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# Big fun software boom takes off

THE entertainment software boom forecast in *Computing* three months ago is now well underway.

Latest figures from the trade show that CPC programs are steadily gaining a larger share of the market while sales of games software for other machines like Spectrum and Commodore have been declining.

Chris Sarney says CPC games now account for more than 18 per cent of total sales, up from about 11 per cent last year.

Industry observers say the boom owes much to the 40 per cent cut in the price of 3in discs three months ago.

Cost of Amstrad's CP-2 basic discs was slashed from £5 to £2.99, and software



Feedback to January's *Computing with the Amstrad*

houses told *Computing* with the Amstrad at the time that high disc price was one of the reasons CPC program sales were being held back.

Previously, publishers disappointed that software sales had not matched the success of the CPC itself were releasing tape-only games, and in some cases even ignoring the machines. "But our research

shows a high proportion of CPC users prefer discs to tapes", said Patricia Mitchell, product manager of Virgin Games.

Amstrad marketing director John Ainsworth predicted, "It will stimulate an enormous demand for disc-based games, and those firms who've got their wits about them and can move fast will

do very well indeed".

This has now been borne out by the sales figures released since January which show CPC products as the fastest-growing software sector.

It is seen as a reward for loyal CPC games producers such as Activision - which launched seven CPC games at once in March - Martech, Bubble Bus, Hewson, Aristonsoft, Alligata, Bug Byte and Mellocoame House.

Good news, too, for software houses who have ensured that their blockbusters - like *The Growing Pains of Axlton Male* from Virgin, *RoboCop 2* from Superior, *Monty Mole* from Gamesin, *Ballbreaker* from CRI, and the PDS wargames series - are released for the CPC.

## IBM FADING IN PC BATTLE

AMSTRAD is pulling away from its biggest rival IBM in the fight for supremacy in the British business PC market.

Latest figures from market researchers Ramtec put Amstrad's share up to a record 35.8 per cent which represents a 10 per cent lead over the former leader.

Before the turn of the year Amstrad was only 1.4 per cent ahead - the first time they had taken the lion's share of the market. But Ram-

tec's survey reveals that only a small percentage of the Amstrad sales were taken up by PCs.

But the survey was made among independent distributors rather than High Street chains, where most PCs are sold.

Amstrad is keeping cool about the figures, a spokesman describing them as "very pleasing". It is thought they are waiting to see whether this is a trend.

## ROYAL FROLIC ON THE CPC

A LIGHT-hearted look at the Royal Family is the subject of the latest CPC release from 8th Day. In the hope of receiving a knighthood, HRH officers must race in the Queen's girth after an embarrassing mix-up at the DMS.

The price is £2.99 on tape, £5.99 on disc.

TELEVISION'S only regular computer programme *Micro Live* faces the axe Database Publications, presented by hosts of letters from readers, is determined to ensure the axe will not fall.

The last *Micro Live* in the present series was scheduled for the end of March. Head of Continuing Education (Television) at the BBC David Hargreaves said: "The present season of *Micro Live* is its third. We have decided not to plan a fourth for next winter.

"We want to pause, take stock and think about how we ought to be making the best contribution to our understanding of information technology in the future".

Derek Meakin, head of Database Publications, said: "Micro Live has played a leading role in

## MICRO LIVE FACES AXE

introducing the delights of computing to an ever-growing audience.

"To all the series now, when so many exciting developments are taking place in the whole world of microcomputing, is a retrograde step".

So, *Computing with the Amstrad* readers, it's time to play your part. If you want to help save *Micro Live*, write to: The Controller, BBC 1, TV Centre, Wood Lane, London W12



## DIXONS DRIVE INTO THE USA

HIGH Street chain store Dixons is poised to expand into the US - and that could mean really good news for Amstrad.

The electrical stores group is a major retailer of Amstrad products, and its American venture could open up fresh markets for British exports.

Dixons is negotiating to buy Cyclone Corporation, owner of the coast-to-coast string of 120 Silo electrical appliance outlets.

Amstrad is hoping this means its micros will eventually appear on the shelves of every Silo store.

Amstrad already has an American presence through Sears chain stores and dis-

tributor Video, but a spokesman said: "We're after as much exposure as we can get."

"We hope our claims will be considered when Dixons completes the deal for Cyclone".

## Four in one for the CPC

A SPREADSHEET for the Amstrad CPC has been released by Audigenix. The company claims Matrix is probably the most powerful spreadsheet for any home computer.

It is billed as four programs in one. Apart from the usual spreadsheet for displaying tabulated accounts, it has a database capability, a text editing notebook and a graph plotting facility.

