

A Database Publication

Computing *with the* AMSTRAD

Vol. 2 No. 2
February 1986
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The independent magazine for Amstrad computer users




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Computing with the AMSTRAD

Create your own graphics
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from your Amstrad
PC1640

Vol. 2 No. 2 February 1989

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Mini Office II Communications



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£3.3m ads campaign launched

AMSTRAD is spending £3.3 million on an advertising campaign aimed at reinforcing the position of its PCW 8256 word processor in the business market.

The campaign, which will run until mid-March, consists of a run of 40 second television commercials and advertisements in both popular and quality daily newspapers and specialist computer magazines.

"It is not a one-off campaign especially for the 8256", said marketing director Malcolm Miller. "It is the same approach we use for all our new products, and up till now the 8256 has not featured in any such campaign".

In another move to attract the businessmen Amstrad has launched a second disc drive for the 8256.

Priced at £156, the 3in unit sits underneath the machine's existing drive and can be fitted by any Amstrad dealer with approved service facilities.

100 NEW AMSTRAD PRODUCTS UNVEILED

THE second Amstrad Computer Show is an occasion to smash all previous records, with more than 100 new products to be launched.

It is the largest mass unveiling to be witnessed at any event dedicated to a range of items from one British manufacturer.

Two thirds of all the 72 major companies exhibiting will be unveiling at least one breakthrough in their field.

And the total number of innovations on display at the November, Hammersmith, on January 11 and 12, will be three times higher than those recorded at the annual last October Amstrad Show.

"We knew this was going to turn into a real spectacular within 10 days of the last one", said Derek Maskin, head of Database, the show's organiser, "for by that time every possible inch of space had been booked by exhibitors."

"This we see it as proving a bonanza for users and setting the test in 1988 as being the

year of the Amstrad".

A survey of companies developing new software in time for the show revealed one surprising fact.

Utilities will account for the lion's share of the latest software available, with games pushed into second place and educational programs running a strong third.

"We see the future for the Amstrad range as lying not with games but in much more useful functions", one leading software house told Computing with the Amstrad.

The utilities that will be on show range from databases through to the most advanced spreadsheets and stocklisting programs.

On the hardware front new products include three models on display like the first time, joystick, a digital tracer, light-pens, digitiser tablets, disc drives, upgrades and a computer desk built specifically for the PCW 8256.

"When we first decided to hold a show in January, some

people threw their hands in the air and said: 'Who is going to produce new products for them?', says Derek Maskin.

"After all, according to them, everything new would be out by Christmas."

"But we believed there would be a lot of companies developing just to satisfy the huge market of Amstrad users early in the New Year. And it certainly appears that we were correct".

WORDSTAR ON A CARD

A JOINT venture between Cursons and MicroPro International has produced Pocket WordStar on the credit card-sized Astren ROM card for the Amstrad CP/M-based machines.

There are also plans to put the word processing package on a new high speed RAM card with up to 1mbyte of memory.

UTILITIES LEAD NEW RELEASES

DATAFL Research, a company normally associated with concrete computer giants like Apple, has jumped on to the Amstrad bandwagon.

It will be displaying four new products for the CPC 8128 and the PCW 8256 at the Amstrad Computer Show. They are:

DR Graph, a program which can produce pie charts, bar graphs, combined bar and line graphs and stacked bar charts.

DR Draw, menu driven and using GSK output, that creates structured drawings in full colour.

C Basic, a Basic compiler with DR-C Basic language.

Postal Mail, an in-house standard Postal.

All four cost £49.95.

Other leading companies who are to launch products at the show include:

DR-Treasure: A range of products for the CPC8128 including a light pen, speech synthesiser, 94k and 256k memory expansion upgrades and a 256k system disc.

Private Systems: An assembler programmer and address ROM card for the CPC484 and

CPC8128 priced at £85.

Complan: A database for the PCW 8256 costing £39.

Borneo - Educational Software: D level physics and G level chemistry for £12.95 each on disc only.

Intellimar: Play Your Cards Right, a computer version of the television game show for the CPC range, £7.95 on cassette.

The Electric Swirl: A prototype of a new digital tracer which the company intends to market for "well under £50".

Worthing Computers: The

first public showing of its new network system.

StarStar Systems: One of three new models at the show, this one - the Magic Master - is the cheapest at £99.95.

ICL: Mega Maths, a complete self-tuition maths course containing 24 programs and 504 topics. On disc or two cassette price £24.

Hi-Soft: Casting, a program designed to help keep track of files on disc. Price £14.95.

Amsoft: Four new graphics adventure games. All on disc only and priced £13.95.

GAMES BRIEFS

BUDGET software publisher Budget has released intriguing-to-space game *Arkaders* for the Amstrad.

The player has the choice of exploring or joyrider control to other space planets from vital trade lanes and earn the chance to take on increasingly difficult tasks. Price: £2.99.

SHOCKS and horror games are on the way in Friday the 13th, a co-production for the Amstrad from Denmark and Ask, which features Jason the unseen terror of the series of creepy films.

Described as an arcade game with an element of adventure, it will be full of surprises - but not nasty ones, says Denmark. Price is £8.95.

RIGHTS to the latest Steven Spielberg blockbuster *Back to the Future* have been obtained by Electric Dreams, and an "action filled adventure with a touch of teenage romance" will be produced for the Amstrad priced £8.95.

The design concept has been developed by Mark Byles and the game uses sophisticated cartoon animation techniques and digitised stills from the movie.

THE YOUNG ONES GO ON AMSTRAD

All lovers of the celebrated TV programme "The Young Ones" take heart. Now you can enjoy the company of your favourite madcaps on the Amstrad.

In association with the original writers of the programme, Mik and Lisa Masaj and Ben Elton, Orpheus has developed the Young Ones game for the machine.

Featuring the notorious Rick, Vyvyan, Mike and Neil, an intelligence system called Poppet Master has been cre-

ated to handle the zany characters so that they behave as they would on the TV series.

The action takes place in their house, which contains the furniture and objects which have become familiar to fans of the series.

They walk, talk, pick up and smash objects and react as their Young Ones characters.

Available shortly, the game will sell at £7.95 on cassette and £8.95 on disc and will include instructions in the form of a poster.

Tolkien classic

LATEST releases for the Amstrad from Mailbourne House include *Lord of the Rings Game I* on twin cassette tapes.

Written by the same team which produced *Moblin*, it features English input which enables the computer to recognise intelligent sentences up to 128 characters long.

The player can interact and communicate with the other characters in the game, telling them what is required of them and answering their questions.

Its 800 word vocabulary is claimed to be the largest choice

ever offered in any home computer game, and there are more than 200 locations, of which the major ones are illustrated.

Played singly or in a group, any of the roles of Frodo, Sam, Pippin and Merry can be taken on. Price is £19.99, including a beginners instruction tape.

Mailbourne House is also offering a *Land of the Rings* hologram featuring the image of Nazgul or Ring-Wraith. It costs £28.99, with a larger, deluxe version at £48.99 in a 100 copy limited edition.

MORALE BOOSTER

SET in the final stages of a terrible war, *Darthwark* from Casablanca sets the player the awesome task of restoring morale and buying time for his army to retreat for the next round of fighting.

The enemy, however, is superior in almost every department and only a step away from perfecting the ultimate weapon. Arcade action and strategy combine in *Darthwark*, which costs £7.95 on cassette.

Collect a gem

LATEST action-packed arcade adventure from Karna for the Amstrad CPC series, *Renegade*, gives the player the task of finding and retrieving a priceless jewel from a criminal mastermind.

The gem is scattered deep in the criminal's labyrinthine headquarters, heavily guarded by sophisticated weaponry and 38 different kinds of nasties.

Karna games manager Joe Day reckons *Renegade* is "not just a game yet, with plenty of action and shooting involved and also strategy - a winning combination".

It costs £8.99 on cassette. A disc version to be released soon is expected to cost about £14.50.

FIFTY HAPPY HOBBIT WINNERS

Winners of the Computing with the Amstrad October 1988 competition for 50 copies of *The Hobbit* adventure game were:

1. Steve, Warrington, Sutton, Dean, P. Harwell, Tennyson Hill, Marlow, Bucks, Mike Strainell, Berkshire Play Resources on Barnes, Vicini, 2. Max, Ingleton Park, Herts, P. Barrett, Tyzack Hill Woodstock, Shetland, C. Ray, Broomfield St, Bury St Edmunds, Suffolk, J. T. Johnson, Westwood Road, Bath, Bristol, Gloucestershire, Yorksters.

M. Smith, Whalley Road, Accrington, Lancs, G. Bell, Saltash Hill, Brunel University, Uxbridge, Middlesex, R. Gammann, Warrington Road, Gifford, South, W. Oswald, Porridge Road, Gifford, South, P. A. Fox, Central Way, Linnich Park, Perth, South Gloucestershire, T. Pickett, Oldbath Way, Bideley, Surrey, J. Dick, Crookwell Way, Reading St James, Peterborough, Lincs, K. Brown, Lyth Road, Ridge, Wiltshire,

Lance, P. Ryan, Mildred Avenue, Progress, Marlborough, W. Page, St. John's Avenue, Romsey, Kent, S. Crosswell, Sutton, Epsom, Angli, M. Bennett, West/Oxford, Sutton Road, Laverstoke, Suffolk, A. Pimbley, Ann Lane, Weymouth, Dorset, N. Williams, Cleveley, M. Cross, Faversham Road, Norwich, Norfolk.

A. Jones, Bury Farm Road, Peppin, St. Thomas, Cambridgeshire, Lawrence, Suffolk Road, Warrington, Surrey, J. Matthews, Barkness Road, Surbiton, A. Brackley, Hampton Court, Ascot, Berkshire, C. Davidson, North Yaxley, L. Dickinson, Longnor Road, West Green, Cheshire, C. Linnin, The Nurseries, Eastleigh, York, J. Collier, West Lane, Wymonbury, Cambs, S. Bath, Gillingham Road, Dorset, S. Jackson, East H. Westcott, Wiltshire, D. King, H. Higgins, Gifford Way, West Heath, Birmingham.

G. Telford, Telford Drive, Brooklands Village, Wokingham, G. Boris, Pinner, London, W. Wiggins, Greenfield, York and

Wes. M. Hammond, Gifford, Pinner, W. York, J. Taylor, Meadow Road, Pinner, W. Yorks, H. Barker, Boreham, Luton, Lancs, R. Rod, Westmeadow Avenue, Salisbury, Brighton, S. Swain, G. Green, Eric Lynn, A. Williams, Aldbrough, T. Wright, Ben Arden, South Devon, Devon, Devon.

A. Wetherstone, Madras Avenue, Wetherstone, Kent, M. Hodgson, Bay House, Kettering Road, Northampton, Wetherstone, Cambridgeshire, H. Powell, Woodland Chase, Chesham, Bucks, (James, S. Tomsett, Marston Green, Wetherstone, Leicestershire, M. Phillips, Wetherstone Avenue, Wetherstone, Northampton, S. Hales, Hildon Close, Hildon, Shropshire, Surrey, H. Hulse, Apsallade Close, Arundel, W. Johnson, Southend-on-Sea, Essex, Mersey Road, Salford, W. Dale, Salford St. Alexander, Southampton, D. Parker, Salford Road, Southampton, Oxford, Oxfordshire, J. Spiller, Salford, Mersey, Road, Wetherstone, North.





Amstrad tipped for awards

AMSTRAD has been shortlisted in two categories of the prestigious Recognition of Information Technology Achievement (RITA) Awards for 1986.

The PCW 8256 has reached the final of the Business Computer System of the Year section, while Alan Sugar, the company chairman, is in line to become the Computer Personality of the Year.

Sponsored by Which Computer? magazine, the business computer system award sees the PCW 8256 lined up against Dividers 1242 and Research Machines Nimbus.

Careers Exhibitions, the RITA organisers, have revealed that the PCW 8256 has been nominated because of the innovative marketing involved.

"The judges felt that a new market - small businesses and professionals - could be opened up by Amstrad's package which retails for less than £400", a spokesman told *Computing with the Amstrad*.

Melaine Miller, Amstrad's sales and marketing director, is understandably proud of the machine reaching the award final.

"I am delighted the PCW 8256 has been nominated", he says. "It shows there is a place in the market for this type of machine and that the PCW 8256 has successfully filled this position".

Meanwhile the RITA judges have also justified their choice of Alan Sugar's nomination for

Skyfox flies in

THE combat simulation program Skyfox has been converted for the CPC464 by Mikolajch UK.

Features include a 3D scrolling flight simulator, 16 scenarios, five skill levels and air-to-air and air-to-ground combat modes.

The price is £8.95 on cassette.



Melaine Miller - Delighted the PCW 8256 has been nominated

the Personality of the Year category.

"The judges were impressed by Alan Sugar's desire to make information technology accessible to everyone", reported a spokesman.

"He demands simplicity of presentation and operation, aiming to make information technology accessible to a whole new market".

The winners are to be announced at the awards dinner which is being held on the first day of the Which Computer? Show.



Alan Sugar... nominated as Computer Personality of the Year

MINI OFFICE II IS LAUNCHED

Mini Office, the revolutionary software package which transformed the face of low-cost business computing in the UK, has finally met its match - an enhanced version of itself.

In all it has taken a total of 26 man years of programming to come up with its successor, Mini Office II, now available for the Amstrad range of micros.

Some of Britain's leading programmers and software designers were called in, not only to improve the four existing modules - word processor, database, spreadsheet and graphics - but to add another two, label printing and communications.

And already Mini Office II is being hailed as a potential blockbuster in the same mould as the original version, the only non-game to reach number one in a Top Ten chart.

Given a sneak preview, one leading reviewer told *Comput-*

ing with the Amstrad "State of the art has become a much devalued phrase these days - but this really is it. But what is most surprising is that once again they've brought it out at a price everyone can afford".

It was from Peter Davidson, head of Database Software, that the instruction went out to the programmers to go one better than Mini Office.

"The problem we faced was that this was a product that had everything", he says. "It was a bestseller, it had been critically acclaimed and it was the easiest to use business package ever".

"Also it had reached the finale of not one but two categories of the British Microcomputing Awards and it had broken the price barrier for business software".

"In other words, the task for the programmers was enormous. But they've done it".

Hi-tech communications link

REVIEWERS are already predicting that *Mini Office II* will have an even greater impact on the market than its predecessor thanks to its communications link.

The communications module offers a unique multi-colour facility - never available for the free time on a scrolling screen.

You can choose from a vast range of colours - 27 foreground, 27 background and 27 border colours.

A revolutionary type-ahead

window is also included. This enables the user to check his comments as he types, even while *Mini Office II* is still being revised.

"The package would be worth it for the window alone", claims one reviewer. "It is invaluable for playing on-line games such as *MSD* or playing real time chat systems".

An expanded ASCII file transfer mode has also been incorporated. This allows the user to place character files - such as machine code or word

processing - on text-only systems. Another facility is a break key which can be used to send break levels to remote systems.

All main features of the package are accessible from function key commands, an alternative to the need to constantly return to the main menu.

"We have made the communications module do everything that *Mini Office II* does", said a spokesman for the team behind it.

PC-DOS emulator for the 6128

A GERMAN add-on board is to be launched this spring which, it is claimed, will provide IBM PC compatibility for the Amstrad 6128.

Visitors to the Amstrad Computer Show will be given a quick preview when its prototype is unveiled by importers Screens and West German developers Vortex.

Using a 16 bit second processor, the board will enable the machine to use PC-DOS and MS-DOS software. Its price is expected to be between £289 and £399.

"The idea was to create a second processor which will close the gap once and for all between what people term home and business machines", said Suzanne Nigel Sinclair.

"The board goes this by enabling the businessmen to run the IBM software he uses at work on an Amstrad at home.

"Also price is such that what everyone thought was a vision a year ago of businesses having orange-black will become reality".

A report in Popular Comput-

ing Weekly insists Amstrad is to tackle IBM head-on itself to chase the launch of its own IBM PC compatible this spring.

"Much of the groundwork for Amstrad's entry into the business computer market has already been done", it said.

Amstrad however has denied it is launching any such machine. "It's never to us", said marketing director Malcolm Miller.



AMX Mouse makes tracks for France

BRITISH mice are currently launching an invasion of France — and it is all thanks to Amstrad. Not the furry little creatures, but those spin-mechanical devices beloved of UK computer buffs.

Advanced Memory Systems — creators of the acclaimed AMX Mouse for the CPC range —

has revealed that it has shipped 5,000 of them to Amstrad in France.

"It seems that now Amstrad has become the undisputed market leader in that country the local population are swiftly developing a taste for high class British peripherals.

"Amstrad in the UK so liked the AMX Mouse that they offered it to the company in France", Nick Pearson of AMS told *Computing with the Amstrad*.

"Within days we received an order for 5,000. And that is only the first shipment".

A finalist in the Peripheral of the Year Award in 1988, the AMX Mouse has only recently become available for the Amstrad mice.

The original mouse for the BBC Micro sold 10,000 units in the first nine months alone.

Its popularity stems from the fact that it offers for the first time an entirely new approach to computing that makes the keyboard seem old fashioned.

The package, both here and in France, includes AMX Art, a computer aided drawing program utilising on-screen windows, icons, pull down menus and pointers for producing professional standard drawings or more complex icons saved and printed.

It also contains Pattern Designer, AMX Control and Icon Designer.

"We feel the French have shown remarkably good taste in choosing our mice", says Nick Pearson. "Mind you, it's only fair when you consider how much of their wine we drink".

Cutting communications costs

A 16KH communications package for the Amstrad has been launched at a price the manufacturer claims is 50 per cent lower than any comparable product on the market.

DataStar Systems has configured up the multi-standard Magic Modem and linked it with the latest terminal software, Communication, for £199.95.

And now the company is predicting it will become the number one modem package in the Amstrad market within three months.

"We have the right product at the right price — and that's what Amstrad people like", says Barry Kite, managing director of DataStar Systems.

Communication was commissioned by DataStar from leading software design house Honey-soft.

The authors say the view-



data terminal is the only data standard available for the Amstrad to offer real time display of incoming data with the full support of a dynamic screen and easy selection of options.

With retidelling facility, it can connect with a variety of host systems including Prestel and MicroLink and supports telesoftware downloading on Amstrad.

It has programmable function keys for user IDs, is easily configured for any host system and uses a system of pop-up

menus to select options.

The menu driven speaking facility presents a choice for data received to be copied either on disc or printed up.

The Magic Modem itself is designed and built to BS6306 Standards, and BABB approval is now being sought.

The base rate are 300/300 full duplex, 1200/75 slowdata, 75/1200 reverse vmodem's, 1200/1200 half-duplex and full standards (request version only).

The special launch price is £99.95, including V.A.T., plus software and interface.

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wait till you've seen the second...

AMSTRAD COMPUTER SHOW

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Sunday, January 12 10am-5pm
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On display will be just about every piece
of hardware and software yet produced
for the entire Amstrad range.

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This is the one show you mustn't miss!

SOFTWARE FOR THE AMSTRAD

ULTRABASE

General Purpose Database

Ultrabase is a general purpose file management package allowing large amounts of information to be stored and processed. It is extremely powerful yet flexible & easy to use.

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THIS program will take you into the realms of Amstrad graphics and gives quite a good 3D effect by building up a picture of a racing car in the same way as a child would build it with Lego.

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The routine is not perfect. It is meant to show what can be done and to stimulate a few ideas — and, of course, to give you a utility to incorporate in your own routines.

