September 25–October 1 1987 Vol 6 No 38 60p

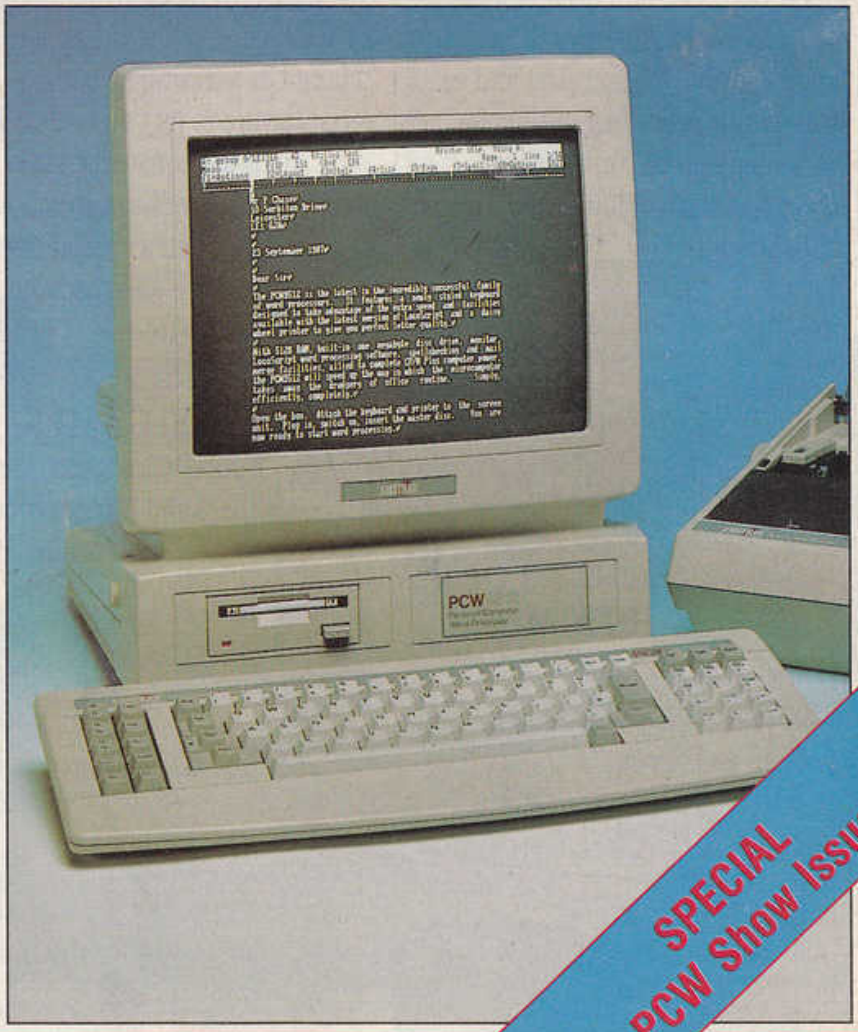
POPULAR Computing WEEKLY

Amstrad PCW 9512 review inside

NEWS DESK Spectrum price cuts

SOFTWARE ST Basics compared

PCW Show Floor plan and stand guide inside



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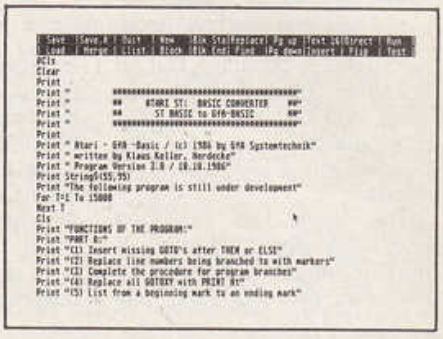

Top: Amstrad CPC. Second: Fast Basic. Above: Super Sprint. Below: Moonstrike.

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Amstrad pulls back on CPCs

CPC: dealers say demand is holding up.

AMSTRAD is chopping £50 off Spectrum Plus 3 from this week, and £10 off the Plus 2. Both machines will now be bundled with a joystick and 17 games.

The move has increased speculation about the future of the CPC range of 8-bit Amstrad machines, particularly as it has emerged that WH Smith is dropping it. Advertising for the CPC has been cancelled with a number of leading computer magazines, and WHS computer buyer Ian Laurie admitted last week that the chain is no longer handling it.

"It is not a line that we will continue selling," he said.

The future of the range has been in doubt for some time.

An Amstrad spokesman denied that the cuts have been made in response to trade pressure and described the announcement as a "commercial move". He said he had no information on the future of the CPCs.

The Plus 3 now sells for £199, while the new Plus 2 is £139.

Teleconference doubts

MICRONET is soon to introduce a tele-conferencing facility, for 'private' or 'closed group' discussions.

The facility will work with both viewdata and 80-column scrolling formats (another new addition to Prestel's features) and will be available on a pay-as-you-go basis.

But recent allegations by the likes of Independent Television's Roger Cook over illegal use of bulletin boards for child pornography contacts, have raised doubts about the ethics and the legality of a 'closed user group' where topics of conversations will not be dictated.

David Rosenbaum, Micronet's Marketing Manager understood the possible difficulties, but commented:

"Conversations that take place in locked rooms will be totally private and confidential – that's part of the attraction of the teleconferencing system."

● Next week *Popular* will be looking in more depth at Micronet's new developments.

GST launches Desktop Publisher

AT A press launch last Wednesday, GST showed off their latest product, *Timeworks Desktop Publisher*. Available in England from November, there will be an Atari ST version costing £99 and a version for the Amstrad PC and compatibles, the price for which was undecided at time of going to press.

GST's Chris Scheybeler pointed out that the company had a good background in the area, with their programmers having written the *First Word* suite of word processors as well as producing specialist software for electronic typesetting systems used by local and national newspapers.

At a sneak preview before the official press launch, *Popular* had a chance to see the program and its extensive list of features. One advantage over the competition will be the wealth of printer support, with drivers already written for nearly all 9 and 24 pin matrix printers as well as Postscript and HP Laser printers, and the option of sending postscript files to disc for professional typesetting. No software currently supports the Atari Laser printer because Atari have yet to confirm the specification, but GST promise one soon.

Being based on the GEM operating system, *Timeworks* will be fully menu driven with optional "short cuts" to duplicate menu commands for those who prefer to leave their hands on the keyboard. GST in the past have written "mouse only" software.

A sophisticated graphics editor, similar to *Easy Draw*, will be included within the main program to create either stand alone illustrations or to embellish imported pictures. So far the programs that *Timeworks* will support include all those producing GEM format files (*GEM Draw, GEM Paint, Easy Draw*, etc) and Degas *Elite, Neochrome* and *PC-Paintbrush*. A superior picture manipulation facility is promised, to alter picture size without the usual distortions.

Text can either be entered directly or be prepared on a separate word processor and imported. Text can be imported in either ASCII, *WordStar, First Word* or *Word Writer* files.

Other features include automatic hyphenation and frame rejection, so that if a block of text has a picture placed over it, the software will automatically reformat the area. GST had yet to decide on the number of fonts, but said that at least there would be a Times lookalike and a few special headline fonts is in the larger point sizes.

Balls go bananas

OCEAN Software have acquired the rights to produce a computer game based on the Madballs range of toys.

Pictured is Ocean Director Jon Woods and two of the Madballs, which are produced by American company TCFC (Those Characters From Cleveland) Inc. In the game you will play the part of Dustbrain, a sort of Madball Thatcher, whose aim is to eliminate his political opponents, Screamin' Memmie and Slobulus, by controlling the planet's supply of cabbage and fish heads.

The Madballs game will be released in December for Amstrad CPCs, C64 and Spectrum.

Popular needs a Staff Writer

POPULAR Computing Weekly needs you! We have a vacancy for a Staff Writer, and you could be the right person for the job.

The position will involve writing copy for our news pages, as well as helping out on the rest of the magazine with features, reviews and interviews.

Knowledge of the home computer industry is important, but so is the ability to write, learn quickly, work to tight schedules, and fit into a small, friendly team. The ideal candidate will be young, enthusiastic and looking for his/her first steps into an exciting career in computer journalism.

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More news on pages 6 & 11

SOFTWARE HOTLINES

Dilemma:
A well known software house sends you a press release about their next release, based on some daft boardgame.

Do you chuck it in the bin and forget all about it, and risk upsetting the company (thereby missing out on lunch at the PCW show), or do you praise it to the skies?

This is the sort of problem you'll have to face if you buy *Scruples*, the computer version of the well-known boardgame being planned by **Leisure Genius.**

The game has over 200 questions, all of which allow you to drop someone else in the merde, and if you can't find anyone willing to play the game with you then the computer has 64 preprogrammed personalities that you can play against.

Virgin Games (which owns **Leisure Genius**), has given up basing games on the real-life (?) adventures of Richard Branson, and have decided to license the rights to the *Action Force* range of toys, which is probably a good move. And, at this very moment a copy of their *How To Be A Complete Bastard* game is biking its way to me, so there'll probably be a review in next week.

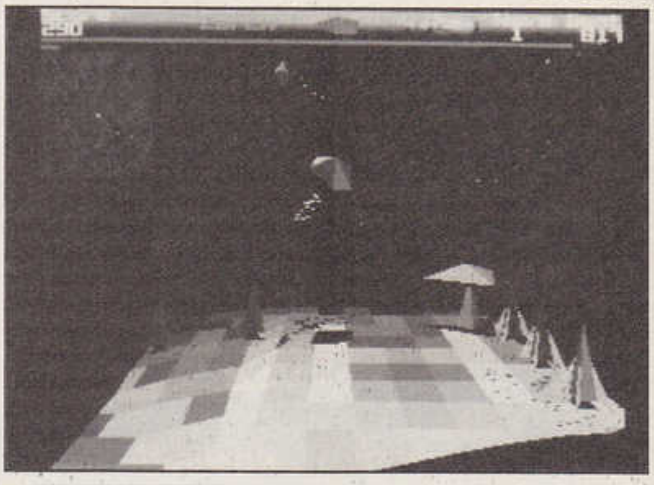
Does anybody out there remember the fuss that we all used to make just before the release of a new **Ultimate** game? Well, **Mastertronic** have just acquired the rights to rerelease **Ultimate's** old titles on their Ricochet budget label. So now games like **Knightlore, Alien 8,** and **Sabrewulfe** which probably got more rave reviews for **Ultimate** than any other games in the history of the universe, can be yours for just £1.99.

Having tied up James Dean for a licensing deal, **US Gold** has also added Sir Charles Chaplin to their stable of stars. They've come up with a game in which you have to choose a script for a silent movie, then cast it and gather together all the props and scenery. The action in the film is made up of arcade sequences that you take part in as the Tramp character, and you play these back to edit them into a complete film for release in the cinemas, with your score depending on the audience's reaction. It all sounds very odd (US Gold keep using the word 'concept', which is always worrying).

Also at the show will be *Zarch,* **Superior's** new Archimedes game that we mentioned recently. We can now let you have a look at it with the nice little screen shot below. The Archimedes is also about to get its first graphics package, in the form of *Artisan* from **Clare's Micro Supplies.** The machine isn't in the shops yet, but there's already more software for it than for the +3 Spectrum.

More news of **Hewson's** *Magnatron;* this is Steve Turner's follow up to *Quazatron* and features the continuing adventures of the KLZP 'droid – this time onboard a space station, where it has to destroy a number of nuclear reactors. There's a screen shot above (to make up for the upside down one that we had on last week's cover, and for the screenshot of a non-**Hewson** game in a recent **Hewson** review. Sorry about that, Andrew).

Cliff Joseph



NEXT WEEK

Date with danger

Popular Computing Weekly has achieved the near impossible and obtained an audience with Alan Sugar.

Is Amstrad dropping the CPC Range? Will there be any more new models? What is to become of the Spectrum range? All these questions and more will be answered in next week's interview.

The big three

Can the Acorn Archimedes really compete with the likes of the Commodore Amiga and Atari ST?

In this full test, *Popular* looks in depth at these three machines and draws some controversial conclusions.

The Mild One

Is Bill Stealey, the President of Microprose, really as 'wild' as everyone makes out? *Popular* met the man behind the mouth and drew some surprising conclusions.

PCW News

The show may be over, but the reports go on. *Popular* will not only bring you the first full report of the show, it will also be the most complete.

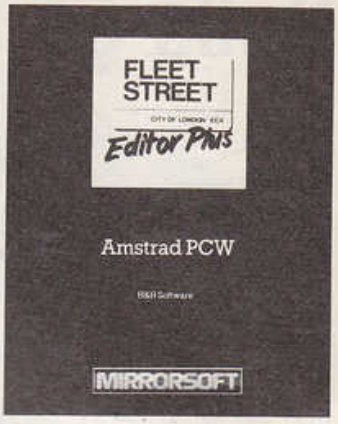
Pages dedicated to 8 and 16 bit software, as well as news and views on the latest hardware from the show.

Popular will, as always, be the magazine that gives you the low-down on the latest developments.

Deep pockets

MIRRORSOFT has announced a deal with W H Smith to display DTP packages in its top fifty stores, and has slashed the price of *Fleet Street Editor Plus* by £20.

The selected outlets will be stocking the whole Mirrorsoft Fleet Street range of DTP software, including the PCW DTP package which now costs £49.95.



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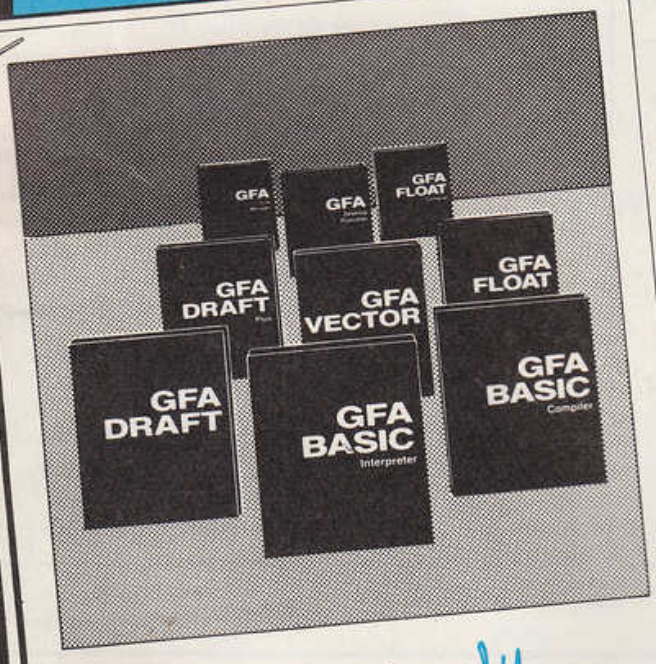

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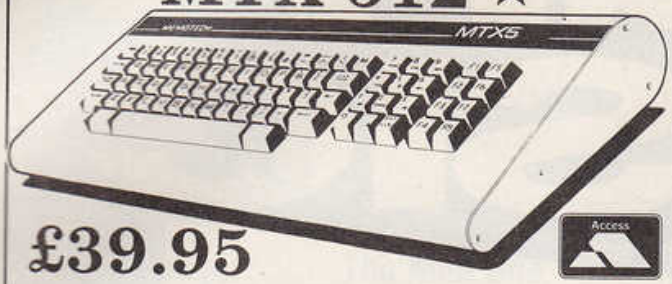

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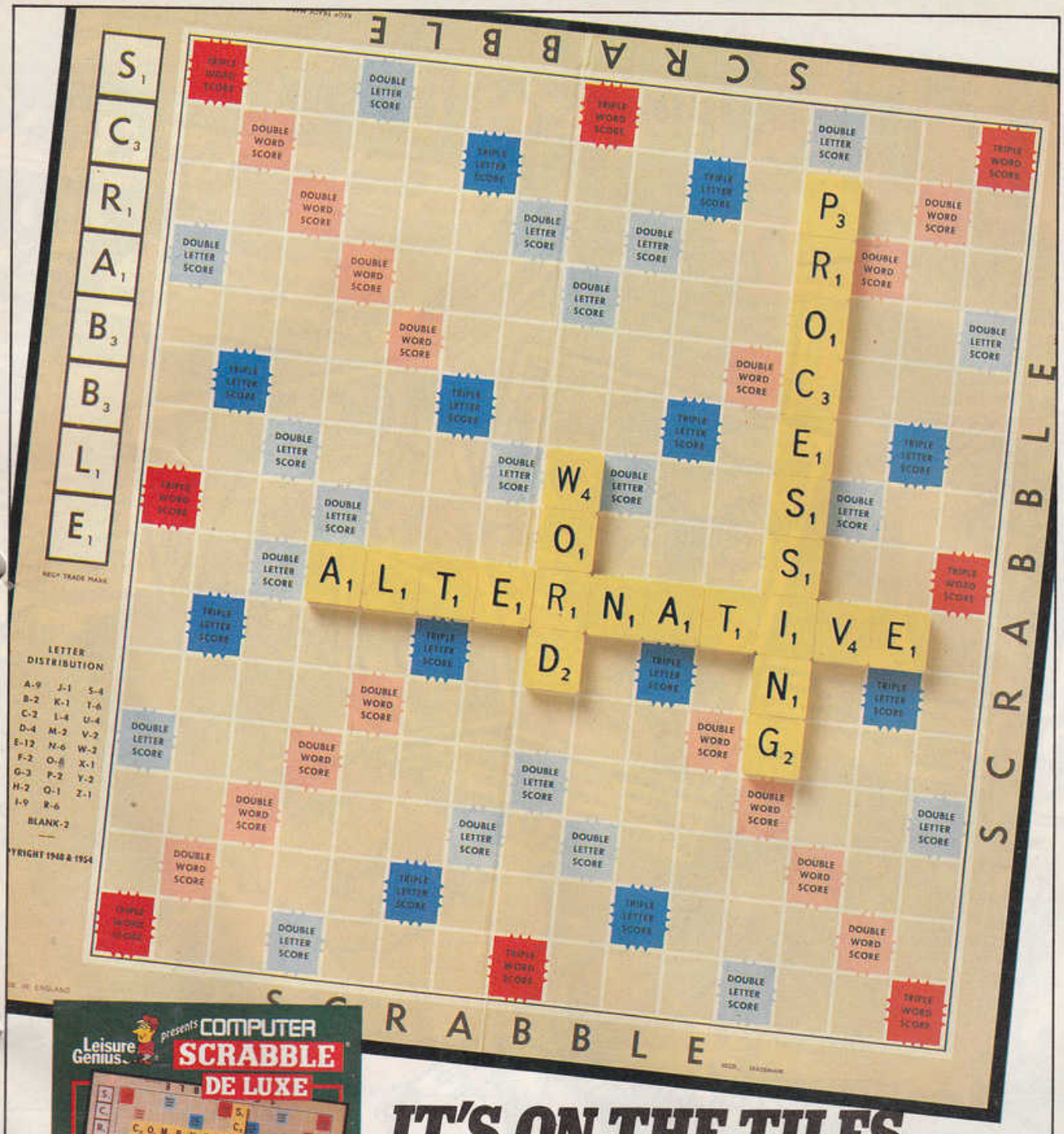

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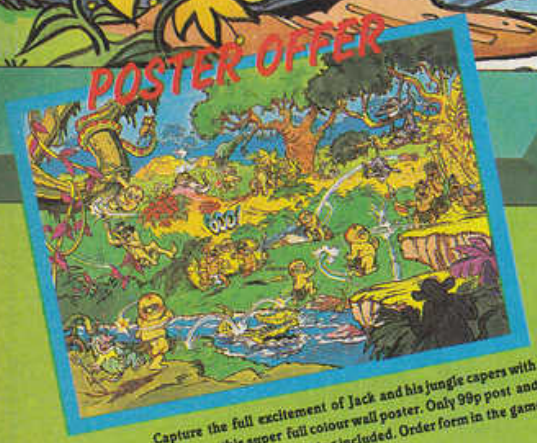

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BMF steps in on piracy

THE BMF last week announced that it is to mount a major campaign against software piracy, something which is estimated to cost the UK computer industry around £150 million every year.

Welcoming action taken by FAST (the Federation Against Software Theft), and the arrival of new legislation to combat the problem, BMF spokesman Clive Booth warned:

"Legislation and litigation can only address the worst abusers. We need a parallel effort to educate both business and the public at large about the issues.

"People need to understand that buying software is effectively buying a licence to use information, and not a 'buy and do as you please' commodity," he added.

"It's a little like a road fund licence. There are rules and guidelines to be observed wherever you go and it should be the same with software."

Addictive fixes it for a new Nixon

ADDICTIVE Games, a part of the Prism Leisure Corporation PLC, has recently re-launched *President*, a game designed to test your ability to rule effectively the nation.

Priced at £2.99 this time around, the game gives you the chance to become the next Roosevelt or Nixon (although the game seems not to incorporate such unplanned disasters as Chappaquiddick and Watergate).

Programmed by Kevin Toms, the man responsible for the original strategy success, *Football Manager; President* includes such day to day traumas as oil wars, balance of payments difficulties, and electoral popularity.

President will be re-released on September 23rd, and will be available for the Amstrad CPC range of computers, as well as the Spectrum and Commodore 64.

Softek's budget label at Show

FOLLOWING the launch of its *ACE* arcade label, leading software house Softek International has also announced its plans to enter the budget market with a second new label.

The *Micro Selection* range will be launched at this week's *PCW* show, and the initial batch of releases will include repackaged hits such as *Thai boxing*, and *Sky Runner*. Future releases will be a mixture of both original titles and further re-releases, though there are no definite plans to repackage any old Softek or Edge titles as yet.

The new label will be priced at £1.99, but there is also likely to be budget material available for the ST and Amiga later this year, probably to be aimed at below the £10 mark.

A Softek spokesperson told *Popular*:

"This isn't second-hand material. We're very excited about launching the two new labels, and we know that this is going to be a sure-fire hit for Christmas."

Equinox may see the light of day

TYNESOFT, the rapidly expanding games software house, has purchased Mikro Gen from the CSD receiver.

This is an odd turn of fate for Mikro Gen who were sold. Colin Courtney, Managing Director of Tynesoft, said that most of the existing titles would be released in Tynesoft's Microvalue range, but that some of the as yet unreleased software (such as the long awaited ST version of Equinox) would be released at full price later in the year.

The purchase concludes a good week, and indeed year, for Tynesoft which published accounts showing turnover up to over £1,000,000 and profits up 200%.

The dispute over the Sparklers titles which Maynard International recently bought from CSD has been settled.

A total of 120 Sparklers items will now appear either under the Sparklers imprint itself, otherwise on Alternative or Top Ten.

Glentop brought to book with GFA title

GLENTOP Press Ltd, publishers of *GFA Basic*, has announced details of a forthcoming book on the language. The book, written by *GFA Basic's* author, Frank Ostrowkski, will cover programming all aspects of GEM, graphics, and other applications. It is due for release in mid-October and will be over 280 pages and be bundled with a disc containing numerous example programs.

The much delayed 3-D graphics package for the Atari ST, *GFA vector*, will now be released at the PCW show, part of the delay being due to poor duplication of the German translated manual.

The program, which integrates fully with *GFA Basic*, features up to 1024 points, 1024 lines, 32 objects. It also sports rotation in one degree steps upwards, about X, Y and Z axes and scaling factors from 1,64th to 8 times.

Contact Glentop Press on 01-441 4130.

DIARY DATES

SEPTEMBER

23–27 September
Personal Computer World Show
Olympia, London
Details: Latest hardware, software and peripherals for business and leisure computing
Price: £3, £2 – (parties over 10)
Organiser: Montbuild 01-486 1951

OCTOBER

15–17 October
Desktop Publishing Show
Business Design Centre, London
Details: Demonstrations of latest hardware and peripherals, plus seminars and user clinics
Organiser: Database Exhibitions, 061-456 8383

NOVEMBER

14 November
National Einstein Exhibition
National Motorcycle Museum, Birmingham
Details: Einstein software etc.
Price: 50p
Organiser: UKEUG (0473) 49507

Prices, dates and venues of shows can vary, and you are therefore strongly advised to check with the show organiser before attending. We cannot accept responsibility for any alterations to show arrangements.