Features include cut and paste sheet editing, pull-down menus, large spreadsheet area, adjustable column widths and many mathematical functions.

The notebook features a text editing area for preparing letters, reports and such and the facility to store on data from the spreadsheet.

Financial information can also be presented in graphic forms such as line graph, bar graph or pie chart.

Price £29.95 on cassette and £39.95 on disc.



## Superior database for PC1512

ONE of the world's leading database houses has entered the Amstrad market for the first time with a revolutionary database for the PC1512.

Precision Software has unveiled Superbase Personal, an easy-to-use package for £59.95 designed specifically to make the most of the Gem environment.

This powerful system places reliance on the number of fields or on the size of the record, and as many files as needed can be opened to build up a relational report.

Superbase Personal has been developed as a "very easy" data management

system. It offers a unique facility for coordinating pictures and text. The graphics management capability allows pictures to be retrieved and displayed, and there is a built-in automatic slide show picture sequence.

This multi-file relational database incorporates all the latest user-friendly techniques such as windows and pull-down menus. Data manipulation is achieved by the click of a mouse or video recorder style symbols on screen.

File structures can be changed at any time without disturbing existing records,

and there is a specially designed straightforward printing feature.

Precision is well known on the international database scene, with sales of more than 100,000 packages worldwide. However this is its first product for the Amstrad range, having made its name primarily in the Commodore market.

"We are well aware of the importance of Amstrad in the micro scene today," said Nigel Lovett-Turner, Precision's sales director. "That is why we have devoted considerable time and money to develop this package".

## Welcome to 18,000 new readers



FROM this month Computing with the Amstrad will incorporate the best features of AMTIX, which has now ceased publication. And that means a warm welcome to 18,000 AMTIX readers.

Within these pages they will find every familiar feature, all presented in the lively and entertaining style with which they are familiar.

Features such as the covered AMTIX! Accolades, which are awarded to games which score over 90 per cent, and the long-awaited AMTIX!, which add a new dimension to arcade games playing.

To all our new readers: Welcome on board - it's great to have you with us.

Derek Mackie, Managing Editor

# COURSES FIRM SAYS CPC TOPS LEAGUE

AMSTRAD CPCs are the machines of the moment as far as a leading computer education organisation is concerned.

Microwise UK runs a series of tape and disc based courses for a variety of computers.

"Of all the courses, the ones for CPC are the most popular", said Microwise principal Jim Baxter.

The company has just revised its range for the CPC. They are suitable for all ages and aimed at providing users with a better understanding of their machine, its use, and competing practice in general.

"We work on the idea of a family, Mum, dad and the two kids buy a first computer, get it home and realise after a few hours use they don't know what more to do with it", he said.

But Microwise has been surprised at the number of enquiries it has received from pensioners wishing to learn about computers.

"I suppose it is an ideal pastime for such people, and we are happy to help", he said.

Each course is tailored to the individual by the progress reports. "We have found we gear these reports in terms of

ability rather than age", said Baxter.

"We believe that this service is unique in offering courses to Amstrad users with a back up service included. This enables assistance and advice on coursework to be given".

Each course is supplied with software, texts, a progress report and help sheets.

The courses include: Introducing Basic, Continuing Basic, Numbers Maths and Functions, Graphics and Sound, and Files.

Price £77.00 (£75.00 for two or more) on cassette; £78.00 (£77.00) on disc.

## Prestel via MicroLink

AMSTRAD console enthusiasts may soon be able to access Prestel's massive 300,000 page database through MicroLink.

British Telecom is running the messaging services of Prestel and Telecom Gold, with which MicroLink is associated. This will immediately create a 120,000 strong user base of micro owners able to exchange messages with each other.

## Glued together

SANDPIPER has released a program to bring together its Amstrad PCW office software. It described Glue as "a major step to full office automation".

The program provides an interface between Sandpiper's Accounts, Payroll and File Manager packages.

Glue can take data from other manufacturers' software.

## Birthday winners

OUR Second Birthday Competition was a great success. The combination of prizes - generously provided by Electric Studio and Gemini Graphics - attracted piles of entries. Eventually we picked out the following 30 people, and their super prizes should be with them any day now.

