

July 31-Aug 6 1987

40 200A
Vol 6 No 30 60p

POPULAR Computing WEEKLY

NEWS DESK

Amstrad's PCW9512
- picture inside

Archimedes stars
at Acorn show

Enterprise: back
from the dead?

GRAPHICS

Special offers
on art
programs - p18

Graphics series
- the human face

HARDWARE

A second drive
for your
Amstrad PCW8256

GAMES

Blasting away
in Game Over



Art Director



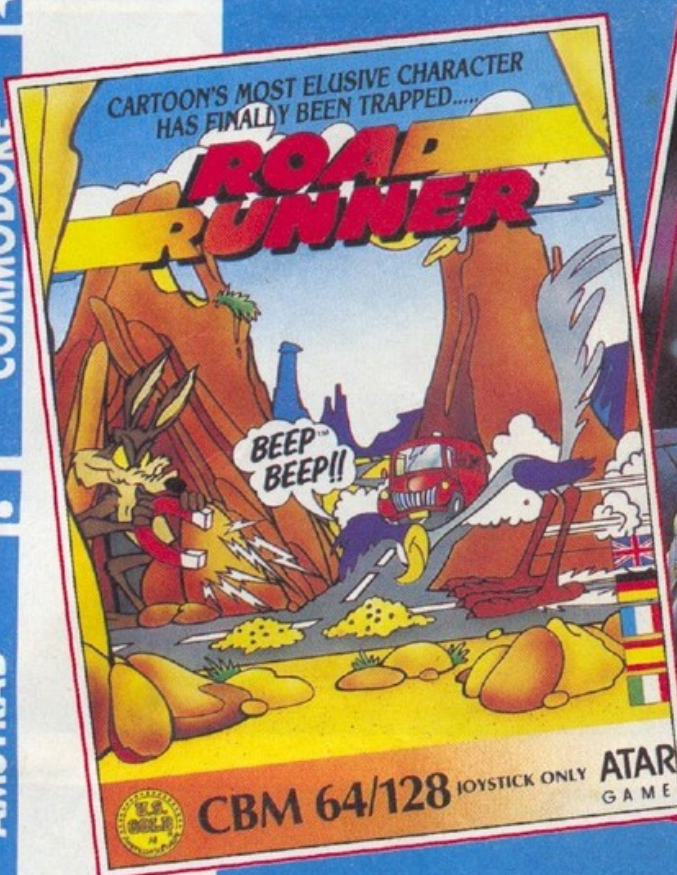
Advanced Art Studio

ATARI

COMMODORE

SPECTRUM

N E W RELEASES



ROAD RUNNER

GAME OVER

WOOLWORTHS

A Great Deal in Entertainment



* At selected larger stores.

* Items subject to availability

COMMODORE

SPECTRUM

AMSTRAD

SPECTRUM

COMMODORE

AMSTRAD

ATARI

AMSTRAD

COMMODORE

ATARI

SPECTRUM

July 31–Aug 6 CONTENTS

POPULAR
Computing
WEEKLY

News

6 News Desk Amstrad's PCW9512 sees the light of day . . . Atari relaunches the 130XE . . . Virgin moves into business software.

13 News Analysis The government has plans to reform the law of copyright. How will this affect the software industry? Christina Erskine looks at the implications.

31 Soundcheck Mark Jenkins concludes his tour around the UMI 3S module for the BBC machines.

32 Communications David Wallin brings you news from the bulletin boards, and answers networking queries from readers.



Top: Amstrad's PCW9512. Above: Pace's second drive for the PCW8256. Below: Paul McKinley looks at complex shapes in the concluding part of his graphics series. Bottom: Catch 23 from Martech.

Features

15 Bit 2 One MSX machine which stood out in the crowd of like machines was the Yamaha CX5 with its musical capabilities. Clive Watts looks at *Bit 2*, a software package which enhances those features still further.

16 PCW second drive Why get involved in the upgrade path to 8512 or even, later this year, 9512, when you can already add a second disc drive to your 8256. David Wallin tries out Pace Micro Technology's 5 1/4 inch PCW drive.

Programming

19 Special Offers To accompany the final part of our series on graphics programs, we've lined up some tasty discounts on commercial art programs.

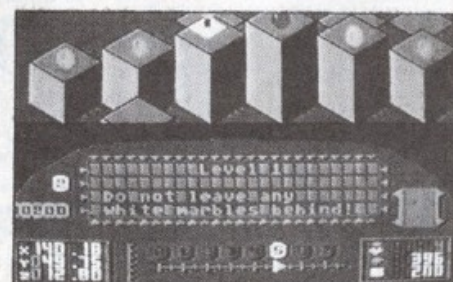
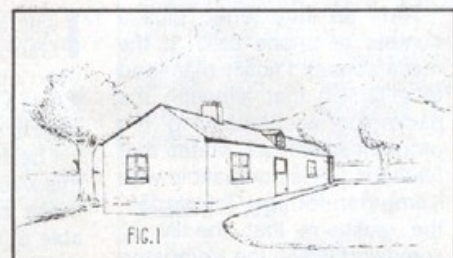
20 Graphics packages – and how to get the best from them In the final part of our series, Paul McKinley shows you how to create images using square and circle features, and gives some guidelines on drawing human faces.

22 Listings Screen Machine on Spectrum; fade it, slide it, mix it, manipulate your screen to your heart's content. On Amstrad CPCs, a program to enable you to list those variables and then define them.

Production on the Commodore 64 is all about creating your own screens and producing Basic listings from them. QL Cat gives you plenty of file information not available in QDOS. Finally, Faster Basic will help all machine owners with their Basic programming.

22 Bytes and Pieces Short routines for you to type in.

28 Peek and Poke Kenn Garroch answers your programming queries.



Games

40 New Releases Your complete guide to all the games released this week, including *Game Over* from Imagine, *Pile Up!* from Ariola on the Reaktor label, and Martech's *Catch 23*.

Editor Christina Erskine **News editor** John Brissenden **Features editor** Cliff Joseph **Technical editor** Duncan Evans **Production editor** Michelle Beauchamp
Marketing and Advertisement manager David Osen **Advertisement executives** Athena Peerman **Classified manager** Susannah King **Classified executive** Robert Cole
Editorial secretary Annmarie Allan **Administration** Carol Frith **Credit control manager** Gabriella Piscina **Managing editor** Peter Worlock **Publishing director** Jenny Ireland
Published by Sunshine Publications Ltd, 12–13 Little Newport Street, London WC2H 7PP. Tel 01-437 4343 Telex 296275 Fax 01-439 0681
Typeset by Magazine Typesetters, 6 Parnell Court, East Portway, Andover, Hampshire. **Printed by** McCorquodale Magazines, Andover, Hampshire.
Distributed by S M Distribution, London SW9, Tel 01-274 8611, Telex 261643.
© Sunshine Publications Ltd 1987. ISSN 0265-0509

ABC

How to submit articles Articles which are submitted for publication should not be more than 2000 words long. The articles, and any accompanying programs, should be original. It is breaking the law of copyright to copy programs out of other magazines and submit them here – so please do not be tempted. We cannot guarantee to return your programs – so please do not send your only copy. **Accuracy** Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

Popular Computing Weekly. Tel: 01-437 4343.

Incompatible Fairlight

Following T A Collins' letter regarding loading programs with *Fairlight* for the Spectrum, I feel that I should pass on my experiences with the 128K version of this program as a warning to him and other potential purchasers.

I bought a copy of this program in December 1986 for use with my (then) new Spectrum 128 and Kempston joystick interface, and discovered on loading, that although the program appeared to load satisfactorily, when any key or the joystick fire button was pressed, the computer crashed and reset to 48K mode.

I obtained a replacement program from my dealer, with exactly the same results. I then returned the replacement copy to the manufacturers after initially reporting the problem by phone.

Some six weeks later, another replacement program arrived - with the same problem, yet again, on loading.

At this stage, I replaced the joystick interface, on the off-chance that this was at fault, again with no improvements.

After an irate letter, plus a number of phone calls to the manufacturer, I finally managed to establish that although the packaging accompanying the program specifically states that *Fairlight 128* is compatible with Kempston-format interfaces, the reality is that the IN 31 command which the Kempston joystick interface generates is not in fact supported.

R K Northover
London E9

Extra commands tape

Thanks for publishing my C16 extra commands program. Perhaps you could mention that anyone not wishing to type in the program (it is a bit long) could send a cheque/PO to me at 67 Wrose Road, Five Lane Ends, Bradford BD2 1LN.

I will supply them with the program on tape with a couple of extra bonus programs, UDG generator/manipulator program and an automatic 'data' line maker program.

The cheque/PO should be for £2.50, made payable to Peter Finan.

Peter Finan
Bradford

The honest companies

Another good word for a couple of excellent companies in the computer business.

Having recently treated my C64 system to a disc drive, I contacted Tasman Software, which stated that an upgrade from tape to disc would cost £5.00. I duly sent off the cash, and received, by return, a fully packaged disc including full instructions.

The second company deserving praise is Compumart of Loughborough, which sells discs and disc boxes. Having already bought a 50 disc capacity box, I decided that I needed another.

Unfortunately, Compumart could not supply the product. Instead, the company sent me a 100 disc capacity box at no extra cost.

It gives me great pleasure to endorse these companies as examples of how simple courtesy and customer relations should be conducted

Keith R Munn
Glasgow

Hiding under the desk

I was interested to read Kenn Garroch's reply about magnetic interference (*Popular*, May 22). I too have suffered from the effects of this.

I believe in my case some of this was due to the use of one of those computing desks available at various stores. Perhaps my experiences may be of help to others.

I have a Commodore 64 with a C2N cassette unit, a 1541 disc unit and MP8801 printer. I use a small black and white TV for ordinary utility work.

I found after a while with the new desk that a number of tape programs which had previously loaded OK began to give loading errors. After cleaning and aligning the tape heads I found that most of the problems were solved if the C2N was on the floor under the desk!

On checking up in the C2N manual I note that it is stated that the cassette unit should not be closer than two feet from the TV or monitor, and in the Easyscript manual it says three feet.

On most of the desk units I have seen the restricted space means this is very difficult to arrange.

I got over the difficulty by

adding a little shelf at floor level to the desk. I also have the cassette unit in a small earthed tunnel made of sheet steel.

This acts both as a magnetic and RF screen, and seems to overcome most tape loading problems.

I also had problems with the disc unit. I modified this with a mains power switch on the front so that it could be switched on conveniently without stretching over the back.

To make more room on the desk top I added a second shelf just under the desk top to take it neatly and tidily. I discovered that the shelf needs to be about eight inches under the desk top otherwise the unit gets abnormally hot in the restricted space.

Reginald A Mascall
Bristol

Calculating VAT

Perhaps users of the Amstrad PC1512 might like to try calculating VAT on the Gem Desktop calculator and committing it to memory:

$a * 15 \% M+$,
then MR,

where a is 10, 100, and 1000 respectively. In each instance, the figure returned by the memory is 15!

Rev Thomas Scarborough
South Africa

The hidden pirates

I write about the hidden scandal of the computer users' groups. Because of the subject matter, please could you withhold my name and address, for fear of ridicule and retaliation.

I recently went to a few different user groups for the first time, to see what went on at these meetings. After initial suspicion the people there got down to the business of the evening.

Piracy. User after user, computer after computer. Virtually all that was done was to show off newly 'acquired' software, give copies out, then when everyone had a copy of everything they wanted, pack up and leave.

As a programmer, I found it totally disheartening that these people, covering a whole range of ages, did nothing but copy other programmers' work. To see people copying and playing my own games was also rather

depressing.

I realise piracy goes on and nothing can realistically stop it totally, but these groups seem to bring it out of the seamy backroom and playground into the open, and even condone it.

As a non-member, I was asked to pay a visiting fee. I was then informed that I couldn't copy software unless I joined the group. This further encourages piracy, making it seem more acceptable to copy software, and deprive programmers of their livelihood.

I have been to various different meetings, for the Commodore 64 and Acorn computers. It was the same for each. One user even had a massive alphabetical list of his pirated software collection, letting members go through and pick out what software they wanted.

I asked some of the older hands if all user groups were like this, and they said they knew of no other type. Surely it is time to stamp out these piracy collectives and drive piracy into the shadows it deserves to be in. I stand to be corrected on the typicality of my experiences, and hope other user groups are different.

I somehow think that hope is a vain one.

Name and address supplied

Corrections from Rainbird

I am writing to thank you for the review of our new adventure, *Knight Orc* by Level 9 in *Popular* July 10-16, and to point out a mistake which has occurred about the price.

Knight Orc retails at £19.95 on the Atari ST and Amiga - not £24.95 as stated in the review.

I'm afraid the error in prices came from our end and so I would be very grateful if you'd print this letter to inform your readers of the correct price.

Just think though, instead of paying out £24.95 for *Knight Orc*, this brilliant adventure is available for just £19.95!

Also, the game *Tracker* is published by Rainbird, not Firebird as you stated last week.

Clare Edgeley
Public Relations Manager
Rainbird

Eprom 2 available

Your readers may be interested to know about the second issue of *Eprom*, the

Spectrum review magazine, following on from the well received first issue (mentioned in the letters page in June).

Eprom is the brightest new amateur based magazine in the country and is always glad of new readers, or contributions. To find out what the fuss is all about just send a 70p PO/cheque made out to Eprom, at 328 The Maltings, Penwortham, Preston, Lancs PR1 9FD, plus a postage stamp please. Sorry, no back issues of Eprom 1 available as it sold out after the last mention in the illustrious pages of this magazine (so send in your order for issue two now!).

T Worrall
Preston

Certain utterances

Firstly I would like to compliment you on the quality of PCW. I particularly appreciated the recent banishment of games to the back. I was however driven to certain utterances by something I read in the letters page of *Popular*, June 26.

A reader wrote asking where he, and "hundreds of other users" could obtain a two pass assembler for the CBM64. These do seem to be becoming rare, and you replied that Super-soft were "still selling" their Mikro assembler which costs £57.50. So why the utterances? Well, the previous PCW carried a news item about my companies RS232 interface and 6502 assembler package for the 64. The latter costs a mere £12.99 and is somewhat better value for money in this age of budget software.

A Holme
York

Solving the puzzle

A number of new readers have contacted us recently asking for a fuller explanation of the rules and conditions for entering the Puzzle which appears on the inside back page each week.

For them, and also as a recap for seasoned Puzzle solvers, here is a full list of, well, hardly 'rules' as such; let's call them guidelines. They should answer all the queries we've received recently.



"How about something for the weekend, Sir?"

Conditions of entry

1) The closing date for the each puzzle is given every week. As you have around three weeks to send your entry in, feel free to save postage by putting solutions to two or three puzzles in one envelope.

Just keep the different puzzle solutions to separate sheets.

2) We do not need (nor want) your solutions on disc or cassette. We do not have time to run them all each week, and we would probably get snowed under trying to return disc and tapes to their rightful owners.

3) We do need the listing of the program you used to solve the puzzle. You can send a computer print-out, or if you don't have a printer, type out or handwrite the listing (legible handwriting, please).

4) Please write the actual answer to the puzzle somewhere on your entry, either output as part of the program, or written underneath.

5) Also, you should include short program notes - show your workings!

Judging

1) The winner will normally be the person who submits the most concise, clear program, which accounts for the elements of the question set, and produces the correct answer.

2) This does not mean you need to own a computer with awesome programming powers. We make allowances for the

machine used, and the different capabilities of various computers.

3) While we can usually tell from the listing which machine, or machine type has been used to generate a solution, it helps enormously if you can note the computer used in your entry.

4) Entries from those who solve the puzzle without writing a computer program will not be disqualified, but they do start off at a disadvantage.

Most, if not all the puzzles are most sensibly solved using a computer. Besides, the puzzle is not intended to test phenomenal power of mental arithmetic, but to challenge you to write the neatest computer program which solves it. This is computer magazine, after all.

5) The winning solution does not have to be identical to that given by puzzle setter Gordon Lee's - again to take different machines into account.

6) If no correct solution is submitted for any one puzzle, then no prize will be awarded for that puzzle (it has happened!).

7) If there are several clear, concise, correct solutions for any one puzzle, which, in the opinion of the judges, cannot be separated, the winner will be drawn at random from the final shortlist. There is only one prize awarded each week.

8) The judges' opinion is final.

9) Puzzle entries should be sent to Puzzle No XXX, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 7PP.

Correction

Here are the elusive missing lines to our Spectrum listing, A Game of Two Halves, which was to have appeared last week.

```
408 IF u$="1" AND match=0 THEN LET cpf
ix=INT (RND*2): LET crd=INT (RND*48)+1:
LET m$=v$(crd): LET j$="*** FA Cup Matc
h ***": IF j$(crd)="o" OR v$(crd)=y$ TH
EN GO TO 408
```

We're sorry but *Popular Computing Weekly* cannot guarantee to reply to all letters requesting a personal answer. It helps us enormously if readers are prepared to have general queries answered on these pages, so, if possible, please do not send SAEs.

The mating threat

In Game Two of our readers' versus *Colossus* chess tournament, the readers, playing white, moved their rook to g3, probably hoping to threaten mate with their queen on b6. *Colossus* has, however, avoided all that by just moving its king out of the way to f8 (see diagram for latest position).

Apologies are due for the misprinted Game Two board position last time. The pawn shown on c6 should, of course, have been a rook.

Also, could readers please use full algebraic notation specifying both squares for their move, to avoid any possible confusion?

Over to you

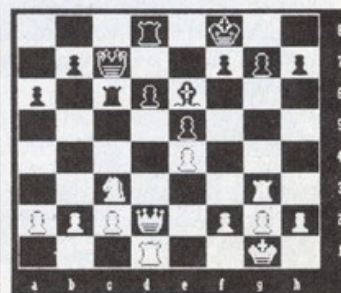
What do you think would be the readers' best move now?

Send your suggested move to either Inter-Mediate (*Popular Chess*), Freeport, Sawbridgeworth, Herts CM21 9YA (no stamp needed), or *Popular Chess*, Unit 2, The Maltings, Sawbridgeworth, Herts CM21 0PG (with a stamp).

Only one vote per person please, and all entries must reach either address by Wednesday, August 5.

Game Two

1 Pe2-e4	Pc7-c5
2 Ng1-f3	Nb8-c6
3 Pd2-d4	Pc5xd4
4 Nf3xd4	Pe7-e5
5 Nd4-b5	Pa7-a6
6 Nb5-d6+	Bf8xd6
7 Qd1xd6	Qd8-f6
8 Qd6-d1	Ng8-e7
9 Nb1-c3	Pd7-d6
10 Bc1-e3	Ke8-g8 o-o
11 Bf1-e2	Bc8-d7
12 Ke1-g1 o-o	Rf8-c8
13 Qd1-d2	Nc6-d4
14 Ra1-d1	Nd4xe2+
15 Nc3-e2	Rc8-c6
16 Be3-g5	Qf6-e6
17 Bg5xe7	Qe6xe7
18 Ne2-c3	Bd7-e6
19 Rf1-e1	Qe7-c7
20 Re1-e3	Rf8-c8
21 Re3-d3	Rc8-d8
22 ?	
23 ?	



New PCW gets daisywheel

AMSTRAD last week launched its new PCW9512 wordprocessor at the NOMDA office equipment exhibition in Atlanta, USA. The new machine will make its UK debut at the PCW show in September.

The 9512 costs \$799 (about £500). Although UK prices will not be announced until the September launch, a £499 price tag looks likely.

The machine differs substantially from the hugely successful PCW 8256/8512 which preceded it, and features:

- a system unit containing one 3 inch disc drive, with an optional second drive.
- a 20 cps letter-quality daisy wheel printer.
- a paper-white monitor.
- 512K Ram.
- bundled *Locoscript II* word-processing software.
- *Locospell* spelling checker.
- *Locomail* mailmerge software.
- Parallel Centronics interface, for connection to four other printers.
- Optional CPS 8256 serial



Amstrad's new PCW 9512 with daisywheel printer

interface.

- 15½ inch auto paper and tractor feeds.

Amstrad insists that the earlier machines are not being dropped, despite persistent

speculation about their future.

"We will continue to supply our previous PCW models, as we feel that there will continue to be a strong demand for them," said Amstrad marketing

chief Malcolm Miller.

The most likely result of the 9512's arrival – and particularly the inclusion of a daisy wheel printer – will be £100 price cuts on the 8256 and 8512.

Virgin label targets Yuppies

DETAILS emerged last week of Virgin's first moves out of the games software market. The company's new label will simply be called Virgin Software, and the first title will be launched at September's PCW Show.

The company has been preparing for the move for several months, and indeed was expected to announce a number of business packages during the summer.

But Virgin's Patricia Mitchell



Nicky & Dicky: Virgin's Nick Alexander & Richard Branson

made it clear that the new label will definitely not be producing spreadsheets, wordprocessors or other traditional business programs. Nor would there be any "adult games".

"It's more home-based entertainment," she said. "We're trying to get people who have used a PC at work and have a cheap PC at home.

"It's for people to use a PC to do something more useful than play games," she added. One

example would be a stocks and shares portfolio manager.

Mitchell was able to confirm only a few details, but she did say that Virgin is working on half a dozen products for the new label. Initial Virgin Software titles will carry a £50 price tag.

She also stressed that Virgin Software had no plans at the moment to cater for machines such as the Macintosh, but would produce titles solely for PCs.

Kempston outfit bows out

KEMPSTON Micro Electronics, manufacturer of Amstrad peripherals, has gone into voluntary liquidation. Peripherals marketing operation Kempston Data will continue trading, and is unaffected by the move.

KME founder Abta Pandaal was philosophical about the closure of the five-year-old company, which had actually stopped selling products last summer.

"That market has gone and we've moved on into other things. There's a very long list of manufacturers who have fallen into the same trap. The past is the past and there's not a lot you can do about it," he was reported as saying.

Plus 3 price cut on cards

A £50 price cut for the Spectrum Plus 3 was being predicted last week, with an announcement expected between now and Christmas.

Speculation arose once the £249 price tag for the Plus 3 – which goes on sale this week – was known. This was a lot higher than had been expected, and was considered far too high by many, given the 128K storage and comparatively low specification of the new

Sinclair appear uncompetitive, and W H Smith has already announced it will not be stocking it.

Secondly, it is thought that a mid-range Spectrum – a "Plus 2A", or Plus 3 minus a disc drive – could be announced shortly. This would force a cut in the price of the Plus 2 as well. But last week Amstrad was dismissing all talk of any price cuts.

"We have no plans to cut the price at this time," said a



Spectrum Plus 3: £199 by Christmas?

machine.

But recent events may have forced the issue. Atari's announcement of a £100 cut in the price of its 520STFM from September 1 – to £299 – made the

spokesman. Asked whether any move would be announced by Christmas, he replied: "It is not, and never has been, our policy to talk about marketing strategy in advance of announcements."

Online bonanza for US hackers

HERE'S a good story. It's about these teenage computer hackers in ten US cities who access credit card numbers and bank records to go on an online spending spree – and get into the national security network.

But it's not *War Games 2*, it's a true story. According to a report in *The Guardian* last week, police and secret service agents in Pittsburgh uncovered the ring after one teenager's mother was curious about where he got an expensive skateboard.

But it turns out that it didn't end at skateboards. Clothes, TV and hi-fi worth thousands of dollars was bought through the illegal bulletin board which covered the whole country. The hackers only stopped short of the ultimate – a car.

Secret service officials were reportedly tight-lipped about the possible danger to national security posed by the youngsters.

"We have no knowledge of any teenagers invading the government security system," said one.

SOFTWARE HOTLINES

The next month or so is going to be a good time for owners of STs and IBM compatibles who like games by **Ocean**, but it's slim pickings for the rest of us at the moment.

Most of the major software houses are now concentrating their efforts on the PCW show in September, so there's not a vast amount of interesting new stuff on the way, although there is a lot of converting across formats going on.

ST owners can look forward to the arrival of *Tai-Pan* (yes, really), *Slap Fight*, *Top Gun* and, perhaps the most interesting arcade release so far for the ST, *Head Over Heels*.

Top Gun will also surface in a PC compatible version, as will *Tai-Pan* and the totally addictive *Arkanoïd*.

Down at the Spectrum and C64 end of the market, yet more licensing deals are behind two of the more interesting games on the way.

Gremlin Graphics has almost completed *Mask*, an arcade adventure based on the popular comic strip. It's one of those *Man From Uncle* type scenarios, where organisations with names made out of lots of initials battle it out for control of the world using hi-tech gadgets to chase each other around and blast each other to bits with.

It was supposed to be ready for July release, but it looks like August is more likely at the moment.

Over in America, Arnold Schwarzenegger's latest film is raking in lots of money, and

Activision has grabbed the software rights. The film is called *Predator*, and someone at Activision described it as "a cross between *Southern Comfort* and *Alien*".

Arnold and his biceps go into the southern swamps in search of some kidnapped diplomats, and then end up being chased by a thingy from outer space. Somehow I get the feeling that it might just be a shoot 'em up.

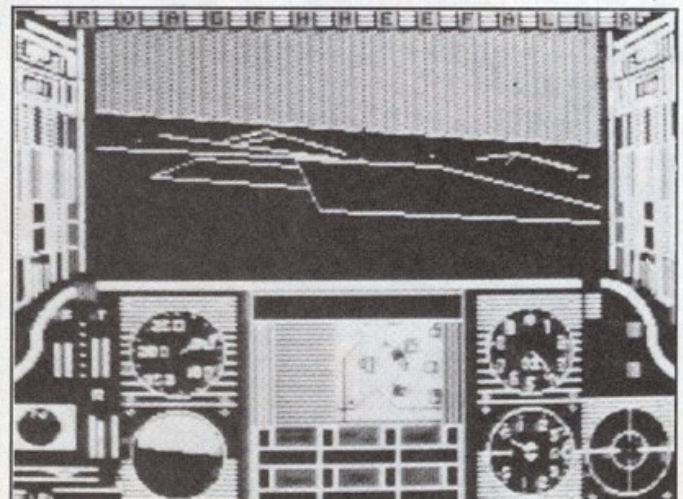
In a slightly more cultured but no less violent vein, Activision will also be releasing the Spectrum version of *The Last Ninja* soon, and that will be quickly followed by *Ninja's* sequel, *Bangkok Knights*, based on the art of Thai boxing.

Another piece of bicep rippling software on the way is *Captain Courageous* due soon from **English Software**. Like *Predator*, it sounds like it owes a bit to the *Rambo* films as it's described as a game of 'hair-raising jungle combat' with a great deal of splashing across rivers and swinging from tree to tree, but CC will only be available on the C64.

Now, with the arrival of the Plus 3 only a few days away, we're starting to get a few confirmed titles for the new machine. Many companies are 'thinking about' disc-based games, but so far only **Microprose** has definitely announced one with release dates and prices. Its *Gunship* helicopter simulation has sold bundles on the C64 and from August should be available for the Spectrum in both cassette and disc version.

And that definite price? £12.95. So you've now got some idea of how much the games are going to cost you.

Cliff Joseph



Gunship

Archie steals Show

THIS year's *Acorn User* show attracted the crowds in greater numbers than usual, and it was all because of one machine. For the first time in public Acorn had the Archimedes, the RISC technology-based machine, on show.

Although no commercial software was in evidence for the machine, a number of demonstration programs did give a glimpse of the speed and power of the Archimedes. David Braben's *Lander* game in particular, with its scrolling three-dimensional solid landscape, impressed.

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

Price: On application

Organiser: Database Exhibitions, 061-456 8383

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

Computer Concepts was quick off the mark in the support stakes for the Archimedes with ARM (price £12.95), a book on assembly language programming, while Norwich Computer Services was offering subscriptions to *Archive*, a magazine for the Archimedes.

New hardware for any of the existing Acorn machines was thin on the ground but Vine Micros did have *Romboard 4*, which allows you to store four Roms and choose whether to overlay the Ram banks or the cartridge slots. Nidd Valley Micro Products had a mouse, which can be used on its own or with their *Grafik* mouse software package, total price £39.90.

The same company was also demonstrating *Desktop Illustrator*, a package for producing designs to be printed. £49.90 including a mouse. In a similar field, Wight Scientific were showing *Signwriter* (£29.95), a program for instant display lettering.

For doing their own programming an interesting product was Elsevier-Biosoft's *Overlay Basic* (£29.95). This comes as an Erom and allows users to keep Procedures and Functions as library subroutines on disc. It does this by intercepting error reports and searching the disc for the appropriate routine



Archimedes

which has been called. You don't have to worry about line numbers clashing and local variables remain so.

For more advanced programmers Mijas Software were exhibiting *Source-Level Debug* (£22 for basic system, new *Debug* disc at £20), a tool for debugging assembler and C programs.

On the games front only Tynesoft with the licensed *Spy v Spy* conversion and Superior/Acornsoft with *Crazy Rider* - something like *Pole Position* on a motorbike - had anything new.

With little else at the Acorn User Exhibition as exciting, Archimedes more than stole the show - it was the show.

Duncan Evans

Priests 'n' PCs on TV

COMPUTER "duffs" are the target of a new series on Channel 4, *So We Bought a Computer*. The six-part series, which began last Monday, is aimed at people who are "frightened by computers".