We shall be creating a 3D picture in a similar way to that used to form 2D pictures — constructing a three dimensional combination from the standard 8×8 character matrices used when printing.

Characters can be arranged together, and new ones can be redefined, so that the final size and shape of the picture is limited only by screen size.

The character printing subroutine takes the normal character or a user-defined one and creates from it a set of cubes in the same positions as data would be in the printed character.

Figure 1 shows the transition we make in this program. The cube routine simply draws a cube of the required size in the position given to it. By drawing the cubes in a row from the deepest position to the shallowest, we eliminate the hidden edges.

The routines are driven by the print string subroutine at line 1200. This will take the string in *str* and print it to the screen in block form.

This section requires some variables to be set. Before we call it we



Figure 1. Each cube in the matrix is converted to a block on the screen.

need to give values to:

- bx=xx** The top left position of the string.
- bx=yy** Vertical position of top left of the string.
- angle** Angle of the string, below horizontal.
- thick** Thickness of lettering.
- wide** Width of each cube printed.
- deep** Height of each cube printed.
- width** } Maximum value for *bx=xx*.
- depth** }

The maximum values relate to the ability to increase the size of the print as the string is processed. In this way the string appears to be coming out of the screen in true 3D form.

The subroutines will take an average of the start and end values and adjust the size of intermediate characters accordingly. The angle of the string is that at which the characters slope.

The subroutines has been kept simple by only allowing for strings to be printed on a downlope from left to right. Printed cubes automatically eliminate those immediately behind them or those that cannot be seen.

If you wish to use other directions you must work out which faces of the cube are showing and draw the string so that the nearest characters are drawn last. The precise angles and sizes of the strings are more a question of trial and error than theory.

The small section of machine code at the end moves the character matrix to a position in store where Basic can

read it. The character definitions are held in the lower ROM. The routine enables this ROM, calls a subroutine to find where the definition for the current character is, and then moves the eight byte sequence to location 42020 onwards.

The main routine can then pick up each of these values to test each of the bits. If a bit is set the cube routine will draw the block.

Any character can be used, as the routine prints whatever is in the string.

I have redefined two characters to produce the racing car and have printed different sizes of the letter C to produce the wheels. Thus the

```

10 REM Amstrad block graphics
20 REM By Ian Norton
30 REM !!! Coping with the MS1000
40 DIM L:2,24:INK 3:4:INK 5:3
50 CLR=0000 @:000@:0000 1710
60 REM
70 REM strings
80 REM
90 @:=1000" Amstrad"
100 @:=1000
110 @:=@:=1000@:=1000
120 @:=1000@:=1000@:=1000@:=1000
130 @:=1000@:=1000@:=1000@:=1000@:=1000
140 @:=1000 1200
150 REM
160 REM load
170 REM
180 @:=1000 1200
190 @:=1000

```


1080 atbc2c+R000d00*0*0000p0	1680 H027 ch	1700 H00
1100 0000 1000	1610 RETURN	1710 H010000 0770
1120 RETURN	1580 H00	1740 P00 (+0 TO 10)000 10P00 0000+
1200 H00	1510 H00 code	1...0000777
1210 H00 print string	1550 H00	1700 H00 (+0 TO 10)000 1100 1...000
1220 H00	1520 v11000000000000000000	777
1230 v1000L0000	1540 v11000000000000000000	1700 RETURN
1240 v1000L00000000	1500 P00 (+1 TO 0)00	1730 0070 00,00,00,00,00,000,000,00,0
1250 v1000L0000000000000000	1560 p10000110000	00,000,000,001,00,00,00,00,000,000,0
1270 v1000L0000000000000000	1570 p1000011000000000000000	1760 0070 00,00,00,00,00,00,00,00,00,00
1280 ch00000000	1580 P007 p1000,01000000 0...000	
1290 P00 ch01 TO L00000	1600 P007 p100001,0100000000000000	
1300 P000 00000,000000000000,011	2000000,0,0000	
1310 CALL 0000000000000000	1680 H027 1	
1320 P00 row0? TO 0 000? -0	1610 p1000011000000	
1330 P00 col0? TO 0?	1620 P00 (+1 TO 0000?)	
1340 IF 0P000 00000000 00? (1=col)	1630 1100000000000000000000000000	
1 1000 0000 0700	1640 P007 p1000,01000000 000	
1350 H027 col	1650 0,0,0,0	
1360 H027 row	1660 p1000010000000	
1370 ch0000000000000000000000000000	1680 H027 1	
100	1670 H07000	
1380 H0100000000000000000000000000	1700 H00	
1700 deep00000000	1710 H00 000000 code	



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RIGHT, we hang about—type Program 1 into your micro. If you remember what we covered last time you'll find it easy to understand what's happening.

The DIM of line 30 sets aside memory space for an array, `array()`. This array is made up of 11 elements going from `array(0)` all the way to `array(10)`.

As is my normal practice, the first element of the array, `array(0)`, is ignored. This is wasteful of memory but it's justified by making the program's action easier to understand.

The FOR...NEXT loop of lines 40 to 80 READs into the array the numbers that the Amstrad finds in the data file. As the loop goes from 1 to 10, so each element of the array is used to store one of the numbers from line 110.

The second loop prints out the list of numbers in reverse order. Try changing the first line of the loop to:

```
FOR control=10 TO 0 STEP -1
```

or:

```
FOR control=10 TO 0 STEP -1
```

and see what happens.

By now you should have grasped that combining FOR...NEXT loops and arrays is a very powerful technique. Using a loop you can read data into a program and store it in an array.

In the programs in this article all the data comes from the data lines at the end of the program. This is just to make the examples clearer.

In practice, you're more likely to use INPUT or take the data from a tape or disc file. Whatever method you use, the fact remains that storing the data in an array allows you to do all sorts of things that you couldn't do with our normal variables.

Try getting Program 1 to display all

```
10 REM Program 1
20 DIM highly(10)
30 DIM name()
40 FOR loop=0 TO 10
50 READ highly(loop)
60 NEXT loop
70 REM PRINTS (1) out in reverse
80 FOR control=10 TO 1 STEP -1
90 PRINT highly(control)
100 NEXT control
110 DATA 0,1,2,3,4,5,6,7,8,9
```

Program 1

Ordering the elements of arrays

By PETE BIBBY

the even numbers in the list or all the odd ones or, maybe, all the even numbers greater than 3. Once you've got the numbers in an array, manipulating the data (as it's known) becomes much easier.

Up until now, all the arrays we've defined have been numeric, used (amazingly!) for holding numbers. You

```
30 REM Program 2
40 DIM name(5)
50 REM filling array
60 FOR loop=1 TO 5
70 READ name(loop)
80 NEXT loop
90 REM using array for output
100 FOR control=0 TO 5
110 PRINT name(control)
120 NEXT control
130 PRINT
140 DATA Pete, Eileen, Roger, Sue, Eric
```

Program 2

can also have arrays that hold strings and these are known as string arrays. Program 2 shows a string array being used to store five names.

This works in exactly the same way as Program 1 except that now strings are being read from the data line and placed in a string array, `name()`.

It's the dollar sign (\$) at the end of the array name that indicates to the micro that it's a string array. Be careful not to mislead this off as in:

```
50 DIM name(5)
```

If you do this the program halts with the annoyingly misleading mes-

sage:

```
fatal error in 20
```

Notice that the error has occurred because you've tried to READ a string into `name()` — a numeric array. The Amstrad can't reconcile the two, so it stops and blames the data line.

While you can't put strings into a numeric array, you can read numbers into a string array, as changing the data line to:

```
140 DATA 1,2,3,4,5
```

shows. The program happily accepts the numbers, storing them in `name(1)` through to `name(5)`. However the numbers are stored as strings. You can't do maths with them, as you'll find if you enter:

```
PRINT name(1)
```

which gives the:

```
100 success
```

message.

Let's take a closer look at the five elements of the array `name()`. Figure 1 shows the elements of the array and the contents of each element.

Notice how not only are the names stored in the array, with `name(1)` holding Pete and `name(2)` containing Eileen, but also they are stored in a particular order.

Just as the first element is `name(1)`, the second is `name(2)` and so on, the first item of data is Pete, the second Eileen and so on to Eric.

So by putting things into an array we are also giving them an order. This means that when we create an array, not only are we using the elements as pigeonholes to keep things in, we're also saying something about the way these things are related. In post terms we are structuring the data.

In the last program I didn't really

element	name(1)	name(2)	name(3)	name(4)	name(5)
contents	Pete	Eileen	Roger	Sue	Eric

Figure 1: The array `name()` and its contents

matter who came first in the list or who came last, it was just a collection of the inhabitants of my house. However at times the order of an array is important, as you'll see when you run Program III.

As you can see from line 20, this program uses two arrays named `name$` and `mark%`. Line 50, embedded in a FOR ... NEXT loop, uses them to store a set of names and marks. Line 60 then uses another FOR ... NEXT loop to display the list of names and marks.

It's a fairly straightforward program that should give you no problems. It does, though, make

```

10 REM Program III
20 DIM name$(5),mark%(5)
30 REM Filling array
40 FOR loop% TO 5
50 NEXT name$(loop),mark%(loop)
60 NEXT loop
70 REM Using array for output
80 FOR control% TO 5
90 PRINT name$(control),mark%(control)
100 NEXT control
110 PRINT
120 DATA Pete,10,Elleen,20,Bodger,30,
    Spot,40,Druc,50

```

Figure 11

some interesting points. To see what I mean, take a look at the data line, line 120.

From just looking at this you should be able to see that Pete's mark is 10, Elleen's is 20 and so on. The name and the following mark are related.

This relationship still holds in line 50, where `name$(loop)` and `mark%(loop)` put the data into the relevant array. When `loop` is 1, Pete is stored in `name$(1)` and Pete's mark, 10, is stored in `mark%(1)`. Similarly Elleen is put into `name$(2)` and her mark of 20 is held in `mark%(2)`.

Each set of related data, someone's name and their mark, has the same value of `loop`, so each element of `name$()` is linked to the element in `mark%()` with the same subscript (the number in the brackets).

Suddenly the order of both arrays becomes important. Figure 11 shows the elements of `name$()` and `mark%()` along with their contents.

Although the two elements `name$()` and `mark%()` are completely separate, they do have a relationship.

element	1	2	3	4	5
<code>name\$()</code> contents	Pete	Elleen	Bodger	Spot	Druc
<code>mark%()</code> contents	10	20	30	40	50

Figure 12: The parallel arrays `name$()` and `mark%()`

The first element in each array holds information about the same person. Similarly with the second and so on to the end.

It wouldn't be hard to have a third array such as `age%` which contains the age of each of the members of `name$()`. In this `age%()` would be my age, `age%(4)` Spot's, and `age%(5)` would hold Eric's age.

When we have a set of arrays like this, where the elements of each array are in the same order and each element concerns the same subject (as `name$()`, `age%()` and `mark%()` all concern Bodger), the arrays are called parallel arrays. And when you've got a set of parallel arrays, it's easy to get information out of them by using the subscript as a pointer. Program IV shows how this is done.

The first part of the program is the same as Program III. It takes the values from the data line and puts them in the arrays `name$()` and `mark%()`. The second part of the program is rather different. It asks you whose mark you'd like to know, asking you to enter the number shown by the person's name (lines 100-120).

The choice of numbers is limited to the number of elements in the array. And, of course, the numbers reflect the position of the various elements in `name$()`.

As soon as the Amstrad has the number, say `x`, it can go to the array `mark%()` and pick out `mark%(x)` knowing

```

10 REM Program IV
20 DIM name$(5),mark%(5)
30 REM Filling array
40 FOR loop% TO 5
50 NEXT name$(loop),mark%(loop)
60 NEXT loop
70 REM selecting one (line) from array
80 pointer%=
90 WHILE pointer%<
100 PRINT "Whose mark do you want?,"
    Press the relevant number key)
110 PRINT
120 PRINT "1) Pete's,PR10% 2) Elleen's,PR
    20% 3) Bodger's,PR30% 4) Spot's,PR40% 5)
    ruc's,PR50%"
130 INPUT pointer
140 IF pointer%<1 THEN GOTO 100
150 PRINT name$(pointer),mark%(pointer)
160 PRINT
170 GOTO
180 DATA Pete,10,Elleen,20,Bodger,30,
    Spot,40,Druc,50
190 PRINT

```

Program IV

that this is the mark obtained by whoever is held in `name$(x)`. The number `x` acts as a pointer to the information you want to retrieve from the array.

Because of the WHILE ... WEND loop, the process continues until you give it the number 0. Can you explain why the program prints out a 0 before it stops? What about `mark%(0)`, the element we've ignored? Might this have something to do with it?

When you've understood how the program works, try adding a few more arrays like `age%` and getting the info to print out this information as well as the mark. And after that you can strain your brain with Program V.

This has three string arrays, each with three elements (ignoring the first). These elements are used to hold the names of the first three students in English, Maths and Computing. As you'll see from Figure 13, it's the same three each time, only the order has changed.

Although heavily disguised with a

Subject	First	Second	Third
English	Jan	Jan	Tom
Maths	Sam	Sam	Tom
Computing	Jan	Tom	Sam

Figure 13: The top three students in each subject

pair of nested FOR ... NEXT loops, the first part of the program is really the same as in all the programs so far. It just takes data from the data line

```

10 REM Program I
20 REM english(3), math(3), computing
30
40 FOR outer=1 TO 3
50 FOR inner=1 TO 3
60 IF outer=1 THEN READ english(3)
70 IF outer=2 THEN READ math(inner)
80 IF outer=3 THEN READ computing(inner)
90 NEXT inner
90 NEXT outer
100 PRINT "Press 1, 2 or 3"
110 INPUT choice
120 CLS
130 IF choice=1 THEN PRINT "English r
        res"

```

Program V

and stores it in an array. However in this case it's storing it in three arrays, the outer loop deciding which of the arrays is used by the inner.

The first time round the outer loop, outer is 1. The program then goes on to the inner loop which cycles three times, each time taking a name from the data list and putting it in an element of a string array. Since outer is 1, the array used is english\$(line 50).

When the inner loop has finished the outer loop starts again. This time outer is 2 and so the array chosen is math\$(line 60). I leave it to you to figure out what happens on the third cycle of the outer loop. Figure 10 shows the resulting array.

By the time the program gets to line 100, the three arrays have had

Array Element	1	2	3
English	Jan	Joe	Tom
Math	Joe	Jan	Tom
Computing	Jan	Tom	Joe

Figure 10: The array and their elements

their elements filled. You are now asked to press 1, 2 or 3 and, depending on your response, the top three in either English, Maths or Computing are displayed.

Can you alter the program so that when you enter a number it gives you the names of all the people who came first, or second or third? Think of parallel arrays and pointers.

No doubt some of you will be looking a bit askance at Program V and quite rightly. After all the

```

140 IF choice=1 THEN PRINT "Maths res
        ults"
150 IF choice=2 THEN PRINT "Computing
        results"
160 PRINT
170 FOR loop=1 TO 3
180 IF choice=1 THEN PRINT english(loop)
190 IF choice=2 THEN PRINT math(loop)
200 IF choice=3 THEN PRINT computing
        (loop)
210 NEXT loop
220 PRINT
230 DATA Jan,Joe,Tom
240 DATA Joe,Jan,Tom
250 DATA Jan,Tom,Joe

```

message "Press 1, 2 or 3" isn't all that informative. It should really tell you what happens if you do. And the input isn't wrapped. Try entering -2 or 5 and see what results. It would be much better to only allow inputs of 1, 2 or 3. I leave this to you.

Another criticism of Program V is that it's too long. Do we really need those two FOR...NEXT loops? The answer is no, as you'll see if you add the following lines to Program V:

```

10 REM Program Vc
40 REM no inner loop
50 REM this reads all values into an
        arr
60 READ english(inner),math(inner),
        computing(inner)
70 REM Joe (line seven five
80 REM but the data has to be re-organ
        ized
230 DATA Jan,Joe,Jan
240 DATA Joe,Jan,Joe
250 DATA Tom,Joe,Joe

```

Program Vc

Here the use of one READ for all the arrays has saved us a loop. However notice that the data in the data list has had to be put into a different order. The data list in Program V mirrored the data in Figure 11.

In Program Vc the data is arranged so that all the firsts are together, then the seconds and then the thirds. The program is shorter, but only at the expense of manipulating the information before it's presented to the program. While this is easy in this

case, imagine doing it for a class of 40.

The point to grasp is that while we may make the program simpler and more efficient, this has to be balanced against the amount of work that has to be done to the data to get it into the form that this simpler, more efficient program requires.

Now let's take a look at what we've done so far this month. We've seen how array elements can be used to hold numbers and strings. We've also seen how we can use the arrays to hold an ordered list. We can get an any element of a list by using the subscript as a pointer. And we're not only stuck to one array.

So long as we follow the same order, we can have a number of arrays and refer to the elements concerning the same subject by using just one pointer. And these parallel arrays, as they are known are powerful things.

But they're not as powerful as the two dimensional arrays we'll be dealing with next time. Until then I

```

10 REM Program Vc
20 REM results(3,3)
30 FOR subject=1 TO 3
40 FOR place=1 TO 3
50 READ result(subject,place)
60 NEXT place
70 NEXT subject
80 PRINT "Press 1, 2 or 3"
90 INPUT choice
100 CLS
110 IF choice=1 THEN PRINT "English r
        esults"
120 IF choice=2 THEN PRINT "Maths res
        ults"
130 IF choice=3 THEN PRINT "Computing
        results"
140 PRINT
150 FOR place=1 TO 3
160 PRINT result(choice,place)
170 NEXT place
180 PRINT
190 DATA Jan,Joe,Joe
200 DATA Joe,Jan,Joe
210 DATA Jan,Tom,Joe

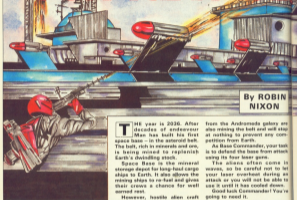
```

Program Vc

leave you to ponder Program Vc which does the same job as Program V but in a different way.

What's happening here? How come there are two numbers inside the DIM? And why is there only one array and not three? All will be revealed next month.

SPACE BASE



By **ROBIN NIXON**

THE year is 2020. After decades of endeavour Man has built his first space base - in the asteroid belt. The belt, rich in minerals and ore, is being mined to replenish Earth's dwindling stock.

Space Base is the mineral storage depot for long-haul cargo ships to Earth. It also allows the mining ships to re-fuel and gives their crews a chance for well earned rest.

However, hostile alien craft

from the Andromeda galaxy are also mining the belt and will stop at nothing to prevent any competition from Earth.

As Base Commander, your task is to defend the base from attack using its four laser guns.

The aliens often come in waves, so be careful not to let your laser overheat during an attack or you will not be able to use it until it has cooled down.

Good luck Commander! You're going to need it.