- PCW prizewinners: 1st: L. Lydale, London; 2nd: G. Marks, Douglas; 3rd: J. Budge, London.
- CPC prize-winners: 1st: A. Hallen, Tring; 2nd: M. Bevan, Swanton; 3rd: J. Bolton, Harlow.
- Rammer-egg: R. Davies, Reading; C. Holland, Leeds; P. Booth, Leicester; M. Crivenski, London; J. Payne, Coventry; J. Coleman, Barnack; A. Smith, Thame; Martin Heath, G. Parkinson, Leicester; M. Cooper, Norwich; W. Booth, Haverhill; P. Michael, Merseyside; C. Stedman, Northampton; C. Johnson, Bradford; R. Brooks, Yeovil; R. Nares, Garsdon; S. Hayden, Walsley Garden City; P. Holland, Stamford; S. Bradford, Garsdon; B. McManisland, Abbeville; S. Collier, St Albans.

## Assembler update

ARMOR has finished work on a new version of its Maxam Assembler plus a C compiler for the CPC 6128 and the PCW.

Maxam II has a totally different editor, based on Amstar's Protext word processor.

A new monitor has also been written complete with symbolic debugger. It enables switching through the various part of the CPW-memory map.

The C compiler, which also runs on CPW, now allows external spaces to be linked. Users can link with Maxam or vice-versa. Both cost £79.95.

Armor is at present working on a version of Protext for the Amstrad PC.

## STOP PRESS

After the games pages of this issue had gone to press DR Technica announced a substantial reduction in the price of their 268K, Silhouette One and 268K Memory Expansion. Both down from £99.95 to £75 and 64K Memory Expansion from £49.95 to £29.95.



Arnhem Manor... detective thriller

## New games for CPC

TWO new games for the CPC have been released by Melbourne House.

One the Destroyer is set in the future and players must try to save the Dorned City from flooding by penetrating the city's defences and confronting the terrible pirates who rule it.

The Mystery of Arnhem Manor is a two part detective thriller for the CPC. The player

takes on the role of an investigative journalist and must try to discover the whereabouts of the missing Colonel Fortesque.

The village of Arnhem must be explored and its inhabitants questioned. Regular telegrams and articles must be sent to the editor and these may be filed using a save and print option.

Both new games cost £8.95.

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# SCALEXTRIC®



This split-level racing game incorporates all the excitement of the race track, in fact many race tracks, as it features an icon-driven track designer that allows you to construct your own tracks as well as select scaled Formula 1 championship circuits.

One or two people can play and have their own 3D view. Some ingenious programming has made the feel of controlling the cars very realistic, and you can even bump and push your opponent's car if you want to play dirty!

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Also available for **Spectrum 48/128** and  
**Commodore 64/128**

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2557.



## BALLBREAKER

**CRL, £7.95  
cas, £14.95  
disc, keys and  
joystick**

In the dim and distant past, when home computers were a figment of Clive Sinclair's imagination, there existed a state-of-the-art video game by the name of *Breakout*. A variation on the ping-pong theme, you used a ball to chip away at a brick wall until it completely disappeared.

*Ballbreaker*, the latest hit-nach offering from CRL, is an earlier, three-minute version of *Breakout*

which results in the occasional preferred bonus. On the plus side you now have a fire button and a stack of 10 missiles — more useful for taking out that final massive block.

Screen one is a straightforward brick wall (no problems there), but screen two is a different sort of arena. Apart from the ordinary stretch of wall running across the middle of the arena there are two sets of columns, in front of and behind it.

The very fact that there are now three levels of wall means that the front columns are much closer to your ball. A ball



which enables all the wonderful facilities that are at the disposal of today's programmer.

The first thing that you notice about *Ballbreaker* is that everything is shown in 3D in glorious technicolor.

The game is played in the *Ballbreaker* arena, which has three solid walls and a fourth side which you must defend with a ball.

Unlike the original game the wall is vertical. As the ball hits a block at the base of the wall it disintegrates, which creates a hole for the ball as the ball falls down to hit the gap.

The bricks aren't all identical in shape so you may be left with a hole in the middle of an arena, which provides a gap through which you can hit the ball.

Once on the far side of the wall the ball bounces repeatedly against the bricks, creating havoc with the multi-colored masses. You can take a breather at this point and wait the ball's return.

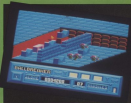
Some of the blocks are con-

volving from one of these requires a lightning fast response if you are to return it.

Being a nasty bunch of chaps the CRL programmers didn't think this was tricky enough so they placed purple frogs on top of the front two columns. The instant that a column is destroyed, the frog leaps off and hits it.

Busting the frog and setting it free is its death will not help — the snail-pac frogs are immortal immediately in their original starting position, allowing them to attack again and again.

Your only source of action is to hit the frog with the ball or a missile, but due to the close proximity of the wall this is



easier said than done.