"You needn't know the internal workings of the combustion engine to learn to drive a car, and it's the same with a computer," said presenter Carol Vorderman, who also appears on C4's *Countdown* programme.

The series covers different areas of computer applications in small businesses, from word-

processing in the first programme, to databases, spreadsheets, graphics, communications and computers in retailing.

Each programme features interviews with a number of users, none of whom are experts, including the priest who uses an Amstrad PCW for writing sermons, and the fruit farm owner who works out payroll on an IBM PC.

There is also an interview with an "expert", who answers basic questions about choosing systems for particular



Very Rev. John H. Allen (Provost of Wakefield)

applications.

So We Bought a Computer is on Channel 4 every Monday at 6.30pm.

NOW FOR COMPUTER

MASK™

The Battle Continues!!!

Join with the forces of MASK, skillfully commanded by the brilliant strategist Matt Trakker and combat the evil of the villainous VENOM in their quest for domination of the world. No longer need you stand by and passively observe the evil deeds of Mayhem and his co-conspirators. Here is your chance to dig deep into your cunning and put your skills to the test against possibly



the greatest master criminal the world has ever seen, fact or fiction.

This classic conflict of good versus evil is portrayed with a realism and excitement that can only take its lead from the world's most famous collection of superheroes and supervillains. There are creations of adventure, there are creations of combat but there is not a creation quite like MASK!!!

SAY GOODBYE CONDOR

MAYHEM!!

BRAD! THIS IS THUNDERHAWK
HOLD ON, I'LL SOON BE
ON HIS TAIL...

MASK™ AND THE ASSOCIATED TRADE MARK ARE THE PROPERTY OF KENNER PRODUCTS, TOYS, INC. (C) 1987

GREMLIN

CBM64/128 & Amstrad - £9.99 TAPE
£14.99 DISK
Spectrum 48/128K - £7.99 TAPE



'Whaddya mean, you sold the last copy?'

No doubt about it . . . bulging eyes, flaring nostrils, face contorted in rage, literally smoldering with frustration.

Another ordinary ST user has missed out on *ST Update*.

Trouble is, in its first few months *ST Update* has been a monstrous success. There's simply

no way you can be sure that there'll be a copy for you, unless you order one today.

It's too late after the event. Tearing your newsagent's arm off and beating him to death isn't going to help.

Save yourself the anguish. Just ask him nicely to keep your copy safe each month.

Ads watchdog savages computer industry again

THE computer industry's bad name for misleading advertising hasn't been helped by the latest report of the Advertising Standards Authority.

Complaints were upheld against no less than five computer companies for a variety of failings. The most publicised of these companies was Cambridge Computer, which received criticism for its advertising of the Z88 portable (see *Popular Computing Weekly*, July 3).

KK Stationers of London's Edgware Road was investigated over prices the company quoted for the Psion Organiser. KK had advertised the Psion at £82 for the Organiser II-CM, and £115 for the XP exclusive. So VAT-inclusive prices should have been £94.30 and £132.25.

A customer at the shop was told that inclusive prices were £99.50 and £139.50, but the

company later admitted to the ASA that the customer had been misinformed, and that the advertised prices were correct.

Non-appearance of advertised products was the reason for an ASA verdict on Mirrorsoft. The Authority upheld a complaint about the *Fleet Street Editor* DTP program.

This was being advertised in the computer press in November 1986, but was still unavailable in March 1987, although it did appear in April. The ASA asked Mirrorsoft to avoid such a delay in the future.

A similar problem got Nabitchi Computing of Liverpool into trouble. A customer questioned the continued advertising of the Locoprinter daisy wheel driver for the Amstrad PCW 8256, when she was repeatedly told by the company that it was not yet available.

Nabitchi claimed that supply

problems had caused a shortage, but were reminded by the ASA of the need to ensure the availability of products before they were advertised.

The final complaint was over claims of a split baud rate for PMS Communications' Dialup comms package for the IBM PC and compatibles.

Promotional literature failed to make it clear that the split baud rate could only be achieved on the PC by using a speed-buffered modem, and the ASA decided that this qualification should have been expressed in the brochure.

The ASA report shows a continuation of the bad record of computer companies in promoting their products. The industry consistently falls foul of the Authority, and is rivalled only by the holiday and financial services industries in complaints about its advertising.

NEXT WEEK

Desktop publishing

Next week sees the start of a two part feature on this year's fashionable topic. We'll look at what's available, what effects you can expect, and why desktop publishing on the small micro still has some way to go.

Lisp

Kenn Garroch begins a new series on learning Lisp - which stands for List Processing. Created as an artificial intelligence tool, Lisp has very few commands, but uses them to 'process lists' of data, hence its name.

Psion emulator for PCs

PSION has launched a software development emulator for writing OPL (Organiser Programming Language) Programs for its successful Organiser II handheld computer on an IBM PC.

Psion - which is currently producing 2,000 Organiser IIs a week - reckons the Developer will make it easier and quicker to write OPL programs.

"It's for any people that currently use OPL on an Organiser, and have a PC, from the likes of you and I to people in big corporations," said a Psion spokeswoman.

What sort of applications would Psion expect people to develop with the new product? "It could range from writing alarm procedures to much more complicated procedures - absolutely anything."

The product - on a 5¼ inch floppy disc - enables the PC or compatible to operate as a complete replica of an Organiser, but with a full-size keyboard and inbuilt screen editor.

Procedures can be stored in MSDOS files on disc, and then transferred to the Organiser's

Datapaks using the recently-announced BS333 Commo Link. The product will run on all IBM or compatible PCs with

512K Ram and MSDOS 2.0 or later.

The Organiser Developer costs £49.95 (including VAT).

Enterprise is back

ENTERPRISE Computers looks set to make a return to the UK market, nine months after the company folded its UK operations.

Former Enterprise executive Neil Blaber is currently in discussion with the firm's new owners in Germany, but hopes to be acting as the firm's UK agent shortly.

"Enterprise is not officially moving back into the UK yet, but it might be," Blaber said last week. "But I'll be carrying the full back catalogue of software and selling the machines and peripherals."

It appears that many new titles from Germany, not previously available in the UK, will reach the UK market under the deal.

The Enterprise story dates

back to 1983, when the company was called Samurai Computers. The name was shortly afterwards changed to Elan, and the Elan Enterprise announced.

The company swiftly changed its name again, to Flan, and finally to Enterprise. Meanwhile the machine, announced in late 1983, didn't actually appear until the 1985 PCW show in September of that year.

The British company's assets were bought up by an Indian company, Broadlight, and have now been bought by the German company.

Blaber reckons that prices for the Enterprise will still be "fairly competitive" - about £80 for the 128K machine, and £60 for the 64K.

Games consoles compared

The Sega, Nintendo and Atari 65XE are all vying for places in the high street stores, as the return of the games console looms. We look at all three and explain what the consoles have to offer the games enthusiast.

The silly season

Why do so many companies go to the wall during the summer? We look at the effects of the micro 'silly season'.

Machine code programming

Spectrum owners who'd like to improve their machine code should take a look at Andrew Styles' article, hints, tips, increasing the speed of programs and saving memory.



ZONEFOUR LTD

All disks now sent 1st class or courier



MIMIC IN FREE LIBRARY CASES

DS 96 TPI	10s	£7.60
FLIPSIDED	10s	£7.15
DS 48 TPI	10s	£6.80
UNIVERSAL	10s	£7.95

MIMIC 3.5"

SS	10s in Library Case	£13.55
DS	10s in Library Case	£15.95

5.25" BULK UNBRANDED DISKS (LIFETIME GUARANTEE)

FULLY CERTIFIED	SS 48 TPI	SS 96 TPI	DS 48 TPI	DS 96 TPI
Try 10 and see	£4.75	£5.55	£5.55	£6.35
25	£9.60	£10.40	£10.40	£11.20
50	£18.40	£19.20	£19.20	£20.80
100	£33.60	£35.20	£35.20	£36.80
250	£76.00	£77.60	£77.60	£80.00
500	£144.00	£148.00	£148.00	£152.00

MAXELL AMSOFT 3"	10s	£20.00
3" MIMIC CF2DD	10s	£26.40

ACCESSORIES INC VAT

IBM/Amstrad PC1512 Printer Cable GPR10125 x cent.	£7.15
Disk Notcher/doublers	£3.60
Disk cleaners 3.5"	£3.95
5.25" cleaner	£3.60
Mini Vac for printers and keyboards	£5.55

5.25" BULK COLOUR UNBRANDED

FULLY CERTIFIED	SS 48 TPI	SS 96 TPI	DS 48 TPI	DS 96 TPI
10*	£7.15	£7.95	£7.95	£8.75
25	£17.60	£19.20	£19.20	£20.80
50	£32.00	£36.00	£36.00	£38.40
100	£60.00	£64.00	£64.00	£72.00
250	£140.00	£152.00	£152.00	£160.00
500	£272.00	£208.00	£208.00	£300.00

RED, GREEN, BLUE, GREY, BEIGE

10 in single colour OR 2 of each please state in large quantities your choice. (If stocks are available) * in library cases

3.5" BULK UNBRANDED DISKS 135 TRILIFETIME GUARANTEE

	SS	DS
10	£11.95	£13.55
25	£28.00	£32.00
50	£52.00	£64.00
100	£96.00	£120.00
250	£220.00	£280.00
500	£400.00	£520.00

VERBATIM IBM AND COMPATIBLE ADD ONS

6.6 Megabyte Internal Drive	£699.00
Databank 30 Megabyte	£699.00
C.P.U. Card DATI	£499.00

AMIGA HARDWARE

A500 Amiga	£445.00
Cumana compatible 1 meg disk drive	£140.00
Modulator	£24.95

ALL 5.25" DISKS HAVE REINFORCED HUB RINGS, SLEEVES, LABELS AND WRITE PROTECTS.

ALL DISKS CARRY A LIFETIME GUARANTEE.

ALL DISK PRICES INCLUDE VAT AND P/P.

TO ORDER PLEASE CALL DIRECT DISK LINE: 10AM 6PM

MIMIC HIGH DENSITY COBALT COATED 1.6 MEG SUITABLE FOR A.T.S.

10	50	100
£14.40	£64.00	£120.00
Verbatim preformatted for use with Kodak 6.6 meg drive or equivalent (5 Pack)		
		£90.00

DISK BOXES INCLUDING VAT

5.25"	50 capacity £6.95	100 capacity £9.35
3.5"	40 capacity £6.80	80 capacity £9.55
3"/3.5"	80/90 capacity £9.55	
10 x 3.5" or 5.25" (library case)	£1.20	

SOFTWARE

We sell the full range of SAGE POPULAR SOFTWARE	
ABC All in One Business Package	£150.00

Please Note: We can now offer you a duplicating service and in-house printing, packaging and most services you require. If you require any of these services, please telephone for a quotation on 0707 331076.

ZONEFOUR, Unit 11, Mundells Court, Welwyn Garden City, Herts. Tel: 0707 334460

Please call for bulk and seasonal prices and a full list of Paper, Labels, etc. etc. and new catalogue

Copy and be damned

Christina Erskine assesses the impact of the new Bill which aims to overhaul the 30-year-old Copyright Act later this year, and finds the Government has caught the industry on the hop.

THE 30 year old law of copyright is due for an overhaul in a government Bill this year.

The new Bill is at the white paper stage at the moment and is due to be laid before the House of Commons in November.

Obviously not all of it concerns computer software copyright, as a piece of legislation with about 20 different sections, covering the whole issue of intellectual property rights. But one aim of the Bill is to reinforce the relevance of the copyright law to software, as covered by the amendment to the Act in 1985.

The controversial 10 per cent blank tape levy will apply only on tapes with a total playing time of 35 minutes and longer.

"It will allow people to make sound recordings for their own purposes, but it does not cover computer software," said a spokesman for the Department of Trade and Industry.

But Bob Hay, head of FAST (Federation Against Software Theft), which has secured convictions against software pirates under the copyright law, believes that the tape levy, if implemented, will be "quite detrimental".

"Will the public be discerning enough to say they can tape off the radio, but not computer software?" he said.

"It seems to be saying that copying isn't a good thing, but for an extra 10 per cent it's okay."

However, the new law does go some way to protect software; a clause in the current draft version states that copyright, as well as covering the written word and broadcasts, also refers to "other works in non-human readable form". This phrase, according to the DTI, is being included specifi-



Works in "non-human readable form": computer software - in whatever format - comes clearly within the bounds of copyright in the new Bill

cally for computers.

"The law will confirm that computer software definitely comes under copyright protection. Storing information in a computer is a form of reproduction which cannot be copied without the owner's consent.

"The phrase also refers to work typed in at a keyboard without being produced on paper first," the DTI spokesman said.

One area of particular concern to FAST and a number of software houses is that of 'software libraries', or hiring out programs.

The computer industry's point of view is that in practice, software hired is almost invariably copied before being returned. In the case of many disc-based programs, of course, you are strongly advised by the publisher to make back-up copies. Here, once the hired master discs are returned, you still have the back-ups - not the purpose backing up

discs is intended for.

However, the new Bill does not, at its present stage, specifically make provision for legislation against software rental.

FAST, for one, hopes to bring some influence to bear. "We'll pursue the rental question at the committee stage of the Bill," affirmed Bob Hay.

In general, however, Hay welcomes the Bill, and feels it should clarify and improve the current situation, but there are a number of additional points he would like to see addressed.

"We'd like the burden of proof on the part of the author to be lessened; we want improved powers for Customs and Excise people relating to importing; we're pushing for rental rights to be determined by copyright owners," he said. He added that he believes that the film and video industry would also welcome the last point.

The new Bill should become law sometime in 1988. While it is

not politically controversial and should receive a measure of all-party support, its very length means that it will probably take some time to go through from its initial introduction in November.

We contacted a number of software houses, particularly those known to have suffered from the activities of pirates in the past, to find out what they thought about the impending changes.

Unfortunately, those that we spoke to appeared to be unaware that the overhaul was taking place, although they indicated that any change in the law that put computer software firmly under the aegis of copyright was to be welcomed.

Despite the fact that a private member's Bill in 1985 passed an amendment to the Copyright Act, specifically including software, both the DTI and software companies felt that the 'double confirmation' that the new Bill will give was desirable.

Evesham Micros

Don't forget all prices **include** VAT and delivery

PRINTERS

Select a printer bargain from Evesham Micros' carefully selected range; chosen for quality, reliability and value. We believe our offers are the best in the country, when comparing prices remember that ours **include** VAT, printer cable to suit your micro and insured/receipted delivery. The price you see is the price you pay.

Price includes
2 extra ribbons
value £13.90 F.O.C.

Star NL-10

Our most popular printer. Our sales now exceed 1,500 units and still only three faulty! Need we say more. Many interesting features make this the class printer buy in its class.

- Automatic single sheet feed
- Tractor and friction feed built in
- "Front panel" selection of many modes
- Double and quad height characters
- Interchangeable interface cartridges
- Lowcost cut sheet feed option

FREE!
2 spare
ribbons
(value £13.90)

Ideal for Commodore owners, buy with the 64/128 cartridge and use as a CBM ready printer. If you change your micro just buy a new cartridge.
In a group test with other popular printers in the price range such as Epson, Citizen and OKI What Micro described the NL-10 as "the Rolls Royce of this group".

Only **£249.00**

Cut sheet feeder available as an option at £63.25

15"
carriage

Star NX-15

Wide carriage version of the NL-10. Most features are the same in particular the quality and reliability offered by Star printers. An exceptionally keen price for such a good printer.

Only **£349.00**

Cut sheet feeder available as an option at £159.00

24 PIN
TECHNOLOGY

Star

NB24-10
NB24-15

Part of the new breed of printers. Using 24 pins instead of the conventional 9 a whole new standard of dot matrix printers is appearing. These Star models offer this technology, and at our prices are very affordable.

- 216cps draft mode, 72cps in NLQ!
- Optional font cartridges available
- Auto single sheet feed with tractor built in
- Sensibly priced cut sheet feeders
- Dozens of other high tech. features

If you want one of the new class of printers then you won't find better quality and value than these.

NB24-10 (80 column) Only **£499.00**

NB24-15 (132 column) Only **£699.00**

Cut sheet feeders £63.25 & £199.00 respectively

Panasonic

KXP-1081

A superb printer for the money. This must be the best sub £200.00 printer on the market. We don't know of any other similarly priced printer that can match it for print quality, reliability and ease of use.

- Friction and tractor feed
- 120cps draft and 25cps NLQ
- Epson/IBM compatible
- Wide range of print styles

A lot of printer at a very tempting price, you could pay much more than this for much less!

Only
£189.00

Micro P. MP165

A very popular printer that must offer the best speed per pound. Epson compatible to the extent that it even uses an Epson ribbon. Very well defined NLQ mode that many feel is the best on any 9 pin matrix printer.

- 165cps draft mode, 35cps in NLQ
- Friction and tractor feed built in
- 2K buffer
- 2 year guarantee

Only
£219.00

A high specification printer for a very modest price.

OTHER MODELS

Amstrad DMP 2000	£159.00
Amstrad DMP 3000	£179.00
Amstrad DMP 4000	£369.00
Micro P. MP200	£299.00
Micro P. MP201	£375.00
Star ND15	£439.00
Star NR15	£499.00
Micro P. MP26 (new 26cps d/wheel)	£249.00
Micro P. MP40 (new 40cps d/wheel)	£349.00

**DON'T FORGET ALL PRICES INCLUDE
VAT, DELIVERY & CABLE**

If you would like further details/print sample of any model please send S.A.E.

AMSTRAD 1512

All prices include VAT & delivery

Single drive Mono	£499.00
Double drive Mono	£615.00
Single drive Colour	£665.00
Double drive Colour	£789.00
20MB hard Mono	£979.00
20MB hard Colour	£1169.00

EVEHAM 32 MEG 1512

We can offer amazing value by upgrading single and double drive models. We use top quality fully guaranteed Miniscribe mechanisms. Formatted capacity 32.5 MB. Upgrade to 640K is also included.

Single drive mono 32MEG/640K	£889.00
Double drive mono 32MEG/640K	£999.00
Single drive colour 32MEG/640K	£1049.00
Double drive colour 32MEG/640K	£1179.00

THE AMSTRAD OFFICE

New promotion from Amstrad, includes 1512 DD/MM, DMP3000 printer plus Wordstar and Supercalc. Great value...

OUR PRICE.....ONLY.....**£789.00 inc.**

THE EVEHAM OFFICE

Enhanced version of the Amstrad Office, as above plus a 32MEG hardcard and 640K memory upgrade, fantastic value.

OUR PRICE.....ONLY.....**£1149.00 inc.**

32 MB HARDCARD

Miniscribe hardcard, ideal for 1512, simple fitting, very low power consumption and a huge 32.5 MB formatted capacity. Supplied fully tested and configured to suit 1512.

OUR PRICE.....ONLY.....**£369.00 inc.**

UPGRADE YOUR 1512

Memory upgrade to 640K, full instr.	£19.95
Cipher 20MB external tape streamer	£469.00
NEC V30 processor, improves speed	£24.95
8087-2 maths co-processor	£159.00

COPY II PC

Central Point Software's top rated copy program for the 1512 and other compatibles. Runs many popular business programs from hard disk without reference to floppy eg. DBASE, SYMPHONY, LOTUS 123 etc. Latest version.....**£34.95**
Also available from Central Point is **PC TOOLS**, the best features of Norton Utilities + a full DOS interface etc **£34.95**

ATARI ST

520 STFM	£369.00
520 STM + mouse, d. drive & 1st word	£339.00
1040 STF	£559.00
SM125 Hi-res mono when purchased with ST	£89.00
SM125 purchased separately	£119.95
Philips CM8833 Hi-res colour c/w cable	£289.00
(extra £10.00 discount on above if purchased with ST)	
Cumana 1meg drive	£149.00
Cumana 2meg (twin) drive	£249.00

All ST computer sales include 5 disks full of software, including word pro, graphics, games, utility and demo programs.

AMIGA

AMIGA A500	£539.00
PHILIPS CM8833 Hi-res colour c/w cable	£289.00
(extra £10.00 discount on above if purchased with A500)	

All A500 computer sales include 5 disks full of software, including utility, game and demo programs.

DISKS & BOXES

5.25 inch

Pack of 25 DS/DD disks c/w sleeves, tabs and labels. Good quality, fully guaranteed	£13.95
25 disks + box Pack of disks as above plus 50 capacity locking storage box	£22.95
25 disks + box As previous offer but with 100 capacity locking storage box	£24.95
50 Capacity Box High quality lockable storage box. Smoked perspex top	£10.95
100 capacity box As above but more capacity	£13.95

3.5 inch

Pack of 10 DS/DD disks c/w sleeves and labels. Top quality, fully guaranteed	£13.95
10 disks + box As above but in 10 capacity plastic library case	£15.95
Pack of 25 DS/DD disks c/w sleeves and labels. Top quality fully guaranteed	£33.95
25 disks + box Pack of disks as above plus 40 capacity locking storage box	£39.95
40 capacity box High quality lockable storage box. Smoked perspex top	£9.95

THE SLIMLINE 64

NEW LOOK '64

An easy to fit new case for your trusty '64. It feels like a new computer for just a few pounds

- Simple to fit
- Low key height
- New Ivory colour
- Injection moulded
- Modern style

ONLY
£19.95



Replacement power supply for CBM64	£24.95
Disk Notcher... Use both sides of disks	£5.95
1541C Disk drive	£189.95
Freeze Machine... Backup/utility cart	£28.95
Dolphin Dos... Parallel disk system 1541	£69.95
Quickdisc... Fastload/utility cartridge	£19.95

We have most Commodore equipment in stock
If you don't see what you want give us a call

SINCLAIR

Spectrum 128K +2 pack with joystick and 6 games.....**£119.00**

THE EXCELERATOR+

COMPATIBLE DRIVE

At last a truly compatible option to the 1541C. Many advantages over that model not least of which is the price saving.

- Handles disk turbos
- Direct drive motor
- 1 year guarantee
- External 8/9 switch
- Very reliable
- Compact size
- Very quiet
- Doesn't overheat

Several reviews have appeared on the Excelsior+ and all have been very flattering, indeed one reviewer was drawn to comment, "the only thing I could find wrong with it was that the sticker was put on crooked". Praise indeed.

Don't saddle yourself with a lumbering hippo

The Excelsior offers more for less money

ONLY
£159.95

COMBINATION OFFER

Excelsior+ & Freeze Machine
tape to disk backup cartridge **£179.95**

NEXT DAY DELIVERY ON ANY ITEM £5.00 EXTRA

How to order

Send cheque/P.O. or Access/Visa details
By phone with Access/Visa no.
Government, educational & PLC orders welcome
Same day despatch whenever possible
All offers subject to availability E.&O.E.
Callers welcome, open 6 days 9.30-5.30

Evesham Micros
63 Bridge Street
Evesham
Worcs. WR11 4SF
Tel: (0386) 765500
Telex: 333294 EMCRO

Also at; 1756 Pershore Rd., Cotteridge, Birmingham B30 3BH Tel; 021 458 4564

2-BIT PERFORMANCE FOR YAMAHA

Clive Watts explains how one small piece of software from Accessories Etc. can change your Yamaha from a back bedroom plaything to a high-tech performer.

The Yamaha FM-Tone modules SFG01 and 05, made for use with the CX5 or other MSX computers, are capable of producing some breathtaking musical results. Most of the available software, however, is designed to allow data to be programmed into the system for subsequent automatic playback, and is not so suitable for real-time performance. The built-in "Call Music" feature overcomes some of the limitations, but is still lacking in many real-time performance controls – in particular expression; tremolo/vibrato and sustain.

BIT 2 is a program written by David Pearce and published by Accessories Etc. which is designed to provide these controls, together with many other desirable features. To make use of all these extra facilities, a sustain pedal and a special type of joystick are required. Both can be supplied at modest cost by Accessories Etc.; alternatively the DIY buff can easily construct the necessary add-ons from the instructions in the handbook supplied with the program. One of the YK keyboards (YK-01, 10 or 20) is also needed.

With BIT 2 it is possible to program up to 20 performance memories with voice and parameter combinations, any of which can be recalled at the touch of one or two keys. Pressing any of the numeric keys 1-9 & 0 will recall Performance memories 1-10. Pressing SHIFT and the appropriate numeric key recalls memories 11-20.

The main display shows one of the Performance memories at a time, selected as above. Each memory defines four "instruments", labelled INSTR.1/2/3/4, together with all the parameters that go to make up the desired sound recipe. Each instrument is defined by the name and number it has in the voice file.

Once the instruments for each memory have been defined, the way in which they are combined and controlled can be examined. In the lower left corner of the main screen is a panel labelled "SYSTEM". Under this are four parameters which will affect all the instruments in that performance memory. Firstly, MODE (1-9) determines how the four instruments in the

memory are combined. Mode 1 allows eight notes polyphonic play on INSTR.1, INSTR.2, 3 & 4 are not used; Mode 2 allows four notes polyphonic play on INSTR.1 & 2 simultaneously (dual voice); Mode 3 allows four notes polyphonic play on both INSTR.1 & 2, INSTR.1 to the left and 2 to the right of a determinable split point.

Mode 4 allows two notes polyphonic on all four instruments; Mode 5 allows two notes on each side of a split point, each on two instruments. Modes 6-9 allow various combinations of notes to be played on the keyboard simultaneously with the simple built-in sequencer.

The sequencer permits a simple melodic phrase of up to about 100 notes and rests of equal length to be entered. Rhythm can be constructed by careful use of rests, and although strictly limited in its scope, the sequencer can be used to good effect. I found that entering a simple round (Frere Jacques) and triggering the sequence in several different octaves at suitable time intervals produced a pleasing effect. The sequence can be triggered either by a key on the keyboard, or by the Select key on the computer keyboard; it can be set to play once only or to repeat continuously; it can be set to always play in the key in which it was entered or to transpose to the key of any note played, or to remain in the same key but to start on the note played, thus

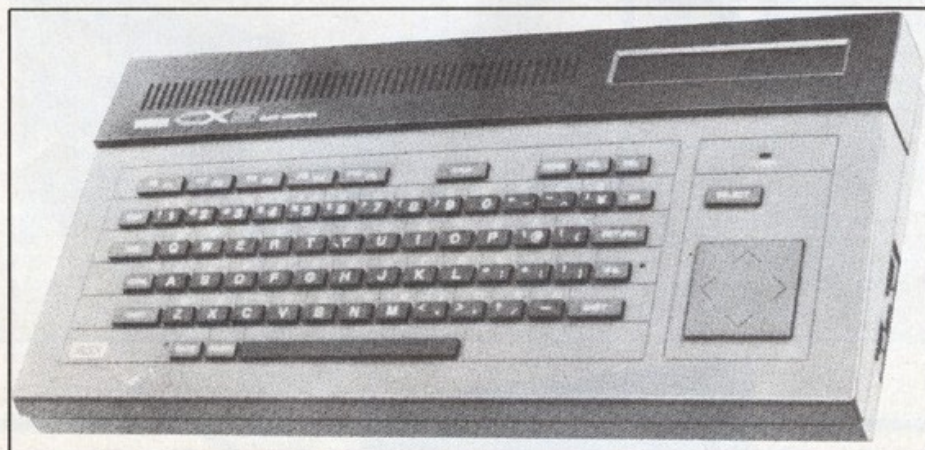
giving a sort of modal effect.

An attractive feature of the program is the ability to move voices from file to file. It is a simple matter to create a new voice file using some voices from the Preset file, some from the User file and some from the Alternative file. The User and Alternative voice files can be saved together with Performance memories, thus preserving their usefulness. (It is advisable to make Performance memories 1-10 call voices from the User voice file and Performance memories 11-20 call voices from the Alternative voice file.)

At £20 for cassette and £25 for disc I consider the program offers excellent value for money. It also gives a sensible and balanced set of alternative resources which greatly expands the capabilities of the Yamaha FM Tone Module. I anticipate making good use of it in my future music making.

Clive Watts

Program BIT 2 Micro Yamaha CX5 and other MSX micros compatible with SFG-01 and -05 FM tone modules. **Price** £20 cassette, £25 disc **Supplier** Accessories Etc, Box 566, Newport Pagnell, Bucks MK16 0NW.



The Yamaha CX5

GIVING YOUR AMSTRAD THAT EXTRA DRIVE

David Wallin weighs the pros and cons of adding a second 5 $\frac{1}{4}$ inch disc drive to your PCW.

The PCW machines have now gained credence as fully fledged computers, as opposed to electric typewriter substitutes. So it's no surprise that the conventional peripherals have begun to appear for them.

One of the obvious add-ons for a PCW8256 is the addition of a second disc drive. While you can upgrade to a second 3 inch drive through Amstrad itself, you can also opt for a 5 $\frac{1}{4}$ inch drive through several manufacturers, including Pace Micro Technology.

The cost of different drives is about the same, but adding a 5 $\frac{1}{4}$ inch drive to your PCW set-up has some not immediately apparent advantages.

Moulded in cream coloured plastic, the drive is strong enough to support the monitor of the 8256, yet light enough to carry around by hand. The entire unit has just two switches, an LED and a catch. One switch is an On/Off switch, the other a 40/80 track select. The LED shows when the drive is in use (as does the drive A LED) and the catch locks the disc in place, releasing it when opened (again, as does drive A's) simplicity itself, as is the manual. Consisting of a single folded piece of A4

card, one page tells you how to plug the drive in and format discs and the other how to use TDOS (more in a minute).