100 KEY
 110 KEY *
 120 KEY * SPACE BASE
 130 KEY *
 140 KEY * By Robin Nixon
 150 KEY *
 160 KEY * (c) Computing with the
 170 KEY * andTWO
 180 KEY *
 190 KEY *
 200 KEY
 210 SYMBOL WTOR 220-267 267 0-1
 220 SYMBOL 220, 0, 08, 24, 08, 08, 08, 24
 230 SYMBOL 221, 0, 0, 08, 120, 120, 04, 0, 0
 240 SYMBOL 222, 0, 24, 08, 08, 08, 24, 08, 0
 250 SYMBOL 223, 0, 0, 0, 0, 120, 0, 0, 0, 0
 260 SYMBOL 224, 0, 0, 0, 0, 0, 0, 0, 0
 270 SYMBOL 221, 0, 0, 0, 0, 0, 120, 0, 0, 24
 280 SYMBOL 222, 0, 0, 0, 0, 0, 0, 0, 0, 0
 290 SYMBOL 223, 24, 0, 15, 0, 0, 15, 0, 0, 24

300 SYMBOL 224, 24, 221, 08, 24, 24, 08, 221
 310 SYMBOL 225, 08, 120, 248, 120, 120, 248
 320 SYMBOL 226, 4, 0, 0, 0, 0, 0, 0, 0, 0
 330 SYMBOL 227, 24, 0, 0, 0, 0, 0, 0, 0
 340 SYMBOL 228, 22, 0, 0, 0, 0, 0, 0, 0
 350 SYMBOL 248, 15, 21, 0, 0, 0, 0, 0, 0, 0
 360 SYMBOL 241, 220, 220, 220, 220, 220, 220
 370 SYMBOL 242, 120, 0, 0, 0, 0, 0, 0, 0, 0
 380 SYMBOL 243, 248, 248, 220, 224, 220, 220
 390 SYMBOL 244, 220, 0, 0, 0, 0, 0, 0, 0, 0
 400 SYMBOL 245, 220, 224, 220, 248, 248, 220
 410 SYMBOL 246, 220, 220, 220, 220, 0, 0, 0

, 21, 15
 420 SYMBOL 247, 220, 220, 220, 220, 220, 220
 430 SYMBOL 248, 220, 220, 220, 220, 224, 220
 440 SYMBOL 249, 140, 08, 140, 08, 08, 140, 0
 450 SYMBOL 250, 24, 24, 08, 24, 120, 24, 220
 460 SYMBOL 251, 0, 08, 08, 220, 220, 0, 08
 470 SYMBOL 252, 24, 220, 24, 120, 24, 08, 24
 480 SYMBOL 253, 0, 08, 0, 0, 220, 0, 0, 0, 0
 490 CALL BACKS (1) 0, 0, 0, 0, 2, 2, 0, 0, 0, 0
 500 END (1) 0, 0, 0, 0, 0, 0, 0, 0, 0
 ON 2x PAPER DISK LOCATE 24, 2x PRT WTOR
 622 BASE*

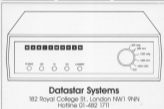
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C



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In a recent review I only touched upon the fact that there is the world of difference between stock control and stock recording. I also suggested that the software houses must not play on the fact that the average American user does not even realize that this difference exists.

In writing this piece I am not rubbishing stock recording, or other simple stock systems.

An analogy may make this point clearer. Just because we can not afford a Rolls-Royce is no reason to mock the Mats. The former is the ultimate while the latter is the first practical means of transport for many drivers.

Just the same situation exists in stock management systems. Stock control is the ultimate, whereas stock recording is your first practical system.

I well remember being run ragged trying to shoehorn a full stock control system onto a 5 1/4 18 bit mainframe with 330 megabytes of disc storage, the ability to run up to 32 programs concurrently, each with up to 10 files open.

Certainly the system had a very large number of customers, suppliers, items of stock and transactions to process, but even had these figures been far smaller a micro would have been as much use as triangular wheels on a bicycle.

The following list indicates the very least that needs to be carried out in a stock control system. The number of times any or all of these actions need to be done, or the value of the stock, is of no importance:

1. Record all stock items as they leave the warehouse.
2. Record all stock items as they enter the warehouse.
3. Record what is in the warehouse and fit for issue with what the computer records indicate.
4. Calculate when a stock-out will occur.
5. Calculate which items must be purchased in order to replenish the warehouse with just sufficient stock to meet the likely demand for those items.
6. Incorporate into all calculations:
 - a) The delay a supplier claims you will incur before receiving a delivery.
 - b) How accurate these claims prove to be.
7. Maintain a full cross-reference system so that if stock-outs occur due to unusually high demands for any item, suitable alternatives may be supplied.
8. Record all monies spent on stock, tied up in stock and committed to future purchases of stock, and so on.

TAKING STOCK

b) How accurate these claims prove to be.

7. Maintain a full cross-reference system so that if stock-outs occur due to unusually high demands for any item, suitable alternatives may be supplied.
8. Record all monies spent on stock, tied up in stock and committed to future purchases of stock, and so on.

JO STORK examines how far a micro can go down the road to full stock control

If this made your head spin, think what it does to a computer. Some of these actions are self-evident, but others need explanation. Take heart, it is not too difficult to understand, even if carrying them out has broken more than a spirit.

The businessman must know how many days' stock exists for every item in the warehouse. What complicates matters is that the rate at which even a single item is issued from the warehouse may be far from constant.

Many items are seasonal, weather-dependent, fashion triggered or have limited shelf life. A stock of 1,200 Christmas trees in February is the definition of bad news while you store them for nine months. Similarly, having only 1,200 at the beginning of November could cause a stock-out long before many children have seen their first Santa. Saying you sell an average of 35 Christmas trees per day

through the year is as nonsensical as having 35 days of fresh cream in the store.

The first thing that is required to achieve full stock control is therefore the ability to readily calculate the effects of when and how many items to order with the effects of the unpredictability of the demand for each item. The arithmetic is not particularly complex, but can only be achieved if an accurate history of every movement of every item over a reasonable period of time is available.

If you kept only 500 articles of stock, each of which have different variabilities of sales, you can now see that the computer must store plenty of sales history data as well as perform a fair few calculations.

Other factors need taking into consideration. Discovering you have 30 days stock for an item may not upset you. Phoning up your supplier and discovering he can not deliver any more for 50 days will ruin your day and hand the business to your competition. Consequently any stock system must, in this example, warn you at least 50 days in advance that an order needs to be placed for the item. This means storing the supplier's ability to replenish your warehouse.

Your supplier is in business to show a profit, and may have several "bats" available. They may allow discounts of increasing value, the more you purchase or the sooner you pay. Alternatively they may offer special reductions, such as on old products.

You, likewise, wish to operate profitably and so need to know these levels of discount as well as what are your stock-holding costs, borrowing costs and so on, if you are going to

have a sensible pricing policy which reflects the costs your suppliers charge, the amount of stored information has gone up again, as have the number of calculations required.

And I'm not finished yet. Let us take the case of a small workshop manufacturing Thingammys, each of which normally require a 3mm widget in their construction. If however, 3mm widgets are unavailable, either 2mm doodads or 4mm widgets are suitable but slightly more expensive alternatives. This has a couple of effects.

- The usage of the alternative parts, doodads, becomes higher than history indicated, thereby significantly raising the risk of doodads now stocking out.

- Replenishment of this alternative may require more or less time than does the original component.

Telling our Thingammy manufacturer that he is about to stock out of 3mm widgets is not enough. He must also know if his workshop will come to a complete standstill for lack of suitable alternatives being available at the same time.

The suggested replenishment of 3mm widgets which the computer offers next, therefore, take into account all the resources which are available, not just the most commonly applied. All this takes up yet more storage and requires still more processor power.

What should be clear, even from this brief summary, is why I too nearly failed to squeeze a full stock control system on to a medium sized mainframe. Equally evident should be why an Amstrad is not up to the task, and why the software supplier who calls his precious program a control system is incoherent or otherwise trying to hoodwink you.

Having said all this, do not write off the micro as a silicon joke. Providing you do not have more than about 300 stock items, 250 customers and 150 suppliers to manage, it is perfectly capable of performing some of the eight activities above. This will fall far short of full stock control, but can be extremely valuable nonetheless.

Examining the eight points which constitute stock control we discover that the Amstrad can handle the first two items in the list - recording the



"Telling our Thingammy manufacturer that he is about to stock out of 3mm widgets is not enough..."

acceptance from the suppliers into the warehouse and the issuing of the goods to the customers.

Come the bi-annual trauma of stocktaking the Amstrad can also compare what is on the shelves with what is in its records. However no worthwhile attempt is possible at computing how much of this stock is beyond dates and so on.

Provided your stock movements are moderately constant throughout the year - that is, you sell furniture not ice cream - then calculation of when stock-outs might occur is possible, as is a simple estimate of the replenishment level required. This will prove far from infallible, and many businessmen would be wise to over-ride the computer's recommendations on occasions.

So far, of the first five necessary actions I listed as being the most basic requirements of a stock control system, the Amstrad performs two in full and three in part. The 6th and 7th in my list are completely beyond a micro. It was these areas which created all my headaches on the mainframe.

As for the 8th and last, some coding is possible on the Amstrad. Simple calculations based on the value of the items entering and leaving the warehouse is reasonable, as is the value of the contents of the stores. It is the computations which

deal with forecasting what the future value of inventory will be which are impossible.

Adding all the eight steps together, we find a score of: $1+1+5+5+5+0+0+5=42=80\%$ for these activities. Far short of full stock control, as I said.

Returning to my early analogy, it would be stupid to be stuck at home for lack of transport merely because you can not afford a Rolls-Royce. Even simple stock recording systems can quickly pay for themselves, by saving you time and money compared to a pen and paper method.

My advice to you is **Do not be fooled by the claims of the software suppliers into thinking all your stock problems are over once you buy their wonder-child.**

When choosing your system ignore the advertising and look closely at the file sizes, the record contents and the data which can be reported. This will give you a short-list of those systems which appear to offer the necessary facilities, irrespective of the claims made. The final selection must be the package which is easiest to use.

Finally, before signing a cheque, ask yourself the question: "Am I disciplined enough to keep the records up to date at all times?" If you have any doubts, you had better stick to zapping aliens instead.

Amstrad Business Central
Purchase Ledger System,
Nominal Ledger System

Quest International
Computer Technology

AFTER 15 years of producing and supporting commercial systems I know the dilemma software houses face. They must trade off producing a package which is simple in use but contains few features, with producing a complete implementation which proves to be more than some people can handle.

Quest chose the latter option with this system, which made studying the features a lengthy task. Furthermore extra care was needed because I suspect that it is a conversion from another CP/M machine with more memory and larger files.

Regular readers may recall my writing of Quest's Stock Control System: "I look forward to reviewing the other parts of the combined business package which interface with this suite. This is particularly true of the purchasing aspects, which would complete the stock in - money out - stock out - money in loop".

This early report has increased since once again Quest provides vast amounts of extremely competitively priced software. Everything you could ever need and then some is provided. Furthermore, the interfacing between stock, sales, invoicing, purchases and the ledgers is first class. As you see, high price, and I could continue in this vein.

So why am I also criticise justifiably? The problem is that the convention has put these purchase and nominal systems out of touch with the stock system as far as the size of business is concerned. The following maximum figures illustrate this point.

400 nominal codes, headings, wages, heading, phones, purchases and so on, under which accounts may be posted is more than are needed by organisations turning over £20,000,000 on £100,000 mainframes. A company needing more

Mis-match 'twixt multi-national and corner shop

than 30-50 codes has grown beyond the Amstrad league.

3000 supplier accounts is about right for an Amstrad user, but 1,000 transactions a month is a disproportionately large number. This represents posting all accounts every four working days on average, which is blatant nonsense. The industry average is 25-30 working days. Again 1,000 entries/month represents a company far beyond the Amstrad league.

Such concern may appear trivial, but these two sales make no sense in isolation. They need considering in conjunction with the stock, invoicing and sales portion reviewed earlier. The very high maximum values mentioned are set by the CPC884's capacity, which is fair enough. Also there is no need to use every byte available and there is great merit in purchasing a system which can not be outgrown.

Unfortunately this same capacity sets the stock portion of the combined system a limit of only 300 different items for sale, which represents a tiny business unless it is an unusual trade.

You see what I mean by the scales being out of step. On the one hand there is sufficient capacity for a multi-national and on the other there is insufficient for a corner shop. Prospective users must reconcile this mix-match and remember that sound business systems need three things. These are reliable hardware, good software and a thorough systems analysis.

The Amstrad meets the first of these criteria. As with the earlier

modules you must use a twin disc system, placing the programs in A and the files in B.

Quest's software definitely fulfils the second criteria, provided you are not limited by the stockfile size. Furthermore the handbooks explain the operation very clearly.

It is the third area where problems will occur. Very few small businessmen can do this reconciliation. Also the handbooks give little aid in analysing the precise user needs or determining what parameters, headings, codes and so on are required by such a sophisticated system.

If you understand enough basic book-keeping to know which options to select and what the many financial fields represent you should have no difficulty in running the packages. If you are in the least bit unsure however, you need to purchase a good book-keeping text or even a mentoring of your accountant's time.

You'll also need help in deciding which features are superfluous. I believe one such could well be the automatic cheque-writing which I would hesitate to use in all but the largest organisations.

I can only say that if the package can be fitted around the business there is probably no better product, whether every option is used or not. The occasional system complexities encountered will reward the effort of their understanding.

Unfortunately there are few companies who can use it in its present form, even though all would do well to consider it. With minor re-working of the stock elements for the new PCWB156 it would be perfect.

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Last month DAVID McLACHLAN showed how to write a program to design word puzzles. Now he's come up with an aid to help solve them



W O R D J M U
 . B S Q U A R E
 G E C K O S R
 E D P R T U Z

MY old headmaster used to say: "It's easy enough to ask questions, the trick's answering them..." Well, last month we gave you a word square creator. Now we've come up with a program to help you solve previously created word squares.

Any data file produced by last month's program will contain a ready-made word square and a list of the words hidden in it. This month's program is designed to assist you to solve the word square contained in that file.

When you run it you'll be prompted to load one of your files and asked if you want a printout. If your reply is Y the word square is sent to the printer.

The puzzle is displayed in a box at the left-hand side of the screen with

the words hidden in it. These words are also listed to the right of the screen for reference.

In the top left corner of the box is a yellow cursor which you move using the corresponding arrow keys.

Move it to the first letter of a word which you think you have found then press Copy. A red block will be printed above the list of words to acknowledge that the start position has been selected.

Next move the cursor in the direction that the word is displayed. Remember, it can read in any direction and even be displayed in reverse.

When you reach the end letter "set" it using the Copy key and a second red block will be displayed alongside the first, acknowledging that the end position has been

selected.

The list will then be searched for the word you have indicated. If a match is found, an asterisk is placed alongside the word in the list indicating that it has been located correctly. The word in the box and its counterpart are then highlighted by changing their colour to red.

If the search fails to find a match this is indicated by a beep.

When you locate a correct word the elapsed time is printed at the bottom of the screen. This will enable you to have word square competitions with friends.

When all the words have been found you will again be asked if you want a printout. If your reply is Y the word square is printed out and can be marked with the solution for later reference.

Wordsquare

```
10 REM wordsquare solver
20 REM: Computing with the Asdrad
30 REM by David McJannet
40 REM from an idea by Davis Edwards
50 WORD = 1
60 WORD = 0
70 PRINT "Enter file name " ; INPUT file
80 IF LEN(file) < 1 THEN PRINT "ERR:": GOTO 10
90 LOCATE 1,2:PRINT "Print out: " ; WORD
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980 LOCATE 1,2:PRINT "Print out: " ; WORD
990 LOCATE 1,2:PRINT "Print out: " ; WORD
1000 LOCATE 1,2:PRINT "Print out: " ; WORD
```



Give your fingers a rest ...
All the listings from this month's issue are available on cassette.
See our special offer on Page 93.

ROLAND WADDILOVE'S Variable Dump takes the slog out of error checking

VARIABLE Dump is a short machine code routine to add an extra command `!VARDUMP` as an `RXX`. It simply lists all the variables that have been used by a Basic program.

Why would you want to list all the variables? Well, suppose you typed in a listing and it didn't behave as expected when run. It's most likely to be a simple typing slip.

One of the features of Locomotive Basic is that it will create an additional variable every time it comes across a word it doesn't recognise. So if the program uses a variable called `start` and you accidentally typed `scare` instead it would add `scare` to its list of variables. By printing all the variables it's easy to spot any that have been entered incorrectly.

The program must be run before using `!VARDUMP`. After each variable name it waits for a key to be pressed. This is to prevent long lists of variables scrolling off the top of the screen.

To understand how the routine works we need to know how the Amstrad stores its variables. These are stacked up in the memory starting at the end of the program. Arrays are always placed at the end of the variable stack. All other variables are inserted before these.

It'll call the address of the end of the program currently in memory `TOP`. The value of `TOP` is stored at `&A686` if you have Basic 1.0, and at `&A685` if you have Basic 1.1. The `CPC664` has Basic 1.0 and the `CPC6128` has Basic 1.1.

The lowest point in the memory which is free I'll call `LOWMEM`. This is the top of the variable stack. Basic 1.0 stores `LOWMEM` at `&A690` and Basic 1.1 stores it at `&A68C`.

The end of the normal variables and the start of the arrays is stored at `&A697`, Basic 1.0 and `&A69A`, Basic 1.1.

Variable Dump prints the ordinary variable names list, if there are any.

Check your variables to spot your mistakes

These are stored between `TOP` and the start of arrays. Of course if these two values are the same then there aren't any.

When Basic stores the variable it ANDs the characters of the name with `&DF` to convert any letters to upper case. This has the unfortunate effect of converting any numbers in the name to Ascii values below 31 - reserved for control codes. The last letter of the name is marked by setting bit 7 of the Ascii code.

To print out a variable's name the characters are ANDed with `&7F`, then ORed with `&20`. This restores the name.

The byte in memory immediately following the variable's name indicates what type it is. An integer is 1, string 2 and real 4. A % sign is printed after integers' names and a \$ sign after strings.

The address of the next variable name is found by adding the space taken up by the variable to the address of the type byte. Integers take up 5 bytes, reals 8 and strings 6.

Remember that the actual string is placed at `HMEM`. The data in the

variable stack is the string descriptor giving the name, length and address of the string.

A separate routine is required to handle arrays. The name and type is printed out in the same way, followed by a pair of brackets to show that it is an array.

The actual space taken up by the array depends on the number of dimensions and elements there are. The two bytes following the type byte tell us how much space has been reserved. The next variable is stored at the address of these two bytes plus their contents plus 4.

If the address of the next variable is equal to `LOWMEM` all the variables have been listed.

Program 1 is a Basic listing with the machine code stored in state statements. Run this and call `&A000` to enable the `RXX`. Program 11 is an assembly listing of the routine.

You should find debugging a lot easier using Variable Dump to list all the variables. Now all we need is a routine to tell us which line the mispelt variable is actually in.

Can anyone help?

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Two dominate the Top Ten



ADVENTURE TOP TEN

1 Adventure Quest	Level 5
2 Return to Eden	Level 5
3 Lords of Time	Level 5
4 Colossal Adventure	Level 5
5 The Hobbit	Melbourne House
6 Emerald Isle	Level 5
7 Heroes of Karn	Interceptor
8 Jewels of Babylon	Interceptor
9 Message from Andromeda	Interceptor
10 Forest at Worlds End	Interceptor

THIS month sees the first of the Adventure Top Tens. As you can see, Level 5 and Interceptor have virtually dominated it. The only other software company to have got in is Melbourne House with *The Hobbit* and deservedly so, in my opinion.

Keep sending in your marks and we'll publish another Top Ten in a few months. Now for the latest releases.