If you set yourself up to blast the frog with a missile there is a very good chance that you won't have time to return the ball. Concentrating on returning the ball will inevitably result in you being rammed by a charging bulfrog... heeey!

There are 35 different screens, all containing different problems and puzzles. Once you have destroyed the wall on the first screen you progress to the next by taking the ball past you and fall off the edge.

On the higher screens there are diamond-shaped bricks which when struck by the ball will destroy every brick in the arena, allowing you to move on to the next level. If you shoot the escape brick with a missile it will not function correctly and you cannot skip that screen.

Certain shapes of brick will replenish your missile stocks while others will start you with a life. If on any occasion you strike the escape brick before hitting three bonus blocks you miss the opportunity to improve your chances of survival.

The perching purple frogs are not the only inhabitants of the arena — you will also be attacked by needles which drill inside the blocks. The first thing you learn about these is when you destroy a certain shape of block and get caught by a needle. The heater miss may be avoided by hitting a wall, but to rebound to the ball smashes it into through.

My only grip is with the game controls, as you are unable to move the ball before the ball has bounced into the arena. If you happen to lose a

ball while your bat is at the side of the arena, it is frozen in this position until the new ball is served.

The new ball always appears in the centre of the arena so you have to make a mad dash for the middle of the arena and hit the ball on the run.

The speed of travel of both the ball and your bat are sensitive to the amount of on-screen action. If you've just blasted a massive hole in the wall and the ball is falling to take its place, the action slows down, not dramatically, but enough to serve as an excuse if you lose the ball. Minor grumbles aside I found *Ballbreaker* to be a stunning game. The level of variety is tremendous and the graphics are a treat for the eyes.

Jon Davis

### Presentation 88%

Opening menus with a good selection of options.

### Graphics 92%

Wonderfully solid shapes that look good enough to eat.

### Sound 85%

Choice of tune on sound FX.

### Playability 85%

Occasionally unpredictable response of bat to controls.

### Addictive qualities 92%

So simple but totally absorbing.

### Value for money 91%

Worth every penny.

### Overall 92%

State of the art *Breakout*.

## STRIKE FORCE COBRA

**Piranha, £8.95  
case, joystick  
and keys**

**S**YDNEY Station City to Sydney friends has a lot to answer for. Not only does he produce outstandingly vibrant cut-3D spots which show his ability to string together more than three consecutive words... but he also seems to have inspired the numerous gun-bling characters currently

inhabiting the world of computer games. And there's an option to choose four out of eight possible team members, each with a different character profile. Presumably a carefully chosen mix of team members will accomplish the task more quickly.

Your weapons include a lightweight sub-machine gun, and also a megagram flam-grammer (MFC) which will either destroy or confuse the enemy, who will attempt to damage your own lightweight body armor.



populating the world of computer games.

Strike Force Cobra, a crack elite fighting force of 30 soldiers, has been formed by the world police to stop an evil criminal genius from triggering an instant nuclear holocaust.

The mission - to destroy the evil genius's computer hacking system before it is too late. A familiar scenario, but? Maybe James Bond has a lot to answer for as well!

By fighting their way through the enemy fortress and seeking out the 30-soldier command, the four members of Strike Force Cobra must obtain the secret codes to the lock of the fortress's main computer room. Hazards on the way include 300-40000 weapon systems, electronic traps, laser retorts and human guards.

The game scenario is of the 3D graphics-panoramic type, so many small rooms are visible at any one time due to the cutaway nature of the graphics.

A combination of joystick and keyboard control allows you to jump, dive, crouch, stand up and fire, but it would have been nice for everything to be done by one or two keys.

What makes the game slightly different from other games of a similar genre is the depiction of the military of the discipline, and the realistic ap-

pearance of the characters. But feel and facilities can be reached - it managed it several times during the game.

Gameplay in this new title from Piranha is extremely absorbing, and will appeal to those who like to stretch their brains as well as their fingers.

**Nigel Lewis**

### Presentation 85%

Colourful title page and detailed option screen.

### Graphics 85%

Some of the clearest 3-D graphics around.

### Sound 60%

A bit disappointing, more footstep and gun noises would have worked wonders.

### Playability 80%

Action is slightly sluggish, but very good on the whole.

### Additive qualities 95%

You'll keep coming back to solve the mission.

### Value for money 85%

Impending theme and good value.

### Overall 84%

A good arcade adventure with nice graphics.