The six stages to connecting the drive are easy to follow. Initially you are told to lay the monitor face down on a flat surface. I found the best surface to be a firm mattress as it has a small amount of give in it. Having removed the rear of the case, you have to locate the internal second drive ribbon (with the case open, it will stare you in the face).

This has to be fed out of the case, through the same slot as the printer interface emerges from. The unit is re-assembled and the end of the cable connected to the cable on the disc drive. A five minute operation if that (it can be a bit fiddly to get the cable through the case).

The power lead has to be plugged into the mains, and it even comes complete with its own plug. The drive is now ready to use. You have to switch the drive on before turning the computer on otherwise the computer does not know it's there. This is useful when you want drive B to be drive A, as it were.

With the 80/40 track select set to 80, each disc can be formatted for 800K with Diskit (some users may have an old

version of CP/M and if this is you, you need to get the latest version. The old version does not recognise second drives properly - I did have this trouble, but Pace knew exactly what to do. The upgrade is free on return of the original disc).

The second page of the manual is about TDOS.COM. TDOS.COM is supplied on a 5 $\frac{1}{4}$ inch 80 track disc. Once loaded, it will enable you to transfer MSDOS or PCDOS files to CP/M once compatible with the Amstrad. You cannot run MSDOS or PCDOS programs, but you can use data created under those DOSs.

For example, a test file created on an Amstrad PC1512 could be converted to a text file on the 8256, but the text editor used on the PC cannot be converted for the 8256. Even files such as *Wordstar* ones with control codes can be converted to CP/M without corrupting the codes.

Therefore a *Wordstar* file created on a PC1512 can be converted to a *Wordstar* PCW file and all the control codes will still be there. OS change (Operating System change) of a file is the only time when the 40/40 track switch will need switching to 540 tracks as most IBM machines use 40 tracks. Do not forget to switch back!

I had just one problem with the drive. The discs can be very temperamental. The PCW manual advises that you do not switch the computer off with a (3 inch) disc in the drive. In reality this rarely has any ill effect. With 5 $\frac{1}{4}$ inch discs it can be a far greater problem.

Overall, I consider the drive to be worthwhile as well as economical for a user with lots of discs. It's priced very competitively with other 5 $\frac{1}{4}$ inch drives, comes with reasonable software and is remarkably easy to fit and use. The On/Off switch I consider to be invaluable and the fact that the interface is housed in the case with the drive means there's no awkward fitting as with some drives. Highly recommended - I don't know what I'd do without it.



Product Pace 5 $\frac{1}{4}$ inch second drive
Micro PCW 8256 Price £190.90 inc VAT
Supplier Pace Micro Technology, Allerton Road, Bradford, West Yorks BD15 7AG.

NOW! £5 OFF ALL TRADE PRICES

YOUR MICRO DESERVES THE BEST...

When your home or business micro costs several hundreds of pounds, it deserves the finest repair facilities in Europe (well, probably!). And the finest prices – £5 off trade rates for a limited period only. ★ How? At Verran we use our own range of advanced automatic test equipment (now sold worldwide), backed by stringent 2-8 hours soak-rack testing. That means speed, ultra-low prices and, most important, guaranteed reliability. For the first three months we'll repair any fault free. For the next three, at half these quoted prices. ★ It's the finest service available.

★ Currently we handle over 3500 products on average every day. Providing services for such leading companies as Amstrad plc, Commodore Business Machines, Sinclair Research, Rank Xerox, Dixons, Currys, Boots, W H Smiths, John Menzies and many more. ★ Join them and take up our special offer now.

Recommended and Approved by

AMSTRAD ACORN ATARI SINCLAIR COMMODORE

EUROPE'S LEADING COMPUTER REPAIR CENTRE



★ SPECTRUM	TRADE £19.95	NOW £14.95
★ COMMODORE 64	TRADE £24	NOW £19
★ BBC B STD BRD	TRADE £30	NOW £25
★ AMSTRAD 464	TRADE £30	NOW £25
★ ELECTRON	TRADE £25	NOW £20

...AND UNBEATABLE DISCOUNTS ON ALL COMPONENTS!!!

★ With over £500,000 worth of spares in stock, we can meet many of your specialised requirements. We've listed a few examples and for anything not displayed just call us and we'll quote immediately inclusive of first class post.

SPECTRUM SPARES

Z80 CPU	2.50
ULA 6C001	7.00
Power Supply	6.50
ROM	7.00
4116 RAMS	.75
ZTX 690	.40
ZTX 213	.40

Keyboard Membrane

Spectrum	3.00
Spectrum Plus	8.00
Metal Templates	3.00

COMMODORE SPARES

6510 Processor	12.00
6525 CIA	12.00
6581 Sid Chip	15.00
901225 Graphic ROM	10.00
901226 Basic ROM	10.00
901227 Kernal ROM	15.00
906114 House Keeper	10.00
6569 – VIC	18.00
4164 RAMS – Memory	1.00

Power Supplies

C64	19.50
C16	15.00

All the above prices include VAT but please enclose a further £1.50 post and packing on all component orders.

HOW TO CONTACT US

★ For quotes on computers not listed or on any component, telephone 0276 66266. (Quoting POP/317).

★ To send us your micro for repair, mail it securely packed, accompanied by cheque, postal order (made out to Verran Micro Maintenance Limited) or quote your Access or Barclaycard number. And to obtain your special discount quote POP/317.

Verran

Verran Micro-Maintenance Limited, Unit 2H & 2J, Albany Park, Frimley Road, Camberley, Surrey GU15 2PL. Telephone 0276 66266.

ARTISTIC DIRECTION

Over the last three weeks Paul McKinley has been suggesting ways in which you can get the most out of graphics packages. It's one thing to see wonderful demonstration pictures; quite

another to reproduce them yourself.

However, if your appetite for trying out some of Paul's ideas has been whetted by our series, why not take advantage of our special offers on this page, and buy an art

program at a discount?

We've tried to cater for most machines: the programs on offer are:

Advanced Art Studio (Rainbird).

Available for Spectrum 128, Amstrad 6128, Commodore 64 (tape and disc) and Atari ST at £5 off the normal price of £24.95.

Art Director (Mirrorsoft).

Available for the Atari ST at 10% off the normal price of £49.95.

Art Studio (Mirrorsoft).

Available for the IBM PC and compatibles at 10% off the normal price of £49.95.

Quest mouse and Paint software (Watford Electronics).

Available for the BBC B and BBC Master series at 10% off the normal price of £67.85 (mouse and software together).

Your cheques/POs, etc, must be accompanied by the appropriate coupon. Please make sure you send them to the correct address - given on each coupon. Allow 28 days for delivery.

Now turn to page 20 for the final part of our series on getting the most out of graphics packages.



The Quest mouse (left)

Quest mouse and Paint software

Name

Address

Please send me.....package(s) comprising the *Quest mouse plus Paint Software* for the BBC B ☐ BBC Master ☐

at £60.95 per pack.

I enclose a cheque/PO for £..... made payable to Watford Electronics.

Please send this coupon to *Popular Computing Weekly*, Art Program Offer, Watford Electronics, 250 High Street, Watford, WD1 2AN.

Art Director and Art Studio

Name

Address

Please send me.....copy (copies) of *Art Director* for the Atari ST ☐ *Art Studio* for the IBM PC and compatibles ☐ at £45 each.

I enclose a cheque/PO for £..... made payable to Mirrorsoft. Please debit my Access ☐ Visa ☐ American Express ☐ card: the number is

Please send this coupon to *Popular Computing Weekly*, Art Program Offer, Mirrorsoft, Athene House, 66-73 Shoe Lane, London EC4P 4AB.

Advanced Art Studio

Name

Address

Please send me.....copy (copies) of the *Advanced Art Studio* for the Spectrum 128 ☐ Amstrad 6128 (disc only) ☐ Commodore 64 tape ☐ disc ☐ Atari ST ☐

at £19.95 each.

I enclose a cheque/PO for £..... made payable to Sunshine Publications.

Please send this coupon to *Art Studio* Offer, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 7PP.

AMIGA PROGRAMS

If you have written programs for the AMIGA or ST, we would like to hear from you. Ability to write in C or machine code essential. CMB 64/128 games programmers with a good track record of published programmes, who wish to write for the Amiga should send samples of 64/128 programmes. Outright or royalty payment for finished programs, excellent terms of payment, world wide distribution guaranteed.

Write to and send samples for evaluation to:

Karen Graham
Anco Software Ltd.,
35 West Hill, Dartford
Kent DA1 2EL
(0322) 92513-92518



VALES LARGEST INDEPENDENT
RETAIL OUTLET

- * PART EXCHANGE WELCOME
- * ALL PRICES INC VAT-EXC P&P
- * ALL COMPUTER REPAIRS UNDERTAKEN
- * USED COMPUTERS AND ACCESSORIES WANTED

*** USED ***		*** NEW ***	
SPECTRUM 48k	£ 39.99	AMIGA 500 inc MODULATOR	£499.00
SPECTRUM 48k PLUS-	£ 49.99	AMIGA 1 MEG DISK DRIVE	£189.00
SPECTRUM 128+2	£ 89.00	AMIGA MODULATOR	£ 19.99
COMMODORE 64 inc REC	£ 99.00	COMMODORE 64C	£150.00
MPS 803 PRINTER	£119.00	COMMODORE 64CONSUMER	£189.00
COMMODORE 128 inc REC	£140.00	COMMODORE 128	£189.00
COMMODORE 1541DISC DRIVE	£ 99.00	COMMODORE 128D	£359.00
MPS801 PRINTER	£ 79.99	1541C DISC DRIVE	£150.00
MPS803 PRINTER	£119.00	NEOS MOUSE & CHEESE	£ 19.99
AMSTRAD 464 inc MOD	£ 99.99	1571 DISK DRIVE	£189.00
AMSTRAD 464 inc COL MON	£189.00	AMSTRAD PC1512DC	£749.00
AMSTRAD 6128 inc MOD	£199.00	AMSTRAD 6128 inc MOD	£279.00
AMSTRAD 6128 inc COL MON	£279.00	AMSTRAD 6128 inc COL MON	£360.00
AMSTRAD PCW 8256	£350.00	AMSTRAD PCW 8256	£429.00
AMSTRAD PCW 8512	£450.00	AMSTRAD PCW 8512	£529.00
DMP2000 PRINTER	£110.00	AMSTRAD PC1512SM	£479.00
BEC MODEL B SERIES 7	£199.00	AMSTRAD DMP2000	£149.00
BEC MODEL B inc DFS	£249.00	AMSTRAD DMP3000	£179.00
ACORN ELECTRON	£ 45.00	AMSTRAD DMP4000	£369.00
ATARI 800XL	£ 45.00	1050 DISC DRIVE	£120.00
ATARI 130XE	£ 79.00	CUMANA 1meg ST DRIVE	£145.00
ATARI 520STM	£189.00	ATARI 520STM	£249.00
ATARI 520STFM	£310.00	ATARI 520STFM	£359.00
ATARI 1meg DRIVE	£ 89.00	ATARI 1meg DRIVE	£139.00
ATARI MONO MONITOR	£ 99.00	ATARI MONO MONITOR	£139.00
1 ONLY AMIGA A1000	£899.00		

NEW
20% OFF R.R.P. ON ALL SOFTWARE
ATARI ST / AMIGA / COMMODORE 64 / PLUS4 / C16 / SPECTRUM

CHEQUES MADE PAYABLE TO: G.T. COMPUTERS LTD
21 CHARLES STREET NEWPORT GWENT TEL: (0633) 216654
133 CITY ROAD CARDIFF, GLAM. TEL: (0222) 483038

WE DONT SELL CHEAP COMPUTERS!
WE SELL OUR COMPUTERS CHEAP!!

FREE SOFTWARE ...

Is what you get when you buy an Amstrad PCW, but how many people make the most of it? Now, for the first time, this double package from two of Britain's most experienced computer authors takes the lid off the PCW's hidden power:

- **WORD PROCESSING:** everything you always wanted to know about templates, layouts, standardised forms, odd-sized formats — from the ABC of LocoScript to the sophisticated techniques of the modern office
- **CP/M:** sensible working methods for a secure and efficient system
- **GSX:** complete details of how to get presentation-quality graphics from straightforward Basic programs
- **LOGO:** graphics and list processing for the first time user
- **BASIC:** your own suite of business programs including a database, accounts program, bank account record, invoice creator and many more.

Practical Amstrad Word Processing and The Amstrad Companion — 440 pages of ideas that will turn your PCW into the power house it was meant to be! **You can obtain the books at only £6.00 each or an amazing price of £10.00 for the two including p&p.**



To Theresa Lacy, Sunshine Books
12/13 Little Newport Street
London WC2H 7PP

Please send me _____ copies
of practical Amstrad Word
Processing and Amstrad Companion
(both for £10 inc. p&p)

I enclose a cheque/postal order for £_____ payable to
Sunshine Books
Alternatively please debit my Visa ☐ Access ☐
American Express ☐
Account Number _____ Expiry Date _____
Signed _____
Name (capitals please) _____
Address _____

ON THE FACE OF IT

Paul McKinely wraps up his graphics series with a how to guide on drawing faces and other complicated forms

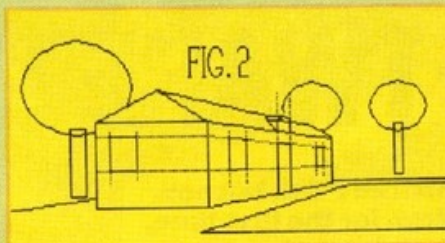
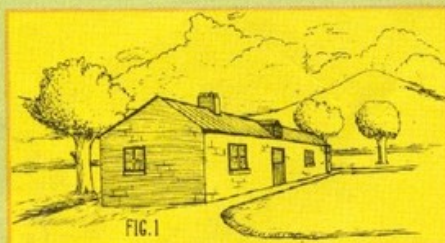
Up to now I've shown you how to turn the basic functions of any graphic package (line, circle, fill, ray, magnify, spray etc) into recognizable pictures and last week I talked a little about using colour and shading to give depth to your work. It is, however, quite a jump from a mountain sunset to Botticelli's 'Venus'. The human face and form are probably the most difficult subjects to portray accurately with computer graphics. This does not mean that you'll never be able to draw people on your screen, just that you'll have to put a bit of effort into it.

It will probably be best to stick to copying drawings and photographs for the time being, then when you have a bit of experience you can try creating graphics from scratch. Below I've detailed three methods of accurately copying pictures onto the screen. I'll start with the easy one.

Squares, circles and triangles

The first method involves breaking the picture to be copied into its basic components, ie squares, rectangles, circles and triangles. Fig. 1 shows a sketch of a country

cottage. To start copying this onto the screen, first divide it into the simplest shapes possible. The end wall is a rectangle with a flattened triangle on top. The facing wall is a long rectangle with one end shorter than the other. The roof is the same except it slopes left. All these shapes can be drawn easily with standard functions like line, box and elastic line. Guidelines can also be drawn in to help keep the windows and doors in proportion. Background shapes can be treated in the same manner. Trees are just tall rectangles topped by circles.



"The human face and form are probably the most difficult subjects to portray accurately"



Once all the basic shapes are drawn in I have Fig. 2. Colour and detailing can now be added (Fig. 3). I used four colours: black, white, blue and green, along with fill patterns to produce the finished picture. The shadow on the near wall, roof and ground is a checkerboard pattern in black/white (black/green where it falls on the grass). The tree trunks are blue/black with solid black for shading while the crowns are formed by filling the circles with solid green then going around the edges with spray. Shading is added by a black spray on one side. Windows are solid blue with diagonal white bands to indicate reflections. Note that the pattern on the roof is not a fill but is drawn in by hand. This allows me to put the lines closer together towards the far end, so improving perspective. Mountains are blue/green and the sky is a blue/white check-board.

It's obvious that this method of copying works best for angular subjects like buildings and machines. If you want to copy people or animals then other methods are needed.

Using a grid

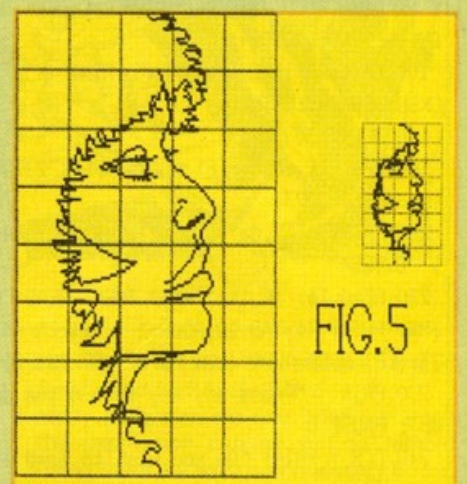
One method, adapted from the pen and ink artworld, involves drawing equally proportioned grids over both the subject picture and your computer screen. Fig. 4 shows a drawing of a face divided into an 8x5 grid. Drawing a similar grid onto the screen will allow you to copy the picture square by square as in Fig. 5. When doing this sort of freehand drawing the draw function is not always the best choice. Depending on the program you are using and the method of input (mouse, joystick, lightpen, etc) draw mode may be too inaccurate to produce the fine lines needed. Personally I find the continuous or elastic line function best for detailed freehand drawing. Lines can be

“One method, adopted from the pen and ink art-world, involves drawing equally proportional grids over both the subject picture and your computer screen”

drawn two or three pixels at a time then fixed with a click of the mouse or fire button. The closer together the fixed points are the smoother the curves will be.

“The graph method has the advantage of producing very accurate pictures but it has the drawback of being hard on the eyes”

The grid should be of a lighter colour than the drawing to allow you to remove it easily after the picture has been copied. In Fig. 5 the grid is blue, while the drawing is done in black. Once a grid has been drawn it can be saved before use so it may be used again. This method has the advantage that you can change the size of the picture simply by re-scaling the grid. In Fig. 5 the squares of the grid are 3 character squares by 3 character squares so the face covers almost the full height of the screen. If I wished to draw a smaller version I simply draw a smaller grid, say, 8 pixels by 8 pixels per square. This allows me to draw the face much smaller but still keep it in proportion (Fig. 5). Note how the eye level of the smaller face is in line with the eye level of the larger. This is the 'eye line'. It is similar to the concept of the horizon line I mentioned two weeks ago. Keeping the eye levels of several different sized figures on a line provides the illusion that they are in fact



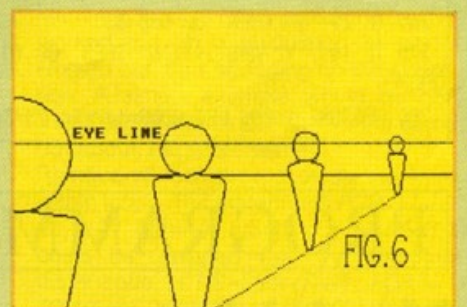
figures of the same size standing at various distances into the screen, as in Fig. 6.

You can demonstrate this for yourself by drawing a simple face on your screen. A circle with two smaller circles for eyes and a line for a mouth will do. Now draw a second face in the same way but half the size of the first. Using the move function drag the small face to different positions on the screen. You will see that only when it is on a horizontal line with the large face will it give the impression of being 'behind' it.

Graphs

Probably the simplest but most tedious way to get pictures onto the screen is to trace them out.

Place a thin sheet of graph paper over the subject you wish to copy and trace the rough outlines in light pencil including areas of highlight and shadow. Once that is done go over the graph paper again with a heavy marker filling in all the squares of the graph through which the pencil line passes. Now copy out the pattern of pixels onto the



screen with magnify. Once you have the basic shape you can add any detailing and colours you wish (Fig. 7).

This method has the advantage of producing very accurate pictures but it also has the drawbacks of the pictures being a fixed size and it's hard on the eyes.

And that's the end of this short series of articles. I hope they have been of help in showing some of the basics of good computer graphics and that you now feel confident enough to have a go at knocking out your own version of the Mona Lisa. Happy pixel pushing!

Screen Machine

Robert Robinson

Store and display screens in a variety of ways with Screen Machine. Screens can be faded, wiped from the left or right, top or bottom, or in columns. The attributes can be equally scrolled and also made to sweep in or out.

First, a screen must be loaded, and you are prompted for the address to load it to.

The demo in the program requests a screen and then proceeds to perform its repertoire of fades. The Print routine is simply used to transfer a saved screen from memory to the screen.

To use the individual routines enter *RANDOMIZE* (picture start address) and then *LET mc=USR(specific routine start)*.

```

5 BORDER 0: PAPER 0: INK 7: CLS
10 RESTORE 1000: INPUT "START ";ADDR:
CLEAR ADDR-1: LET ADDR=1+PEEK 23730+256
*PEEK 23731: LET X=2
20 PRINT AT 0,0;"SCREEN MACHINE > R.RO
BINSON"
30 READ T$: IF T$="***" THEN GO TO 20
0
40 READ CK,H$: LET C=0
50 PRINT AT 2,0;"ASSEMBLING: ";T$,
60 FOR A=1 TO LEN H$ STEP 2
70 LET HI=CODE H$(A)-48: IF HI>9 THEN
LET HI=HI-7
80 LET LO=CODE H$(A+1)-48: IF LO>9 THE
N LET LO=LO-7
90 POKE ADDR,16*HI+LO: LET C=C+PEEK AD
DR: LET ADDR=ADDR+1
100 NEXT A: IF C<>CK THEN PRINT "'CHE
CKSUM ERROR": STOP
110 GO TO 30
200 RESTORE 1000: LET ADDR=1+PEEK 23730
+256*PEEK 23731
210 PRINT AT 2,0;"ROUTINE";TAB 20;"STAR
T BYTES"
220 READ T$: IF T$<>"***" THEN READ CK
,H$: PRINT T$,TAB 20;ADDR;" ";(LEN H$/
2): LET ADDR=ADDR+(LEN H$/2): GO TO 220
230 PRINT "Press any key to run the de
mo": PAUSE 0
240 CLS : PRINT "Do you wish to load a
screen?"
250 POKE 23658,8: LET I$=INKEY$
260 IF I$="Y" THEN GO SUB 360
270 IF I$<>"Y" AND I$<>"N" THEN GO TO
250
280 RESTORE 1000: LET ADDR=1+PEEK 23730

```

```

+256*PEEK 23731
290 INK 0: CLS : INK 7: READ T$: IF T$=
"***" THEN GO TO 280
295 IF T$="FADE" THEN CLS
300 READ C,C$
310 IF T$="STORE" THEN GO TO 340
320 RANDOMIZE 40000: LET MC=USR ADDR
325 PRINT #0;AT 1,16-(LEN T$/2);T$
330 PAUSE 200
340 LET ADDR=ADDR+(LEN C$/2)
350 GO TO 290
360 INPUT "FILENAME: ";F$
370 LOAD F$CODE 40000: RETURN
1000 DATA "PRINT",975,"1100402A765C01001
BEDB0C9"
1010 DATA "STORE",1277,"ED5B765C21004001
001BEDB0C9"
1020 DATA "FADE",6175,"21004011070043E5C
57CFE583015E5CBB4D5ED5B765C19E5DDE1D1E1D
D7E00771918E6C1E1237610DE1100402A765C010
01BEDB0C9"
1030 DATA "COLUMN",4615,"2A765C110018191
10058010003EDB016800608C52A765CDD2100400
100187EA2DD779023DD230B78B120F3C1CB1ACBF
A10E1C9"
1040 DATA "PIXEL DOWN",7779,"2A765C11001
B19110058010003EDB02A765C06C0C53EC090672
E007CE6C00F0F0FB35F52A765C7AD6405719D10
05F7DE6FB0F0F0FB35F52A765C7AD6405719D10
12000EDB0C17610CAC9"
1050 DATA "PIXEL UP",7130,"2A765C1100181
9110058010003EDB006C1C505602E007CE6C00F0
F0FC640577CE60782577C87B7E6E05F7DE6FB0F0
F0FB35F52A765C7AD6405719D1012000EDB0C17
610CCC9"
1060 DATA "PIXEL LEFT",6631,"2A765C11001

```

```

B19110058010003EDB0DD2A765C111F00DD19211
F4013010120C50608C5E5DDE506C0DD7E00A1771
9DD1910F6DDE1E1C1CB110C7610E6C12BDD2B10D
DC9"
1070 DATA "PIXEL RIGHT",6893,"2A765C1100
1819110058010003EDB0DD2A765C210040112000
018020C50608C5E5DDE506C0DD7E00A17719DD19
10F6DDE1E1C1CB17CBF7610E5C123DD2310DCC9
"
1080 DATA "ATTRIBUTE DOWN",2218,"2A765C1
1004001001BEDB0061BC5012000EDB0C17610F6C
9"
1090 DATA "ATTRIBUTE UP",3084,"2A765C110
04001001BEDB001000309E5626B09545DE10618C
5012000EDB0C17610F6C9"
1100 DATA "ATTRIBUTE LEFT",5664,"2A765C1
1004001001BEDB0011F0009D5E5DDE1E10911200
00620C5E5DDE50618DD7E007719DD1910F7DDE1E
1C12BDD2B7610E7C9"
1110 DATA "ATTRIBUTE RIGHT",5598,"2A765C
11004001001BEDB0D5E5DDE1E11120000620C5E5
DDE50618DD7E007719DD1910F7DDE1E1C1DD2323
7610E7C9"
1120 DATA "ATTRIBUTE INWARD",5662,"2A765
C11004001001BEDB0060DC5E5D52A765C1180191
9DD21805911200019DD1910F6DDE5D1012000EDB
0D1E1012000EDB076C110D7C9"
1130 DATA "ATTRIBUTE OUTWARD",7703,"2A76
5C11004001001BEDB0060DC5C52A765C11E01719
11200DD21E05719DD1910FB012000DDE5D1EDB0
C12A765C11001B19DD21005B11E0FF19DD1910FB
DDE5D1012000EDB076C110C3C9"
2000 DATA "***"
9990 SAVE "SCREEN": VERIFY "SCREEN"

```

PROGRAMMING: AMSTRAD CPC

Vari-List

Alastair Scott

This program for any Amstrad CPC allows you to list all the variables present in a program, in the order in which they were defined.

Once the program has been correctly entered press Control V or type in: *VARLIST*

to clear the screen to Mode 1, print a title and list the variables, one at a time.

You can save the machine code with *SAVE "VARCODE",B.&9D00,&F5* and then reload it with *MEMORY &9CFF:LOAD "VARCODE":CALL &9D00*.

```

100 Variable List
110 by Alastair M. Scott
120 MODE 1:MEMORY &9CFF
130 FOR addr=&9D00 TO &9DF4
140 READ byte$:POKE addr,VAL("&"+byte$):
ch=ch+PEEK(addr)
150 NEXT

```

```

160 IF ch<>&7008 THEN SOUND 1,300,50:PRI
NT"Error in DATA statements!":END
170 SOUND 1,80,50:CALL &9D00:PEN 2
180 PRINT:PRINT"!VARLIST command install
ed."
190 PRINT:PRINT"Press CONTROL-V to list
variables."

```


PROGRAMMING: AMSTRAD CPC

```

200 KEY 141,"!VARLIST"+CHR$(13):KEY DEF
55,1,118,86,141
210 PRINT:PEN 1:END
220 DATA FD,21,F5,9D,FD,CB,00,7E,C0,FD
230 DATA CB,00,FE,01,C2,9D,21,F6,9D,CD
240 DATA D1,BC,CD,00,B9,F5,3A,02,C0,A7
250 DATA C4,AF,9D,F1,C3,0C,B9,21,CF,9D
260 DATA CD,A1,9D,2A,87,AE,E5,ED,5B,85
270 DATA AE,A7,ED,52,E1,28,32,EB,23,23
280 DATA CD,77,9D,E5,21,F2,9D,CD,A1,9D
290 DATA E1,CD,06,BB,09,E5,ED,52,E1,38
300 DATA EB,18,18,CD,77,9D,E5,E5,21,ED
310 DATA 9D,CD,A1,9D,E1,E1,CD,06,BB,23
320 DATA 5E,23,56,23,23,23,19,E5,ED,5B

```

```

330 DATA B9,AE,A7,ED,52,E1,38,DD,C9,7E
340 DATA F6,20,E6,7F,CD,5A,BB,CB,7E,23
350 DATA 28,F3,7E,FE,01,20,08,3E,25,01
360 DATA 05,00,C3,5A,BB,FE,02,20,08,3E
370 DATA 24,01,06,00,C3,5A,BB,01,08,00
380 DATA C9,F5,7E,CB,7F,20,06,CD,5A,BB
390 DATA 23,18,F5,F1,C9,21,6A,AE,22,2C
400 DATA 9D,21,68,AE,22,31,9D,21,6C,AE
410 DATA 22,6E,9D,C9,C7,9D,C3,25,9D,56
420 DATA 41,52,4C,49,53,D4,00,04,01,0F
430 DATA 02,0E,00,4C,49,53,54,20,4F,46
440 DATA 20,56,41,52,49,41,42,4C,45,53
450 DATA 0F,01,0D,0A,0D,0A,80,28,29,0D
460 DATA 0A,80,0D,0A,80,00,00,00,00

```

PROGRAMMING: GENERAL

Faster Basic

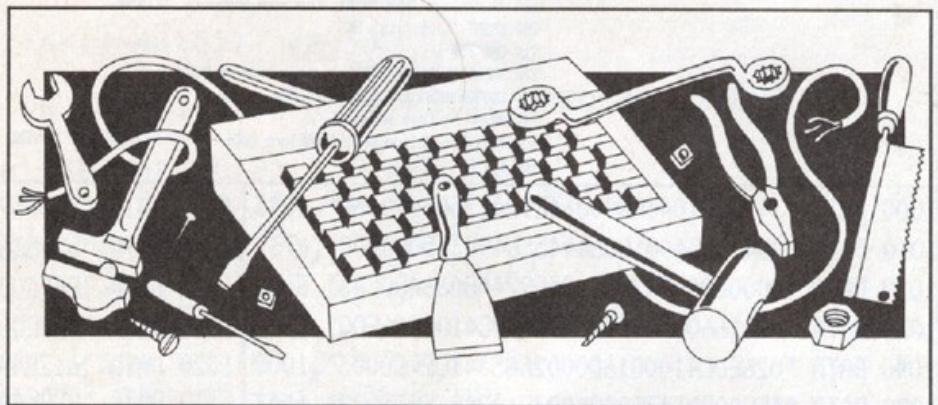
Malcolm Sargent

Do you complain that your basic programs run too slow? If so you can use the following information to speed up your programs. The normal structure of a program is divided into sections, which are (1)-(2)-(3)-(4)-(5)-(6). Where,

- (1) Initialisation of variables.
- (2) Main loop of the program.
- (3) Main body of the program.
- (4) Routines.
- (5) Sub-routines.
- (6) Data.

