronics 739 printer. These usually work perfectly together except when using the language Comal. The problem is that when the printer is asked to list a program, it double-spaces the lines. Although this makes the listings very readable it uses a lot of paper. Is there any way we can stop this happening?  
*Fergus Sullivan, Co Meath, Ireland.*

**A** With most printers, solving problems like this is simply a matter of tinkering with the dip switches. The Centronics 739 has four dip switches, and the one that controls automatic line feed is switch number four. When this is in the on position you should get the effect you describe.

If you're getting variable line spacing without altering the dip switches it may be something to do with your software. Switching the printer off and on before printing will reset it to its normal status.

## Sanyo signals get on with QL

**Q** My Sanyo green monitor requires a composite video signal input. I understand that the monitor output for the

Sinclair QL will be of RGB type. These signals are, presumably, incompatible and I would be grateful if you could suggest possible ways of connecting the two together.

A brief explanation of the difference between the two signals would also be of interest.  
*BJ Crossley, Erdington, Birmingham.*

**A** Actually, you're in luck. The QL seems to get on well with Sanyo monitors, and has the necessary composite output to allow you to use your monitor. Cut off one end of your TV cable so you're left with the phono plug that fits your monitor on the other end, then get yourself a DIN plug for the other end.

Now if you check the entry for monitor in the Concepts section of your QL manual (much of the QL's hardware seems to be deemed conceptual by Sinclair) you'll find the pinouts for the QL's RGB output.

All you then have to do is solder the central core of the cable to the composite output, and the outer part to Ground, and voilà!

The basic signal that comes out of a computer is in fact RGB, and composite is an RGB signal plus a sync signal mixed into the one wire. When this arrives at the composite monitor an extra piece of circuitry decodes it so that it can be used. So if you return to your QL pinout you'll see that the composite signal is not actually a part of the RGB signal, but a synthesis of it.

A major advantage of composite is that it's a lot easier to wire up. The disadvantage is that RGB will generally give you higher resolution.

## Auto-stop hitch with cassette

**Q** I have a Ferguson 3T27 cassette recorder and am experiencing loading problems. The cassette recorder clicks and eventually the play button pops up, thus making the computer produce an 'R tape loading error'.  
*Adrian Danks, Alloway, Ayr.*

**A** The problem lies in the auto-stop mechanism built

into your cassette recorder. This consists of a little lever that pushes against the tape as it runs past the heads. Normally, at the end of a cassette, the tape reaches the end of the reel and goes tight and the lever is pushed, disengaging the heads and stopping the tape.

If the cassette reels are a little tight then the lever is constantly being pushed into the position where it almost disengages the heads producing the clicking noise. The tightness also causes the tape to run more slowly than normal, giving rise to errors.

There is really nothing that can be done about this, unfortunately, except to try a tape recorder that does not have an auto-shut-off mechanism, or get some new tapes. It might be worthwhile cleaning the inside of the recorder as a build-up of fluff may even be causing the problem — but this is unlikely.

## Brother won't talk to a Spectrum

**Q** I have a ZX Interface 1 and two Microdrives. When I connected the Interface 1 to a Brother HR5 thermal transfer printer fitted with an RS232C interface, using a Sinclair RS232 lead, the printer would not print.  
*D Snowden, London E18*

**A** RS232 interfaces are a perennial bugbear, because even if the baud rates are sorted out you can still have problems caused by the way the interface itself is wired up. In the case of the Sinclair RS232 cable and the Brother RS232 interface there shouldn't be a problem on this last count.

Your problem therefore probably lies in baud rate. The Interface 1 manual (page 36) gives you advice on what to do, but is misleading in that it tells you set the highest possible baud rate.

Try setting both the HR5 and the Spectrum to 110 baud, and see if it works then. You can sometimes find that there are marginal incompatibilities between what one machine thinks is, say, 300 baud and what another thinks it is.

If having tried various setting combinations you still can't get any joy try contacting big Brother.



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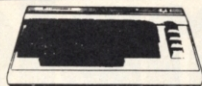
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## MICROWAVES

More hints and tips from our readers to make programming a little easier.

You all know the feeling: after hours, days or even weeks spent on a particular problem you suddenly see the answer. Or on one of those late-night expeditions through the memory map you find some undiscovered feature. Well don't keep it to yourself — send it here. We pay £5 for every tip and routine printed and £25 for the Microwave of the Month.

Send your contributions to:  
*Microwaves, PCN, 62 Oxford Street, London W1A 2HG.*

### Hidden trove of spare Oric memory

Exploring the pointers involved in the Oric memory-move routine (Microwaves, Issue 65) uncovered the following areas of spare memory:

#BF00 — #BFFF in text mode  
#9FB0 — #9FFF in hires mode  
These follow the character set; preceding it is a larger gap:  
#B400 — #B4FF in text mode  
#9800 — #98FF in hires mode

This area appears not to be over-written at any time by the operating system so gives a far larger area for machine code programs than the official #400 — #420.

*D G Pepler,  
Wilmslow, Cheshire.*

### MODs maths is slightly flawed

When using the MOD operator in a coin analysis routine for the BBC Micro I encountered the following problem illustrated in this program:

```
10 NET = 128.09
20 PENCE = (NET * 100) MOD 100
30 PRINT PENCE
```

This gives PENCE as 08 and not 09, as it should be. This is an acknowledged problem which Acorn attributes to the way in which MOD arithmetic is performed. A correction can be achieved thus:

```
20 PENCE = (NET * 100 + .005) MOD 100
100
PJ Parry,  
Iver, Bucks.
```

### POKE to interrupt Oric interrupts

Most Oric 1 owners will know already that CALL #E6CA turns off the keyboard scanning interrupt. This CALL can be used to cure the random squiggle char-

acters produced when using the printer, and it also speeds up programs by 20 per cent. CALL #E804 turn the interrupt on again.

This procedure, however, doesn't work on the Atmos. The following CALLS work on both the Oric 1 and the Atmos. POKE #30E, 64 . . . turns interrupts off.  
POKE #30E, 192 . . . turns interrupts on.

One warning — the WAIT command functions by counting these interrupts. If interrupts are off then the WAIT command will never finish. *K Heptinstall,  
Blackpool, Lancs.*

### Using software on 'unfinished' QL

Although the QL ROM is not the final debugged version the Psion software performs impressively.

My Spectrum, however, is coupled with a printer equipped with only a parallel interface (using the Kempston centronics interface), which is incompatible with the QL's serial ports. A cheap way to use the printer with the QL is to link the two computers via a homemade adaptor, using the SER2 port on the QL to the Interface 1 port.

In order to print Quill files via the Spectrum, I discovered that the following is necessary:

- When installing the printer data file using 'INSTALL-BAS', set the end of line code as CR (code 13); also, to suit the Kempston interface, the 'ESC' code has to be preceded by another 'ESC'. So the codes for underline mode are (esc), (esc), '.\_', 'l'.
- From Quill, 'print the \_doc file to another Microdrive file (resulting in a \_lis file). Printing direct to the serial port to the Spectrum causes a crash.
- When sending, use a baud rate of 4800. The QL command is simply:

```
10 BAUD 4800
20 COPY MDV1 _FILENAME _
LIS to SER2
● Set up the Spectrum with:
10 FORMAT "T";4800
20 OPEN #4;"T"
30 LET AS=INKEY$ #4
40 IF AS=CHR$(10) THEN LPRINT:GOTO 40
50 LPRINT AS; GOTO 30
```

When this is completed break into the program and CLOSE the channel — not very elegant but

### Amendment to Oric STR\$ colour routine

D Harrison's Microwave (Issue 65) on the Oric STR\$ function works well until you need to display the figures in a text line in which case matters can become complex. When the STR\$ function is used, the Oric places the control character for green ink, CHR\$(2), at the beginning of the string. Therefore a simple method would be to include an instruction that removes this first character so that you can colour the string variable as you wish.

The program below asks you to enter the date, month and year and then a number between 1 and 5 which selects the ink colour in which the variables will be printed. Lines 60 and 70 remove the first character if it is CHR\$(2) and line 80 produces the desired colour.

*A Sandham  
Lower Kersal, Salford.*

```
10 CLS
20 PRINT "ENTER MONTH, DATE AND YEAR WITH A COMMA
  BETWEEN ANSWERS"
30 INPUT M$,D$,Y$
40 INPUT "ENTER A NUMBER (1 TO 5):";IK
50 DT$=STR$(D$):YR$=STR$(Y$)
60 IF LEFT$(DT$,1)=CHR$(2) THEN DT$=MID$(DT$,2)
70 IF LEFT$(YR$,1)=CHR$(2) THEN YR$=MID$(YR$,2)
80 PLOT 5,14,"IT'S THE" + CHR$(IK) + DT$ + CHR$(8)
  + " OF" + M$ + CHR$(IK) + YR$
90 END
```

### BBC gains Epson printer functions

This BBC program sets up the function keys to give some of the features available on the Epson MX 111 printer.

The keys give a succession of ASCII codes rather than "VDU2,1,etc" as this makes their use both transparent and possible when using languages or ROMs other than Basic eg Forth or View.

After entering and running the Basic program, the resulting contents of the function key buffer should be saved as a block of memory to be loaded transparently when required.

To use the keys in command mode of View, enter \*FX228,1 and use with SHIFT and CTRL keys pressed together.

*Paul Tolson,  
Dewsbury, W Yorks.*

```
10 REM//FUNCTION KEYS FOR EPSON MX80 111//
20 REM//PAUL F TOLSON//
30 REM CLEAR FUNCTION KEY BUFFER
40 *FX18
50 REM CONDENSED ON/OFF
60 *K.0:B:A:0:C
70 *K.1:B:A:R:C
80 REM ENLARGED ON/OFF
90 *K.2:B:A:I:AW:A:A:C
100 *K.3:B:A:I:AW:A:A:C
110 REM EMPHASISED ON/OFF
120 *K.4:B:A:I:AE:C
130 *K.5:B:A:I:AF:C
140 REM UNDERLINED ON/OFF
150 *K.6:B:A:I:A-A:A:A:C
160 *K.7:B:A:I:A-A:A:C
170 REM USA CHARACTER SET
180 *K.8:B:A:I:AR:A:A:C
190 REM ENGLISH CHARACTER SET
200 *K.9:B:A:I:AR:A:A:C
210 REM RUN THEN *S.PRINTER B00+100
```

it seems to work. The end of line code sent via the serial port appears to be CHR\$(10), even though it originated as a carriage return.

It is possible to use an INPUT

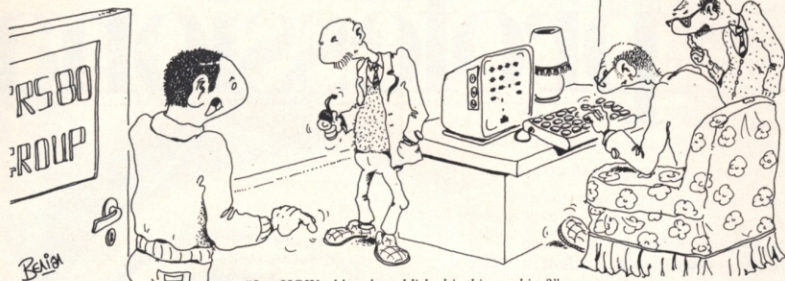
AS place of INKEY\$, but this gives odd results for no apparent reason.

*Dr H O'Neal  
London  
SE4.*



West Hertfordshire 80 Users Association is changing its tune, as Harriet Arnold reports.

# Signs of the times



"Just HOW old and established is this machine?"

A TRS-80 group is facing up to facts and planning a BBC open evening in a radical change of direction.

'We're at a crossroads at the moment,' says the Hertfordshire group's organiser, Terry Bradbury, who explained that BBC and Commodore owners are to be recruited to the

Bricket Wood-based club. 'We have the advice and expertise to offer that comes from having an old and established machine, so they have much to gain.'

It's not surprising then that forthcoming projects will be software-orientated: converting segments of programs from Z80 to 6502 and hardware/

software interfacing to download programs between different machines. One member is already at work on moving TRS-80 programs to Commodore 64s via NOS, the Netherlands multi-purpose Basic.

'Some of the things we take for granted, they would give their eye-teeth for,' says Mr

Bradbury referring to their disk operating systems, machine code monitors and debugging programs.

At the club's next meeting CP/M 86 will be demonstrated on a Tektronix machine.

For more details contact Terry Bradbury on Park Street (0727) 73633.

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# oftware from a point of view.



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# PRACTICORP

Improve your Spectrum's Basic, armed with a ZX Interface 1 and the tutelage of Gavin Monk.

# Basic extensions

This article shows the Spectrum user how to allow for three new commands:

■ **SCREEN\$** *n* . . . which is equal to the following Basic commands: **BORDER** *n*; **PAPER** *n*; **INK** *n*; **FLASH** *n*; **BRIGHT** *n*; **CLS**.

■ **INVERSE** . . . which swaps the ink and paper colours over in the screen attribute file.

■ **BIN** . . . this now stands for 'Bit Inverse' and inverts the normal screen.

As well as offering fast storage to Microdrives, RS232, and networking, ZX Interface 1 also offers the hidden facility to extend Spectrum Basic. The interface offers the option to jump to a machine code routine, which has been written by the user, when a syntax error occurs. This means that the syntax of most keywords can be changed and machine code routines called by these new commands.

When a syntax error occurs control is sent to the shadow ROM in the interface, and this checks to see if the error was caused by an interface command. If this is the case then the command is executed in the normal way. However, if the command entered also fails the shadow ROM syntax check then a jump to the address held in the new system variable Vector is made.

This variable normally contains #01F0 (# denotes Hex) which causes a jump to the shadow ROM to produce a syntax error. However, Vector can be changed to point to your own routines in RAM.

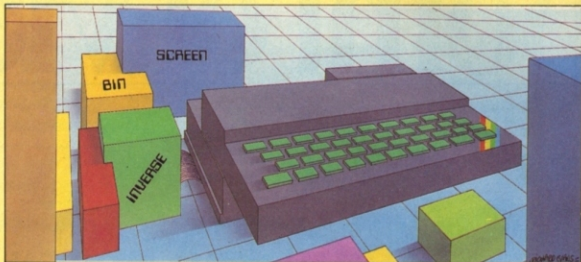
Your routine in RAM should contain two separate modules — one to check the syntax of the added command and another to actually execute the new command. When writing this piece of code two points should be noted:

■ The shadow ROM will be paged in. This means that all Z80 restarts will be different.

■ The keyboard is not scanned and frames not incremented.

Listing 1 shows the assembler listing of the routine to add and execute the extra commands described previously. It was produced using Hisoft's Gens 3M assembler. First the new system variables are created by using hook code #31 and the address held in Vector is changed to point to the start of the new syntax checking routine.

Now every time a syntax error occurs this new routine will be jumped to. On entry to the routine the A register will contain the ASCII code for the first character of the statement — 206. This is first checked to see if it is one of the new added statements **SCREEN\$**, **INVERSE**, or **BIN**. If this is so a jump to the full syntax



Listing 1: Set-up routines for the extra commands

```
#HISFT GENS3M ASSEMBLER#                               Copyright  HISOFT 1983
ZX SPECTRUM                                              All rights reserved

Pass 1 errors: 00

10 ;
20 ;
30 ;RESET SCREEN ATTRIBUTES TO ANY COLOUR
35 ;VIA SCREEN# n FUNCTION AND INVERT SCREEN
37 ;VIA INVERSE & BIN FUNCTIONS
38 ;FOR ZX INTERFACE 1 USERS ONLY
39 ;
40 ;COPYRIGHT G.B.MONK 1984
50 ;
60 ;
70 SETUP ORG 60000 ;START ADDRESS
80 RST #0 ;SETUP NEW SYSTEM VARS.
90 DEFB #31
110 LD BC,START
120 LD (VECTOR),BC ;CHANGE VECTOR
130 RET ;RET TO BASIC
135 ;
140 ;CHECK SYNTAX
145 ;
150 START CP SCREEN-206 ;CHECK TOKEN
160 JR Z,SCRSYN ;JUMP TO SCREEN# MODULE
165 CP INVERT-206 ;CHECK TOKEN
170 JR Z,INVSYN ;JUMP TO INVERSE MODULE
175 CP BIN-206 ;CHECK TOKEN
180 JR Z,BINSYN ;JUMP TO BIN MODULE
185 JP ERROR ;ERROR IF NEITHER
190 ;
195 ;SCREEN# SYNTAX
200 ;
210 SCRSYN RST #10 ;GET NEXT CHR
220 DEFN NEXTCHR
230 RST #10 ;GET NUMERIC EXP
240 DEFN NUMEXP
250 CALL STEND ;CHECK END OF STATEMENT
260 ;
270 ;RUNTIME OPERATION FOR SCREEN#
280 ;
290 RST #10 ;GET COLOUR IN A
300 DEFN UNSTA
310 LD H,A ;SAVE A
320 RST #10 ;CALL BORDER
330 DEFN BORDER
340 LD A,H ;RESTORE A
350 RLC A ;MOVE COLOUR TO BITS 3-5
360 RLC A
370 RLC A
380 CP 25 ;CHECK CONTRAST LEVEL
390 JR NZ,INK0 ;INK BLACK
400 OR 7 ;WHITE INK
410 LD (ATTR,P),A ;CHANGE INK AND PAPER COLOUR
420 RST #10 ;CALL CLS
430 DEFN CLS
440 JP BASIC ;RET TO BASIC
450 ;
```



checking routine for that statement is made. Otherwise the syntax error is pointed out as normal by jumping to the routine at H01F0 in the shadow ROM.

Let us assume that the first character was a SCREEN\$ token and a jump has been made to line 170 of the assembler listing. Now the full syntax of the new statement is checked.

By using the RST #10 instruction the syntax checking routines in the main ROM are called. The character pointer is moved up one by calling NEXTCHR (#0020) and then the routine to evaluate a numeric expression (#1C82) is called.

Numeric expression and checks a numeric expression and places the result on the calculator stack if it is runtime. A call is then made to the shadow routine STEND (#05B7) and this checks for the end of a statement and either returns to Basic if it is syntax checking, or back to the program if it is runtime. The other syntaxes are checked in a similar manner.

The actual runtime routines are just the same as any other machine code program except that calls to ROM routines are made via a RST #10 instruction (as the shadow ROM is in place) and they must end with a call to #05C1 and not a RET statement. This causes a return to the main ROM routine which interprets the Basic.