Dun Durech Gargoyle Games

I imagine that many of you who read this column consider a reviewer's

job to be an easy one, and generally you would be right. Every so often though, an adventure comes in that makes it a nightmare and *Dun Durech* is one such.

You play Cuchulainn and your task is to rescue your friend Loag who has been kidnapped by Sear, a sorceress, and taken to the secret city of Dun Durech.

You begin in the streets and, although I can give you tips on making money, finding secret doors and getting maps, I still haven't worked out what I need to know to rescue Loag or even where he is.

The game is completely graphical. All the actions necessary are performed by single key input. The views are displayed as though you were on the same level looking sideways on to Cuchulainn and a key press will start him moving either to the left or the right.

Other characters will often pass by, sometimes stealing things from him in the process.

Objects can be picked up and offered to other characters and shops can be entered and goods purchased.

VERDICT: This is probably the best graphic adventure I have seen.

The Island of Middle Redbeard

Not every text-only adventure has the added bonus of an opportunity for every purchaser to win a prize.

For every copy sold Redbeard will

Competition winners

THE response to September's competition for the most maps and solutions was phenomenal. Winner was G.V. Wright with 14 complete maps and solutions. Brian Standing and Adrian Steel sent in nine and eight solutions respectively so I decided to award them all some software.

The prize winners were:

G.V. White: Peter Gerards book *Exploring Adventures on the Amazon*, *Mystery of the Java Star*, *North Sea Bullion*, *Elden*, *Shadow of the Bear*, *Mardona*

Quest, *The Trial of Arnold Blackwood*, *Arnold Goes to Somewhere Else*, *Castle Dracula*, *Warlord* and *Dun Durech*.

Brian Standing: *Castle Blackstar*, *Alan*, *Smugglers Cove*, *Message from Andromeda*, *Forest at Worlds End*, *Ring of Darkness*, *The Wise and Fool of Arnold Blackwood* and *Mission One: Project Volcano*.

Adrian Steel: *Snows Fall*, *Angolique*, *Queen Tulla*, *Ice Station Zero*, *Faerie*, *Mountain Palace Adventure* and *Colossal Cave Adventure*.

put £1 into a deposit account and in July the names of all the people clever enough to have solved the riddles in the game will be put into a hat. The first name pulled out will win the contents of the account.

Your task in this game is to escape from a desert island. You start on the north shore of the island and a nearby cave complex will soon have you striking a light – literally.

The caves can be mapped if you have the patience – there are only 10 locations there. If you check your possessions you will find yourself faced with the first riddle and an object that will have you at – and past – an earlier impasse.

That's enough help, there's a price

Adventuring with Gandalf

at stake here!

Backboard didn't send me an entry form for the competition, not that I blame them. It wouldn't have done me any good anyway, I still haven't found an answer to that first riddle, let alone the others I have come across.

Although the documentation makes no mention of it, I am certain that this game has been written using Glibb's Quill.

Reading this in mind, and the fact that the documentation is very basic, I feel that the game is over-priced.

Admittedly there is a possibility of your winning a prize and the game itself is very good, easy to get into and very hard to get out of.

VERDICT: A very clever adventure that I recommend. I would feel happier if it was cheaper and, if it has been "Quilled" I think that purchasers should have the opportunity of knowing this before they buy.

Martina Quatt
Melbourne House

This is advertised as being the author's sequel to Classic Adventure and, from the mail I have been receiving, it seems to be just as hard,

Hints Dept.

Andrew Burgess wants to know how to get into the boat to cross the river and how to get down the crossed wall in Forest of Wanda Feal. Climb into the boat. The wall is closed.

G. Frewitt and Stuart Mackie are having trouble with Messages from A. Robinsons. To turn off the computer you need a key. To get past the mirror room point the laser at the plate. What do you do with the raised disk on the glass pedestal? Fill it with something.

A. James, Sean Frewitt and Barry Howell need help with Joseph of Babylon. To get past the cannibals just watch what you are doing. You don't come back across the bridge – there is another way out. To use it you should cross the pit and look west.

Mark Wechner wants to know where the plank and matches are in Glass of Studies. The matches are through the ice room and the plank just before it. You'll get into a blocking one if you can't get through the ice room – be careful, the second answer you think of is probably the right one.

Stuart Mackie would like to know how to buy the power driver from the innkeeper in

Emerald Isle. Use the reward money you get by dropping the water in the police station.

Sean Frewitt can't find the stick in Return to Eden. How've you been up the tree in the forest yet? Then go across the strengthened Eagle branch (don't come around here!). No? Then don't chase the meager out, it's a social cuber.

The wood pile is a good place to start. The south platform will ease your load and the north one will escalate the situation. The blue berry sounds useful and would feed to a tricky situation.

George DeLaCour seems to be having a lot of problems with Heroes of Karn. The main thing to remember is that it is usually one of the Dead Heroes who implements the solution. Magic will soothe the spider.

A weapon will kill the phoenix but remember its reputation and shed a few tears on the ashes when it dies. An eagle predator will tackle the bat. What would you sacrifice a piece with? To get the jade flower without it breaking requires that you cushion its fall.

Watering a very thorny plant will raise your chances of finding the silver coin.

though you will be glad to know that I have yet to find or receive any letters about bugs in it.

Your task is to save the universe from destruction by collecting the lost components of Mardon's immortality machine and returning them to him.

I can't tell you a great deal about this adventure as I've barely out of the first few zones. But from what I've seen so far it is going to be very difficult to finish.

Melbourne House say that there are about 150 locations and a 600 word vocabulary. Your quest will involve travel from the distant past to the far future.

VERDICT: An extremely good text adventure that I cannot help but recommend. I'm so impressed by it in fact, that I will

give an adventure to the first person to send me a full solution. Don't forget to send me a list of the adventures you have already though, or you could end up with a second copy.

Red Moon
Level 3

Long, long ago the world was full of magic and many mythical beasts roamed the land. Numerous magicians were always interfering in other people's business or taking us ancient torments.

The moon was red then but, by those wise enough to ask, it was realized that the moon was turning pale, becoming whiter each time it eclipsed the sun. Millennia passed

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and eventually it was realized that the peering of the moon was causing magic to fade from the land.

In a desperate attempt to retain some of their power, the wisest and strongest of the magicians met and realized some of their being into the formation of a red moon crystal.

The crystal was set into a tower in an island far away and when the moon became forever white the island became the last bastion of magic on the earth.

Over the ensuing years, as the memory of abundant magic faded, the island became a shrine. Pilgrims flocked to it, hoping that under the crystal's influence they too might become magicians.

One, disappointed in his failure stole the crystal and fled. The island's council met and the most powerful magician was chosen and given the task of finding the culprit and returning the crystal.

Unfortunately, when he got home he found that the newest and stupidest of his apprentices had taken the only means of transport off the island.

Summoning the last of his fading power, the magician sent a telepathic call to his apprentice giving him the task of recovering the crystal. You play the part of that apprentice.

Until Brian Stenning sent in a map to this adventure I was quite bogged down in it. I therefore have to disagree with his verdict that it is disappointing and quite easy to solve. It is easier than others from Level 8,

but that still makes it better than most on the market.

The packaging has been reduced, as has the price. The inlay is now pulled out from behind some plastic shielding on the outside of the cassette box.

A lot of software houses seem to be doing this now and I wish they wouldn't. The plastic always seems to come off, leaving you with nowhere to put the documentation.

This is the first program I have found that crashes if you have Micropower's ROM box fitted and you should remove it before attempting to load it. Knowing Level 8, I expect they will write in with a fix to overcome the problem.

VERDICT: I find it very hard to criticize anything that Level 8 produces. However, I do think that they should go back to text only games. *Red Moon* is good, but nowhere near the standard of *Dungeons Adventure* or *Adventure Quest*. Still, it's a good graphics adventure that I recommend.

Elbow Opinion

This is an arc-venture in which you have to guide a fairy around a forest to find seven potions that are then to be used to restore life to seven flowers in order for them to bloom.

If that description puts you off, don't let it. I've spent over two weeks

trying to complete this game and I don't think I'm any nearer the end than when I started.

So far I have mapped out over 200 locations and found nine objects, only one of which, a bottle, looks as though it could be one of these potions.

Some of the objects will help you to deal with the nasties that inhabit the forest. For instance, the spider will kill the swarm of white diamonds and the leaf the purple ones.

However, the loss of energy involved usually meant my demise within a couple of moves anyway.

Two locations have the complete stampede - the repeller field and the spider room these locations north and one west of the start.

I forgot to mention the spiders, didn't I? Generally they are inviolable, so are virtually impossible to avoid. The only way past them seems to be to just get in and out as fast as possible.

Unfortunately, this doesn't work when trying to go north from the spider room I've mentioned. Something must kill them. I just wish I knew what.

You are given a quantity of energy for each of your five lives and contact with anything except the objects I have mentioned and lucky horseshoes which increase your score, will deplete that energy.

VERDICT: A very impressive game with good graphics. Recommended.

SOS Dept.

David Donnelly has written in asking how to get past the fly traps to get the case of SP in Pyjamas. I haven't seen this yet, so can anyone help him? He has also enclosed some tips for the game.

The triangle key from the rocket room opens the room in the fuel room on level one.

It can also be used to get the orb from the fuel room by going into the inner room and then jumping onto the table.

You need the library ticket to get the library book from the spare bedroom.

Andrew Burgess wants to know

how to get past the haunted room in *Demis of Sarcadia*. I think you need a lot of bottles for this one, but does anyone know for certain?

Sharon Wigglesworth says you shouldn't be afraid of lowering your own trumpet if you want to get down the precipice in *Forest of Worlds End*. I'm glad to hear you have become "hooked" on adventures. Sharon, I too am a saint-fantasy level fiction reader. I should think that anyone who likes sci-fi would love adventures too.

Sarahman (sic!) has sent in a full map and list of uses for objects and characters in *Warlords*. Anyone who wants a copy should send the

usual size. He goes on to say that in his opinion it is the best adventure yet from Interceptor and that it has good graphics - I agree.

David Mackin asks for help with *Subzero*. I still haven't seen this. He can't stick the map together, open the safe or put the aerial in the torpedo tube. Can anyone help?

Jehney Edgaard writes from Denmark to say that you have to fight the wolves in the forest on the eastern side of the river before the nymph will appear and give you the ring in *Forest at Worlds End*. Many thanks Jehney, what's the adventure scene like in Denmark?

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Big on letters, small on space ... that's ROBIN NIXON's magnifying program

YOU may remember Glyne Davies' superb large character utility in the September issue of Computing with the Amstrad.

Although it is an excellent program, being rather large it takes up a lot of room - especially if you want to use large letters for a title page or a game screen layout.

For those of you who, like me, hate to do too much typing when it can possibly be avoided, may I present Mini Magnifier.

This is really a three line program. Line 220 sets up the colours and defines the functions. Lines 40000 and 40010 are the Mini Magnifier subroutine. In the listing, lines 230-280 could be replaced with statements of your own choice.

The program works by setting Symbol After to 32. This means that all characters after 32 (space) can be re-defined. To enable this to be done your Amstrad places a copy of the character set just below Hlines and reuses Hlines to one character below the character set so that it cannot be overwritten.

Without going into unnecessary detail, each character definition is stored in a sequence of eight bytes. These correspond to the eight parameters following a Symbol command. This therefore gives us a quick and simple means of finding out the definition of any character.

To produce his large letters Glyne Davies fills in each block of a character by drawing lines. In Mini Magnifier the boundaries of the block are worked out by functions 21 to 24.

Then a graphics window is defined and cleared to a chosen colour.

This is a much faster method, but it has one disadvantage. The minimum screen width of a graphics window is the width of a character in Mode 2 - one byte.

This means that if you want small large letters (if you see what I mean) you will lose out on definition. No problem! Use Glyne Davies' program.

On the CPC464 there is really no way around this difficulty, as you haven't got a fill command. You can either have slow, good definition large characters or fast, medium definition large characters. You play your money and takes your choice.

To use Mini Magnifier you type line 220 as the first line of your program. This initializes the subroutine.

Then to print large text you need to define the six variables mentioned in the Major Variables panel. Having

defined them you then 00000 40000 and hey presto!

For future use I suggest you delete all the REMs and lines 230-280. Make line 220 into line 1 and save the program. It will then be possible to re-use Mini Magnifier with most programs.

```

000 REM *****
010 REM *
020 REM * 810000 *
030 REM *
040 REM * By R.NIXON *
050 REM *
060 REM * c) Computing *
070 REM * with the *
080 REM * AMSTRAD *
090 REM *
100 REM *****
110 REM
120 CALL M0C0+M0R0+M0C0 BY 0000
M0R0=32:007 FN1=075:020+040:007 FN
020=075:020+040+040:007 FN2=020+17:02
030=040+020:020+040:007 FN3=(020+00:020)
+020+(020+040+040:007 FN3=(040 AND 075)
030:020
130 020+"Computing" 020+020:020+020
+1:020+FN 020+1:020:0000
140 020+"with the" 020+020:020+020:020
+1:020+0:020+0:020:0000
150 020 020+0007040*020+14:075:020+120
+1:020+0:020+020:020:0000
160 0075 040
00000 FOR 02040 TO 020:020+1:020+040
020:020:020+0:020+0:020:020+0 TO 0
+1:020+020:020+020+020+020+020:020
TO 0 STEP -1:IF FN2 THEN 020:0:0:0
FN2,FN3,FN4,FN5:020:020 020
00000 NEXT 020:020:020:RETURN

```

MAJOR VARIABLES

X0,X1 Top left hand corner of where you want printing to start.

C0 Colour you want your text to be printed in.

W0,W1 Width of each character.

H0,H1 Height of each character.

T0 Text you want printed.

FUNCTIONS

FN23, FN21 Work out the top left coordinates of a block.

FN24, FN22 Work out the bottom right coordinates of a block.

FN25 Decides whether or not a block is to be printed.

Know your odds

THE theory of random numbers grew out of gambling in the 18th century as cards and dice were closely studied by mathematicians trying to explain certain paradoxes.

Their results were largely ignored by players who either misunderstood the calculations or, quite properly, argued that psychology and temperament were more important.

For example, and without question, Poker is the card game for professional gamblers and there are just four simple rules for winning namely:

- Always play for money on the table.
- Always play with people you know.
- Do not drink when playing.
- Last (and least) know the game and the odds.

Now knowing the odds may be the least important, but it is essential and also the most difficult to learn and apply correctly. To give a feel for poker odds I have written a simple program, Listing 1, which will deal and classify poker hands. Incidentally this is also a standard test for a random number generator.

There are nine classes of poker hands. These and their "pot" probabilities are shown in Table 1.

The program detects a hand with at least one pair by using the array

Aleatoire keeps a poker face and deals out some good advice for card game players

pair() to find cards of similar value and, via a multiplication trick it can classify such a hand immediately. Particular examples, showing what is generated in this array are shown in Figure 1.

On exit the variable p has been set to the highest integer generated by the multiplication trick. These are shown highlighted in Figure 1. Note that the case of a full house (three of a kind + a pair) does not give a unique value, but depends on the order of the cards.

You can verify this, and also see how the multiply trick works, by calculating the values of p and pair() for all created by the lines 270-300 (see Figure 1).

Readers are invited to verify that any other ordering of a full house, say 3,4,3,4, will always finish with p set to 32 or 64.

If p is still 2 at the end of the pair check, further tests are made for a straight and/or flush in lines 430 and 440. I leave it to the interested reader to work out how these work and also to extend the program to count the hands falling into the various

categories and compare the results with Table 1.

Now this is only the very beginning of "knowing the odds", because they are further complicated in the real game by rounds of betting, exchanging cards and bluffing. Nevertheless, it would seem obvious that if you have a better than average hand then you should always play.

By better than average I mean that if there are N people playing and you have a hand that can beat $(N-1)/N$ of the possibilities then you have the advantage - this is a fallacy because the penalty for failure is all important.

To demonstrate this, consider the very simple game of Montana Red Dog. To get a hand each player must put an "ante" into the pot. He then receives five cards and must decide either to pass or to try to beat, by suit and value, the next card in the deck. If he plays and wins he takes the ante pot.

If, however, he plays and loses he has to double the pot, but he can also immediately ante for another hand. Note that four aces in this game is a certain win but (at 64,132 to 1) is

1. High card	1 to 1
2. Pair	1.4 to 1
3. Two pair	30 to 1
4. Three of a kind	48 to 1
5. Straight	254 to 1
6. Flush	508 to 1
7. Full house	693 to 1
8. Four of a kind	4164 to 1
9. Straight flush	84873 to 1

Table 1 Hand probabilities

```
10 DIM v(13),pair(13),mult(13)
20 FOR i=1 TO 13
30 READ v(i)
40 NEXT i
50 DATA 8,2,3,4,5,6,7,8,9,1,1,1,1
60 v(i)=v(i)*v(i)+v(i)+v(i)+v(i)+v(i)+v(i)+v(i)+v(i)+v(i)+v(i)+v(i)+v(i)+v(i)
70 pair(i)=v(i)
80 FOR i=1 TO 13
90 pair(i)=v(i)
100 NEXT i
110 flush=0
120 IF v(1)=v(2) THEN flush=flush+v(1)
130 IF v(2)=v(3) THEN flush=flush+v(2)
140 IF v(3)=v(4) THEN flush=flush+v(3)
150 IF v(4)=v(5) THEN flush=flush+v(4)
160 IF v(5)=v(6) THEN flush=flush+v(5)
170 IF v(6)=v(7) THEN flush=flush+v(6)
180 IF v(7)=v(8) THEN flush=flush+v(7)
190 IF v(8)=v(9) THEN flush=flush+v(8)
200 IF v(9)=v(10) THEN flush=flush+v(9)
210 IF v(10)=v(11) THEN flush=flush+v(10)
220 IF v(11)=v(12) THEN flush=flush+v(11)
230 IF v(12)=v(13) THEN flush=flush+v(12)
240 IF flush=0 THEN pair=1
250 IF flush>0 THEN pair=flush
```

Listing 1 Program to deal and classify poker hands

Hand	A	2	3	4	5	6	7	8	9	T	J	Q	K	Value
A 2 3 4 5	3	2	2	2	2									No pair
A 2 3 4	4	2	2	2										Pair
4 4 5 5 6				4	8	2								Two pair
2 2 3 6 9							16	2	2					3 of a kind
T T T J J										16	32			Full house
Q Q Q Q K												256	2	4 of a kind

Figure 1: Values generated by the array `pair[]`

For the case of TTTJJ we get			But for the case of TTTJJ we get!		
Card	Value	<code>pair[]</code>	Card	Value	<code>pair[]</code>
T	16	2 -> <code>pair[10]</code>	T	16	2 -> <code>pair[10]</code>
T	16	<code>pair[pair[10]] = 4 -> pair[50]</code>	T	16	<code>pair[pair[10]] = 4 -> pair[10]</code>
T	16	<code>pair[pair[10]] = 16 -> pair[50]</code>	J	11	2 -> <code>pair[11]</code>
J	11	2 -> <code>pair[11]</code>	J	11	<code>pair[pair[11]] = 8 -> pair[11]</code>
J	11	<code>pair[pair[11]] = 22 -> pair[11]</code>	J	11	<code>pair[pair[11]] = 64 -> pair[11]</code>

Figure 2: How the card order changes the value for a full house

unlikely to be dealt, particularly when there is a pot worth winning.