LETTERS

Wonderful, wonderful life

As a regular reader of PCW I never cease to be amazed at Kenn Garroch's ability to answer the many diverse problems as posed in his PEEK & POKE column. How can one person know so much about so many different computers, be it a technical or programming problem, and then again have time to compose the sometimes quite involved programs required as answers. He certainly receives my admiration and I'm sure that of your other readers. It's good to know that there's someone to fall back on during these times of computer advancement.

John McCleave
Dorset

Cruel world

As a serious computer user I feel compelled to write regarding the advert that Commodore has been running about the Amiga A500.

I feel that it's rather cruel of Commodore to categorise other home and business computers as fit for the toy cupboard.

In fact I doubt if many serious programmers and business users would ever need to use a computer with a blitter chip, four channel stereo sound and brilliant colour graphics – unless of course they are games programmers.

Judging by the large percentage of games-oriented software on the Amiga, I fail to see why Commodore cannot claim its A500 to be no more than a toy as well. After all a toy is a machine whose major function in life is to play games.

And of course if the computer's sound, colour graphics and screen handling is better than the other computers', then you have – a super toy.

Can you see an accountant using a complex spreadsheet needing all that?

As for the speed of the Amiga A500 I suppose it is relatively fast (with its 16-bit databus and a cpu speed of 7.14mHz when compared to, say, the PC or other 8-bit machines.

But when it is compared to the Atari 520STFM (also with a 16-bit databus and a cpu speed of 8mHz) or the 640k Sinclair QL (which only has an 8-bit data bus and a cpu speed of 7.5mHz) the A500 is somewhat slow. Although the A500 is faster when dealing with the screen and sound because of its dedicated chips in this area.

Don't get me wrong. I am not writing this letter to bring the wrath of Commodore and the Amiga users upon me.

I just think it's sad when a reputable firm like Commodore which has been in the computer industry for a number of years should act below the belt and go computer bashing. Isn't there enough computer-bashing going on among rival computer users without the need for the big companies joining in?

Finally, on a lighter note, I think that the Amiga A500 is a wonderful machine (if you can afford it!) and I shall be saving up my pennies for one.

A terminal junkie somewhere in the British Isles.

We look forward to other reader's comments on this. Your comment regarding business users not needing the Amiga's graphics capabilities has also been made by senior industry observers.

But surely Commodore is free to pitch its advertising as it sees fit?

A not quite right knight

With reference to PCW issue 11/9/87. On pages 10 and 11 you carry an interview with Sir Clive Sinclair in which reference is made to the Acorn Archimedes. having long been an admirer of Sir Clive I am sorry to see him making such remarks that bring back memories of the original BBC contract comments from Sir Clive. I am sad to say that he has got his facts wrong, or if he hasn't then the programs used to test the speed were very badly written.

Sir Clive states that multiplying two numbers takes 23 micro seconds on the Archimedes. Apart from being a sweeping statement without any explanation or qualification it is wrong.

There is no indication of the size of the numbers to be multiplied so I will give details of two separate cases. To multiply two numbers together to produce a 32 bit result will have a worst case time of 2.125 micro seconds. This is made up of 1 's' cycle and 16 'i' cycles. An 's' cycle takes 125 nano-seconds in RAM and 250 nano-seconds in ROM. All 'i' cycles take 125 nano-seconds. A multiply by 0 or 1 takes 125 nano-seconds.

If you require double precision with a 64 bit result then using a sensible routine results in a worst case time of 5 micro seconds. Certainly a lot faster than Sir Clive claims. The way in which code is written is crucial on a RISC processor and where sloppy programming might not make much difference on an 80386 it certainly does on the ARM. For instance if you include branches everywhere the code will be a lot slower. It is often much better to repeat small sections of code than to call them as a sub routine.

I am confident that the Archimedes will be a world beater just as long as we British don't kill it ourselves first.

Dave Clare
director
Clare's Micro Supplies

Eprom, and on . . .

I would like to suggest or request that PCW publishes an article covering the subject of EPROMs and burners.

The situation is that so many devices now contain EPROMs or ROMs, in many cases programmed with annoying characteristics that many an owner would dearly love to amend! I refer to everything from video recorders ("time-out" and revert to channel 1 aftr 2 minutes!); car alarms (delay periods) and others.

Nearer to your heart, of course, are computer ROMs with well-known bugs which the owner knows how to correct, and would like to do so. Or stretches of unused ROM locations where the owner would like to add some facilities. Second hand 8-bit computers can be picked up cheaply enough for many of your readers to want to experiment, if only they had the facilities or knowledge to burn an EPROM!

If a chip could be taken out of some gadget and paged at a known part of a computer's memory map, and assuming that the type of Processor in the gadget could be seen (frequently Z80s are used), then most of your readers would not have too much difficulty in disassembly. (Even if their computer uses a different processor, it isn't too hard to write a disassembler in BASIC).

It would be very helpful if you could publish something covering the following points for the usual 8 and 16-bit home micros:

1) How is the memory map made up, in terms of pin connections? In other words, how can you tell which memory chips on a board appear where in the map?
2) What are the pins on RAM chips and EPROMs?
3) Is there an EPROM burner available for each of the common home micros? If so, perhaps you could list suppliers?
4) Is it generally possible to replace ROMs with EPROMs? Are response times as good?
5) In general terms, what would the hardware need to be, to attach to a computer's user port for the purpose of reading in or paging in the contents of an external memory chip? I am thinking it would be good to know how to make up a "black box", perhaps with a push-button on it.

I feel that a sizeable proportion of your readership know enough and have enough programming ability to want to do this kind of thing, but would like to know more hardware, which is always the stumbling-block.

Peter Erskine
Essex

Phew, we'll see what he can do to help!

No money for non players

I was fascinated to read that Commodore can afford to shell out one and a quarter million quid for Chelsea football club, but they still can't afford to bring the price of the Amiga down to a level where it is truly competitive with the ST.

Most of the people I know who use/buy home computers' nearest contact with the sport is through playing the venerable 'Football Manager'! Even the ones that do watch football would have much rather had the money off their CBM computers . . .

Alan Lenton
London

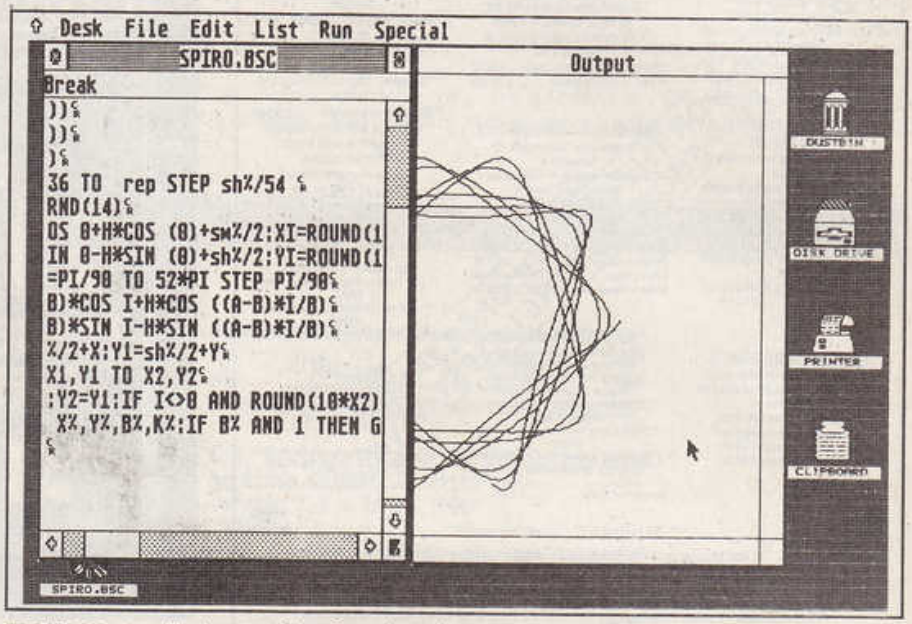
PS: I wonder if any of your readers who took up the Amiga voucher offer noticed a certain lack of enthusiasm on the part of the dealer they bought from . . . this may be to do with the fact that CBM is making the dealers pay £55 out of every £100 they give off – still they have to raise £1.25m from somewhere!

STacks of Basic

Disc-based Basic makes the Atari ST a natural for third-party variations, but not all versions are equally useful, and Atari's own update is the worst of all, as Duncan Evans finds on the test bench.

Unlike most eight bit micros, the Atari ST has two features which encourage third party implementations of Basics. The first is that the language is not built in, but supplied on disc. The result is that *Atari Basic* is unbelievably awful.

So which Basic do you go for? Stick with the supplied *Atari Basic*, or go for Glentop's *GFA Basic*, Computer Concept's *Fast Basic* or indulge in HiSoft's *Basic Compiler*? In this article we set out the relative merits and drawbacks of each product, and deal with them chronologically.



Fast Basic: excellent support for Gem, but sloppy cursor control

Table 1

PCW test	Atari	Fast	GFA	HiSoft
1	0.9	0.145	0.105	0.048
2	2.8	0.58	0.395	0.056
3	5.94	1.305	1.025	0.198
4	8.03	1.55	1.01	0.258
5	8.03	1.505	1.085	0.263
6	14.2	2.575	1.765	0.536
7	20.9	4.11	2.845	1.026
8	10.0	2.725	2.945	1.411
Avg:	8.85	1.801	1.397	0.475
Circle (r75)		0.34	0.055	0.075
Solid Circle		0.34	0.17	0.21
Box (130sq)		0.09	0.0175	n/a
Solid Box		0.09	0.0475	0.075

Table 2

Product	Atari	Fast	GFA	HiSoft
Price (disk)	Free	45.95	45.95	79.95
Editor Features	4	9	7	6
Ease of Use	1	6	9	7
Graphics	5	8	8	7
Sound	7	3	7	7
GEM	1	8	7	7
File Handling	6	8	7	7
Structure	4	7	8	9
Overall	2	8	9	7

Atari Basic

Atari Basic sports the most unhelpful and unusable editor that I for one have ever encountered. Half the time it doesn't do what it's supposed to.

One of the more annoying features is that there is no wraparound on the windows so that when a line reaches the right hand edge the whole program lurches left, and you lose track of what was on that side of the screen.

The entire thing is unbearable to program with, considering the alternatives.

As far as commands go, Atari Basic just about measures up to the good 8-bit implementations, but is sadly lacking in a number of vital areas. Graphics are only adequately catered for, although there are no sprite commands, with CIRCLE and ELLIPSE, and filled versions thereof. LINEF and a FILL that allows use of all the ST's inbuilt styles. On the subject of colour there is the ridiculous situation of having 512 colours, and not having a command to change the 16 colour pallets you start with (in low resolution).

File handling is dealt with much better as you can load and save not only Basic programs but blocks of memory with BSAVE and BLOAD. For dealing with records and data files there are OPEN, PRINT#, CLOSE, GET#, INPUT#, LINE INPUT# and WRITE# to juggle with.

Possibly the only area of *Atari Basic* that can hold its own is the sound department. The SOUND command lets you control three music and a white noise channel with volume, notes played, octave, and duration parameters. WAVE, controls the waveforms used in SOUND, via envelope, shape, period and delay parameters. Better than the facilities offered by *Fast Basic* and just about comparable with everyone else's.

As far as structure goes you can have GOSUBs and GOTOs aplenty. There aren't any procedures, REPEAT . . UNTIL or DO . . LOOP constructs although WHILE . . WEND and IF . . THEN . . ELSE are supported. Pretty poor fare indeed.

The next black mark against this language is in the provision of GEM commands. There aren't any. Want to read the mouse, use pull down menus, alert boxes? Tough. The only option is write your own routines which poke values into CONTRL, INTIN and PTSIN arrays, and then call the required operating system routine with VDISYS for the VDI, or use GEMSYS and its arrays for the AES.

So, having determined that only the poor and the mad program in *Atari Basic* it might have come as some relief to those thinking of purchasing an ST that Metacomco *MCC Basic* will be bundled with the machine in the new year. Unfortunately *MCC Basic* can only be viewed as the finished version of what Atari is currently bundling. Most of the bugs are fixed and here are more commands, especially in the graphics department, which includes the desperately need-

continued on page 15 ▶

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◀ continued from page 13

ed mouse and RGB ones. Low level access to the BIOS and XBIOS has been improved but alas, alas, the silly people have left the editor exactly as it was! The stupidity of this leaves me speechless.

Fast Basic

Having observed how cumbersome the *Atari Basic* editor was, Computer concepts, veterans of the BBC market, sought to produce one that rectified the faults and provided a complex and comprehensive programming environment.

Well, the editor is nothing if not packed with useful features. GEM is supported both from the point of desk top accessories and easy mouse interpretation, alert boxes, windows, drop down menus, and shrinking and expanding boxes.

Up to ten programs can be held in memory at one time, and control is easily switched between them. In the early stages of programming development this is certainly handy as you can store your main program in one segment and then test subroutines in the others.

Word processing like options are available to cut and paste sections of programs, and in the same vein you can search and replace items. Having cut a block you can even paste it into a different programming segment, so the testing subroutines concept mentioned earlier is made even easier.

If it all sounds like a bed of roses then beware, because there are a couple of weeds in this particular garden. Compared with the *Atari Basic* window system, *Fast Basic's* edit window, output window and, usually concealed, immediate windows are a definite improvement. But not so that programming becomes as easy as using the *GFA Basic* editor.

Once again there's no wraparound on the window and the manner in which text disappearing off one end is handled leaves much to be desired. It's better than *Atari Basic* but then that's not saying an awful lot. The other point is that cursor control is very sloppy, long after you take your finger off the cursor or delete keys the cursor continues to romp along.

As far as commands go, *Fast Basic* scores heavily. All the GEM graphics primitives are available as direct commands. From patterned lines to solid boxes with rounded edges, ellipses, circles, solid or empty. One of my favourites is the TXTSCROLL command which scrolls the contents of the text window. You specify the destination location and off the thing flies, superbly smooth, exquisitely fast. Text handling is undoubtedly best catered for by *Fast Basic*.

Structured programming is quite well served with IF . . THEN . . ELSE . . ENDIF, DEF PROC and PROC, WHILE . . WEND, and REPEAT . . UNTIL. Strangely absent though is a DO . . LOOP and EXIT LOOP construct. *Fast Basic* supports the usual BLOAD and BSAVE and supplies a comprehensive selection of file handling commands. Based on the BBC commands of old, OPENIN and OPENOUT deal with opening files for read/write operations. Also OPENUP, BGET#, BPUT#, PTR#, GETREC#, PURREC#, PRINT# and EXT#, which returns the length of a file, add to a collection which provides every means of file handling that your heart desires.

As mentioned earlier, GEM is very well supported. For the simpler functions like reading the mouse and dialogue boxes, programming is straightforward and easy. For some of the more complex GEM functions the manual abandons all hope of teaching the unconverted and recommends you get a book on the subject instead.

```
| Save  |Save,A | Quit  | New   |Blk Sta|Replace| Pg up |Text 16|Direct | Run   |
| Load  | Merge | Llist | Block |Blk End| Find  |Pg down|Insert | Flip  | Test  |
@Cls
Clear
Print
Print "        ************************************"
Print "        **     ATARI ST:  BASIC CONVERTER    **"
Print "        **       ST BASIC to GfA-BASIC       **"
Print "        ************************************"
Print
Print " Atari - GfA -Basic / (c) 1986 by GfA Systemtechnik"
Print " written by Klaus Keller, Herdecke"
Print " Program Version 3.0 / 10.10.1986"
Print String$(55,95)
Print "The following program is still under development"
For T=1 To 15000
Next T
Cls
Print "FUNCTIONS OF THE PROGRAM:"
Print "PART A:"
Print "(1) Insert missing GOTO's after THEN or ELSE"
Print "(2) Replace line numbers being branched to with markers"
Print "(3) Complete the procedure for program branches"
Print "(4) Replace all GOTOXY with PRINT At"
Print "(5) List from a beginning mark to an ending mark"
```

GFA Basic: incredibly fast, and very easy to edit – even in colour

GFA Basic

After sweeping across Europe and making large inroads into the American market SystemTechnik's *GFA Basic* reached the UK shores, to be duly marketed by Glentop.

GFA Basic's main claim to fame, if you believe all you hear, is that it is marginally faster than *Fast Basic*. In fact the programs run at an incredible speed, and the difference between it and *Fast Basic* becomes very noticeable when using graphics.

All this is highly laudable – but what makes me favour *GFA* rather than *Fast* is the editor. It undoubtedly has less features, and you can't have program segments, but what more than makes up for this is that the editor supports two screens. The edit screen and the display, which you also type commands in directly from. Switching between the two is easy, and there are no annoying windows to get in the way (unless your program uses them of course).

The edit screen works, if you are in low or medium resolution, in medium res mode so that you can edit in 80 columns and still use the 16 colour mode! Only HiSoft's *Basic Compiler* has anything like a similar feature.

At the top of the edit screen is a black bar containing all the cut, paste, block move, and search and replace functions. You can either point at them with the mouse or press the relevant Function Key.

What is odd looking about *GFA* programs is that concatenation is not allowed. This, combined with automatic indenting gives listings a very structured look. Once again there is no wraparound (there isn't on any of these products) but *GFA* handles lines that are greater than the screen length a good deal more intelligently. For one thing with only one command statement per line you're unlikely to run off the end of the screen. But, if you do, then only the line that you are entering scrolls off to the left. And it only does one character at a time, as you type them in at the other end of the line.

GFA Basic supports virtually the same graphics commands as *Fast Basic*, fills, boxes, circles, ellipses, arcs, polygons, various text styles and also a number of blitting options. GET and PUT read a specified section of memory into a string and then splat it back down on the screen again. Fast Basic and HiSoft Basic also contain these commands but the *Fast Basic* ones are not as impressive in terms of speed, and the *HiSoft* ones are very clumsy to use. As an example, if you cut a square, eight pixels by eight, you can splat it at the rate of 230 per second! Even larger areas are still gloriously fast. For whole screens though, there are a couple of dedicated commands, not seen on the other Basics, namely SGET and SPUT which simply read an entire screen into a string and then transfer it back again.

The audio department is covered as well

continued on page 17 ▶

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Saved! by HiSoft
Customer and Press comments

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Saved! looks like a comfortable winner in all departments. **ST Update 7/87.**
This has got to be good value for money by anyone's way of thinking. **Atari ST User 7/87.**
Using a rating scale of 0 to 10 we'd give Saved! 15. **ST Applications 6/87.**

DevpacST
Customer and Press comments

A very professional and excellent piece of software. Nice documentation. Very powerful, excellent manual. A programmer's best friend. Superb! **Our customers.**

this package is strongly recommended. **Atari ST User 7/87.**
DevpacST is well-designed, well-implemented, HiSoft should be congratulated for a job well done. **Byte 11/86.**
DevpacST is the assembler analog of Turbo Pascal ... it is by far the easiest and fastest assembler package to use. **CL 10/86.**

HiSoft BASIC Compiler
Customer and Press comments

Excellent, professional product. Worth waiting for! Makes BASIC into a high level language. Great!! **Our customers.**

To sum up: HiSoft BASIC is extremely fast, powerful and compatible ... in addition its friendly environment makes it a joy to use. **Atari ST User. 9/87.**
If outright speed is the most important factor, the HiSoft compiler wins hands down ... HiSoft's compiler is the only BASIC system on test which is truly extendable ... HiSoft BASIC is a true development tool ... the product with by far the greatest potential. **ST World. 8/87.**

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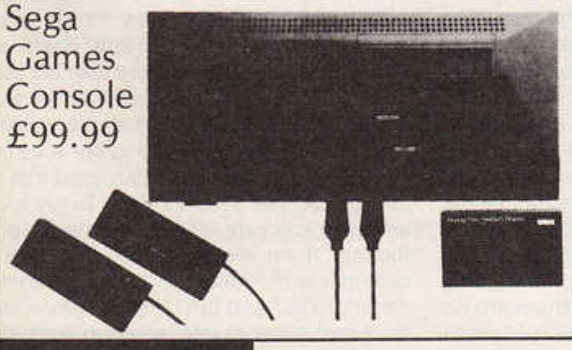

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◀ continued from page 15

as *Atari Basic* and *HiSoft*, and thus better than *Fast Basic*, with BEEP, SOUND and WAVE.

File handling is pretty good, although it falls short of the excesses offered by *Fast Basic*. What is done better are the poke and peek commands. *GFA Basic* uses POKE, DPOKE, and LPOKE for single, double and four byte operations, while *Fast* uses indirection operators such as ? and ! which can hardly be said to be as friendly. If you prefix the *GFA* commands with an S you can poke in the supervisory mode of the 68000, ie, reserved storage space where you are normally not allowed.

When it comes to structure, *GFA Basic* is a little odd in that its procedures are labelled PROC name(var) but are accessed with GOSUB name(var) and recalled with RETURN. Make no mistake though, quaint though they may sound, these are procedures and you can pass variables and have local variables as well.

The rother commands in this group are IF . . THEN . . ELSE . . ENDIF, DO . . LOOP, REPEAT . . UNTIL and WHILE . . WEND. A good selection, only bettered by *HiSoft Basic's* similar, but more flexible, structures.

As I've mentioned *GFA Basic* is very fast but there are instructions built in to make programs run even faster. INC and DEC increment and decrement a named variable by one, and make counting even faster.

Access to GEM is something of an oddity. On the one hand you have wonderfully simple mouse and dialogue box commands, and on the other, there's the rather complex, and poorly explained, menu commands. Conversely, one area where *GFA Basic* completely outstrips Fast is in providing low level access to things like the BIOS and XBIOS.

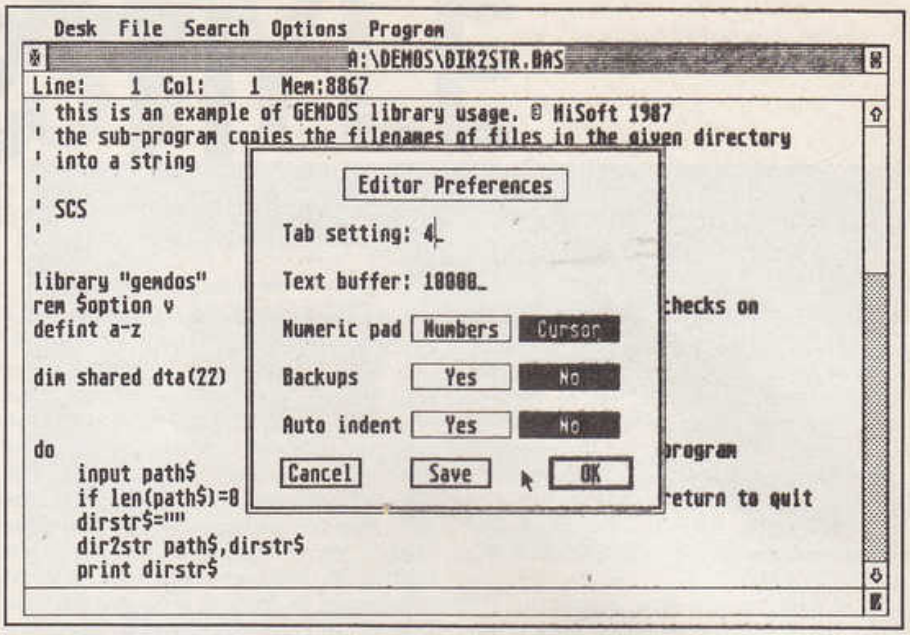
GFA Basic is good, very good in fact. But wait, the German programmers are working on version three of the program which will be a major revision. Amongst the plans at this stage are those to add another 150–200 commands to the interpreter. And, almost unbelievably, they expect the thing to run up to twice as quickly!