**Runtime routine for SCREEN\$ n:** The value of n is first removed from the stack and saved into the H register. The border colour is then changed by calling the border routine in the ROM. The ink colour is changed to black or white to give maximum contrast and this is stored with the paper colour in the ATTR-P system variable. The ROM clear screen routine is used and this uses the value of ATTR-P.

**Runtime routine for INVERSE:** BC is loaded with the start of the attribute file and the A and D registers are used to swap over the ink and paper colours. The BC register pair is incremented and the program loops round until the whole attribute file has been inverted.

**Runtime routine for BIN:** BC is loaded with the start of the screen memory and the A register is used to invert the screen bytes by exclusive oring it with #FF. Again the program loops round until the whole screen has been inverted.

The Basic loader program is for those of you who don't own assemblers. Type in the program and save it to cassette or Microdrive before running. Now run the program and if you are greeted with the message Checksum error in data recheck the data in lines 500-540. Once all is OK a list of the new commands and their operation will appear on the screen. After this list an option to save the machine code by itself to cassette or Microdrive is given and the instructions on the screen should be followed. To use the new commands once saved enter the following as a direct command:

CLEAR 59999: LOAD "" CODE (or Load "m";d;"name" CODE for Microdrive)  
:RANDUSR 60000

```

440 ;INVERSE SYNTAX
450 ;
460 INVSYN RST #10 ;GET NEXT CHR
470 DEFN NEXTCH
480 CALL STEND ;CHECK END OF STATEMENT
490 ;
500 ;RUNTIME OPERATION FOR INVERSE
510 ;
520 LD BC,ATTRST ;BC=START OF ATTR FILE
530 LOOP LD A,(BC) ;ASCREEN ATTR
540 AND 7 ;A=OLD INK
550 RLCA
560 RLCA
570 LD D,A ;A=NEW PAPER
580 LD D,A ;D=NEW PAPER
590 LD A,(BC) ;ASCREEN ATTR
600 AND %00111000 ;A=OLD PAPER
610 RLCA
620 RLCA
630 LD A,D ;A=NEW INK
640 LD D,A ;D=NEW INK & PAPER
650 LD A,(BC) ;ASCREEN ATTR
660 AND %11000000 ;A=BRIGHT & FLASH BITS
670 ADD A,D ;A=BRIGHT, FLASH, NEW PAPER & INK
680 LD (BC),A ;STORE NEW ATTR
690 INC BC ;INC ATTR POSITION
700 LD A,B
710 CP #58 ;CHECK FOR END OF ATTR FILE
720 JP NZ,LOOP ;REPEAT IF NOT END
730 JP BASIC ;RET TO BASIC
740 ;
750 ;
760 ;BIN SYNTAX
770 ;
780 BINSYN RST #10 ;GET NEXT CHR
790 DEFN NEXTCH
800 CALL STEND ;CHECK END OF STATEMENT
810 ;
820 ;RUNTIME OPERATION FOR BIN
830 ;
840 LD BC,SCRST ;BC=START OF SCREEN
850 LOOP1 LD A,(BC) ;ASCREEN BYTE
860 XOR A ;INVERT IT
870 LD (BC),A ;STORE NEW BYTE
880 INC BC ;INC SCREEN POSITION
890 LD A,B
900 CP #58 ;CHECK FOR END OF SCREEN
910 JP NZ,LOOP1 ;REPEAT IF NOT END
920 JP BASIC ;RET TO BASIC
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The extended Basic commands will not work after a new but they can be set up again by RAND USR 60000.

Once you have the new commands operational type SCREEN\$ 1 and the screen and border colours will turn blue and the ink colour white. The BIN and INVERSE commands will have the same visual effect on the screen.

The BIN command affects the use of the POINT instruction as any point that was set will now be reset and vice-versa. A particular use of the BIN command is to invert screen dumps.

● Further, more complicated commands are detailed in two books: *Master Your ZX Microdrive* by Andrew Pennell, and *The Complete Spectrum ROM Disassembly* by Dr Ian Logan and Dr Frank O'Hara.

Table 1 — ROM routines

Table 1 — ROM routines

#1C82	'MAIN'	get numeric expression
#1C8C	'MAIN'	get string expression
#0018	'MAIN'	makes A register the current byte in line
#0020	'MAIN'	makes A register next byte in line
#01F0	'SHADOW'	syntax error
#05B7	'SHADOW'	statement end check
#05C1	'SHADOW'	return to Basic interpreter
#0020	'SHADOW'	gives a shadow ROM error (this should be followed by a data byte between #16 & #FF
#0028	'SHADOW'	give a main ROM error, #5C3A should first be loaded with the error number

Listing 2: Extended Basic program notes

```

10 Set new RAMtop
20 Reset cs as a checksum
50-60 READ and POKE the machine code above RAMtop
70 Increments checksum
90 Test for checksum error
100-180 Print instructions for new commands
500-540 Machine code data
1000-1030 Save to tape routine
2000-2060 Save to Microdrive routine

1 REM *****
2 REM * Extended Basic For *
3 REM * ZX Interface 1 *
4 REM * Copyright G B Monk *
5 REM *****
6 REM Lower RAMtop and set up machine code
10 CLEAR 59999
20 LET cs=0: REM checksum
30 LET start=60000: REM start address
40 CLS: PRINT "PLEASE WAIT WHILE MACHINE CODE IS POKE"
50 FOR i=start TO start+119
60 READ a: POKE i,a
70 LET cs=cs+a
80 NEXT i
90 IF cs<>12627 THEN CLS: PRINT "Checksum error in data": STOP
100 REM Print new syntax
110 CLS: PRINT "Your basic now has the following extra commands:"
120 PRINT TAB 4;"SCREEN# n": FOR i=1 TO 9: PRINT CHR$(8): NEXT i: PRINT OVER 1:
130 PRINT "This is equal to the following BORDER n: PAPER n: INK n: BRIGHT n: FLASH n: CLS"
140 PRINT TAB 4;"INVERSE": FOR i=1 TO 7: PRINT CHR$(8): NEXT i: PRINT OVER 1:
150 PRINT "This swaps the INK & PAPER attributes of the screen over."
160 PRINT TAB 4;"BIN": FOR i=1 TO 3: PRINT CHR$(8): NEXT i: PRINT OVER 1:
170 PRINT "This inverts the normal screen, i.e. Pixels which are set become reset and Pixels which are not set become set"

```

```

180 PRINT #1:" Press any key to continue."
190 PAUSE 1: PAUSE 0: REM wait for key Press
199 REM save Code routine
200 CLS: PRINT "Do you wish to save the machinecode to:"
210 PRINT TAB 10;"1-CASSETTE": PRINT TAB 10;"2-MICRODRIVE": PRINT TAB 10;"3-NO SAVE"
220 LET a$=INKEY$: IF a$<"1" OR a$>"3" THEN GO TO 220
225 IF a$="3" THEN GO TO 240
230 GO SUB 1000:VHL a$: REM save e routines
240 CLS: PRINT "Extended Basic now ready for use"
250 RANDOMIZE USR 60000: REM set up new commands
260 GO TO 16000: REM cause Program finished report
495 REM data for machine code
500 DATA 287,49,1,106,234,237,6,7,183,92,201,254,220,40,11,254,1,5,10,42,254,246,48,76,195
510 DATA 240,1,215,32,0,215,130,28,205,183,5,215,148,30,183,215,151,34,124,7,7,7,254,25,48
520 DATA 2,246,7,50,141,92,215,107,13,195,193,5,215,32,0,205,183,5,1,0,88,10,230,7,7,7
530 DATA 7,87,10,230,56,15,15,1,5,130,87,10,230,192,130,2,3,120,254,91,32,230,195,193,5,215
540 DATA 32,0,205,183,5,1,0,64,10,238,255,2,3,120,254,88,32,246,195,193,5
999 REM cassette save routine
1000 CLS: PRINT "Insert data cassette and remove EAR lead."
1010 SAVE "Ext. BASIC"CODE start,120
1020 CLS: PRINT "Data saved to cassette. File name Ext. BASIC"
1030 RETURN
1999 REM microdrive save routine
2000 CLS: PRINT "Saving to Microdrive"
2010 INPUT "File Name: ";f$;DRIVE No.;d
2020 IF f$="" OR LEN f$>10 THEN GO TO 2010
2030 PRINT "Press any key to save";f$: PRINT "on drive no. ";d
2040 PAUSE 1: PAUSE 0
2050 SAVE "*"n";d:f$CODE start,120
2060 RETURN

```

# Noddy takes a letter



Chris Goddard introduces Memotech's text-handling language — a simple word processor.

**N**oddy, the Memotech's text-handling language, is by no means as versatile as some word processors. But depending on your needs, and what you do with it, you could find it perfectly adequate.

After using it for around six weeks, my conclusion is that in some cases it's not just adequate as a word processor — it can often show advantages over other systems.

I'm pleased with the speed at which I can type in, correct, print and amend text. Noddy may not be sophisticated, but it doesn't have to be loaded into the computer whenever it's used, and it leaves all the memory available for text.

## Printer program

The Noddy page has 39 characters per line, so two lines are used to print 78 characters across an A4 page. The simplest way to do this is to have a printer program in Basic, containing instructions to the printer for the various typefaces you want to use, which is saved to tape each time you save the text. With the Epson RX80, for example, this takes the form:

```
10 LPRINT CHR$(27);"O";CHR$(78)
40 PLOD "PROG1"
```

PROG1 is the Noddy program page listing the pages to be printed, and in the form "L (page ref) for each page with "R after the last page. The printer will print all the pages in the stack.

The printer program in Basic is then built up as required. In the case of a letter file, the letter heading is typed on one Noddy page and is "Listed in PROG1. The first part of the printer program prints the heading, such as in emphasised mode, with possibly

the first line of a business heading in enlarged mode — one line of Noddy is full width in enlarged mode.

This looks like:

```
10 LPRINT CHR$(27);"O";CHR$(78)
20 LPRINT CHR$(27);"E" — sets emphasised mode
30 LPRINT CHR$(14); — sets enlarged mode for one line
40 PLOD "PROG1" — prints letterhead
50 LPRINT CHR$(27);"F"; — cancels emphasised mode
```

Next a PROG2 page is set up in Noddy on which the letter reference is "Listed in the same way as the letter heading, and is followed by a letter-ending page reference. Several endings can be set up on their own pages, as with the letter headings. So we have PROG2:

```
"L CG/PC. — letter reference
"L LE/2. — letter ending 2
```

Now all you need to do is add 60 PLOD "PROG2" to the program in Basic to print the letter text and ending below the heading. Having set this up once, writing a letter consists of creating a Noddy page with a letter reference, such as CG/PC, typing the date on the right-hand side of the page (that will be on line two) and typing out the letter.

The letter reference is entered on PROG2, then you return to Basic and type RUN for your printout. An index page or pages can be set up to record the letter and its reference code. SAVE "Noddy" saves the letter file and the printer program onto tape ready for use again.

The printer program in Basic can be tailored to the requirements of each type of

text file. To change the typeface another line must be added in accordance with the printer manual. For example, for elite use LPRINT CHR\$(27)"M", or for condensed try LPRINT CHR\$(15);. To print away from the left-hand side of the paper, which you may need to do when a line of less than 78 characters or a small type size is being used, it is again necessary to amend the program with a margin instruction to the printer. For example:

```
10 LPRINT CHR$;"I"CHR$(18);
20 LPRINT CHR$(27);"M";
```

This allows an 18-character left-hand margin with elite characters.

The snags with Noddy are the lack of line justification (just like a manual typewriter), you can't change typeface in the middle of a line, and you have to do a bit more messing around with reference numbers than you would have to do with a sophisticated word processor. But I find that only a slight inconvenience.

Set against this you have a number of advantages. Because the facilities are built-in you don't have to waste time loading from tape, and you don't have to go to the lengths of buying an expensive disk drive just so you can produce written output. Clearly, if you're going to need some sort of fast mass storage facility you'll still have to look elsewhere, as you'll have to if you want fancy output and complicated facilities, but it's refreshing to be able to operate a more 'horses for courses' approach.

If you simply need a text processor for the odd letter, or for short notes, then Noddy is worth lending a (Big) ear to.

PCAL





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Our adventurer's column continues as Mike Gerrard provides some answers to readers problems.

# All the answers

**H**obbit problems probably loom largest among adventurers — odd really, when you consider that the original Bilbo Baggins didn't even have a computer to help him. Still, in an attempt to stop you all throwing your micros in the bin — or, in the case of Martin Cleave of Ipswich, committing self-termination with extreme prejudice — a few pointers might be in order.

Anxious not to lose a reader, we'll deal with Martin's query first. If we left it till last it might be too late. His request was a simple one: 'How do you do that brilliant game, *The Hobbit*?' To answer that would take a book, and indeed there are now a couple available that will guide you through the whole adventure if you wish,



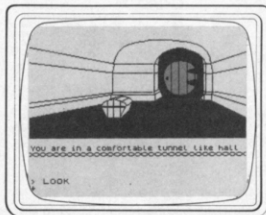
**The Hobbit starts travelling**

though Martin was more specifically concerned that he couldn't get beyond the Misty Mountains.

Well, by the time you reach the hard dangerous path, Martin, with the mountains north and south of you, you should already have acquired a sword and a rope, and also found a means of reading the map. If you haven't done all three, back you go.

If you step off the dangerous path to north or south then you find yourself in a maze of narrow paths, and while these can initially seem endlessly complicated, the locations are really quite simple to map out if you take care. All the connections are logically done, and with each 'narrow path' having a different sequence of possible exits you should be able to tell where you are the whole time. If you can't manage that, though, then the route to take from the hard dangerous path is N/NE/N/SE/D/D/D/D/E/U/W/N, which returns you to your starting place with an additional object that you'll find in one of those locations.

Giving clues in columns like this is always tricky, as we don't want to spoil an adventure for someone who's not ready to see the answers to question. While a series of directions as in the previous paragraph is not giving too much away, with readers able to skip over them without remembering the long sequence, where there are



**The Hobbit — starting point**

more specific clues telling readers what to do then I shall print these backwards, breaking the words up into blocks, which should guard against anyone accidentally seeing something they don't wish to see.

It's a long way from Middle Earth to Scarthorpe, and I agree with several people who said that *Urban Upstart* was by far their favourite adventure, and great fun to play. Its success on the Spectrum has now led to a Commodore 64 version just being released. Patrick Collins, of Amersham, asked how to get out of jail without making yourself ill by sacrificing food or drink, which he was sure would come in useful elsewhere. 'I can get out of jail by eating the cheese or drinking the lager, which takes you to the hospital, and I know how to escape from there. But although I haven't found another use for the cheese or lager yet, I'm sure there must be one.' You're right about that, Patrick, though I must admit that my first instinct was like yours, to get out of jail via the hospital, but once I discovered I did need the cheese and lager for other reasons, it was obvious there must be another means of escape. Like all answers, it's simple when you know it TUOK LAWN ACUO YDNA DETC ARTS IDTE GLL/EHNE HTTN AEGRESEH TOTTXENTIAWT SUJU OYFL.

In the same adventure Sally Barnes, of Coventry, has found the deserted house but cannot get into it. With the unerring instinct of the experienced adventurer,

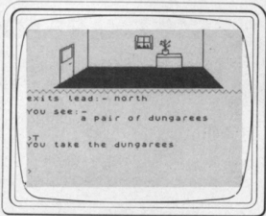


**Urban Upstart — the door to adventure**

she's sure there's something inside there, and she's quite right. How to get in, though? Well, provided you have the right objects with you: NITE GOTH TGNE RTSU OYEV IGOT KNIR DDNA TAOE TKLI MEHT DNAD OOF EHTDE ENUOY.

The publisher of *Urban Upstart*, Richard Shepherd Software, will send you a help sheet in exchange for a stamped addressed envelope, and Level 9 has just introduced the same service for its deservedly popular range of adventures.

The original *Colossal Cave Adventure* is still as popular as ever it was, and though there are lots of tricky tasks in this adventure the most common stumbling block seems to be in getting past the troll. You're told that the troll demands a toll to allow you across the bridge, but he's only interested in treasure and of course you can't possibly reach the maximum score if you've had to sacrifice something to him. There is always a way round that, though: MOORSTN AIGE HTOT KCABDETR OPSN ARTE RASG GEEH TDNA OOF EHTDE ENUOY YASD NALLORTE HTOT SSGE NEDL OGEH TEVI GUOY.



**Urban Upstart — starting point**

For a final problem, back to *The Hobbit*, and the dreaded Goblins' Dungeon. Daniel Shaw, of Reading, was one of many readers pleading to be told how to get out of that wretched place, and this you can do if you have Gandalf or Thorin to help you. Let's assume it's Thorin: WOD NIWH GUOR HTOG YASY LLAN IFDN AWOD NIWN EPOY ASNE HTSM YRRA CNIR OHTO TYAS. Be warned, though, that escaping once is only the beginning.

You will literally know that sequence of events backwards, the number of times you'll need to escape, but if you have any difficulties beyond that then we'll be pleased to try to help you in *PCN's* pages, although we won't be able to answer queries individually. In the next column it'll be back to a look at some new adventures... is there no end to them? We sincerely hope not.

PCN



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# STICK OR SWITCH

**A joystick interface plugs onto  
Kenn Garroch's Electron.**

**M**any people see the Electron as effectively a cut-down BBC, so it lacks all of the nice interfaces that its big sister has built in as standard. The First Byte switched joystick interface, one of the first interfaces for the Electron, is compatible with Atari-type joysticks though only one at a time. At £24.95, it comes with a free games conversion tape containing two programs. The first offers conversions for 20 games and the second is a menu-driven program containing details on how to convert other programs.

## Installation

It comes in a small square cardboard box with the usual cover illustration showing how it is possible to rule the computer

games universe with a joystick. The interface itself is a flat square cream coloured box that plugs into the expansion port at the back of the Electron. Fitting is easy; just remove the expansion port cover and plug in the box, remembering to switch off the power before doing so.

Once the power is turned back on and a joystick has been plugged in, all that remains to be done is to see whether it

works. This is fairly easy and First Byte has included a simple routine to demonstrate how the joystick movements can be detected. This routine is a little over complicated and all that really needs to be done is to use the following:

```
10 PRINT "&FCC0
20 GOTO 10
```

This produces different values when the joystick is moved and the fire button pressed and so on. Detecting the joystick movement from inside a Basic program should be pretty simple. A neater way of doing this is to use our listing which allows the joystick movements to be read using INKEY (-N), where N is one of the numbers shown on page 159 of the Electron User Guide. The joystick movement now takes the place of the selected keys and since the routine is completely relocatable and fairly short it can be put in any convenient position in memory.

The interface is being supported by software houses such as Program Power, Alligator, and A&S. With any other software houses, their programs will need to be converted.

## Verdict

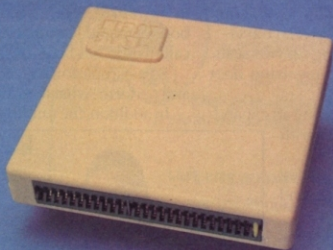
The only obvious problem with the First Byte joystick interface is that when it is connected to the expansion port, nothing else can be connected.

The most probable upshot will be a booming market for expansion boards. These will allow more than one device to be plugged into the Electron.

Also, there is only one joystick port. This is not really a fault since most computer games are for single players, but it would have been nice to have had two joysticks as on the Commodore 64.

Apart from these two niggles, either a joystick interface works or it doesn't. This one works and is easy to install and use.

**Product** First Byte Electron Switched Joystick Interface. **Price** £24.95 including free games conversion tape. **Manufacturer** First Byte Computing, 10 Castlefields, Main Centre, Derby DE1 2PE. Tel: 0332 365 280 **Outlets** WH Smith and other Electron Stockists.



## The Program

The routine, shown in the listing, works by redirecting the keyboard reading routine to one that reads the joystick. To use the program, run it and press the appropriate keys for up, down, right, left, and fire; these should be the same as those used when playing the game. The code will then be saved to tape in a file called STIKA.

To incorporate the routine into a program, just load it into a convenient position in memory, &C00 for instance.

Then redirect the OSBYTE vector at &20A and &20B to point to the routine. So:

```
*LOAD STIKA C00
&20A=&C00 MOD 256
&20B=&C00 DIV 256
```

Then use INKEY (-N) to detect the movement of the joystick.

With professional software, the routine can be loaded into memory, at a position that will not interfere with the program and then initialised by putting the start memory address in &20A and &20B.