However, when programming for speed it is necessary to change this structure, and this is now explained.

Basic executes a program by sequentially running each statement, where each statement follows another. This cycle is interrupted when Basic comes to an instruction where a jump to another statement is required. Then Basic starts a complicated search process. This search process might only take a fraction of a second to complete its task and carry on running the program; however, this time accumulates and slows up the program considerably. The time taken for the search process depends on the number of lines to be searched through, from the start of the program to the new line of execution. Basic has a number of instructions which cause the search process; these are *FOR...NEXT*, *GOTO*, *GOSUB*, *READ*, *DEF FN*, etc. If we change the structure to (5)-(4)-(2)-(3)-(6) (1) the average number of lines in the search process will be lessened. Other variations on the structure will work better for different types of programs. Another way of lessening the number of lines in the search process is to use multistatement



lines and also by removing all *REM* lines.

The variable structure is also important when speeding up programs and the variables are normally stored in a workspace at the end of the program area. This workspace is organised in order of which the variables are first defined, so those defined first are quickest to access.

In order to speed up the program we must minimise the search through the workspace and this can be done by putting the most accessed variables as near the start of the initialisation process as possible.

Arithmetic operations slow down the execution rate, especially trigonometrical and algebraic operations (eg sin, cos, exp, etc). The following rules apply to most versions of Basic, and should be used to speed up arithmetic operations.

1. Addition is roughly five times faster than multiplication so *LET A=Y+Y* is faster than *LET A=Y*2*.
2. Multiplication is about 1.5 times as fast as division so the statement *LET A=Y*0.001* is faster than *LET A=Y/1000*.
3. Multiplication is about 4.5 times as fast as exponential powers so *LET A=X*X* is faster than *LET A=X↑2*.
4. An expression containing a repeated operation should be broken up so that the operation is evaluated only once, eg *LET A=X*Y+3(X*Y)+(X*Y)/4*. This can now

be broken up into the statements *LET B=X*Y* and *LET A=B+3*B+B/4*.

5. Many programmers use brackets when the expression can be written without using them. By using unnecessary brackets the expression will be slowed down by about half.
6. Many trigonometrical expressions can be worked out on a calculator, or partly worked out, thus speeding up the operation. A simple example would be *LET A=sin 90* for which *LET A=1* is the same but about 150 times faster.
7. Remove all constant expressions from within loops. The statements *FOR I=1 TO 10 : LET A(I)=X(I) + SQR (T)+R : NEXT I* could be replaced with the following faster code, *LET S=SQR (T)+R : FOR I=1 TO 10 : LET A(I)=X(I)+S : NEXT I* (R and T are variables all ready defined).

As a final measure to speed up your program you could trace all innermost loops (complete instructions which are executed the most often) and remove all redundant operations and instructions.

The times taken by the computer to find a program line, or variable, or work out a mathematical expression is small by human standards and normally the effect is minor, but when you have a loop which might be executed thousands of times during the program's execution, the time difference can be up to 30% faster.

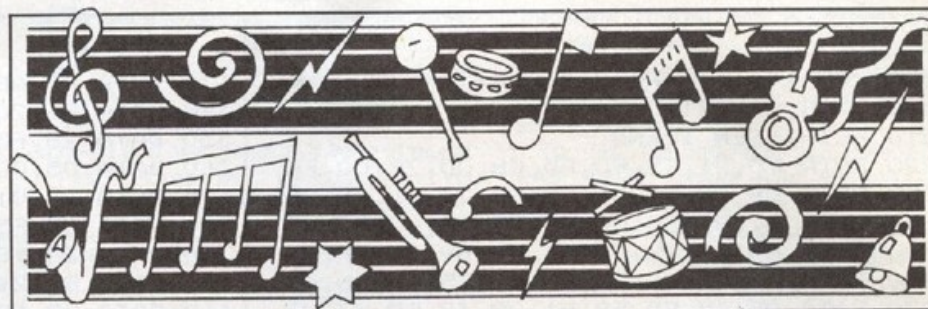
PROGRAMMING: QL

Cat

David Stewart

The standard DIR command may list what is on a microdrive but it does it in an unattractive manner, and it doesn't reveal the lengths of the files. This program will remedy all of that.

The new command can be used as CAT, CAT drive or CAT drive, channel so that other mediums besides the defaults of drive



one and screen can be utilised.

To load the code produced by the pro-

gram enter A=RESPR(880) : LBYTES MDV1_CAT_BIN.A:CALL A.

```
100 REMARK (c) DAVID STEWART
101 REMARK 8th July, 1987
110 REMARK
120 start=RESPR(880):Address=start
130 FOR L=1000 TO 1540 STEP 10
140 RESTORE L:sum=0:READ a$,cs
150 FOR r=1 TO LEN(a$)-1 STEP 2
160 byte=16*DEC(a$(r))+DEC(a$(r+1)):sum=sum+byte
170 POKE Address,byte:Address=Address+1
180 END FOR r
190 IF cs<>sum THEN PRINT "Checksum error in ";L:STOP
200 PRINT "Line ";L: OK
210 END FOR L
220 INPUT "Press ENTER to save code on MDV1_";a$
230 SBYTES MDV1_CAT_BIN,start,880
240 PRINT "Code saved ok."
250 DEFINE Function DEC(H$):RETURN CODE(H$)-48-7*(CODE(H$)>57):END Define
260 :
```

1000 DATA "347B011043FA00064E924E750002006E",1043	1280 DATA "50005245601006030030525113835000",793
1010 DATA "03434154001006444556494345000000",673	1290 DATA "5245383C00010C82000000001670E4243",661
1020 DATA "00000000347B01124E924AB066400C43",862	1300 DATA "84FC000A02B20000FFFF60BA4A446606",1568
1030 DATA "00016600027E323698000C4100046E00",678	1310 DATA "13BC003050FF4CDF043E4E754BE77040",1629
1040 DATA "026E0C4100016D0002665341C2FC0003",1000	1320 DATA "612C4AB06608341976FF70074E434CDF",1466
1050 DATA "45FA02B647FA001AD7C1424515935002",1643	1330 DATA "020E4AB04E754BE7707061124A806606",1365
1060 DATA "159B501B52450C45000366F042804E75",1246	1340 DATA "347B00CE4E924CDF0E0E4AB04E754BE7",1629
1070 DATA "4D4456464C5046444B52414D610001DC",1212	1350 DATA "402045FA00D242B13212C2FC002BD2AE",1758
1080 DATA "66000106700172FF760441FA027C4E42",1298	1360 DATA "0030B2AE0034620E2076180042804CDF",1231
1090 DATA "4AB0660000F42A4843FA02766100015E",1291	1370 DATA "04024AB04E7570FA60F442438BCB670A",1741
1100 DATA "4AB0660000DA4246744076FF43FA020C",1542	1380 DATA "347B01124E924AB0664245FA009B321A",1532
1110 DATA "204D70034E434A0670C0CB0FFFFF6",1773	1390 DATA "34124A4367140C4300026E3632369800",835
1120 DATA "6740600000BA43FA01F24A9167DE0491",1702	1400 DATA "0C4300016704343698024A416F200C41",806
1130 DATA "000000405246610000B243FA021E6100",937	1410 DATA "00066E1A3541FFFE0601003015410007",917
1140 DATA "011C43FA02626100011443FA01CED3FC",1551	1420 DATA "1541001D34B242B061B44AB04E7570FC",1481
1150 DATA "0000000E6100010643FA0270610000FE",900	1430 DATA "4E7570F14E7500000000000000000000",743
1160 DATA "60AA43FA0266610000F4320661000108",1190	1440 DATA "00000000000000000000000000000000",0
1170 DATA "43FA0216610000E643FA0238610000DE",1362	1450 DATA "00000000000000000000000000000000",0
1180 DATA "204D43FA019632FC000A70454E4345FA",1534	1460 DATA "00000000000000000000000000000000",0
1190 DATA "01B624B143FA01B474020C31000A2000",971	1470 DATA "00000000000000000000000000000000",0
1200 DATA "660613BC00BF200052420C42000D66EA",1113	1480 DATA "000000000001000100054D4456315F00",382
1210 DATA "43FA0168610000A643FA01DC6100009E",1478	1490 DATA "00150A4469726563746F7279206F6620",1257
1220 DATA "321A610000B243FA01FA610000903212",1228	1500 DATA "4D44566E5F0A0A00000C2066696C6573",1031
1230 DATA "610000A443FA01F46100008242802B00",1284	1510 DATA "20666F756E64000E0A536563746F7273",1335
1240 DATA "204D70024E4220044E754BE77C2043FA",1374	1520 DATA "206C6566742000092062797465732020",1160
1250 DATA "012A2211243C0001B6A043FA015E4251",1044	1530 DATA "2000000D0A4D656469756D206E616D65",1113
1260 DATA "424342447A0292824A816D04524360F6",1474	1540 DATA "200000062066726F6D2000010A",549
1270 DATA "D2824A4466104A43660C525113BC0020",1257	

Production

D J Cook

If you want to produce nicely laid out screens of graphics or text in C64 Basic then this is the easy way to do it. Run the program and install it with SYS 49486. Then, simply draw on the screen the layout that you want, using the cursor keys. Don't press Return. Also, don't use " " (quotes).

When you are satisfied press F1 and the screen will be transformed into PRINT statements that are added to your Basic program from lines 50000 onwards.

Once used, the routine switches itself off so must be reinitialised. For a second screen the line numbers start at 50260 to avoid overlapping.



```

20 J=49152
30 READA: IFA=-1 THEN 100
40 POKEJ, A
50 C=C+A: C2=C2+A*(J-49151): J=J+1
60 GOTO30
100 IF C<>41768 OR C2<>7150236 THEN PRINT"CHECKSUM ERROR"
120 END
200DATA 144,5,28,159,156,30,31,158,129,149
210DATA 150,151,152,153,154,155,80,195,10,169
220DATA 4,197,197,208,3,32,242,192,76,49
230DATA 234,169,15,49,253,197,155,240,20,197
240DATA 156,240,16,133,155,168,185,0,192,160
250DATA 0,145,45,230,45,208,2,230,46,96
260DATA 133,163,169,224,37,163,208,5,169,64
270DATA 5,163,96,169,192,37,163,208,3,165
280DATA 163,96,169,32,37,163,208,5,169,32
290DATA 5,163,96,169,192,69,163,96,160,0
300DATA 169,128,49,251,197,199,240,245,133,199
310DATA 73,146,76,49,192,160,0,173,16,192
320DATA 32,49,192,173,17,192,32,49,192,24
330DATA 173,18,192,109,16,192,141,16,192,169
340DATA 0,109,17,192,141,17,192,96,169,153
350DATA 32,49,192,169,34,76,49,192,141,16
360DATA 192,169,0,109,17,192,141,17,192,96
370DATA 162,40,32,31,192,32,98,192,169,127
380DATA 49,251,32,60,192,32,49,192,230,251
390DATA 208,2,230,252,230,253,208,2,230,254
400DATA 202,208,225,169,34,32,49,192,169,59
410DATA 32,49,192,169,0,32,49,192,165,45
420DATA 145,47,200,165,46,145,47,136,165,45
430DATA 133,47,165,46,133,48,32,53,192,76
440DATA 53,192,173,33,208,41,15,133,156,133
450DATA 155,169,0,133,253,133,251,169,4,133
460DATA 252,169,216,133,254,56,165,45,233,2
470DATA 133,47,165,46,233,0,133,48,32,115
480DATA 192,169,143,32,49,192,32,213,192,169
490DATA 24,133,2,32,115,192,32,148,192,32
500DATA 170,192,198,2,208,243,32,115,192,32
510DATA 148,192,162,39,32,172,192,169,0,145
520DATA 47,200,145,47,120,169,49,141,20,3
530DATA 169,234,208,8,120,169,19,141,20,3
540DATA 169,192,141,21,3,88,96,-1

```


YOUR NAME IN LIGHTS

Have you ever thought of writing articles for Popular? It's a sure fire passport to fame, if not fortune, and we always welcome contributions from readers for features and articles in the magazine.

Programs

Technical editor Duncan Evans relies on you for the programs section. It needn't be that machine code masterpiece that NASA was promising you vast sums for, what we're looking out for is handy routines, utilities, anything that you've concocted that makes your life easier as a programmer that you'd like to pass on to others.

Don't make your programs too long, please - it's best if we can print the full listing in one week, and a four part listing is probably the largest we can accept. If they're very short, then so much the better, they'll fit neatly into our Bytes and Pieces page.

Features

We're also particularly interested in articles about programming, which should be sent to Christina Erskine. If you think you could explain technical

areas of computing to a wider audience then do let us know.

We also welcome articles on any aspect of home computing, although we cannot feasibly accept anything longer than 2000 words. It's worth checking by phone or letter first that your piece will be suitable, but we're open to all ideas.

Money no object?

If it's not the money you're interested in so much as simply having your say, the Ziggurat slot is where anyone can get up on a soap box and air their opinions. Your article should be 600-650 words long. We pay £15 per Ziggurat published.

For even less money, we'd like to hear your views, comments and opinions on our Letters page, and our columnists are always on the look-out for hints and tips and comments on their own areas of the magazine.

Mark Jenkins welcomes correspondence of a musical nature for Soundcheck, Martin Bryant is interested in any queries or views regarding computer chess, and our communications correspondents will be happy to answer questions about modems and networks (mark your envelope 'Comms').

Any technical or programming problems you're encountering can be addressed to Kenn Garroch. Kenn tries to help as many people as possible in Peek and Poke, but cannot undertake to give personal replies.

How to submit

For features, it is almost always

better if you write or telephone first to discuss your ideas with us. Your articles should be typed or word processed, preferably in double spacing, using one side of the paper only.

Please don't write more than 2000 words for an article. Program notes should explain what your program achieves and how it works, but, again, please keep them concise.

Payment

Listings will be paid at a rate of £25 per published page, Bytes and Pieces at £10 each. For feature articles, we pay £40 per published page, which is about 800 words.

Your payment should arrive six weeks after publication date.

Where to send them

All submissions should be sent to *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 7PP. If you mark which department your letter is destined for on the envelope it will help us process them much more quickly.

We will make every attempt to acknowledge receipt of your submission.



Mini Editor

Ralph Lorenz

This QL listing is a file editor. A normal file can be loaded up, examined and altered, byte by byte. A line of the data is displayed and can be scrolled through using the left and right cursor keys.

If you wish to change the highlighted character press 'a' and enter the character you wish to substitute. Press 's' to save the altered file.

```
5 MODE 8 : PAPER 0 : CLS
7 s$=""
10 INPUT "Filename ( incl. dev )?" "\,f$
20 OPEN_IN #4,f$
21 REPEAT loop
22 s$=s$&INKEY$(#4)
23 IF EOF(#4) THEN EXIT loop
24 END REPEAT loop
35 CLOSE #4
40 l=LEN(s$)
50 p=1
70 AT 2,0 : PAPER 1
80 e=p+32
85 IF e>1 THEN e=1
90 PAPER 0 : AT 2,0 : PRINT FILL$(" ",33)
100 AT 2,0 : PAPER 1 : PRINT s$(p TO e)
110 AT 2,0 : PAPER 2 : PRINT s$(p)
```

```
115 z$=INKEY$(0)
120 IF z$=CHR$(192) AND p>1 THEN p=p-1
130 IF z$=CHR$(200) AND p<1 THEN p=p+1
140 IF z$="s" THEN GO TO 2000
150 IF z$="a" THEN GO TO 1000
200 GO TO 70
1000 BEEP 2000,20
1010 INPUT "Character ? " :c$
1020 s$(p)=c$
1025 PAPER 0 : AT 3,0 : PRINT "
1030 GO TO 160
2000 DELETE f$
2010 OPEN_NEW #4,f$
2020 PRINT #4,s$
2030 CLOSE #4
2040 STOP
```

User Directories

A Down

With this Amstrad CPC program you can install an RSX which enables you to access 256 user directories instead of the usual 16.

The syntax is :USE,N where N is the number of the directory.

Follow on-screen directions after typing it in.

```
10 MEMORY &BFFF
20 m=&9000
30 READ a$: IF a$="END" THEN PRINT
"TYPE CALL &9000":END
40 POKE m,VAL("&"+a$)
50 m=m+1
60 GOTO 30
70 DATA 01,0D,90,21,09,90,C3,D1
80 DATA BC,FC,A6,0D,90,12,90,C3
90 DATA 16,90,55,53,C5,00,DD,7E
```

```
100 DATA 00,32,01,A7,FE,E5,20,0C
110 DATA 21,2D,90,7E,CD,5A,BB,23
120 DATA FE,00,20,F7,C9,07,45,6E
130 DATA 74,65,72,69,6E,67,20,45
140 DATA 52,41,53,45,44,20,46,49
150 DATA 4C,45,20,55,53,45,52,0D
160 DATA 0A,53,61,76,65,20,6E,6F
170 DATA 20,66,69,6C,65,73,20,68
180 DATA 65,72,65,0D,0A,END
```

String\$

Adam Wright

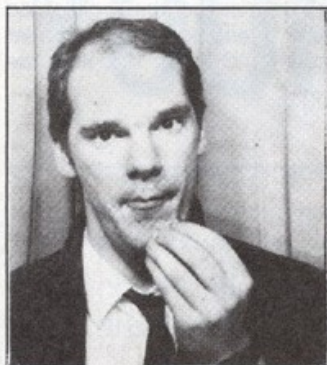
This C64 routine will give you a *STRING\$* style command as used on the BBC. The

syntax is SYS 49152, (string character, number of), string variable, where the variable will contain the result of the operation.

```
0 REM STRING$
1 DATA 32,253,174,32,250,174,32,158
2 DATA 173,32,166,182,201,1,240,3
3 DATA 76,72,178,160,0,177,34,133
4 DATA 250,32,253,174,32,138,173,32
5 DATA 247,183,165,21,240,3,76,72
6 DATA 178,165,28,133,251,32,247,174
7 DATA 32,253,174,32,139,176,166,13
8 DATA 208,3,76,72,178,165,69,141
```

```
9 DATA 0,2,165,70,141,1,2,169
10 DATA 36,141,2,2,169,61,141,3
11 DATA 2,169,34,141,4,2,165,250
12 DATA 160,0,153,5,2,200,196,251
13 DATA 200,248,169,34,153,5,2,200
14 DATA 169,0,153,5,2,165,122,72
15 DATA 165,123,72,169,0,133,122,169
16 DATA 2,133,123,32,121,165,32,115
17 DATA 0,32,237,167,104,133,123,104
```

```
18 DATA 133,122,96
20 S=49152:CK=0:FOR A=5 TO S+138
30 READ D:POKE A,D:CK=CK+D:NEXT A
40 IF CK<>15594 THEN PRINT "ERROR":STOP
50 SYS S,("*,40),A:PRINT A$
READY.
```

with Kenn Garroch

Sharper Sords

Steven Folkles, of Lightwater, Surrey, writes:

Q I have owned a Sord M5 computer for several years now and have been very pleased with it. I also purchased a Sord PT5 thermal printer.

Recently, however, the print head has worn out. I wrote to CGL but the letter was returned, saying that the address didn't exist. I would be grateful if you or one of your readers could tell me where I could obtain a new print head, or a more up to date address for CGL.

Also, as there is very little information about the Sord, I have decided to find out about it for myself, and have started doing a Rom disassembly.

I would also like to be able to program the peripheral chips directly. I would be grateful for any information concerning the following chips: Texas Instruments TMS 9918A VDP; TI SN 76489 PSG; Z80A CTC chip.

A Sorry I can't be of much help with the address or the printer, perhaps one of our readers can help?

The chips are a little easier although I don't know the precise information concerning their use in the Sord. However, the TMS 9918A is the same video chip used in MSX machines, among others. If you can find out the i/o port numbers of the VDP, ie, the number used for the Z80 in and out operations, then the following may be useful.

The 9918A used two ports, one for addressing the video Ram and registers, and the other for data transfer. These are generally placed one above

the other, ie, X is the 8-bit address register, and X-1 is the data register. The 9918 normally has its video Ram separate from the main Ram so all communication has to go through the VDP using the Z80 commands in and out.

To write to the VDP registers, first of all read port X to bring the VDP to attention and then send the value to be written to X followed by the register number plus 128. To write to the VRam (Video Ram) itself, read X and then send the address in low, high byte format to X followed by the value to be written to X-1. Reading the VRam is the same except that X-1 is read with in. As far as I know, the VDP registers cannot be read so a copy of their contents needs to be kept somewhere in Ram.

The VDP registers are:

Register	Contents
0	Bit 0-1 enable external VDP 0 disable Bit 1 is M3, used for selecting the screen mode The rest are unused.
1	Bit 0, sprite magnification Bit 1, sprite size selection Bit 2, reserved Bit 3, M2 of screen mode select Bit 4, M1 of screen mode select used with M2 & M3 as M1 M2 M3 0 0 0 Text mode 1 0 0 1 High res graphics mode 2 0 1 0 Multi-colour graphics mode 3 1 0 0 Text mode 0 Bit 5, Interrupt enable Bit 6, Screen on off switch Bit 7, Select VRam size 4K or 16K.
2	Bits 0-3 are name table address/1024.
3	Bits 0-7 are colour table address/64.
4	Bits 0-2 are address of pattern, text, or multi colour generator table depending on the screen mode. Address/2048.
5	Bits 0-6 are address of sprite attribute table/128.
6	Bits 0-2 are address of sprite pattern table/2048.
7	Bits 0-3 are background colour and 4-7 foreground colour.
8	Read only status register Bits 0-4 are the fifth sprite number. Bit 5 Sprite collision flag Bit 6 Fifth sprite flag Bit 7 Interrupt flag.

Playing around with these should give you a good idea of what they do. The main things to note are that only four sprites are allowed on screen at once, and some of the tables only refer to particular screen modes.

There are 31 sprite defini-

tions, and the format of the sprite attribute table is:

Byte 0 Y position
Byte 1 X position
Byte 2 Pattern number in the pattern table
Byte 3 Bits 0-3 are the colour

The first four bytes in the table refer to sprite 0 which is the front sprite, the second four to sprite 1, etc, Poke around in the Sord's VRam to see if the above are correct and if so, more details can be found in one of the many MSX handbooks.

Both the 76489 PSG and the Z80 CTC are sold by Maplin Electronics so you should be able to obtain data sheets from them. Access should be similar to the VDP using ins and outs.

I hope that this is of some help and that my assumptions concerning the similarity of the MSX are reasonable (no doubt, if they're not, someone will say so).

Tandy advice

D M Burns, of Bradford, W Yorks, writes:

Q Re your queries on the Tandy printers, *Popular*, July 10: as it happens, I have both the printers mentioned and the following information may be useful.

Easiest one first: CGP 115: Only requires three connections as you rightly said, ie, GND, TX, and CTS. The connections are as follows (see diagram) looking at the pin end of the lead.

It is also possible that you may have to connect a loop line between CTS and DTR (ie, short it out) on the RS232 (for both printers).

DMP 105: Output from transmitted end row - data (binary) preamble codes to set up the graphics as follows:

Line feed CHR\$(27); CHR\$(90); CHR\$(n) where n is a fraction n/72 inches. Without any preamble (no escape codes), the line feed is 7/72". Try n=5 for graphics. Everytime a CHR\$(10) or CHR\$(13) is detected, a line feed is generated.

Graphics mode set by CHR\$(18) and unset by CHR\$(30).

Elongation set by

CHR\$(27); CHR\$(14) and unset by CHR\$(27); CHR\$(15).

Any other codes are ignored ie CHR\$(27)+ anything besides those discussed.

Dot positioning set by CHR\$(27); CHR\$(16), N1, N2 + CHR\$(x) where CHR\$(x) is any combination of the seven pins, N1 from 0 to 3 and N2 0 to 255 except when N1=3 where N2 is 0 to 31.

If character style is normal, then the number of dot columns available is 480, if compressed, then 576 and if condensed, is 800. Therefore, to access the 479 columns in normal mode, use N1=1; N2=223. I hope that this goes some way to helping everybody who has these printers. All of the code work with my Spectrum Plus and there is not much trouble with the QL either.



- 1 Not connected
- 2 CTS (Status)
- 3 Ground
- 4 TX (Data)

CGP 115 connection

One thing to note is the buffer store on the DMP-105 which is 138 bytes. If transmission stops for more than a second or so then it gives an automatic line feed (CR+LF). If the mode is not changed and transmission starts again then it will print the first recognisable character it detects. It also has a dual baud rate of 2400/600 that can be set with the DIP switches.

A Thanks for the tip.

Amstrad Fatality

Rev Thomas Scarborough, of Port Elizabeth, South Africa, writes:

Q I get that sinking feeling whenever a "FATAL" error message appears on my Amstrad PC1512 screen. The most

frequent of these - **FATAL: Internal Stack Failure, System Halted** - is not documented. What does it mean?

Also, the manual stresses that the discs should be removed before resetting or switching off the computer, and that they should not be inserted before powering up. If the disc drives are not in operation, why is this necessary?

A A stack failure is generally caused by a program trying to put too much onto the stack causing it to overflow (or try to) and crash into the rest of the operating system.

A stack works in the Last In First out (LIFO) format and is used to store return addresses for subroutines, argument passing, and temporary storage, etc. The LIFO arrangement means that to start with, the stack pointer holds the address of the stop of the stack.

When something is pushed onto it, the pointer moves down to point at the next free space. Taking something off it moves the pointer up and removes that item again, leaving the SP pointing at the next free space.

The upshoot of this is that if you put too much on to the stack, it runs out of memory space and tries to store things in the area under the stack. If the machine senses that this is trying to be done, it gives an error, though it shouldn't necessarily be fatal. The cause of the problem depends on what you are trying to do with the machine. If you are programming it in Basic, then you have probably got a recursive subroutine, ie, one that calls itself and keeps on doing it until the stack is full, eg,

```
100 GOSUB 100
```

Alternatively, you may just have a lot of nested subroutines giving the same effect although, this is unlikely. Some Basics allow the rather bad habit of jumping out of FOR...NEXT loops which can cause the same problem since the data for the loop is kept on the stack, and never taken off. However, in Basic, fatal errors should not occur.

If it is a machine code program that is giving this problem then you need to increase the amount of space set aside for

the stack, and/or examine your program carefully to see why so much stuff is being placed onto it in the first place.

Commercial software should never give stack problems unless used in a strange way, ie, with other, memory resident, programs or without enough memory. If it is commercial software that is playing up then you will have to take it up with the supplier or software house.

On the question of the disc drives, when the machine is switched on and off, it is possible that spurious pulses can be sent to the drive controller that can cause it to do strange things and possibly damage a disc. The other possibility is that the power supply is positioned next to the drives, and the surge through the transformer causes a magnetic field that may damage your discs.

In practice, most modern disc drives have none of these problems, or shouldn't have, since they are, in general, made to be used in the worst way possible, ie, leave the discs in all the time (I certainly do, and so far, have had no problems). However, if the manufacturer advises that you take the discs out, then do so.

In the early days of computers, there was a machine called the Commodore PET which had disc drives that gave this problem. Sometimes they would completely wipe the disc when the power was switched on or off. In later models, this problem was cured, and the drives gave no more trouble - the disc could be left in with no ill effects. The main thing is to make regular backups, anticipating the fact that one day, the computer, for one reason or another, will eat a disc, plastic and all.

Atari experiments

Alan Henderson, of Wokingham, Berks, writes:

I recently bought an Atari ST and have been experimenting with machine code. I have been able to write quite a few programs, but one thing has stumped me. I would like to be able to execute a sequence of programs whenever the ST is switched on, set up the RAM disc, clock, etc. I know about the AUTO

folder and COMMAND.PRГ but I cannot get a sequence of programs to run. Could you tell me how this is done?