## THE SYDNEY AFFAIR

**Infogrames,  
£9.95 case,  
£14.95 disc,  
keys**

**T**hink of ville five shows the peace of a little French town - it makes quite a mess of Mr Sydney's head but I think should anybody want to kill this quiet family man? As a Detective Sergeant in St Dennis's crime squad it is your job to unravel the mystery of The Sydney Affair.

You begin the investigation at the good detective's house, by visiting the scene of the crime. The screen is divided into three sections, the largest of which shows a detailed picture of the

glass on the briefcase informs you that it is broken. Once you have located the keys you will have three suspects.

Always be on your guard for sneaky tricks. Having opened the briefcase you find a diary containing names and addresses. Don't go off and search elsewhere as the briefcase contains just those goodies, accessed by pressing the Copy key a second time - dirty, and. All information should be committed to paper as it is discovered - once every two of the program has loaded you return to the opening screen.

One of your team of officers has discovered the location of the assassin in the flat across the road, which forms the basis of



body and its immediate surroundings.

An icon in the shape of a magnifying glass is used to search the scene for clues. All you have to do is place the icon over the area you wish to examine more closely and press the Copy key.

If the specified area is hiding a clue then the other two screen windows are brought into operation. The lower one displays a picture of the item you have found while the window resembling a note-pad identifies it and provides additional information. For example, rifling Mr Sydney's jacket pocket reveals a wallet, the contents of which are detailed on the note pad.

Certain items in the scene are related. Placing the magnifying

glass over the briefcase informs you that it is broken. Once you have located the keys you will have three suspects.

Always be on your guard for sneaky tricks. Having opened the briefcase you find a diary containing names and addresses. Don't go off and search elsewhere as the briefcase contains just those goodies, accessed by pressing the Copy key a second time - dirty, and. All information should be committed to paper as it is discovered - once every two of the program has loaded you return to the opening screen.

One of your team of officers has discovered the location of the assassin in the flat across the road, which forms the basis of

body and its immediate surroundings.



each of its disposal. When you log on, you can communicate with a variety of official websites.

Messages about particular investigations can be sent to other police agencies in the following format: "Information on 'STRANGE' affair." If the receiving agency has had no involvement in the case, then they will supply you with all available information.

The Detective Squad for Judicial Information can be accessed and details requested on individuals if the person in question is wanted, then you will be told why and by whom. The Judicial Research and Completion Centre has a similar function, but you can also request details on objects as well as people.

If all else in each police work becomes too much for you, there are always the sophisticated techniques to fall back on. If you know a person's name and address then you can go round and beat a statement out of him! The statements are always true, but come complete with a peevy photograph of the person being interviewed.

Pressing the Examination key allows you to perform autopsies and ballistic investigations. These explain the bullet hole in the wall and tell you from which building the shot was fired.

The Sydney Affair is an excellent educational program, a real challenge for the amateur detective.

Neil Auld

## BRIDE OF FRANKENSTEIN

**Ariolasoft, £8.99 case, joystick and keys**

**T**he thought of marital bliss has all been too much for Frankie who has cracked up under the strain. As the future Mrs. Frankenstein you take a crash course in food building - all you need now are the parts! The *Bride of Frankenstein* follows your gross riddling exploits as you strive to give life to your frozen one.

The leading role in this classic horror story is played by a rather clumsy sprite who goes

one day at a time.

Before the main playing area there are four types of icons. The first is Frankie's coffin - as you acquire new bits they are fitted to his skeleton and a list made of those collected.

Next there are the icons which display what you are carrying: keys, spades, pickaxes and other implements and you use the cursor keys to highlight the required object.

Each number three is a glass flask containing green liquid - the elixir of life. The more you roam the castle, the more elixir you accumulate, but losing your flask is a real loss to be remembered.

Fortunately there are several



by the name of Mrs. Stein. With the *Bride* hair floating in the wind she explores a very colourful and detailed castle.

Her fantastical adventures are also depicted as large cartoon-style characters. So cleverly allowing them to move behind some objects and in front of others the games are given a more 3D feel.

The 88 screen playing area covers castle rooms, corridors, parks, graveyards and crypts. Most of these contain doors, the majority of which are locked - except corpses!

In various rooms around the castle are keys hidden in all, but each one will only open specific doors and you can only carry

store rooms within the castle where you can walk to a locker and fill up. The final room is a beating heart, but beware of high blood pressure.

Skeletons and skeletons roam the castle looking for Mrs. Stein. Carried with these skulls has been the sparring - prolonged contact will kill her.

Certain areas of the castle have been given populations that others, but until you locate them you will find that the game doesn't last more than a few minutes.