Let us assume that you only bet when you can beat half the remaining cards in the deck. This strategy is simulated by the program in Listing 11, and I invite the reader to run it just to see how quickly you will go broke when betting with the odds just in your favour.

You can then alter line 70 so that it only bets on even-money favourable odds, for example:

```
16 IF 604.75 THEN 38
```

means it will only try when it can beat

75 per cent of the remaining cards. This will take longer, but will still go broke.

Note that if you only bet on even certainties you are liable to lose your money by continually paying the ante for a hand but never playing it.

This game featured in an episode of the Western series *Alias Smith and Jones*. Our heroes had been working a gold mine with three other prospectors and, snowed in for the winter, decided to pass the time playing *Red Dog*.

For months the pot stayed reasonable, but eventually, and

inevitably, a streak run of bad cards occurred, the pot became enormous and no one could either afford or dare to risk the losing penalty.

Eventually Hannibal Hayes, by carefully watching the discards, received a fairly mediocre hand which nevertheless he knew could beat all remaining cards. He bet on this certainty, won all the money and explained that the only sensible way to play such games is a very long period of waiting for the pot to grow plus another wait for the right hand.

Successful gambling really is 99 per cent a game of patience.

```
248 IF card1 AND last1:last THEN 11a
249 11a
274 IF pair1:val14 THEN 294 ELSE 3a1
:reval1=0
284 GO TO 248
294 pair1:val1=0
300 pair1:val1=0
318 last:rest
328 NEXT card
338 FOR card=0 TO 5
348 last1:val1:card1=0
358 NEXT card
```

```
248 IF p=0 THEN 428
274 IF p=4 THEN PRINT"pair"
300 IF p=8 THEN PRINT"two pair"
334 IF p=16 THEN PRINT"3 of a kind"
400 IF p=32 OR p=64 THEN PRINT"full h
ouse"
410 IF p=128 THEN PRINT"4 of a kind"
428 GO TO 188
430 IF high:low THEN PRINT"straight"
"
440 IF flush THEN PRINT"flush" ELSE P
RINT
450 GO TO 188
```

```
18 money=100
28 pot=0
38 money=money-1
48 pot=pot+1
58 PRINT pot
68 r=0:0
78 IF r=0,3, THEN 88:else
88 IF r=0:00 THEN 88:else
98 money=money-pot : 1000
108 pot=pot+1
118 IF money=0 THEN 28
128 PRINT"broke"
```

Listing 11: The Red Dog Algorithm

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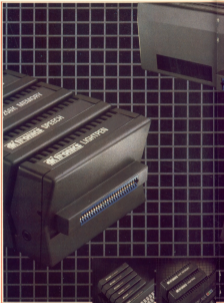
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TIME TESTER

THIS is an educational game to help children between about four and eight learn how to tell the time.

Timezoo has an attractive display and includes the reward of a simple maze game for repeated correct answers. This, plus a hi-score table,

helps to keep the children's interest.

The program draws a clock face with randomly set hands and, depending on the level of play chosen, asks for the time in different ways:

Level 1: Choose from four answers in the form: ten past five, quarter to

six.

Level 2: Choose from four answers in the form 3.05, 10.20.

Level 3: Type in the time in the form 3.05 without any choice of answers.

A game consists of 12 clock faces, after which a score and rating based upon level, speed and accuracy is given.

Since only the time between the answer being requested and entered counts, the child can study the display as long as he or she wishes before moving on to the next question.

This is especially useful when they've given a wrong answer. The maze game reward is optional and is

VARIABLES

AB, BB	Time descriptions.
X, Y	Location and control variables.
RS	Used in DRAW() functions.
SCORE, SCORE2	Scores.
HI	Arrays used in hi-score table.
NAME, GRADE	
LEVEL	Level of play.
DOES	Number of turns.
GAME	Control of whether maze game to be offered.
INROW	Count of correct answers in a row.
HOUR, HON, HOUR2	Times used during maze game.
MINUTE, MI, MINUTE2	
TIM	Array holding alternative answers.
NUMS	Numbers required.
NUMC	Number of correct answer.
R	Answer given.
IS	Answer input.
SHAPE	Array holding data of hand shapes.
TOTIM	
START	Timing speed of answers.
ANSW	
MAZE	Control array for maze locations.
LOOP	Drawing maze game display.
LOSE	Whether maze game won.
LB, T	Location and control variables.
DATUM, DATUM1	Timing maze game.

SUBROUTINES

500	Set NAME.
1000	Initialize variables, set up array of hand data.
2000	Initialize code for double height and screen center.
3000	Initialize.
4000	Initialize/new game.
5000	Draw clock display screen.
6000	Get question.
7000	Choose alternative answers - levels 1 & 2 only.
8000	Choose answers given - all levels.
9000	Input answer - level 3 only.
10000	Score routine.
11000	Hi-score table.
12000	Maze game.
13000	Time price routine for level 1.
14000	Time price routine for level 2.
15000	Sound data.
16000	Main sound routine.
17000	Format and print score.
18000	Double height.
19000	Win sound routine.


```

TIME,2,10:00:00,2,10:00:00,2,10:00:00
600 IF HOUR.5 THEN hour=hour+ 0.5
hour=hour+1
610 IF HOUR.5 THEN minute=minute+0.5
ELSE minute=minute+1
620 FOR x=0 TO 1
630 IF HOUR.5 THEN hour=hour+minute
GOTO 610
640 IF HOUR.5 THEN hour=hour+0.5 ELSE
hour=hour
650 IF HOUR.5 THEN minute=minute+0.5
minute=minute
660 IF hour THEN hour=hour+1 ELSE IF
P hour THEN hour=hour+1
670 IF x=0 THEN x=1 ELSE IF x=1
THEN x=0
680 time,2,hour:time,2,mi
690 FOR x=0 TO 10 IF time,2,minute,1
+ hour:time,2,minute,1 AND x=0 THEN
hour ELSE NEXT
700 x=x+1:LOCATE 24,2:PRINT x:GOTO
690:GOTO 700
710 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
720 NEXT:LOCATE 25,1:PRINT"Wait!"
GOTO 730:GOTO 730
730 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
740 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
750 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
760 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
770 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
780 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
790 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
800 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
810 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
820 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
830 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
840 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
850 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
860 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
870 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
880 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
890 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
900 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
910 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
920 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
930 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
940 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
950 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
960 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
970 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
980 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
990 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300
1000 IF hour THEN time,1,1=0:GOTO
12000 ELSE GOTO 12300

```



```

LOCATE 25,2:PRINT"Tell the time!"
GOTO 600
600 LOCATE 25,2:PRINT"Wait!"
GOTO 610
610 LOCATE 25,2:PRINT"Wait!"
GOTO 620
620 LOCATE 25,2:PRINT"Wait!"
GOTO 630
630 LOCATE 25,2:PRINT"Wait!"
GOTO 640
640 LOCATE 25,2:PRINT"Wait!"
GOTO 650
650 LOCATE 25,2:PRINT"Wait!"
GOTO 660
660 LOCATE 25,2:PRINT"Wait!"
GOTO 670
670 LOCATE 25,2:PRINT"Wait!"
GOTO 680
680 LOCATE 25,2:PRINT"Wait!"
GOTO 690
690 LOCATE 25,2:PRINT"Wait!"
GOTO 700
700 LOCATE 25,2:PRINT"Wait!"
GOTO 710
710 LOCATE 25,2:PRINT"Wait!"
GOTO 720
720 LOCATE 25,2:PRINT"Wait!"
GOTO 730
730 LOCATE 25,2:PRINT"Wait!"
GOTO 740
740 LOCATE 25,2:PRINT"Wait!"
GOTO 750
750 LOCATE 25,2:PRINT"Wait!"
GOTO 760
760 LOCATE 25,2:PRINT"Wait!"
GOTO 770
770 LOCATE 25,2:PRINT"Wait!"
GOTO 780
780 LOCATE 25,2:PRINT"Wait!"
GOTO 790
790 LOCATE 25,2:PRINT"Wait!"
GOTO 800
800 LOCATE 25,2:PRINT"Wait!"
GOTO 810
810 LOCATE 25,2:PRINT"Wait!"
GOTO 820
820 LOCATE 25,2:PRINT"Wait!"
GOTO 830
830 LOCATE 25,2:PRINT"Wait!"
GOTO 840
840 LOCATE 25,2:PRINT"Wait!"
GOTO 850
850 LOCATE 25,2:PRINT"Wait!"
GOTO 860
860 LOCATE 25,2:PRINT"Wait!"
GOTO 870
870 LOCATE 25,2:PRINT"Wait!"
GOTO 880
880 LOCATE 25,2:PRINT"Wait!"
GOTO 890
890 LOCATE 25,2:PRINT"Wait!"
GOTO 900
900 LOCATE 25,2:PRINT"Wait!"
GOTO 910
910 LOCATE 25,2:PRINT"Wait!"
GOTO 920
920 LOCATE 25,2:PRINT"Wait!"
GOTO 930
930 LOCATE 25,2:PRINT"Wait!"
GOTO 940
940 LOCATE 25,2:PRINT"Wait!"
GOTO 950
950 LOCATE 25,2:PRINT"Wait!"
GOTO 960
960 LOCATE 25,2:PRINT"Wait!"
GOTO 970
970 LOCATE 25,2:PRINT"Wait!"
GOTO 980
980 LOCATE 25,2:PRINT"Wait!"
GOTO 990
990 LOCATE 25,2:PRINT"Wait!"
GOTO 1000
1000 LOCATE 25,2:PRINT"Wait!"
GOTO 1010
1010 LOCATE 25,2:PRINT"Wait!"
GOTO 1020
1020 LOCATE 25,2:PRINT"Wait!"
GOTO 1030
1030 LOCATE 25,2:PRINT"Wait!"
GOTO 1040
1040 LOCATE 25,2:PRINT"Wait!"
GOTO 1050
1050 LOCATE 25,2:PRINT"Wait!"
GOTO 1060
1060 LOCATE 25,2:PRINT"Wait!"
GOTO 1070
1070 LOCATE 25,2:PRINT"Wait!"
GOTO 1080
1080 LOCATE 25,2:PRINT"Wait!"
GOTO 1090
1090 LOCATE 25,2:PRINT"Wait!"
GOTO 1100
1100 LOCATE 25,2:PRINT"Wait!"
GOTO 1110
1110 LOCATE 25,2:PRINT"Wait!"
GOTO 1120
1120 LOCATE 25,2:PRINT"Wait!"
GOTO 1130
1130 LOCATE 25,2:PRINT"Wait!"
GOTO 1140
1140 LOCATE 25,2:PRINT"Wait!"
GOTO 1150
1150 LOCATE 25,2:PRINT"Wait!"
GOTO 1160
1160 LOCATE 25,2:PRINT"Wait!"
GOTO 1170
1170 LOCATE 25,2:PRINT"Wait!"
GOTO 1180
1180 LOCATE 25,2:PRINT"Wait!"
GOTO 1190
1190 LOCATE 25,2:PRINT"Wait!"
GOTO 1200

```

```

PRINT"Your time stopped score was",ST
GOTO 600
7000 PLOT -111,-81,0:DRAW 440,80:GOTO
7,10:PRINT"you have earned the tic
toe!"
7100 IF score<20000 THEN cti="Master
Timeballer" ELSE IF score<30000 AND
score<30000 THEN cti="Expert Timeballer"
ELSE IF score<30000 AND score<
30000 THEN cti="Timeballer grade 2"
ELSE IF score<30000 THEN cti=" novice
Timeballer"
7200 RESTORE 10000:GOTO 10000:PLOT -
10,-10:0:DRAW 8,10:DRAW 270,0:FOR
i=0 TO 9:LOCATE 11,15:PLOT 10:IF x=
score<30000 THEN GOTO 10000
7300 FOR i=0 TO 9:IF score<20000:1
HEN 10 1,0:GOTO 10000 ELSE LOCATE 10
,10:PRINT"PRESS ENTER TO CONTINUE"
7400 IF 10000=1 AND 10000=1
THEN 1000
7500 FOR i=0 TO 9:GOTO 10000
7600 FOR i=0 TO 9:GOTO 10000
7700 FOR i=0 TO 9:GOTO 10000
7800 FOR i=0 TO 9:GOTO 10000
7900 FOR i=0 TO 9:GOTO 10000
8000 FOR i=0 TO 9:GOTO 10000
8100 FOR i=0 TO 9:GOTO 10000
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11300 FOR i=0 TO 9:GOTO 10000
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11500 FOR i=0 TO 9:GOTO 10000
11600 FOR i=0 TO 9:GOTO 10000
11700 FOR i=0 TO 9:GOTO 10000
11800 FOR i=0 TO 9:GOTO 10000
11900 FOR i=0 TO 9:GOTO 10000
12000 FOR i=0 TO 9:GOTO 10000

```


THIS month we'll look at what the different CCP (Console Command Processor) commands do, and how CP/M organises memory. First, however, let's go back to the beginning — always a good place to start! — and see just what happens when you type MCFM.

First, Basic hands over control to the cold boot routine in the BIOS ROM. (Cold boot is the CP/M term for the machine being completely reset and CP/M started up "from cold".)

This routine looks for, and loads, the boot sector from the system tracks of the disc in drive A. Don't worry if you don't know what these terms mean — we'll explain them in later articles.

For now, just take them as meaning a special place on the disc which you can't get at where the programs which make up CP/M live.

Anyway, this sector contains a short program, 512 bytes long, which initialises the computer. To do this, it first loads the configuration sector from the disc. This contains data put there by the program SETUP, which lets you customise the system to your own requirements.

We'll talk more about how to give your CP/M go-faster stripes next month.

Once the boot program has used this information to set up the computer as you want it, it passes control back to the BIOS ROM — to the warm boot routine, this time.

A warm boot occurs quite frequently in CP/M — every time a program finishes and hands control back to the system, or whenever you type Ctrl+C on the keyboard.

What it does is to load the main parts of CP/M from the disc, the CCP and BIOS, "log in" the disc to let the system know what's on it, and hand over control to the CCP.

Remember the CCP is just a program which acts as an "interface" between you and the computer.

Put a copy of your master disc — MVEN use the original — into drive A, side 1 up. Next reset the computer by pressing Ctrl+Shift+Esc and type login. This performs the cold start, setting the computer up and loading

the BIOS and CCP from disc.

The CCP tells you that it's alive and waiting for a command by displaying the ubiquitous A> prompt.

There are only six commands you can type in response to this which the CCP can understand and obey itself — these are called the resident, or built-in, commands and can be seen in Figure 1. If you type anything else in response the CCP assumes that what

It's just a program which acts as an "interface" between you and the micro

you have typed is the name of a program on disc, and will attempt to load it into memory and execute it. These "commands by default" are called transient commands, because they change depending on which programs you have available on the disc in use.

Whenever CP/M is looking for input it provides some editing commands and other facilities. Ctrl-X deletes everything you have typed on the line, Ctrl+P will echo all console output to your printer (typing Ctrl+P again will turn this off, Ctrl+S will temporarily pause console output (restart it by pressing any key) and Ctrl+C will abort and warm boot.

DIR

The first of the built-in commands, DIR, you've probably met already.

Type:

DIR

and you will get a directory listing of the files on side 1 of your disc. (Actually, you could have used dir instead of DIR as CP/M ignores case.)

This command is the CP/M

A whistlestop tour of CP/M

equivalent of the Amstrad CAT command, but as you have probably noticed, does not tell you the sizes of files. You will notice a file in the list called STAT.COM.

Now type:

STAT 5.1

This is not one of the built-in commands — the CCP will recognise it as a transient command and so will load and run the program STAT.COM. As you will see from the screen, STAT gives us a much fuller directory listing than DIR.

We'll discuss what all the information means another time. For now just note that we get a list of files on the disc in alphabetical order, their sizes in kilobytes, and the amount of space still available on the disc.

The disadvantage of STAT is simply that it is a transient command — the program STAT.COM must be present on the disc for the command to work. DIR will work on any disc.

Notice the ** we gave STAT as a parameter on the command line. This is an example of what CP/M calls an ambiguous file name, and simply asks STAT to give us information on all the files on the disc, whatever they're called.

SAVE

The second built-in command we come to is SAVE. This is classified in Amstrad's DD-1 manual as being "for specialist use only". Well, you are all about to become "specialists". Make sure your disc is write-enabled with the little white tab pulled fully OUT and type:

SAVE 28 free.com

The disc will whir and clank for a few seconds, then A> will return and nothing else seems to happen. What

DIR	Gives a limited directory listing of the files on a disc.
SAVE	Saves specified number of pages of memory, starting at \$100 (links) with the specified name.
REN	Renames existing files.
ERA	Erases unreserved files. Use with caution!
USER	Changes current user area.
TYPE	Lists AsclI text files to the screen.

Figure 1: Summary of CCP resident commands

\$FFF0	
\$C000	BIOS ROM
\$B000	BIOS stack
\$E000	BIOS extended jumpblock
\$A000	Firmware and BIOS variables
\$4000	BIOS jumpblock
\$0F00	BIOS
\$8700	CCP
\$8100	TPA
\$0000	SFA

Figure 2: Amstrad CP/M memory map

have we done? Well, type:

```
StatI fred.com
```

This is another way of using STAT, this time with an alphanumeric file name. It will provide information only on the file we specified.

You will see that we now have a file on disc called FRED.COM! In fact, all SAVE does is to copy the number of pages of memory specified, from the start of the TPA onwards, into a disc file with the name we've given. (A page of memory is 256 bytes.) Type:

```
StatI fred.c
```

FRED has the same effect as STAT! Well, it should do — they're identical. That's because after we first called STAT and it had executed it was still present in memory.

The command user **24 fred.com** immediately afterwards simply copied STAT out of memory to a new file, FRED.COM (STAT just happens to be 24 pages long).

REN

The third built-in command is REN, or rename. This lets us change the name of a file by typing:

```
RenI fred.com fred.c
```

So far:

```
RenI jim.com fred.com
```

and then use DIR or STAT to check that FRED.COM has been renamed to JIM.COM. Run JIM by:

```
GoIpe fred
```

if you need convincing.

ERA

The fourth built-in command is

ERA, or erase. **BE WARNED** — this one is dangerous! As the name suggests, it lets us erase and effectively destroy files which we no longer want. There is no simple way to recover something which you have erased by accident! Type:

```
EraI jim.com
```

and JIM.COM will cease to be. (Check this with DIR or STAT, as before.)

USER

The fifth resident command is not one we'll use much, and I won't go into it in any detail. The USER command:

```
UserI 0
```

where 0 is a number from 0 to 15, allows us to split a disc up into 16 different user areas. Normally we work in USER 0 without knowing anything about it.

User areas in standard CP/M 2.2 are virtually useless, so for the moment we'll ignore them. Feel free to experiment, however — you'll soon discover the limitations.

TYPE

The last command in our white-hot tour of the CCP is TYPE. This lets us look at the contents of any files of AsclI text on the disc. Most is the standard system of representing written text in computers.) Type:

```
AtIpe jim.com
```

and we can read the text file containing the assembler source code for the transient utility DUMP.COM.

TYPE will not let us look at machine code — for instance .COM

program files. Try it if you want and see what happens — the results tend to be spectacular.

Notice also that in general Amstrad Basic programs cannot be TYPE'd successfully — this is because they are not stored as AsclI, but use a special coded format: TYPE can't read!

So far I've explained a little about the different "bits" of CP/M, and what they each do. Figure 2 shows where each of them live in the Amstrad's memory while CP/M is running.