A All you need is a program in the AUTO folder that uses the Gem EXEC function to load and run the programs in sequence. EXEC is Gemdos (Trap #1) \$4B and requires the following parameters:

Environment	Long word of the address of the env string. I'm not sure what this is for, but it works of it points to zero, ie, a null string.
Command	Long word address of the command string, identical to the command input for TTP (TOS Takes Parameters). If none then point to zero.
File	Address of the file name string to be executed ie the pathname.
Start/load	0 means load and run, 3 means load but don't execute, the address of the base page is returned in DO in this case.

When a program has been loaded and run, exiting returns you to the calling program which can then load and run another. One thing to note is the type of the command program. This should be of the type PRG, otherwise, any PRG files that are loaded and run have a tendency to crash since the mouse and menus do not work properly.

It is possible to run Tos programs from PRGs but not the other way around. In the auto case it does not matter since the system is looking for a PRG file in the AUTO folder (there should only be one file in there).

As an example, the following program loads a Ram disc and a date time setup program before exiting to the desktop. Assemble it into a file called CMD.PRГ (or whatever .PRГ) and then copy it into the AUTO folder.

The discname should be DESKTOP and the two files RDISK and DTIM should be available in the top level directory, ie A:RDISK.TOS and A:DTIM.TOS. If you want them in a folder then put the correct pathname in the file names of the CMD file. Save the desktop and reboot, the programs will run automatically.

```
START  MOVE.L  A7,A5      Standard header
        MOVE.L  *USTK,A7
        MOVE.L  4(A5),A5
        MOVE.L  8(A5),D0
        ADD.L   $14(A5),D0
        ADD.L   $14(A5),D0
        ADD.L   *$100,D0
```

```
        MOVE.L  D0,-(SP)
        MOVE.L  A5,-(SP)
        MOVE.W  D0,-(SP)
        MOVE.W  *$4A,-(SP)
        TRAP    #1
        ADD.L   *12,SP
        BSR     60
        MOVE.L  *0,-(SP)
        TRAP    #1
GO      move.l  *env,-(sp)  Environment string (null)
        move.l  *com,-(sp) Command string (null)
        move.l  *fil1,-(sp) First file
        move.l  *0,-(sp)   Load and run please
        move.l  *$4B,-(sp) GEMDOS EXEC
        trap    #1        Doit
        add.l   *16,sp    Correct the stack
        move.l  *env,-(sp)
        move.l  *com,-(sp)
        move.l  *fil2,-(sp) Second file
        move.l  *0,-(sp)
        move.l  *$4B,-(sp) Doit
        trap    #1
        add.l   *16,sp
        rts
env      dc.b    0        Null env string
com      dc.b    0        Null command string
fil1     dc.b    RDISK.TOS;0 RAM disk program
fil2     dc.b    DTIM.TOS;0 Date time program
USTK     ds.l    256
        ds.l    1        User stack of 256 longs
        even
        END
```

Atari rumours

Stuart Birchall, of Upholland, Lancs, writes:

I was considering buying an Atari STFM as a progression from my C64. However, as I am not purchasing a monitor, rumours of the Atari modulator being ineffective and sub-standard, causing severe screen distortion, have deterred me.

Are these rumours true, or has Atari ironed out its modulator problems?

A As far as I know, there are no problems with the Atari RF modulator. The only picture distortion will be due to the medium resolution being a little too fine for the TV picture. Low res should work fine.

SICK COMPUTER?



MICRO CLINIC

For a Professional and Efficient Repair Service

WHY ARE WE DIFFERENT TO MOST OF OUR COMPETITORS?

- ☐ The whole computer is guaranteed for 4 months!
- ☐ Every computer is fully soaked tested before return!
- ☐ All leading makes of computer repaired.
- ☐ We don't say 24 hour service and then take 3-4 weeks!

Just pack your computer carefully, if in doubt include power supply.

(i) Include cheque/postal order to MICROSNIPS Ltd.

(ii) Or pay by ACCESS/VISA/SPECTRUM Charge Card/Lombard Tricity Card giving Card No. and Expiry Date

Prices shown are guaranteed maximums - subject to no tampering! And include return postage

(for Group 4 Courier - Add £8)

PHONE 051-630 3013



LIGHTSPEED

SOFTWARE

60 HIGH STREET, HANHAM, BRISTOL BS15 3DR
TEL: (0272) 604130

ATARI 8 BIT CASSETTE

Arcade Classics	7.95
Arkanoid	7.50
Atari Aces	8.25
Boulderdash Cont. Set	8.50
Boulderdash	8.50
Colossus Chess	8.50
Footballer Of The Year	8.50
Gauntlet	8.25
Green Beret	7.50
Jewels Of Darkness	12.50
Leaderboard	8.25
Phantom	8.50
Platform Perfection	8.25
Smash Hits 4, 5, 6, 7	8.50
Spitfire 40	8.50

Portal	28.00
Space Battle	8.50

ELECTRON

Acomsoft Hits 1, 2	7.75
Code Name Droid	7.75
Computer Hits 10, 1, 2, 3	7.75
Elite	10.50
Five Star Games 1, 2	7.75
French On The Run	7.75
Paperboy	7.75
Phantom Combat	7.75
Round The World	
In 40 Screens	6.75
Superior Collection Vol. 3	7.75
XOR	7.75
Yie Ar Kung Fu	7.00
Yie Ar Kung Fu II	7.75

ATARI 8-BIT DISC

Boulderdash Cont. Set	12.50
Colossus Chess	12.50
Footballer Of The Year	12.50
Gauntlet	12.25
Leaderboard	12.50
Smash Hits 5.6	12.50
The Pawn	16.75
Tomahawk	12.50
Ultima IV	16.95

AMIGA

Arctic Fox	24.50
Barbarian	20.00
Demolition	8.50
Flight Sim. II	39.95
Flight Sim. II Scenery 7	28.50
Fairy Tale	42.00
Guild Of Thieves	19.00
Hitchhikers' Guide	24.50

ATARI ST

Airball	19.00
Auto Duel	19.00
Barbarian (Psygnosis)	20.00
Bridge Player	18.75
Extravaganza	10.50
Flight Sim. II	39.95
Flight Sim. II Scenery 7	26.50
Guild Of Thieves	19.00
Gauntlet	19.00
Jupiter Probe	12.50
Leaderboard	19.00
Phantasia II	19.00
Pro Sound Designer	43.50
Road Runner	19.00
Starblazer	19.00
Sub Battle Sim	19.00
Vegas Gambler	19.00

Please make all cheques/P.O.s payable to Lightspeed Software. All orders post free inside the U.K. Normally despatched within 24 hours, but please allow 7 days.

A full list of titles available for Atari ST, Atari 8-Bit, BBC Electron, C16/+4, PCW, IBM and Amiga
Please write or call for details



VISA

BYTEBACK

THE ATARI ST

SPECIALIST

GAMES	ONLY	ONLY	ONLY
Road Runner	£19.50	Mercenary	£19.50
Jupiter Probe	£11.50	Universe 2 ST	£35.00
Boulderdash	£19.50	Mission Mouse	£15.00
Brian Clough	£19.50	ST Karate	£15.00
Gauntlet	£19.50	ST Karate	£15.00
Barbarian	£19.50	ST Karate	£15.00
Star Trek	£15.50	Barbarian	£19.50
Airball	£19.50	Deep Space	£27.50
Grafton & Xunk	£15.50	Bratcacos	£27.50
Hades Nebula	£18.50	Arena/Bratcacos	£27.50
Sub Battle	£19.50	Wanderer 3D	£19.50
Altar	£19.50	Starblazer	£19.50
Prohibition	£15.50	Phantasia II	£19.50
Super Tennis	£19.50	Road War 2000	£19.50
10th Frame	£19.50	Flight Simulator II	£39.00
Leaderboard	£19.50	Mouse Trap	£11.50
Shanghai	£19.50	Liberator	£10.00
MS1	£19.50	Timeblast	£7.50
Hacker 1 or 2	£19.50	Plutos	£11.50
Strip Poker	£15.50	Xevious	£19.50
Thai Boxing	£15.50		
Space Pilot	£15.50	ADVENTURES	ONLY
Joust	£23.50	Stationfall	£19.50
Star Raiders	£23.50	Golden Path	£15.50
Word for Word	£31.50	Guild of Thieves	£19.50
Super Huey	£15.50	Passengers Wind	£19.50
Arctic Fox	£31.50	Bureaucracy	£27.50
Skyfox	£19.50	Hollywood Hijinx	£23.50
Q Ball	£15.50	Essex	£23.50
Rogue	£19.50	Brimstone	£23.50
Winter Games	£19.50	Tass Times	£19.50
Super Cycle	£19.50	Borrowed Time	£19.50
Turbo GT	£19.50	Mindshadow	£19.50
Eden Blues	£19.50	Alternate Reality	£19.50
Macadam Bumper	£19.50	Temple of Apshai	£19.50
GFL Football	£19.50	Moonmist	£23.50
GFL Basketball	£19.50	Leather Goddesses	£23.50
Trailblazer	£19.50	Trinity	£27.50
Karate Master	£10.00	Hitch Hikers	£23.50
Typhoon	£18.50	M.F. Voeving	£27.50
Arkanoid	£11.50	Deadline	£23.50
Hippo Backgammon	£31.50	Bally Hoop	£23.50
Ninja Mission	£7.50	Enchanter	£23.50
Goldrunner	£19.50	Sorcerer	£23.50
Technate Chess	£19.50	Spellbreaker	£23.50
Trivia Challenge	£19.50	Jewels of Darkness	£15.50
Shuttle II	£19.50	Pawn	£19.50
Karate Kid II	£19.50	Ultima 2	£19.50
Pinball Factory	£19.50	Kings Quest II	£23.50
Cards	£15.50	Black Cauldron	£23.50
Electronic Pool	£15.50	Winnies the Pooh	£19.50
Major Motion	£23.50		
Silent Service	£19.50	UTILITIES	ONLY
Harrier Strike	£35.00	HabaWriter	£29.00
SDI	£36.50	HabaView	£39.00
Balance of Power	£23.50	Wordwriter	£63.50
Strike Harrier	£19.50	Mouse	£184.00
Metro Cross	£19.50	Stuff	£19.50
		M. Cache	£19.50
		Pro Sound Design	£45.00
		First Word Plus	£63.50

All the Latest Public Domain Software... from only £3.50

MUCH, MUCH MORE SOFTWARE AND HARDWARE. S.A.E. FOR LISTS. ALL PRICES INCLUDE VAT AND FIRST CLASS POST. TELEPHONE 0636 79097 FOR PERSONAL ASSISTANCE.

SEND CHEQUE OR POSTAL ORDER TO:

BYTEBACK Dept. PCW, 6 MUMBY CLOSE, NEWARK, NOTTS NG24 1JE

FORGET WIRE-FRAME 3D. FREESCAPE™ IS SOLID!

THE BEST IN SCOTLAND FOR DISCOUNT

CITY CENTRE COMPUTERS

136 Ingram Street, Glasgow G1. Tel: 041-552 4222

SUMMER BARGAINS AT LOW PRICES

AMIGA 1000 + MONITOR 512K	£950
ATARI 520 STM + 1 MEG DRIVE	£375
ATARI 520 STFM	£350
ATARI 1040 STF	£525
ATARI 1 MEG. DRIVE	£160

Also available, Atari and Amiga add-ons

SPECIAL OFFER: 15% OFF ALL SOFTWARE

PUBLISHING PARTNER	£130
C64 AND VIC POWER SUPPLIES ONLY	£10.50

REAL BARGAIN:

3 1/4" DS/DD DISCS	£20 for 20 or £40 for 50
5 1/4" DS/DD DISCS	£19 for 50

Huge discount for bulk orders
Above prices do not include postage for mail order

HOW TO IMPROVE YOUR BBC

Mark Jenkins finishes his review of the UMI3S, and lets you in on a real bargain.

As promised last week, we'll start by completing our look at the UMI3S, the stripped-down version of the UM12B Midi interface and software for the BBC and Master Series.

As I pointed out, the 3S has fewer connections than the 2B (Midi In, two Midi Outs, Clock, Sync 24 and Start/Stop) plus connections to the 1MHz bus and user port. Whether you're using it with one or many synths, and with or without a drum machine, it's simplicity itself to connect up once you've installed its Eprom firmware.

You can use 16-channel recording and each channel can be in real time or step time, the latter cleverly displaying each note and octave as you play it. You can overdub a pattern many times, although of course this will be of limited use if you only have one synth capable of operating on one Midi channel and making only one sound at a time.

Edit Pattern allows you to remove memory-consuming pitch bend, modulation or patch change information from your performances, and you can use Append Pattern to add patterns together or to make "safety copies" of patterns in different memory locations. Patterns are simply identified by number, 1-127, and when you want to create a song you simply type in a series of pattern numbers and choose Song Play.

In Song Play mode you can use the comma and dash keys to add transpositions to your patterns - so "4, 4-3, 1, 4, 2" could play a chorus, then the same chorus three semitones lower, then a verse, then the chorus again, this time two semitones higher than normal. You can even display different portions of the song in different colours, and insert symbols which will repeat or loop sections.

You can re-assign all the Midi channels used by the 16 tracks and the Midi synch implementation is quite advanced. It's also very easy to link up to a non-Midi drum machine provided it has either a Roland Din sync or a clock input, and both patterns and songs can be saved to tape or disc.

As a bonus, the 3S is also able to save DX7 sounds and Casio CZ sounds singly or

in banks, and will utilise shadow Ram where available for increased song capacity. The 3S can be synchronised to tape for complex multi-track recordings, which is obviously useful when you don't have as many synths as you want tracks.

The 3S has been designed more for the computer buff interested in music than for the musician interested in using computers. However, it's quite a powerful system; the most important point is that it's friendly and rapid in use. The Beeb's display looks terribly simple compared to the packed screens of the latest ST and PC packages,



but at least everything is labelled in plain English and there's little chance of confusion; the space bar and return key do 90% of the work.

The 3S system works quickly and efficiently, and will be updated gradually to give it more of the editing and other facilities of the UM12B. In the meantime, it remains an excellent Midi workhorse for current BBC owners, although perhaps not sufficient argument for buying a BBC in the first place if you're still trying to choose a music micro. Price is £230 including postage.

For a more powerful system you could go for the UMI Professional, which has four output ports to minimise delays and which has on-board software for "micro editing" (editing of every Midi event) and for sound editing of the DX7 and TX81Z module. Port two on the Professional model can also have a D-A convertor added to control a monophonic analog synth such as Mini-Moog. Price is £287.50.

Now on to some real budget stuff. Grant

Punchard has kindly written from Aldershot after entering his local Curry's to buy a tumble dryer and coming out with an Echsoft synth keyboard for the Spectrum 128 for £10. Normally this unit is sold with the micro at £130, but after dashing home to plug it into his existing Spectrum, Grant says he was "stunned by its sophistication and sound quality. The 3-octave metal keyboard has full-sized keys, very user-friendly software with record and play back options, a superb edit mode for amplitude and pitch envelopes and a capacity of eight sounds in memory".

Grant's not sure if the Echo-soft is available at this price nationwide, but it may be worth nipping down to your local Curry's to find out.

Richard Shaw of Glasgow writes, "I own a Casio CZ5000 and a Spectrum - I've read about the Ram Music Machine, CZ Android and CZ Tool Kit - but have not been able to find them locally".

The Ram Music Machine should be available nationally - as you'll know by now, it provides a little bit of Midi sequencing, a little bit of sampling and a little bit of sampled

percussion at around £50. If you can't find it in any micro shops (or even Boots) try calling Ram at 106 Fleet Road, Fleet, Hampshire (0252 850085).

CZ-Android is manufactured by Hybrid Arts and distributed by Syndromic Music but is only available on the Atari ST. The CZ Tool Kit, on the other hand, is a very powerful editor/librarian system available from XRI Systems at 10 Sunnybank Road, Wylde Green, Sutton Coldfield, West Midlands (021-382 6048) and they'll be happy to send you a price list for mail ordering.

New products coming up for review in the next few weeks - EDX81Z, a TX81Z editor for the ST from Softwares; and a load of sequencers, event editors, librarians and other packages for the FB01, Mirage, RX drum machine, DX/TX7, Prophet 2000 and Casio on the C64/128, PC and ST from Sonus, newly imported into the UK. Plus next week - the winners of our first birthday competition.

U-Music, 17 Parkfields, London SW15 6NH, 01-788 3729.

A QUESTION OF PARITY

David Wallin answers readers' questions about the logistics of bulletin boards and the reasons why things sometimes don't go quite how they should.

This week I'll be dealing with some of your questions and answers about bulletin boards.

Firstly, Mr G N Porilo has one big problem. He has joined Prestel, but cannot seem to log on in the conventional way. Instead he is using a special 300/300 baud London number. This must be extremely annoying, as this host computer converts all graphics characters into dots and the display is monochrome.

Since the main reason most people use viewdata systems is for the colour and graphics and loss of them, coupled with using the reduced speed of 300/300 must be most antagonising. I will try to suggest what the problem is along with a solution, though to be quite frank, I've never known anyone with this trouble.

The first thing to do is ensure that your software is set to Viewdata emulation. This could have one of many names, including: Viewdata, Prestel, Teletext, colour and even CBM! If you are not set to the correct emulation (ie, Ascii rather than Viewdata), then characters will be interpreted by your computer wrongly. This is because each character is given a reference code and Ascii (American Standard Code for Information Interchange) uses a different code for each character to viewdata. The main reason is that viewdata has a different set of characters (control codes, graphic codes etc).

If your software cannot emulate viewdata, new software will be needed. One point to note is that many bulletin boards now work with both viewdata and Ascii emulations. They work out which you are using by asking you to press return at the start.

As viewdata uses a # as a return character and Ascii uses control-M, the host computer can read this in and instantly tell what emulation you are using. Thus it is essential that if you are using viewdata, you enter a # as your return character.

The next thing to ensure is that you are at the correct baud rate. Silly as it may seem, 1200/75 is still sometimes written as 75/1200 and 75/1200 written as 1200/75. If you are not careful, you may end up using the wrong baud rate even though it's written as though it were the correct one. For viewdata you want 1200/75 - receive 1200, transmit 75. If the modem cannot handle 1200/75, a new modem will be needed.

Next, one major problem could be a

wrong protocol. The data protocol for Prestel/Telecom Gold is 7E1 and for other Ascii services it is *usually* 8N1. Other formats, such as 7E2 and 8I1 do exist, but are uncommon. 7E1 refers to data word size of seven bits, even parity and one stop bit. 8N1 is eight bit data word, no parity and one stop bit.

Word size can be any of 5, 6, 7 or 8 bits, parity E, O, N, I, S or R and there could be 1, 1½ or 2 stop bits. The parities are E: Even; O: Odd; N: None (there is no parity - 8 bit data word); I: Ignore (worth trying in many situations); S: Set (parity bit is 1); R: Reset (parity bit is 0).

It's not necessary to understand how parity works and I have explained it briefly before. As it says above, try parity of Ignore if you do not know the parity.

"The first thing to do is ensure that your software is set to Viewdata emulation. This could have one of many names"

To use Prestel, you should ensure that your software and modem are set as follows: Speed: 1200/75; Parity: 7E1; Emulation: Viewdata.

You should also ensure that the modem is in originate mode (if there is no option to change from originate to answer assume you are in originate, and that you have the correct telephone number. In this case, I would doubt the number is wrong, as Prestel send it to you with your password and are unlikely to get it wrong (Prestel in London is 618).

It's back to parity for Phil Borman's problem. When I explained parity in full some weeks ago, I only briefly mentioned Mark and Space parities and said you are unlikely to come across them. Phil uses QCode software on the QL and the parities offered are: Even, Odd, Mark and Space. I still hold that you will be very unlikely to use them.

Mark and Space are other names for Set and Reset and basically give a parity bit of 1 or 0 respectively. The only parity on QCode

which is used in normal communications is Even. The most common parity, None (as used in 8N1), is not listed and Mr Borman understandably wants to know how to obtain it. I think the answer lies in setting the software to eight data bits and one stop bit. Since with eight bits, it is theoretically impossible to have a parity other than N on a home micro, the software will probably set to no parity automatically on selection of eight bits. Since most home micros are 8-bit computers, they can only handle eight bits of data at a time.

The inclusion of a parity bit would result in nine bits of data per character which would certainly confuse the average computer. Even 16/32-bit computers like the Amiga do not use parity with eight bit data for similar reasons.

Smart readers will be thinking 'What about the start and stop bits??' Start bits are used to tell the computer when the data for the character will be transmitted and a stop bit represents the end. These are used for synchronisation and are stripped off from the required bits (the eight bits, or seven bits and parity) by the receiving software. If everything is set correctly then it should happen automatically, without you even knowing it.

So, to answer the question, set to eight bit data word and try it. If it does not work, the software cannot handle 8N1 and new software is needed.

A new BB called Hybrid is now online. 1200/75, and maybe 300/300, is what Lee Nickeas told me on behalf of the sysop, Simon Lowe. 8N1, on the phone number 0602-609403.

The hours for this board are a bit complicated, so read the next bit carefully.

Friday	0830 → 1630	2200 →
Saturday	0830	2200 →
Sunday	0930	1100 →
Monday	0630	

You can ring up at any other time and 'book' the board. If you do this, the sysop will put it on-line at the time you request for your call. It's a bit like the old ring 'n' request boards that used to be popular.

Finally, another board. This one is newish but has been on-line for a few months. In Nottingham, it's called Sherwood Forest BBS ('What else?') says the sysop, Kevin Lindley and can be reached 24 hours a day on 0602 397113. 1200/75 and 300/300, ASCII, 8N1. Some of the features/SIGs include adventures, Amiga, BBC, E-Mail, 'network' (?) and communications.

MICRO-FILE

SOFTWARE

STORT SOFT MAIL ORDER SPECIALISTS

INCREDIBLE LOW PRICES!

ALL DISKS CARRY A NO QUibble REPLACEMENT GUARANTEE, ARE CERTIFIED 100% ERROR FREE & COME WITH LABELS, 5 1/4" ALSO HAVE SLEEVES & WRITE PROTECTS AND REINFORCED HUB RINGS.

BLANK 5 1/4" DISKS

DISK NOTCHER FREE WITH EACH 100 DISKS PURCHASED

	10	25	50	100	10 in a plastic lib. case
UNBRANDED					
SS48 TPI	£4.50	£9.00	£17.00	£33.00	£5.50
DS48 TPI	£5.50	£11.00	£19.00	£35.00	£6.50
DS96 TPI	£6.50	£13.00	£21.00	£37.00	£7.50
DS96 TPI FLIP SIDED	£7.00	£14.00	£22.00	£38.00	£8.00
MIMIC FLIP SIDED DS96 TPI	£8.95	£20.00	£38.00	£70.00	£9.95
MIMIC HIGH DENSITY					
1.6meg	£23.00	£52.00	£100.00	£180.00	£24.00
COLOURED - mix & match or all one colour					
SS48 TPI	£6.50	£12.00	£22.00	£42.00	£7.50
DS48 TPI	£7.50	£14.00	£24.00	£44.00	£8.50
DS96 TPI	£8.00	£16.00	£28.00	£50.00	£9.00

SPECIAL PRICE!! Dyan DS48TPI BOX OF 10 ONLY £10.95

BLANK 3 1/2" DISKS

	10	25	50	100	10 in a plastic lib. case
MF100 (SS/DD)	£12.95	£30.00	£58.00	£115.00	£13.95
MF200 (DS/DD)	£14.95	£35.00	£63.00	£125.00	£15.95

LOCKING DISK BOXES

3 1/2" HOLDS 40	£7.95	3 1/2" HOLDS 80	£9.95
50/90 HOLDS 60 3" or 90 3 1/2"	£9.95		

BLANK 3" DISKS

	10	25	50	100
CF2	£25.00	£60.00	£110.00	£200.00
CF200	£33.00	£80.00	£150.00	£280.00

LOCKING DISK BOXES

5 1/4" HOLDS 50	£7.95	5 1/4" HOLDS 100	£9.95
3 1/2" HOLDS 40	£7.95	3 1/2" HOLDS 80	£9.95
60/90 HOLDS 60 3" or 90 3 1/2"	£9.95		

FULL RANGE OF ATARI HARDWARE & SOFTWARE - BEST PRICES - RING FOR DETAILS!

Just write for more information. Cheques etc. payable to STORT SOFT (International orders add 10% and remit in pounds Sterling by bank draft or intl. money order. Write for quote in any other currency)

ACCESS/MASTERCARD/EUROCARD/VISA accepted. CREDIT CARD ORDER LINE - 0279 89509
24 HOURS A DAY, 7 DAYS A WEEK - NO HIDDEN EXTRAS - WHAT YOU SEE IS WHAT YOU PAY
18 CROWN CLOSE, SHEERING, BISHOP'S STORTFORD, HERTS CM22 7NX (252)

COMPUTER ACCESSORIES

5 1/4" DISK NOTCHER (Double your disk capacity on a single sided drive)	£3.95
DISK CLEANING KITS Liquid non-abrasive type - protect your valuable software	
5 1/4" DCK	£3.95
3 1/2" DCK	£4.95
ST/IBM/AMSTRAD 1512 TO CENTRONICS PRINTER LEAD (2 metres)	£8.95
ST TO RS232 MODEM LEAD (2 metres)	£8.95
BATTERY POWERED MINI-VAC - for keyboards, printers etc.	£9.95
QUICKSHOT II+ (microswitch) joystick	£8.95

COMPUTER STATIONERY

PRINTER PAPER - Continuous fan fold, sprocket fed.				
SHEETS	11" x 9.5" 60gsm	A4 70gsm	11" x 9.5" 90gsm	A4 90gsm
500	£4.95	£6.95	£9.00	£9.95
1000	£8.95	£10.95	£14.00	£15.00
2000	£13.95	£16.50	£24.00	N/A
LABELS - Continuous fan fold, sprocket fed.				
	70mm x 36mm	89mm x 36mm	102mm x 36mm	89mm x 49mm
1000	£4.15	£4.25	£4.50	£5.75
2000	£7.50	£7.90	£8.40	£10.50
Please specify number of labels across (1, 2 or 3)				

Please specify number of labels across (1, 2 or 3)

SPECIAL OFFERS

★ 520STM, SF354 (1/2 MEG DRIVE), MOUSE & 1st WORD WORD PROCESSOR	£344.95
★ 520STM, SF354 (1/2 MEG DRIVE), MOUSE & 1st WORD WORD PROCESSOR, & SM 125 MONO MONITOR	£434.95
★ 520STM, SF314 (1 MEG DRIVE), MOUSE & 1st WORD WORD PROCESSOR	£379.95
★ 520STM, SF314 (1 MEG DRIVE), MOUSE & 1st WORD WORD PROCESSOR & SM 125 MONO MONITOR	£459.95

All Hardware comes with free dust covers!! All STs come with 5 public domain disks including CPM emulator and the arcade game Megaraoids, 5 blank discs to get you going. Basic language disk and manuals.

NAME YOUR OWN INCOME

"Make Money With Your Micro" details exciting opportunities for you. How to start your business. Services to offer. Expanding. All the know-how you need to earn real money. The manual costs just £10.00 post paid. C.W.O. Full refund if not satisfied.

Order today from

Bookmark

(PCW4), 14 Truro Close, Congleton CW12 3BD

(353)

RAMASOFT

Budget Utility Software

For the AMSTRAD CPC range of home computers

JUNIOR-WORDPRO

JUNIOR-WORDPRO is a word processor for the Amstrad CPC 464/664/6128 designed specifically for children. Clear, and very simple to use. Amstrad Action said: "It is so easy it's a child's play." Some features boasted by JUNIOR-WORDPRO are:

Full cursor movement * Fast movement to the end and start of text * Full line insert and delete * Character insert at cursor * Forward and backward delete of characters * Text overwrite mode * Rejustification of ragged text * Easy text save and load facility * Fully automatic printout * Word wrap at right margin * Rapid text centering * Mode 1 text and double line spacing for clarity.

JUNIOR-WORDPRO comes with three tutorial text files that guide your child through the functions of word processing, step by step, and include simple exercises.

JUNIOR-WORDPRO is £9.95 on cassette and £12.95 on disc, from:

Ramasoft

Dept (P), 6 Stile Plantation
Royston, Herts SG8 9HP
Tel: 0763 43715

(350)

ADVERTISING RATES FOR MICRO-FILE

Semi Display
Lineage

£8 per single column centimetre (+VAT)
35p per word (+VAT)

CALL SUSANNAH KING or ROBERT COLE on 01-437 4343 FOR SEMI DISPLAY ADVERTISING

ATARI 520 STFM NOW IN STOCK FOR ONLY £369.95

Includes mouse controller, manual, language disc and other utilities

AMIGA A500 NOW IN STOCK PHONE FOR DETAILS

SUMMER SPECIAL OFFER this month only.

Buy a computer from us and get a three day mini-break holiday anywhere in Britain FREE

Due to massive response we've extended this special offer until the end of August.