HiSoft Basic Compiler

The latest Basic into the fray is the *HiSoft Basic* compiler which is obviously not an interpreter, like the others, but a text editor and a compiler. Programs are thus written using the editor and then compiled either to memory or to disc.

One of the major selling points about *HiSoft Basic* is that it will compile standard *Atari Basic* programs without change, although of this I'm somewhat suspicious. The advantages provided by this product are the compatibility mentioned, a usable programming environment, and an extended command list. Oh, yes, your programs will naturally run much, much faster as well.

The first thing you can't help but notice is that the text editor only runs in medium or high resolution modes. So, for applications that run in low resolution you'll have to use the SCREEN 0 command at the start and SCREEN 1 at the end.



HiSoft Basic: a bit of an oddity, but a useful adjunct to Atari Basic

The editor itself is very spartan looking, and its features reflect that. Lines can be deleted or inserted and blocks of lines shuffled around and deleted. The commands are all available from the keyboard and are similar to those used in *Wordstar*. It's all very simple to use but doesn't match *GFA Basic's*, or the complexities of *Fast Basic* either.

The graphics commands are just the same as *Atari Basic's* with one or two important additions. POINT reads the colour of a specified pixel, and SCREEN is used for selecting the screen mode although you should note that only TOS or TTP programs should use this command as the GEM AES and VDI don't like screen mode changes from within a program. Not many additions there, I'm sure you'll agree. There are however more. A lot of functions and commands are available on the disc as machine code routines, contained within libraries. You must use the LIBRARY command and the library name (ie LIBRARY XBIOS) to access those particular functions, which are then loaded off the disk and incorporated into your compiled program. While this is a good idea in theory, it should after all mean that your programs are compiled more efficiently, in practice it results in quite a messy situation.

The actual libraries are the BIOS (Basic Input/Output), XBIOS (Extended BIOS), GEMDOS (the operating system), GEMVDI (Virtual Device Interface) and the GEMAES (Application Environment Services). More than any other version of Basic, HiSoft gives you access to these routines within the ST. While the manual explains many of these functions well or adequately, some of the explanations are unclear to say the least. There's lots of good stuff here but expect hard work getting at it.

Having seen that Atari Basic supported few commands for structured programs, HiSoft have certainly made an effort in this department with procedures, DO . . LOOP, REPEAT . . END REPEAT, and WHILE . . WEND. What gives HiSoft Basic the thumbs up over the others here is that the DO . . LOOP construct can have WHILE and UNTIL added to the DO, and WEND, WHILE and UNTIL at the bottom end. Undeniably flexible.

Probably Atari Basic's second biggest failing is that there are no commands to control the GEM interface. HiSoft have made improvements in this direction as well with MOUSAE, and a plethora of window commands. Other support can be found in the libraries of course.

Conclusions

Both *GFA Basic* and *Fast Basic* are very good implementations of the language. If you have half a mind to develop 68000 machine code programs as well, then your best bet is *Fast Basic* as it contains an inbuilt assembler. The *Fast Basic* manual is generally better than that supplied with *GFA Basic* (which was translated from German after all) but despite these two points I would heartily recommend *GFA Basic* instead, and it should be noted that there is a rather good compiler for the languages as well.

HiSoft Basic is an oddity. I wouldn't recommend it over either of the two major Basics because I don't particularly like the way it works. I would say it is worthwhile for anyone who is a committed *Atari Basic* programmer to purchase *HiSoft Basic* because of the speed increase and more friendly environment.

As far as the new version of *Atari Basic* is concerned, I'm afraid we can write that off already.

Duncan Evans

IT'S THE

Ian Rook gives the once over to Amstrads eagerly awaited successor to the best selling PCW 8256, imaginitively named the PCW 9512.

The Amstrad PCW was code-named Joyce, after Alan Sugar's secretary Joyce Caley. The machine was designed for secretaries not to replace them. All that would be ousted was the Olympia typewriter which hid the waists of the nations typists. Now they are masked up to the designer spectacles by the VDU of the PCW 8256. Soon they will have to find some cushions to see over the top of the new PCW 9512.

It is amazing just how successful the PCW has been. The reception desk of my local Amiga software house is graced with a PCW; many of the major magazines and newspapers have their text crafted on Amstrads. Even *Popular* relies on a crowd of Joyces to put the words on your page. You'd think that there was not much scope for improvement.

The PCW is two years old (Happy Birthday to you, Happy Birthday to you – blow out the candles) at this years PCW show. You don't get Ford sticking with the same Escort for that long and so the boys from Brentwood (home of Amstrad, just the wrong side of the M25 and too near Southend to pass itself off as civilization) has wheeled out a new model. Unlike Ford the old Joyce stays in production but having seen the development costs amortised the price drops to £299 plus VAT. The new machine is Joyce 3. Deduction reveals the Joyce 2 to be the PCW 8512. A machine which looked like an 8256 but boasted 512K RAM and a second 720K disk drive. This also has had its price pruned; to £399 plus VAT. Logic and a sense of fair play dictating that at £499 plus VAT the PCW 9512 with better bits bolted is a step above that.

Pretty

The PCW 9512 is the prettiest Amstrad machine ever. At first glance it appears to be a PC 1512, the colour is the same. But this is a deception which is laid bare by a three inch disk drive. Then you notice the other differences between the PC case and the new PCW. The monitor does not tilt, but it looks smart with 8512 holes for ventilation. The back of the monitor is better styled, and the top slopes sharply. This means that the printer will no longer fit on top of the machine but it can go either side of the main unit. Many people found that having the position of the PCW 8256 printer dictated by a short lead was a limitation. The screen is no longer green, white is considered more exectuve. Despite Amstrad's insistence that the screen is paper white the text is white on a black background, not inverted as on a Mac or ZX81.

I am assured that the workings of the keyboard are identical to those on the 8256, which in turn is the same as the 1512. This only goes to show what a different good keycaps make. The PCW 8256 felt cramped, I often hit keys by mistake. On the 9512 things are better spaced, the shift keys in particular are easier to get at. The large area below the spacebar shows some concern about ergonomics. Anyone who is used to an Amstrad PC will feel at home with fingers on Joyce 3, but if you are used to an earlier PCW things get confusing. The functional keys have been moved from between the QWERTY section and the numeric pad to the left where they masquerade as PC function keys.

Formidable

The 720K drive has usurped the 180K drive fitted to the elder sister. This means that like the 8256 the 9512 is a single drive machine and like the sibling it can be upgraded with the addition of a second drive, but not the same unit. A Joyce 3 with dual drives and nigh on 1.5 megabytes of disk storage is a formidable machine.

Upwards disk compatibility is maintained, so the 9512 will read 180K disks but cannot write to them, and 720K disks from the 8512 are indistinguishable by their sameness. The disks are Amstrad standard 3inch, no-one else uses these (OK, so the Tatung Einstein uses them but no-one uses a Tatung Einstein, consequently only Amstrad users buy 3inch disks). Suffice to say that Amstrad have built a standard by being bigger, and like the standards IBM establish in the same manner it's not the best but it works. Thanks to the widespread use of Amstrad disks the price has fallen to £2.99 (only twice the price of an Amiga style 3.5inch disk) from the quite ridiculous £5.

Malcolm Miller and his cronies in the Amstrad marketing department have never been modest about the abilities of the Amstrad machines, so having exhausted the terms "Near letter quality" on the PCW 8256 printer and "letter quality" on the new LQ 3500 they have been forced to call the daisywheel printer "perfect letter quality". Exaggeration apart the 9512 printer is very good, it may not be the much rumoured 24 pin dox matrix mechanism I expected but it is not as slow as the other sub £1,000 daisywheels of my acquaintance, at about 20 characters per second. The carriage is very wide, and will easily take a sheet of A4 sideways. Unfortunately the printer is very big, and not really in keeping with the sleek lines of the system unit. The size is essential for using the 9512 with a spreadsheet. On the 8256 you could condense the type, try that with a daisywheel and you end up with a mess.

Both print wheels and ribbons are freely available. The wheels and codes accepted by the printer conform to Diablo 630 protocols, the daisywheel equivalent of Epson compatible.

Expensive

There are some people who will want faster printer, graphics or both. For them the PCW 9512 offers a centronics parallel port. There is no need for the expensive CPS 8256 interface if you do not want to attach a modem. If you do need a serial port then the interface will fit but hangs off the back like an afterthought. The 9512 is more of a typewriter replacement than the other Joyces so it is unlikely that many people will buy CPS's.

There is quite a price difference between the 8512 and 9512, particularly when you realise that it is the more expensive machine which has fewer disk drives. The price hike is justified by the inclusion of LocoScript 2, the improved wordprocessor from Locomotive Systems in Dorking. LocoScript 2 is sold separately at £20, but the 9512 also comes with LocoSpell and LocoMail. These are sold at £40 each and so the three justify the extra cost of the 9512 in themselves. I'd argue that 'Mail and 'Spell have always been disproportionately overpriced.

To drive the new printer, and any of the centronics printers you are likely to hang off the back, LocoScript 2 has a number of printer drivers. The manual suggests that you will be able to buy printer drivers for additional daisywheels and printers. I'll believe that when I see them on sale. LocoScript 2 offers 448 characters which can be printed on a PCW 8256 dot matrix printer. There is no way you will be able to find another printer or combination of daisywheels which can reproduce them all. You cannot attach an 8256 dot-matrix printer to a 9512, they are very different beasts.

Problems of printer compatibility are one of the reasons why the complete system approach of the PCW works so well. Most people will only use the Amstrad supplied printer and daisywheels with the same basic character set. I'd argue that if you really need to do a lot of printer and typeface swapping then you have bought the wrong machine. The dot matrix output of the other PCW's is not bad and much more flexible.

NEW STYLE

Repetitive

LocoScript is easy to use, you can sit down and quickly produce letters with a little help from the manual. This means that most of the users I've come across learn by doing and so miss out on loads of LocoScript's features. It is worth taking some time to learn about start-of-day disks, which reduce the time it takes to get going when beginning a session. Layouts (despite being very different from LocoScript 1 layouts) simplify the process of getting the page to look right. Blocks and Paste buffers speed up the typing of repetitive documents. If time is money then reading the manual is an investment.

LocoMail and LocoSpell help increase the value of the system. The dictionary for LocoSpell is English, based on Chambers 20th Century Dictionary as used by Scrabble players. Checking is run from inside LocoScript, which speeds up the process, suggestions are offered for incorrectly spelt words and the vocabulary can be increased through the addition of user dictionaries. The best reason for upgrading a PCW 8256 was to use the LocoSpell lexicon. The 9512 is already upgraded.

Useful

LocoMail is one of those programs which a few people will find extremely useful and the rest won't touch. Mail merging is complicated. It took me nearly a week to get what I wanted from MailMerge for WordStar. The lessons of time have meant that Locomotive learnt to make LocoMail easier to use than that but it will still take a couple of dry runs to get what you want.

It takes a programmer to stretch LocoMail, there are options to test a data file for things like outstanding balances and then insert different texts ranging from "Thank uou for your prompt payment" through "this maount is now outstanding" and up to "Pay up today or we send da Boyz 'round". You choose the text, but the meaning is the same. Most LocoMail users will probably find the nuances of < > and truth tests too confusing. Programming the software is not my greatest reservation, it is the life of the printer. You could easily store enough on a 720K disk to mail over 3,000 people with customised versions of the same letter. The PCW printer would have to run for days and nights to get through that lot, only stopping for a new ribbon. This kind of hammering is more than a cheap printer should be expected to take. It is also a very long time to wait for the output. You really do need a faster and more robust printer for this kind of task. There is a tractor unit which removes the difficulty of having to feed in each sheet but no single sheet hopper, a device which would make short mailing runs possible on standard company notepaper.

All Amstrad PCW's are supplied with CP/M+. Being an old operating system there is plenty of good software, and it is amazing how many companies have benefitted from transferring forgotten products to 3 inch disks. There has even proved to be a market for rival wordprocessors. Arnor have scored quite a hit with Protext. This runs perfectly on a 9512, although a modicum of printer installation is advisable.

CP/M+ has the very useful ability to think of one disk drive as both A and B, swapping the definitions while you swap disks. The PCW has a 368K RAM Disk so you could copy files one at a time, but a whole floppy needs the features of CP/M+.

As anyone who bought a Jupiter Ace will tell you, no machine is complete without a BASIC interpreter. The language is ideal for running up the odd text processing program or complete accounts system. The PCW is supplied with a wonderful Basic. Mallard Basic was written by Locomotive software to be better than and compatible with Microsoft Basic. Mallard is fast and has a high level of mathematical precision. But it does not have any graphics of its own. You can use add-on graphics, either in the form of the Amstrad supplied GSX routines – which are a nightmare to use, or Ex-Basic from Nabitichi in Liverpool. Being a monochrome machine graphics aren't exactly the PCW's long suit. Neither is the sound, a Spectrum-like beep being the best it can muster. So Mallard is right for the PCW. What is very wrong is the inclusion of Logo, a mickey mouse language if ever I saw one. Anyone who thinks a program which reads

```
pd
lt 45          is more      DRAW
fd 100         readable than 100,100,200,200
pu
```

either needs their head examining or is a teacher. Still it looks good in the list of bundled software and the instructions help fill the manual.

The manual is large, 624 pages and unlike early PCW manuals is bound like a book. This means it will not lie flat. Perhaps this is another way of generating revenue, because after a few weeks of use with a paperweight holding open the key pages so that you can learn how to work headers and footers. The pages make a bid for freedom. Soon the book becomes very loose leaf!

The binding apart Amstrad and Locomotive have really learned from the stick they took over the earlier manual. The new book is far better illustrated with diagrams showing what happens on the screen and which key to press. I suspect that users who upgrade from an 8256 will find the detail of the new manual tedious, but they should spare a thought for new users. We were all learner drivers once.

The PCW 9512 is the best typewriter replacement ever. It is also an OK CP/M+ computer. But if you want a bit of both the 8512 probably represents better value for money. LocoScript 2 is a vast improvement on the original LocoScript, especially when you take into account the inclusion of LocoScpell. Anyone who had reservations about the print quality of the 8256 will now be swayed. After hours there are a host of games, including the best 8 bit version of Starglider. The unanswered question is why no other computer manufacturer has brought out a machine with which to compete.

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Amiga BB

Tony Jackson, of Bexley Kent, writes:

Q I intend to open a bulletin board running on my Amiga 1000 and I hope to offer (for a closed membership fee of £5-10) as much public domain software as I can lay my hands on. Unfortunately the membership fee is to cover the cost of importing PD software from the US. To reduce costs, I thought I would offer PD software for other machines, is this possible? I know I can't run it but is it possible to upload and download software with the Amiga?

Also Amiga peripherals are much more expensive in the UK than they are in the US. Could you tell me what it entails in the way of import tax and VAT etc to import both hardware and software?

P.S. How many bytes are there in 1 Mega Byte?

A If you have an ST available then transferring files between the machines is simply a matter of hooking up an RS232 interface, and using a bit of terminal software at either end. As far as I know, you will not be able to read ST disks (or any other disks, beside Amiga, for that matter). What you need is a set protocol, say Xmodem, to make sure all of the files are compatible with other systems that will be accessing the BB. If the PD programs can be obtained in ASCII format then there should be no problems whatsoever in transferring them between machines. You might try hooking up to an ST BB and downloading some software to see how it goes?

AS far as I know, you can import anything you like from the US and all you have to pay is VAT and the p&p. This certainly applies if the goods are not for resale. However, I syspect that things may get a little more complex if you want to sell the goods you're importing.

A Mega byte, reputedly 1 million bytes, is actually 1048576 bytes or 2^{20} alternatively it is 1k times 1k or 1024 × 1024 i.e. 1048576.

Eye of a needle

Alan S Wolstencroft, of Knutsford, Cheshire, writes:

Q Ref. PCW of 28th August "Tied up with ribbons", I have found, using a Star DP510, that for some ribbons, the eyelets are so flat that they sometimes slip through the toggle so that the tape is run to the end and is scotched and printing stops, In such case the mechanical action can be rendered more positive by carefull insertion into each eyelet of a small brass paper clip of the bifurcated variety, suitably shortened with the ends folded in.

Concerning the user maintainance or printers, I find that it is possible to remove all superficial dust but there is little guidence on the removal of dust accumulating in the least accessible places- where, one supposes, it could cause real problems. Also I am uncertain as to the correct mode of lubrication, if any, of the round polished steel bar on which the printing head is carried.

Do you think PCW could publish something in the way of guidelines on printer maintenance?

A Thanks for the tip, I use 3in1 (sorry about the ad) oil on the bar in my printer which seems to work admirably. Just drip a little on when it gets too dry or begins to rattle. I suspect that the best thing is to use cotton buds (whups again) soaked in meths to get at the nooks and crannies but, as you say, there are some parts that are pretty well inaccesible without dissecting the printer. The best thing to do is keep the lid shut as much as possible and, if you use it professionally, get a maintenance contract.

Chalk and cheese

Stephen Chance, of Stockwell, London, writes:

Q Re 'Cheese Tasting Session' in Sept 4th issue.

I have only the disk version of Cheese, but hopefully the tape version is similar enough for the following information to be of use.

The bit map, colour RAM, and screen RAM are saved by Cheese as a single program file which loads from $8000 to $D000. The file is so large because, with vertical scrolling, Cheese creates a picture about half as big again as the actual hires screen. The main chunk of the bitmap is at $8000, the screen RAM at $C200, and the colour RAM at $C800. Also, the background colour, to be poked into $D021, is at $CFFD.

Unfortunately, to get a useful picture out of all of this, everthing has to be moved; with the bitmap at $8000, half of it is obscured from the VIC chip by the character generator ROM Image; $C200 is the midpoint of a text screen rather than the start address of one, and of course the colour RAM has to be relocated to $D800.

I find that the most convenient solution is to switch to Bank 3 ($C000 $FFFF), placing the bitmap at $E000, and screen RAM at $CC00. All this takes minutes in Basic, but the following machine code routine wil accomplish it in the twinkling of an eye.

To use, load a cheese file into memory i.e. LOAD "A.CHE",8,1 from disk or LOAD "",1,1 from tape, load and run the program and call SYS 32508. To return to normal call SYS 32571.

Actually, I wrote the program in the hope of a tenner from 'Bytes and Pieces' but you stole my thunder.

A Sorry about that, I'll have a word with the Editor and see what can be done.

continued on page 25 ▶

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◀ continued from page 22

ṢTicky, mouse

John Grimaldi, of Thornton Heath, London, writes:

Q I have had my ST for some months now and have just begun to experience problems with the Mouse. It has started to become very innaccurate, and has a sort of lumpy feel, I have an idea that it may need cleaning but I don't want to take it apart for reasons of warranty. Is this a common problem and how do I solve it?

A Turn the mouse over and you will see a section with two arrows on it. Push the section in the direction indicated and it will come off. Don't worry about it: that's what it's meant to do. Remove the ball and give it a wipe.

Next, peep inside and you will see three rollers, one for the x direction, one for the y direction, and one to keep things steady. These rollers should be silvery coloured, if they're not then they need cleaning.

The best way to remove the gunge is to scrape the rollers with a screwdriver or knife until they are gleaming again. Polish up with a bit of meths or lighter fuel if you like; but *don't* get it on the ball or the plastic bits, because it isn't at all good for them in the longer term. Try not to get too much gunge inside the mouse as this will eventually muck up the whole of the works.

If you clean the beastie once a month or so, you shouldn't have too many problems. If the mouse begins to squeak then you have got troubles, the best solution for which is a cage.

Character assassination

Stephen Howlett, of Morriston, Swansea, writes:

Q Is it possible to change the Spectrum's character set? I have designed a new set of numbers and letters using UDGs and I can change the Spectrum's to mine. The trouble is that I can only use 23 UDGs so I hope you can help.

Some would say that the Spectrum's character remains the same whatever you do to it . . .

A In the system variables there is a pointer to the character set which normally points to the ROM definitions. Change this to point to RAM, and the whole set can be redefined. Locations 23606 (low byte) and 23607 (high byte) hold the address 256 less than the start of the actual definitions. The first 32 characters (0-31) are control codes and therefore do not have shape definitions so, 8*32=256 i.e. the gap before the first character, space (32). Characters are defined on an 8×8 matrix of dots e.g.

```
00000000
00011000
00111000
00011000
00011000
00011000
01111110
01111110
```

Would define the 1 character shape. The following program demonstrates how this can be done from Basic: it copies the character set from Rom to RAM and redefines part of the A definition.

```
10 CLEAR 39999
20 PRINT "AAAAAA"
30 PRINT "CHARS NOW AT"
40 PRINT PEEK(23606),
PEEK(23607)
50 PRINT "I.E.",PEEK(23606)+
PEEK(23607)*256
60 FOR T=0 TO 127*8
70 POKE 4000+T, PEEK(15616
+T)
80 NEXT T
90 POKE 23607,INT ((4000
-256)/256)
100 POKE 23606,4000-256*INT
(40000/256)
110 PRINT "REDEFINE PART
OF A"
120 POKE 39744+(8*65),255
130 PRINT "AAAAAA"
```

RS232

D P Berkley, of York Electronic Research, The Fishergate Centre, 4 Fishergate, Yorks, writes:

Q I am writing in reply to Cristopher Adams' letter in the August issue of PCW concerning problems encountered in connecting a ZX-81 to a Brother printer.

The Brother range of printers support both hardware handshaking and X-on Xoff protocol, but unfortunately these mutually exclusive formats have been implemented in such a way as to prevent communication if the printer is not given a CTS signal, which requires modification to the D connector wiring, in order to overcome this problem the following connections should be made:
Pin 2 TX printer --> controller
Pin 3 RX controller --> printer
Pin 7 OV i.e. ground
Pin 20 RTS o/p low when printer is busy
pins 4, 5, 6, 8 should be connected together.

Y.E.R. will provide a cable specially wired for Brother printers with our Commodore C64/C128/Plus 4 RS232 interface for no extra cost. If any readers have difficulty in interfacing Commodore computers to Brother RS232 printers we would be happy to discuss technical problems. Phone 0904 610722.

A Ta.

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Kenn Garroch and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke, PCW*, 3rd Floor, Greencoat House, Francis Street, London SW1P 1DG.

The last waltz

In the fourth and last part of his series on computer sound, Kenn Garroch looks at analogue to digital convectors and speech.

Last week I mentioned that it is possible to use a sound chip to synthesize real sounds using amplitude modulation, changing the value in the volume register according to the waveform to be produced. The sounds produced were defined using sine synthesis, ie combinations of sine waves. Wave forms can also be defined from programming, some by using sampling devices known as ADCs (Analogue to Digital Converters). An ADC measures the amplitude or volume of a waveform at specific intervals returns the values as binary numbers on a data bus. These can be read into the computer and used with the sound chip or a DAC (Digital to Analogue Converter) to reproduce them. Sampled sounds can also be modified with computer programs to produce filters, echos, frequency changes etc. The crucial factor about ADCs is the speed at which they can convert the incoming waveform. For example, take a sine wave of 440Hz, if its amplitude was measured every second, the resulting set of numbers would be meaningless. Taking samples every 2.3ms i.e. 440 times a second is better but they will not look or sound like a sine wave.

To gain the best result, the sampling frequency must be at least twice the frequency being sampled e.g. 440Hz needs to be sampled at at least 880Hz or every 1·1mS to produce a result that at least represents the correct frequency on playback, ideally, higher sampling frequencies than this are desirable, and when using ADCs to sample sounds that can be heard i.e. in the range 20–20kHz, they must do a conversion at least once every 25µs. This should cover all the audible frequencies but will cause most computers and ADCs some problems. There are, however, ADCs that will operate at these frequencies and reproduce a respectable result.