The bottom 256 bytes, page zero, make up the system parameter area. This contains a lot of data useful to both CP/M and programs.

The next, and largest, area of memory, starting at \$100, is the transient program area where all programs, including any you might write, are loaded by the CCP when you type a transient command.

Above this is the CCP itself. However this area of memory is also available to a program as an "extra" bit of TPA, as once the CCP has loaded the program it is no longer needed.

When the program finishes a warm boot will occur to reload the CCP in case it has been overwritten.

Above the CCP is the BIOS, the main part of the operating system. This must never be overwritten by a program else the system will crash.

Above the BIOS live the BIOS or machine specific parts of the system — the various jumpblocks and variables required to glue things together, and, at the top, the BIOS ROM lurking under the screen RAM.

■ **Next month we'll move on to look at the programs present on disc and discover some tricks to make life easier if you only have one disc drive.**

Switched RAM really means business

ROBIN NIXON assesses a RAM box which promises more memory for your micro

THE DR-Tronics bank switched RAM box gives your Amstrad either an extra 64k or 256k of RAM, depending on the version you have. It comes in a small box which plugs into the floppy disc port on the CPC464 or the expansion port on the CPC664 and CPC612B.

The version we received for review would not plug into a CPC 612B but DR-Tronics tell me that later versions will have a re-designed case which will connect to all models.

There is also a connector on the back of the RAM box to other add-ons can be attached to it.

Because the Z80 cannot handle more than 64k at a time the extra RAM is bank switched. That means that the extra memory is divided up into chunks, or banks. You can switch between these banks of memory, though your Z80 can only talk to one bank at a time.

Although the 64k of the standard CPC464 is a lot of RAM — the standard BBC Micro only has 32k — and is enough for most purposes, there are several applications for which you may need a lot more.

For example, pull down menus in graphics programs require a large amount of memory in which to store

the screen data "behind" the menu. Also the extra RAM could be used to store the information for large databases. These would run much faster in RAM than on disc.

Having the extra memory is one thing, using it is another. If you are an experienced assembly language programmer you can access the extra RAM directly.

However DR-Tronics provide a far easier system for making use of it. With the RAM box you get a cassette of RSK — resident software extension — utilities which give your Amstrad extra Basic commands such as DEMULATE which emulates the bank switching of a 128, or ISWAP, which swaps graphic screens instantaneously.

When you run the RSK program the first thing it does is a RAM test to check that the RAM box is present and working. If the test is successful your Amstrad will have an extra 14

commands as detailed in Table 1.

Let's have a look at two of the RSK commands in detail. ISWAP saves the contents of a window to the extension RAM and LOADSW reloads it. Listing 1 gives an example of how these commands can be used to construct pull-down menus.

Lines 20-60 draw a grid on the screen.

Line 70 defines a random window. Line 80 saves the contents of the window to the extra RAM.

Lines 100-120 clear the window and print a message in it.

Line 140 restores the previous contents of the window.

This windowing technique doesn't take up any of the Amstrad's normal memory but the short Basic routine, so features like it could be included in virtually all Basic software.

To access the extra RAM from Basic without using RSKs you use OUT & PPOD in the following manner.

LD A,1	; Bank to be switched in.
PODI BC	; Save all registers
LD C,8	; except B and flags.
AND 3	; (Bank AND 3) +
LD E,A	;
LD A,C	;
AND 20	; (Bank AND 20)
ADD A,A	; + 1
OR B	;
OR 170	; + 176
LD DE,7F00H	; BC=07F0H.
OUT (C),A	; Switch bank in.
POP BC	; Restore registers.
RET	; Return.

Listing 1

```
00000 1          DDPRN 41,2:PAPER 01,7
00001 2-60 10 TO 1 STEP 0.05:RDR In
; grid on screen
00002 4001,0:ORAN 0001,000
00003 0,000+1:ORAN 000,000+1
00004 1
00005 10000 00000+**0000:RDR Wait for key
; key press
00006 100000 01,001000 11+0+11,0000
00007 010+0+100000 11+0+0111,001000 11+0
1000,00100000+10+001000 11+00+001
```

Listing 1

The 14 extra commands

ISAVES	Allows you to save the entire contents of a screen to any section of the extra RAM.	IRISH	Produces a fast re-display of the current screen after issuing ISWAP or ILOW.
ILOADS	Retrieves a screen from extra RAM.	IASRRAM	Interrogates the RAM box. This can be used to find out the amount of extra RAM available, the number of banks of free RAM, or whether a certain location is free.
ISAVEM	Saves the entire contents of a specified window to any section of the extra RAM.	IPOKE	Let's you poke a byte into any location in the extra RAM.
ILOADW	Loads a window back.	IOPEN	Pokes any location in the extra RAM.
ISAVED	Saves data from any area of formatted memory to any section of the extra RAM.	IBANK	If you have the 548 version you have four banks of 76k available, or if you have the 358k version you have 16 banks. The bank you are working with can be selected by IBANK.
ILOADD	Retrieves the above data.	ISIMULATE	Emulates the memory handling - bank switching - of the CPC6128.
ISWAP	Fast swap between the current screen and a saved one - especially useful for animation.		
ILOW	Fast display of a saved screen.		

Table 1

where Bank is the bank to be switched in.

BT 578H, H+Bank 48 D+Bank 48 204

To select a particular bank from assembly language you would enter the routine in Listing 1 where A contains the bank to be selected.

Using ISIMULATE, CP/M software for the CPC6128 such as Masterfile and Taward 128 will run on a CPC464, as the CPC6128's bank switching techniques are fully implemented. However it is not a complete

CPC6128 upgrade. For a start DK Tronics says it doesn't envisage releasing CP/M plus with the RAM box and, of course, it won't give you CPC464 the additional Basic commands of the CPC6128.

Also the operating systems of the CPC464 and CPC6128 are quite different, and many programs written on the CPC684 use "illegal" calls which will not work on the CPC464 or CPC6128.

Illegal calls are made directly to memory locations rather than through vectors - which remain in the

same place while the locations they point to may not.

So is it a worthwhile addition? Well, if you find yourself running short of memory when writing software, or would like to take advantage of the animation facilities of ISWAP, then this add-on is for you. Also don't forget that it does give you a larger CP/M environment of 61k.

It is also possible that an amount of business software will be written to take advantage of the extra RAM. If this happens the RAM box is certainly worth keeping an eye on.

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3D blockbuster



MISSION, from Melbourne House, is a sensational space-time adventure with spectacular graphics and brain-teasing questions.

You are the pilot of a liner, the SS Siskelate, and your mission is to go back in time and replace historical events that have been displaced by evil aliens who discovered time travel before you.

To do this you must engage enemy starships in space-to-space combat and collect their corpses which materialise in the form of letters of the alphabet.

These letters form words which are the answers to historical problems in the various time zones.

The combat is carried out using stunning fast action 3D vector graphics.

You'll need your wits about you and a good steady hand on the controls to see off all the alien ships in your sector without sustaining too much damage to your own ship.

Having collected all the letters you assemble them to find out what the original cargo was.

You then find and fly through a time warp and select the correct time zone to take your cargo into.

Within this time zone you must fly to the planet and find out if your cargo will solve the historical problem.

If you have selected the correct time zone and you

solve the problem, your fuel and oxygen are replenished and you can battle for another cargo.

If you choose the wrong zone you fight your way out to be again.

As there are nine time zones in a time grid, nine time grids in a time block and three time blocks, plenty of brain power is needed.

I strongly recommend that you keep notes of the problems that need solving in the time zones. That you will inevitably visit in time.

Each zone can take a fair time to complete so the save game option is very welcome.

This is probably the best game I have played on my Amstrad. **Alan Mitchell**

Hacking a way through Egypt

PROGRAMS from Melbourne House are renowned for their graphics and originality, and their latest game, **Fighting Warrior**, lives up to these high standards.

You, the champion of all Egypt, must use your dexterity and skill in combat to battle your way across the sands and rescue a beautiful princess.

As you walk along the desert past pyramids and tombs, treasure materialise before you ready for battle. Armed with only a single sword and your sharp reactions, you must fight off several different nasties, including a winged devil.

Using keyboard or joystick you can walk forward, backward, jump and duck. You have only three fighting moves — strikes to the



head, stomach and legs.

Your energy is indicated at the bottom of the screen by a series of arrows. When you have two arrows left your character starts to flash and if all the arrows go you drop your sword, slump to the floor and flake away.

If your idea of heaven is basking the living daylights out of every person in sight, this is right up your street.

It's good fun and should appeal to fans of Melbourne's earlier hit — The Way of the Exploding Fox.

Andy Miao

Use it! — up to a point

LOAD the **Use it!** tape into the datsaboard and go off and make a cup of coffee, because it takes a tedious eight minutes to load, without even a title screen to deliver the proceedings.

Eventually the main menu appears, which allows you to file it, Calc it or Graf it.

In my view the 'programs' usefulness increases steadily in that same order.

Time it allows either a digital or analogue display, with a subsequent choice between a straightforward clock, an alarm facility or a stopwatch. The latter can operate in elapsed time, lap or countdown modes.

All are very well programmed as the screen display is clear, smooth and quite impressive, yet I was left with a feeling of uncertainty.

How many people will want

to load in a program just to see a watch?

Calc it transforms the numeric keypad and the cursor keys into the standard calculator layout. Again the result is very pleasing to the eye, and the key response is quick and accurate.

One rather nice feature is the constant display of the memory contents and the screen operand, as this will give children a better understanding of how a calculator 'thinks'.

Graf it is the best section, allowing the input of up to 48 integral items of data, which can then be shown displayed as a line graph, a pie chart or a bar chart.

The implementation of the pie chart can cause problems depending on the data numbers, with some of the numerical labels being overwritten by others.

However the 3D effect on the bar chart is most impressive, and this actually looked to be of practical use.

Overall an interesting attempt from Bubble Bus Software, but one which does not entirely work.

Phil Taylor

Fight Arnhem again

ARNHEM by Gates Computer Simulation is a simulation of the famous Market Garden operation in September 1944 when the Allies attempted to break through Holland and across the Rhine into Germany with a massive airborne invasion.

With one computer playing the part of the defending Germans you can now attempt to rewrite history and defeat Germans before Christmas 1944 — preventing the Battle of the Bulge ever happening.

In order to do better than Field Marshall Montgomery you must first learn how to place and manoeuvre your forces effectively.

To help you the program comes in scenarios of increasing difficulty which, when mastered, allow you to attempt the final operation of advancing beyond Arnhem and destroying ALL German units.

Scenario 1 is to advance the British tanks, armoured carriers and so on to just beyond Eindhoven in seven "turns", where a turn is eight hours.

If you can clear and travel along a road then you can move units as quickly but the computer Germans block the road wherever possible and you then have to stop and fight your way through.

Bridges are particularly bad bottlenecks because they must be captured otherwise your heavy tanks can hardly advance at all.

Scenario 2 has diagonal glides you 10 turns — 80 hours — to advance to Grave but this time you have, and need, the help of American paratroops to clear and hold the road ahead.

Scenario 3 assumes you have achieved 1 and 2, so now you have 28 moves — almost nine days — to advance from Grave and over Arnhem's bridge.

The first 10 turns have to be fought entirely by your British and American paratroops, at which point the computer begins automatically to feed

your ground forces through from Grave.

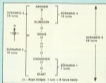
Scenario 4 is the hardest to win because the British troops alone have to take and hold the Arnhem bridge for 12 turns — that is, five days.

I never managed to do this, but the computer measures your success by how many of your troops survive north of the river, so I just landed everything to the extreme north west, dug in and the computer never found them. However, this scenario

tactic will not work in the final full scenario, because the Germans then drive south over Arnhem bridge and cannot be dislodged — you MUST make your British airborne troops realistically dig in and fight for this last, crucial bridge.

The game comes with a 28 page booklet of instructions and information which, alone, takes two or three hours to read, understand and apply correctly.

It took me about two weeks



to work out how to win the game and destroy all 77 German units.

Since the full game can take about eight hours to play there is a sophisticated facility plus, having beaten the computer, the program allows you, or preferably a friend, to play the German side rather more intelligently and the battle can be re-fought for many months if you have the stomach and stamina.

To sum up, this will not appeal to quick reaction players, but if you like chess and/or want a change from adventures then I thoroughly recommend this fascinating and logical war game. A superb puzzle. **Dave Allies**

If it moves, shoot!

ON THE RUN, a fast, action-packed game by Design Design, you enter a dangerous zone inhabited by wild mutants to collect six flasks of dangerous chemicals before they have time to become acids.

Because of their lethal nature you wear a protective suit, complete with jet pack to get you rapidly through the maze.

Unfortunately, the suit requires energy and each time you come into contact with one of the mutants your energy is depleted.

On your way through the maze you come across objects, some of which will help you in your quest.

The golden rule with this game is "If it moves shoot it, if



it doesn't, see what happens if you pick it up".

Hidden somewhere is a secret object which you must find before the large frog will open the exit to allow you to

escape into the next stage.

Keys to control both movement and aimed bombs may be changed at the start of the game, although I found it easier to use a joystick.

As you guide your character through the maze, your remaining energy and the time left is displayed as a bar graph at the top of the screen.

Movement of your character is smooth, although it can be a little difficult to shoot the mutants when you are at the edge of the screen.

This is because only a slight movement of the joystick will take you onto the next screen. I would have preferred a continuously scrolling display.

An excellent game with tightly detailed graphics.

Steve Lucas

Rally graphics impress

FASTEN your seat belts for an exciting car ride in **Rally II**, as Lofords put you behind the wheel for stunts and spills on the rally circuit.

The instructions are somewhat limited so it's a case of get going and find out what happens. I must have written off many thousands of pounds worth of expensive cars before I actually found out how to slow the thing down.

The inverted controls steering and the fire button is the



brake, so it's safe (read: slow) again as you try to slow down enough to get safely around the corner.

The rally is in 10 stages all of which must be completed before you register a score on the winners' board. There are various weather conditions and penalties. Snow, fog and night-time additions, and see through and bridge sections all combine to make you crash off the side of the road or into the other competitors.

The graphics are very good and colour is used to nice effect. The sound is quite reasonable too and adds to the impression of speed.

I quite enjoyed playing this game but felt that in spite of the great sound and graphics it might not always keep me coming back for another go.

Alan Mitchell

World class pool

SOFTWARE houses sometimes use a celebrity's name to help sell a second rate game. This is not the case with **Alex Higgins' World Pool** from Gam. It requires no help whatsoever.

Being a bit of a pool player myself, I have built up a small collection of snooker and pool games on my BBC and Amstrad computers. Unfortunately these have not been full implementations of the real thing. With the arrival of this program my dreams have been fulfilled.

This is real eight ball pool, seven stripes, seven spots and a black played in accordance with the UK eight ball playing rules.

The game is for two players only, though I have just spent the past three days playing for both stripes and spots. It's just as much fun. Control is via the

keyboard or with one or two joysticks.

You are prompted to place the cue ball in the G, and then set the strength of the shot.

This is indicated by a white line at the top of the screen - the longer the line the stronger the shot.

Finally you are given the option of applying any combination of top, bottom, left or right hand spins. These preliminaries completed, hit the fire button and watch the pack split.

The movement of the balls is a delight and the rolling stripes are incredible. They always appear to be rolling in the direction in which they are travelling.

Finally, that make or break feature of the game - the ability to create realistic rebounds and collisions. **Alex Higgins' World Pool** creates



these angles with incredible accuracy. I have sunk some phenomenal three ball plants and been just as satisfied as I would have been had I been playing the real thing.

I cannot praise this game too highly. In fact I would rather play it than the real thing.

Jon Davis

Cat in a dog fight

IN Paws, from Artic, you play the part of Selwyn, a tom cat, and proud father of 10 kittens.

Bulldog Billy and his pals are gathering together for their nightly raid on your rear home. Normally you and your kittens have enough cataplectic energy to see the pack off, but today of all days your kittens have decided to have a wander round the neighbourhood.

You can try and bring them home before the Bulldog's home from a pack, or strain you defeat enough dogs so that they don't reach full strength.

Whatever you choose, you will have to trudge through a wood, alleyway, town and scrapyard, keeping your strength up by eating goodies such as steak-walk mice, dried sandies, plastic ducks and goldenf, bowl and all.

These enable you to the fluffy balls at manhandling dogs and rid the streets of them. You can also drop lumps of cataplectic energy which stun the dogs for a short time.

You start off with a high



vitality level which deteriorates as you collect your kittens. If you decide to fight a dog the amount of energy required to defeat it is determined by its colour. If your stamina value reaches zero you lose one of your nine lives.

You can find out the position of your kittens, the dog's position and your detailed status by referring to an see map.

If you succeed in either collecting your kittens or disposing of enough dogs you progress on to the next level which, of course, has more of the same remains to put up with.

The screen displays are excellent with good attention to detail, like the scapery with its trees, TV sets and town newspapers. The dogs all look like cousins of Fred Bassett, while Selwyn the cat seems to change his shape depending on which direction he's walking.

The movement of all the characters is smooth and a pleasure to watch.

My main criticism is that there is no sound, not even a tiny meow or a wail. To some people this will be a positive plus, but a bit of sound would have added to the fun.

Overall a very enjoyable game with very good colourful graphics. It should keep the youngsters occupied for quite some time.

Ian Saunders

HGV test the easy way

DO you admire the skill of the pro driver as he manoeuvres in the tightest of situations with ease? Now, with **Juggernaut**, an HGV driving simulation on CD-ROM, you can put yourself in the hot seat.

An laser-driven theme provides options which include normal driving and a practice mode in which you can choose a variety of situations.

Here you can familiarise yourself with the vehicle's controls and handling before electing to adopt the role of a delivery driver which is the major part of the game.

As the letter you collect commodities from different

locations, returning in the shortest possible time, taking into account fuel stops, repairs and the speed limit.

The screen indicates the goods carried and those yet to be collected and there's a view of the cab showing the gauges and the gear stick.

Buttons allow selection of start, phone, load/fuel, unload, pause and merge. A map of the town, which changes each game, is displayed in the lower half of the screen and shows your current position.

As you drive along the view changes to show bends and junctions and a variety of road-side features such as houses, traffic signs, fences

and telephone kiosks.

The vehicle responds nicely to acceleration and braking and gear changes (two forward and one reverse), but sluggish to changes in direction.

Accidently running out of road is a noisy business and causes damage which is automatically repaired when you next stop for fuel - but this adds dramatically to the elapsed time.

You can use the phone to find the goods depots whenever you come across a kiosk en route. Your sail prompts a search of the map for the premises needing the care of your choice, which is



then highlighted.

The graphics are superb and once I got the hang of handling the vehicle the game became fun to play. I would recommend it as an addition to anybody's collection.

David Andrews

Slow but smart

OP Software, of 3D Voice-Class fame, has a dual-speed tape available featuring the old but popular game of **Backgammon**. The program aims to offer a clear, convenient display and playing system, encouraging new players to quickly learn this game of strategy and chance.

In fact, initial printing of the board is a little slow but smart, and you may alter the board return to suit your own taste.

Those who doubt the tenacity of the computer's move throws can enter the scores obtained from real dice, and a change sides feature is offered. Unfortunately, I could not get this last option to work as intended.

The program seems to have been taught the rules well, trapping illegal and impossible moves correctly. Only one level of play is offered - not a problem in itself, but I was a little concerned that it seemed quite easy to keep level with the computer.