PACK 1 - Atari 520 STM complete with mouse, 1 meg disc drive complete with manuals and demos £399

PACK 2 - Atari 520 STFM with mono monitor £459 complete with manuals and demos

PACK 3 - Atari 520 STM with 1 meg drive mono monitor manuals and demos at £489.95

SPECIAL OFFER Atari mono monitor £109.95

SPECIAL OFFER First Word Plus £59.00

ST SOFTWARE AT GIVEAWAY PRICES

Balance of Power	£26.99	Prohibition	£15.95
Championship Football	£19.95	Barbarian	£19.95
Karate Kid II	£19.95	Golden Path	£19.95
The Pawn	£19.95	Brian Clough's Football	£19.95
Prosound Designer	£47.95	Fortunes	£19.95
Colonial Conquest	£24.95	Air Ball	£19.95
Hades Nebula	£16.95	Hard Ball	£19.95
Guild of Thieves	£19.95	Crystal Castles	£11.99
Arkanoid	£12.95	Gauntlet	£19.95

This is just a small selection of our Atari Software. Send S.A.E. for list

Blank discs £30 for 10. Bulk purchase - please ring for prices.

Amiga A500 - phone for details

Amiga A2000 - phone for details

AMIGA SOFTWARE AT GIVEAWAY PRICES

Balance of Power	£29.95
Defender of the Crown	£26.95
World Games	£19.95
Guild of Thieves	£19.95
Winter Games	£19.95
Star Glider	£19.95
Championship Football	£19.95
Swooper	£16.95
Deluxe Paint II	£129.00
Barbarian	£19.95
Instant Music	£24.95
The Surgeon	£39.95
Karate Kid II	£19.95

More new releases this week phone for details

This is just a small selection of our Amiga Software.

Send S.A.E. for list

Other Commodore and Amiga peripherals in stock, please phone for details

We are Commodore appointed dealers

(360)



SOUND N VISION

11 Silk St, Leigh, Lancs WN7 1AW.

Phone now for details - Tel: (0942) 673689

Cheques and P/Orders payable to: Sound N Vision P.&P./VAT INCLUDED

Visitors welcome in showroom. Send S.A.E. for price list.



BrunWord

"BrunWord offers considerable flexibility... excellent spelling checker... very easy to use datafile" - CWTA.

"BrunWord is a very competent programme" - AMTIX

*** SUPERB WORD PROCESSOR PROGRAMME ***

- ** Amazingly fast response
- ** Unbeatable text appearance
- ** Full printer features
- ** Displays true print format

*** LIGHTNING SPEED SPELL CHECK PROGRAMME ***

- ** 30,000 word English dictionary
- ** Checks 2500 words per minute
- ** Automatic correction and instant look up

*** INTELLIGENT DATAFILE PROGRAMME ***

- ** Alphabetical, numerical or date sorting
- ** 20 fields with user defined headings
- ** Intelligence mail merge
- ** Intelligence label printing

All three Programmes together on 3in Disc £25.00
BrunWord + BrunSpell Tape £14.50. DataFile Tape £10.00
For CPC464, CPC664 or CPC6128 - State which machine
(ask for our free 8 page booklet)

7 Days Free Trial

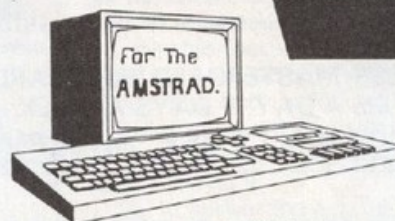
Ring our hotline 6-9 pm and we will send you BrunWord for 7 days free trial (CPC6128 disc version only). We are confident that once you have our programme you will not want to be without it.

or send a cheque/postal order to:-

Brunning Software

34 Helston Road,
Chelmsford, Essex, CM1 5JF.

Telephone (0245) 252854 (24 hours)



BrunWord

BrunWord is recognised as unbeatable with its superb system of justifying text. It has an excellent editor, a continuous "see what will be printed" display, comprehensive printer facilities and responds almost instantly to all routines.

* True Insert and Overwrite * Touch typing speed * Fast block save, move, copy, insert & delete * Quick local editing with word delete/undelete * Adjustable margins and TABs * Instant word wrap * Column/Line/Page display with file name * Find and replace * Security code * Help menus * Single character embedded printer commands * Page throw markers * Multiple copies * Odd/even page headers/footers with page numbers * Multi file printing with full facilities * Print specified pages * Full printer features work with any printer * True word count * True display super/subscript numbers * User defined print characters * Tired eyes facility.

BrunSpell

CPC6128 disc - 30,000 word dictionary - 2600 words/minute
CPC464/664 disc - 30,000 word dictionary - 1100 words/minutes
CPC464 cassette - 10,000 word dictionary - 2000 words/minute

DataFile

DataFile is specially written to complement BrunWord and is a self-contained card filling programme with very fast access. Files can be selected and then sorted alphabetically, numerically or by date. The BrunWord Interface has artificial intelligence which allows the programme to choose a style of addressing that is suitable for the data. BrunWord justifies the text before printing. Labels, reports, personalised letters - DataFile has unlimited print formats using BrunWord.

How BrunWord Compares

Take as an example the Justification process. Tasword uses an our dated method where spaces are added only from the right hand side. This has the effect of making the lines appear to stretch across the page. The Tasword system should be much faster but in fact Tasword takes 19 seconds for a 306 word paragraph while BrunWord takes just 1.5 seconds.

Tas-spell has a similarly disappointing performance. The text of our free booklet was checked by Tas-spell after the 37 unknown words had been saved, and it took a staggering 18 minutes and 31 seconds for the 3455 words. BrunSpell took just 1 minute 21 seconds for the same text.

SOFTWARE

SOFTWARE

LATEST RELEASES

	SP	64	AMS
Last Ninja	Call	£6.95	—
Oink	—	£6.25	—
Wizball	Call	£6.25	Call
Killed Until Dead	£6.25	£6.95	—
Metrocross	£6.25	£6.95	£6.95
Hydrofool	£5.50	£6.25	—
Barbarian	£6.95	£6.95	£6.95
Slapfight	£5.50	£6.25	£6.25
Quartet	£6.95	£6.95	£6.95
Mutants	£5.50	£6.25	£6.25
Thing Bounces Back	£5.50	£6.95	£6.95
Livingstone	£6.25	—	—
F15 Strike Eagle	£6.95	£6.95	£6.95
Enduro Racer	£6.95	£6.95	£6.95
Shadow of Mordor	£5.50	£6.25	—
Head Over Heels	£5.50	£6.25	£6.25
Gunrunner	£5.50	—	—
Prohibition	£6.95	—	£6.95
Big Sneeze	£6.95	£6.95	—
Road Runner	—	6.95	—
Laurel & Hardy	—	6.95	—
Trio Hit Pack	6.95	6.95	6.95
Game Over	6.25	6.25	—
World Class Leaderboard	—	6.95	—
Convoy Raiders	5.50	6.95	—

JULY SPECIAL OFFERS

ATARI ST SOFTWARE

Gauntlet	£18.95	2218 Baker Street	£18.95
Star Raiders	£18.95	Colonial Conquests	£22.95
Airball	£11.95	Guild of Thieves	£18.95
Hardball	£18.95	Balance of Power	£22.95
Altair	£15.95	Sub Battle Simulator	£18.95
Barbarian	£18.95	Phantasia II	£18.95
Road Runner	£18.95	Boulderdash Construction Kit	£18.95
Matropolis	£9.95	Extravagasia	£9.95
Passengers in the Wind	£18.95	Space Pilot	£12.95
Pirates of Barbary Coast	£9.95	Vagas Gambler	£18.95

JULY EXTRA: BUY 2 OR MORE AND DEDUCT AN EXTRA 50p OFF EACH ONE

★ ★ ★ SOFTWARE CLEARANCE SALE ★ ★ ★ LIMITED STOCK AVAILABLE

SPECTRUM		AMSTRAD		COMMODORE 64	
Masters of the Universe	£2.99	Pajad	£3.45	Beach-head 2	£1.99
Return to Oz	£1.99	Return to Oz	£1.99	Temple of Asphai Trilogy	£1.99
Mantroniks	£1.99	Trailblazer	£3.95	Outlaws	£1.99
Boby Baring	£1.99	Space Shuttle	£3.95	Power Play	£1.99
Strike Force S.A.S.	£1.99	Boby Baring	£3.95	Shao Lins Road	£1.99
Aquajet	£2.99	Raid	£1.99	Vikings	£1.99
Silent Service	£2.99	Unbelievable Ultimate	£2.99	Return to Oz	£1.99
		Classic Collection 1	£2.99	Inheritance	£1.99
		Jack the Nipper	£3.45	Dragons Skull	£1.99
				Aquajet	£2.99
				Masters of the Universe	£1.99

BOOKS

ALL BOOKS £1 EACH
(Plus 50p P&P on each book)

ACORN ELECTRON

Adventure Games - Electron
Programming for Education
Electron Gamesmaster
21 Games for the Electron
Software for Electron
Instant Arcade Games
Very Basic Basic for Electron
Dynamic Games for Electron

GENERAL

Home Applications
Hacker Handbook
Complete Programmer
Computer Programmers in Basic
Illustrating Computer Without Jargon

SINCLAIR SPECTRUM

Creating Arcade Games
Spectrum Handbook
Basic Made Easy
Discover Your Spectrum
Educational Programs
60 Games and Applications
Creating Adventures
Delving Deeper Into Your Spectrum
Programming Your ZX Spectrum
Putting Your Spectrum to Work

AMSTRAD

Your First CPC Book
Structured Programming
Learning Programs

COMMODORE 16

The Working Commodore 16

COMMODORE 64

Graphic Art for the 64
Putting Your C64 to Work
Power Plays on C64
Commodore C64 Comics

STAR GAMES 1

comprising:
Way of the Tiger
Rescue on Fractalus
Barry McGuigan Boxing
Beach-head 2
£3.99
C64, Spectrum, Amstrad

UNBELIEVABLE ULTIMATE

comprising:
Attic Attack
Sabre Wolf
Underworld
Alien 8
£2.99
Spectrum only

SPECTRUM STINGER

comprising:
Bruce Lee
Pole Position
Cyber Run
Zoro
£2.99
Spectrum only

AMSTRAD ACADEMY

Zoro
Bruce Lee
Bounty Bomb
Dambusters
£2.99
Amstrad only

UNBELIEVABLE ULTIMATE

comprising:
Entombed
Staff of Karmah
Bike Witch
Imhotep
£2.99
Commodore 64

CLASSIC COLLECTION

Auto Mania
Witches Cauldron
Pyjama Rama
Battle of the Planets
£2.99
Commodore 64

SCOT ADAMS SCOOPS

Pirate Adventure
Strange Odyssey
Voodoo Castle
Buckaro Banz
£2.99
C64, Spectrum, Amstrad, C16

CHEETAH

125+
JOYSTICK
£6.95

ATARI

SM125 MONO
MONITORS
£95

COMMODORE

C2N
CASSETTE
£29.95

PROGRAMME

REF. GUIDE
C64
£4.95

INTERNATIONAL

SOCCER
CARTRIDGE
COMMODORE 64
£3.95

SIMONS

BASIC
CARTRIDGE
COMMODORE 64
£9.95

25 DOUBLE

SIDED
DENSITY 5 1/4"
BLANK DISCS
£14.95

COMMODORE MPS 801

AMSTRAD DMP1
PRINTER RIBBONS
3 FOR
£10

MAIL-CENTA

17 Campbell Street, Belper, Derbyshire DE5 1AP. Telephone: Belper 6830

Postage: UK free over £5; under £5 add 50p. Overseas please add 75p per item

Telephone orders using Access welcomed

Strictly Mail Order only

(355)

DISCOUNT SOFTWARE

AMSTRAD 464/664	TAPE	DISC	POPULAR GAMES	TAPE	DISC
Mini Office 2	13.50	17.99	Elite	9.95	12.50
Illustrator	13.50	—	Fist II	8.95	13.50
Quill	15.50	17.99	Rena Rama	7.95	13.95
Illustrator Quill	21.95	—	Metrocross	7.95	13.99
Tasprint	8.99	11.75	Army Moves	7.95	13.95
Tasword	17.95	—	Krak Out	8.95	13.99
			Hydro Fall	7.95	12.95
AMSTRAD 6128/825			Kinetic	7.95	11.95
Cardboard	—	52.99	Enduro Racer	7.95	13.99
Obase 2	—	109.00	Auf Wiedersehen Monty	7.95	13.99
Art Studio	—	17.99	Samurai Trilogy	8.95	13.50
New Word	—	62.00	The Big Slide	8.95	—
Super Calc 2	—	44.95	Indoor Sports	7.95	13.50
Tasword	21.99	—	Paper Boy	8.99	13.50
COMMODORE 64			Tomahawk	8.95	13.95
Easy Script	12.99	—	Short Circuit	7.95	11.50
Geos	47.50	—	Future Knight	8.95	13.50
Mini Office 2	13.50	—	Escape From Fingies Castle	8.95	12.95
Paper Clip	—	41.99	Hyper Ball	8.99	13.50
Paper Clip Spell Checker	—	54.99	Light Force	7.95	13.50
Quill Illustrator	19.99	—	The Double	8.99	—
New Consultant	—	39.99	Heart Land	—	13.50
Swift Spread Sheet	—	21.99	The Last Ninja	8.99	13.50
COMMODORE 128			Blood And Guts	8.50	12.95
Obase 2	—	109.50	Gauntlet	7.99	13.50
C128 Compiler	—	36.50	Footballer Of The Year	8.99	13.50
Swift Spread Sheet	—	21.99	Space Harrier	8.99	13.50
Super Script 128	—	65.95	Trivia Pursuit	13.50	18.50
SPECTRUM			Young Slayers	13.50	18.50
Art Studio	12.99	—	Baby Corner	13.50	18.50
Graphics Adven. Creature	19.95	—	Ace Of Aces	7.99	12.50
Lastword	12.99	—	Cobra	7.95	11.95
Mini Office 2	13.50	—	Jail Break	7.95	13.50
Omni Call 2	12.99	—	Gunship	12.99	16.99
Quill	12.95	—	Breakthrough	8.99	13.50
Quill Illustrator	19.95	—	Aliens	7.99	11.50
Tasprint	8.50	—	Silent Service	8.99	13.50
Tasword 2	12.50	—	Killed Until Dead	8.99	13.50
Tasword 3	13.99	—	Deadlined	—	22.99
TOP TEN GAMES	TAPE	DISC	COMPILATIONS	TAPE	DISC
1. Shadow Skimmer	7.95	11.50	Accolade Collection	8.95	—
2. Falcon	8.95	—	Konami-F Coin-op Hits	8.50	12.95
3. Oink	11.95	13.50	Ben Computer Hits	8.50	12.95
4. Barbarian	8.99	11.99	Hit Pak	8.50	12.95
5. Whizz Ball	7.95	11.95	5 Star Games	8.50	—
6. Shadows of Nurde	7.95	13.50	They Sold A Million III	8.50	12.95
7. Exec Leaderboard	8.99	13.99	Now Games III	8.50	—
8. Mag Max	7.95	11.95			
9. Wonder Boy	8.95	13.99			
10. Football GFL	8.99	13.50			
TOP TEN BUDGET	TAPE				
1. Milk Race	1.89				
2. One Ball	1.89				
3. BMX Simulator	1.89				
4. Park Control	1.89				
5. Denarius	1.89				
6. Thunderbolt	1.89				
7. Super Robin Hood	1.89				
8. Vampire	1.89				
9. Strike	2.85				
10. Flash	2.85				

Software available for
Amiga, Amstrad, Electron,
Spectrum, Commodore.
Price includes P&P
for orders over £7.
Under £5 add 50p.

Cheques and POs to:

CROWN SOFTWARE
47 Crown Drive, Spalding, Lincolnshire.
Tel: 0775 69058

(313)

AMSTAT Modular Statistics and Mathematics Package

MARKETED BY S. C. COLEMAN

Available for BOTH PCW AND CPC ranges ★ ★ ★ New Amstat 7

AMSTAT 1 - means, standard deviations, variance, skew, kurtosis, 1-sample, 2-sample, and paired t-tests, 1-way AOV with single and multiple confidence intervals, 2-way AOV, correlations, regressions, histograms, scattergrams, transformations, file store and retrieve, output to wordprocessor file, manual. Flexible variables and observations to a total of 500 (+) data points.

AMSTAT 2 - 27 nonparametric tests in 4 programs providing a "complete Siegel". Binomial, Chisquare (3), Kolmogorov-Smirnov (2), Runs, McNemar, Sign, Wilcoxon, Walsh, Randomisation (2), Fisher, Median (+extension), Mann-Whitney, Wald-Wolfowitz, Moses, Cochran, Friedman, Kruskal-Wallis, Contingency, Spearman, Kendall, Kendall partial, Concordance.

"tremendous value" - Tony Kandle, Popular Computing Weekly, 8-14th May 1986.

"I now give it an unreserved recommendation..." - Jo Stork, Business Computing with the Amstrad, July 1986.

AMSTAT 3: FORECASTING

An array of business oriented mathematical and statistical software: Linear and Polynomial regression, Trend and Seasonal Variation, Multiple Regression Analysis, Transformations, Exponential Smoothing, Adaptive Filtering. Graphic display, full printout, manual suited to immediate use and for teaching.

AMSTAT 4: RESOURCE MANAGEMENT - LINEAR PROGRAMMING MODULE

General Purpose Linear programming + Specialised Transportation and Assignment variants. Capable of analysing and solving problems of sequencing, scheduling, blending, and allocation of scarce resources. 40 page manual, 18 worked examples.

AMSTAT 6: SFANOVA - Up to 8-way analysis of variance for equal cell sizes. Unequal cell sizes on 1-way AOV. Maximum of 2,000 data points (300 on unexpanded CP/M 2.2). Input for ASCII files. Output to screen or text file with full AOV table + main and interaction means and Newman-Keuls on main effects. Manual (disc only).

AMSTAT 7: RESOURCE MANAGEMENT II - STOCK AND PRODUCTION ANALYSIS
Calculation of optimum re-order levels for both single and multiple items. Dynamic programming to calculate optimum production schedules for single items and consolidation of several results into a multiple schedule. Also Pareto and Lorenz analysis. Output to screen or printer. Includes operational manual with worked examples.

The programs have applications in research of all kinds, education, sales, production planning, work and method study, financial planning, personnel, social work etc.

Price list:	CPC	PCW	Price list:	CPC	PCW
AMSTAT 1	£25.95	£27.95	AMSTAT 6	£25.95	£27.95
AMSTAT 2	£39.95	£39.95	AMSTAT 7	£25.95	£27.95
AMSTAT 3	£25.95	£27.95	AMSTAT 1+2	£49.95	£49.95
AMSTAT 4	£25.95	£27.95	AMSTAT 1+2+3+4	£89.95	£89.95

These prices are exclusive of V.A.T.

All prices include P&P within U.K.

+ 24 hours answerphone

For more details of PC equivalent please enquire.

Cheques and P.O.s to:

S. C. COLEMAN
33 Leicester Road, Ashby-de-la-Zouch,
Leics LE6 5DA.
Tel: 0530 415919

(27)

CRIBBAGE

The popular pub game six card cribbage is now available for the Spectrum 48K/128K

Features include:

**IMPRESSIVE FULL COLOUR
PLAYING CARD GRAPHICS
100% MACHINE CODE
TWO LEVELS OF PLAY
AUTOMATIC SCORING
HELP OPTION FOR BEGINNERS**

Six card cribbage is suitable for both beginners and experienced crib players and comes with full instructions and rules of the game.

★ ★ ★ ★ MONEY BACK GUARANTEE ★ ★ ★ ★

If you are not delighted with six card cribbage then simply return the tape within 5 days and your cash will be refunded.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Send cheque or postal order for £6.50 to

ESEM SOFTWARE

112 Wrington Close, Little Stoke, Bristol BS12 6EJ

Tel: 0454 612811

(260)

FOR SALE

COMMODORE 128, + 1570, + 8250LP, + SFD1001, + 1901, + leads, + interfaces, + software. Also Amiga A1000 512K, + extra drive, + software. Serious enquiries/offers. BITS, Beach House, Beach Street, Herne Bay, Kent CT6 5PT. Tel: 0227 363754.

QL ENTHUSIAST SELLING UP: QLs, monitor, disc drive, interface with Centronics, extra Ram, Forth, Assembler, toolkit, games, graphics, books, mags, and so on. Good cond., good prices. Tel: 0865 723314. Evenings.

ATARI SYSTEMS: 130XE, Omnimon enhanced 800XC, Happy enhanced 1050 drive, 1050 drive, 1029 printer, books, 300-600 games. Will sell as two systems, or may split. Tel: Colin 0302 780016. After 6pm.

QL, £60; disc interface, £45; 512k Ram upgrade, £55; single 3.5" 1Mb drive, £70; dual 3.5" 1Mb drive, £125; Philips 7502 mono monitor, £55; softwares free. Tel: 0506 37497. Mr. Lee.

ATARI ST OWNERS - Write now for a free copy of our latest newsletter and public domain library catalogue. The ST-Club (PCW487), PO Box 20, Hertford SG13 8NN.

C64 SOFTWARE for hire. Prices from 60p to £2.00 for 1-2 weeks. Many happy customers. Peter Young, 17 Albert Street, Amble, Morpeth, Northumberland NE65 0LX.

MULTITASKING MANUAL. Write large or complex programs? Interested in advanced techniques? S.A.E. for free brochure: Kernels, 59 Arncliffe RG12 4EA.

AMSTRAD 6128, disc drive, colour monitor, DMP2000 printer, Mini Office II program, spare discs, manuals, £400 o.n.o. Tel: T. Cox 01-574 6068/070 072 64616.

AMSTRAD CPC 464 colour monitor, disc drive, joystick, over 50 utilities, games, books, magazines. £260. Also Oric Atmos, £25 and ZX 81 16K, £15. Tel: 0268 690850.

TANDY 1000EX colour system, IBM compatible computer, plus printer, cable, joystick, basic manual. Price, £490. Tel: Kingswinford 279687.

COMMODORE 64 data recorder plus some free games £120. Tel: South Benfleet 750861.

AMIGA

PUBLIC DOMAIN SOFTWARE

We have the very latest Fish, # 52 to # 80, and Amicus, # 11 to # 20, disks in stock. Please send S.A.E. for latest release sheet. No membership fees. Quality guaranteed.

All disks each \$3.00 inc. VAT.

P/P is charged at cost. Courtesy of Jumpdisk.

1 Free Disk for every order of 10 Disks

George Thompson Services Ltd.

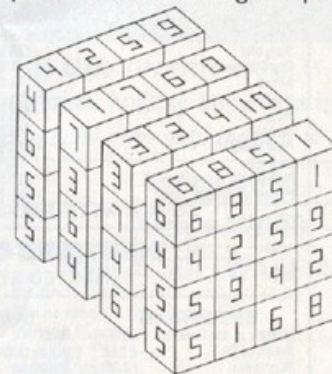
Old Reigate Road

Betchworth, Surrey RH3 7DR

Tel: 073-784 4675 (291)

THE MAGIC CUBE PUZZLE

(3 dimensional magic square puzzle)



On the left is shown a row of magic squares which together form a magic square in three dimensions called a magic cube.

The ultimate aim of this package is to reconstruct a jumbled up magic cube after first mastering the two dimensional version.

There are interesting number patterns which can help you in this task.

Available on cassette for the BBC Model B Microcomputer PRICE £7.99

MOSAIC SOFTWARE, 4/15 The Grange, London SW19 4PS. Tel: 01-946 4821

SOFTWARE REQUIRED

Software house requires leisure or commercial software programmes.

Fully developed with documentation or underdevelopment based on IBM PC, Amstrad PCW and PC, Atari ST and PC.

Please contact Veronica on:

0395 45059

(352)

DRIVE TRANSFER UTILITY

FOR WAFI DRIVE, MICRO DRIVE, OPUS, BETA OR SPECTRUM +3

A total of FOURTEEN programmes on one tape, plus a 40-page book which on its own is a complete course on transferring to any drive. Includes converting some fast/jerky types to normal, so can transfer to drive. Can transfer FULL 48Ks. SCRABBLE is easy.

Order as 007 Multispy £9.95

007 SUPERFILE 2

and

LISTFILE 3

Over 200 sold after demonstrating at small computer show.

Can auto-trans to WAFI DRIVE, MICRO DRIVE OR DISC OR AMSTRAD 6128.

SUPERFILE CAN PRINT OUT AS FILES OR LABELS. Holds up to 500 name/address records and can find any in under a second. Fast machine code Search, Alpha-sort etc. PRINTS BY SEARCH, SORT, OR STRING.

LISTFILE 3 is similar to above but holds 1000 single line files on one tape.

For Spectrum (state drive) £6.95

Amstrad 464/664/6128 £9.95

Postage: UK included free.
Europe + £1. Elsewhere + £2

(340)

G. A. BOBKER, ZX-GUARANTEED (Dept PCW)
29 Chadderton Drive, Unsworth, Bury, Lancs
Tel: 061-766 5712

(Do not phone if Star Trek is on TV)

BEST PRICES

THETA COMPUTERS

ATARI 520 STFM £345
(with mono monitor £435)

ATARI 1040 STF (mono system) £549

AMIGA 500 £510

(with colour monitor £825)

(inc. VAT & carriage)

Ring for best prices on all makes.

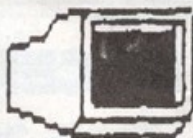
Phone: THETA COMPUTERS NOW!

Tel: 0943 816133 (329)

FOR SALE

THE COMPUTER DEPOT

205 Buchanan Street
Glasgow G1 2JZ
Tel: 041-332 3944



COMMODORE +4

64K computer
datasette
disc drive
joystick
and software

★ ONLY £99.95 ★

A veritable Aladdin's cave for the computer lover
Visit or telephone

SCOOP PURCHASE

12in. Green Monitor
Ferguson MMO2

★ ONLY £49.95 ★

Suitable for Commodore, BBC,
Electron, IBM, Amstrad PC,
Spectrum, Atari, etc.
(Specify type of lead.)



(301)

NEED HELP? . . . well, read on

If you are an owner of Amstrad CPC or PCW, and don't ever get a chance to help other users, write reviews or air your opinions — NOW YOU CAN.

Amstrad CPC Newsletters and PCW File provide these opportunities and include hints and tips to keep you going!

But the best part is, it's *NON-PROFIT MAKING* CPC Newsletters are £5 for 6 and PCW files are £7 for 6 *FANTASTIC* issues. And, of course, you get access to the Public Domain Library *ABSOLUTELY FREE!!*

What more could you ask for? Give it a go and you'll be back for more and more.

Send for a sample, just enclose a SAE you'll be very surprised.

Amstrad Computing Newsletters CPC Newsletter + PCW File

Mr. C. A. BRYANT,

11 Havenview Road, Seaton, Devon EX12 2PS

"Give me a call on 0297-20456 after 7 or anytime Sunday"

NEWSFLASH: We've just merged with the PCW User Group in Coventry, giving you a bigger, wider and better service!

SERVICES

FAULTY SPECTRUM?

As you are probably aware from press reports Sinclair Computers no longer have a repair department.

Our computer repair workshop has been an **OFFICIAL** Sinclair Repair Depot for the past six years and we are pleased to announce that we will continue to do your out of guarantee repairs as in the past.

Send your faulty computer **DIRECT**

SPECTRUM	£18.75 inc parts
ZX81	£11.50 inc parts
16K RAM	£9.95 inc parts
MICRODRIVE	£15.95 inc parts
INTERFACE 1-11	£18.75 inc parts

CALL OR SEND WITH CHEQUE OR P.O.

T.V. SERVICES OF CAMBRIDGE LTD
FRENCH'S ROAD, CAMBRIDGE CB4 3NP
Tel: 0223 311371

28TV

COMPUTER REPAIRS

Fixed Super Low Prices!

Inclusive of parts, labour and VAT



FIRST AID
FOR
TECHNOLOGY

1 week turnaround
Free collection/delivery available for local area

★ INTRODUCTORY OFFERS ★

SPECTRUMS	£14 inc. + Free Game
C64	£22 inc. + Free Game
C16	£18 inc.
VIC20, C+4	£22 inc.
BBC	£32 inc.
ELECTRON	£19 inc.
AMSTRAD 464	£32 inc. + Free Game
C & N CASSETTE UNITS	£19 inc.
C64 P.S.U. FOR SALE	£20 inc.

Please enclose payment with item — 3 month warranty on repair
Please enclose advert with repair

W.T.S. ELECTRONICS

(182)

5-9 Portland Road, Luton, Beds LU4 8AT. Tel: 0582 458375. Telex: 265871

PROBLEMS WITH YOUR COMPUTER?