```
10 JL=123:JR=119:JU=126:
JD=125:JF=111
30 PROCKEYS
50 DIM JSTIK 200:JSTICK=&5000
60 NORM=(%20B*256)+%20A
70 FOR %1=0 TO 3 STEP 3
80 P%-JSTICK
90 OPT %1
100 CMP #129:BEQ KEY:JSR NORM:RTS
110 .KEY CPX #L:BEQ LEFT
120 CPX #R:BEQ RIGHT
130 CPX #U:BEQ UP
140 CPX #D:BEQ DOWN
150 CPX #FR:BEQ FIRE
160 JSR NORM:RTS
170 .LEFT LDA#FCC0:AND #255-JL
180 BEQ T:BNF F
190 .RIGHT:LDA#FCC0:AND #255-JR
200 BEQ T:BNF F
210 .UP LDA#FCC0:AND #255-JU
220 BEQ T:BNF F
230 .DOWN:LDA#FCC0:AND #255-JD
240 BEQ T:BNF F
250 .FIRE LDA#FCC0:AND #255-JF
260 BEQ T:BNF F
270 .T LDX#255:LDY#255:LDA #&B1
280 SEC:RTS
290 .F LDX#0:LDY#0:LDA #&B1
```

```
300 CLC:RTS
310 J
320 NEXT
330 %SAVE STIKA 5000+5D
340 END
350 DEFPROCKEYS
360 PRINT"press key for:"
370 PRINT"Left:"
380 L=FINKY
390 PRINT"Right:"
400 R=FINKY
410 PRINT"Up : "
420 U=FINKY
430 PRINT"Down : "
440 D=FINKY
450 PRINT"Fire : "
460 FR=FINKY
470 ENDPROC
480 DEFFNKEY1
500 FOR T=1 TO 128
510 IF INKEY(-T)<>0 THEN %T
520 NEXT
530 GOTO 500
540 DEFFNKEY2
550 T=256-FNKEY1
560 PRINT"PRESS THE SPACE BAR"
570 IF INKEY(%0)<>" " THEN %T
580 %T
```



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The Encore comes as a fold-out unit with full-travel keyboard and membrane-type function keystrip. The single 5.25in disk drive gives 360K of storage.

# BACK FOR AN ENCORE

Osborne, pioneer of the portable, is back. Stuart Cooke takes an early look at the Encore.

**O**sborne Computer is set to make a comeback into the British micro market with its new, lightweight portable called the Encore.

The Encore weighs about nine pounds, has an 80 × 16 LCD display, a single disk drive and 128K of RAM as standard. Osborne claims that the Encore is totally software compatible with the IBM PC.

A padded black case is supplied with the machine.

## Keyboard

The keyboard folds down from the main unit, which holds the screen and a single 5.25in floppy disk drive, to form an 'L' shape. The keyboard has 63 alphanumeric keys, ten function keys, and a section of the keyboard can be turned into a numeric key pad.

'Keys' is probably not the correct name to give the membrane strip situated at the top of the keyboard. This strip has areas marked out for the ten function keys, and areas to press for the real time clock, modem and disk drive. Unfortunately, the membrane on the preview model was coming away from the casing in the top left corner—this will have to be watched for on production machines.

As mentioned, the keyboard pivots from the main body of the Encore. Two plastic lugs are all that hold the keyboard to the main unit and if the keyboard was allowed to fall it wouldn't be at all surprising if the keyboard broke off.

In use the keyboard proved to be very reliable and had a good feel to it. My only gripe is the size of the return key. Most machines designed for business use tend to

have a large 'L' shaped return key, the one on the Encore is only double size. Perhaps I was just being clumsy but I did hit the wrong key on more than one occasion causing the machine to do things that I wasn't expecting.

## Screen

A 16-line by 80-column LCD display is provided. This tended to suffer from a problem that is common to all LCD displays: if you move position relative to the display you will no longer be able to see the text on screen. This means a constant fiddling around with the control at the side of the machine.

Because the display has only 16 lines, Osborne's claim that the machine is totally IBM-compatible is a little bit of a white lie. Most IBM software uses the whole 25 lines



## PCN PRE-TEST HARDWARE

of the screen. When such software is used on the Encore, any screen display which requires 25 lines is chopped off.

A 25-line display is in the offing and Encores will be some of the first machines to have them fitted. Osborne says that owners of machines with 16-line displays will be able to upgrade very easily.

### Storage

Once in production the Encore will be supplied with one 5.25in disk drive: a second drive will be an optional extra. Two drives were provided with the review machine. Each drive offers 360K of storage.

One moan about the drives is the way in which the disk is inserted, with the label away from you. This may not be the end of the world but if you want to check that you have the correct disk in place then you either have to remove the disk completely or crane your neck.

### In use

Perhaps the most annoying feature of the machine looked at was its habit of hanging up in the middle of running a piece of software. Once the machine had stopped working the only way to restart it was to pull out the plug and turn on again.

It must be remembered that the machine looked at was a preproduction model and the regular non-performance of the machine was probably due to this.

Despite claims that the Encore is totally IBM software compatible, some programs on the IBM system disk did not work

correctly. Most noticeable of these was the total inability to run either Basic or BasicA. Once instructed to load either of these, the machine would appear to load them and then either jump out of disk mode and return to the real time clock, or just stop working. In either case the only way to re-use the machine was to power it off and start again from scratch.

The final version of the Encore will have a built-in modem. A terminal emulation program is integrated with the modem and, like the clock, can be accessed at the press of a button. No modem was supplied in the preview model, so it was not possible to check out the performance.

A press of the clock function key displays the time, date and a very pretty world map. A press of the disk key will return you to whatever you were doing before.

The rear of the machine holds all of the sockets for the supplied interfaces. This is where you will find the socket for the 300 baud modem, an RS232 port capable of 300 to 19.2K baud synchronous and asynchronous communication, and a centronics parallel port.

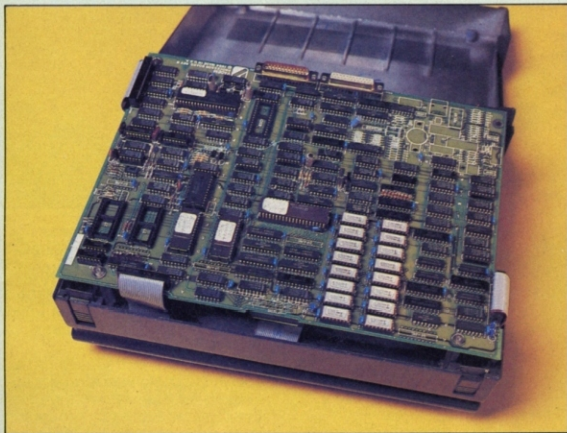
Power to the machine is supplied by a 15-volt adaptor. A rechargeable/removable battery pack is an optional extra. Of course, that will increase the weight.

### Verdict

Osborne is paying the way towards a whole new breed of portable computer. If the IBM 'compatibility' can be tightened up the Encore is an ideal choice for someone who has access to an IBM in the office. It should be possible to work in the home, or even on the move if you have battery backup. Because the Encore will have a built-in modem it should be possible to download files from the machine to the office IBM or the company mainframe over a normal telephone line.

Once the machine is fitted with a 25-line screen it is possible that the Encore will be a better buy than an IBM because of its lower cost and true portability.

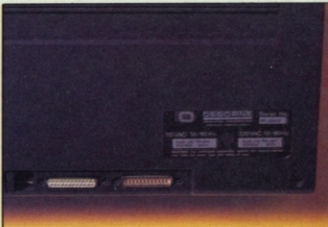
PCN



The main circuit board is vertically mounted behind the LCD screen. The heart of the system is the large brown chip in the centre of the board—the 80C86, CMOS version of Intel's 8086 main processor. Note the three empty sockets: for application software in ROM?

**Price**  
**Processor**  
**ROM**  
**RAM**  
**Storage**  
**Screen**  
**O/S/Language**  
**Distributor**

around £1,500  
80C86 16-bit microprocessor  
16K  
128K expandable to 512K bytes  
360K 5.25in floppy disk drive  
16-line × 80 column LCD, graphics 480 × 128.  
MSDOS 2.1  
Future Management (Portable Computers) Ltd. 0908 615274



Interfaces include parallel printer port and RS232 serial port. The full production model will come with built-in modem.

# The Flagship...



In keeping with a long tradition of producing fine quality dot matrix printers, Epson have now launched their new flagship. The LQ-1500 is a new breed of printer, that will give you the best of both worlds. A dot matrix printer, although capable of 200 CPS in draft mode, can be set to produce letter quality at 66 CPS by simply flicking a switch.

Like all Epson products, versatility has been a primary consideration of the LQ-1500, incorporating friction feed as standard with optional tractor and hopper feed and a carriage width of a full 15".

You now have at your fingertips

all the advantages of a daisywheel machine, in terms of quality, together with the added benefits of condensed or enlarged characters and proportional spacing, plus very high speed when set to operate in draft form.

Having superb graphics capabilities and optional 8-bit parallel (Centronics) RS 232 and IEEE interfaces, the LQ-1500 has taken

its rightful place at the head of the Epson fleet of fine dot matrix printers.

Epson have been leading the field in the design and production of printers for many years. Printers that are now successfully operating in all kinds of business environments, like the ever popular RX-80 and FX-80. With speeds of 100 CPS and 160 CPS respectively, dot addressable graphics and optional tractor feed available on the FX model, these two machines are extremely reliable and widely used.

The RX-80F/T has the same



# The Fleet



advanced features as the RX-80 but having both friction and tractor feed as standard, it's a totally versatile machine at a thoroughly realistic price.

With an ever watchful eye on the changing face of the printer market, Epson have identified a growing need for a high speed printer with the ability to accept wider paper. Thus was born the FX-100, again including all the advantages of its predecessors.

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# Toeing the MSDOS line



## Tandy's new IBM-compatible held surprises for Stuart Cooke.

**T**andy's latest micro is something of a turn-up for the books. This US company has consistently produced non-standard machines, but now it is supporting MSDOS, which is rapidly becoming the industry standard for 16-bit computers.

At first sight, the TRS-80 Model 2000 reveals nothing out of the ordinary and it would appear this US giant has simply jumped onto the bandwagon of IBM-compatible machines and is hoping to break into a new market area. However, a closer look at the machine uncovers some interesting features.

For example, the processor is an Intel 80186, which Tandy claims is 'a next generation true 16-bit cpu'. So, the machine runs faster than most of its competitors. Tandy also provides disk drives with a 720K byte capacity, much greater than the standard drives supplied with other machines.

Now that this US company has decided to follow the MSDOS trail it has done it in style by producing a micro which offers more than its IBM-able competitors, thus moving into the PC market — even if it's a

little later than most other cloning companies.

## First impressions

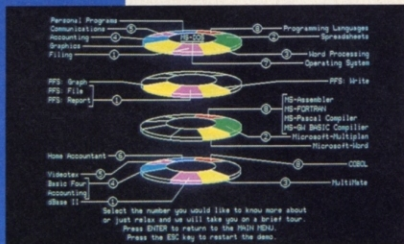
The TRS-80 Model 2000 has the same boring looks that are becoming a standard for desk-top business machines. You are supplied with a 'box of tricks' containing the two disk drives and all the processor and expansion cards. The monitor sits on top of the main box and the keyboard plugs in from the front with a coiled lead.

Unfortunately, the whole machine is made from a white plastic, and it was only a matter of hours before my finger prints started to appear on the casing giving little hope for its appearance after a short time in a smoky office.

## Documentation

Tandy supplies four manuals with the 2000. Two are large folders, one describing the MSDOS operating system and how to use it, the other the Basic reference manual. The other two pieces of supplied reading are an MSDOS and Basic reference card and an introduction to the 2000.

The latter is aimed at the complete



novice. Lots of diagrams show how and where to connect things, and it even takes you through how to turn the machine on and off, so little is missed out. Both the MSDOS and Basic manuals are clear and easy to follow, and a complete beginner to computing should be able to format disks and load programs within minutes of sitting in front of the machine.

## In use

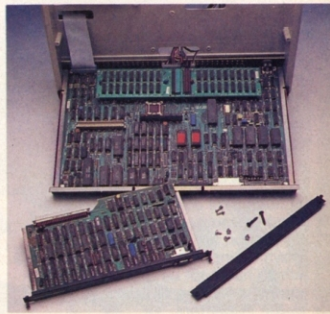
Almost immediately you will see exactly why Tandy chose the 80186 for the cpu. Programs run much faster than the same software would on a comparable machine. A local Tandy store supplied a copy of Multiplan to judge the speed at which this machine could operate.

Plugging the keyboard into the front of the machine is done with a DIN plug and socket. What is really unfortunate is that the socket this plug fits into is hidden away under a lip on the front of the machine. It proved impossible to plug in or remove the keyboard without either getting some assistance or risking a disaster.

The keyboard is of the normal 'low profile' type, has 90 keys including 12 function keys and a ten-key numeric pad. A couple of retractable legs on the base mean the keyboard can be tilted.

It has a good feel, and a touch typist should find it comfortable to use. The only gripe is that the spacebar is small and has a tendency to rattle when pressed.

A colour monitor and colour graphics board were provided with the review machine, and the display gave a very clear and sharp picture which was easy to read. The demo disk gave a good impression of the potential of the graphics; graph





## Conversion categories

Even though the Tandy 2000 uses the MSDOS operating system it is not possible to run all the software that is available for other MSDOS or IBM-compatible machines.

There are three categories for MSDOS software:

### CATEGORY 1

To run software which falls into this category, the user simply boots up the MSDOS operating system, removes the system disk and runs the software as described in the manual.

### CATEGORY 2

Software that falls into this category must be converted for use on the Tandy 2000 by the user. Tandy supplies information sheets to explain how to do this.

### CATEGORY 3

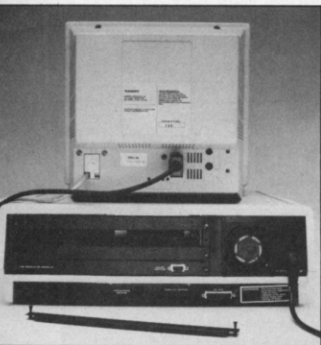
Any programs that fall into this category will not run at all. However, Tandy is having most of the popular pieces of software rewritten to run on the 2000.

plotting was quick and the Basic FILL command was among the fastest and smoothest I have come across. Graphics resolution is 640 x 400 for both colour and monochrome displays with eight colours if you have a colour board installed.

Compare this to the four colours and 320 x 200 colour, 640 x 200 monochrome resolution on the IBM and you can see that for graphics, the Tandy machine would be a good choice.

The machine's speed makes smooth and fast animated displays possible. In fact, the demo program flashes a number of points on the border of one of the displays very quickly, and this is performed in Basic.

Each of the drives provided on the Model 2000 have a 720K capacity. One of the demo programs displays how the total capacity of these two drives is equivalent to nine of the drives on the standard IBM.



# Elegant electronics

The Tandy Model 2000 runs the 80186 processor, an upgraded and more compact version of the 8086. This advanced processor gives the 2000 almost twice the processing speed of an IBM PC in some applications, although this is mainly due to the Tandy clock frequency of 8MHz as compared to the PC's 5MHz.

The 80186 also has the advantage that, apart from being more compact, it is software compatible with the 8080, the 8085, the 8086 and the 8088.

This means that software originally written for the 8080, such as Wordstar, and software written for the 8088 such as the suite of Perfect Software or Lotus 1-2-3, can easily be converted to run on the Tandy Model 2000, and any modifications will only be for input/output protocols and peripheral devices.

Internally, the 80186 is basically a whole computer system on a single chip. The cpu is an enhanced version of the 8086 with an improved instruction set, to make assembly language programming a little easier, and changes in the internal architecture to make the instructions execute a little faster.

Even with this large capacity no problems were encountered while using them.

## Expansion

It is extremely easy to expand the machine. All that's involved is to slide the expansion board into one of the expansion slots on the rear of the machine. Expansion boards exist for RAM expansion, a real time clock and a Digi Mouse controller board.

## Software

Since the Tandy 2000 uses the MSDOS operating system there is a reasonably big market of software available. Not all software can be loaded into the machine and run straight away, even though it is possible to read IBM format disks. Tandy is in the process of converting many popular MSDOS packages and can already supply compilers, word processors and spreadsheets.

Basic is supplied with the machine, the dialect of which bears an uncanny resemblance to Microsoft's Extended Colour Basic. If you have ever had the chance to use a Tandy colour computer, or an IBM model, you should have no problems.

As with all the packages you can get with the machine, the Basic is very fast. I

Left: There are three slots on the back of the machine for expansion boards. Far left: The main cpu board and an additional colour board.

Also included on the chip are devices that would normally be separate chips, such as clock generators, DMA controllers, timers, and the chip select logic. This means that instead of the usual 40-pin or even 60-pin chip, the 80186 uses a 68-pin package to accommodate all of the input/output that is necessary to run a system of this size.

The problem with the 80186 is mainly due to its popularity because of the above features. It is made only by Intel at the moment and, although it is expanding production facilities and talks are going on with Advanced Micro Devices about second sourcing them, the chips are still in fairly short supply. Because of this, it is surprising that Tandy has launched its Model 2000 in the UK so early. This could very easily lead to shortages somewhere along the line which would hold up production and cause delays in deliveries.

But, by the looks of things and, unless something even more amazing comes along, the 80186 is a very comprehensive piece of hardware and will probably do extremely well.

Kenn Garroch

examined the demo disk with the machine, and I found it was all produced from Basic.

## Verdict

The Tandy Model 2000 has some attractive features compared to machines with a similar price tag. If you want to play around with graphics or require a machine that is fast, take a look. If you only require a machine that runs MSDOS, you will probably find this machine more expensive than its alternatives.

PCN

Examples of IBM-PC packages which will run on the Tandy Model 2000 are:

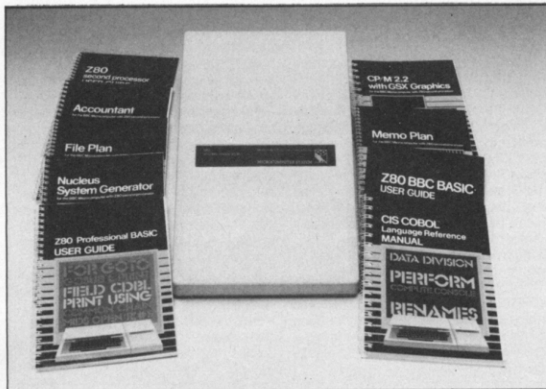
PACKAGE	FROM
Random House	
Dict/Proofreader	Aspen/Wang
Quick Code	Fox and Geller
Tax Preparer	IBM
Accounts Payable	IBM
Accounts Receivable	IBM
General Ledger	IBM
Payroll	IBM
Easy File	Info Unlimited
Selector	Systems
Supersort	MicroAp
Front Runner Kit	MicroPro
PMCOBOL	Open Systems
	Ryan McFarland

## SPECIFICATION

Price	£2298.85
Processor	Intel 80186
Memory	128K expandable up to 768K
Graphics screen	640 x 400 colour and monochrome
Keyboard	90 keys including numeric keypad and 12 function keys
Operating system	MSDOS

# ACORN'S SECOND COMING

Acorn's second processor demonstrates that two are better than one, says Simon Horner.



**A**corn's Z80 second processor has been a long time coming, but it's on the streets at last. More than just a go-faster add-on, it comes with the CP/M operating system, and a bundle of professional software packages.

An expected price of £299, will bring you an off-white box containing a Z80B processor running at 6MHz, 64K of 150nS DRAM, a bootstrap ROM (to load CP/M *etc*) and a massive ULA (uncommitted logic array) which provides the logical interface to the BBC. There's also a new ROM-based filing system, the DNFS, which contains the disk and network filing systems in one.