At least beginners will not be unduly discouraged. To be



fair, it was not so easy to win, and play proceeds at a good pace.

The printed instructions are very important for a product such as this, and those supplied are quite adequate for anyone with a general appreciation of the game.

However a later edition might include more explanation of the overall points of the game, and definitions of the few technical terms. For example, talking to explain 'tossing off' could lead some users to a slow start.

I think novices and casual players will find this program entertaining, while enthusiasts might welcome the inclusion of the doubling cube. General observation is clear and play reliable, but I thought the price of £9.95 a little high.

Phil Marlow

Switch from film works well

The Rocky Horror Show has always been one of my favourite films. I was therefore excited but sceptical when I received the game of the film from ORL. Could a computer game possibly capture any of the humour and magic of the film?

For those unfamiliar with the plot, Brad and Janet are two American teenagers whose car breaks down during a thunderstorm.

Seeking help they arrive at a mysterious castle. From here on the plot becomes weird, wry and just a little naughty.

Before the game begins you must decide whether you wish to play Brad or Janet. Once in the castle you discover that your partner has been turned to stone with a medusa machine. Your only hope is to use the de-medusa machine, which, surprise surprise, has been dismantled and scattered around the castle.

The characters are drawn in outline and move around in a three-dimensional setting, if you have seen the show you

may recognise some.

Riff Raff is the music depressive baron who is just a little too trigger happy with his laser gun.

Eddie, complete with motorcycle, tears around the house like a maniac if the temperature in his freezer climbs above freezing point.

Don't jump into Magenta, BR-Raff's sister, as she will steal your clothes. She slows your progress as you are forced to shuffle around with your hands strategically placed for modesty's sake.

Incidentally, I forgot to mention that the castle is a disguised space ship. The clock in the corner of the screen displays the time remaining before it blasts off to the planet Transylvania.

The music to the superb 'Time Warp' theme plays throughout the game and the characters mutter lines from the film in little speech bubbles. If you're hearkened enough to have seen the film more than once you'll love these touches.

James Whiddell

Simple bridge

KLIMA's *Bridge* is a simulation of the card game. The screen gives a continual display of the contract, tricks so far, last trick, bidding and score in the four corners of the screen.

The remaining space is for the four hands and playing them on to a small central table, decked out in green felt.

Playing your cards has been made as simple as possible. Suit or value of a card can be selected in a joly order, but when you can follow suit you only need enter the value, and opponents are played automatically.

Further aids are you can just press Enter to play the lowest of a suit or Spade to play the highest. After a while you can play a hand at close to the speed of real card play.

In the bidding emphasis is on "natural" Ace and bidding, loosely based on Gorp points $M=4$, $K=3$, $Q=2$, $J=1$ plus three points for a void and so on.

All this is rather tersely explained with examples of opening bids and responses to one of a suit or one no-trump.

There is an even further note on the Statman response to one no-trump, but apart from the Blackwood artificial bid of four no-trumps — which is asking your partner how many aces he has — you are on your own for bids of two or a suit upwards.

A book will help, but you can't be sure the program has read the one you choose.

Although written in Basic — the deal takes a few seconds to compute — the program plays a fair game at reasonable speed and will give the lingo that vital first step into the world of *Clash of Shields*.

The main criticism is that it does not let you practice via redoubling or replacing a hand, surely a simple feature yet almost essential in a patient computer program that will never tire of post-mortems.

Adapted

Traffic tends to stall

YOU know the situation. You are driving somewhere in a hurry and the traffic lights are against you. A queue of cars builds up but the lights stubbornly refuse to change.

Tempers and engines get hotter as the line of cars gets longer . . .

Well, *Traffic*, from Aristonsoft, gives you the opportunity to help other drivers out and keep the traffic flowing.

You have been given the thankless task of Head Traffic Controller in London and as the game starts you are in charge of six junctions in an unnamed part of the capital.

Using a joystick or keys you position the cursor over the junction where you want to change the lights and press the fire button.

Cars, lorries and bikes come from several directions and as the volume of traffic increases the queues understandably get bigger and it becomes harder to clear the junctions.

If the queues reach a



certain length you are deemed to have started up the city and told to get on your bike. But if you manage to keep the vehicles moving the scene changes and you are given a more complicated junction layout to control.

The best graphics are contained in the title screen, which shows a London bus and the face of a winking policeman.

Unfortunately, the graphics during play are not so imagin-

ative. You have a bird's eye view of the streets, but there is no three-dimensional effect. All vehicles are little single-colour boxes devoid of details like wheels, windows, or drivers.

Play is not helped by the inadequate 11 lines of instructions which contain the advice "But beware, if the traffic jams get too long you lose".

There is no explanation of how the scoring works, or what the numbers taking away alongside each junction mean. All I know is, if one of these numbers reaches 5 you lose.

Traffic is an original idea presented in an unoriginal way. Colourful and more detailed vehicles would have been an improvement plus additional problems like police cars on emergencies, and breakdowns or accidents causing blocked junctions.

Despite the different junction layouts there's not enough variety to make it addictive.

Brian Finerty

Be an Eddie Kidd

YOU can experience all the thrills and spills of motorcycle stunt riding without any of the real-life risks, thanks to a new game released by DSI.

In *3D Street Rider* you have to wing your bike over a row of double-deck buses. Battling against lateral crosswinds, you have got just one minute to accelerate towards the ramp, take off and guide the bike in the air before hopefully landing the ramp on the other side.

You start with five buses, a number that Eddie Kidd could jump blindfolded in a snap, but which caused me a few problems.

My early attempts resulted in me reaching top speed, clearing the buses while the bike was still gaining height, and crash-landing another 30 bus-lengths away.

If you manage to clear this hurdle, another five buses are

added and then another, rising to a formidable total of 45 which I and around 50 different bikes have not managed to clear.

This is a colourful game with expert sound-effects, and a fun-to-realistic graphic of an exploding bike which gradually fades away until only the floating letters are left.

As the start your view is over the hangers, with an indicator showing which gear you are in and a picture of the bike on the left which shows whether you are leaning forward or sitting back.

To accelerate you press the fire-button on the Spacebar, and when the speeding bike reaches the ramp the screen changes to a side-on view.

At the top of the ramp you should lean back to gain extra height, but be careful not to stall. Lean back for too long and you will perform some



ridiculous somersaults before hitting the deck and exploding.

When I first loaded this game I wondered how addictive it would prove. Since then I've played it for hours, and I know I won't stop until I have cleared 45 buses. Then Eddie Kidd will really have to eat his heart out.

Brian Finerty

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LOGICAL OPERATIONS: When we AND, OR, or XOR two numbers what we are doing is comparing each bit of the binary form of those numbers according to specific logical rules. We take each corresponding pair of bits from the two binary numbers in turn - the input bits - apply the rule and write down the resultant bit.

Usually we deal with 8 bits, or a byte, at a time, relating to each bit in the byte by a number, ranging from 0 to 7. The right-hand, or least significant bit (LSB), is bit number 0, the one next to it bit number 1 and so on. Numbered this way, the left-hand

or most significant bit (MSB), is bit number 7. The bit numbers of the binary number 11001010 are:

Bit number	7	6	5	4	3	2	1	0
Binary number	1	1	0	0	1	0	1	0

So to apply the logical operator to two numbers we first convert them into 8-bit binary and then compare the corresponding pairs of bits in each number. You'll see from the truth tables that the result is only ever 0 or 1. When we've compared each pair of bits, we're left with another 8 bit number, the result of the logical operation.

AND: When we AND two bits together, the resultant bit is a 1 if, and only if, both of the input bits are 1. Otherwise the result is 0. This is shown in the AND truth table:

First bit	Second bit	Result bit
0	0	0
0	1	0
1	0	0
1	1	1

Test this out on your Amstrad using lines like:

```
PRINT 1 AND 1
```

and you'll soon see how this works in practice.

OR: If we logically OR two bits together the resultant bit will be 1 if either or both of the input bits are 1. The result is 0 only if both input bits are 0. The OR truth table shows the rules:

First bit	Second bit	Result bit
0	0	0
0	1	1
1	0	1
1	1	1

Use your mind to confirm the truth table with lines such as:

```
PRINT 0 OR 1
```

The ninth of our Amstrad quick reference charts

WHEN a bit becomes a 1 it is said to be set, or true. When a bit becomes a zero, it is cleared or false.

XOR, or EOR as it's also known, is the Exclusive OR operator. Here the resultant bit will be a 1 only if the input bits are different.

Hence if one input bit is 0 while the other is 1, then the resultant bit is 1.

If the input bits are both 0 or both 1, then, obviously, they are the same. The resultant bit then becomes 0.

First bit	Second bit	Result bit
0	0	0
0	1	1
1	0	1
1	1	0

Try lines such as:

```
PRINT 1 XOR 1
```

to check the table above.



```

10 REM The Dirty Dealings
20 REM and the Downy Computers
30 REM
40 REM      by
50 REM
60 REM      S.Mitchell
70 REM
80 REM (c) Computing with
90 REM The Wizard
100 REM
110 REM * Set up variables *
120 REM
130 DEFINT A=0&0, squares(4),3,check
140, H:SYMBOL AFTER 240
150 DIMO 240, 0, 40, 255, 34, 35, 49, 48, 4
160 DIMO 240, 0, 12, 255, 480, 234, 148, 1
1, 48
170 DIMO 238, 3, 10, 11, 12, 13, 13, 10, 3

```

```

170 SYMBOL 231, 173, 240, 240, 240, 240, 24
8, 240, 173
180 ship=COR(COR)+COR(COR)+square
+COR(COR)+COR(COR)
190 G=1, 12, 14, 20, 30, 3, 0, 1, 4, 0, 1, 3
R, 1, 1, 0, 1, 2, 1, 3, 0, 4, 1, 2
200 grid(11)=11*11
210 FOR x=1 TO 49:square(1)=grid(x)
square(1)=3*x:square(2)=y
220 grid(x)=10000+G*I:INT(x)/10
I=0 THEN grid(1)=grid(10) I=10:11:11:11:11
-2
230 NEXT
240 FOR x=1 TO 49:READ check(1)=I:NEI
T:RESTORE 1010
250 FOR x=1 TO 49:FOR i=2 TO check(1)
I=COR(COR)+check(1)=I:NEI:NEI
260 NEXT
270 REM * Calling Menu *

```

```

300 REM
310 NUMBER 3:GOTO 1:MENU:G=1:FOR I=
LOCATE 1,2
320 PRINT "DILLY DEALINGS & THE DOWN
Y COMPUTERS":PRINT, STR$(G(1)), "-"
330 FOR I=LOCATE 3,7:PRINT "Press one
bar alongside your choice:"
340 FOR I=PRINT:PRINT, "1) To see the
instructions"
350 PRINT:PRINT, "2) To play a game"
360 PRINT:PRINT, "3) To watch the comp
uter play"
370 PRINT:PRINT, "4) End the program"
380 FOR I=1,4:FOR J=20:FOR K=20:FOR L=
1:GOTO 1540
390 opt=COR(COR)+opt**OR 20:PRINT
100*opt+I=0:GOTO 1540:FOR I=1:FOR J=1
:FOR K=1
400 IF opt+I THEN HERE I:CALL MORDC:P

```

```

470 IF P<P1 THEN GOTO 480
480 ON SP GOTO 500,500,500,500,500 IF SP<
1 THEN GOTO 510
490 WEND 491,492,493,500 494-498 499 500
510 IF FLAG2 THEN PRINT 41," You can
not eat a fire delivery date:FOR 4
=1 TO 100000 1,100,50,7,8,1:NEXT
420 IF FLAG2 THEN PRINT 41,40:GOTO
520 you can not make any more deliveries:FOR 4
=1 TO 100000 1,100,50,7,8,1:NEXT
430 IF FLAG2 THEN PRINT 41,40:GOTO
530 assignments delivered:PRINT:GOTO
570:FOR 4=1 TO 100000 1,100,50,7,8,1
:GOTO 491,41,10000 41,40,40,7
:GOTO 501,41,50,7,8,1:GOTO
440 WHILE 1=1:GOTO 490:IF SP<0 GOTO
5 500
450 GOTO 1000:FOR LOCATE 11,10:PRINT
" END OF GAME"
460 PRINT TAB(10);STR$(11);,"1"1:FOR
LOCATE 11,10
470 IF SP<0 THEN PRINT "YOU WANTED
TO DELIVER"DATA"COMMENTS" ELSE
PRINT "WILL COME | ALL 000000 CONP
5700 SOLD"
480 GOTO 110
490 END
500 REM = Instructions =
510 REM
520 GOTO 1000:FOR 1:GOTO 1
530 PRINT:PRINT TAB(10);"INSTRUCTIONS"
:PRINT TAB(10);STR$(10);,"="
540 FOR LOCATE(10);PRINT "1) You have to
deliver consignments of"PRINT," 000
000" computers in each sector."
550 PRINT:PRINT "2) You must visit to
a 49 sectors"PRINT,"in 49 sectors 4
49."
560 PRINT:PRINT "3) You cannot visit
the same sector"PRINT," twice."
570 PRINT:PRINT "4) You must deliver
in the following"PRINT," sectors on 1
hour dates."
580 FOR LOCATE(10);PRINT,"Sector 7,1 on
the 11th,"GOTO 590:PRINT," 4,4 on
the 22th."
590 PRINT," 1,7 on the 37th,"GOTO
47," 7,7 on the 47th."
600 GOTO 5:GOTO 170:GOTO 1000:FOR 1
610 PRINT:PRINT "1) Each hyper-space
jump takes one"PRINT," Galactic day."
620 PRINT:PRINT "2) You spaceship can
only jump sectors"PRINT," in the 48
living ways ="
630 FOR LOCATE(10);PRINT,"3) REMOT, 1 UP

```



```

ON SP=1:PRINT,"2) LEFT, 1 UP OR DOWN
."
640 PRINT,"3) UP, 1 LEFT OR RIGHT,"PR
INT,"3) DOWN, 1 LEFT OR RIGHT."
650 FOR LOCATE(10);PRINT "3) To move to
a sector enter the"PRINT,"grid co-ord
inches by pressing ="
660 FOR LOCATE(10);PRINT,"the number abo
ve the bottom first,"PRINT,"next, th
e number on the left side."
670 FOR LOCATE(10);PRINT:PRINT TAB(10);"Y
ou are now in the plotting room"PRINT
7,"working out your course, GOOD LUCK
."
680 GOTO 170:RETURN
690 REM
700 REM = Game Loop =
710 REM
720 GOTO 000:REM Set up board
730 GOTO 170:REM Accept user move
740 IF FLAG2 THEN 1000:REM end game
if user quits or date not set
750 GOTO 170:REM main menu
760 GOTO 170:REM test for more legs
1 moves
770 IF FLAG2 THEN 1000:REM end game
if no more legal moves
780 GOTO 730:REM Go back to accept m
ove
790 REM
800 REM = Set up board =
810 REM
820 GOTO 1000:REM 49,1,49,1,1000
REM 41,1,1,1,1,1,1,1,1000:REM 41,10,10
:GOTO
830 FOR 41,1:FOR 41,1:FOR 1:FOR 4
1,1:FOR 41,1:GOTO 840 ELSE GOTO
840 FLAG4:DATA:1:GOTO:1:GOTO:1:GOTO
850:FOR 4=1 TO 49:REM check,1:NEXT
860 TAB:FOR 4=1 TO 49:STEP 49:REM
860 GOTO 1000:REM 4,10,1
870 GOTO 4,10:grid:grid:1:IF grid
18 THEN PRINT grid:

```

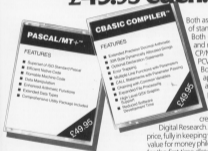
```

870 NEXT:grid
880 FOR 4=1 TO 100:STEP 10:REM 100
:GOTO 100:REM 100,4,2
890 GOTO 100,4,2:grid:grid:grid:IF 4
:grid THEN PRINT grid
900 NEXT:1000
910 LOCATE 20,10:PRINT "1) LOCATE 20
,10:PRINT "2) LOCATE 11,10:PRINT "3)
LOCATE 20,40:PRINT "4) FOR LOCATE
11,10:PRINT "5)
920 FOR 4=1 TO 10000 4,10:LOCATE 4,2
:PRINT 0001041:GOTO
930 PRINT 40:PRINT 41,"STARTING"PRINT
7:GOTO 40,"STARTING"
940 LOCATE 41,10:PRINT 41,"Press 0"
to end game"
950 REM:1000:1000:REM 4,10:1,1,2,1
0,1,10:10 1,10:10:10:10:10:10:10:10
960 REM
970 REM = Accept user move =
980 REM
990 LOCATE 41,10:PRINT 41,"Move to a
sector "1:GOTO 10
1000 GOTO 170:FOR 41,4
1010 SP=1:GOTO 1000:IF SP<0 1
1020 IF SP<0 THEN FLAG2:GOTO 1000
1030 IF SP<0 THEN FLAG2:GOTO 1000
1040 IF SP<0 THEN LOCATE 41,17,1:PR
INT 41,SP:GOTO LOCATE 41,17,1:PR
INT 41,SP:GOTO 1:PRINT 41,"1"
"
1050 SP=1:SP=1:SP=1:SP=1:SP=1:1000,1
,1
1060 IF 1000:GOTO 1000:GOTO 1000
1070 GOTO 1000:GOTO 1000
1080 SP=1:GOTO 1000:GOTO 1000
1090 FOR 4=1 TO 49:FOR 4=1:GOTO 1000,1
:GOTO 1000:GOTO 1000
1100 GOTO
1110 FOR 4=1 TO 49:FOR 4=1:GOTO 1000,1
:GOTO 1000:GOTO 1000
1120 GOTO 1000:GOTO 1000:GOTO 1000
1130 GOTO 1000:GOTO 1000:GOTO 1000
1140 GOTO 1000:GOTO 1000:GOTO 1000
1150 GOTO 1000:GOTO 1000:GOTO 1000
1160 GOTO 1000:GOTO 1000:GOTO 1000
1170 GOTO 1000:GOTO 1000:GOTO 1000
1180 GOTO 1000:GOTO 1000:GOTO 1000
1190 GOTO 1000:GOTO 1000:GOTO 1000
1200 GOTO 1000:GOTO 1000:GOTO 1000
1210 GOTO 1000:GOTO 1000:GOTO 1000
1220 GOTO 1000:GOTO 1000:GOTO 1000
1230 GOTO 1000:GOTO 1000:GOTO 1000
1240 GOTO 1000:GOTO 1000:GOTO 1000
1250 GOTO 1000:GOTO 1000:GOTO 1000
1260 GOTO 1000:GOTO 1000:GOTO 1000
1270 GOTO 1000:GOTO 1000:GOTO 1000
1280 GOTO 1000:GOTO 1000:GOTO 1000
1290 GOTO 1000:GOTO 1000:GOTO 1000
1300 GOTO 1000:GOTO 1000:GOTO 1000
1310 GOTO 1000:GOTO 1000:GOTO 1000
1320 GOTO 1000:GOTO 1000:GOTO 1000
1330 GOTO 1000:GOTO 1000:GOTO 1000
1340 GOTO 1000:GOTO 1000:GOTO 1000
1350 GOTO 1000:GOTO 1000:GOTO 1000
1360 GOTO 1000:GOTO 1000:GOTO 1000
1370 GOTO 1000:GOTO 1000:GOTO 1000
1380 GOTO 1000:GOTO 1000:GOTO 1000
1390 GOTO 1000:GOTO 1000:GOTO 1000
1400 GOTO 1000:GOTO 1000:GOTO 1000
1410 GOTO 1000:GOTO 1000:GOTO 1000
1420 GOTO 1000:GOTO 1000:GOTO 1000
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1960 GOTO 1000:GOTO 1000:GOTO 1000
1970 GOTO 1000:GOTO 1000:GOTO 1000
1980 GOTO 1000:GOTO 1000:GOTO 1000
1990 GOTO 1000:GOTO 1000:GOTO 1000
2000 GOTO 1000:GOTO 1000:GOTO 1000

```

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By ROLAND WADDILOVE

Defining keys? Then you might need this function key lister

YOU'VE probably always taken it for granted that when you press the A key on your Amstrad you get the letter A reflected on your screen.