Deaths are notoriously difficult to shake off, especially since your speed of movement is reduced when a body is in the room.

There are two main areas in which you can walk your heart out. The first is the pathway to the graveyard, the second the sanctuary open within the castle.

This contains a plentiful supply of elixir but appears to be built on a pit in the time space continuum. Every time you use the spade there is a good chance that you will end to a different part of the castle, which can be used to your advantage.

The spade and pickaxe are essential tools for the amateur grave robber. Just stand in front of a headstone and dig - three shovelfuls will usually be sufficient to unearth some of Frankie's secrets.

The pickaxe is used for opening cracks and churning ground. Many of the rooms are built to a long is a definite advantage, unless you like hanging about in the dark.

The trap card states that the dungeons contain electric prisoners and goes on to say that you could set them free... or use them in other ways - then spare parts are probably much faster than the ones I've just dug up in the graveyard!

*Ariolasoft* has got the level of difficulty just right. The game appears almost impossible at first, but with a reasonable amount of perseverance you will soon find your fingers increasing. This is a first rate arcade adventure game for the horror fanatic.

Carol Barlow

### Presentation 83%

Superb line art showing dramatic first, repeated completion time and age target.

### Graphics 85%

Direct use of graphics for some-of-the-crime investigations.

### Sound 54%

Very limited.

### Playability 85%

Heaven going until you get a lead.

### Addictive qualities 80%

The computer's omnipotent replies tend to spell things.

### Value for money 81%

Should provide many hours of frustration.

### Overall 85%

A real brain exercise.

### Presentation 86%

Good story line, well laid out instructions.

### Graphics 88%

Colourful but chaotic.

### Sound 84%

The title tune is a little silly but Bach - played by a tone deaf bellows.

### Playability 87%

Clowns are a major problem until you learn how to avoid them.

### Addictive qualities 85%

Has a tendency to be more frustrating than addictive.

### Value for money 84%

Good value for this entertaining game.

### Overall 88%

Excellent arcade/adventure game.

## ACE OF ACES

**US Gold,  
£9.99 case,  
£14.99 disc,  
joystick and  
keys**

**A**Ce of Aces puts you at the controls of a biplane to speed bomber with the objective of knocking out enemy fighters, bombers, VT rockets, tanks and air bases.

The game starts in the briefing room, where the commander points to a small

The bombardier's view includes a full graphical status report of all weapons available and allows the dialling of empty fuel tanks to reduce the plane's weight.

The colour scheme is a little bland, but the game itself is very enjoyable, if a little difficult.

Much of the game seems a little rushed, especially the pilot's screen which is quite cluttered and detracts from what could have been a great game.



blackboard from which you must choose to fly a mission or have a practice run.

You can equip your plane with rockets, bombs, cannon or an extra fuel tank for the longer missions - the selections reflect the type of mission chosen.

In the second mission you make your attack runs on U-boats before they dive to safety.

Enemy bombers are heading for London in the third mission. You must destroy them all using rockets - which are not known for their accuracy.

In the final mission you aim to dispose of BT rockets while being attacked by enemy fighters.

Unlike many other arcade simulations, the game is divided into five separate elements. The main pilot's display has all the controls which allow you to fly the aircraft, including artificial horizon, altimeter and radar.

The engineer has two views on to the port and starboard wings from here he must control the throttle and lower settings of the engine.

The navigator's view shows the position of the plane on a map of western Europe, along with the position of any enemy activity.

## SHOCKWAY RIDER

**FTL/Gargoyle  
Games, £8.95  
case, £13.95  
disc, joystick  
or keys**

**F**TL's first offering on the CPC was Light Force, which topped the Amiga charts for some time. Now after a long

wait a direct hit on any of the many Nagas that litter the wastelands on the later levels.

The music proved to be very good, fitting in well with the plot, but tended to get repetitive after very few games. Music and sound FX can be toggled however, though the effects were nothing more than unimaginative beeps and whistles.

I think FTL seems to have let



out serious Shockway Rider, the company's latest horizontal shoot-em-up.

Shockway Riders are the toughest members of the 21st century street gangs, and all want to complete the ultimate goal of going "Full Circle", a trip which takes them around the entire Megacity on the triple-speed walkways.

Each walkway - there are eight - consists of three tracks moving at different speeds, the slowest being the inner track.

You must avoid all objects and people, while moving fast enough to cover 12 one-way streets (which come at one-second intervals) in under two minutes.

Most of the hazards found on the walkways are passive, such as railings which slow off the rider's head, and the policeman's ball which flies along any track which has been ridden too long.