Also included is a set of bundled software on seven disks with 11 manuals, packaged separately. All this makes the second processor well worth having for business applications.

## In use

The BBC Z80 Basic is a fast implementation and proves that two processors are better than one. The new interpreter is more stringent than the old one, and

doesn't allow jumps out of FOR...NEXT loops except, for example, another NEXT, nor will it accept LOCAL statements inside these loops.

Since it runs on a Z80, the built-in assembler takes Z80 instead of 6502 mnemonics. All the operating systems vectors (OSBYTE, OSWRCH OSWORD *etc*) are covered from the Z80 end but the HL and A registers are used to pass the parameters instead of A, X and Y.

Because CP/M files do not have to occupy contiguous space on the disk, there are no infuriating 'can't extend' errors. There are also no worries about transferring Acorn DFS programs and files from one system to another as utilities are provided for all these tasks.

## Software

The Professional Basic, by Locomotive Software, is considerably different from BBC Basic and has more in common with Microsoft than any other.

Its unusual extras include the potential to produce ASCII files of programs as well as protected ones using the options A and P

respectively with SAVE. It also includes such things as a While loop structure and UPPER\$, for converting strings to upper case, and many more.

The only package in the Plan suite I have used extensively is MemoPlan, which seems to be remarkably sophisticated in some ways and primitive in others. For instance, it is possible to have five files open at once, with automatic virtual storage, and edit two of them on screen simultaneously. Mailmerge is supported, using files from FilePlan, and labels can be produced to any format.

However, the underline facility is 'invisible' and it is not possible to enter printer control codes, so it ignores the possibility of flexible printer control.

For programmers, The CIS COBOL suite will be a dream or a headache depending on their experience with mainframes and long-winded languages. It is a complete implementation of the standard compiled language which, together with Forms, Animator and Nucleus, should enable production of very good business software within a reasonable time.

The whole system relies on the Tube to operate. Its job is to keep the two processors talking to each other, even though they are fundamentally different. The information is sent down the data/address buses using (from the 6502 BBC end) the SHEILA addresses &E0 to &FF *ie* absolute addresses &FFE0-&FEFF. These should only be accessed through the OSBYTE calls 150 (read) and 151 (write). For example: \*FX151,&E0,65 should send the code for "A" down the tube from the 6502.

To each system, the Tube represents a conventional input/output device occupying eight bytes of memory. Normally the Z80B will do all the language processing while the 6502 is left doing the I/O commands, such as VDU, PRINT, PLOT, SOUND *etc* though it is possible to access all of these from the Z80. All this means the combination of the two processors can work much faster than is normal for a desk-top micro.

## Verdict

This is a very useful CP/M system and with the bundled Plan suite, Cobol system, and Professional Basic it covers all the necessary business software. However, it's not a budget package since together with BBC, disk drives, monitor, printer, and Z80 board it will top £1200.

**PCN**

### Software supplied with the system.

- Full version of CP/M 2.2 with ED, ASM, DDT, and the graphics extension GSX.
- Z80 form of BBC Basic with a Z80 version of the assembler.
- 'Professional Basic'.
- Set of Plan software from Chang laboratories which includes:
  - Memo Plan, a word processor
  - File Plan, file management
  - Graph Plan, spreadsheet and graphics
  - Accountant, nominal ledger, sales and purchase daybooks
- CIS COBOL which includes:
  - Animator debugging
  - FORMS macro (for designing screen input)
  - Nucleus (a report program generator)

**Product** Z80 second processor for the BBC Price £299 inc VAT **Manufacturer** Acorn Computers **Distributor** Vector Marketing, Dennington Estate, Wellingborough, Northants NN8 2RL, or Acorn Dealers.





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## SOFTWARE

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## Games

Welcome news this week for TI99/4A owners is the release of a new game from a relatively new company. The game is *Sloopy's Christmas* and the company is Sceptre Software of Newcastle.

An interesting feature of *Sloopy's Christmas* is a system called Musiload, a tape system that plays real — as opposed to computer-generated — music while the program loads.

*Sloopy* is a hound and your task is to get his friends together for the festive season. Success here gives you a password that will send you on to parts 2 and 3 which involve getting a turkey and driving home after indulging in the Christmas spirits. It looks good value at £5.

The most eye-catching release of the week is *Match Point* from Sinclair. With timing worthy of Bjorn Borg, the cassette hits the shops in Wimbledon fortnight and gives you



the chance to participate in those baseline battles on the Centre Court.

It is an action-packed tennis simulation featuring excellent 3D graphics and a clever control system — either keyboard or joystick — allowing you to perfect a range of shots from the drop volley to the cross-court backhand pass beloved of Dan Maskell.

If the action gets too much for you, there's an exhibition mode that allows you to sit back with the strawberries and watch the Spectrum play itself. Alternatively the two-player mode lets you take on another tennis buff in the family.

The business simulation is a popular genre of computer games and another entry from a new company is *New Venture* from Falcon Computing. Definitely one for the budding

capitalist, the idea is to launch a retail business and make pots of money. The cash, of course, is just a means to an end. You have to spend it on frivolous luxuries.

There are plenty of factors to make life interesting, including taxes, the power of advertising, incompetent accountants and inflation. *New Venture* is available for the 48K Spectrum with a Commodore 64 version coming soon.

Also on the Spectrum is *Reichswald* from Merry and Wallace. If capitalism isn't your thing, how about death and destruction, *World War 2* style? This one puts you in command of the American forces in the battle for the Rhine in 1945. A war game simulation, it gives you the chance to control armour, infantry, reconnaissance and engineering units in

an attempt to cross the Rhine before the computer-controlled German forces destroy all the bridges.

## Education

Griffin Software has four new titles for the 48K Spectrum and BBC Model B. *Englishskills I* and *II* and *Mathskills I* and *II* deal with basic concepts in these subjects and Griffin claims the programs 'have been fully teacher-tested and are compatible with the standard O-level and CSE syllabuses.'

Prices are £9.95 for the Spectrum and £11.95 for the BBC.

## Utilities

All quiet on the utilities front this week, with one notable exception. ISP has released *Scope II*, the revised and improved version of its acclaimed games designer.

For the 48K Spectrum *Scope* is a medium-level compiled language specifically designed for graphics and sound manipulation. The main feature is that it compiles your program to machine code which allows you to write fast, action games.

*Scope II* comes with a comprehensive manual which features a tutorial on using the compiler and example programs.

## BBC B

Mystery of the Java Star	£7.95	Shards Software 01-591 7666
Frac Attack	£6.95	Shards Software 01-591 7666
Mathskills I	£11.95	Griffin Software 021 236 2552
Mathskills II	£11.95	Griffin Software 021 236 2552
Englishskills I	£11.95	Griffin Software 021 236 2552
Englishskills II	£11.95	Griffin Software 021 236 2552
Cesar the Cat	£6.95	Mirrorsoft 01-353 0426
Droga	£9.95	Acornsoft 0933 79300
Meteor Mission	£9.95	Acornsoft 0933 79300
Tetrapod	£9.95	Acornsoft 0933 79300
Volcano	£9.95	Acornsoft 0933 79300
Gateway to Karos	£9.95	Acornsoft 0933 79300
Temperature Control		
Simulation	£9.95	Acornsoft 0933 79300
The Examiner	£9.95	Acornsoft 0933 79300

## TI99/4A

Sloopy's Christmas	£5.00	Gamesware
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## COMMODORE

Cash Book 64	£75.00	Anagrams Systems 0403 59551
Orc Attack	£7.95	Creative Sparks 0252 543333
Fun to Learn	£6.95	Shards Software 01-591 7666
Monster Maths	£6.95	Shards Software 01-591 7666

## ELECTRON

Science 1	£7.95	Shards Software 01-591 7666
Hopper	£9.20	Acornsoft 0933 79300
Freefall	£9.20	Acornsoft 0933 79300
Arcadians	£9.20	Acornsoft 0933 79300
Sphinx Adventure	£9.20	Acornsoft 0933 79300
Desk Diary	£9.20	Acornsoft 0933 79300
Picture Maker	£9.20	Acornsoft 0933 79300

## SPECTRUM 48K

Mathskills I	£9.95	Griffin Software 021 236 2552
Mathskills II	£9.95	Griffin Software 021 236 2552
Englishskills I	£9.95	Griffin Software 021 236 2552
Englishskills II	£9.95	Griffin Software 021 236 2552
Scope II the Games Designer		ISP Marketing, 15 Castons Yard, Basingstoke, Hants
Reichswald	£5.50	Merry and Wallace 05436 4225
Match Point	£7.95	Sinclair 01-235 9649
Logo	£36.95	Sinclair 01-235 9649

## DRAGON 32

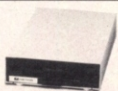
Operation Safras	£7.95	Shards Software 01-591 7666
Horace Goes Skiing	£5.95	Melbourne House 940 6064



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# Pascal-picking 64

**B**asic is not the best microcomputer language; it's not very fast. An alternative becoming popular is Pascal, often the second language available to a particular micro. The launch of the Amstrad series is an example; Pascal is already available for it.

Oxford Computer Systems, which specialises in compilers and cross-compilers for the Commodore range of machines, has produced a version of Pascal for the Commodore 64. At present, only a disk-based version is available, but the firm intends to release a cassette version soon.

Several features of the language make it an attractive alternative for the Basic programmer. Programs in Pascal are divided up into a block structure. Procedures and functions are fully catered for, and the user is not limited to standard data types.

When programming in Pascal, these features can be employed to write modular programs, with each block/procedure/function doing a set task. This should result in programs that are more efficient and easy to understand.

## Features

The company is keen to point out that Oxford Pascal is a full implementation of the original language. Extras have been added to make use of some of the 64's features, but not everything has been covered — there's no sprite handling, for example.

It is a true compiler insofar as it is possible to produce programs that will run independently of the compiler itself.

Part of the package is an editor which has been written to behave very like the existing Basic editor. The editor is enhanced with auto line numbering and renumbering. FIND lists all occurrences of a specified string and REPLACE substitutes one string for another.

Sequential disk files are allowed (including chaining), and very large programs may be written with several segments which can be separately compiled, then linked to produce one large program. Also, the command LOCATE will produce a file which can be run from Basic like any normal program.

Most users will have Commodore 1541 drives, and the faster 4040 drives can be



used, if you can get them.

Using a disk-based compiler to write small programs can be annoying as there are a number of processes to go through before you see any results.

Oxford Pascal boots up in resident mode where the compiler and editor are already in RAM. This allows programs to be written and run without the need to

## PCN PRO-TEST SOFTWARE

**A version of Pascal for the 64, tested by David Janda.**

compile to disk. Of all the features available, this is the best. It will no doubt allow learners to grasp the language easily, and at a later stage progress to the disk-based compiler.

## Documentation

The 80-page manual serves as user guide and tutorial. But some areas are given very little attention. Not only that, but details are scattered about the manual, and I found myself doing a lot of cross-referencing. Some type of index or command summary would have been most welcome.

## In use

Loading the compiler takes a little over two minutes, and once loaded a lower case 'ready' is displayed. All input is in lowercase, but can be changed with the commands UPPER and LOWER.

It took me about five minutes flat to get used to the line-orientated editor, which is very similar in operation to the Basic version.

After writing a program, it's saved to disk using the PUT command. To actually compile the program, the system disk has to be inserted as it contains overlays needed for compiling, linking and so on. When COMP is entered, messages are displayed telling you when to swap disks. This happens until the program is compiled and saved as an object file.

If you wish, the file can be changed so that it will run without the compiler.

No problems were encountered during any compilation, and the error messages are quite adequate. Options allow for the compiler to list the program to screen or printer as it is compiling.

On the tests that I ran, I was disappointed to find the compiler-produced code wasn't that much faster than the Basic equivalent. Part of the reason is due to all floating point operations being done through the Basic ROM and kernel, and also because the object code is p-code (pseudo code — not the fastest in the world).

## Verdict

Although the compiled code doesn't run as fast as Pascal ought to, this doesn't cast a shadow over the product. I enjoyed using Oxford Pascal a great deal, and I can imagine many other users doing so as well.

It being a full implementation of the language will mean that many students could learn Pascal on the Commodore 64 without the worry of incompatibility with larger systems. And on this point I would recommend it highly to anyone who wishes to learn a 'real' programming language.

For those who opt to buy the cassette version, there are some differences from the full implementation. However, disk-based users can use the resident mode, and so have the best of both worlds.

In resident mode, the editor, compiler as well as the source and object code are all held in memory at the same time. This may seem wasteful, but with the editor and compiler in memory there is still 12K to



spare.

There are also commands for bit manipulation, I/O errors may be interrupted, and keyboard interrupts are catered for. The 64's internal clock may be read with the functions HOURS, MINUTES and SECONDS. It is also possible to call machine code routines by using the word EXTEND followed by the address.

PEEK (X)	As in Basic.
POKE (X,Y)	As in Basic.
ORIGIN (X,Y)	Sets the pointer x (of any type) to address y.
VDU (X,Y,C)	Stores character c in vdu memory at row x, column y.
GETKEY: C	Returns character from keyboard.
ENVEL (V,A,D,S,R)	Voice, attack, decay, sustain, release.
VOICE (V,F,W,D)	Voice frequency, wave type, duration.
VOLUME (I)	Controls master volume (I) of Si/D chip.
BORDER (C)	Sets border colour.
SCREEN (C)	Sets screen colour.
PEN (C)	Sets colour of text.
PAPER (C)	Sets hires background colour.
INC (C)	Sets hires foreground colour.
EXAMINE (X,Z,I)	Returns a value of 1 if point at x,z is on.
PLOT (F,X,Y,X1,Y1)	Multipurpose plot command to plot and draw as well as fill an area.
WINDOW (X)	Creates a text window starting at top line and terminating at line x.

**Features**  
**Documentation**  
**Performance**  
**Usability**  
**Reliability**  
**Overall value**



**Name** Oxford Pascal V1.0 **Publisher** Oxford Computer Systems (software), Hensington Road, Woodstock, Oxford OX7 1JR. **Outlets** Mail order and selected retailers **Price** Disk £49.95 + VAT Cassette £14.95 + VAT.



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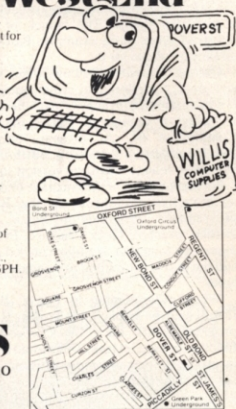
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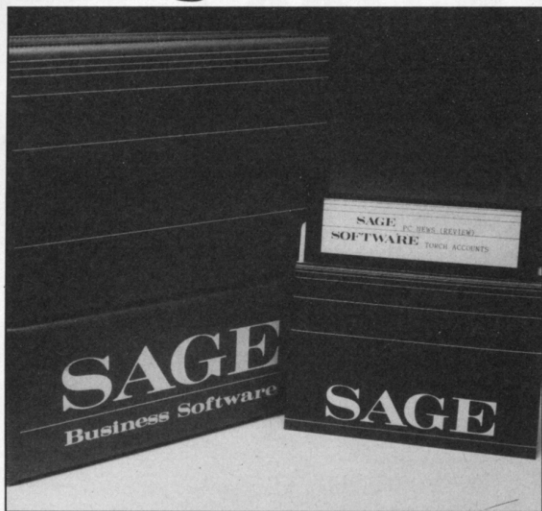
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# Package with a Plus



**Neville Ash finds extra power in Sage Plus.**

**S**age Plus, from the Sage range of accounting programs, adds to the features of Sage, which was promoted as a single disk accounting program in CP/M, MSDOS or PCDOS.

Since accounting programs use up to seven disks in the complete system, plenty of disk-shuffling has to be done. With non-computer oriented staff this can lead to complications with the wrong disks being used or even damaged.

A single disk program overcomes the problems, the capacity of the disk determining the number of accounts.

## Getting started

The package comprises a three-ring, A5 binder with a manual and a disk. The first step is to make at least one working copy of the program, then keep the original in a safe place. You must also prepare a data disk for the ledgers. Here, the capacity of the disk determines the number of ledgers and transactions. A Sirius version of the program with its 600K disks will have space for more accounts on the data disk than the IBM PC.

To calculate the number of transactions possible per disk, the program uses a simple calculation: multiplying each account by 50 bytes. Budget limits are included, each allocated 15 bytes. Finally, the nominal categories are entered — you must have a minimum of 120 by 30 bytes.

These figures are together subtracted from the disk's total capacity, producing

the amount of space available for transactions. Then divide by 90 and the result is the maximum number of transactions.

Sage Plus allows a combined total of 9,999 sales and purchase accounts, the same as the number of nominal accounts. However, the manufacturer recommends that the minimum number of transactions per disk should be 1,000.

After the Sage Plus working copy disk has been placed in Drive A and the ledger disk into Drive B, press CTRL+ALT+Delete with a genuine PC; or with the lookalikes just press the reset button. Alternatively, at the A prompt, type in Accounts, then the message to insert your ledger disk into Drive B will appear. If you haven't inserted a disk at this stage you may get an error message. After pressing Return/Enter, the main menu appears.

## In use

Seventeen options are available from Initialisation to leaving Sage. Before entering any data, option one — the Initialisation routine — must be followed. Taking this option the message, 'Place a formatted clean disk into Drive B' appears. At this stage you decide on the number of purchase, sales and nominal accounts. Then the ledgers can be created, and the purchase accounts allocated. Following this, you enter the account number, existing account name (which appears as 'unused account' for new names), the new account name and the credit limit. Orig-

nally Sage didn't have this latter facility. The same procedure applies to setting up the sales accounts.

Under the nominal ledger, Sage Plus allows you a three-part division — trading account, profit and loss and the balance sheet, which is standard procedure for accounting packages, but it also gives you the opportunity to allocate a budget amount for each of these.

Once you've entered the accounts configuration, entering the details is easy. You select the appropriate option, Sage asks you to wait until the selected one is found, then you enter the relevant details.