Translating the sounds back from numerical to audible form can be done either with a sound chip as described before, or with a DAC which will produce a far superior result. Since eight bits is a convenient number format for computers, most ADCs quantify the amplitude of a sampled signal into values from 0–255 which can be read directly into a computer user port and stored quite conveniently in memory. Most sound chips only allow volume values from 0–15 so the signal must be reduced 16 times to output it via this method. This reduces the quality, but an eight bit DAC will reproduce the sound, more or less, at the quality at which it was sampled.

An eight bit DAC simply converts values form 0–255 into voltages with the same increment, i.e. if the output is to vary between 0 and 5V then the DAC will split this into 256 steps or units of 0.02V.

There are a number of commercial ADC/DAC units available for home micros, generally used for speech synthesis. They can record sounds which are stored in memory, and then reproduce them in normal or modified form (see ST Update September–November 1987 for a circuit that is easily adapted to any micro with an i/o port).

ADC/DAC systems are used along with special speech chips because of the amount of information contained in the spoken word. A speech synthesis chip normally uses phonemes, or parts of word sounds, to create its vocabulary. All words can be broken down into sections, each of which is a distinctive sound, and can be recombined in different ways to produce reasonably intelligible speech. These phonemes (or, more accurately, allophones) are much more suited to speech synthesis than having each word available in memory because they take up so much less space. Consider a sampled word that lasts half a second sampling at 40kHz into eight bits produces 20000 bytes, quite a lot of memory even by today's standards.

Storing phonemes themselves takes up a lot of space, the thing is that the data is held in ROM is a special chip that includes the DAC and all of the gear necessary to reproduce the sound. All the programmer has to do is select the required sequence of phonemes to produce the desired word. Most words will split into less than 5 or 6 phonemes so the computer is not handling very much data.

The main drawback with speech synthesis chips is that they tend to be rather roboty and usually have American accents – the BBC micro speech chip is an exception in that it uses a British news reader as its basis. The main problem with phonemes is that they don't convert from text to sound, as spelling is inconsistent.

All in all, there is a lot that can be done with sounds and computers. It is difficult to cover it all in a few articles. Any detailed description has to be machine specific since there is no standardisation. I have tried to give an overall view.

```
100 REM SYS 32508 TO VIEW CHEESE FILE
110 REM SYS 32571 TO VIEW TEXT
120 POKE 55,251:POKE 56,126:CLR
130 A=32508:B=200
140 FORZ=0TO21:C=0:FORY=0TO11
150 READD:C=C+D:IF D<256 THEN POKEA,D
160 A=A+1:NEXT
170 READD:IFC<>D THEN GOSUB190
180 B=B+10:NEXT:END
190 PRINT"ERROR IN LINE"B:RETURN
200 DATA 32,9,127,32,105,127,32,155,127,32,205,127,1110
210 DATA 96,173,2,221,9,3,141,2,221,173,17,208,1266
220 DATA 9,32,141,17,208,173,0,221,41,252,141,0,1235
230 DATA 221,173,22,208,9,16,141,22,208,169,56,141,1386
240 DATA 24,208,173,33,208,141,255,127,173,253,207,141,1943
250 DATA 33,208,96,173,2,221,9,3,141,2,221,173,1282
260 DATA 17,208,41,223,141,17,208,173,0,221,41,252,1542
270 DATA 9,3,141,0,221,173,22,208,41,239,141,22,1220
280 DATA 208,169,21,141,24,208,173,255,127,141,33,208,1708
290 DATA 96,169,0,133,251,169,128,133,252,169,0,133,1633
300 DATA 253,169,224,133,254,160,0,177,251,145,253,165,2184
310 DATA 253,201,63,208,7,165,254,201,255,208,1,96,1912
320 DATA 230,251,208,2,230,252,230,253,208,2,230,254,2350
330 DATA 76,123,127,169,0,133,251,169,194,133,252,169,1796
340 DATA 0,133,253,169,204,133,254,160,0,177,251,145,1879
350 DATA 253,165,253,201,232,208,7,165,254,201,207,208,2354
360 DATA 1,96,230,251,208,2,230,252,230,253,208,2,1963
370 DATA 230,254,76,173,127,169,0,133,251,169,200,133,1915
380 DATA 252,169,0,133,253,169,216,133,254,160,0,177,1916
390 DATA 251,145,253,165,253,201,255,208,7,165,254,201,2358
400 DATA 219,208,1,96,230,251,208,2,230,252,230,253,2180
410 DATA 208,2,230,254,76,223,127,234,85,256,256,256,2207
```

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Newsmaker

Simon T Goodwin

Desktop publishing involves the design, manipulation and printing of a page of text and graphics. Posters, adverts or newsletters can be produced with ease and stored for future use. The computer stores the page in memory (one page takes 51K) and the user can work on one third of the page at any one time. Switching between the three parts of the page is quick and easy.

To get the program up and running you must type in two programs. Program I is Basic, while. Program II is a machine code listing. Run Program II first. This pokes in the machine code data. If errors are found a message will be displayed. If the data has been typed in correctly a file "pager.bin" will be saved onto the disc.Program II can then be deleted. Running Program I loads the machine code and enters the main program. Remember this program is 6128 only. It may run on an expanded 464/664 but the commands prefixed by a ":" may need to be altered.

Newsmaker is menu driven throughout. To move the pointer use the cursor keys. The Copy keys selects an option from the menu. Pressing the Esc key returns to the main menu. The main menu headings are Text, Graphics, Banner, Files, Print and Miscellaneous and are displayed at the top of the screen.

Text

Upon selecting this option you are greeted with three options: Load File, Enter Text and Exit. (An exit option is included on all sub-menus. Selecting it returns to the main menu). The Load File option can be used on word-processor files (Protext Program files and Mini Office II files work) or ordinary ascii files. Move the cursor to the position you want the text to appear at and press Copy. Then type the name of the program. If you load text into a shape (say as triangle) it will fill it. Whenever the program runs out of space it displays an overflow menu. Then you can either return to the menu or chose another position to start printing more text. The Enter Text option lets you type text directly on screen. The Cursor keys and the Delete key can be used to move the cursor. Pressing Clr returns to the main menu.

Graphics

This is perhaps the most rewarding way of using this program. A number of options are available: Dot mode, Line mode, Fill, Spray, Cut and Paste. The Dot and Spray modes can be used to write or erase (type E or W when the menu appears). Pressing Copy produces either a dot or a spray pattern depending on which option you use. Line mode surprisingly enough allows lines to be drawn. Use cursors and Copy to set the location of one end of the line, then do the same for the other end of the line. To use the Fill option you must already have moved the cursor to the required position. Be careful here as one false move can ruin your designs. The Cut and Paste options allow you to move chunks of graphics and text from one screen location to another. To Cut you must set the position, width and depth of the area to be cut using the Cursors and Copy. The Paste option allows you to display the graphics you have cut anywhere on the screen. You must set the position to paste, again using Cursors and Copy. You can even move text from one of the three screens to another.

As this is a three week listing, more instructions are given next week. Also, if you'd like a copy of *Newsmaker* on disc then send £7.00 to 41 Fountains Drive, Acklam, Middlesborough, Cleveland T55 7LW.

```
10 REM ********************************
20 REM *** NEWSMAKER Program I       ***
30 REM *** ST Goodwin August 1987    ***
40 REM ********************************
50 REM
60 ON ERROR GOTO 4720
65 ON BREAK GOSUB 4730
80 SYMBOL AFTER 32
90 MEMORY 37999
100 MODE 2
110 LOAD "pager":CALL 38000
120 |BANK,5:|MOVE,49152,16384,16384:|BAN
K,0
130 |BANK,6:|MOVE,49152,16384,16384:|BAN
K,0
140 |BANK,7:|MOVE,49152,16384,16384:|BAN
K,0
150 |BANK,0
160 MODE 2:PAPER 0:PEN 1:BORDER 13:INK 0
,26:INK 1,0
170 :
180 :
190 DEFINT a-z:DIM b(12),cf(80,2):FOR a=
0 TO 6:b(a*2)=2^(6-a):NEXT
200 storex=100:storey=100:dense=5:scrn=1
210 z=20000:pas=25000
220 :
230 :
240 WHILE 1
250 eror=0
260 PEN 1
270 RESTORE 4650
280 LOCATE 1,1:PRINT SPACE$(80)
290 LOCATE 1,2:PRINT SPACE$(80)
300 TAG:FOR n=30 TO 600 STEP 96:MOVE n,3
90:READ a$:PRINT a$;:NEXT:TAGOFF
310 PLOT -5,-5,1
320 PLOT 3,368:DRAWR 632,0:DRAWR 0,28:DR
AWR -632,0:DRAWR 0,-28
330 a%=0:|MENU,6,1,1,0,0,28,390,@a%
340 ON a% GOSUB 390,1380,2430,2740,3460,.
3960
350 WEND
360 END
370 :
380 :
390 |CUT,49152+160,z,20,100
400 |FWINDOW,55457,13,90,0
410 PLOT 10,360:GOSUB 4590
420 RESTORE 4660:|UPRINT,20,346,"Text"
430 TAG:FOR n=1 TO 3:READ a$:MOVE 20,330
-(n*16):PRINT a$;:NEXT:TAGOFF
440 a%=0:|MENU,3,0,0,1,1,20,314,@a%
450 |PASTE,49152+160,z,20,100
460 IF a%=2 THEN GOSUB 520
470 IF a%=1 THEN GOSUB 740
480 IF a%=3 THEN RETURN
490 RETURN
500 :
510 :
520 GOSUB 1030
530 rt=1:GOSUB 2660:rt=0:FOR n=1 TO 255:
CALL &BB1B:NEXT
540 mk=1:stx=x:sty=y:LOCATE x,y:CALL &BB
B1
550 WHILE 1
560 a$=INKEY$
570 IF A$=CHR$(127) THEN GOSUB 690:GOTO
600
580 IF x=80 AND y=25 THEN 600
590 IF a$<>"" THEN IF ASC(a$)<240 THEN
LOCATE x,y:PRINT a$;:x=X+1
600 IF x=80 AND y<25 THEN cf(mk,1)=x:cf(
mk,2)=y:mk=mk+1:x=stx:y=y+1
610 IF a$=CHR$(13) AND y<25 THEN cf(mk,1
)=x:cf(mk,2)=y:mk=mk+1:x=stx:y=y+1:LOCAT
E X,Y
620 IF a$=CHR$(240) AND y>sty THEN PRINT
 CHR$(11);:y=y-1
```

```
630 IF a$=CHR$(241) AND y<25 THEN PRINT
CHR$(10);:y=y+1
640 IF a$=CHR$(242) THEN GOSUB 1000
650 IF a$=CHR$(243) AND x<80 THEN PRINT
CHR$(9);:x=x+1:IF x=80 AND y<25 THEN x=s
tx:y=y+1:LOCATE stx,y
660 IF mk=80 THEN CALL &BB84:RETURN
670 IF a$=CHR$(&10) THEN CALL &BB84:RETU
RN
680 WEND
690 IF x=stx AND y=sty THEN RETURN
700 PRINT CHR$(8);" ";CHR$(8);:IF x=stx
THEN x=cf(mk-1,1)-1:y=cf(mk-1,2):mk=mk-1
:LOCATE x,y:PRINT CHR$(16);CHR$(8);:ELSE
 x=x-1
710 LOCATE X,Y:RETURN
720 :
730 :
740 ex=0:GOSUB 1030:rt=1:GOSUB 2660:rt=0
750 tx=x:ty=y:LOCATE tx,ty
760 x2=(x*8)-8:y2=((25-y)*16)+16:stx=x2
770 !CUT,49152+160,z,42,60:!FWINDOW,5545
7,40,50,0:MOVE 10,360:GOSUB 4600
780 WINDOW 4,40,4,8:FOR n=1 TO 255:CALL
&BB1B:NEXT
790 INPUT "Filename ",f$
800 IF f$="" OR LEN(f$)>8 THEN 790
810 !PASTE,49152+160,z,42,60:WINDOW 1,80
,1,25
820 mkr=0:OPENIN(f$)
830 WHILE NOT(EOF)
840 LINE INPUT #9,a$(1)
850 FOR n=1 TO LEN(a$(1))
860 IF ASC(MID$(a$(1),n,1))=0 THEN PRINT
 CHR$(7):x=tx:y=y+1:x2=stx:y2=y2-16:GOSU
B 1330:IF df=1 THEN GOSUB 1140:ELSE IF y
<26 THEN PRINT:GOTO 910
870 LOCATE x,y:PRINT MID$(a$(1),n,1);
880 x=x+1:x2=x2+8
890 IF x=81 THEN x=tx:y=y+1:x2=stx:y2=y2
-16:GOSUB 1330:IF df=1 THEN GOSUB 1140:E
LSE IF y<26 THEN PRINT:GOTO 910
900 GOSUB 1300:IF df=1 THEN x=tx:y=y+1:x
2=stx:y2=y2-16:GOSUB 1330:IF df=1 THEN G
OSUB 1140:ELSE IF y<26 THEN PRINT
910 IF y=26 THEN GOSUB 1140
920 IF ex=1 THEN GOTO 970
930 NEXT:x=tx:y=y+1:x2=stx:y2=y2-16:GOSU
B 1330:IF df=1 THEN GOSUB 1140
940 IF y<26 THEN PRINT:ELSE GOSUB 1140
950 WEND
960 CLOSEIN
970 RETURN
980 :
990 :
1000 IF x>stx THEN PRINT CHR$(8);:x=x-1:
RETURN
1010 IF x=stx AND y>sty THEN x=79:y=y-1:
LOCATE x,y:RETURN
1020 RETURN
1030 FOR n=1 TO 255:CALL &BB1B:NEXT:GOSU
B 2340
1040 WINDOW 1,80,1,25
1050 LOCATE 15,5:PRINT "MOVE CURSOR AND
PRESS COPY TO"
1060 LOCATE 15,6:PRINT "LOCATE TEXT."
1070 LOCATE 15,8:PRINT "Press a key"
1080 WHILE INKEY$="":WEND
1090 !PASTE,49152+160+13,z,40,100
1100 x=storex:y=storey:GOSUB 4390:storex
=x:storey=y
1110 RETURN
1120 :
1130 :
1140 !CUT,55457,z,42,60
1150 !FWINDOW,55457,40,56,0:MOVE 10,360:
GOSUB 4600:WINDOW 4,40,4,8
1160 ex=0
1170 INPUT "Do you want to (E)xit or (S)
end the  rest of the text to another pla
ce   ";e$
1180 e$=LOWER$(e$)
1190 IF e$="e" THEN ex=1:CLOSEIN:WINDOW
1,80,1,25:!PASTE,55457,z,42,60:RETURN
1200 IF e$<>"s" THEN 1170
1210 !PASTE,55457,z,42,60
1220 GOSUB 1030
1230 rt=1:GOSUB 2660:rt=0
1240 tx=x:ty=y:LOCATE tx,ty
1250 mkr=0
1260 x2=(x*8)-8:y2=((25-y)*16)+16:stx=x2
1270 RETURN
1280 :
1290 :
1300 df=0:FOR tgh=x2+6 TO x2+16
1310 IF TEST( tgh,y2 d) <>0 THEN df=1
1320 NEXT:RETURN
1330 df=0:FOR tgh=y2 z TO y2 16 STEP  2
1340 IF TEST( x2+4,tgh) <>0 THEN df=1
1350 NEXT:RETURN
1360 :
1370 :
1380 !CUT,49152+160+13,z,20,100
1390 !FWINDOW,55469,13,90,0
1400 PLOT 105,360:GOSUB 4590
1410 RESTORE 4670:!UPRINT,120,346,"Graph
ics"
1420 TAG:FOR n=1 TO 7:READ a$:MOVE 120,3
30-(n*16):PRINT a$;:NEXT:TAGOFF
1430 a%=0:!MENU,7,0,0,1,1,120,316,@a%
1440 !PASTE,49152+160+13,z,20,100
1450 ON a% GOSUB 1490,1630,1730,1770,187
0,2130,2310
1460 RETURN
1470 :
1480 :
1490 GOSUB 2340:INPUT "(W)rite or (E)ras
e";e$:e$=LOWER$(e$)
1500 IF e$="w" THEN penn=1:GOSUB 2400:EL
SE IF e$="e" THEN penn=0:GOSUB 2400:ELSE
 GOSUB 2400:GOTO 1490
```

```
10 REM ------------------------------
20 REM -     Newsmaker Program II     -
30 REM -    By Simon.T.Goodwin 1987   -
40 REM ------------------------------
50 REM
60 MEMORY 37999
70 linenumber=210:address=38000
80 FOR n=1 TO 161
90 count=0
100 FOR i=0 TO 7
110 READ a$:POKE address,VAL("&"+a$)
120 address=address+1
130 count=count+VAL("&"+a$)
140 NEXT i
150 READ check$:check=VAL("&"+check$)
160 IF count<>check THEN PRINT "Error in
 line";linenumber:END
170 linenumber=linenumber+10
180 NEXT n
190 REM
200 SAVE "pager",b,38000,1286
210 DATA 01,7A,94,21,E0,94,CD,D1,442
220 DATA BC,C9,A0,94,C3,75,95,C3,549
230 DATA 9F,95,C3,DF,95,C3,C9,95,58C
240 DATA C3,6D,96,C3,10,96,C3,C3,485
250 DATA 96,C3,2E,97,C3,F5,98,C3,531
260 DATA FC,98,C3,0F,95,C3,11,99,468
270 DATA 43,55,D4,50,41,53,54,C5,369
280 DATA 54,43,4F,4F,52,C4,47,43,2D5
290 DATA 4F,4F,52,C4,45,4D,50,48,2DE
300 DATA 41,53,49,5A,C5,55,50,52,2F3
310 DATA 49,4E,D4,44,50,52,49,4E,2EB
320 DATA D4,4D,45,4E,D5,42,41,4E,35A
330 DATA CB,4D,4F,56,C5,46,57,49,368
340 DATA 4E,44,4F,D7,4C,4F,41,C4,358
350 DATA 00,00,00,00,00,00,00,00,0
360 DATA 00,00,00,00,00,00,00,00,0
370 DATA 00,00,00,00,00,00,00,00,0
380 DATA 00,00,00,00,00,00,00,00,0
390 DATA 00,00,00,FE,00,00,00,00,FE
400 DATA 01,01,01,01,00,00,00,DD,E1
410 DATA 6E,06,DD,66,07,DD,4E,02,2EB
420 DATA DD,46,04,DD,7E,00,32,03,2B7
430 DATA 95,CD,F6,95,C9,C5,E5,1A,57A
440 DATA 77,23,13,10,FA,E1,01,00,299
450 DATA 08,09,30,04,01,50,C0,09,15F
460 DATA C1,0D,20,E9,C9,7A,2F,57,3A0
470 DATA 7B,2F,5F,13,E5,AF,67,6F,386
480 DATA E3,7A,B3,20,02,E1,C9,06,3E2
490 DATA 11,CB,15,CB,14,3B,10,10,228
500 DATA F8,1B,14,E3,E5,19,30,01,336
510 DATA E3,E1,E3,CB,15,CB,14,E3,549
520 DATA CB,15,CB,14,E3,10,EC,D1,46F
530 DATA CB,2A,CB,1B,C9,DD,6E,06,3F5
540 DATA DD,66,07,DD,5E,04,DD,56,3BC
550 DATA 05,DD,4E,00,DD,46,02,C5,31A
560 DATA E5,7E,12,23,13,10,FA,E1,396
570 DATA 01,00,08,09,30,04,01,50,97
580 DATA C0,09,C1,0D,20,E9,C9,DD,446
590 DATA 6E,06,DD,66,07,DD,5E,04,2FC
```