However, as this article shows, it ain't necessarily so. You can arrange things so that pressing the A will give you B, C or whatever. Confusing as this seems, it's actually quite useful. The point is that each key in the Amstrad has its own unique number, in the range 0 to 79. This number simply labels the key switch — not the letter that happens to be printed on it.

It has to be like this to allow for the keys that are duplicated, such as the digits 0-9. How else could the Amstrad tell which of the two number 0s had been pressed for instance?

Fine, but how does the Amstrad know what to interpret the key press as? Well, it maintains a table to help it keep track — and when you switch on it defaults to the normal state of affairs, where pressing a key with the

A marked on it is interpreted as A.

In actual fact our normal A key has the number 63 associated with it and, provided we haven't done anything clever, the Amstrad will look up 63 and see that it's linked with 65.

65? Yes, because that's the Ascii for A — remember that the Amstrad likes numbers, not letters. So our table links the key switch numbers with the Ascii code we want it to be interpreted as.

Why not label it as 65 in the first place, you may ask? Well, getting our characters in this way has three advantages:

- It allows for the operating system.
- It allows for duplicate keys.
- It lets us rewire keys to give us any value between 0 and 255.

The code produced by a particular key when pressed is quite easily altered, if for some reason you wanted the A key to produce the letter B when pressed then:

00 0F W,1,6

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would tell the Amstrad to produce the Ascii code 66 when key number 60 is pressed. The 1 indicates that the key is to auto-repeat if held down. Zero would disable this feature.

Extra codes can be logged on to the end of the command to indicate which code is to be produced if Shift or Ctrl is held down at the same time.

The codes 128 to 159 have a special significance. The Amstrad stores 32 strings, one for each of these codes. When one of these special codes is produced it is removed from the keyboard buffer and replaced with the whole string. The keys producing these codes are called function keys.

To set up a function key to produce a string we use KEY, for instance:

```
KEY 128,"000 1"&CHR(1)
```

As you can see, any string expression can be used. When the code 128 is encountered it is expanded into the full string.

Any key can be defined to produce the codes using KEY DEF. On power up, or after a reset, the keys on the numeric keypad to the right of the main keyboard produce codes 128 to 149. You'll have to use KEY DEF to redefine some of the other keys on the keyboard to produce the rest of the function key codes.

Although there are 32 strings, the

Amstrad only reserves 128 bytes of memory. This will not be enough if all the keys are to be defined, or if long strings are to be used. Fortunately the function key buffer - the memory where the strings are stored - can be any size and anywhere in memory. It can only be allocated from machine code though.

```
LD HL,address
LD HL,length
CALL ADDR
```

will place the buffer at address and reserve length bytes for the strings.

With 32 function keys it's difficult to remember which have been defined and which haven't and what the definitions are. Accompanying this article is a short machine code utility to list the key definitions.

Run Program 1, a Basic listing which pokes in the machine code. Program 11 is the equivalent assembly listing. Call &A000 to list the definitions.

The routine as it stands will only list keys 128 to 149, the default keys. If you want to list all the definitions then poke &A000 with 160 - the last key number plus 1. As this may produce rather a lot of output you can end at any time by pressing a key.

All the control codes, such as carriage return, CHR\$(13), are represented by their graphics symbols.

This prevents the display from being corrupted.

Function keys are quite handy when typing in listings. As a final note, here's probably the most useful:

```
KEY 127,"CALL WORD:CALL
WORD:000 1:LIST"&CHR(1)
```

It resets the ink, pen and paper, changes to Mode 1 and lists the program in memory, if any.



Program 1

Addr...	000 &A000	&A05C1	POP BC	&A05E9	IF (HL)
&A000	.ajoy1	&A02a10 F1	20 key2	&A040	.del
&A000C0 0F 00	CALL &A00F	&A02b10 0F 00	CALL &A00F	&A041	LD B,C
&A00120 F0	20 C,joy1	&A02c10	RET C	&A042 6A	LD B,100
&A00200 00	LD C,128	&A02d10 0F 00	CALL string	&A043 50 A0	CALL digit
&A003	.joy1	&A02e10 00	DEFN &A000	&A044 00 00	LD C,LD
&A003C0 2F 00	CALL string	&A02f10 00	DEFN B	&A045 50 00	CALL digit
&A004	DEFN 'x2'	&A03010	INC C	&A046 00	LD C,1
&A00400	DEFN B	&A03110	.nan	&A047	.digit
&A005C0 40 00	CALL dec	&A03210 00	LD A,141	&A048 70	LD A,B
&A00620 20	LD A,50	&A03310 00	20 C,joy1	&A049 16 2F	LD B,&A0F
&A007C0 20 00	CALL &A00A	&A03410 0F 0F	20 H,joy1	&A04A 07	AND A
&A00860 FF	LD B,255	&A03510 0F	RET	&A04B	.del1
&A009	.joy2	&A03610	.string	&A04C 1A	INC B
&A00900	INC B	&A03710	POP HL	&A04D 70	LD HL,del1
&A0097F	LD A,C	&A03810	.ajoy	&A04E 03	ADD A,B
&A00A00	LD L,B	&A03910	LD A,(HL)	&A04F 07	LD B,A
&A00C10 12 00	CALL &A012	&A03A10 20 00	CALL &A00A	&A050 70	LD A,B
&A00D20 07	20 HL,joy1	&A03B10	INC HL	&A051 C1 20 00	IF WORD
&A00D20	DEFN BC	&A03C10 07	20 A	&A052	END
&A00D20 20 00	CALL &A000	&A040 20 F0	20 HL,ajoy1		

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The data way to store lots of screens

HOW is it possible to store 10 to 20 screens to memory, as in *Apprentice*? I am planning a program involving the use of about 10 graphic screens, and do not want to load each one from tape.

Why is it that when I used the routine in *Easy Draw* for loading one after screen in memory in one of my game programs, whenever I puffed up the screen, I had without amounts of graphical garbage put in the middle of my screen?

How do you use CALL \$BDF0 in a program to reduce flicker? I have tried and failed. — **Stephen West, East Haddon.**

One way of storing a number of screens is to build up your screens with user defined characters and to store them in data statements.

So first you design your characters and define them using SYMBOL, then you store the screen character by character in the following manner:

```
SCREEN DATA 1,3,246,...etc...
```

Where 1 is the PCH, 3 is the PAGE R and 246 is the character. The data could then be read using the following program:

```
10 FOR I=1 TO SCREEN IN TO
20 READ PA,PP,PN
30 FOR P=PAGEP (PP) UNTIL CH
40 NEXT I
```

Alternatively you could use Roland Woodford's screen computer in the July 1984 issue to save screens to tape for later recall as it works a lot faster than an ordinary save or load.

With *Easy Draw* it would seem that you have written a rather long program which, due to its length, is overwriting part of the memory where the second screen is stored.

The call \$BDF0 is most useful when you are accessing the screen a lot and very quickly — most often in machine code programs.

When called, this routine stores all accesses to the screen RAM until it has been fully updated and the electron beam has started to fly back to the top-left hand corner of the screen.

Any changes to the screen then take place during the frame fly-back.

So to make most efficient use of this routine you would call it immediately before accessing the screen.

Line spacing taped

PLEASE try that letter using Donald and my new printer, the MP-185.

I have been plagued by double line spacing at how some of your other readers.

Having opened the printer used to access the second statement I tried No 8 without success. (Maybe I should have

tried No 7.)

Whenever I then tried a piece of tape over pin No 14 as suggested by an earlier correspondent and things got a little better. I say 'a little' as it does work.

I have several programs with PRINT statements in, and want to know if there is a way of addressing these to the printer without adding #0 to every line with a print statement in a PRINT — PRINT#1 gives the message syntax error.

As a newcomer to computing may I endorse some other complaints about staining for us 3 drivers.

I think you probably lose the balance right for us amateurs and the whole thing isn't all that good. Well done! — **K.J. Barber, Cambridge.**

We're afraid it's not possible to send text to the printer without a #0. However, you can simulate it by setting a variable such as STREAM to the current output stream you

are using.

If you are writing to the screen STREAM should be set to a value between 0 and 7. Otherwise if you're sending to the printer set STREAM to 8.

Then in place of just typing PRINT or PRINT #0, in the future use:

PRINT RETURN

Each time you change STREAM all following output will be directed to that stream.

CPC664 gesture

COULD I know if a few comments on the 664 please? I am one of the CPC664 owners who were overtaken by a great leap in prototyping technology earlier this year.

Now that DXtronics are offering memory upgrades which will allow the use of CP/M Plus on the 664 perhaps Amstrad could make as gift of a CP/M plus after and hard-working software.

6128 owners get both CP/M plus and CP/M 3.1 with their machine as I don't think a second would break the bank.

It is useless to consider selling the 664 and upgrading because Discos are still trying to unload the machine at around £220 with more money. — **Graham E. Curtis, Derby.**

Grotty symbol

COULD you tell me how I can get the symbol ' ' in line 2770 of *James's Diary*.

I have tried everything and just can't get it. — **G. Bates, Devonport.**

The symbol you require is the vertical arrow on the same

Those pricey 3in discs

I WOULD like to buy the Amstrad 6128, but first of all I have a few questions.

Why are 3in discs for the Amstrad so costly? A pack of 10 3in discs would cost £40, while a pack of 10 5 1/4in discs would only cost £20?

Also, is it possible to store programs on tape with the 6128? I don't fancy re-writing a 5 pin DIN plug, but according to Tony Baker in issue No. 12 you have to.

Keep up the good work — you seem to be the best no-nonsense magazine there is for the Amstrad. — **P. N.**

Ogilvie, Perthshire.

3in discs are just more expensive to manufacture. The price of discs also varies depending on whether they are double or single sided, double or single density and their quality.

Double sided, double density, 80 track 5 1/4in discs can be as much as £30 for 10. Try shipping around, you may be able to find some cheaper.

Tony Baker's problem was with using a stereo cassette player. If you stick to mono you shouldn't have any problems at all.

key as the natural sign.

You'll find that many printers print it as the flat character you see in the listing.

Fine service

I WOULD like to draw your attention to excellent service I received from Sapphire Software.

I recently bought their program *Landscape* through the post. Unfortunately both the first and second versions of the game sent to me would not load on my Amstrad CPC464, and both had to be returned.

You can imagine how thrilled I was to receive, within a week of returning the second version, a pack of four copies of the game with a certificate from the MD saying that he hoped that one of them would load successfully.

I am pleased to say that one did load very successfully and my husband and I have spent many enjoyable hours trying to become millionaires.

I not only commended the organisation for its excellent customer relations but also the game for its originality and challenge. — **Mrs G.A. Swain, Leighton Buzzard.**

It's nice to hear of a company offering such a good after sales service.

TESTing pixels

Can you help me use the Amstrad RGB command? — **K. Varma, Slough.**

TEST is useful when you need to know the colour of a certain pixel.

```
PRINT TEST(x,y)
```

returns the RGB colour of the screen coordinate x,y.

Faster PHIL

FASTEST computations on an excellent year's machine code series which I have been

Computing with the AMSTRAD Postbag

WE welcome letters from readers — about your experiences using the Amstrad, about tips you would like to pass on to other users... and about what you would like to see in future issues.

The address to write to is:

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Following closely, I have written a program (right) which can be used in using the Master program which is equivalent to BASIC:

```
5 CLR
10 PRINT "HELLO"
20 GOTO 10
```

Even though my machine code version is approximately 15 per cent faster than Basic, it offers an easier way of printing PWD because if this word was a bit longer the machine code would become very long-winded! — **Philip Pike, Worcester.**

The listing below will enable you to print strings using asterisks. You simply have to issue a CALL, which is followed by GOTO "the string to be printed" and GOTO 0.

```
000 GARD
Print string
DEFI HL
:api
LD A,HL)
CALL AVSA
INC HL
BR A
JR HL,api
JP (HL)
```

```
CALL string
DEFI "hello...!"
DEFI 0
DEFI
CALL
```

```
4000 CALL (string) 00 00 00
4001 NOP here 00
4002 LOAD A,50 50 50
4003 CALL Charout 00 50 00
4004 LOAD A,40 30 40
4005 CALL Charout 00 50 00
4006 LOAD A,4F 30 4F
4007 CALL Charout 00 50 00
4008 LOAD A,C 30 4C
4009 CALL Charout 00 50 00
4010 JMP here 00 00 00
```

Justified margin

I WOULD like to add my contribution to the ongoing *Just* editor page.

This short listing will allow the right margin to be justified if required once you have justified left using the *Just* key in insert mode.

It takes most five starts into account, starting from the tab mark.

It does not attempt to justify about lines — nothing looks other than a justified line containing two words. This is very handy for letter address heading.

The program lines (right) are in addition to Peter Whiteley's from the June issue of *Computing with the Amstrad*.

If you have incorporated Peter's modifications, remember the lines 2200 and 2200 to 2217 and 2218. If not, just remember the 2210 to 2218.

After this renumbering add the following lines:

```
2118 LOCATE 18,14:PRINT "A
2119 right margin,END"
2200 G=0:DEFIN=14:DEFIN=10
2201 IF G=0 THEN justfi
2202 G=1:DEFIN=14:DEFIN=10
2203 IF justfi THEN G=
2204 IF justfi THEN G=
2205 DEFIN=14:DEFIN=10
2206 DEFIN=14:DEFIN=10
2207 DEFIN=14:DEFIN=10
2208 DEFIN=14:DEFIN=10
2209 DEFIN=14:DEFIN=10
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Painless surgery

I AM writing to you about the double line feed problem encountered when using an Amstrad CPC464 with an Epson printer. Previous solutions have included cutting wire 14 on the printer connector, setting the printer's internal DIP switches and sticking tape over pin 14 on the edge connector.

I have discovered another solution which avoids the problems incurred by using the above methods.

My solution is to alter the size of the printer's line feeds using the control characters ESC A and ESC J.

The ESC A code is best using:

```
HEX 0E,09H(21)'0'00H
M
```

where n is the size of the line feed in units of 1/72in and can lie in the range 0 to 255. I find values of about 8 best, but you can use any value you prefer.

The ESC J code is best using:

```
HEX 0E,09H(21)'0'00H
M
```

where n is, as above, the size of the line feed, but in units of 1/216in and is calculated for more accurate positioning.

I find this a flexible solution which I hope will be of use to your readers. — Alan Thomas, Marbury Tydfil.

Programs galore

THANK you for replying to my letter asking if there was a mistake in the Space Hunter program in the November edition of your magazine.

Soon after I sent the letter I discovered my typing was successful and I have now got it running perfectly.

I understand you cannot help personally in every letter. As I stated in my last letter I am a complete novice at the

computing game and enjoy it a lot and by taking the time to answer you have pleased another customer, as I have now placed a repeat order at my newspaper for your magazine.

I am not into playing games as far as I like typing in programs, but find it difficult to get books with programs in I wonder if you could tell me any addresses of publishers from whom I could order books by post. — K. Hodgkins, Pontefract.

It's great to hear that in the end you managed to get your program to work.

It must be very disappointing to spend hours typing one in and then not being able to get it to run because of a simple typing mistake that you cannot find.

We know — we're all done it, and keep asking our readers to check their listings carefully for these.

It's nice to know that occasionally our suggestions meet with some success.

Here is a list of some of the publishers that we know produce books for the Amstrad from whom you should be able to order a catalogue of their products:

Interface Publications, 2-11 Kensington High Street, London W8 5NP.

Melbourne House, Castle Yard House, Castle Yard, Richmond TW9 1BT.

Argus Books, 1 Golden Square, London W1R 3AN.
Bernard Babani, The Granaries, Shephards Bush Road, London W8 7PF.

Milne Press, Castle House, 27 Ladbroke Road, Tyndridge Walks, Epsom.

Samphire Books, 12-13 Little Newport Street, London WC2E 8PP.

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Pondering the PCW

I AM considering buying an Amstrad PCW 8325 and would like to ask a few questions on it beforehand.

I am not what you'd call a computer initiated person, and

the idea of actually buying and owning one of these I find quite a daunting prospect.

I think that the Amstrad PCW 8325 sounds really good value for money — especially as it includes the printer. One thing worries me — its screen. It seems rather 'stinky' when you look across the monitor and it was quite big and a bit out of focus at the edges. Is there any way of rectifying this?

I have also heard that LoadScript is complicated for first time users — it does test rather awkwardly on the screen.

I wonder if there was any way you could refer it to suit your personal needs?

I would also like to know what is meant by LoadScript constantly formatting a file for the printer while it is being edited and why the text before the cursor position is continuously scanned and re-formatted on screen as the cursor passes over it.

LoadScript constantly creates a TEMP file — what is a TEMP file?

And as a final side issue, I was advised if the word processor could be used for manuscripts and notes? And if so, how many disks approximately would you need for, say, a 200 page novel? — Catherine Barber, Muggenford.

There's no way you can alter the screen presentation. This out of focus effect doesn't happen in the same place on all machines and on some it doesn't even occur at all.

It's the lack of the draw scale, and it's not all that important anyway as the main field of text is centred on the screen away from the edge.

The screen effect you refer to is the resolution of the monitor and is standard for medium resolution equipment. It's a trade off for a low cost package.

To answer your second point, LoadScript may look complex to the first time user.

Like any sophisticated package it needs some getting used to, but Amstrad have made every effort to make it as user-friendly as possible, and it

is not as bad as it may first appear.

There is no way to alter it to suit your own needs, as with most professional software, it is a complete package, protected against copying and therefore inaccessible to the average user.

Most word processors save files in disc, and when it comes to printing them in a particular format you either have to put embedded commands in the text beforehand, or the files are formatted by the computer in some other way so they are able to be printed.

The disadvantage with the first method is that you don't see on screen what you are going to get as a final result.

The disadvantage with the second is that because the computer is being used to format the printing, manuscript applications become slow.

LoadScript formats for the printer all the time. This also means such functions as save, and search/replace, that speed up concurrent applications, such as adding another file or disc management while printing is taking place.

The simplest way to explain a TEMP file is as follows. LoadScript can handle a file of any length, depending on the disc storage space at your disposal, but this cannot be handled by the RAM all in one go.

So a TEMP file is continually created on disc and is automatically recalled into memory as you scroll through the document.

The problem with working on a lengthy manuscript is that it can't all be held in one file as you might, for instance, choose to have one file per chapter.

These have to be printed out separately, but because LoadScript has a facility for starting page numbers at any number, the task is made simple.

A 200 page novel written double spaced on A4 paper, would need at least two double sided disks.

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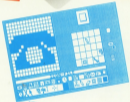
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