While originally Sage offered VAT analysis, Sage Plus has added a credit limits feature as well as credit control and budget variance reports. Invoicing can also be linked to stock files.

Most people using accounting programs don't want to concern themselves with computing beyond using the software. Any program intended for this market should therefore be usable after following the tutorial.

A colleague who works in accounts was pleasantly surprised at the clarity of the text and the subsequent ease of use of the program.

## Documentation

The two-part manual has 27 pages of demonstration routines to introduce the package. The rest of the manual goes through each stage of Sage's operation, with plenty of illustrations and important features in blue.

## Support

A hotline help service is available to registered users only. There's also a ledger recovery service for damaged data disks and it's claimed that recovery is possible in most cases.

## Verdict

Sage Plus retains the ease of use offered by Sage and adds features many people commented on when it was first launched.

Sage Executive adds invoicing and a number of other features and costs £695. Sage Plus users can upgrade to the Executive version for £195, while original Sage users can upgrade to Sage Plus for £195 and to Executive for £375.

The original selling feature of Sage — a single program disk — remains its best feature. Adding the ease of use, Help hotline and damage recovery services makes it an extremely strong contender in a crowded marketplace.

PCN

## RATING (5)

**Features**  
**Usefulness**  
**Documentation**  
**Performance**  
**Usability**  
**Overall value**



**Name** Sage Plus **Application** Accounting **Price** £525 **System** IBM PC **Publisher** Sagesoft, Hawick Industrial Estate, Newcastle-upon-Tyne NE6 1AS, 0632 761 669 **Format** Disk **Other versions** CP/M, MSDOS **Outlets** Dealers.

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## Issue 13, June 3-9

**Pro-Tests:** Telewriter for Dragon 32, Aberneth Forth for Spectrum, GFS graphics processing system for Apple II+, Joysticks, rulers, Ajile Features: Dragon meets Tandy, Oric music part 2, training, Basic for Colour Gene and Genie 1.

**Gameplay:** Everest Ascent (Spectrum), Colour Gene roundup, Micro Maze (Jupiter Ace), Qix (Atari).

**Program/Cards:** Cupid (Oric), Atari (Dragon 32), Time Bomb (Atari).

**Databases:** peripherals.

**Pro-Tests:** Apple Accelerator II board, Modula-2 (Apple II), Oric Joystick Control Unit II, Kempston Centronics Interface, BBC Speech Synthesiser.

**Features:** Newbrain Basic part 1, Sirius destination.

**Gameplay:** Ali Dididums (Spectrum), Monopole (Commodore 64), Automopoli (Spectrum), Dragon dramas.

**Program/Cards:** Time Bomb (Atari), Sheep Drive (BBC).

**Databases:** Software.

**Microspedia:** Spectrum, Part 1

## Issue 15, June 16-22

**Pro-Test:** Comt 35, Address Manager (Spectrum), Syrex (Commodore 64), MST Interface (Epson HX-20), Voice Input Module (Apple II).

**Features:** Newbrain Basic part 2, Genie scene.

**Gameplay:** Cleared for Landing, Playing the Ace (Apple II), Valires, Star Janner (Dragon 32).

**Program/Cards:** Mover (BBC B), Sprite Clock (Commodore 64), Pirate Island (Atari), 3 of 9, Mini-mind (Colour Genie), Brickbat (Dragon 32).

**Databases:** Hardware.

**Microspedia:** Spectrum, part 2.

## Issue 16, June 23-29

**Pro-Tests:** Atari v Acorn, word processing for the Commodore 64, Simplifile (CP/M), MPF-II printer, Z80 Pack for BBC.

**Features:** ZXSI Maths, US mail, Atari graphics.

**Gameplay:** Computer Scramble (Spectrum), Education (BBC), Horace and Spiders (Spectrum), Catcha Snatcha (Vic 20).

**Program/Cards:** Video Tiler (T1994A 3 of 6), Bowling (Spectrum), Pirate Island (Atari), Microspedia: Spectrum, part 3.

## Issue 17, June 30-July 6

**Pro-Tests:** Duet-16, The Organizer (CP/M), Trace and ZX Test (Spectrum), Jaki 6100 data transfer, Vindex Ultra Term (Apple II).

**Features:** Leaving part 1, Atari screen action.

**Gameplay:** Oric chess, Grand Master (Commodore 64), Escape from Dragon (BBC), Jet Pac (Spectrum), The Ring of Darkness (Dragon 32), Spectrum spactacle.

**Program/Cards:** Video Tiler (T1994A 4 of 6), Pirate Island (Atari), Word processor (BBC).

**Microspedia:** Sound, part 1.

## Issue 18, July 7-13

**Pro-Tests:** Tandy 100, RS232 interface (ZX81), ROM pager (Commodore), Interface printer buffer, IBM Personal Basic, Spectrum assembler, Newbrain WP.

**Features:** Leaving Part 2, Lynx music.

**Gameplay:** Spectrum Backgammon, BBC Snooker, Commodore 64 round-up, Serpentine (Vic 20), Post (Spectrum), Spectrum Safari.

**Program/Cards:** Ford Processor (BBC), Fruit Machine (Spectrum), Microspedia: Sound Part 2.

## Issue 19, July 14-20

**Pro-Tests:** 16-bit chips, Stock control (Epson HX-20), Malphas (Torch), Smith-Corona daisy-wheel, ZX81 word processing.

**Features:** Insurance, buying second-hand.

**Gameplay:** Escape MCF (C64), Apple round-up, Temple of Apsai (C64), Lullaby (Spectrum), Health-rod (Spectrum).

**Program/Cards:** Colour Code (Atari), Wreck (Dragon 32), Microspedia: Sound, part 3.

## Issue 20, July 21-27

**Pro-Tests:** Radio bareboard, Vic digital tape drive, Sekoloka colour printer, Toolkit (Spectrum), Bonus (Pet payroll), Newbrain monitor, Features: Computer art, Dragon scrolling.

**Gameplay:** Rabbit Trail (T1994A), Aztec Challenge (Atari), Vic 20, T1994A, BBC round-up, Joast (Spectrum), Molar Mail (Spectrum), Print Shop (Spectrum), Time-Lords (BBC).

**Program/Cards:** Tumbler (Oric), Wreck (Dragon), Atari Errors, Speed Race (Vic 20).

**Microspedia:** Sound, part 4.

## Issue 21, July 28-August 3

**Pro-Tests:** BBC graphics, Newbrain assembler, BBC turtle, Oric printer, Triumph printer.

**Gameplay:** Franklin's Tomb (Dragon), Hummer House of Horror (Spectrum), Jumpman (64), Jumping Jack (Spectrum), Fourth Encounter (Vic), Cyclom (64).

**Program/Cards:** Collection (Vic), Bomber (64), Defender (BBC), Microspedia: Sound, part 5.

## Issue 22, August 4-10

**Pro-Tests:** Spectrum FORTH, BBC graphics, Music synthesizers, IBM plotter, Brother daisywheel, Maltron keyboard, Mupid.

**Features:** Gene assembler, Dragon machine code.

**Gameplay:** River Rescue, Oric Attack (Atari), Zork (64), Knot in 3D, 3D Combat Zone (Spectrum), Mista (Oric), Velmor's Lair (Spectrum).

**Microspedia:** CP/M part 1.

## Issue 23, August 11-August 17

**Pro-Tests:** Sort Basic-G, Tawford, BBC microscopes, Microdrive, Tandy Model 4.

**Features:** Dragon machine code, Atari controllers.

**Gameplay:** Bridge Master, Syx, Manic Miner (Spectrum), Atari roundup, Candy Flow (Hanger), Oric, Everest (Dragon).

**Microspedia:** CP/M, part 2.

## PERSONAL COMPUTER



## Issue 24, August 18-24

**Pro-Tests:** T-Maker III, Spectrum Fifth, daisywheels surveyed, Spectrum digital trace, Laser.

**Features:** Videotex, Dragon machine code.

**Gameplay:** Oric roundup, Cookie, Egg Farm, Xadom (Spectrum), Sea Lord (BBC), Lullaby (Dragon), The Island (64).

**Microspedia:** Commodore 64, part 1.

## Issue 25, August 25-31

**Pro-Tests:** Electron, Simons Basic, Oric monitors, Microdrive.

**Features:** Newbrain map, Acorn Atom, Dragon machine code.

**Gameplay:** Suspended (64), Terror Daktis, Trans Am (Spectrum), Dragon roundup, Jagger (Oric), Frogger (IBM).

**Microspedia:** Commodore 64.

## Issue 26, September 1-September 7

**Pro-Tests:** Microtan 65, BCFI, BBC tracer, 80 column Pet, Oric interfaces.

**Gameplay:** Magic Mountain, Smugglers Cove (Spectrum), Spectrum roundup, Matrix (64), Ninja Warrior (Dragon), Dallas, (Oric), Call to Arms (IBM).

**Microspedia:** Commodore 64.

## Issue 27, September 8-September 14

**Pro-Tests:** Sharp M2700, BBC Lsp, Apple editor, IBM mice.

**Gameplay:** Zip-Zap, Zoom (Spectrum), Spectrum roundup, Howler Bover, Benji-Space Rescue (64).

**Microspedia:** Dragon, part 1.

## Issue 28, September 15-September 21

**Pro-Tests:** Zenith Z100, Snail Logo, Atari Supergraphics, Newbrain CP/M, IBM mice.

**Gameplay:** The Witness, Super Scramble, Sixt (64), Harrier Attack (Oric), Morocco Grand Prix (Dragon), Pharaoh's Tomb (Spectrum).

**Microspedia:** Dragon, part 2.

## Issue 29, September 22-September 28

**Pro-Tests:** Portico Miracle, Dragon editor, BBC toolkit, Dragon drives, Apple light pen.

**Features:** IX2 disassembles, TI transformations.

**Gameplay:** Griddler, Glooperi, California Gold Rush (64), Oric roundup, Bomb Alley (BBC), Splat, General Election (Spectrum).

**Microspedia:** Dragon, part 3.

## Issue 30, September 29-October 5

**Pro-Tests:** NEC's Advanced Personal Computer, Financial Planner (IBM), Kongsman's a.b.c. Countabout (Hot Dog Spotter, Spectrum), Trina VTX500, Extended Basic (Dragon).

**Features:** Spectrum machine code, Gameplay: Hall of Death/Sword of Fargol (64), 747 Flight Simulator (BBC), Dragonfly (Dragon 32), Personal Note Invaders (BBC).

**Programs:** Search (ZX81), Composer (Oric).

**Databases:** Hardware.

**Microspedia:** Everything you wanted to know about programming, part 1.

## Issue 31, October 6-October 12

**Pro-Tests:** Atari 600XL, Condor Mini, Merit 30 (IBM), Acacia Non-volatile, Diary-File system (BBC), ROM extension board (BBC).

**Features:** Oric sound routines.

**Gameplay:** Greedy Gadd (Spectrum), Kong (Spectrum), Crazy Kong (64), Cuthbert Goes Walkabout, Movie Producer (Dragon).

**Programs:** Commodore (Oric), 555 (Spectrum), Anagram (Dragon).

**Databases:** Peripherals.

**Microspedia:** Everything you wanted to know about programming, part 2.

**Chubnet:** User Groups.

## Issue 32, October 13-October 19

**Pro-Tests:** Mattel Computer, Suprator (Intellivision), Sprite-Gen (BBC), Typing Strategy (Apple), Decoder 2 (Spectrum), Cirtch Epron Programmer (Apple).

**Features:** Teletext options, Inside the Genie.

**Gameplay:** Space Shuttle Frogger (Dragon 32), Atari roundup, Speedrow 2/Football Pools (Spectrum).

**Databases:** Software.

**Chubnet:** Clubs.

**Programs:** Bees Away (BBC), Composer (Oric).

**Microspedia:** Everything you wanted to know about programming, part 3.

## Issue 33, October 20-October 26

**Pro-Tests:** CWP's Cortex, Sinclair ZX Interface 2, Watford DRS (BBC), Watford (BBC), Atariwreath.

**Features:** Oric Operating System, Gameplay: Dragon roundup, Hunter (64), Cricket/Luna Crabs (Spectrum), 1 Deep Space (BBC).

**Program/Cards:** Key, Utility (Lynx), Bees Away (BBC), Flight Test Card (Apple).

**Microspedia:** Everything you wanted to know about programming, part 4.

## Issue 34, October 27-November 2

**Pro-Tests:** NEC's PC-801A, Simply File (64), The Forest (Spectrum), Amcom DRS (BBC), Currah Microscope (Spectrum).

**Features:** Oric Machine Code, Gameplay: Fort Apocalypse/Pooyan (Atari), Death Cruise/Chill (Dragon), Trunch Canyon (BBC), Football Man/Pool (Spectrum).

**Databases:** Hardware.

**Microspedia:** Everything you wanted to know about programming, part 5.

## Issue 35, November 3-November 9

**Pro-Tests:** Kaypro 10, Stock Control (Spectrum), Educational games (BBC), Brother EP22 electronic typewriter, ADS Centronics Interface (Spectrum, Jupiter Ace).

**Features:** Tandy Graphics, BBC Operating System.

**Gameplay:** Valthia (Spectrum), 64 roundup, Slinky (Atari), Hespert (64).

**Programs:** Mini Mail (Spectrum), Mini-Square (Oric).

**Databases:** Peripherals.

**Microspedia:** Everything you wanted to know about programming, part 6.

## Issue 36, November 10-November 16

**Pro-Tests:** Tiger from H/I, ZX81-Forth, Exmon (Oric), Cycle Planner, Growth Tracker/Diet Master (Spectrum), U-Com 2 (Apple).

**Features:** Newbrain sound, BBC FX commands.

**Gameplay:** Creepers (Vic 20), Exterminator (64), Spectrum round-up, Death Mines of Sinus (Dragon).

**Programs:** Falklands Raid (BBC), Decoder 2 (Spectrum), Pyramid (Spectrum).

**Databases:** Software.

**Microspedia:** Everything you wanted to know about programming, part 7.

## Issue 37, November 17-November 23

**Pro-Tests:** Apple II, Paint (Atari), BBC Micro Toolkit, Spectrovid, Big Ears.

**Features:** Flight simulators, Spectrum.

**Gameplay:** Empire/Treasure Tomb, Crystal Chalice, Temple of Zoro (Dragon 32), Cobus Maze/Bewitched (Vic 20), Cosmic Convo/Planetfall (64), Bagaboo/Gorilla (Spectrum).

**Programs:** City Defense (Oric), Falklands Raid (BBC), Pyramid (Spectrum), Monitor (Oric).

**Databases:** Clubnet.

**Microspedia:** Everything you wanted to know about programming, part 8.

## Issue 38, November 24-November 30

**Pro-Tests:** CWP's Cortex, Sinclair ZX Interface 2, Watford DRS (BBC), Watford (BBC), Atariwreath.

**Features:** Oric Operating System, Gameplay: Dragon roundup, Hunter (64), Cricket/Luna Crabs (Spectrum), 1 Deep Space (BBC).

**Program/Cards:** Key, Utility (Lynx), Bees Away (BBC), Flight Test Card (Apple).

**Microspedia:** Everything you wanted to know about programming, part 4.

## Issue 39, October 20-October 26

**Pro-Tests:** CWP's Cortex, Sinclair ZX Interface 2, Watford DRS (BBC), Watford (BBC), Atariwreath.

**Features:** Oric Operating System, Gameplay: Dragon roundup, Hunter (64), Cricket/Luna Crabs (Spectrum), 1 Deep Space (BBC).

**Program/Cards:** Key, Utility (Lynx), Bees Away (BBC), Flight Test Card (Apple).

**Microspedia:** Everything you wanted to know about programming, part 4.

## Issue 40, September 29-October 5

**Pro-Tests:** CWP's Cortex, Sinclair ZX Interface 2, Watford DRS (BBC), Watford (BBC), Atariwreath.

**Features:** Oric Operating System, Gameplay: Dragon roundup, Hunter (64), Cricket/Luna Crabs (Spectrum), 1 Deep Space (BBC).

**Program/Cards:** Key, Utility (Lynx), Bees Away (BBC), Flight Test Card (Apple).

**Microspedia:** Everything you wanted to know about programming, part 4.

## Issue 41, November 3-November 9

**Pro-Tests:** Kaypro 10, Stock Control (Spectrum), Educational games (BBC), Brother EP22 electronic typewriter, ADS Centronics Interface (Spectrum, Jupiter Ace).

**Features:** Tandy Graphics, BBC Operating System.

**Gameplay:** Valthia (Spectrum), 64 roundup, Slinky (Atari), Hespert (64).

**Programs:** Mini Mail (Spectrum), Mini-Square (Oric).

**Databases:** Peripherals.

**Microspedia:** Everything you wanted to know about programming, part 6.

## Issue 42, November 10-November 16

**Pro-Tests:** Tiger from H/I, ZX81-Forth, Exmon (Oric), Cycle Planner, Growth Tracker/Diet Master (Spectrum), U-Com 2 (Apple).

**Features:** Newbrain sound, BBC FX commands.

**Gameplay:** Creepers (Vic 20), Exterminator (64), Spectrum round-up, Death Mines of Sinus (Dragon).

**Programs:** Falklands Raid (BBC), Decoder 2 (Spectrum), Pyramid (Spectrum).

**Databases:** Software.

**Microspedia:** Everything you wanted to know about programming, part 7.

## Issue 43, November 17-November 23

**Pro-Tests:** Apple II, Paint (Atari), BBC Micro Toolkit, Spectrovid, Big Ears.

**Features:** Flight simulators, Spectrum.

**Gameplay:** Empire/Treasure Tomb, Crystal Chalice, Temple of Zoro (Dragon 32), Cobus Maze/Bewitched (Vic 20), Cosmic Convo/Planetfall (64), Bagaboo/Gorilla (Spectrum).

**Programs:** City Defense (Oric), Falklands Raid (BBC), Pyramid (Spectrum), Monitor (Oric).

**Databases:** Clubnet.

**Microspedia:** Everything you wanted to know about programming, part 8.

## Issue 44, November 24-November 30

**Pro-Tests:** Apple II, Paint (Atari), BBC Micro Toolkit, Spectrovid, Big Ears.

**Features:** Flight simulators, Spectrum.

**Gameplay:** Empire/Treasure Tomb, Crystal Chalice, Temple of Zoro (Dragon 32), Cobus Maze/Bewitched (Vic 20), Cosmic Convo/Planetfall (64), Bagaboo/Gorilla (Spectrum).

**Programs:** City Defense (Oric), Falklands Raid (BBC), Pyramid (Spectrum), Monitor (Oric).

**Databases:** Clubnet.

**Microspedia:** Everything you wanted to know about programming, part 8.

## Issue 45, November 30-December 6

**Pro-Tests:** Apple II, Paint (Atari), BBC Micro Toolkit, Spectrovid, Big Ears.

**Features:** Flight simulators, Spectrum.

**Gameplay:** Empire/Treasure Tomb, Crystal Chalice, Temple of Zoro (Dragon 32), Cobus Maze/Bewitched (Vic 20), Cosmic Convo/Planetfall (64), Bagaboo/Gorilla (Spectrum).

**Programs:** City Defense (Oric), Falklands Raid (BBC), Pyramid (Spectrum), Monitor (Oric).

**Databases:** Clubnet.

**Microspedia:** Everything you wanted to know about programming, part 8.

## Issue 46, December 7-December 13

**Pro-Tests:** Apple II, Paint (Atari), BBC Micro Toolkit, Spectrovid, Big Ears.

**Features:** Flight simulators, Spectrum.

**Gameplay:** Empire/Treasure Tomb, Crystal Chalice, Temple of Zoro (Dragon 32), Cobus Maze/Bewitched (Vic 20), Cosmic Convo/Planetfall (64), Bagaboo/Gorilla (Spectrum).

**Programs:** City Defense (Oric), Falklands Raid (BBC), Pyramid (Spectrum), Monitor (Oric).

**Databases:** Clubnet.

**Microspedia:** Everything you wanted to know about programming, part 8.



**Issue 38, November 24-November 30**  
**Pro-Tests:** Coleco's Adam, Small Business Accounts (Spectrum), Materieffe (BBC), Monitor roundup.

**Features:** Apple programming, NewBrain editor part 1, Dragon action part 1.  
**Gameplay:** Once roundup, Haunted Hedges/Corridors of Genon (Spectrum), Microbe: One Hundred & Eighty (BBC), Atari roundup.  
**Programs:** Lower CLS (Spectrum), Shipment (Spectrum), Monitor (64), Basic Search (BBC).  
**Databases:** Hardware.  
**Microcopia:** Guide to Monitors.

**Issue 39, December 1-December 7**  
**Pro-Tests:** Dragon 64, Tandy CGP-220, White Knight II (BBC), Cross Reference Utility (IBM).  
**Features:** NewBrain editor part 2, Dragon Action part 2.  
**Gameplay:** Once roundup, Haunted Hedges/Corridors of Genon (Spectrum), Microbe: One Hundred & Eighty (BBC), Atari roundup.  
**Programs:** Lower CLS (Spectrum), Shipment (Spectrum), Monitor (64), Basic Search (BBC).  
**Databases:** Buyer's Guide to Micros.

**Issue 40, December 8-14, 1984**  
**Pro-Tests:** Times 2058, Thermal Printer TP-10, Cambridge Computing joystick (Spectrum), Beeb/Beeb: The Synthesizer Processor (BBC), Vizavize/Vizaspell (64), Education games (Spectrum).  
**Features:** NewBrain editor part 3, Dragon Action part 3.  
**Gameplay:** Pinball Wizard (Vc20), The Quest of Mermaid (64), Way Navy/Savage Pond (Atari).  
**Programs:** Link Four (Spectrum), Tilt (Dragon).  
**Microcopia:** Buyer's Guide to Peripherals.

**Issue 41, December 15-December 21**  
**Pro-Tests:** Apple II, Byte Drive 500, INMAC: Power Cleaner, Commodore 1701 Colour Monitor, ICB:Base (64), Database: MST-Cale (Dragon).  
**Features:** Computerized Psychotherapy (BBC), Spectrum Display.  
**Gameplay:** Microcopy/Pettigrew's Diary (Dragon), 64 roundup, Dimension Destructors/Sheer Panic (Spectrum).  
**Programs:** Colony Inver (Spectrum), Grid Bike (Vc20).  
**Microcopia:** Buyer's Guide to Software.

**Issue 42, December 22-January 4**  
**Pro-Tests:** Spectrum add-ons (U-Microcomputers system), Ori-1, Fletstar, Games Designer (Spectrum).  
**Features:** Micros of 1983, Computer Security, BBC word processing, Dragon Action part 4.  
**Gameplay:** International Football (64), Grouch/Chiquered Flag (Spectrum), Way Out/Jet Boot Jack (Atari).  
**Programs:** Super-vaders/Outback (Vc20), Danger Ranger/Up Personce (Dragon 32).  
**Databases:** Clubs.  
**Microcopia:** Games Special.

**Issue 43, January 7**  
**Pro-Tests:** IBM Junior, Grafpad (BBC), Walters WM80 printer Devpac (Spectrum).  
**Features:** Computer speak, Spectrum Display, Tab in Ori.  
**Gameplay:** Trace Race/Pinball (Dragon 32), Colour Genre/Gene Hunter Killer/er Wimpy (Spectrum), Crazy Caveman/Goodness Gracious (64).  
**Programs:** Jungle Chase (Ori), Screen Dump (BBC).  
**Databases:** Hardware.  
**Microcopia:** Electron part 1.

**Issue 44, January 14**  
**Pro-Tests:** Hitachi MBE-10002, Acorn Telecast (BBC), Integrex Colourjet printer, DTI-Base (64), Diam/Microprint 42/51/Multitouch (Spectrum).

**Features:** Adventure games, Colours of Genon.  
**Gameplay:** Devil Assault/Vauxs & Dragon Racer (Dragon 32), Survive/Forbidden Forest (64), Survival/Countdown (Vc20).  
**Programs:** Minifield.  
**Databases:** Peripherals.  
**Microcopia:** Electron part 2.

**Issue 45, January 21**  
**Pro-Tests:** Portables - Commodore SX50, Olivetti M10, Acorn sportjet printer: Turbo 20 day/wheel; Spectrum educational software; BBC graphics extension ROM.  
**Features:** Bargain buys: Making money with your micro.  
**Gameplay:** Viking and Pub Crawl (Dragon), Traxx and Wild West Hero (Spectrum), Atari/Commodore 64 roundup.  
**Programs:** Battletaster Fighter (Commodore 64).  
**Databases:** Software.  
**Microcopia:** Electron part 3.

**Issue 46, January 28**  
**Pro-Tests:** Apple IIc Macintosh; BBC sideways ROM board; IEEE interface for Commodore 64; Silver Reed EX44 typewriter/printer; Bridge on Spectrum and Dragon; BBC, film program.  
**Features:** Boring by mail order; programming the Memotech.  
**Gameplay:** Barney Brothers and Guardians (Spectrum), Birdie Barage and Plankwalk (BBC), Blue Moon and Dancing Feats (Commodore 64).  
**Programs:** Caves of Treasure (ZX51).  
**Microcopia:** Modems and communication.

**Issue 47, February 4**  
**Pro-Tests:** Sinclair QL: Atari Touch Tablet; Silver Reed EXP500 day/wheel; IBM Cobot; BBC/Spit Check.  
**Features:** Programming the Memotech part 2; Low cost printers.  
**Gameplay:** Mothership and Quinic Games (Spectrum), Birdie Barage and Plankwalk (BBC), Blue Moon and Dancing Feats (Commodore 64).  
**Programs:** Adventure, Spectrum roundup.  
**Programs:** Pot Hole (Dragon).  
**Databases:** Hardware.  
**Microcopia:** A to Z of Atari part 1.

**Issue 48, February 11**  
**Pro-Tests:** Spectravideo 328; Atari 800 XL; Dragon 3in disk drives; low cost monitors; Atari C (Apple); BBC educational software.  
**Features:** Sideways printing on Epson HX10.  
**Gameplay:** Bedlam and Morris Meets the Berks (Spectrum); Commodore 64 roundup; Zor-

gon's Kingdom and Flight Zero-One Five (Vc20).  