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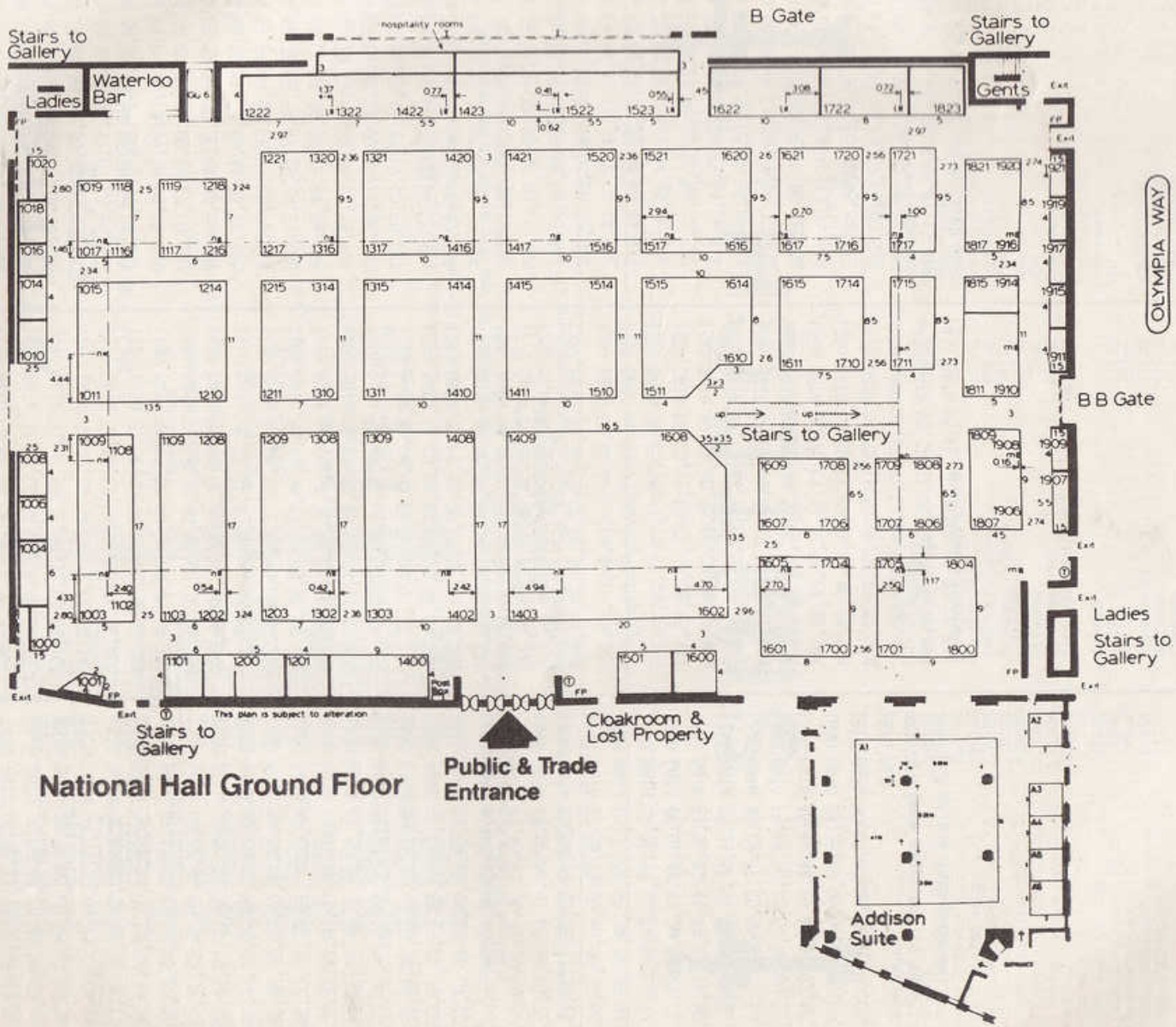
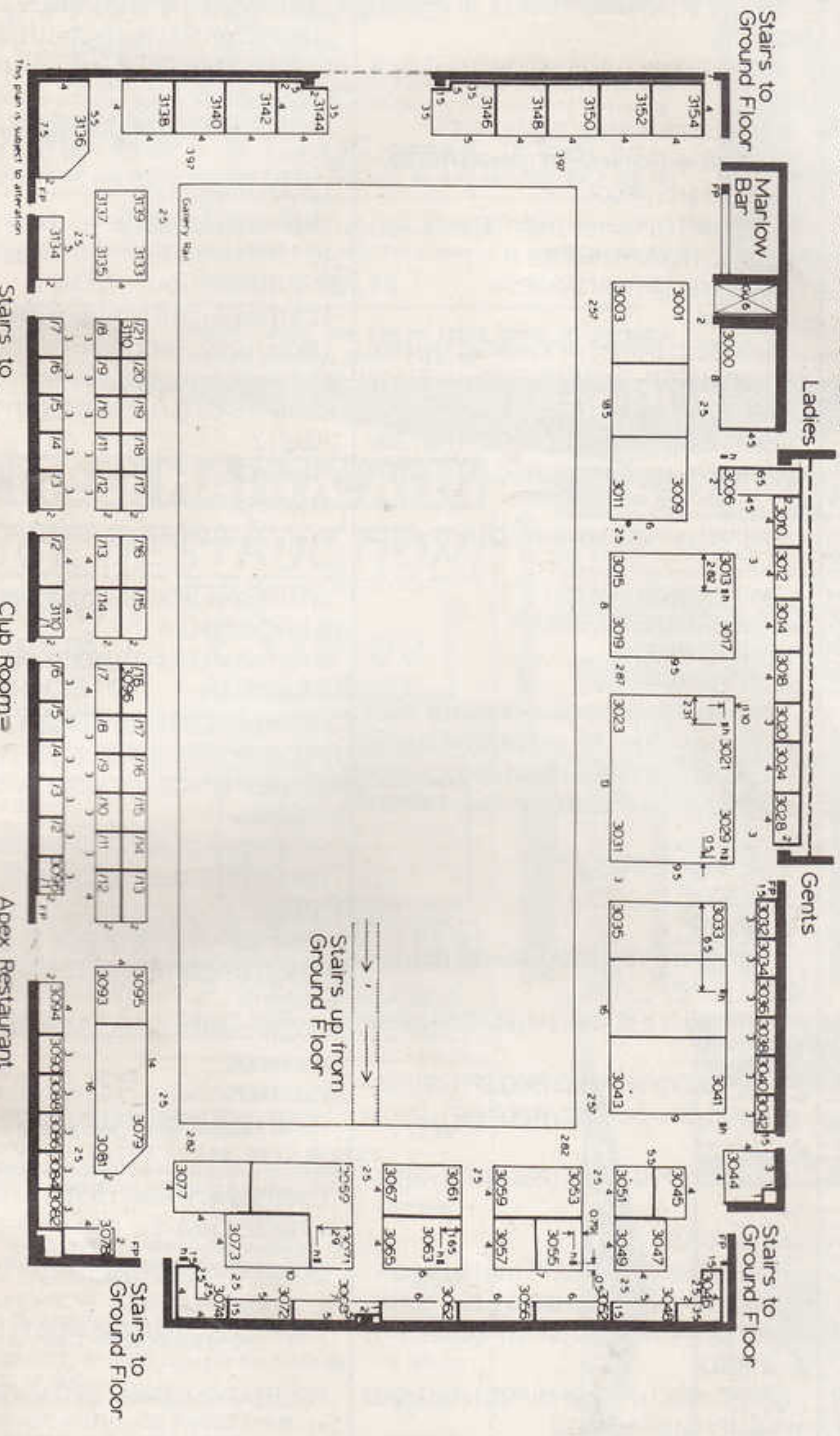
600 DATA DD,56,05,DD,4E,00,DD,46,386
610 DATA 02,C5,E5,1A,77,23,13,10,2B3
620 DATA FA,E1,01,00,08,09,30,04,221
630 DATA 01,50,C0,09,C1,0D,20,E9,2F1
640 DATA C9,DD,6E,02,DD,66,03,DD,439
650 DATA 5E,04,DD,56,05,CB,3C,CB,36C
660 DATA 1D,CD,1D,BC,18,0C,C9,DD,38D
670 DATA 6E,02,DD,66,04,2D,25,CD,2D6
680 DATA 1A,BC,DD,5E,00,DD,56,01,345
690 DATA 7D,12,13,7C,12,C9,C5,E5,3A3
700 DATA 3A,03,95,77,23,13,10,F8,2B7
710 DATA E1,01,00,08,09,30,04,01,128
720 DATA 50,C0,09,C1,0D,20,E7,C9,3B7
730 DATA CD,58,96,DD,5E,04,DD,56,42D
740 DATA 05,DD,6E,02,DD,66,03,ED,385
750 DATA 53,E4,94,22,E6,94,CD,C0,4F4
760 DATA BB,3A,E8,94,47,DD,2A,E9,4AB
770 DATA 94,CD,B3,96,2A,E6,94,06,454
780 DATA 10,2B,10,FD,ED,5B,E4,94,408
790 DATA CD,C0,BB,21,00,00,11,08,282
800 DATA 00,3A,E8,94,47,19,10,FD,323
810 DATA EB,21,00,00,CD,F9,BB,C9,456
820 DATA DD,6E,00,DD,66,01,7E,32,33F
830 DATA E8,94,23,7E,32,E9,94,23,3EF
840 DATA 7E,32,EA,94,C9,CD,58,96,482
850 DATA 3E,17,CD,5A,BB,3E,03,CD,345
860 DATA 5A,BB,DD,5E,04,DD,56,05,38C
870 DATA DD,6E,02,DD,66,03,ED,53,3D3
880 DATA E4,94,22,E6,94,CD,C0,BB,55C
890 DATA 3A,E8,94,47,DD,2A,E9,94,481
900 DATA CD,B3,96,2A,E6,94,2B,2B,410
910 DATA ED,5B,E4,94,CD,C0,BB,3A,542
920 DATA E8,94,47,DD,2A,E9,94,CD,514
930 DATA B3,96,C9,3E,05,CD,5A,BB,437
940 DATA DD,7E,00,CD,5A,BB,DD,23,43D
950 DATA 10,F1,C9,DD,5E,00,DD,56,438
960 DATA 01,1A,47,13,1A,6F,13,1A,12B
970 DATA 67,13,7E,C5,E5,CD,DE,96,4E3
980 DATA E1,C1,23,10,F5,C9,CD,A5,5D5
990 DATA BB,11,EB,94,06,08,CD,06,32C
1000 DATA B9,7E,F5,CD,09,B9,F1,12,4BE
1010 DATA 23,13,10,F2,06,08,21,EB,252
1020 DATA 94,11,F3,94,7E,12,13,12,2E1
1030 DATA 13,23,10,F8,3E,FE,21,F3,38E
1040 DATA 94,CD,A8,BB,3E,FF,21,FB,51D
1050 DATA 94,CD,A8,BB,3E,FE,CD,5A,527
1060 DATA BB,3E,0A,CD,5A,BB,3E,08,32B
1070 DATA CD,5A,BB,3E,FF,CD,5A,BB,501
1080 DATA 3E,0B,CD,5A,BB,C9,3E,01,333
1090 DATA 32,0C,95,3E,00,32,0D,95,1E5
1100 DATA 3E,17,CD,5A,BB,3E,01,CD,343
1110 DATA 5A,BB,CD,BA,BB,DD,7E,0E,4C0
1120 DATA 32,0E,95,DD,7E,0C,32,0B,276
1130 DATA 95,DD,7E,0A,32,09,95,DD,3A7
1140 DATA 7E,08,32,0A,95,DD,7E,06,2B8
1150 DATA 32,0B,95,DD,5E,04,DD,56,344
1160 DATA 05,DD,6E,02,DD,66,03,ED,385
1170 DATA 53,04,95,22,06,95,CD,B6,2FC
1180 DATA 98,CD,98,97,3A,0D,95,FE,46E
1190 DATA 00,20,07,3E,42,CD,1E,BB,24D
1200 DATA 28,EF,CD,86,98,3E,17,CD,424
1210 DATA 5A,BB,3E,00,CD,5A,BB,C9,3FE
1220 DATA 3A,08,95,FE,00,28,07,3E,242
1230 DATA 08,CD,1E,BB,20,75,3A,09,2B6
1240 DATA 95,FE,00,28,07,3E,01,CD,2CE
1250 DATA 1E,BB,20,41,3A,0A,95,FE,311
1260 DATA 00,28,07,3E,00,CD,1E,BB,213
1270 DATA 20,7C,3A,0B,95,FE,00,28,29C
1280 DATA 08,3E,02,CD,1E,BB,C2,60,310
1290 DATA 98,7E,09,CD,1E,BB,20,01,2A6
1300 DATA C9,DD,6E,00,DD,66,01,3A,392
1310 DATA 0C,95,77,32,0D,95,C9,06,2BB
1320 DATA 50,C5,06,FF,10,FE,C1,10,3F9
1330 DATA F8,CD,19,BD,C9,3A,0E,95,441
1340 DATA 47,3A,0C,95,B8,C8,CD,E7,456
1350 DATA 97,CD,86,98,ED,5B,04,95,463
1360 DATA 21,60,00,AF,19,22,04,95,204
1370 DATA CD,86,98,3A,0C,95,3C,32,334
1380 DATA 0C,95,C9,3A,0C,95,FE,01,344
1390 DATA C8,CD,E7,97,CD,86,98,2A,528
1400 DATA 04,95,11,60,00,AF,ED,52,2F8
1410 DATA 22,04,95,CD,86,98,3A,0C,2EC
1420 DATA 95,3D,32,0C,95,C9,3A,0C,2B4
1430 DATA 95,FE,01,C8,CD,E7,97,CD,574
1440 DATA 86,98,2A,06,95,11,10,00,204
1450 DATA AF,19,22,06,95,CD,86,98,370
1460 DATA 3A,0C,95,3D,32,0C,95,C9,2B4
1470 DATA 3A,0E,95,47,3A,0C,95,B8,2B7
1480 DATA C8,CD,E7,97,CD,86,98,2A,528
1490 DATA 06,95,11,10,00,AF,ED,52,2AA
1500 DATA 22,06,95,CD,86,98,3A,0C,2EE
1510 DATA 95,3C,32,0C,95,C9,ED,5B,3B5
1520 DATA 04,95,2A,06,95,CD,C0,BB,3A6
1530 DATA 3E,05,CD,5A,BB,3E,8F,CD,3BF
1540 DATA 5A,BB,3E,05,CD,5A,BB,3E,378
1550 DATA 8F,CD,5A,BB,3E,05,CD,5A,3DB
1560 DATA BB,3E,8F,CD,5A,BB,3E,05,3AD
1570 DATA CD,5A,BB,3E,8F,CD,5A,BB,491
1580 DATA 3E,05,CD,5A,BB,3E,8F,CD,3BF
1590 DATA 5A,BB,3E,05,CD,5A,BB,3E,378
1600 DATA 8F,CD,5A,BB,3E,05,CD,5A,3DB
1610 DATA BB,3E,8F,CD,5A,BB,3E,05,3AD
1620 DATA CD,5A,BB,3E,8F,CD,5A,BB,491
1630 DATA 3E,05,CD,5A,BB,3E,8F,CD,3BF
1640 DATA 5A,BB,3E,05,CD,5A,BB,3E,378
1650 DATA 8F,CD,5A,BB,C9,DD,7E,00,495
1660 DATA CD,58,BD,C9,DD,6E,04,DD,40A
1670 DATA 66,05,DD,56,03,DD,5E,02,2DE
1680 DATA DD,46,01,DD,4E,00,ED,B0,3EC
1690 DATA C9,DD,6E,02,DD,66,03,7E,3DA
1700 DATA 32,5A,99,23,5E,23,56,EB,30A
1710 DATA 22,5B,99,DD,6E,00,DD,66,3A4
1720 DATA 01,22,5D,99,3A,5A,99,47,28D
1730 DATA 2A,5B,99,11,F8,07,CD,77,372
1740 DATA BC,D2,49,99,2A,5D,99,CD,45D
1750 DATA 83,BC,D2,49,99,CD,7A,BC,4F6
1760 DATA C9,21,5F,99,06,0B,CD,52,312
1770 DATA 99,C9,7E,CD,5A,BB,23,10,3F5
1780 DATA F9,C9,00,00,00,00,00,52,214
1790 DATA 45,41,44,20,45,52,52,4F,222
1800 DATA 52,2E,00,00,00,00,00,00,80
1810 DATA 00,00,00,00,00,00,00,00,0
1820 REM
1830 REM Once pager.bin is saved
1840 REM delete this program.
```



National Hall Ground Floor

PCW Show floorplan and show guide



Company	Stand No
Acorn	1303
Activision	1417
Adventuresoft	1100
Amstrad	1403
Anco	3059
Anglo Computers	0316
Arnor	1915
Atari	Atari Village
Babani Publishing	1001
Bubble Bus	1008
Cambridge Computers	1607
Commodore	CBM Village
Compuprint	4002
Computer Bookshops	2212
CRL	3142
Cumana	2026
D & H Games	3096
Digital Integration	1201
Direct Disk	3096
Domark	3035
Durell	3146
Electric Dreams	1317
Electromusic Research	3030
Electronic Arts	1517
Hi-Soft	3077
Kuma	3154
Level 9	3066
Lightwave Leisure	1018
Llamasoft	3093
Martech	3009
Mastertronic	1109
Mattel	3032
Micronet	3143
Microprose	1511
Miracle Technology	4042
Mirrorsoft	1601
Newsfield	3047
Novagen	3062
Ocean	1411
Pace Micro Technology	4026
Piranha	1617
Popular Computing	3021
Precision	4208
RAM Electronics	4015
Robtek	1117
Romantic Robot	1921
Samsung	2010
Sentinel	2116
Software Projects	3140
Superior	3096
Tasman	1916
Trojan	3017
Tynesoft	1722
US Gold	1311
Virgin Games	3096

Blackwolf

J Myatt

Part two of Blackwolf is presented this week. To complete the game you must make it to the door marked IN, while collecting a series of keys for the locked doors, a gun to shoot the ants, an axe for opening a pair of trees, and avoiding the giant ants, the rolling barrels, and the two types of gun posts.

```
700IFX%<2X%=16:PROCC:PROCLEFT1:GOTO960
710IFY%>24Y%=3:PROCC:PROCBACK1:GOTO730
720GOTO650
730Q=11:PROCWAL1:Q=18:PROCWAL1:Q=25:PR
OCWAL1
740P=4:Q=1:PROCH2:P=13:Q=2:PROCR1:FORQ
=3 TO 6:PROCR2:NEXTQ:PROCR3:P=2:Q=6:PRO
CT:P=4:Q=7:PROCT:P=15:Q=4:PROCH2:P=11:Q=
6:PROCT
750IFK4%=0:COLOUR128:COLOUR7:VDU31,12,
8:VDU212
760PROCRE:BE%=0
770PROCM
780IFK4%=0:IFX%=11ANDY%=8:PROCTING:K4%
=1
790IFX%<5ANDBE%=0ST%=1
800IFY%>10:IFST%=0:PROCANT
810ST%=0
820IFX%>16X%=2:PROCC:PROCRIGHT1:GOTO20
0
830IFY%<3:Y%=24:PROCC:PROCFRONT1:GOTO5
90
840IFX%<2X%=16:PROCC:PROCLEFT1:GOTO880
850IFX%>6:IFY%=50RY%=6:O%=470:P%=850:P
ROCL
860IFX%<11:IFY%=20RY%=3:O%=350:P%=945:
PROCL
870DE%=0:GOTO770
880Q=11:PROCWAL2:Q=18:PROCWAL2:Q=25:PR
OCWAL1
890P=2:Q=2:PROCH:P=13:FORQ=1 TO 6:PRO
CR2:NEXTQ:PROCR3:P=5:Q=7:PROCT:P=1:Q=6:P
ROCT
900PROCRE
910PROCM
920IFX%>16X%=2:PROCC:PROCRIGHT1:GOTO73
0
930IFX%<2:PROCC:X%=16:PROCLEFT1:GOTO22
70
940IFY%<3PROCC:Y%=24:PROCFRONT1:GOTO96
0
950GOTO910
960P=13:Q=18:PROCR1:FORQ=19 TO 25:PRO
CR2:NEXTQ
970Q=4:PROCWAL1:Q=10:PROCWAL1:P=3:Q=24
:PROCT
980P=4:Q=19:PROCH:P=2:Q=19:PROCT
990IFD9%=0:P=5:Q=13:COLOUR130:PROCDOV
1000P=14:Q=12:PROCH
1010P=4:Q=11:PROCH:N=1085:FORM=478 TO
680STEP32:PROCRIV1:NEXTM
1020PROCRE:J%=20:ST%=0:BE%=0
1030PROCM
1040IFK9%=1:IFD9%=0:IFX%=6ANDY%>10:PROC
TING:D9%=1:VDU4:COLOUR128:FORT=14 TO 18
:VDU31,5,T:VDU32:NEXTT
1050IFY%>24Y%=3:PROCC:PROCBACK1:GOTO880
1060IFX%<2:X%=16:PROCC:PROCLEFT1:GOTO21
80
1070IFX%>16:PROCC:X%=2:PROCRIGHT1:GOTO5
90
1080IFX%<5ANDBE%=0ST%=1
1090IFY%<9:IFST%=0:PROCANT
1100IFY%>7PROCBAR
1110DE%=0:GOTO1030
1120Q=11:PROCWAL2:Q=18:PROCWAL1:Q=25:PR
OCWAL1:P=1:FORW=1 TO 6:PROCR2:NEXTQ:PRO
CR3:P=3:Q=2:PROCH2:P=14:Q=5:PROCH2:P=15:
Q=1:PROCH:P=16:Q=6:PROCT:P=15:Q=19:PROCH
2
1130P=6:Q=13:PROCT
1140PROCRE
1150PROCM
1160IFX%>7:IFY%=60RY%=7:O%=420:P%=815:P
ROCL
1170IFX%<12:IFY%=30RY%=4:O%=320:P%=910:
PROCL
1180IFX%<2X%=16:PROCC:PROCLEFT1:GOTO60
1190IFY%<3Y%=24:PROCC:PROCFRONT1:GOTO12
20
1200IFX%>16PROCC:X%=2:PROCRIGHT1:GOTO13
60
1210GOTO1150
1220IFD2%=0:COLOUR128:P=3:Q=14:PROCDOV
1230P=1:Q=20:PROCR1:FORQ=21 TO 25:PROC
R2:NEXTQ:Q=4:PROCWAL1:Q=10:PROCWAL1:P=2:
Q=12:PROCH
1240P=5:PROCT:P=15:Q=25:PROCT:P=13:Q=22
:PROCT:P=16:Q=19:PROCH2
1250P=15:Q=13:PROCH:P=9:Q=12:PROCT:P=13
:Q=14:PROCT:P=14:Q=17:PROCT
1260PROCRE:BE%=0
1270PROCM
1280IFX%>7:IFY%=20RY%=21:O%=530:P%=370
:PROCL
1290IFX%<5ANDBE%=0:ST%=1
1300IFY%<9:IFST%=0:PROCANT
1310IFY%>24Y%=3:PROCC:PROCBACK1:GOTO112
0
1320IFX%<2X%=16:PROCC:PROCLEFT1:GOTO310
1330IFD2%=0:IFX%=4:IFK2%=1:PROCTING:D2%
=1:VDU4:COLOUR128:FORT=15 TO 19:VDU31,3
,T:VDU32:NEXTT
1340IFX%>16X%=2:PROCC:PROCRIGHT1:GOTO14
60
1350ST%=0:GOTO1270
1360P=1:Q=16:PROCR1:P=13:PROCR1:FORQ=17
TO 24:P=1:PROCR2:P=13:PROCR2:NEXTQ:PRO
CR3:P=1:PROCR3:Q=11:PROCWAL1
1370IFD6%=0:COLOUR130:Q=18:PROCDOH
1380P=7:Q=22:PROCT:P=11:PROCT:P=9:Q=25:
PROCT:P=15:Q=12:PROCH2
1390IFK7%=0:COLOUR128:COLOUR1:VDU31,9,2
3:VDU212
1400PROCRE
1410PROCM
1420IFX%<2X%=16:PROCC:PROCLEFT1:GOTO112
0
1430IFK6%=1:IFD6%=0:IFY%=17:PROCTING:Q=
18:PROCDOVC:D6%=1
1440IFK7%=0:IFY%=23:PROCTING:K7%=1
1450GOTO1410
1460Q=4:PROCWAL2:Q=10:PROCWAL1:P=15:Q=5
:PROCH2:P=1:Q=13:PROCR1:FORQ=14 TO 23:P
ROCR2:NEXTQ:PROCR3:P=13:Q=13:PROCH:P=16:
Q=12:PROCT
1470IFD8%=0:COLOUR130:Q=14:PROCDOH
1480IFK9%=0:COLOUR128:COLOUR2:VDU31,8,2
1:VDU212
1490P=13:Q=17:PROCR1:FORQ=18 TO 23:PRO
CR2:NEXTQ:PROCR3:P=8:Q=22:PROCH:P=11:Q=2
4:PROCT
1500IFK1%=0:VDU31,15,12:COLOUR1:VDU212
1510PROCRE
1520PROCM
1530IFX%>7:IFY%=60RY%=7:O%=500:P%=820:P
ROCL
1540IFD8%=0:IFK8%=1:IFY%=13:PROCTING:Q=
14:PROCDOVC:D8%=1
1550IFK9%=0:IFX%=7ANDY%=21:PROCTING:K9%
=1
1560IFX%<2X%=16:PROCC:PROCLEFT1:GOTO122
0
1570IFK1%=0:IFX%=14:IFY%=12:PROCTING:K1
%=1
1580IFY%<3:Y%=24:PROCC:PROCFRONT1:GOTO1
980
1590GOTO1520
1600P=4:Q=22:PROCH:Q=11:PROCH:P=13:Q=22
:PROCH:Q=11:PROCH:P=3:Q=18:PROCH2:P=15:Q
=15:PROCH2
1610FORM=350 TO 600STEP32:N=330:PROCRI
V1:N=840:PROCRIV1:NEXTM
```

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COLOUR 1512	520.87 **599.00**	616.52 **709.00**	N/A **N/A**	737.39 **848.00**	833.04 **958.00**	780.87 **898.00**	876.52 **1008.00**
MONO 1640	494.78 **569.00**	581.74 **669.00**	868.70 **999.00**	711.30 **818.00**	798.26 **918.00**	754.78 **868.00**	841.74 **968.00**
CGA 1640	625.22 **719.00**	712.17 **819.00**	912.17 **1049.00**	841.74 **968.00**	928.69 **1068.00**	885.22 **1018.00**	972.17 **1118.00**
EGA 1640	755.65 **869.00**	842.61 **969.00**	1129.57 **1299.00**	972.17 **1118.00**	1059.13 **1218.00**	1015.65 **1168.00**	1102.61 **1268.00**

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```
1620IFD3%=0:P=17:Q=3:COLOUR129:PROCDOV
1630Q=4:PROCWAL1:Q=10:PROCWAL2:P=2:Q=6:
PROCT:IFK2%=0:COLOUR7:VDU31,4,7:VDU212
1640PROCRE:J%=11
1650PROCM
1660IFX%<11:IFY%=190RY%=20:O%=320:P%=39
5:PROCL
1670IFX%>7:IFY%=160RY%=17:O%=420:P%=495
:PROCL
1680IFK3%=1:IFX%=15:IFD3%=0:PROCTING6:VD
U4:COLOUR128:FORT=5 TO  7:VDU31,17,T:VDU
32:NEXTT:D3%=1
1690IFY%>24:PROCC:Y%=3:PROCBACK1:GOTO31
0
1700IFX%>16:X%=2:PROCC:PROCRIGHT1:GOTO1
860
1710IFK2%=0:IFX%=5:VDU4:COLOUR128:VDU31
,4,7:VDU32:PROCTING6:K2%=1
1720PROCBAR
1730DE%=0:GOTO1650
1740Q=4:PROCWAL2:Q=10:PROCWAL2:P=1:Q=12
:PROCR1:FORQ=13 TO  20:PROCR2:NEXTQ:PROC
R3:Q=25:PROCWAL1
1750IFAXED%=0:P=8:Q=10:PROCT:P=10:PROCT
1760P=1:Q=7:PROCT:P=17:PROCT:IFK3%=0:CO
LOUR128:COLOUR1:VDU31,16,7:VDU212
1770P=13:Q=12:PROCR1:FORQ=13 TO  20:PRO
CR2:NEXTQ:PROCR3
1780IFK5%=0:COLOUR128:COLOUR1:VDU31,7,2
2:VDU212
1790PROCRE
1800PROCM
1810IFK5%=0:IFX%=7:IFY%=22:PROCTING6:K5%
=1
1820IFY%<3:Y%=24:PROCC:PROCFRONT1:GOTO8
0
1830IFK3%=0:IFX%=15ANDY%=7:PROCTING6:K3%
=1
1840IFY%=8:IFAXE%=1:IFAXED%=0:PROCTING6:
VDU4:COLOUR128:VDU31,8,9:VDU32:VDU32:VDU
32:VDU32:VDU31,8,10:VDU32:VDU32:VDU32:VD
U32:AXED%=1:S%=S%+30
1850GOTO1800
1860Q=4:PROCWAL1:Q=10:PROCWAL2:J%=13:P=
13:Q=12:PROCR1:FORQ=13 TO  23:PROCR2:NEX
TQ:PROCR3:P=4:Q=12:PROCH
1870P=7:Q=22:PROCH:P=10:Q=25:PROCT:P=15
:Q=14:PROCH2
1880P=17:Q=7:PROCT:N=250:FORM=290 TO  5
60STEP32:PROCRIV1:NEXTM:P=3:Q=21:PROCH
1890IFAXE%=0:COLOUR128:COLOUR1:VDU31,11
,23:VDU216
1900IFD4%=0:COLOUR128:Q=9:PROCDOH
1910PROCRE
1920PROCM
1930IFAXE%=0:IFY%=23:PROCTING6:AXE%=1
1940IFD4%=0:IFK4%=1:IFY%=8:Q=9:PROCTING
:PROCDOVC:D4%=1
1950PROCBAR
1960IFX%<2:PROCC:X%=16:PROCLEFT1:GOTO16
00
1970DE%=0:GOTO1920
1980Q=4:PROCWAL1:Q=6:P=1:PROCR1:P=13:PR
OCR1:FORQ=7 TO  19:PROCR2:NEXTQ:PROCR3:P
=1:FORQ=7 TO  19:PROCR2:NEXTQ:PROCR3:J%=
15
1990IFD5%=0:COLOUR129:Q=12:PROCDOH
2000P=7:Q=7:PROCT:P=11:PROCT:IFK6%=0:CO
LOUR2:VDU31,9,5:VDU212
2010Q=24:PROCWAL2:PROCRE
2020PROCM
2030IFD5%=0:IFK5%=1:IFY%=14:PROCTING6:Q=
12:PROCDOVC:D5%=1
2040IFY%>24:Y%=3:PROCC:PROCBACK1:GOTO14
60
2050PROCBAR
2060IFK6%=0:IFY%=6:PROCTING6:K6%=1
2070DE%=0:GOTO2020
2080Q=24:PROCWAL2:Q=4:PROCWAL1:Q=10:PRO
CWAL1:FORM=350 TO  650STEP32:N=220:PROCR
IV1:N=1100:PROCRIV1:NEXTM
2090P=13:Q=18:PROCH2:SK%=19
2100P=12:Q=15:PROCT:P=14:Q=12:PROCH:P=5
:Q=13:PROCT:COLOUR1:VDU31,3,5:VDU187:VDU
188:VDU31,3,6:VDU186:VDU189
2110IFK8%=0:COLOUR128:COLOUR2:VDU31,16,
21:VDU212
2120PROCRE
2130PROCM
2140IFY%>24:Y%=3:PROCC:PROCBACK1:GOTO44
0
2150IFK8%=0:IFX%=15:IFY%=21:PROCTING6:K8
%=1
2160PROCSHO
2170DE%=0:GOTO2130
2180Q=4:PROCWAL1:Q=10:PROCWAL1:Q=25:PRO
CWAL1:P=2:Q=7:PROCT:P=13:Q=18:PROCR1:FOR
Q=19 TO  24:PROCR2:NEXTQ:PROCR3
2190P=14:Q=17:PROCT:P=11:Q=14:PROCH:P=2
:Q=12:PROCH:N=220:FORM=290 TO  550STEP32
:PROCRIV1:NEXTM:P=7:Q=13:PROCH:P=2:Q=23:
PROCH
2200IFK10%=0:COLOUR128:COLOUR2:VDU31,5,
20:VDU212
2210P=8:Q=20:PROCT:P=6:Q=19:PROCT
2220PROCRE
2230PROCM
2240IFK10%=0:IFX%=5:IFY%=21:PROCTING6:K1
0%=1
2250IFX%>16:X%=2:PROCC:PROCRIGHT1:GOTO9
60
2260GOTO2230
2270M=950:FORN=230 TO  1000STEP40:PROCR
IV1:NEXTN:Q=11:PROCWAL2:Q=25:PROCWAL1:Q=
18:PROCWAL2:P=2:Q=2:PROCH:Q=5:PROCH:P=15
:PROCH:Q=2:PROCH
2280P=12:Q=13:PROCT:P=13:Q=15:PROCT:P=1
:Q=13:PROCR1:FORQ=14 TO  20:PROCR2:NEXTQ
:PROCR3
2290J%=17:IFD10%=0:COLOUR130:Q=10:PROCD
OH
2300COLOUR1:COLOUR135:VDU31,9,4:VDU217:
VDU218:VDU31,9,5:VDU219:VDU220:COLOUR7:C
OLOUR130:VDU31,3,16:VDU207:VDU208:VDU31,
3,17:VDU209:VDU210
2310P=7:Q=7:PROCT:P=11:PROCT
2320PROCRE
2330PROCM
2340IFX%>16:X%=2:PROCC:PROCRIGHT1:GOTO8
80
2350IFY%=7:PROCF
2360PROCBAR
2370IFY%=12:IFD10%=0:IFK10%=1:PROCTING:
Q=10:PROCDOVC:D10%=1
2380DE%=0:GOTO2330
2390DEFPROCM
2400COLOUR128
2410IFINKEY(-73)ANDINKEY(-105):GOTO2520
2420IFFR%=0ANDINKEY(-73)IFW%=0:Y%=Y%-1:
PROCFRONT1:LF%=0:FO%=1:RG%=0:BK%=0:GOTO2
440
2430IFFR%=0ANDINKEY(-73)IFW%=1:Y%=Y%-1:
PROCFRONT2:FO%=1:BK%=0:RG%=0
2440IFBK%=0:IFINKEY(-105)IFW%=0:Y%=Y%+1
:PROCBACK1:LF%=0:FO%=2:FR%=0:RG%=0:GOTO2
490
2450IFBK%=0:IFINKEY(-105)IFW%=1:Y%=Y%+1
:PROCBACK2:FO%=2:FR%=0:RG%=0
2460IFRG%=0ANDINKEY(-67)IFW%=1:X%=X%+1:
PROCRIGHT2:LF%=0:BK%=0:FO%=3:FR%=0:GOTO2
490
2470IFRG%=0ANDINKEY(-67)IFW%=0:X%=X%+1:
PROCRIGHT1:FO%=3:FR%=0:BK%=0:LF%=0
2480IFLF%=0ANDINKEY(-98)IFW%=1:X%=X%-1:
PROCLEFT2:RG%=0:BK%=0:FO%=4:FR%=0:GOTO26
00
2490IFLF%=0ANDINKEY(-98)IFW%=0:X%=X%-1:
PROCLEFT1:FO%=4:FR%=0:RG%=0
2500IFINKEY(-73)ANDINKEY(-67):FO%=5
2510IFGU%=0ENDPROC
2520IFFO%=1ANDINKEY(-74)F1%=1
2530IFF1%=1:PROCFIU
2540IFFO%=2ANDINKEY(-74)F1%=2
2550IFF1%=2:PROCFID
2560IFFO%=4ANDINKEY(-74)F1%=4
2570IFF1%=4:PROCFIL
2580IFFO%=3ANDINKEY(-74)F1%=3
2590IFF1%=3:PROCFIR
```