The local residents - old ladies and punks - also ride the walkways, but they don't take to you speeding motor, and will dispose of you neatly if you get in their way.

Not everything found on the walkways is harmful. Gold and money can also be found, along with an assortment of weapons from bricks to rockets which will kill a rider who is directly in front of or behind you.

Trapping unarmoured sidekicks only harms pedestrians, but you gain bonus points if a

triple-bomb a Naga with this one. The game was just too sparse for my liking, even though a lot was happening on screen.

Shockway Rider can be an enjoyable game, but is only going to appeal to certain people - take a long look before buying.

Anthony Clarke

Instead this is an above average - a modest strategy simulation which has a generous amount of mass appeal!

Anthony Clarke

**Presentation 87%**  
Interesting way of selecting options, but the view screens could have been better.

**Graphics 67%**  
Bland and unimaginative, with little colour and depth.

**Sound 55%**  
MIMM!! Beepes

**Playability 63%**  
Difficult to get the coordination of changing screens and keeping the plane in the air.

**Additive qualities 75%**  
A game which has that "Just one more go!" appeal.

**Value for money 64%**  
A bit steep for this quality of game.

**Overall 68%**  
Points of appeal for those with the apt and coordination of an eagle.

**Presentation 81%**  
Good on screen instructions, easily handled keyboard layout.

**Graphics 72%**  
A little sparse, but Tebbe (my gang members look great cool).

**Sound 85%**  
Great music, limited spot FX.

**Playability 73%**  
Practice mode makes the game much more playable.

**Additive qualities 69%**  
Only played for half an hour at a time, but an enjoyable full hour.

**Value for money 81%**  
Less than most games, but would have been better as a budget title.

**Overall 83%**  
Not FTL's best, but still one worth a look.

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## HEAD OVER HEELS

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WHEN Batman appeared all these months ago, it was heralded as one of the best 3D games available. Jon Ritten, author of *Batman*, has now written *Head Over Heels*, an another 3D maze runabout, but it is quite a different game.

The Blacktooth Empire has been growing steadily for many years, taking over other planets and ruling by oppression.

The creators of the peace-loving world of *Freedom* are becoming worried that their planet will soon succumb to the Blacktooth threat, so they have sent two of their top spies, Head and Heels, to counter the threat.

These two characters are a strange breed of symbiotic animal which can join together and become a larger animal or separate to control tricky situations.

Head, as the name implies, sits on top of Heels. Over the years he has lost his legs and developed strong arms and the capability of wings which allow him to jump long distances and have a limited amount of controlled flight.

Heels has also changed, losing his arms and developing strong legs with which he can run very fast.

The differences between them mean that only together do they have any hope of completing their mission - to begin revolution on all of the



Blacktooth Empire's auxiliary planets.

The game starts with the two characters separated and in different parts of a large gym, making the first order of business to bring them together while collecting two pieces of vital equipment.

From here they must then travel to each of the four planets in turn and called the Creators of Blacktooth with which to start the revolt.

The first planet in the system is Egyptia, a strange world where civilization seems to revolve around people wrapping corpses in bandages and cutting them in pyramids.

The Penitentiary is the Empire's prison planet, from which few return, it also holds

the secret of the Pin.

A densely vegetated planet, known as Selenia, is the third in the system. The natives live in wooden houses and eat traps for urinary animals.

The final planet is Bode World. This is a huge Western Liberty used only by the Empire and his minions, who we learn on the old West.

The task before the heroic pair is not as impossible as it first seems, and you will find several objects to aid your quest.

A scroll used by Heels gives the creature a limited ability to carry objects around the current screen.

You must collect a crown from each of the four planets before you can embark on the final quest. Teleports are scattered over the landscape, and these provide the only access to certain rooms.

Spings, switches and conveyor belts make up the rest on the landscape, making progress easier, but at times leading the two characters into a trap. In a

similar way to *Batman*, you will find magic objects which give a character limited special powers, but they do run out with time and do not always work on both characters in the same way.

Joining Head and Heels together and picking up a special power will result in both characters gaining the new abilities.

There are options to change the sensitivity of the controls, the volume of the sound, redefine the keys and choose a joystick.

Head and Heels have to be controlled separately by redefining buttons for the two, though if one of the pair loses all his lives the other will be left on his own.

The game features 20 pieces of music which sound different actions, such as finding a crown or picking up a bump. There is a greater variety in the graphics and backgrounds than *Batman*, making it a much larger game.