**Programs:** Gridtrap (Lynx).  
**Databases:** Peripherals.  
**Microcopia:** A to Z of Atari part 2.

**Issue 49, February 18**  
**Pro-Tests:** Ori Atmos; tracker ball controllers; Spectrum speech synthesizers; Rainbow Writer (Dragon); Colour Game assembler; Spectrum educational programs.  
**Features:** Computer jargon; 42-column display on Spectrum.  
**Gameplay:** Quadrant and Jepsac (Vc20); Crazy Ballon and Supacatchatropa (Commodore 64).  
**Programs:** Sprite generator (Commodore 64).  
**Databases:** Software.  
**Microcopia:** A to Z of Atari part 3.

**Issue 50, February 25**  
**Pro-Tests:** Sanyo MBC550; Commodore speech synthesizer; BBC real-time control interface; BBC machine code trace; Atari home utilities.  
**Features:** Expanding your Spectrum; introduction to Lisp.  
**Gameplay:** Urban Uptani and Godzilla and the Martians (Spectrum), Shuttlezap and Hooked (Dragon).  
**Programs:** Musicase (Ori).  
**Chubnet:** Microcopia: Printers part 1.

**Issue 51, March 3**  
**Pro-Tests:** Sharp's PC5000; Graphics Package (Ori), Fancy Font (CPM, Torch), Superbase Application Database (64), Printer roundup, IEEE 488 interface (BBC).  
**Features:** Microdrive data files.  
**Gameplay:** Spectrum selection, Robotops (T1994A), Batty Builders/Birdies (Atari).  
**Programs:** Millipede (BBC/Electron).  
**Databases:** Hardware.  
**Microcopia:** Printers, part 2.

**Issue 52, March 10**  
**Pro-Tests:** Wren, MSX, Multisynth 64, Mr. Ts Number Games etc (BBC), Spectrum, 64, Hybrid cable (Ori, Atmos).  
**Features:** Adventure games.  
**Gameplay:** Dragon roundup, Snort-Free Fall (BBC), Spectrum roundup.  
**Programs:** UFO (Vc20), Morse Code (BBC), Gary the Guita (64).  
**Databases:** Peripherals.  
**Microcopia:** Printer, part 3.

**Issue 53, March 17**

**Pro-Tests:** Yamaha YIS03, Tandy TRS-80 model (R3232), MDMP5 (BBC), Toolkit (BBC), The Quail (Spectrum).  
**Features:** Screen technology, Atari graphics.

**Gameplay:** Megahawk/Megawarg (64), Castle of Doom/Faby Baby (Spectrum).  
**Programs:** Battle Stations (Spectrum).  
**Databases:** Software.  
**Microcopia:** Reaching for the Cosmos, part 1.

**Issue 54, March 24**  
**Pro-Tests:** IBM's Portable PC, Spectrum keyboards, Beebfont, Games Designer (Vc20).  
**Features:** Atari graphics, Chip shortage.  
**Gameplay:** Airstrike 2/Pole Position (Atari), Deathscape/Fighter Pilot (Spectrum), BBC roundup.  
**Programs:** Ohello (64), Chappart (CGL M-5).  
**Chubnet:** User groups and clubs.  
**Microcopia:** Atmos, part 2.

**Issue 55, March 31**  
**Pro-Tests:** H-P 130, Light pens (BBC), 64, Micro-Prolog (Spectrum), Electron Graphics System (BBC).  
**Features:** Spectrum routines, Consumers rights.  
**Gameplay:** Patience/Metagalactic Llamas Battle at the Edge of Time (Vc20), Lok/Rat Split (Ori), Tennis (Atari).  
**Programs:** Fast Draw (Dragon 32), Flash simulator (Atari).  
**Databases:** Hardware.  
**Microcopia:** Communications, part 1.

**Issue 56, April 7**  
**Pro-Tests:** Zenon Type 'n' Talk, Micro Command (BBC, Spectrum), Commodore 1001 disk drive, Apple's Macintosh, Animator (Dragon 32), Knoware (IBM).  
**Features:** Spectrum maths, Adventure in history.  
**Gameplay:** Hunchback Arze Challenge (64), Defence Force/Psychic II (Ori), Volcanic Planet (Spectrum).  
**Programs:** Ape King (Vc20), Lynx VAI.

**Issue 57, April 14**  
**Pro-Tests:** Microkey, Mores Disk Drive Interface (Spectrum), Atari 1020 colour printer/ploter, FTI Moneywise (IBM PC, Sirius).  
**Features:** Assembly course, Portables.  
**Gameplay:** Learning games (Spectrum, Ori), Air Traffic Control/

Super Spy (Dragon), Neptune's

**Issue 58, April 21**  
**Pro-Tests:** Wrap Bit Rabbit, Pitit Apple graphics, Edward BBC word processor, Dynamic Graphics/Photos (Spectrum).  
**Features:** Commodore 64 extended Basics, Microdrives made easy.  
**Programs:** C-File database for Spectrum 48K.  
**Microcopia:** Spectrum, 64, BBC games reviewed.

**Issue 59, April 28**  
**Pro-Tests:** Grid Compass, Hunky Hunter, Canon X-07, Apple Homeword, Commodore 64/CPM, Dragon Sprig Magic, Atari printers, Minor Miracles modem.  
**Features:** Assembler language.  
**Programs:** Hubnet for Ori.  
**Microcopia:** Spectrum, BBC, Dragon, Atari games reviewed.

**Issue 60, May 5**  
**Pro-Tests:** TRS80 40 portable, BBC Disk Doctor, Spectrum Tazeword II, Quik keyboard, Bob robot.  
**Features:** Ori FILL command.  
**Gameplay:** Pytron and Red Baron (Spectrum), Avenger and Dragon Hawk (Dragon), Colour Genre roundup.  
**Programs:** Poison Toss on Commodore 64.  
**Microcopia:** Graphics on Commodore 64, Ori and Atari.

**Issue 61, May 19**  
**Pro-Tests:** Epson FX-8, Apple Pro-DOS, Commodore 64 Colours 2 chess, Dragon Sprint compiler, Solidisk RAM expansion for BBC.  
**Features:** Artificial intelligence, assembler P.1.  
**Gameplay:** Atari roundup, Commodore 64 roundup, Quest and The Quest of Mermaid (Spectrum).  
**Programs:** BBC/Electron 3D graphics, Ori renamer, Commodore 64 split screen graphics.

**Issue 62, May 26**  
**Pro-Tests:** Targem, Dragon OS9, Spectrum educational packages, Expressbase II, BBC bugies, Commodore 64 Koola graphics pad.  
**Features:** Spectrum sound, Japanese peripherals.  
**Gameplay:** Rapides and 1984 (Spectrum), House of Death and Operation Grenilla (Ori).  
**Programs:** Dragon hi-res graphics, Commodore 64 graphics, Spectrum array sort.

**Issue 63, June 2**  
**Pro-Tests:** Apple IIc, Sord IS11, Canon dot matrix printer, Ori disk drives, Acorn 4502 processor and Bitclock graphics system, Dragon sound packages, Commodore 64 speech synthesizer.  
**Features:** Ori Budget, assembler P.4.  
**Gameplay:** Galactic Warriors, Magic Meepies (Spectrum), Flying Feathers and Plumb Charity (Commodore 64).  
**Programs:** Ori assembler/disassembler.

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The thrill of the chase gripped Bob Chappell in these action games for the 48K Spectrum.

# Spectrum spills

## INFERNAL COMBUSTION



Fighting raging fires hasn't figured in many games I can recall so this may be the first.

The scene is the inside of a multi-storey building, each floor joined by ladders. Scuttling around the uppermost floors are the occupants who appear to be in a bit of a flap. No wonder — fire has broken out on several of the floors.

Down on the ground floor, standing quite fortunately midway between a tap and a bucket, is our little hero. Grabbing the bucket and pausing only to fill it from the tap (this boy is no fool), he has to sprint around the building hurling water at the outbreaks. The idea is to extinguish all the fires and proceed to the next toughest screen where the arsonist has struck again.

While you are busy firefighting, the occupants try to make good their escape by fleeing, in their own haphazard, panic-stricken way, down to the ground floor exit. However, they can't get past any blazing area nor through any locked doors — you must help by opening doors and all this while nipping back and forth to refill your bucket.

The sample tape lacked a cassette inlay (still at the printers), so I don't know why strewn around the floors were several cans marked with an F, and other odd objects. Possibly for bonus points? From time to time, what appears to be a pink elephant cavorts across the top floor, but for what purpose I am unsure.

Should you come into contact with the flames, you are immediately turned into an angel, a fitting reward for your heroic efforts.

Despite having no instructions for play, I thoroughly enjoyed this game. Movement of the hero was just a trifle stiff in one or two places, but that apart, the animation and effects were of a pretty high standard. Quite addictive, too. This ori-

ginal and entertaining arcade chase is well worth seeking out.

## BORZAK



A funny-looking purple alien with a proboscis that Cyrano De Bergerac would have gasped at, Borzak is a stranger on a strange planet. The creature has to stroll along the surface, dodging various vagaries of nature as he goes.

There are six levels of play, all much the same except for the hazards. Borzak has no defence systems and can only jump or duck to avoid oncoming traffic as he moves.

At ground level, he must avoid holes, large speckled frogs, snakes and grasping hands. Above are flying ducks, dragonflies and dangling spiders. The game is quite good fun but difficult to complete without skipping levels since the hazards are generated random-

ly, often resulting in a combination that Superman couldn't beat, let alone a pacifist with a big nose. It's worth buying — Borzak's a lovely character.

## STOP THE EXPRESS



Chasing games have a habit of taking place either in a maze or somewhere dank and dismal underground. Bringing fresh air to this species is Stop the Express.

An express train has been hijacked by the Redmen (no, this isn't cowboys and indians). Your job is to make your way along the carriages, unlock the motorman's cabin and stop the train.

You control a cute, ginger-headed lad who starts out on the roof of one of the coaches of the moving express. Hang about too long and the first of many Redmen (similar to our hero but beetroot coloured) appears on the scene and hurls a knife.

Fortunately, not only can you duck down but also run, jump and (your trump card this) release a snakebird. With a bit of luck, the latter will knock any pursuing Redmen off the train to earn you a respite. You run along ten coaches, leaping gaps, dodging birds and tunnels, until you can safely climb down inside a carriage.

Stage two has the Redmen as before, aided and abetted by strap-hanging nasties and bouncing objects. You can also do a bit of swinging on the straps. I never survived this stage and so didn't reach the driver's cabin. The only drawback is that there are nine keys controlling your hero (each with an alternative) — playing with a joystick (ZX II interface only) makes it easier.

Graphically, the program is superb. The train's headlong rush and the animation of the characters are delightful. Sound effects are minimal but with such an original environment and exciting action, this has to be among the top chase games.

## ORION



That's enough wind through your hair; now down to more familiar territory with Orion.

Back in maze country, you control a small rocket-car which has to roam around 25 caverns in search of stolen androids. Each cavern is an aerially-viewed maze, populated by creatures and four of your androids.

Green meenies must be avoided as they are lethal on contact unless your shields are activated. White meenies are quite nutritious but gobbling one up causes your scanner to malfunction, making the wall of the maze invisible.

A simple game with decent graphics and sound, it won't set the world ablaze but offers a good chase, nonetheless. PCN



**Stop the Express** £5.95, Sinclair Research, Camberley (0276) 685311

**Orion** £5.95, Software Projects, Liverpool 051-428 7990

**Infernal Combustion** £5.95, Strange Loop, 124 Sylvan Avenue, London N22 5JB

**Borzak** £6.95, Channel 8 Software, Preston (0772) 53057



# DRAGON 32

## Lust for lucre

**Name** If I Had a Million **System** Dragon 32 **Price** £9.95 **Publisher** Phoenix Software, Spangles House, 116 Marsh Road, Pinner, Middx O1 868 3353 **Format** Cassettes **Language** Basic machine code **Outlets** Retail/mail order.

They say it's hardest to make that first million and from then on, the going gets easier. Phoenix's latest offering is a mixture of that old faithful, Monopoly, and business strategy games.

### Objectives

Your first task is to bankrupt the other players, and make £20,000. If you succeed, you'll be given a running code for the adventures stage plus a loan of £1 million.

You've then got six months to convert the loan into £5 million to win.

### In play

The version of Monopoly is reasonable, but as nearly all of the memory appears to be used by the program, the graphics are very limited. You get a basic colour display of where you landed and little else. There's no overview of who has what; it may be best to dig out the board to keep track.

The Dragon only keeps track of the score, and there is no option for it to join in the play. As the game progresses, a leader should emerge — although it took me

approaching five hours to reach the magic £20,000. He or she will be given clues to the second stage.

Once you've struggled through stage one, the next part (the adventure) is far more enjoyable, but for one player only.

Your £1 million has to be invested, you get no interest just leaving it in the bank. A variety of opportunities are offered, ranging from backing films, shows and housing projects to investing in new toys, Easter Eggs and software. You also have a chance to play the stock market, and the only limit is one transaction per day and two investments a week.

Rather annoyingly, you have to save the game halfway through, and then load up the second part (which is actually the other three months of your time limit).

There were one or two other little niggles with the program; for example, you couldn't quit at an auction, you had to continue bidding until you won. Also I got fined not once but twice for trying to import drugs when I hadn't.

### Verdict

If you can put up with part one, you should enjoy the adventure.

If you're a would-be Arthur Daley looking for that nice little earner, have a go.

Jim Ballard

#### RATING (5)

Lasting appeal



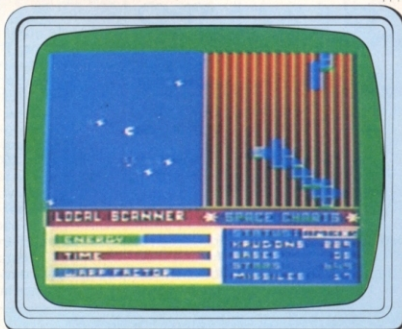
Playability



Use of machine



Overall value



## Difficult docking

**Name** Space Fighter **System** Dragon 32, 1 joystick **Price** £8 **Publisher** Microdeal, 41 Truro Road, St Austell, Cornwall O726 67676 **Format** Cassette **Language** Machine code **Other versions** None **Outlets** Mail order/retail.

With several versions of Star Trek type of game already available for the Dragon, it's hard to see how anyone could generate interest in a new one, but this is certainly an appealing version of the old favourite.

### Objectives

You needn't worry if you've already rid the universe of the Klingon enemy, as this time it has been over-run with Krugons and you, as commander of the Starship Endeavour, have to wipe them out.

### In play

Although this type of game is a little complicated to get to grips with, the effort pays off and in this case the procedure has been simplified in one respect. Instead of having to input grid co-ordinates to move about the universe, your ship is controlled by the joystick and simply goes in whichever direction you want.

On the right of the screen is a grid map of the universe, though the only thing it shows is your own position, not where the Krugons are nor where your own essential star bases are. On the left of the screen is a local scanner showing your immediate vicinity, and here you can see the stars, Krugons and star bases.

How many of each there are in the universe seems to be decided at random though within set limits, there being anything from about two to six star bases and from two to three hundred Krugons.

One thing that remains constant is your initial supply of missiles, which is 20, so with all those Krugons to kill it's important to discover quickly just where and how you can dock in order to replenish your supply.

The docking procedure requires a great deal of dexterity with the joystick as you move a large cross towards the Star Port, adjusting both in vertical and horizontal speeds as you go.

The graphics, sound and responses on *Space Fighter* are all you could wish for, although it could have been improved considerably and made much tougher if the Krugons were able to fire at you, which does happen in some versions of the game.

As it is, they're rather sitting ducks, or sitting Krugons, for your photons, which you can guide about the screen with your joystick.

The hard part, though, is the constant accurate docking that is required.

### Verdict

Till now I've preferred the Salamander version, *Dragon Trek*, as being the best available for the Dragon, but *Space Fighter* gives it a good run for its money.

Mike Gerrard

#### RATING (5)

Lasting appeal



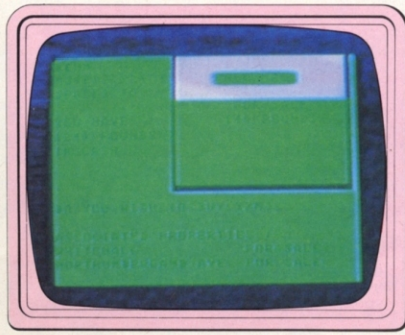
Playability



Use of machine



Overall value



## DRUMULATOR

Title: *Drumulator*  
Machine: *Oric 1*  
Language: *Oric Basic*  
Application: *Music*  
Author: *Piers Sherwood*

This program for the Oric 1, will turn your computer into a programmable drum machine.

The drum machine has eight drum sounds: bass and seven pitched snares. The normal parameters for the bass drum decay and snare drum decay (set at 150 and 350 respectively) can be

changed to produce very different sounds.

You are given the choice of 12 or 16 step patterns. These can be typed in using keys 0 to 8 where 0 is a rest, 1 is the bass and 2 to 8 are the different pitches of the snare drums. A maximum of ten patterns can be entered and you can chain these together to produce the desired sequence. The sequence can contain up to 200 steps and each step pattern may be repeated.

When you have entered the sequence you input the tempo and your creation will be played back to you. At this stage you can still change the speed with the up and down cursors which will speed it up or slow it down. It is possible to edit your sequence at any stage.

Clear instructions are included in the program and with a little practice you could produce some very professional results.

## Program notes

10	Sets up sequence array
20	Sets the drum decay time
30	Switches off cursor and keyclick
100-260	Routine for entering drum patterns
120	Gets reply and checks for invalid entry
180	Loop to enter pattern
190	Gets the keys pressed
200	Prints the entries
210	Fills array with data