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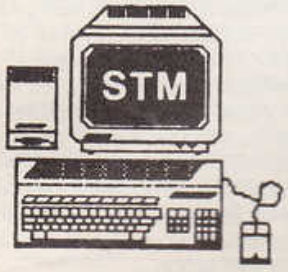

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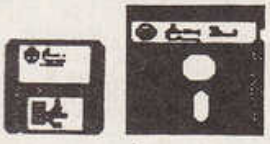

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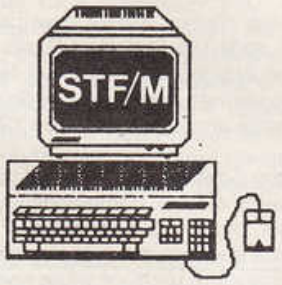

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Phoenix

Ian Wooff

Over the next three weeks Ian Wooff explains how to customise Basic and provides very useful examples.

Part 1 – Adding commands to Basic

The following routine allows new commands to be added to Spectrum Basic by extending the Spectrum's interpreter held in ROM. This method works on the Spectrum, Spectrum+ and should work on 128K versions.

Although the Spectrum provides a comprehensive range of Basic commands there is always the desire to add more. The possibilities are endless, new graphic commands, commands to produce white noise, and toolkit commands soon.

There are two different ways of adding new commands to basic. The first is to reuse the tokens which are already in use. For example, the CLS command might become CLS LENGTH, HEIGHT which would clear the given area of the screen. These new commands must fail the normal syntax checking in ROM.

The second method is to create new keywords, such as *RENUM or *FILL. The '*' is needed to get out of 'K' cursor mode. The star could be replaced by a dot, a question mark, or one of a variety of characters.

This article adopts the second method as although the definitions take more memory, it can be seen at a glance what they do.

The following routine demonstrates how new commands can be added to Basic, by adding a command to draw a box.

*BOX X-Coordinate,Y-Coordinate,BOX HEIGHT,BOX LENGTH

The X and Y co-ordinates point to the bottom lefthand corner of the box, the HEIGHT and LENGTH specifying the dimensions of the box in pixels.

Listing One is a Basic program which enters the extended interpreter into memory before saving it to tape. The extended interpreter recognises, checks the syntax, and executes the new commands, when they are used.

To use the new command enter listing one and run it. Once the code has been saved to tape type NEW <ENTER>, then enter and run listing two, to test the new command.

Any program which uses the extended interpreter must begin with the command 'RANDOMISE USR 64756' to turn the extended interpreter on. The commands CLEAR and NEW turn the extended interpreter off and so the above command must be used to turn it back on.

The new commands can be entered in either upper or lower case or a mixture of both. Spaces and colour codes can be added in the command at the user's will.

If the computer accepts a line containing a new command but produces the error report "Nonsense in BASIC", when the line is run then place a space in front of the new command. It is up to you to 'pad out' to new commands with spaces, if desired.

If the computer refuses to accept a line containing a new command it is probably because the extended interpreter is not turned on. To solve this place a REM command at the start of the line and the line will now be accepted by the computer. Then enter the following as a direct command, RANDOMISE USR 64756. This will turn the extended interpreter on. The REM command can now be removed from the line and the computer should accept the line, if the problem was caused by the extended interpreter being off.

The extended interpreter allows the new commands to have any form of parameters, numbers, functions, basic variables, strings etc. In short, if it's acceptable to the interpreter in ROM it is acceptable to the extended interpreter.

You may wish to alter the first character of the new command to something other than a star. To do this simply poke 64818 with its code, ie, POKE 64818,CODE "!". The new character should remove the 'K' cursor mode.

Listing Three is dissassembly of the code and shows how you can add further commands of your own.

As mentioned above the method of adding new commands is to extend the Spectrum's interpreter to include your own new commands. When the interpreter in ROM comes across something that it does not allow or understand it produces one of those irritating but useful error messages.

If we can get control before an error message is produced we could test to see if the error was caused by one of our new commands, and if so, deal with it.

To see if this is possible we need to look at what the Spectrum does with an error.

1) The address reached by the interpreter is copied into the error pointer X PTR.

2) The error code is put in ERR NR.

3) The stack pointer is loaded from ERR SP, so it points to the item at the bottom of the machine stack.

4) The calculator stack is cleared.

5) The machine code instruction RET removes the bottom item from the stack and control is given to this address.

At runtime the address removed by the RET instruction is 4867 (1303H). This halts the program and the correct error message is produced. During syntax checking this address is 4791 (12B7H), and causes the line to be displayed with a flashing cursor at the position which caused the error.

By placing the start address of our extended interpreter at the bottom of the machine stack control will be given to it when an error occurs. This seems fine, but where is the bottom of the machine stack?

The address of the bottom of the machine stack is held in the system variables at 23613/4 (5C3D/EH), and is known as ERR SP.

So all we need to do is to substitute the bottom of the machine stack, the address held in ERR SP, with the address of our extended interpreter. When an error occurs the stack pointer is loaded from ERR SP and control is transferred to our extended interpreter using the RET instruction. This seems fine, but how do we know whether the program is being run and so the command needs executing, or is just having its syntax checked?

Here the system variables come to the rescue again. This time it is FLAGS at 23611 (5C36H). When a program is being run bit 7 of FLAGS is set, when syntax is being checked bit 7 of FLAGS is reset.

The first routine at 64756 places the start address of the extended interpreter at the bottom of the machine stack. This routine is at 64756 (FCF4H), and so command RANDOMISE USR 64756 must be placed at the start of any program which uses the new commands to bring the extended interpreter into action.

During both syntax checking and runtime any new command will have error code 11 "Nonsense in BASIC", this code being held in the system variable ERR NR at 23610 (5C3AH). So the first job of our extended interpreter is to test ERR NR to see if it holds code 11. If it does not, control is given back to ROM.

If it does hold code 11 then the extended interpreter must test to see if the error was caused by one of our new commands. If it was, then its syntax must be checked and if required the command must be executed. To do this the extended interpreter uses three tables.

The first table used by the extended interpreter is the Command Table. This holds the command format data for all the new commands. Each entry in this table takes the form,

Command length, Command, parameter value (eg, 3, "BOX", 0)

The three represents the length of the new command, "BOX", and the zero is the parameter value. The table must be ended with a byte which has bit 7 set. If in doubt add 128 (80H), to the end of the table.

The second table is the Parameter Table which holds the possible parameters which new commands may have. Multiple parameters are separated by commas.

PARAMETER	PARAMETER VALUE
Four numbers	0
Three numbers	2
Two numbers	4
One number	6
No parameters	8
One string	10
Two strings	12
One number and one string	14

It is possible to add new parameter formats such as three strings. To do this create a routine to check for three strings separated by commas, and add it to the extended interpreter. For example:

```
call 7298       ;ROM routine to evaluate a
                 string 1C8CH
call COMMA      ;ex. interpreter routine test
                 for a comma FDDAH
jp   STR2       ;ex. interpreter routine
                 evaluate 2 strings FD7BH
```

Add the address of this routine to the end of the Parameter Table and the new parameter value becomes 2 plus the last parameter value. Using this method any combination of parameters is possible for your new commands.

The third table is the Address Table. This holds the addresses of the routines which execute the commands during runtime. The values in this table must be in the same order as the values in the Command Table.

The extended interpreter is able to handle 255 new commands. This value could easily be increased to 65535 new commands, the only problem being that of memory which sets a practical limit of less than 1000 new commands.

Some important points to bear in mind when adding your own new commands are:

1) The parameters are placed on the calculator stack in the reverse order to how they appear in the command. Use the extended interpreter routines GETBC and GETA to get and 8 bit or 16 bit numbers off the top of the calculator stack. Strings have a string descriptor placed on the stack. To find the address and length of the string use CALL 11249 (2BF1H). On return A equals one for a complete string, ie, old copy of string to be deleted, or zero if the string comes from an array of strings or is a 'slice' of a string. BC is set to the length of the string and DE is set to the start address.

2) The registers IY and HL' must be set correctly as a return to Basic is being made. IY must always be 23610 (5C3AH), and HL' must be 10072 (2758H) on returning

3) The routines which execute the new commands must be ended by a jump to the extended interpreter routine RET at 65197 (FEADH).

4) Two commands with the same name but different parameters are not allowed. For example, *MOVE 10,10 and *MOVE "SHIP","LAND".

5) New commands which are the same as Sinclair commands are allowed. For example *PAUSE 100 and PAUSE 100 (Sinclair command 'M' key).

6) The letters making up new commands in the Command Table **must** be entered in upper case otherwise they will not be recognised by the extended interpreter.