**AMSTRAD — ATARI —
MSX — SINCLAIR!**

**FOR FAST, RELIABLE AND
PROFESSIONAL REPAIRS AT
COMPETITIVE PRICES**

CONTACT:

PM ENGINEERING

UNIT 8, NEW ROAD, ST IVES,
CAMBRIDGESHIRE PE17 4BG

ST IVES

(0480) 61394

(345)

FAST COMPUTER REPAIR CENTRE — IN LONDON

*BBC Micro, Commodore, Spectrum

*Amstrad, Others

*We sell spare parts

*Used Micros bought and sold

*Eprom Programming Service

Phone: 01-863 7166

PROMPT ELECTRONICS

Unit 4, 15 Springfield Road,
Harrow, Middx HA1 1QF
(entrance in Amersham Road) (70)

400/800 **LOOK** NOW
XL/XE **ATARI OWNERS** ST

Are you having difficulty finding suitable software? If so, then look no further. We have available for both hire and purchase one of the largest selections of both UK and American titles to choose from. Games and Utilities for all ages. Hardware and add-on utilities at discount prices and special deals regularly being offered. If you would like further information please send a large S.A.E. to:
CHARWOOD PRODUCTS AND GAMES
30A Warwick Avenue, Queens, Loughborough
Leicestershire LE12 9HS
Tel: 0509 412502

SPECTRUM REPAIRS

48k Spectrum faults	£17.00
48k Spectrum KB faults	£12.00
4184 memory ic	90p
4188 memory ic	80p
280 cpu	£2.10

ALL PRICES INCLUDE VAT
AND POSTAGE

RA ELECTRONICS

133 London Road South,
Lowestoft, Suffolk NR33 0AX
Tel: 0502 66289 (307)

EAST LONDON MICRO SERVICE CENTRE

Spectrum, Commodore, Amstrad,
Atari, MSX plus peripherals.

Turnaround typical of 2-5 days.

Three months warranty
guaranteed.

Postal repairs undertaken.

Computer IC's components sold.

Budget games, software and
accessories sold. Mail order
welcome. Trade enquiries
welcome.

Open 9am-8pm Mon.-Sat

SAN ELECTRONICS

63 Plashet Grove, East Ham
London E6 1AD

Tel: 01-472 4871

Four minutes walk from Upton Park Tube Station.
(358)

OXFORD HARD DISCS

OXFORD HARD DISCS, KINGS COPSE
PARK, GARSINGTON, OXFORD OX9 9EU
TEL: 0865 66471

Low cost Networking
from £279 per PC

52Mb external
Streamer £450

PC16/40 ECD in
stock 20Mb hard
card £285

30Mb hard card
£315

PC1512 Mono 20Mb	£798
PC1512 Mono 30Mb	£830
PC1512 Colour 20Mb	£930
PC1512 Colour 30Mb	£960

20Mb Seagate + Controller £285
30Mb Seagate + RLL Controller £325
40Mb Seagate + Controller £541

Installation takes 30 minutes;
all kits supplied with PC1512 mounting
brackets; all discs supplied formatted and
configured; installed your CPU £30 + P.&P.

TELEX KIT £50 EXTRA

(359)

EXCEPTIONAL VALUE

5.25" DS DD DISKS
£12.50 per 25 disks

NO QUIBBLE GUARANTEE

Cheques or POs to:
DAYTADISC

Uplands Cottage Four Ashes Road
High Wycombe, Bucks
Tel: 0494 712324

(351)

DISK SALE

10 3.5" DISKS FOR
ONLY £10.95 INC.

Description	Quantity	Price
3.5 DS/DD	10	£11.95 inc.
3.5 SS/DD	10	£10.95 inc.
Storage Box (10 disks)	1	£1.50 inc.

All disks by top manufacturers with a lifetime guarantee.
Remember price includes VAT & postage.
For Same Day Express Dispatch (1st Class Post) add £1/10 disks.
E.C. customers please add £1 extra postage/10 disks.
Quantity discounts - please call.



Athene Consultants

33 Holly Grove,
Fareham, Hants PO16 7UP.
Tel: 0329 282083

(323)

BLANK CASSETTES

WITH LIBRARY CASES

	C10	C15	C20	C30
20	7.50	7.70	7.90	8.70
50	16.00	16.20	16.90	18.50
100	29.00	30.00	31.00	35.00

Fully Inclusive (C.O.D. £1 extra)

DISKS

10 5 1/4 DS/DD
£6.50 inc. case
10 3 1/2 SS/DD
£16 inc. case
10 3" AMSOFT
£26 inc. case

MEMOTECH COMPUTERS
AND ACCESSORIES

MTX 512 COMPUTER	£43.00
DMX 80 PRINTER	£150.00
RS232	£30.00
PASCAL ROM	£30.00
SPECULATOR ROM	£30.00
1 mb. DISK DRIVE & INTERFACE	£160
1 mb. DISK DRIVE & INTERFACE	£160

All the above prices are fully inclusive. We stock the entire Memotech Range. Order/Enquiries to:

UK HOME COMPUTERS
82 CHURCHWARD AVE, SWINDON,
WILTS SN2 1NH
24-hr Phone Service 0793 695034

Atari 800 XL / 130 XE
Essential Utilities

Transdisk Version 3.0

The most powerful tape to disc system for the Atari now made even better. Transfers commercial, machine code, "boot" cassette games or any other software to disc. Single, multi-stage and now even non-standard format tapes present no problem to Transdisk. Plus, enjoy the convenience of loading and running your newly transferred software from an automatic disc menu. No other tape to disc utility for the Atari is as powerful or successful as this! £19.95 inc. Supplied on disc with instructions.

The Freezer!

An amazing new utility for the Atari! "Freezer" programs while they are RUNNING on your computer. The Freezer then takes over control and allows you to make a back-up copy of the frozen program. The back-up copy will load, and restart from the frozen point, on ANY Atari XL/XE computer, independent of The Freezer! Freezes disc OR tape programs even those that are heavily protected! Easy to use - hit one key to freeze the program in memory then insert a blank disc and hit another key to save it - that's it! £19.95 inc.

Send an S.A.E. or phone for more details of these utilities.

Special offer order both programmes for £35.00

Make Cheque or P.O. payable to DIGICOMM and send your order to:

DIGICOMM

170 Bradwell Common Boulevard, Milton Keynes, Bucks MK13 8BG. Tel: 0908 663708. (121)

FOR SALE

STOP YOUR BALLS
SLIPPING!

Get the E.C.L. mouse pad and release the full potential of YOUR mouse.

Only £3.95 incl. P&P & VAT from:

EAST COAST LEISURE
30 Scarborough Road, Filye
North Yorkshire YO14 9EF

(346)

ATARI ST
PUBLIC DOMAIN

Why reinvent the wheel? We have a large selection of languages, demo's, utilities, comm's and games etc., available. A stamp for our list will save you hours of frustration. No membership fees.

Discs from £3.00 to £4.50

MCISOFT

9 Abingdon Gardens, Bath,
Avon BA2 2UY (178)

RIBBONS

ALADDINK

FABRIC RIBBON CASSETTE RE-INKING

Trial offer: £1 per ribbon

Post used cassettes with payment to:

ALADDINK (Dept PC),
4 Hurkur Crescent, Eyemouth,
Berwickshire TD14 5AP
Tel: 08907 50965 (338)

LABELS

Self Adhesive
Disk & Cassette Labels

DISK LABELS - 3" & 3 1/2" Disk labels, 71 x 69 mm, on tractor feed backing for computer overprinting. White: 500 - £15.55, 1000 - £22.05, 2000 - £25.69. Tinted labels in - Blue, Pink, Grey, Cream, Yellow, Orange, Green: 500 - £21.35, 1000 - £31.05, 2000 - £43.63.
5 1/4" Disk, 95 x 36 mm, White: 500 - £12.75, 1000 - £17.75, 2000 - £20.56. Tints as above: 500 - £15.20, 1000 - £24.65, 2000 - £34.36.

CASSETTE LABELS - On tractor feed backing. Rolls of 500 labels, White - £14.66, Tinted - £16.90. A4 sheets, 12 labels per sheet, 100 labels - £3.50, 200 - £6.00, 1000 - £21.85

All prices are inclusive of VAT & carriage.

We are specialist computer label makers and can provide printed labels in 24/48 hrs. For price list and sample brochure of our full range of self adhesive micro computer labels plus details of quantity discounts

☎ Sittingbourne (0795) 28425 (24 hrs)

Industrial Process

Unit A4
Smead-Dean
Centre
Sittingbourne
Kent ME10 3RN

Self Adhesive Labels - **SUPERFAST**

DUPLICATION

We now OFFER THE FOLLOWING: data/audio cassette duplication for most computers; Disc duplication (£5.25); blanks; PHOTOCOPIED LABELS & INLAIS PRINTED, with your LOGO, or dot-matrix.

Price list from: **SSP**,
20 Westland, Lutterton, Near Bicester,
Oxon OX9 0DF.
Tel: 0869 252831 (283)

BULLETIN
BOARDS

WIZARD

0703 631431 (300/300) 6pm-midnight

Eight words, no parity, one-stop bit. Sections on-line. (Coms/Hackers hotline). Information, Intelligence, Oracle. (Bright ideas, bloomers, club spot etc). Electronics and computing mailboxes and much, much more to come!!! (347)

EDTX 81Z

From Softworks

Atari 520/1040 ST Voice editor for Yamaha TX81Z

Fully mouse controlled * Edit or parameters (fine) * Performance and micro-tune * Choice of graphic or alphanumeric voice editing.

Price £49.95 inc. VAT and P&P

Available mail order only

SOFTWORKS

32 Chalcot Rd, London NW3 8LP

TRADE ENQUIRIES WELCOME (354)

M

CRO
SLE

1 THE SOUTH EAST

SOUTHEND-ON-SEA

ESTUARY PERSONAL COMPUTERS

Commodore's Amiga A500 available NOW. Call for price.
Also Atari ST, Amstrad, Spectrum and Acorn Computers
and software stocked.

Software at discount prices.

Victoria Circus Shopping Centre
(escalator from railway station)
Southend on Sea

Tel: (0702) 614131

(289)

WEALDSTONE



**We specialise in
ATARI
hardware and software**

Video & Software
(Inside Osprey Business Computers)
5 The Bridge, Wealdstone
Middlesex, HA3 5AB
01-861 2407

(280)

FARNHAM

FARNHAM COMPUTERS

We are dealers for:

**AMSTRAD
ACORN
ATARI ST**



For your computer,
software and peripherals
requirements.

Call us for prices:

1 South Street, Farnham Surrey.
Tel: 0252 723107

(327)

LONDON

TRIANGLE TELEVISION

The Amiga specialist

- ★ A500 and A2000
- ★ Full range of peripherals
- ★ Full range of software
- ★ Video/Graphic Specialists

Phone for details

130 Brookwood Road,
London SW18 5DD
Tel: 01-874 3418



(322)

LONDON

DIGITAL SHADES LTD

East London's No. 1 Amiga
and Atari ST specialists.
We specialise in Atari STs,
Amiga 500s, hardware,
software and peripherals.

- ★ A500 + Starter Kit and
Modulator £529
- ★ 520 STFM plus Starter Kit. £370

9 Selsdon Road, Upton Park
London E13 9BY
Tel: 01-471 7969

(357)

3 SCOTLAND

MEGABYTE

Scotland's fastest growing
ATARI Centre

Atari's always in stock!
Come and see us for the latest
and greatest IBM compatibles.

12 Ettrick Square, Town Centre,
Cumbernauld G67 1ND
Hotline: 0236 738398

(274)

GLASGOW COMPUTER CENTRE

Atari appointed dealer
and Service Centre

Specialists in Atari ST Computers

VIRGINIA GALLERIES

(1st FLOOR)

33 VIRGINIA STREET
GLASGOW G1 1TU

TEL: 041-552 1522

(126)

DEALERS!

You can reach 40,000 readers for as little as £25 a week!
For more details phone Susannah on (01) 437 4343

2 THE MIDLANDS AND NORTHERN ENGLAND

LANCASHIRE

AMSTRAD MAIN DEALER

Entire Range Ex-stock, plus Stationery, Accessories, Supplies, Upgrades, Software, Repairs

Vast Printer Range Ex-Stock
Dot Matrix 80col 100cps from £130
Lasers 8ppm under £1,600

Training Courses and Maximum Help for First Time Users

Authorised **AMSTRAD** Business Dealer
Approved **AMSTRAD** Service Centre

MICRO-TECH

Tel: 061-797 6419 (24 hours)
Fountain St, Bury, Lancs BL8 2NS

(331)

SHEFFIELD

SOFTLINE

Yorkshire's leading ST and
Amiga dealer

1st Floor
19-21 Division Street,
Sheffield S1 4OE
Tel: 0742 757070

Mail Order Hotline:
0742 750969

(278)

LIVERPOOL

CITY SOFTWARE

Specialists in:
**AMSTRAD
COMMODORE
ATARI
SOFTWARE
AND HARDWARE**

66 Lime Street,
City Centre, Liverpool
Tel: 051-708 7100

(263)

MANCHESTER/HINCKLEY

COMLEX SPECIAL PRICES WITH THIS AD! AMSTRAD SUMMER DEALS

Including twin floppy, Supercalc, Wordstar printer - £649; Colour version add £159; with Tandon 20 Meg hard card add £199. All prices + VAT - phone for others not listed.

AMSTRAD PC

1DD Mono	£423	20Mb Upgrade for Amstrad PC (fitted if required)	£345
2DD Mono	£522	Amstrad 1512 Mono (20Mb Seagates)	£760
1DD Colour	£567	640K Memory	£899
2DD Colour	£666	Amstrad Colour 1512 (20Mb Seagates)	£899
20Mb Mono	£833	640K Memory	£899
20Mb Colour	£977	Amstrad 128K memory upgrade	£29

SUMMER SPECIALS

Tandon PCA20	£1349
Mini Scribe 30 Meg card	£299
Tandon 20 Meg upgrade	£255
Tandon 20 Meg business card	£255

PRINTERS

Epson LX8000	£189
Star NL10	£199 inc. interface
Citizen 1200	£149

ATARI

520STX	£205	520STFM + Philips colour Hi-res	£556
520STFM	£305	1040STF + mono	£556
520STX + mono monitor	£390	1040STF + Philips colour Hi-res	£722

COMMODORE

Amiga 500	£25	Amiga Bridge + S1	POA
Amiga 500 modulator	£25	PC Double Disk Drive	£799
Amiga I	£949	PC One Disk Drive 20Mb	£1099
Amiga II	£1049	AT 20Mb 1.2 Disk Drive 20Mb	£1775
Amiga 2000 1Mb	POA		

GOVERNMENT AND EDUCATIONAL ORDERS WELCOME.
EXPORT ENQUIRIES WELCOME
STANDARD DELIVERY £5 AND NEXT DAY £9.50 - ADD 15% TO ORDER TOTAL
Complex House, 28 Bradgate Road, Hinckley LE10 1LA
(0455) 635583. Manchester 061-976 3763

KEIGHLEY

For your personalised software and
computer rentals

NORTHERN DATA SERVICES



Also special offers on floppy discs -
Only 40p each!

Airdale House, Campbell Street,
Keighley BD21 3AA
Tel: 0535 609456

(348)

3 SCOTLAND



THIS MONTH SPECIAL ALL CASCADE SOFTWARE REDUCED BY
30% OR MORE

TITLE	FORMATS									RRP		RRP		
	C64	C16	P1/A	VIC20	SP48	AMS	PCW	ATARI	IBM/PC	APPLE	DISC	CASS	DISC	CASS
Acc	*	*	*	*	*	*	*	*	*	*	12.95	9.95	9.95	6.95
Slip Runner	*	*	*	*	*	*	*	*	*	*	12.95	9.95	9.95	6.95
Activator	*	*	*	*	*	*	*	*	*	*	12.95	9.95	9.95	2.95
Question	*	*	*	*	*	*	*	*	*	*	12.95	9.95	9.95	2.95
Dice 50	*	*	*	*	*	*	*	*	*	*	14.95	10.45		
Cassette 50	*	*	*	*	*	*	*	*	*	*			8.95	6.95
Life Of Harry	*	*	*	*	*	*	*	*	*	*			8.95	2.95
Ice Butters	*	*	*	*	*	*	*	*	*	*			8.95	2.95
Davey	*	*	*	*	*	*	*	*	*	*			8.95	2.95
3D FREE	*	*	*	*	*	*	*	*	*	*			8.95	2.95

*+ PCW/PC DISC RRP £19.95 OUR PRICE £13.95

SEND FOR OUR CATALOGUE OF OVER TWO THOUSAND TITLES ALL AT DISCOUNT PRICES
ALL PRICES INCLUDE POST & PACKING UK ONLY. EXPORT ORDERS WELCOME

COMSOFT SUPPLIERS OF HARDWARE AND SOFTWARE FOR THE AMSTRAD COMPUTER
COMSOFT HOUSE, 48 DUKE STREET, COLDSTREAM, BERWICKSHIRE TD12 4LF
TEL: 0890 2979. 24-hour order service on 0890 2854

(349)

NORTH YORKS

THE COMPUTER SHOP Special Summer Offers!

- ★ On Spectrum products.
- ★ 20% off all Atari ST and Amstrad CPC and PCW software.
- ★ Callers welcome to view our range of software and accessories too numerous to mention here.

224 High Street, Northallerton
North Yorkshire DL7 8LU
Tel: 0609 774129

(356)

ELLAND

M.F.B. COMPUTERS

Sales and Service of all
Amstrad computers.
Fast repair service for all
leading makes of computer.

Microtronics
14 Victoria Road
Elland
West Yorks
Tel: 0422 76698

(303)

MANCHESTER

MIGHTY MICRO

Computer Supermarket
All items on display
Atari ★ Amiga ★ BBC
IBM compatibles,
printers, disc drives,
books, modems, cables
add-ons and software.
Mail order and export
welcome.

Mighty Micro,
268 Wilmslow Rd,
Fallowfield,
Manchester M14 6WL.
Tel: 061-224 8117

(300)

5 WALES

ABERDARE

VETA LTD

Your one stop computer shop.
Business/home computers
and software.

Micro-Repairs
Mail order service
13 John Street, Abercwmboi, Aberdare,
Mid Glam CF44 6BL. Tel: 0443 47 8777
★ Special offer while stocks last ★
Amstrad PC1512 DDCM £775 incl. VAT
Delivery free UK mainland only

(319)

Your complete guide to all the software released this week

Amstrad CPCs

Program *GPack Patrol Type* Arcade **Price** £1.99 **Supplier** Firebird, 64-76 New Oxford Street, London WC1A 1PS.

Program *Black Magic Type* Arcade **Price** £9.99 tape, £14.99 disc **Supplier** US Gold, Units 2/3, Holford Way, Holford, Birmingham B6 7AX.

Program *Boulder Dash Type* Arcade **Price** £2.99 tape, £4.99 disc **Supplier** Prism Leisure, Unit 1, Baird Road, Enfield, Middlesex EN1 1SJ.

Program *Mission Genocide Type* Arcade **Price** £1.99 **Supplier** Firebird, 64-76 New Oxford Street, London WC1A 1PS.

Would you believe it, another shoot 'em up.

Program *Convoy Raider Type* War Game **Price** £9.99 tape, £14.99 disc **Supplier** Gremlin Graphics, Alpha house, 10 Carver Street, Sheffield S1 4FS.

Atari XL/XE

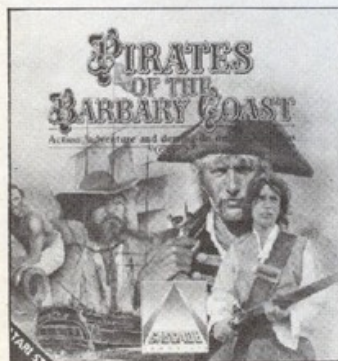
Program (Atari 800 only) *Pirates Of The Barbary Coast Type* Simulation **Price** £9.95 disc only **Supplier** Cascade Games, Harrogate, North Yorkshire.

Program *Boulder Dash Type* Arcade **Price** £2.99 tape, £4.99 disc **Supplier** Prism Leisure, Unit 1, Baird Road, Enfield, Middlesex EN1 1SJ.

Program *Boulder Dash 2 Type* Arcade **Price** £2.99 tape, £4.99 disc **Supplier** Prism Leisure, Unit 1, Baird Road, Enfield, Middlesex EN1 1SJ.

Atari ST

Program *Pirates Of The Barbary Coast Type* Simulation **Price** £12.95 disc **Supplier** Cascade Games, Harrogate, North Yorkshire.



BBC B/B+

Program *The Hunt - Search For Shauna Type* Adventure **Price** £9.95 disc **Supplier** Robico Software, 3 Fairland Close, Llantrisant, Mid Glamorgan CF7 8QH.

See panel for comment.



Electron

Program *Stryker's Run Type* Arcade **Price** £9.95 tape only **Supplier** Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX.



The original version of this was one of the best arcade games released for the BBC. It's now available for the Electron and probably an essential buy.

Program *Panik! Type* Arcade **Price** £1.99 **Supplier** Atlantis Software, 28 Station Road, London SE25 5AG.

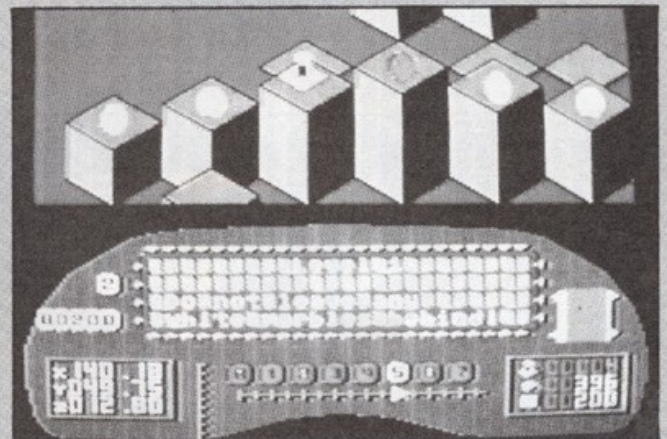
Slightly less essential, but still worth buying because it's so cheap and you may not have an Electron version of this particular game. This is a version of the old arcade game

where you run up and down ladders and across platforms, digging holes to trap the monsters that are chasing you.

Program *Zolyx Type* Arcade **Price** £1.99 **Supplier** Firebird, 64-67 New Oxford Street, London WC1A 1PS.

Commodore 16/ Plus 4

continued on page 43 ►



I always worry about having to review Martech games because I generally either like them a lot or can't stand them at all. Fortunately, *Catch 23* falls into the first category, despite being one of those wire frame graphics jobs that have been done to death of late.

The game is set on an island where a top secret weapon, the CK 23 is being developed. It is your task to penetrate the development complex, steal the plans for the CK 23 and then sabotage a nuclear reactor in order to destroy the entire island.

You've been dropped onto the island by parachute with only a few hours to complete your mission. It is 2200 hours so it's dark, but fortunately you are equipped with a sightloss image enhancer which gives you a 3D image of the island around you (hence the wire-frame graphics), as well as a sophisticated information display that gives you a readout on your status, and on military activity in the immediate area.

You won't be surprised to hear that this activity is mostly armed patrols, both foot soldiers and armoured tanks, that are searching for intruders and will shoot on sight. The island itself is divided into 14 zones, some containing marsh or forest, whilst in others there are deserted villages or military facilities.

The size of the island makes it impractical to cover by foot, but there are shuttles connecting various points which can save you a lot of time.

In any location you can examine the buildings by entering Investigation mode, which will let you know if it is possible to enter or not, and inside there may be items such as explosives or spare ammunition that can help you complete your mission. Another option is Bomb mode, which is fairly self explanatory, I think.

There is also a resistance group on the island, but they have gone underground so you'll need to look for information about them as you explore.

Obviously in a game of this sort the quality of the graphics is important, and thankfully Martech have managed to avoid the jerkiness that affects some wire-frame games, though to do this they have had to slow things down just a little.

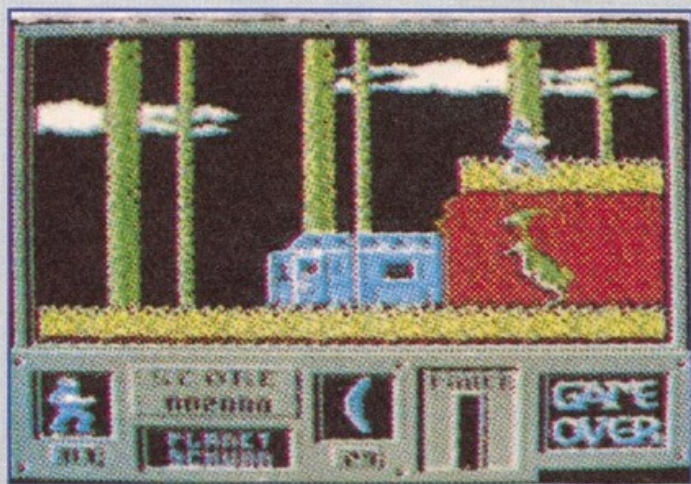
If you're looking for a super-fast shoot 'em up then *Catch 23* probably isn't the game for you, but if you want something that will take a bit of thought and keep you absorbed while we're all waiting for the summer to come back, then it might well be worth a look.

Cliff Joseph



GAME OVER!

Another addictive shoot 'em up from Imagine that we've become hooked on . . .



The first time I looked at a version of *Game Over* (for the Amstrad) I wasn't wildly impressed. The graphics were quite nice, but there didn't seem to be anything special about it that made it stand out from all the other shoot 'em ups.

It also appeared to suffer from one of my big bugbears, the 'go back to the start each time you die' syndrome, which means that you spend hours and hours going through the same old screens over and over again, just to spend ten seconds on a new screen before you die and then have to start all over again.

Then, finished versions of the game arrived for Spectrum, C64 and Amstrad machines and somehow or other I found myself getting hooked on the Spectrum version (isn't life strange sometimes?).

It just goes to show how misleading pre-production copies of games can be, especially when the instructions haven't been written . . .

Imagine's computer games have evolved to the point where the instruction sheet now retains only a vestigial plot, which in this case goes along the lines of:

You, Arkos, have to kill the mad queen, Gremla.

That's it. As usual though, before you can reach this obligatory bad person you have to

fight your way past an almost endless stream of monsters and mechanical defences.

There are two parts to the game. The first, on the planet of Hyspis consists of 25 screens which you have to travel through by blasting your way across the screen from left to right.

This planet is guarded by robots, green monsters, laser turrets, gunships, a large green thing called a Giant Orko, and, the final obstacle, three giant robots.

None of these are instantly fatal, but if they shoot at you or come into contact with you they all drain different amounts of energy. You can recharge your energy, as well as your weapons by shooting your way into the barrels located at various points along the way.

The landscape that you travel across consists of a variety of platforms, pits, and lifts, and you can run, jump or crouch as you attempt to dodge the various obstacles in your way.

Once I'd got a finished copy of the instructions I realised that you don't always have to go back to the start when you get killed. You do have to do this during the first eleven screens, but after defeating the Orko on screen eleven new life continues from that point.

If you complete the first part of the game you'll be given the

code word that allows you into part two.

The planet Skunn is a bit more complicated. Instead of being a simple left-to-right landscape, it consists of two areas, the palace and the forest, the different levels of which are interconnected both horizontally and vertically.

The monsters on this planet are a bit more dangerous, the final one being the Giant Guardian that can absorb tons of laser blasts and has to be destroyed one bit at a time before letting you reach the end of the game.

Strangely enough, out of the three versions that I've played, the Spectrum is the best. The C64 version is a bit sluggish, while the Amstrad one is only slightly faster, though it does

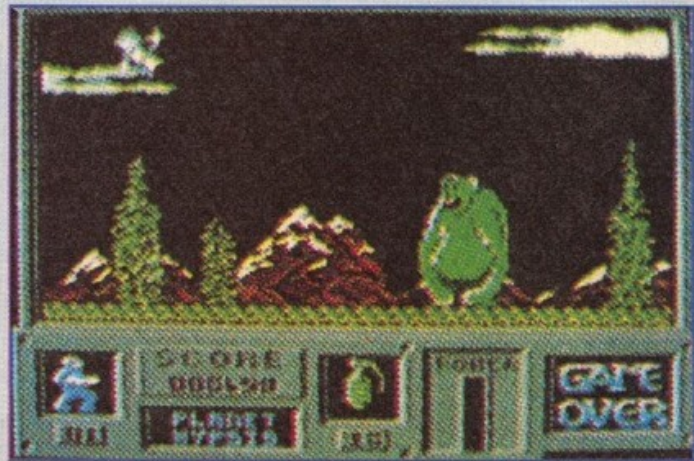
give perhaps the best graphics of the three.

However, despite the least attractive graphics (and some pretty bad attribute problems which result in Green Monsters that are often any colour except green), it's been the Spectrum version that I keep going back to in an attempt to finish the game off.

It's clearly the fastest of the three, and the one with the smoothest response to your controls.

The difference between the three versions is quite marked in fact, so that while the Amstrad and C64 versions are outstanding, shoot 'em ups, it's the Spectrum one that really ought to be a hit.

Cliff Joseph



◀ continued from page 41

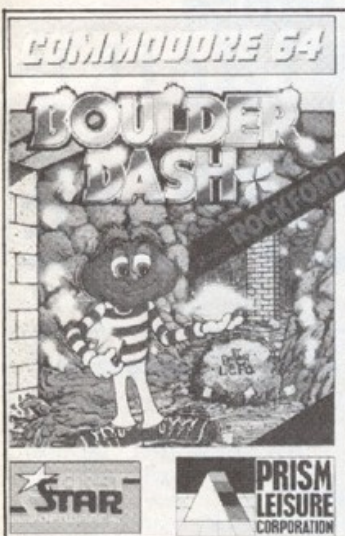


Commodore 64

Program Station Fall Type Adventure **Price** £24.99 disc **Supplier** Infocom/Activision, 23 Pond Street, London NW3 2PN.