```

10 DIMS0(199,1)
20 BD=150:SD=350
30 POKE618,10
40 GOTO1500
100 CLS:PRINT:PRINTCHR$(4)SPC(10)CHR$(27)
"JPROGRAMMER"CHR$(4):PRINT
110 PRINT:PRINT"Which pattern (0 - 9) do
you want to program?"
120 GETA$:P=ASC(A$)-48:IFP<0ORP>9THEN120
130 PRINT:PRINT"OK - pattern "P
140 PRINT:PRINT"Enter the pattern by pre
ssing <0> for res
t"
150 PRINT"<1> for bass
<2-8> for pitched s
nares"
160 PRINT" (2 highest , 8 lowest)"
170 PRINT:PRINT" ' ' ' 4 ' ' ' 8 ' ' ' 2
' ' ' 6"
180 FORA=0TOPL-1
190 GETA$:D=ASC(A$)-48:IFD<0ORD>8THEN190
200 PLOT2*(A+1),16,A$
210 BS(A,P)=D
220 NEXTA
230 PRINT:PRINT:PRINT"OK - do you
want to enter another p
attern (Y/N)?"
240 GETA$:IFA$="Y"THEN100
250 IFA$="N"THEN1000
260 GOTO240
300 CLS:PRINT:PRINTCHR$(4)SPC(10)CHR$(27)
"JSEQUENCING"CHR$(4)
310 PRINT:PRINT" You can now chain your
drum patterns together to c
reate a song."
320 PRINT"You can program up to 200 step
s."
330 PRINT" For each step you must enter
the pattern number and
the number"
340 PRINT"of repeats (followed by 'RETUR
N')"
350 PRINT:PRINT" To end the sequence pr
ess 'S' for"
360 PRINT"the pattern number."
370 PRINT:PRINT:C=0:REPEAT
380 PRINT:PRINT"Step ":"C+1:" Pattern ":
390 GETA$:IFA$="S"THENSQ(C,0)=99:GOTO450
400 P=ASC(A$)-48:IFP<0ORP>9THEN390
405 PRINTP,
410 INPUT"Repeats "R
334 SQ(C,0)=P:SQ(C,1)=R
420 SQ(C,0)=P:SQ(C,1)=R
430 PRINT:C=C+1
440 UNTILC=200
450 PRINT:PRINT:PRINT"OK - PRESS SPACE T
O RETURN TO MENU"

```

```

460 GETA$:IFA$(">") THEN460
470 GOTO1000
500 CLS:PRINT:PRINTCHR$(4)SPC(10)CHR$(27)
"JTHE SONG"CHR$(4)
510 PRINT:PRINT:INPUT"Tempo (In 1/100 se
cs per beat)":"T
520 PRINT:PRINT"To alter the tempo while
the sequence"
530 PRINT"is playing use these keys :-"
540 PRINT"Up arrow - faster"
550 PRINT"Down arrow - slower"
560 PRINT:PRINT"Pressing 'S' will stop t
he sequence"
570 PRINT:PRINT"Press any key to start..
."
580 S=0:C=0:REPEAT
590 IFSD(C,0)=99THEN680
600 FORA=1TOSQ(C,1):B=0:REPEAT
610 DOKE630,2000+T
615 D=BS(B,SQ(C,0)):IFD=0THEN640
620 IFD>1THENSOUND4,(D-2)*S,0:PLAY0,1,1,
SD
630 IFD=1THENPLAY0,4,1,BD
640 REPEAT:K$=KEY$:IFK$(">") THENGOSUB700
650 UNTILDEEK(630)<2000
660 B=B+1:UNTILB=PL:NEXTA
665 IFS=1THEN680
670 C=C+1:UNTILC=200
680 PRINT:PRINT:PRINT"THAT'S IT - PRESS
SPACE FOR MENU"
690 REPEAT:GETA$:UNTILA$=" " :GOTO1000
700 IFK$="S"THENS1:PRINT:PRINT"OK , STO
PPING AT END OF STEP..." :RE
TURN
710 IFK$=CHR$(11) THENT=T-1:IFT<0THENT=0:
RETURN
720 IFK$=CHR$(10) THENT=T+1:RETURN
730 RETURN
800 CLS:PRINT:PRINTCHR$(4)SPC(10)CHR$(27)
"JPLAYING"CHR$(4)
810 PRINT:PRINT:PRINT:INPUT"Tempo (In 1/
100 secs per beat)":"T
820 PRINT:PRINT"To alter the tempo while
a pattern is"
830 PRINT"playing use the up/down arrows."
840 PRINT:PRINT"Pressing 'S' will stop t
he pattern"
850 PRINT:PRINT"Which pattern ?"
860 GETA$:P=ASC(A$)-48:IFP<0ORP>9THEN860
865 PRINTP
870 S=0:A=0:REPEAT
880 DOKE 630,2000+T
885 D=BS(A,P):IFD=0THEN920
890 IFD=1THENPLAY0,4,1,BD
900 IFD>1THENSOUND4,(D-2)*S,0:PLAY0,1,1,
SD
920 REPEAT:K$=KEY$:IFK$(">") THENGOSUB950

```



300-470	Routine for constructing a sequence	650	Checks clock	1090	Gets entry and checks validity
370	Loop to enter sequence data	665	Stops if 'S' is pressed	1110	On entry goes to appropriate routine
390	Gets the pattern number	670	Completes loop	1200-1360	Change the drum sounds
410	Gets the number of repeats	700-730	Routine to change speed if up or down cursors are pressed	1260	Enters bass decay time
420	Fills array with sequence data	800-980	Routine to play individual pattern	1270	Enters snare decay time
500-730	Plays the complete sequence	810	Enters speed	1300-1310	Play demonstration of new drums
510	Gets initial speed of playback	850	Enters pattern number	1500-1640	Title page
580	Loop to play sequence	860	Checks for invalid entry	1630	Sets up array for drum patterns
610	Sets internal clock	870	Loop to play pattern	1700-1940	Edit sequence
615	Takes value from array to determine which drum	880	Sets internal clock	1815	Prints sequence data for each step
620-630	Play drums	890-900	Play drums	1860	Step to be changed
640	Checks for keypress	920	Checks for keypress	1910	New pattern number
		930	Checks clock	1920	New number of repeats
		950-980	Act on keypress to stop or alter speed	1930	Puts new data in array
		1000-1120	Print screen options		

```

930 UNTILDEEK (630) <2000:A=A+1:UNTIL=PL
940 IFS=1THEN1000ELSEGOTO870
950 IFK$="S"THEN5:1:RETURN
960 IFK$=CHR$(10)THEN=T+1:RETURN
970 IFK$=CHR$(11)THEN=T-1:IF<0THEN5:0:
RETURN
980 RETURN
1000 CLS:PRINT:PRINTCHR$(4)SPC(15)CHR$(2
7)"JOPTIONS"CHR$(4)
1010 PRINT:PRINT:PRINT
1020 PRINT"<1> - Enter pattern"
1030 PRINT:PRINT"<2> - Enter sequence"
1040 PRINT:PRINT"<3> - Play pattern"
1050 PRINT:PRINT"<4> - Play sequence"
1055 PRINT:PRINT"<5> - Edit sequence"
1060 PRINT:PRINT"<6> - Alter drum sound
ds"
1070 PRINT:PRINT"<7> - End program"
1080 PRINT:PRINT:PRINT"PRESS THE NUMBER
OF YOUR CHOICE"
1090 GETA$:Z=ASC(A$)-48:IFZ<10RZ>7THEN10
90
1100 IFZ=7THENPRINTCHR$(17):CLS:END
1110 ONZGOTO100,300,800,500,1700,1200
1120 GOTO1000
1200 CLS:PRINT:PRINTCHR$(4)SPC(5)CHR$(27
)"JDRUM SOUNDS"CHR$(4)
1210 PRINT:PRINT:PRINT:PRINT"The normal
parameters are :-"
1220 PRINT"Bass drum decay - 150"
1230 PRINT"Snare drum decay - 350"
1250 PRINT:PRINT"Now enter your new valu
es"
1260 INPUT"Bass decay (and 'RETURN')";BD
1270 INPUT"Snare decay (and 'RETURN')";S
D
1290 PRINT:PRINT"They now sound like thi
s 1"
1300 PRINT"Bass...":PLAY0,4,1,BD:WAIT50
1310 PRINT"Snare...":SOUND4,7,0:PLAY0,1,1
,SD
1320 PRINT:PRINT"PRESS 'C' TO CHANGE THE
SOUNDS"
1330 PRINT:PRINT"OR SPACE TO RETURN TO M
ENU"
1340 GETA$:IFA$="" THEN1000
1350 IFA$="C"THEN1200
1360 GOTO1340
1500 CLS:PRINT:PRINTCHR$(4)SPC(10)CHR$(2
7)"JDRUMULATOR"CHR$(4)
1510 PRINT:PRINT:PRINT:PRINTSPC(5)CHR$(9
6)"Piers W.Sherwood 1984"
1520 PRINT:PRINT:PRINT" This program tu
rns the Oric into a"
1530 PRINT:PRINT:PRINT"programmable drum machi
ne with eight"
1540 PRINT:PRINT"drum sounds,bass and 7
pitched snares."
```