7) If you wish to use a different separator to a comma then duplicate the routine COMMA 64986 (FDDAH), replacing the CP "," with the desired character. The parameter routine will also need rewriting/amending to accept the new separator.

```
  1 DEF FN h(a$)=FN b(a$(1))*16+FN b(a$
(2))
  2 DEF FN b(a$)=CODE a$-48-7*(a$>"9")
 10 CLEAR 64755
 20 FOR a=64756 TO 65143 STEP 8
 30 READ r$,r
 40 PRINT a;":-";r$;"=";r
 50 LET c=0
 60 FOR g=0 TO 7: LET z=FN h(r$): LET r
$=r$(3 TO )
 70 POKE a+g,z
 80 LET c=c+z: NEXT g
 90 IF c<>r THEN  PRINT "ERROR IN LINE
";1000+((a-64756)*1.25): STOP
100 NEXT a
110 SAVE "EX. BASIC1"CODE 64756,388
1000 DATA "2A3D5C01FEFC7123",850
1010 DATA "70C93A3A5CFE0B28",826
1020 DATA "21FDCB017E200721",686
1030 DATA "FEFCE5C3B712CD03",1339
1040 DATA "13FD3600FF2A595C",804
1050 DATA "CDA71121FEFCE5C3",1352
1060 DATA "B412AF3204FE215D",807
1070 DATA "5C35E5DFE1FE2A20",1150
1080 DATA "D034DD2119FEDDCB",1217
1090 DATA "007E20C52A5D5CE5",811
1100 DATA "DD4600DFE6DFDD23",1223
1110 DATA "DDBE00201AE710F4",960
1120 DATA "FD3600FFFD362600",907
1130 DATA "E1DD6E011105FE26",871
1140 DATA "00195E2356EBE948",780
1150 DATA "0C0600DD09E1225D",600
1160 DATA "5C2104FE3418BFCD",855
1170 DATA "8C1CCDD4FDCD8C1C",1217
1180 DATA "181CCD821C18F3DF",905
1190 DATA "1814CD7A1CCDDAFD",1075
1200 DATA "CD7A1C1B09CD7A1C",743
1210 DATA "CDDAFDCD821CFDCB",1495
1220 DATA "007E284CFD36000B",560
1230 DATA "FE0D2804FE3A2040",719
1240 DATA "FD3600FFFDCB017E",1145
1250 DATA "201221FEFCE521B7",1034
1260 DATA "12E5C3761B21FEFC",1126
1270 DATA "E5C3761B3A04FE87",1020
1280 DATA "6F1115FE1889FDCB",1020
1290 DATA "007E2B14DFFD3600",716
1300 DATA "0BFE2C200BFD3600",659
1310 DATA "FFE7C9D1FD36000A",1213
1320 DATA "C305FDCDD52D38F3",1215
1330 DATA "20F1C9CDA22D1BF6",1156
1340 DATA "008EFD99FD94FD9F",1361
1350 DATA "FD8BFD81FD7BFDB6",1537
1360 DATA "FD1FFE000003424F",686
1370 DATA "5800B0CDF7FD3277",1090
1380 DATA "FECDF7FD3276FECD",1586
1390 DATA "F7FD327E5CCDF7FD",1473
1400 DATA "327D5CAFCD282D3A",790
1410 DATA "76FECD6FFE3A77FE",1373
1420 DATA "CD282DAFCD6FFEAF",1210
1430 DATA "CD282D3A76FECD28",965
1440 DATA "2DCD6E34CDB724SA",874
1450 DATA "77FECD282DCD6E34",1030
1460 DATA "AFCD6FFE215827D9",1122
1470 DATA "C3C9FDCD282DCDB7",1327
1480 DATA "24C9000000000000",237
```

```
 10 RANDOMIZE USR 64756
 20 BORDER 0: PAPER 0: INK 7: CLS
 30 OVER 1: DIM a$(704)
110 FOR a=1 TO 11: FOR d=6 TO 1 STEP -1
120 PRINT AT 0,0; INK d;a$: LET t=(a*7)
+d
130 *box t,t,175-(2*t),255-(2*t)
140 NEXT d: NEXT a: FOR a=1 TO 35: PRIN
T AT 0,0; INK RND*7;a$;: NEXT a
150 CLS : FOR s=1 TO 6: INK s
160  FOR a=(s-1)*8 TO s*8 STEP 2
170 *BOX a,a,175-(2*a),255-(2*a)
180 NEXT a: NEXT s
190 PAUSE 0: RUN
```

```
** pass          1
** errors        0
** warnings      0
                    *PRINTER  ON
FCF4=              10         ORG  64756
FCF4 2A3D5C        20         LD   HL,(23613) ;    Address of bottom of stack
FCF7 01FEFC                   LD   BC,START ;      Start of extended interpreter
FCFA 71                       LD   (HL),C
FCFB 23                       INC  HL
FCFC 70                       LD   (HL),B ;        Place START on bottom of stack
FCFD C9                       RET
FCFE 3A3A5C        30 START:  LD   A,(23610)
FD01 FE0B                     CP   11 ;            Was error code 11, "Nonsense in BASIC" ?
```

```
FD03 2821                   JR   Z,NONSENSE
FD05 FDCB017E    40 SYNTAX:
                            BIT  7,(IY+1) ;      Bit 7 of FLAGS set at runtime
FD09 2007                   JR   NZ,RUNERROR
FD0B 21FEFC                 LD   HL,START ;      Syntax error - Place START
FD0E E5                     PUSH HL ;            on bottom of  stack for next error
FD0F C3B712                 JP   #12B7 ;         Jump back to ROM
FD12 CD0313      50 RUNERROR:
                            CALL #1303 ;         Runtime error - Produce error report
FD15 FD3600FF               LD   (IY+0),255 ;    Clear ERR NR
FD19 2A595C                 LD   HL,(23641) ;    Remove floating point forms from line in
FD1C CDA711                 CALL #11A7 ;         editing area before doing a syntax check
FD1F 21FEFC                 LD   HL,START ;      Place START on bottom of
FD22 E5                     PUSH HL ;            stack for next error
FD23 C3B412                 JP   #12B4 ;         Jump back to ROM
FD26 AF          60 NONSENSE:
                            XOR  A
FD27 3204FE                 LD   (COM),A ;       Clear Command code
FD2A 215D5C                 LD   HL,23645 ;      CH ADD holds address reached by interpreter
FD2D 35                     DEC  (HL) ;          Decrease CH ADD to find character which
FD2E E5                     PUSH HL
FD2F DF                     RST  #18 ;           caused the error
FD30 E1                     POP  HL
FD31 FE2A                   CP   "*" ;           Was it a star ?
FD33 20D0                   JR   NZ,SYNTAX ;     Error if not
FD35 34                     INC  (HL) ;          Increase CH ADD  to point to the next
                                                 character
FD36 DD2119FE               LD   IX,COMTABLE ;   Index register, IX, points to Command Table
FD3A DDCB007E    70 LOOP10:
                            BIT  7,(IX+0) ;      Has the end of the table being reached ?
FD3E 20C5                   JR   NZ,SYNTAX ;     Error if it has
FD40 2A5D5C                 LD   HL,(23645)
FD43 E5                     PUSH HL ;            Save CH ADD
FD44 DD4600                 LD   B,(IX+0) ;      Transfere command length to B
FD47 DF                     RST  #18
FD48 E6DF        80 LOOP11:
                            AND  223 ;           Reset bit 5. Quicker than RES 5,A
FD4A DD23                   INC  IX
FD4C DDBE00                 CP   (IX+0) ;        Do characters match ?
FD4F 201A                   JR   NZ,NEXT ;       Jump to NEXT if they do not
FD51 E7                     RST  #20 ;           Increase CH ADD next character to A
FD52 10F4                   DJNZ LOOP11
FD54 FD3600FF               LD   (IY+0),255 ;    Command found
FD58 FD362600               LD   (IY+38),0 ;     Clear ERR NR and X PTR
FD5C E1                     POP  HL ;            remove CH ADD from stack
FD5D DD6E01                 LD   L,(IX+1) ;      Transfere parameter data to L
FD60 1105FE      90         LD   DE,PARTABLE ;   Address of Parameter Table
FD63 2600           BACK1:  LD   H,0
FD65 19                     ADD  HL,DE ;         Position of address in table
FD66 5E                     LD   E,(HL) ;        Transfere parameter address to DE
FD67 23                     INC  HL
FD68 56                     LD   D,(HL)
FD69 EB                     EX   DE,HL ;         Exchange DE and HL
FD6A E9                     JP   (HL) ;          Jump to contents of HL
FD6B 48          100 NEXT : LD   C,B
FD6C 0C                     INC  C
FD6D 0600                   LD   B,0
FD6F DD09                   ADD  IX,BC ;         Increase IX to start of next command
FD71 E1                     POP  HL
```

```
FD72 225D5C              LD   (23645),HL ;     Restore CH ADD
FD75 2104FE              LD   HL,COM
FD78 34                  INC  (HL) ;           Increase Command code
FD79 18BF                JR   LOOP10
FD7B CD8C1C    110 STR2 :CALL #1C8C ;          Two strings after command
FD7E CDDAFD              CALL COMMA
FD81 CD8C1C        STR1 :CALL #1C8C ;          One string after command
FD84 181C                JR   LINEND
FD86 CD821C        STRNUM:
                         CALL #1C82 ;          One number and string after command
FD89 18F3                JR   STR2+3
FD8B DF            NUM0 :RST  #18 ;            Nothing after command
FD8C 1814                JR   LINEND
FD8E CD7A1C    120 NUM4 :CALL #1C7A ;          Four numbers after command
FD91 CDDAFD              CALL COMMA
FD94 CD7A1C        NUM2 :CALL #1C7A ;          Two numbers after command
FD97 1809                JR   LINEND
FD99 CD7A1C    130 NUM3 :CALL #1C7A ;          Three numbers after command
FD9C CDDAFD              CALL COMMA
FD9F CD821C        NUM1 :CALL #1C82 ;          One number after command
FDA2 FDCB007E      LINEND:
                         BIT  7,(IY+0) ;       Has there being an error ?
FDA6 284C                JR   Z,SY1 ;          Jump if there has
FDA8 FD36000B            LD   (IY+0),11
FDAC FE0D                CP   13 ;             Is the next character code 13 or 58,":" ?
FDAE 2804                JR   Z,OK
FDB0 FE3A                CP   58
FDB2 2040                JR   NZ,SY1 ;         Error if not
FDB4 FD3600FF  140 OK    :LD  (IY+0),255 ;     Reset ERR NR
FDB8 FDCB017E            BIT  7,(IY+1) ;       Bit 7 of FLAGS set at runtime
FDBC 2012                JR   NZ,COMMAND
FDBE 21FEFC              LD   HL,START
FDC1 E5                  PUSH HL ;             Place START on bottom of stack
FDC2 21B712              LD   HL,#12B7
FDC5 E5                  PUSH HL ;             Followed by #12B7
FDC6 C3761B              JP   #1B76 ;          Jump back to ROM
FDC9 21FEFC    150 RET   :LD  HL,START ;       Place START on bottom of stack
FDCC E5                  PUSH HL
FDCD C3761B              JP   #1B76 ;          Jump back to ROM
FDD0 3A04FE    160 COMMAND:
                         LD   A,(COM)
FDD3 87                  ADD  A,A ;            Calculate position of command address
FDD4 6F                  LD   L,A ;            in Address Table
FDD5 1115FE              LD   DE,ADDTABLE ;    Address to Address Table
FDD8 1889                JR   BACK1 ;          Jump back to index into Address Table
FDDA FDCB007E  170 COMMA:BIT  7,(IY+0) ;       Did the last parameter cause an error ?
FDDE 2814                JR   Z,SY1 ;          Jump if it did
FDE0 DF                  RST  #18
FDE1 FD36000B            LD   (IY+0),11
FDE5 FE2C                CP   "," ;            Is the character a comma ?
FDE7 200B                JR   NZ,SY1 ;         Error if not
FDE9 FD3600FF            LD   (IY+0),255 ;     Reset ERR NR
FDED E7                  RST  #20 ;            Increase CH ADD
FDEE C9                  RET
FDEF D1        180 REPB :POP  DE ;             Drop return address from stack
FDF0 FD36000A            LD   (IY+0),10
FDF4 C305FD        SY1  :JP   SYNTAX
FDF7 CDD52D        GETA :CALL #2DD5 ;          Top of calculator stack to A
FDFA 38F3          BACK2:JR   C,REPB
```

```
FDFC 20F1                   JR   NZ,REPB ;        Number out of range
FDFE C9                     RET
FDFF CDA22D           GETBC:CALL #2DA2 ;          Top of calculator stack to BC
FE02 18F6                   JR   BACK2
FE04 00           190 COM  :DEFB 0
FE05 8EFD99FD
     94FD9FFD
     8BFD81FD
     7BFD86FD         PARTABLE:
                         DEFW NUM4,NUM3,NUM2,NUM1,NUM0,STR1,STR2,STRNUM
                     ;                          Parameter Table
                     ;                          Contains address of parameter routines
FE15 1FFE0000        ADDTABLE:
                         DEFW BOX,0 ;           Address Tabel. Holds addresses of
                     ;                          routines which deal with commands
FE19 03424F58
     0080            COMTABLE:
                         DB   3,"BOX",0,#80 ;   Command Table. Contains command data
                     ;                          Table terminated by 80H. COmmand MUST
                     ;                          be in upper case letters
FE1F CDF7FD       260 BOX  :CALL GETA
FE22 3277FE                 LD   (BLEN),A ;    Length of box
FE25 CDF7FD                 CALL GETA
FE28 3276FE                 LD   (BHEI),A ;    Height of box
FE2B CDF7FD                 CALL GETA
FE2E 327E5C                 LD   (23678),A ;   Y position of box
FE31 CDF7FD                 CALL GETA ;        X position of box
FE34 327D5C                 LD   (23677),A
FE37 AF           280       XOR  A
FE38 CD282D                 CALL #2D28 ;       Stack 0
FE3B 3A76FE                 LD   A,(BHEI)
FE3E CD6FFE                 CALL LINE ;        A=Height Draw first line
FE41 3A77FE                 LD   A,(BLEN)
FE44 CD282D       290       CALL #2D28 ;       Stack Length
FE47 AF                     XOR  A
FE48 CD6FFE                 CALL LINE ;        A=0 Draw second line
FE4B AF                     XOR  A
FE4C CD282D                 CALL #2D28 ;       Stack 0
FE4F 3A76FE                 LD   A,(BHEI)
FE52 CD282D                 CALL #2D28 ;       Stack Height
FE55 CD6E34                 CALL #346E ;       Negate top value on stack
FE58 CDB724                 CALL #24B7 ;       Draw third line
FE5B 3A77FE       300       LD   A,(BLEN)
FE5E CD282D                 CALL #2D28 ;       Stack Length
FE61 CD6E34                 CALL #346E ;       Negate top value on stack
FE64 AF                     XOR  A
FE65 CD6FFE                 CALL LINE ;        A=0 Draw last line
FE68 215827                 LD   HL,#2758 ;    Reset HL' is destroyed by line drawing
FE6B D9                     EXX
FE6C C3C9FD                 JP   RET ;         End command
FE6F CD282D       310 LINE :CALL #2D28 ;       Stack value in A
FE72 CDB724                 CALL #24B7
FE75 C9                     RET
FE76 00           320 BHEI :DEFB 0
FE77 00               BLEN :DEFB 0

** pass          2
** errors        0
** warnings      0
```

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Screen Wiz

A Kennedy

Load and save your Amstrad CPC screens, to tape, in a compact manner, including details such as the mode, ink and border. The other utility increases the Baud rate. The commands are :LOADSCREEN, :SAVESCREEN, :SUPERSPEED.

```
40 MEMORY &9CFF
50 A=&9D00
60 s=0
70 FOR D=1 TO 24
80 READ B$
90 FOR C=1 TO LEN(B$) STEP 2
100 f=VAL("&"+MID$(B$,C,2))
110 POKE A,f
120 s=s+f
130 A=A+1
140 NEXT C,D
150 READ E
160 IF E<>S THEN PRINT "Sorry, Error in
DATA":END
170 CALL &9D00
180 PRINT "SAVESCREEN, LOADSCREEN & SUPE
RSPEED RSXs have been installed."
190 NEW
200 DATA 010E9D210A9DCDD1
210 DATA BCC900000000199D
220 DATA C3389DC3779DC3B6
230 DATA 9D53415645534352
240 DATA 4545CE4C4F414453
250 DATA 43524545CE535550
260 DATA 455253504545C400
270 DATA DD21BF9DCD11BCDD
280 DATA 7700CD3BBCDD7001
290 DATA DD71020610C5783D
300 DATA CD35BCDD7003DD71
310 DATA 04DD23DD23C110ED
320 DATA 21BF9D1123003E2A
330 DATA CD9EBC2100C01100
340 DATA 403E2BCD9EBCC921
350 DATA BF9D1123003E2ACD
360 DATA A1BCDD21BF9DDD7E
370 DATA 00CD0EBCDD4601DD
380 DATA 4E02CD38BC0610C5
390 DATA 7B3DDD4603DD4E04
400 DATA CD32BCDD23DD23C1
410 DATA 10ED2100C0110040
420 DATA 3E2BCDA1BCC9218C
430 DATA 003E32CD68BCC900
440 DATA 20648
```

Status

Barry Dorrans

This program for the BBC will list the status of the repeat delay and rate, sound, TAB value, ESCAPE, TUBE flag, SPEECH flag, and available RAM. Simply run the program and the machine code at &900 will be called to give the details.

```
 10OSBYTE=&FFF4
 20OSWRCH=&FFEE
 30OSNEWL=&FFE7
 40FOR pass=0 TO 3 STEP 3
 50P%=&900
 60[OPT pass
171LDX #&FF:STX &80:JSR print
180LDA #&BB:JSRfx
230LDA #&C4:JSRfx
260LDA #&C5:JSRfx
280LDA #&D2:JSRfx
310LDA #&DB:JSRfx
330LDA #&E5:JSRfx
350LDA #&EA:JSRfx
370LDA #&EB:JSRfx
390LDA #&FE:LDY #&FF:LDX #0:JSR OSBYTE
:LDA #127:JSR OSWRCH:CPX #&80:BPL modelb
:LDA #&16:JMP ret
391.modelb:LDA #&32
4999.ret:JSR printhex:LDA #ASC"K":JSR O
SWRCH:JMP OSNEWL:RTS
5002.hi87:EQUS "BASIC socket: &"
5003EQUS "Repeat delay: &"
5004EQUS "Repeat rate : &"
5005EQUS "Sound status: &"
5006EQUS "TAB value   : &"
5007EQUS "<ESC> status: &"
5008EQUS "TUBE flag   : &"
5009EQUS "SPEECH flag : &"
5010EQUS "RAM         : "
6000.fx:LDY #&FF:LDX #0:JSR OSBYTE:TXA:
JSR printhex:JSR OSNEWL
7000.print:LDY #0:LDX &80:.ugh:INY:INX:
LDA hi87,X:JSR OSWRCH:CPY #15:STX &80:BN
E ugh:RTS
10000.printhex PHA:CLC:AND#&F0:RORA
10010RORA:RORA:RORA:JSRnyb:PLA:AND#&F
10020.nyb CLC:ADC#48:CMP#58:BCC number
10030ADC#6:.number JMP&FFE3
20000]:NEXT
30000CALL &900
```

Sound FX

A Kennedy

Four types of sound effect are made easy with this program for the Amstrad CPC range. The effects, and syntax, are :EXPLODE, :BANG, :ZAP, and :PING.

```
10 ' SOUND FX RSX
20 ' by Andrew Kennedy
30 '
40 MEMORY &9CFF
50 A=&9D00
60 s=0
70 FOR D=1 TO 20
80 READ B$
90 FOR C=1 TO LEN(B$) STEP 2
100 f=VAL("&"+MID$(B$,C,2))
110 POKE A,f
120 s=s+f
130 A=A+1
140 NEXT C,D
150 READ E
160 IF E<>S THEN PRINT "Sorry, Error in
DATA":END
170 CALL &9D00
180 PRINT "EXPLODE,BANG,PING & ZAP rsxs
have been  installed."
190 NEW
200 DATA 010E9D210A9DCDD1
210 DATA BCC9CBA30E9D1C9D
220 DATA C32F9DC3459DC371
230 DATA 9DC35B9D4558504C
240 DATA 4F44C542414EC75A
250 DATA 41D050494EC70021
260 DATA 359DC3879D000000
270 DATA 0000000F07101010
280 DATA 001E000000214B9D
290 DATA C3879D0000000000
300 DATA 001F071010100004
310 DATA 00000021779DC387
320 DATA 9D6400CB00C90000
330 DATA 38101010001E0000
340 DATA 0021619DC3879DC8
350 DATA 00CB00CB00003810
360 DATA 1010001400000006
370 DATA 00C57E4F78CD34BD
380 DATA 23C1047BFE0E20F1
390 DATA C9,12152
```

GOOD TIDINGS AND SMALL BILLS

When PCW last looked at Mercury Communications, the service was just becoming available to home and small business users. Savings of between 15 to 20 per cent on phone bills were claimed. Nine months later, Steve Gold looks back at how the system saves him a lot of money on phone bills . . .

It was about a year ago that I first heard that Mercury intended to offer an alternative telephone service to home and small business subscribers. At the time my phone bills from British Telecom were of the order of £800 to £1,000.

A year later – and after being subscriber to the Mercury 2300 service for nine months – my overall bills from Mercury and BT are down £450 a quarter – a saving of about 50% and way above Mercury's claimed call savings.

"How is this?" I hear you ask. Before explaining how, it's important to realise that computer modem users are unlike the average subscribers that Mercury pitches its promotional literature at.

Many modem users make a higher proportion of trunk telephone calls than typical residential customers. This is probably because most bulletin boards are an 'a' or 'b' rate trunk call away. Granted, BT's packet switch stream and Prestel services are available on a local call basis for many UK subscribers, but the majority of modem users have an innate desire to communicate with the world – there's something inherently satisfying in communicating with a bulletin board at the other end of the country, rather than just across the city.

"After being a subscriber to the Mercury 2300 nine months, my overall bills from Mercury and BT are down £450 a quarter."

Mercury in perspective

As can be seen from the inset box, the Mercury 2300 service is not a direct replacement for BT services. Subscribers to Mercury must still rent their lines and – in the majority of cases – place local calls via British Telecom. At present, Mercury 2300 subscribers can only achieve call cost savings on trunk and international routes.

For many modem users, however, trunk and international calls account for a major proportion of a telephone bill. Even with Prestel subscriptions all the rage, many modem users still make more than the odd call to bulletin boards several hundred miles distant.

Personal experience

Take my own bills for example. As a computer journalist (stop laughing at the back) who works from home, I make several calls a day to computer manufacturers, both in the UK and abroad, in a bid to get the news before my competitors.

I also edit frames on Micronet 800 on Prestel, as well as subscribing (and supplying computer news) to several electronic mail services both in the UK and abroad, which runs up the bills.

As a rough guide then, about £20 of my original BT-only bills is/was attributable to line and equipment rental, plus another £80 or so per quarter for local calls. This still left a further £700 for trunk and international calls – many of which were made outside of the cheap rate periods.

"It's important to realise that computer modem users are unlike the subscribers that Mercury pitches its promotional literature at."

My latest BT quarterly bill cost me about £140 – the extra £40 or so above my rental plus local calls estimate is for the small residue of trunk calls made via BT. My Mercury bills are rendered monthly and directly debited to my Visa credit card as a matter of course. A typical month's charges work out at about £100 – equivalent to £300 for the quarter as a whole.

The advantages of Mercury

As outlined in my article on Mercury earlier this year, the advantages which accrue from using Mercury 2300 in preference to BT for trunk and international calls include clearer calls, as well as lower call costs.

In addition to this, the Mercury service centre now offers a complete BT-style operator and directory enquiry service. Like BT, Mercury calls to the operator and

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directory enquiry positions are free of charge. Service is much improved over BT's. This is probably due to the relatively low number of subscribers to Mercury 2300 – 10,000 at the last count, but that figure is rising fast.

Still, I now find it possible to get a call to Mercury directory enquiries answered within 20 seconds, regardless of what time of the day or night a call is placed. Compare that to the delays experienced in the late evening or middle of the night for the BT service and I think you'll agree, Mercury directory enquiry service is infinitely better.

Mercury operators are also able to interrogate your billing files at all times – another plus when you want to ask a billing quotation on Sunday morning. Add to that a really friendly service, and the human element of Mercury calls is big plus in the service's favour.

The disadvantages

Contrary to what you might think from the foregoing, there are still disadvantages in using Mercury 2300 over the BT service for trunk and international calls. These include

● Call delays – Using BT, it rarely takes longer than 15 seconds before a tone is heard on an inland direct dialled call – either ringing or engaged signals in the vast majority of cases. Because all Mercury 2300 calls must pulse dial the three digit Mercury access code (usually 131), then log onto Mercury using a ten digit ID, calls take an average of 5 to 10 seconds longer to complete via Mercury 2300, than if made via BT. In practice, this delay is only a minor niggle.

● Network failure – Because the Mercury network is so new, and relies upon BT to interconnect calls at both ends of the circuit, there is more to go wrong with a typical trunk call. On at least three separate occasions over the past six months the Mercury network has been down for a period of between 20 and 120 minutes. To be fair to Mercury, these failures only occurred at relatively off-peak times – Saturday or Sunday mornings. Calls via British Telecom can be made as normal during such times, so telephone service is not entirely unavailable.

● Intermittent network failure – Some calls fail because the Mercury access ports on 131 are either engaged or simply ring out. Redialling the call normally solves the problem. For the inexperienced or novice user of Mercury 2300, however, an engaged Mercury port could be construed as the engaged tone on the number dialled.

● Poor quality circuits – As can be seen from the network map, Mercury currently covers much of the UK's major centres of population, with extensions into Scotland and the south coast promised by the end of October. Despite such limitations, Mercury accepts calls to any UK destination, relying on BT circuits to complete the call to areas where Mercury service is not yet available. On some calls to the far north of Scotland and west of Cornwall, call quality is relatively poor and therefore unsuitable for modem use. Such calls – admittedly few and far between – require the use of BT for successful use of a modem. This factor accounts for the extra £40 or so on my quarterly BT phone bill.

Apart from these problems, Mercury 2300 service is far superior to that provided by BT. Eventually, BT will catch up with Mercury, but it will take until at least 1995 before true digital call quality – as seen on Mercury circuits – becomes available on the BT network.

What is Mercury 2300?

The Mercury 2300 service allows residential and small business users to access the Mercury network via existing telephone lines. Provided you have one of the new square pin plugs on your telephone, all you need is a Mercury smart phone (cost £51.95 including VAT), plus a Mercury authorisation ID (£7.50 plus VAT a year).

Once programmed, you use your Mercury phone for all your calls – dialling as usual for local calls (via BT), but pressing the blue 'M' (for Mercury) button in prefix to the trunk and international access codes.

Mercury then bills all your trunk and international calls – individually itemised and costed – each month or quarter. You continue to rent your ordinary phone line from British Telecom, and place local calls via BT as normal. Trunk calls are also available – albeit at greater cost than via Mercury – as normal.

The advantages over BT service – which Mercury only suppliments, not replaces – include call itemisation, lower costs and clearer circuits.

Mercury 2300 service is currently available in most major centres of population (see network map).

Call savings explained

As I've already mentioned, Mercury claim typical trunk call savings of between 15 and 25 per cent. In my own case, however, these savings amount to about 50 per cent. After some thought on the matter, I attribute the considerable call savings to the following factors:

● Fewer data errors – Since many of my modem calls involve the use of an error correction protocol – MNP for high-speed modem calls, and Kermit or Xmodem for file transfers – the number of corrupt data packets is considerably reduced. Mercury circuits rarely give any problems at V23 (1200 baud) or V22bis (2400 baud).

● Faster modem speeds – Because Mercury 2300 uses digital-quality circuits, compared with BT's predominantly analogue network, call circuits are better able to support the higher modem speeds such as V22 (1200 baud) and V22bis (2400 baud).

● More incoming calls – Because of the faster modem speeds, my home phone line is engaged for shorter periods, allowing more time – particularly during office hours – for people to call me, instead of leaving messages for me to call them on my London voicebank answerphone.

Mercury's future enhancements

At the time of writing, Mercury has just completed reciprocal agreements with the telecommunication authorities in Japan and Scandinavia. Further agreements are pending with other international telecommunication authorities.

Such agreements open up call savings of as much as 20% over BT call costs on international calls – savings already seen on transatlantic calls to the US and Canada. Currently, Mercury is obliged to hand over much of its international call traffic to BT, allowing it to pass on only a small call savings (between 2 and 4 per cent) as its 'agent's commission' for handling the call.

Retransmission from Mercury to BT can also add to the general line noise and lack of signal quality on international calls. This factor tends to negate the call quality advantages of placing calls over the Mercury national network. Once direct connection between Mercury and the rest of the world is available, better call quality – perhaps to digital standards – will be available.

Conclusions

In my first article on Mercury, I suggested that anyone with a quarterly telephone bill – modem user or not – in excess of £75 would be well-advised to consider Mercury as an additional extra to their telephone service.

Since that article, I calculate that figure as a little conservative and – allowing for a two year payback period on the £51.59 smart phone – suggest a figure £70 as the point beyond which most modem users would benefit financially from using Mercury 2300.

Even if your phone bill is below the £70 mark – and there can be few modem users with bills at such low levels – the digital call quality benefits to be derived from Mercury 2300 are still worth the investment. Some Hayes-compatible modem users will find that, if their modem has a tone dialling option, then a smart phone is not needed. At £7.50 (plus VAT), Mercury 2300 telephone service is a bargain not to be missed.