The latest adventure from Infocom, and they're back on top form for the first time since *Hitch-Hiker* (and by the same author). *Station Fall* is the sequel to *Planet Fall*, and again features Floyd The Droid as your faithful companion, as you attempt to unravel the mystery of a deserted space station.

Program Boulder Dash Type Arcade **Price** £2.99 tape, £4.99 disc **Supplier** Prism Leisure, Unit 1, Baird Road, Enfield, Middlesex EN1 1SJ.



Program Boulder Dash 2 Type Arcade **Price** £2.99 tape, £4.99 disc **Supplier** Prism Leisure, Unit 1, Baird Road, Enfield, Middlesex EN1 1SJ.

Program Black Magic Type Arcade **Price** £9.99 tape, £14.99 disc **Sup-**

plier US Gold, Units 2/3, Holford Way, Holford, Birmingham B6 7AX.

Program Decathlon Type Sports Simulation **Price** £1.99 **Supplier** Firebird, 64-76 New Oxford Street, London WC1A 1PS.

An old Activision title re-released by Firebird, containing ten sports events for up to four players. Sports games have been done to death recently, but this one was very popular when it was first released and is good value at its new price.

Program Death Race Type Racing Simulation **Price** £1.99 **Supplier** Atlantis Software, 28 Station Road, London SE25 5AG.



A sort of budget version of *Pole Position*. Not as sophisticated as some other racing games, but reasonable for the price.

Program Re-Bouncer Type Arcade **Price** £9.99 tape, £14.99 disc **Supplier** Gremlin Graphics, Alpha House, 10 Carver Street, Sheffield S1 4FS.

Sequel to Gremlin's *Bouncer* game. You control a ball bouncing over a landscape covered in traps and obstacles and have to reach safety at the end of the course. It's a bit more complicated than *Bouncer*, as you can now fire back at some of the airborne hazards, and you have to touch down on pumping stations from time to time to keep the ball's air pressure up. I found both *Bouncer* and *Re-Bouncer* difficult to play as I couldn't get to grips with the bouncing motion, but I know that a lot of people found *Bouncer* very addictive and they should enjoy the sequel just as much.

Re-Bouncer will only be available on the 64, as there are no conversions planned at the moment.

Program Rebel Type Arcade **Price** £9.95 **Supplier** Virgin Games, 2-4 Vernon Yard, Portobello Road, London W11 2DX.



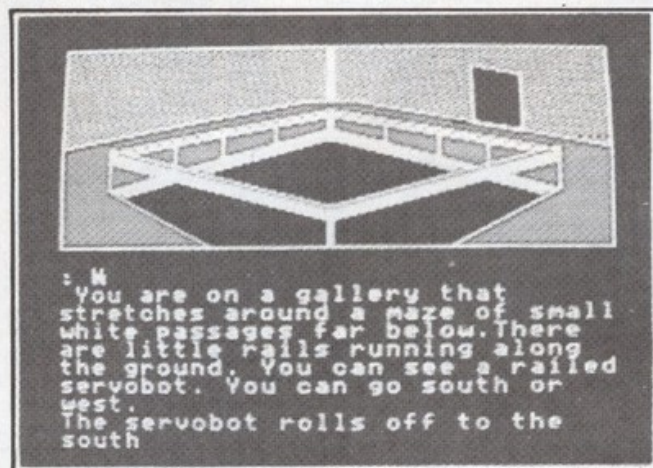
Program Pirates Of The Barbary Coast Type Simulation **Price** £9.95 disc **Supplier** Cascade Games, Harrogate, North Yorkshire.

Program Convoy Raider Type War Game **Price** £9.99 tape, £14.99 disc **Supplier** Gremlin Graphics, Alpha House, 10 Carver Street, Sheffield S1 4FS.

IBM PC and Compatibles

Program K-Data Type Database

continued on page 45 ▶



This is almost a brilliant game. *Pile Up!* is on the Reaktor label, and while it doesn't quite live up to its potential it's still quite an interesting novelty.

The idea behind it is that on a faraway planet there is a large chessboard-like grid, and resting on some of the squares of this grid are strange marbles which are a valuable source of power. But instead of being a simple flat surface this grid is made out of columns which rise up and down at random, giving the landscape the appearance of a whole series of skyscrapers of different heights.

It is your task as a marble pilot (who writes this stuff?) to fly onto the grid in your skimmer and collect as many marbles as you can, transporting them to the power transfer station nearby. The height of the columns affects the power levels in the marbles, so you have to collect them in a certain order, and the marbles themselves are highly explosive so that you have to fly around the columns on the grid very carefully.

There's not much more to it than that, and although the plot might sound a bit odd the action is more or less a matter of flying back and forth across the grid. But what made this fairly limited scenario quite enjoyable to play is the responsiveness of your little skimmer.

The joystick controls the direction of travel, and the fire button controls your altitude, and the skimmer swoops and swerves around all the columns like Chris Reeves in a *Superman* film (accompanied by suitably whooshy sound effects). It's such a smooth action that flying across the grid is fun even if you're just flying back and forth repeatedly.

It's a pity that the programming behind *Pile Up!* hasn't been put into a more ambitious game, because if the skimmer was a bit larger and the landscape were more extensive and populated with a few megalomaniac aliens you'd have the makings of a good shoot 'em up. As it is, *Pile Up!* is an interesting idea, but not quite a chart-topper.

Cliff Joseph



COMMERCIAL AND COMPUTER SERVICES LIMITED 01 549 3028

Amiga Titles	29.00	Leaderboard	20.00	Colourspace	16.00
Bureaucracy	29.00	Leaderboard Tour	20.00	Cards	16.00
Golf	20.00	Mean 18	24.00	Electronic Pool	16.00
Hacker	20.00	Super Huey	15.00	Flipside	16.00
Portal	24.00	Apshai Trilogy	20.00	Goldrunner	20.00
Shanghai	20.00	World Games	20.00	Karate Kid II	20.00
Tass Times	20.00	Amiga Games	10.00	Lands Of Havoc	16.00
Witness	25.00	Atari ST		Major Motion	16.00
7 Cities Of Gold	25.00	Hardware		Mud Pies	16.00
Archon 2	25.00	520 STFM	355.00	Pinball Factory	20.00
Adventure Cons. Set	25.00	520 STFM 1 Colour	605.00	Super Conductor	35.00
Arctic Fox	25.00	1040 STFM	585.00	Time Bandits	25.00
Marble Madness	25.00	1040 STFM Mono	685.00	Trivia Challenge	15.00
One To One	25.00	Hard Disk (SH204)	685.00	Silent Service	20.00
Skyfox	25.00	Mono Monitor	135.00	Crusade In Europe	20.00
The Pawn	20.00	Commodore		F15 Strike Eagle	16.00
Guid Of Thieves	20.00	Amiga Hardware		Ultima III	20.00
Faery Tale Adventure	39.00	Amiga 500	499.00	Balance Of Power	25.00
Borrowed Time	20.00	Colour Monitor	399.00	Black Cauldron	30.00
Bahthoo	24.00	External Drive	249.00	Kings Quest 2	30.00
Cut Throats	24.00	Amiga 2000	1150.00	SDI	35.00
Deadline	24.00	3.5" Discs		Hades Nebula	16.00
Enchanter	24.00	Single Sided (White)	99p each	Mercenary	20.00
THHGTG	24.00	Double Sided (Blue)	145p each	Arkand	20.00
Infidel	24.00	Atari ST Titles		Chess	20.00
Leather Goddesses	24.00	Garrett	20.00	Football Fortunes	20.00
Mindshadow	27.00	GLF Football	20.00	Golden Path	30.00
AMFV	24.00	Macadam Bumper	17.00	Arena/Brattacus	30.00
Moon Mist	24.00	Art Director	42.00	Deep Space	30.00
Music Studio	24.00	Film Director	50.00	Jewels Of Darkness	20.00
Planetfall	24.00	Fleet St. Publisher	100.00	Guid Of Thieves	20.00
Seastalker	24.00	Borrowed Time	20.00	The Pawn	20.00
Sorcerer	24.00	Basketball	20.00	Games Compendium	20.00
Spellbreaker	24.00	Bureaucracy	20.00	Check Mate	12.00
Starcross	24.00	Hacker 2	20.00	Terrestrial Encounter	12.00
Suspect	24.00	Little Comp. People	20.00	Liberator	10.00
Suspended	24.00	Shanghai	20.00	Housetrap	12.00
Trinity	27.00	Tass Times	20.00	Plutos	12.00
Witness	24.00	Strip Poker	15.00	Timeblast	8.00
Wishbringer	24.00	Skyfox	20.00	Apshai Trilogy	20.00
Zork I	24.00	Bridge Player 2000	15.00	Alternate Reality	20.00
Zork II	24.00	ST Karate	15.00	Dungeon Reality	20.00
Zork III	24.00	Protector/Station	20.00	Championship Wrestling	20.00
Silent Service	20.00	Pro Sound	45.00	Phantasia II	20.00
Ultima III	20.00	Wer Zone/Fireblaster	20.00	Dungeongame	20.00
Balance Of Power	30.00	Jewels Of Darkness	12.00	Questprobe	15.00
Defender + Crown	35.00	Star Glider	20.00	Roadrunner	24.00
Deja Vu	30.00	Trailblazer	20.00	Roadwar 2000	20.00
Sinbad	30.00	Typphoon	15.00	Rogue	20.00
SDI	24.00	Passengers	17.00	Super Huey	15.00
Uninvited	24.00	Phoenix	17.00	Super Cycle	20.00
Arena/Brattacus	25.00			Super Tennis	20.00
Deep Space	24.00			Winter Games	20.00
Silicon Dreams	15.00			World Games	20.00
Starglider	20.00				
Hollywood Poker	15.00				
Swooper	15.00				

Please make cheques payable to: Systems Architects Ltd. We also accept Access and Visa. Prices subject to availability. See Amiga Listing for Prices of ST Infocom Adventures. Products not listed please phone for prices. All prices include VAT and delivery in the UK.

Callers are welcome at our shop
SYSTEMS ARCHITECTS

Dept. PCW1, Syndicate Dept. Store, Market Place, Kingston Upon Thames, Surrey KT1 4BR. Tel: 01-549 3028 (24-hr ansaphone)

AMIGA MAIL

AMIGA 500

£495 plus VAT (=£569)

Order now and claim your

FREE DELUXE PAINT (worth £89.95)

FREE TV MODULATOR (worth £24.99)

FREE 10-PACK OF 3½" DS/DD DISKS (worth £19.95)

FREE INSURED FAST COURIER DELIVERY

Discounts on all Amiga peripherals and software

PHONE 0273 672262 NOW TO ORDER

OR FOR LATEST PRICE LIST

6 MONTHS INTEREST-FREE CREDIT -
CALL FOR DETAILS



Please make cheques payable to Adventure Mail Ltd

18 MARGARET STREET, BRIGHTON,
EAST SUSSEX BN2 1TS

Mail order only - order desk open 9.30 - 5.00 Monday to Friday

POPULAR Computing WEEKLY



- Word Processor
- Database
- Spreadsheet
- Graphics

Subscribe now to
**Popular Computing
Weekly** and we'll send you
your own **Mini Office**
program **FREE**.

MINI OFFICE

ORDER FORM

Please enter my annual subscription to *Popular Computing Weekly* at **£25.00 U.K. £39.95 Overseas** and send me my **FREE MINI OFFICE** program as indicated below.

Send me **MINI OFFICE** for: ☐ Amstrad ☐ Commodore ☐ Spectrum
☐ Electron ☐ BBC

☐ Please debit my Access/Visa/AmEx card no: ☐ I enclose a cheque made payable to

Sunshine Publications Ltd.

Expiry date: _____ Signature: _____

Name: _____

Address: _____

Return this form to: PCW Subs, 12-13 Little Newport Street, London WC2H 7PP, U.K.

◀ continued from page 43

Price £49.95 **Supplier** Kuma Computers, 12 Horseshoe Park, Pangbourne, Berkshire RG8 7JW.

Database program that is data-compatible with Kuma's own K-Spread 2, K-Graph 2 and K-Word 3.

Program Flying Start Type Database **Price** £69.95 **Supplier** Mitre Software, International House, 26 Creechchurch Lane, London EC3A 5BA.

Easy to use database, the cowl of which includes three-month subscription to a users' help-line.

Program Boulder Dash Type Arcade **Price** £9.95 **Supplier** Prism Leisure, Unit 1, Baird Road, Enfield, Middlesex EN1 1SJ.

See Spectrum listing for comment, but bear in mind that the PC version costs £9.95.

Program Boulder Dash 2 Type Arcade **Price** £9.95 **Supplier** Prism Leisure, Unit 1, Baird Road, Enfield, Middlesex EN1 1SJ.

Spectrum

Program Ten-Pin Challenge Type Bowling Simulation **Price** £1.99 **Supplier** Atlantis Software, 28 Station Road, London SE25 5AG.

Program Oriental Hero Type Arcade **Price** £1.99 **Supplier** Firebird, 64-76 New Oxford Street, London WC1A 1PS.

Program Black Magic Type Arcade **Price** £8.99 **Supplier** US Gold, Units 2/3, Holford Way, Holford, Birmingham B6 7AX.

Program River Raid Type Arcade **Price** £1.99 **Supplier** Firebird, 64-76 New Oxford Street, London WC1A 1PS.

Gosh, to think that *River Raid* is still around after all these years. It does look a bit dated but it's still addictive in a simple sort of way.

Program Satcom Type Simulation **Price** £1.99 **Supplier** Atlantis Software, 28 Station Road, London SE25 5AG.

A 'hacking' game, in which you have to hack into the computer system of an out-of-control laser satellite and neutralise it before it fries everyone on the planet below. An interesting idea for a budget game, and it makes a difference from all those cheap shoot 'em ups. One of Atlantis' better budget releases.

Program Boulder Dash Type Arcade **Price** £2.99 **Supplier** Prism Leisure, Unit 1, Baird Road, Enfield, Middlesex EN1 1SJ.

The Rockford coin-op game is about to be released in the arcades, so Prism have re-released the two *Boulder Dash* games that introduced Rockford to the games playing world. They're both quite simple games in which you wander around a maze, trying to collect jewels and avoid the deadly falling boulders and other traps. Simple, but very addictive and good value as budget games (especially at £4.99 on disc).

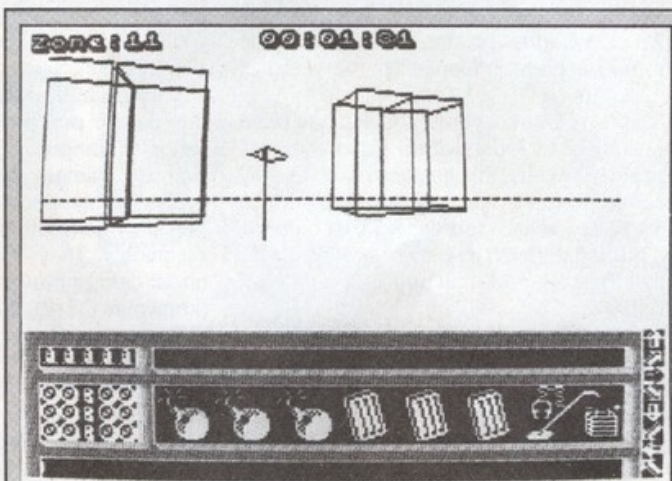
Program Rebel Type Arcade **Price** £9.95 **Supplier** Virgin Games, 2-4 Vernon Yard, Portobello Road, London W11 2DX.

Strategy game rather than arcade action. Defend your coastline from the enemy fleet.

Program Convoy Raider Type War Game **Price** £7.99 **Supplier** Grem-lin Graphics, Alpha House, 10 Carver Street, Sheffield S1 4FS.

Program Catch 23 Type Arcade **Price** £7.95 **Supplier** Martech, Martech House, Bay Terrace, Pevensey Bay, East Sussex BN24 6EE.

A change of style for Grem-lin, a See panel for comment.



Robico Software has a small but respectable catalogue of BBC adventures to its name, and its latest release is *The Hunt*, subtitled *Search For Shauna*.

You play the captain of an intergalactic spacecraft who is searching for Shauna, a kidnapped member of your crew. Your search has led you to a vast space station, where you dock and attempt to confront Shauna's abductor. Of course, the moment you dock things start to go wrong and you've immediately got to solve your first problem. Your ship's hull has been damaged and you've only got about a minute to get out and into the safety of the space station.

Of course the station isn't that safe anyway, and as its main purpose is as a scientific research lab there is plenty of scope for a variety of baffling puzzles and strange characters (such as the Aggro-droid, whose purpose doesn't need much explaining).

The idea behind the game is sound enough, but there are a few points that make it a little frustrating at times. Always irritating are 'instant death' locations, such as the Customs area which you arrive at very early on in the game. As soon as you enter this location you are told that your 'scan' is positive and you are instantly sentenced to death. There is a way around it of course, but unless you've saved your game position it means going back to the start and retracing your steps. You really shouldn't have to do that too soon in the game, so you have a chance to get into the swing of things. The presentation is a bit sloppy, as the location text doesn't always scroll completely off screen when you enter a new location, which leaves odd bits of text floating at the top of the text area which you have to read through again to get to the new text. I suspect that *The Hunt* may have been written using Incentive's *Graphic Adventure Creator*, or *The Quill*, since this is the sort of standard presentational problem that these utilities can suffer from.

The game has a hundred or so locations, with extra graphics on the disc versions, and while it may not be in the infocom league, *The Hunt* is still a fairly competent adventure and my only real doubt about it is the £10 price tag (£12.95 on disc) which I think is a little high for a cassette-based game.

Cliff Joesph

CHARTS

Top Twenty

1	(1)	Paperboy	Elite
2	(4)	Barbarian	Palace
3	(5)	BMX Simulator	Code Masters
4	(2)	The Last Ninja	System 3
5	(3)	Milk Race	Mastertronic
6	(9)	Run for Gold	Alternative
7	(10)	Football Manager	Addictive
8	(8)	Four Great Games	Microvalue
9	(12)	Gauntlet	US Gold
10	(6)	Road Runner	US Gold
11	(7)	I Ball	Firebird
12	(18)	Feud	Bulldog
13	(-)	World Class Leaderboard	Access/US Gold
14	(15)	Six Pack	Elite
15	(19)	Destructo	Bulldog
16	(-)	Enduro Racer	Activision
17	(14)	Army Moves	Imagine
18	(-)	Leaderboard	Access/US Gold
19	(-)	F15 Strike Eagle	Microprose
20	(-)	180	Mastertronic

All figures compiled by Gallup/Microscope

Singing about PCs

The introduction of the IBM PC in 1981 was a milestone in the history of computing. Love it or hate it, it must be admitted that this somewhat infamous collection of grey plastic, metal and silicon has had a great influence on the world of computers.

Over the last six years, the PC has been the subject of much, often rather heated, debate. Recently, this has consisted largely of criticism. I am now going to try and go some way towards redressing that balance by putting forward my own opinion as to why I think some of this criticism is without foundation.

Firstly, I would argue that standards are an essential ingredient in the real world of computing. The standards of the PC along with MS-DOS have created a level of stability in an otherwise fast-moving and extremely volatile market. This has inevitably resulted in the technology falling further and further behind the current 'state of the art', but it has also meant that support for the PC has far exceeded anything available for any other micro. It is only through the right combination of both software and hardware that a particular task can be efficiently tackled.

Prevailing technology has overtaken the PC standard, but it hasn't succeeded in leaving it behind altogether. The MS-DOS operating system has gone through a number of revisions to cope with new innovations such as hard discs and 3½ inch floppy discs. Indeed, new versions of the PC itself have been produced, such as the Amstrad PC, which has sold in large quantities.

The success of the Amstrad shows that people still want a PC, and that the market is constantly expanding to include new users, particularly towards the lower end of the market. At the same time, the so-called 'power users' who have larger and more

complex tasks to carry out are being offered upgraded computers based on the PC standard, but using newer technology, including the successors to the Intel 8088 processor that was used in the first generation of PC's.

Looking further towards the future, IBM is now in the process of introducing its new range of computers known as the PS/2. Far from completely abandoning the PC, IBM has sensibly decided to develop a new family of computers based on the original machines. They will (eventually) operate under an improved version of MS-DOS (known as OS/2), but they are also capable of operating under the current version of MS-DOS and hence will run virtually all of the programs currently in existence for the PC. In other words, the PS/2 is a sensible step towards better technology without abandoning the current standard.

I am not trying to suggest that there is no place for innovation. There is a definite need for companies such as Apple and Atari who aim to produce their own alternatives to the PC standard, providing products which are invaluable to some people. What I am saying, though, is that older technology must coexist with the newer technology so that the serious business user can carry on using the equipment that s/he is familiar with and leave others to innovate. The newer technology will inevitably take over from the PC in years to come. However, with PC users numbering several million throughout the world, we cannot afford to be adopting new standards every couple of years just because something slightly better comes along. There must be a gradual transition from one level of technology to another. Basically, I am suggesting that evolution is always far less painful than revolution.

David Rawlinson

Puzzle No 268

In this crossnumber puzzle can you find the values for A, B, C and D, such that the grid can be filled?

1	2	3
4		
5		6

Across

- 1) C²
- 4) A² (digits reversed)
- 5) B²

Down

- 1) A
- 2) D²
- 3) B (digits reversed)
- 5) C
- 6) D

Solution to Puzzle No 263

Placing the joker at any of the positions 1, 2, 8, 10, 19, 36, 46, 51 or 53 will ensure that the joker is not the final card, irrespective of the number of cards transferred from the top to the bottom of the pack between each discarding.

The program works by totting each 'deal' in turn, in each case using a different number of transfers in the range 1 to 99.

An 'artificial' pack of cards is generated for each deal, this pack comprising a string of 53 Ascii characters in the range 65 to 117. This string is used in the same way as an actual pack.

Winner of Puzzle No 263

This week's winner is Angela Armstrong, of Abingdon, Oxon, who will receive £10.

Rules

The closing date for Puzzle 268 is August 19.

```

10 DIM R(53)
20 FOR A=1 TO 99
25 PRINT A;" ";
30 D$=""
40 FOR C=1 TO 53:D$=D$+CHR$(64+C):NEXT C
100 FOR F=1 TO A
110 D$=MID$(D$,2)+LEFT$(D$,1)
120 NEXT C
130 D$=MID$(D$,2)
140 IF LEN(D$)=1 THEN 200 ELSE 100
200 Z=ASC(D$)-64:R(Z)=R(Z)+1
205 PRINT Z
210 NEXT A
220 FOR F=1 TO 53
230 IF R(F)=0 THEN PRINT F
240 NEXT

```

HACKERS



VIP PROFESSIONAL

THE POWER OF LOTUS 1-2-3™ ON THE ATARI ST



'LOTUS PLUS GEM'

Probably the most impressive program to have been released so far for the Atari ST range, VIP Professional is an extremely easy to use, integrated spreadsheet, database and graphics program which is identical both in features and commands to Lotus 1-2-3™. To give you the best program possible on your Atari ST, VIP Professional integrates the three essential applications of Lotus 1-2-3™ with the smart face of GEM. The same spreadsheet analysis, information management and extraordinary business graphics are all combined in one easy to learn, affordable package. What's more, VIP Professional not only has all the features of 1-2-3™, you can also type the same commands to do the same things. Or, better still, you can use a mouse to make it even simpler! VIP requires only one disk drive to operate and also works with a hard disk drive. It is compatible with both monochrome and colour systems. Probably the most surprising feature of VIP Professional is not its total compatibility with Lotus 1-2-3™, nor its ease of use with the GEM environment, but its price. Lotus 1-2-3™ for the IBM PC AT costs £395 (+VAT=£454.25), whereas VIP Professional for the Atari ST range of computers is a mere £199 (+VAT=£228.85). That's nearly HALF PRICE!

INTEGRATED
SPREADSHEET
DATABASE
GRAPHICS

WITH
LOTUS 1-2-3
COMPATIBILITY

£199
(+VAT=£228.85)



1 SPREADSHEET

VIP Professional was modelled after the powerful, best selling Lotus 1-2-3™ program. It has every feature, every command of that program. In fact, the experienced 1-2-3™ user will feel right at home using the same keystrokes. But this version is made even easier to use by adding the user friendly face of GEM, so the beginner can use it right away. If you want to do your home budgets, financial planning, or sophisticated business inventory control or budget modelling, VIP Professional will fit the bill. And you can freely use 1-2-3™ or VIP Professional files created on other computers in VIP Professional on your Atari ST. And Professional is not only flexible, it's powerful too, with a full 8,192 row by 256 column worksheet to use with up to a massive 4Mb of memory. (Note: Lotus 1-2-3™ has only 2,048 rows).

2 DATABASE

VIP Professional includes a powerful data manager to arrange, store and analyse your important information. It can be used to store your home or business records and do extensive searches, sorts and comparisons. It allows up to 8192 records, with up to 256 fields and queries and 256 search criteria. The database manager can be used in conjunction with the spreadsheet commands to add greater power to the database facilities including sorting specific ranges of the database. You can also specify how you sort files, from the highest value to the lowest value (or from the lowest to the highest), or alphabetically (forwards or backwards). The graphics part of VIP Professional can be used to show trends in the database or other information. With its powerful statistical functions, it has almost limitless power.

3 GRAPHICS

VIP gives shape to your figures by letting you graph your data into six different types of graphs, in startling colour or black and white. Pie charts, bar graphs, stacked bar graphs, line graphs, scatter graphs and X/Y graphs. You can graph your spreadsheet or database data to give instant professional presentations. Your graphs will change instantly as you change the data. When creating a graph you may specify a main heading, a sub heading and a third title at the base of the graph. The necessary scales can be defined either by the user or automatically created. In pie graphs, the most important section of the pie can be separated from the other sections to draw attention to its importance. You may save graphs individually on disk for use at a later date. You can also print your graph on any Epson compatible dot matrix printer.

- VIP Professional has 'Instant Help' so you can find more information instantly.
- VIP calculates to a full 300 digits against Lotus 1-2-3™ which only calculates to 100.
- VIP allows for 256 Query Fields against only 32 allowed by Lotus 1-2-3™.
- VIP has a complete GEM interface, for ease of use, unlike the text of Lotus 1-2-3™.
- VIP allows different fonts and has an on/off cell grid. Not found in Lotus 1-2-3™.
- VIP supports greater memory and larger spreadsheets than Lotus 1-2-3™.
- VIP graphs and worksheet can be viewed together. Pie charts can be exploded.
- VIP can accept any .WKS files from Lotus 1-2-3™ without modification.
- VIP displays all spreadsheet information in user-sizeable GEM windows.
- VIP can be manipulated using either the keyboard or the user friendly mouse.
- VIP is currently available for the AMIGA, ST and APPLE IIc, IIe and IIGS.

OFFICIAL UK VERSION

The official UK version of VIP Professional has a pound (£) sign as a standard part of its character set. Other versions have also been imported unofficially from the USA and have a dollar (\$) sign instead of a £ sign. These versions will not be supported by the UK distributors or their dealers. Ensure that the VIP you buy is the official UK version, not an unofficial import with incorrect characters.



VIP Professional is available from Atari ST Dealers throughout the UK. If your local dealer does not have VIP in stock, it can be obtained by mail order (P&P free) from:

SILICA SHOP Ltd, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX
Tel: 01-309 1111

All comparisons made to Lotus 1-2-3™ are to version 1A.

E&OE

INFORMATION REQUEST FORM

To: Silica Shop Ltd, Dept PCWK 0787, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX

Please send me further details of VIP Professional for the ST

Mr/Mrs/Ms: Initials: Surname:

Address:

Postcode:

I am interested in the Atari ST ☐

I already own an Atari ST ☐

**"MISS THIS AND YOU'RE MISSING
THE BEST PROGRAM OF THE YEAR!"**

ZZAPI 64

WIZBALL

Available
NOW
for the
SPECTRUM
& AMSTRAD



SPECTRUM
£7.95

COMMODORE 64
£8.95
AMSTRAD



THE REVIEWERS ARE RAVING...

"WIZBALL IS THE FINEST RELEASE THIS YEAR"

At last, something to enthuse about! A breath of fresh air... A very individual concept... loads of neat touches... gorgeous animation... I could go on and on... the music and sound effects are great... It's a distinctly professional production, its style and content placing it head and shoulders above existing software... **Wizball is simply brilliant** - one of the best presented, most graphically and aurally attractive and addictive pieces of software available. **"Wizball is the finest release this year.** The scenario and game design are so original... Playing is a joy... The graphics, sound and general

presentation are second to none, and combined with the thoughtful attention to detail and the comprehensive series of game variations, you end up with something rather special. Don't delay, go to your software shop and say 'Mr. Retailer, swiftly hand me a copy of Wizball so that I can go home and play it forthwith' **"An essential purchase"**

A superlative piece of software. Slick in virtually every aspect, wholly original and immensely playable. ZZAPI 64

Screen
Star

The sound throughout is great. This is definitely one groovy game... Enough imagination has gone into it to make it different and still keep it immensely playable. Graphics are fab!

COMMODORE USER