```

1550 PRINT:PRINT" You may enter up to
10 different"
1560 PRINT:PRINT"drum patterns and then
chain them"
1570 PRINT:PRINT"together to play an ent
ire song."
1580 PRINT:PRINT:PRINT"Do you want 12- o
r 16-step patterns?"
1590 PRINT"(Press 'A' for 12 and 'B' for
16)"
1600 GETA$:IFA$="A"THENPL=12:GOTO1630
1610 IFA$="B"THENPL=16:GOTO1630
1620 GOTO1600
~630 DIMBS(PL-1,9)
1640 GOTO1000
1700 CLS:PRINT:PRINTCHR$(4)SPC(7)CHR$(27
)"JSEQUENCE EDIT"CHR$(4)
1710 PRINT:PRINT:PRINT" Use the space b
ar to step through"
1720 PRINT"the sequence.When you want to
stop and:"
1730 PRINT"change a step,press 'S'. You
will then:"
1740 PRINT"be asked to enter the step nu
mber and"
1750 PRINT"the pattern and number of rep
eats."
1760 PRINT:PRINT" When you have finish
ed editing"
1770 PRINT"press 'S' for the step number
and you"
1780 PRINT"will be returned to the menu.
"
1790 PRINT:PRINT"Press the space bar to
start..."
1800 C=0:REPEAT:GETA$.
1810 IFA$="S"THEN1860
1815 PRINT:PRINT"Step ";C+1;" Pattern "
;SQ(C,0),"Repeats ";SQ(C,1)
1820 C=C+1:IFSQ(C,0)=99THEN1830
1825 UNTILC=200
1830 PRINT"Do you want to change anythin
g (Y/N)?"
1840 GETA$:IFA$="N"THEN1000
1850 IFA$<>"Y"THEN1840
1860 PRINT:PRINT"Which step ? (Press 'S'
to end)"
1870 PRINT" (Don't forget to press RET
URN)"
1880 INPUTS$:IFS$="S"THEN1000
1890 S=VAL(S$)
1900 PRINT:PRINT:PRINT"Pattern (0-9) : ";
1910 GETA$:P=ASC(A$)-48:IFP<0ORP>9THEN19
10
1920 PRINT:PRINT:PRINT"Repeats (and RET
URN) "IR
1930 SQ(S-1,0)=P:SQ(S-1,1)=R
1940 PRINT:GOTO1860
```



# Feel like you're marooned?

The micro world has several islands that are good to live on for a while. The 8-bit CP/M island is well-established and comfortable, but plenty of people are now realising that the 16-bit islands called CP/M-86 and MS-DOS offer greater prospects. But moving from 8- to 16-bit can be hazardous — and which 16-bit destination do you choose?

For the software developer or serious programmer, Pro Pascal and Pro Fortran are passports for these three islands. Programs can be transported smoothly from one to the other, and in each environment the acknowledged efficiency of the compilers ensures that programs make optimum use of the facilities available.

## Pro Pascal

- First-ever Pascal for micros to be officially validated to BS 6192/ISO 7185
- Separate compilation facility allows large programs to be subdivided into manageable segments
- 64-bit and 32-bit real arithmetic
- 9-digit (32-bit) integers
- String handling extensions
- Random access file handling

## Pro Fortran

- Complete implementation of the widely used ANSI 1966 Standard
- Very fast REAL, DOUBLE PRECISION and COMPLEX arithmetic and functions
- INTEGER is 32-bits, but 8-bit and 16-bit integers are also provided
- File handling extensions from Fortran 77 include random access, error trapping and end-of-file detection

Each is a true compiler, generating binary machine-code programs which make full use of the capabilities of the machine. The compiled code is re-entrant, enabling ROM-based applications to be developed. Files can be interchanged between programs coded in the two languages. Mixed language programs can be written, and Assembler-coded modules can be linked in to object programs, using the linker and run-time library supplied as part of each package.

The 16-bit Pro Pascal and Pro Fortran compilers run on 8086/88-based micros with 86K physical RAM and CP/M-86 or MS-DOS, and each cost £320 + VAT. The 8-bit Pro Pascal and Pro Fortran compilers run on Z80-based micros with at least 56K physical RAM and CP/M, and each cost £220 + VAT.

**Prospero**  
LANGUAGES FOR MICROCOMPUTERS

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This program enables Basic programmers to handle System Resets in a straightforward way. It uses machine code and Atari's auto-entry mode to implement a sort of ON RESET GOTO ... command.

The program is used as follows: key in the data statements and initialisation code. When this is run, pressing System Reset will cause a normal Reset, but instead of returning to a 'Ready' prompt, the machine will execute GOTO RESET as is you had typed this as a direct command. You can therefore direct the machine to the Basic line of your choice by assigning Reset to be the line number.

Note that POKE 842,12:GRAPHICS 0 is essential to turn off auto-entry and prevent the machine getting stuck. The net effect is as if the TRAP command worked for RESET, except you cannot test for the line number on which the RESET occurred.

The program can be used in many applications, but it is particularly valuable because it stops inexperienced users from breaking out of programs by inadvertently pressing system reset.

Any program that uses I/O channels such as disk or cassette could also use this program to close all open channels on a system reset.

Title: Basic system reset  
Machine: Atari 800  
Language: 6502 machine Code  
Application: Utility  
Author: FM O'Dwyer

# Basic system reset

## BASIC PROGRAM NOTES

- 0 This line turns off auto-entry mode, and prevents the machine getting stuck if the variable Reset is cleared to 0 and the system reset button is pressed. For safety only.
- 10 Sets up the line number for Reset handling.
- 20 Reads and initialises machine code.
- 30-40 Explain the demonstration.
- 1000-1100 Data for machine language.
- 20000-20010 The Reset handler. The contents of line 20000 is essential to turn off auto-entry and prevent the machine getting stuck. The Graphics 0 command merely resets the screen colours, and you can change to any mode you want. Line 20010 lists the program, but any Basic routine may go here.

```

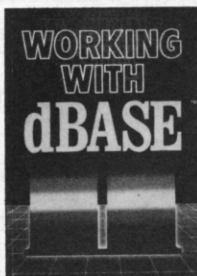
0 POKE 842,12: REM THIS IS FOR SAFETY
10 RESET=20000
20 RESTORE: FOR N=0 TO 63: READ A: POKE 1536+N,A: NEXT N:
X=USR(1536)
30 GRAPHICS 0: PRINT "IF YOU PRESS RESET NOW,"
40 PRINT "THE ROUTINE AT LINE 2000 WILL EXECUTE": END
1000 DATA 104,169,14,133,2,169
1010 DATA 6,133,3,169,2,133
1020 DATA 9,96,169,5,141,197
1030 DATA 2,162,0,138,72,109
1040 DATA 43,6,32,164,246,104
1050 DATA 170,232,109,43,6,208
1060 DATA 240,169,13,141,74,3
1070 DATA 96,29,29,29,29,71
1080 DATA 79,84,79,32,82,68
1090 DATA 83,69,84,155,20,28
1100 DATA 28,28,28,0
20000 POKE 842,12: GRAPHICS 0
20010 LIST

```

## ASSEMBLY LANGUAGE NOTES

- 1000-1050 Define the constants for use in the main routines.
- 1060-1170 Install Reset as the secondary reset handler.
- 1200-1340 The secondary reset handler. This outputs the string GOTO RESET and enters autoentry mode so that this will be executed by the Basic cartridge.
- 1360-1390 The data for the string. This is in 4 parts:
- 1360 This brings the cursor down 4 lines.
- 1370 The string GOTO RESET followed by a carriage return.
- 1380 This brings the cursor up 5 lines.
- 1390 Terminates the data with a null byte.
- 1000 \*=\$600 ;Set the origin of the code to 1536
- 1010 ;
- 1020 CASINI=2 ;Address of RESET vector
- 1030 EOUTCH=\$F6A4 ;Output character routine
- 1040 COLOR=709 ;Color register
- 1050 BOOT=9 ;RESET control register
- 1060 ;
- 1070 ;Initialisation routine
- 1080 ;
- 1090 INIT PLA ;Strip Basic parameter count
- 1100 LDA #RESET&256 ;Low byte of reset address
- 1110 STA CASINI
- 1120 LDA #RESET/256 ;High byte of reset address
- 1130 STA CASINI+1
- 1140 LDA #2 ;Enable reset routine
- 1150 STA BOOT
- 1160 RTS
- 1170 ;
- 1180 ;Reset routine.
- 1190 ;
- 1200 RESET LDAN5 ;Make foreground colour
- 1210 STA COLOR ;same as background
- 1220 LDX#0
- 1230 NEXT TXA
- 1240 PHA ;Output the string
- 1250 LDA STR,X ;"GOTO RESET" one character
- 1260 JSR EOUTCH ;at a time, including the
- 1270 PLA ;cursor positioning codes
- 1280 TAX
- 1290 INX
- 1300 LDA STR,X
- 1310 BNE NEXT
- 1320 LDA #13 ;enable auto-entry
- 1330 STA 842
- 1340 RTS
- 1350 ;
- 1360 STR .BYTE "4 cursor downs"
- 1370 .BYTE "GOTO RESET",155
- 1380 .BYTE "5 cursor ups"
- 1390 .BYTE 0

Two titles for the serious user interested in databases and operating systems.



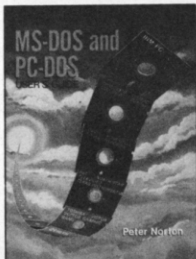
**'Working with dBase II' by M de Pace, published by Granada at £7.95, (paperback 172 pages).** Working with dBase II aims to make Ashton Tate's powerful database management packages more accessible both to outright beginners and existing users. The book is in three parts; there are no diagrams, but there are many examples of dBase 'programs' and files. The margins are sprinkled with key words in a screen outline, which makes it easy to browse.

Part one begins at the beginning, and describes what a database is, how to design file structures, enter and list data, make indices and so on. Part two covers advanced techniques such as inserting, deleting, replacing and editing records as well as joining data files and copying file structures. The final part is devoted to programs written in the command language, explaining how to format output on the screen and printer, create menus for selecting the various routines in your program, use dBase's macro and numeric facilities etc. This section justifiably occupies more than half the book and, like the rest, is well-written with many examples.

The four appendices list dBase program files, briefly deal with using word processing packages such as Wordstar to edit dBase command and format files, and a comprehensive index adds to the attractions.

Working with dBase II would be a boon to first time users.

BS



**'MS-DOS and PC-DOS' by Peter Norton, published by Prentice Hall at £8.95 (paperback, 266 pages).** Mr Norton has produced a readable and instructive introduction to Microsoft's operating system.

The 22 chapters are liberally sprinkled with amusing yet instructive cartoons and run from basic computer concepts to patching commercial programs to suit you.

The emphasis throughout is on usability, rather than theory. Examples are given for all the commands, together with detailed explanations. The book is riddled with useful tips which you're unlikely to find in a manual and even such matters as choosing a programming language are dealt with in informal but informed manner.

There are chapters on choosing software, using batch files, detailed explanations of pipes and filters, the most common errors and how to avoid them.

The index is comprehensive, as is the glossary. There's a complete summary of all the DOS commands but the best feature is that it reads well.

Every first-time user of MSDOS should read this book from start to end. Even those who've been using MSDOS for a while will find many things they may have overlooked and it's much friendlier than a manual and many other introductions to the operating system. Highly recommended.

BS

# A NEW Dragon FOR £39.95

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The 57 instructions available will allow you to: Examine memory (by HEX address or NAME) and insert, TEXT, DATA, or MACHINE-CODE. Search for TEXT or BYTE strings, evaluate a BRANCH OFFSET, moving UP/DOWN and displaying: BYTES, TEXT, or DISASSEMBLED LINES which include branch addresses and indirect values. RUN your code to BREAKPOINTS, or TRACE with the most advanced facilities ever offered. Full register and/or disassembled display option of each step. There are 13 trace "actions" (including USR) for an "ON CONDITION" match TRUE/FALSE, AND or OR, for all the CPU registers testing each BIT, set, clear, or don't care. Three independent "condition" sets. Your code will never hide a 'BUG' from S-22. An intelligent SHIFT, that will not overwrite the moved block, UP/DOWN for any size or any distance. A powerful "WRITE TO BASIC" to include code in DATA statements, with a REM for its name. Instant HARD-COPY output whenever required. The commands are recursive and, when ended, will return to any previous one. This speed and flexibility is enhanced by repeat on all keys, and any key can be set to an input "string". S-22 Commands can also be called (USR) within BASIC. The kit includes a 130-page book "INTRODUCING S-22", an appendix full of machine-code facts about DRAGON/S-22, the 6809 codes on an "ACTION CARD", and the ROM cartridge.

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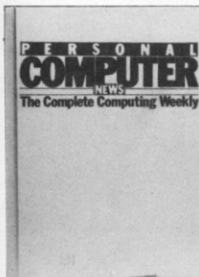
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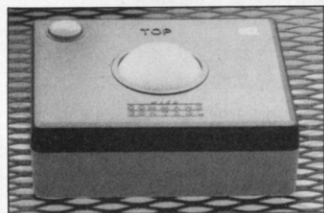
Send to Personal Computer News, Binders Department, 53/55 Frith Street, London W1A 2HG

# QUIT

## Over the top

There's always someone ready to cast doubt on some of life's harmless pleasures — arcade addiction, for example. Of course it doesn't turn us into mindless illiterate headbangers. It's therefore with great sadness that we note that the Wico trackball, marketed in this country by CGL, has the word 'TOP' prominently displayed on it.

The ball itself is 'Phenolic'. This, according to PCN's big red dictionary, means it is an acid made from a phenol and an aldehyde, and it sounds pretty dangerous. Perhaps, looking on the charitable side, CGL prints 'TOP' on its trackball so that this nasty compound doesn't spill out.



## SANTAX ERRORS

In our report last week on GST's Unix-alternative 68K/OS we misprinted the name of GST's managing director, Dr Jeff Fenton. Sorry, Jeff.

All the £ signs in the program listing of Reactor Force (Issue 66) should in fact be # signs.

## NEXT WEEK

**Casio Nostra** — We take a close look at the new £300 portable from calculator king Casio.

**BBC calling** — Listen with PCN as we explore sound on the BBC micro.

**Assembly line** — Don't duck low-level language! Get to grips with Assembler programming through this feature.

**Electron Add-on** — Will Acorn's Plus 1 extend the scope of your Electron? Find out in our Pro-Test.

**Apple PI** — We draw a bead on Apple with this review of a graphics animator.

**Dragon file** — Sort out your filing with our review of a new piece of Dragon software.

**Gameplay** — Spectrum and Atari take the leading roles in this week's games reviews.

**Programs** — More for Dragon owners in our free program listing section.

## Cheltenham jobs are on the up and up

Cheltenham is a town that has slipped out of the public gaze since the GCHQ business, but from the look of a *Computer Weekly* clipping sent in by David Abbot it ought to be investigated as the possible site of a Government job-creation scheme.

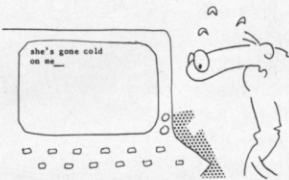
David wins £5 in the PCN

Misprints and Gibberish Contest which promises soon to oust Syntax Errors as our longest-running series.

All entries are gratefully received, and we will continue to shell out a fiver for any that we print.

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## PCN DATES

PCN Datelines keeps you in touch with up-coming events. Make sure you enter them in your diary.

Organisers who would like details of coming events included in

PCN Datelines should send the information at least one month before the event. Write to PCN Datelines, Personal Computer News, 62 Oxford Street, London W1A 2HG.

## UK EVENTS

Event	Dates	Venue	Organisers
Networks 84	July 3-5	Wembley Complex	Online Conferences 01-868 4466
PC User Show	July 3-5	Novotel Hotel, London W6	Daniel Evans 01-837 3699 ext 244
Microtrade '84	July 4-6	Barbican, London	Montbault Ltd 01-486 1951
Artificial Intelligence for Society Conference	July 6	Brighton Polytechnic	Dr Gill, 0273 693655
What Micro? Computer Show	July 14-15	Battersea Park, London SW11	Sue Holliday, VNU, 01-636 6890
Sinclair Computer Users' Exhibition	July 21	Essex Exhibition Centre, Chelmsford	Lance Feller 0245 252900
Electron & BBC Micro User Show	July 19-22	Alexandra Palace, London	Database Publications, 061-456 8383
Advanced Technology	August 9-13	St George's Hall, Liverpool	Advanced Technology, 051-236 0121
Acorn User Exhibition	August 16-19	Olympia, London	Computer Marketplace Exhibitions 01-930 1612
Electron & BBC Micro User Show	August 31-Sep 2	UMIST, Manchester	Database Publications, 061-456 8383
Computers in Action	October 30-Nov 1	Anderson Centre, Glasgow	Trade Exhibitions, 0764 4204

## OVERSEAS EVENTS

Event	Dates	Venue	Organisers
National Computer Conference and Exhibition	July 9-12	Las Vegas, USA	American Federation of Information Processing Societies Inc. 0101 703 620 8900

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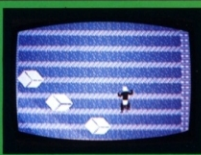
# DON'T JUST SIT THERE - PLAY SOMETHING!

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**SS018**



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manner of treacherous traps and hidden perils - 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!



**SS019**

## 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. Wow! 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, and action replays. Where else could you meet such charming characters as Dusty the dust cloud, Marge the magnet, Ralph the random raindrop, and Lorenzo the chameleon hopper?



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Your micro-PROLOG package includes a front-end program called SIMPLE (for newcomers to the language), plus a User Manual and 300-page Primer. For more advanced users, a micro-PROLOG Reference Manual is available separately at £9.95.

Without doubt, LOGO and micro-PROLOG set new standards for future computer languages. You'll find them in major stores and all good computer shops—today!

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