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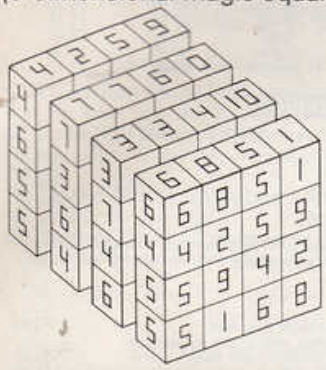

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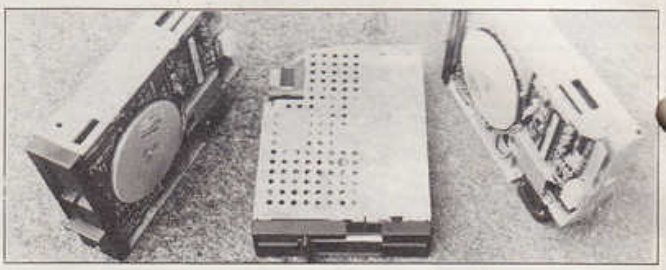

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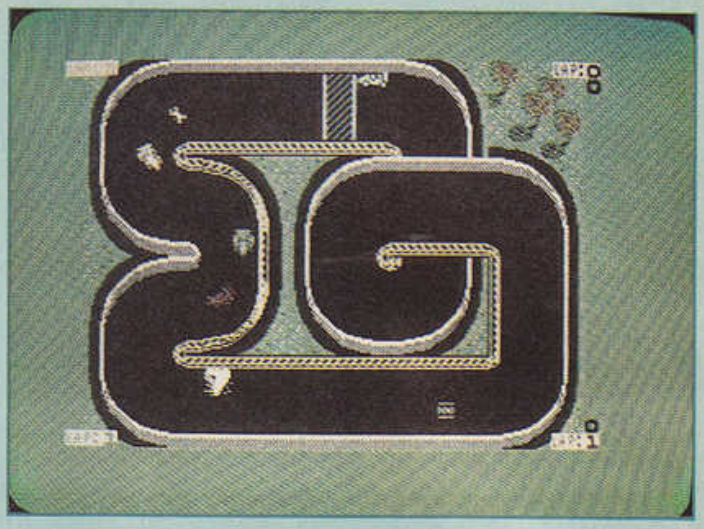
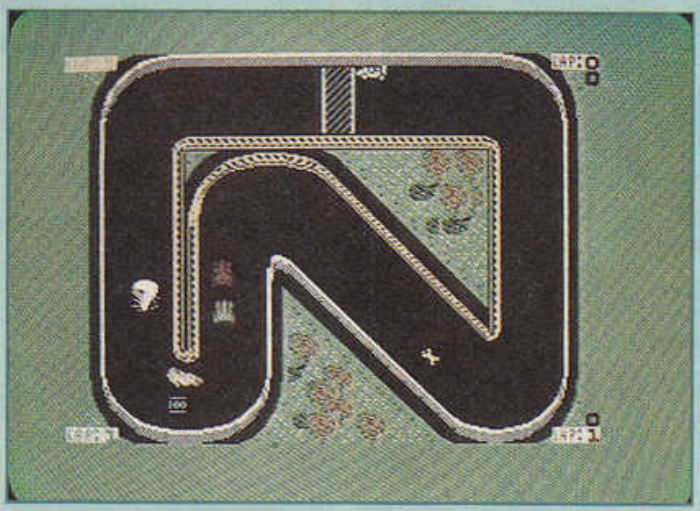


My first reaction when I saw *Supersprint* loaded up was mild disbelief. Instead of the *Pole Position*-type game that I was expecting (that presents you with a view of the track from the driver's seat), what I got was an overhead view of a race track with a few tiny little car shapes on it.

Not exactly state-of-the-art. But although the game might initially seem to be a bit unsophisticated it turns out to be surprisingly playable.

You are given a choice of eight tracks of varying difficulty. The simplest of these are basically straight stretches of road joined by a couple of bends, while the hardest ones look like a pile of hoola hoops. Once you've made your choice, a white flag waves and the computer controlled cars ('drones') zoom off around the nearest bend, leaving you wondering what's happening.

Controlling your car is simple; press 'fire' to accelerate, and choose two keys or joystick to control your direction. There are no brakes, but as soon as you stop accelerating you'll find that you slow down pretty quickly. It takes a little bit of practice to get the hang of steering, and you ought to be careful about how fast you travel at first. If you hit the side of the track you should just bump to a halt, unless you're moving very fast in which case you'll burst into flames. Fortunately you've got three replacement cars which are flown onto the course by helicopter, so all is not lost.



Some of the tracks have underpasses, and you are driving blind as you go through these, so again you'll need a steady hand to keep your car on the track.

Better with two

After a few bumps into the side of the track and a couple of laps in the wrong direction, it occurred to me that it was all quite good fun. Like the recent comeback that the simple shoot 'em up has made, *Super Sprint* demonstrates that a game can be unsophisticated but still fun. But I should add that like a lot of sports based games, *Super Sprint* is much better when two people play it together.

As you skid your way around the various tracks you attempt to avoid a number of obstacles such as oil slicks and puddles, and there is a tornado (which looks like a fingerprint) which smudges its way across the screen occasionally and blows you all over the place. There are also a number of golden spanners (these look like squashed frogs) which give you bonuses when you collect them. If you collect three or more of these then you gain additional custom car features, such as Turbo acceleration, traction, and a higher top speed, which give you a better chance of winning.

In some ways the overhead view of the track works better than the *Pole Position* type of game, since it gives you a clearer view of what's happening around you, and you're not likely to be surprised by a car appearing from behind you and sending you skidding out of control. On the other hand, it does mean that the size of the track is restricted by the size of the screen display, so the amount of variation in each track is similarly restricted.

But my only real doubt about the game is its price. Any game that costs £9.99 really ought to be pretty spectacular and/or original, and since *Super Sprint* is only another coin-op conversion I think Activision are pushing it a little here.

Cliff Joseph

Program *Super Sprint* **Type** Arcade **Machine** C64, Spectrum, Amstrad CPCs **Price** £9.99 **Supplier** Activision, 23 Pond Street, London NW3 2PN.

Your complete guide to all the software released this week

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Program *Motos* **Type** Arcade **Price** £2.99 **Supplier** Mastertronic, 8-10 Paul Street, London EC2A 4JH.

Program *Game Set and Match* **Type** Sports compilation **Price** £12.95 (£17.95) **Supplier** Ocean, 6 Central Street, Manchester M2 5NS.

Program *Scrabble Deluxe* **Type** Board game **Price** £15.95 on CPC6128 (disc only) **Supplier** Virgin Games, 2-4 Vernon Yard, Portobello Road, London W11 2DX.

Program *Saracen* **Type** Arcade **Price** £2.99 **Supplier** Americana, 8-10 Paul Street, London EC2A 4JH.

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Program *Bosconian* **Type** Arcade **Price** £1.99 **Supplier** Mastertronic, 8-10 Paul Street, London EC2A 4JH.

Program *Angleball* **Type** Arcade **Price** £2.99 **Supplier** Mastertronic, 8-10 Paul Street, London EC2A 4JH.

Atari ST

Program *3D Galax* **Type** Arcade **Price** £19.95 **Supplier** Gremlin Graphics, Alpha House, 10 Carver Street, Sheffield S1 4FS.

Atari XL/XE

Program *Dizzy Dice* **Type** Fruit machine simulation **Price** £1.99 **Supplier** Players, Calleva Park, Aldermaston, Berks.

BBC B

Program *Jet Pac* **Type** Arcade **Price** £1.99 **Supplier** Ricochet, 8-10 Paul Street, London EC2A 4JH.

Commodore C16/Plus 4

Program *Dizzy Dice* **Type** Fruit machine simulation **Price** £1.99 **Supplier** Players, Calleva Park, Aldermaston, Berks.

Commodore 64

Program *Hyberblob* **Type** Arcade **Price** £2.99 **Supplier** Firebird, 64-76 New Oxford Street, London WC1A 1PS.

Program *Anarchy* **Type** Arcade **Price** £1.99 **Supplier** Rack-It, 8-10 Paul Street, London EC2A 4JH.

Program *Games Set and Match* **Type** Sports compilation **Price** £12.95 (£17.95) **Supplier** Ocean, 6 Central Street, Manchester M2 5NS.

Program *Talledega* **Type** Arcade **Price** £2.99 **Supplier** Americana, 8-10 Paul Street, London EC2A 4JH.

Program *Saracen* **Type** Arcade **Price** £2.99 **Supplier** Americana, 8-10 Paul Street, London EC2A 4JH.

Program *Beach Head II* **Type** Arcade **Price** £2.99 **Supplier** Americana, 8-10 Paul Street, London EC2A 4JH.

Program *Bismarck* **Type** Wargame **Price** £9.95 (£14.95 on disc) **Supplier** PSS, 452 Stoney Stanton Road, Coventry.

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Program *Dizzy Dice* **Type** Fruit machine simulation **Price** £1.99 **Supplier** Players, Calleva Park, Aldermaston, Berks.

Program *Scrabble Deluxe* **Type** Board game **Price** £12.95 cassette (£15.95 on disc) **Supplier** Virgin Games, 2-4 Vernon Yard, Portobello Road, London W11 2DX.

continued on page 60 ▶

***Moonstrike* is a sedate little shoot 'em up, whose chief claim to fame is that some of the nasties that plummet down from the top of the screen are shaped like light bulbs. That aside, it is a competent but not outstanding addition to the massed ranks of zap games.**

The format of the game is fairly standard; you fly a small spacecraft over the surface of a planet, which is divided into sectors, attempting to bomb a number of land targets at the same time as dodging or destroying the airborne weapons that are aimed at you. You are armed with two types of weapons, a laser mounted on your wing tips for air to air combat, and bombs for the ground targets. The bombs are aimed with a cursor which moves just in front of you, and pressing the fire button at the same time as pulling back on the joystick releases the bomb. At first, switching between the two weapons was a bit tricky, and caused a lot of lost lives, but you should soon get the hang of it.

The graphics are quite nice, not a lot of colour has been used but that has allowed the programmers to add a lot of detail to the graphics. However there are a few things which cause the game to fall short of shoot 'em up heaven. For a start, only half the screen is used as playing area (the other half is devoted entirely to the score table and *Moonstrike* logo, which is a bit of a waste) so you don't have very much room to manoeuvre in. And, as the ship doesn't move all that fast, it can get a bit frustrating finding yourself penned in as often as I did. (On one occasion, just as I passed into sector two, a huge '2' flashed onto the screen obscuring what was going on and causing me to get blown up.)

There's a problem with the laser too, as you can only have one set of shells on screen at a time (like the old Space Invaders), and if you miss a target you have to wait for the shell to go off the top of the screen before you can fire again, so you never really get to work up to the frantic pace of the best shoot 'em ups. So, while *Moonstrike* is a fairly professional effort, it doesn't quite reach the sheer speed and addictiveness that you might look for in this type of game.

Stephen Dean

Program *Moonstrike* **Type** Arcade **Machine** Spectrum **Price** £7.95 **Supplier** Mirrorsoft, Athena House, 66-73 Shoe Lane, London EC4P 4AB.

NEW RELEASES

◀ continued from page 59

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Program *Angleball* **Type** Arcade **Price** £2.99 **Supplier** Mastertronic, 8-10 Paul Street, London EC2A 4JH.

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Program *Sunburst* **Type** Arcade **Price** £2.99 **Supplier** Hewson, Hewson House, 56b Milton Trading Estate, Milton, Abingdon, Oxon OX14 4RX.

Program *Motos* **Type** Arcade **Price** £2.99 **Supplier** Mastertronic, 8-10 Paul Street, London EC2A 4JH.

Program *Ubik's Music* **Type** Utility **Price** £2.99 **Supplier** Firebird, 64-76 New Oxford Street, London WC1A 1PS.

Program *Solomon's Key* **Type** Arcade **Price** £8.99 **Supplier** US Gold, Units 2/3, Holford Way, Holford, Birmingham B6 7AX.

Spectrum

Program *Scrabble Deluxe* **Type** Board game **Price** £10.95 for 128K cassette (£15.95 on +3 disc) **Supplier** Virgin Games, 2-4 Vernon Yard, Portobello Road, London W11 2DX.

Program *Game Set and Match* **Type** Sports compilation **Price** £12.95 (£17.95) **Suppliers** Ocean, 6 Central Street, Manchester M2 5NS.

Program *Beach Head II* **Type** Arcade **Price** £2.99 **Supplier** Americana, 8-10 Paul Street, London EC2A 4JH.

Program *Angleball* **Type** Arcade **Price** £2.99 **Supplier** Mastertronic, 8-10 Paul Street, London EC2A 4JH.

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Program *Ocean Conqueror* **Type** Arcade **Price** £2.99 **Supplier** Rack-It, 8-10 Paul Street, London EC2A 4JH.

Program *Super Nova* **Type** Arcade **Price** £1.99 **Supplier** Players, Calleva Park, Aldermaston, Berks.

Program *Draughts Genius* **Type** Arcade **Price** £2.99 **Supplier** Rack-It, 8-10 Paul Street, London EC2A 4JH.

Program *Rescue* **Type** Arcade **Price** £1.99 **Supplier** Mastertronic, 8-10 Paul Street, London EC2A 4JH.

Program *Bosconian* **Type** Arcade **Price** £1.99 **Supplier** Mastertronic, 8-10 Paul Street, London EC2A 4JH.

Program *Car Wars* **Type** Arcade **Price** £2.99 **Supplier** Firebird, 64-76 New Oxford Street, London WC1A 1PS.

Program *Play It Again Sam* **Type** Arcade **Price** £2.99 **Supplier** Mastertronic, 8-10 Paul Street, London EC2A 4JH.

Program *Pageant of Life* **Type** Board game **Price** £8.95 **Supplier** Softfirm, 21 Ashbourne Way, Thatcham, Berks.

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Program *World Tour Golf* **Type** Sport simulation **Price** £19.95 **Supplier** Electronic Arts, Langley Business Centre, 11-49 Station Road, Langley, Nr Slough, Berks SL3 8YN.

Program *Arctic Fox* **Type** Arcade **Price** £19.95 **Supplier** Electronic Arts, Langley Business Centre, 11-49 Station Road, Langley, Nr Slough, Berks SL3 8YN.

Program *Marble Madness* **Type** Arcade **Price** £19.95 **Supplier** Electronic Arts, Langley Business Centre, 11-49 Station Road, Langley, Nr Slough, Berks SL3 8YN.

You can tell when Christmas is coming because all of last year's big hits start to crop up on compilations. The first of this year's batch arrived with Elite's *6-Pak Volume 2*.

Out of the six games five are re-releases, while one, *Batty*, is unreleased. This isn't very surprising when you realise that *Batty* is actually a *Breakout* clone along the lines of *Arkanoid*. It has all the bonus features found in *Arkanoid* (slow ball, laser, extra lives) as well as the addition of a ball which turns into a fireball, destroying everything in its path. Unoriginal but enjoyable.

Another clone on the tape is Pandora's *Eagle's Nest*. This is one of the best of the recent *Gauntlet* clones, in fact it's so good and so recent that I'm surprised to find it on a compilation so soon. It puts the action in a World War II scenario rather than the usual fantasy setting, but the game is still good old *Gauntlet*.

***ACE* is about the oldest game on the tape. Flight simulators normally bore me silly, but this is more of an action game than a simulator so it's thumbs up for *ACE*. Endurance's *International Karate* is also one of the better examples of its type. You've got about sixteen different moves to master, so you'll need to be totally ambidextrous, but it's all good inscrutable fun if you can master it.**

FTL's *Shockway Rider* is the only game that I'm not totally enthusiastic about. It's an odd game that reminds me of a sci-fi story I read ages ago. You are travelling along a series of moving walkways, some of which move at higher speeds. Your aim is to travel through twelve districts, fighting street gangs and dodging lanes.

On the other hand, the second FTL game, *Lightforce*, is probably the highlight of the compilation. This is far and away my favourite shoot 'em up of all time. It's fast, furious, colourful and totally wonderful.

Obviously the value of any compilation depends upon how many of the games you've already got. But if you don't already have these games then *6-Pak Vol. 2* is excellent value.

Stephen Dean

Program *6-Pak Volume 2* **Type** Compilation **Machine** Amstrad CPC, C64, Spectrum **Price** £9.95 all cassettes (£14.95 C64 and CPC disc) **Supplier** Elite, Anchor House, Anchor Road, Aldridge, Walsall, West Midlands.

CHARTS

Top Twenty

1	(1)	Run for Gold	Alternative
2	(3)	BMX Simulator	Code Masters
3	(2)	Paperboy	Elite
4	(8)	Super Robin Hood	Code Masters
5	(9)	Cricket International	Alternative
6	(4)	Milk Race	Mastertronic
7	(7)	Destructo	Bulldog
8	(6)	Road Runner	US Gold
9	(11)	Soccer Boss	Alternative
10	(31)	Joe Blade	Players
11	(12)	World Class Leaderboard	Access-US Gold
12	(14)	Living Daylights	Domark
13	(13)	Barbarian	Palace
14	(32)	Decathlon	Firebird
15	(5)	Exolon	Hewson
16	(15)	International Karate	Endurance
17	(25)	Olympic Spectacular	Alternative
18	(22)	Back To The Future	Firebird
19	(37)	Tournament Leaderboard	Access-US Gold
20	(30)	ATV Simulator	Code Masters

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Of mice and men

As a regular reader of *Popular*, I could hardly fail to notice its enthusiasm regarding the Atari ST computer. Feeling the need to upgrade from my Sinclair Spectrum, I was also very interested in it, and finally bought a 520STFM and SC1224 colour monitor a few months ago. Potential purchasers may be interested in my verdict:

Every computer has its faults and dare I be the first (?!) to publicise those of the ST in *Popular*.

I was slightly disappointed with the GEM operating system, but only because I've been spoiled by the Macintosh (which I have access to at University). It is a shame that DR did not take time to improve on the desktop concept (which I am sure is possible), instead of producing an imitation which is not as comprehensive. For example, icons cannot be repositioned within a window and file names are restricted to eight letters with an three letter extension. Double clicking requires daily finger exercises unless you copy the control panel accessory onto every disc to slow the mouse down. These are minor gripes however: GEM is an effective WIMP environment and makes the ST one of the most friendly home computers around.

Another minor gripe: there may be 512 colours available, but a large number of these are extremely similar shades of red or green. Although having two buttons on the mouse is an unforgivably daft idea, you do get used to it since most software designers with their heads screwed on only use one of them (the left). But the right button is there, and those without their heads screwed on can easily fall into the trap of using it (eg *Neochrome*). Sometimes, as in the case of *Arena* (an athletics simulation), the programmers seem to have no idea what the mouse is there for, and the user is at first completely baffled by the menus which need to be double clicked.

But, let's face it, the best thing about the ST is its price. It is cheaper now than many 8-bit computers (Commodore 64 + Disk drive, BBC); and yet infinitely more powerful. My niggles about the operating system are really a wider criticism of all operating systems: even the Mac is frustrating at times, and a breakthrough in artificial intelligence is required to make a computer more friendly than that. Manufacturers I think should spend more time and effort on the "man/machine interface" as well as the hardware, since this is one program which will be used regularly by everyone who buys the computer. Even though I can't afford a Macintosh, Apple remains my favourite computer company. As you read this, Apple programmers are using the Cray Supercomputer to design the operating environment for their next generation of computers; while Atari is meddling with the Inmos Transputer for the ultimate in speed; the operating system may be a last minute consideration. Acorn also has designed the fastest micro around, but hastily botched in a Wimp written in Basic; the hardware of the Archimedes can support a much more advanced system to control it.

The ST is an important machine because it ducks under the price point beyond which the British Public wouldn't buy it. Machines as powerful as this have been around for years, but only now have they entered the home computer niche. Atari have made a big step forward for the computer industry because people will look over our shoulders and see that computers have become friendlier since the Sinclair Spectrum days. Perhaps there is another home computer boom in the offing?

Andrew McOwan

This week, due to overwhelming demand, we have decided that it is about time to launch a new puzzle.

And it has also been decided that the best people to think of a new format for the puzzle would be you, the readers.

So, in essence, this week's puzzle is to think of a puzzle; which will start the week after next.

As with all other puzzles, the person who invents the most interesting format for the new puzzle (phew this is getting confusing, Ed!) will receive a prize, which for this special case will be £20.

Because this is such an important decision, we have decided to run this 'design a puzzle' competition for two weeks, so the closing date is October 16.

Send all your ideas to Puzzle Ideas, Popular Computing Weekly, Greencoat House, Francis Street, London SW1P 1DG.

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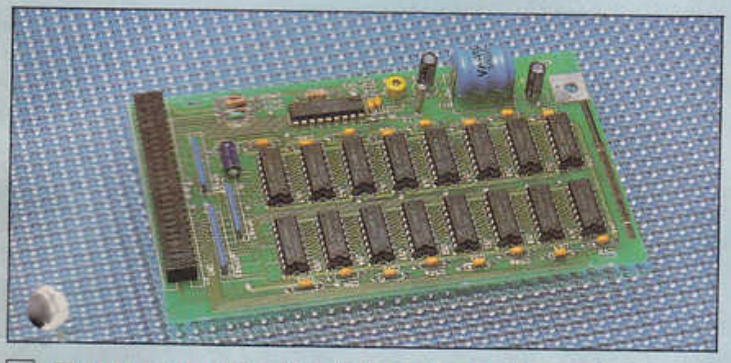

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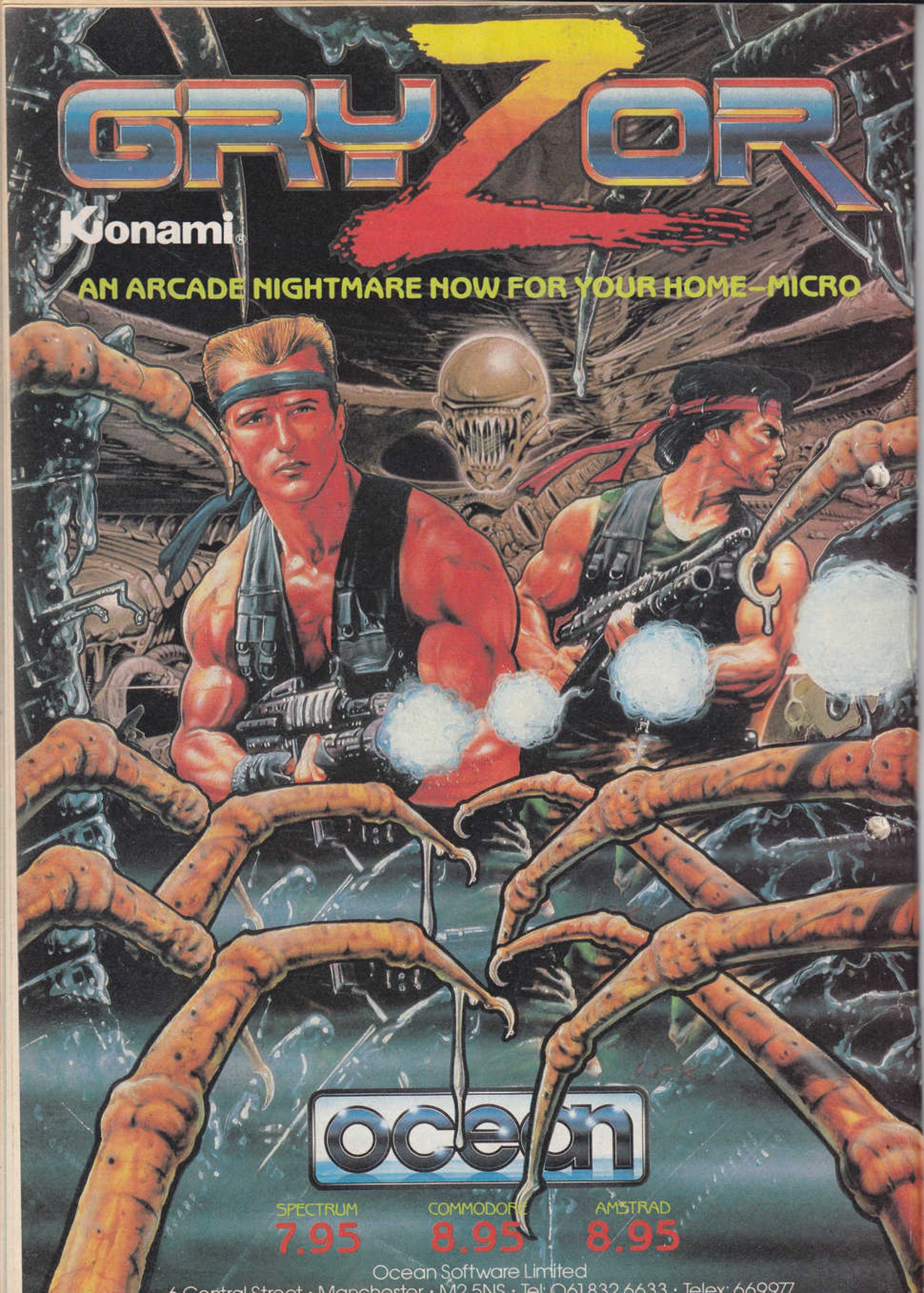
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