The graphics are of the same high quality as *Batman*, though the sound is a great improvement. Even if you are not one to buy 3D games, take a look at this one - somehow it feels very different from any other game of this type I have ever played.

Anthony Clark

### Presentation 92%

Plenty of logical options.

### Graphics 93%

Beautifully defined characters that glide around the screen without a glitch.

### Sound 75%

A little Spectrum like, but otherwise very good.

### Playability 91%

Intrinsically playable, though some of the traps are unfair.

### Addictive qualities 98%

Should appeal to all.

Including those who normally find 3D games boring.

### Value for money 94%

More of a game for less pennies than the competition.

### Overall 93%

Should grace the shelves of every CPC owner.





# AM tips

Anthony Clarke

FOR those of you new to AMTIX, AmTix is our monthly service that helps you to get more out of computer games. Just when you thought you had reached a hopeless situation, along comes a bright spark with all the answers, and a POKE or two to get you out of a jam.

This month I've compiled the tips, but by next month I hope the letters will be flooding in with tips and POKEs from your own good selves. Each month a winner will be picked who will receive software of his choice worth £25. If you have a tip or two, even if it seems trivial, send it to the address on page 24.

## MISSION OMEGA

(Mind Games)

The best robots to build are spiders with 18 legs, a large LASER and the second power supply. They are fast, use few materials and run for long periods before having to recharge.

When you enter a room with

a robot system, move on to the starting square with the colour for the sector you require comes up. The colours relating to each sector have to be worked out by trial and error, but once found are good for the whole game.

## The Fourth Protocol

(Century Communications)

I only began to play this game a short while ago, but here are some tips for section one that should slow down the decision to send you to the West Wall.

Team 1 is not the best players - try putting 10 watchers on the person completing most fire and see what develops.

Only one person has access to all the NATO papers, so put watchers on him by at the latest 10 days into the game or things will start to fall apart.

Patrols should be answered positively and swiftly. Though an umbrella may be too obvious, it is all for the best really.

When Telecom offers help, take it quickly. Try a voice profile on the radio who has access to the NATO papers.

When a person goes missing there is no point in put-

ting watchers on him, but his wife, on the other hand, is a different matter.

Put at least 20 watchers on ARMS. Don't try to feel her collar - that publicity does harm to the image, and all she may bring another hot shape back to the fact.

Building 17 security is simply a matter of common sense - who would want to steal top-secret 100 volts. Also remember that emergency exits must be kept clear at all times.

When a high-ranking official gives you a call, don't hang about. Call him back at once, but you had better have all the answers.

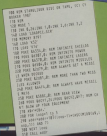
Get all the information possible from Bismheim, and if a longer data exchange is possible then use that as well.

Having a problem with hackers? JMT is a possible way to stop them.

## STARGLIDER (Rainbird)

For those of you not used to Star Glider, here's how to use them. Type in the listing as shown. Save it to a separate disc, insert the game disc, type Run then press Enter as shown. The program should now do all the rest.

This game from Cy Bucker should make Starglider a push-over. It's best if you only include the codes which you think you need, so the game doesn't get too slow.



## IKARI WARRIORS

(Elite)

Just a quick hint for survival on the bridge when you have to tank. Walk along the gap between the start of the bridge and the wall so that you are standing on the supports.

Walk along this support with the biggest set facing in towards the points of the bridge and keep firing. You should be safe from enemy fire, while still within reach of your gun. Grenades are useless here as they just roll over the enemy's head.

## HARDBALL

(Amsoft/Accolade)

Keep burning until the bases are loaded. Then swing far all you're worth and you should pick up four runs. Most people have a tendency to swing too early — just slow down a little and you should hit most balls.

You can gain an idea of where the ball is going to be pitched by watching the batsman. If he glances toward a particular direction then swing at the point the glove moved to.

## SENTINEL

(Firebird)

Sentinel must be one of the simplest, yet most challenging games ever to have graced the CPC. Just to put you on the right course, here are a few tips worked out by the AMTXX gang.

When dealing with just a single Sentinel on the map, it is best to check the direction in which it is moving and then jump around the map, cutting off all the bases and finally avoiding the Sentinel's range until the map is cleared.

When a jump has been made to another shell, the robot should be facing the shell you left behind, though you may have to look up or down to see it, as the robot looks straight ahead after an energy recharge.

Always, unless enemy permits, place a booster before a robot, so reducing the chances of not being able to see the base of the robot and losing the energy incantation.

Some squares may seem perfectly in view but the object there will not be sucked off. Try placing the cursor to the far left, right of

the square or one pixel below.

It is helpful to learn in what situations an object can be sucked off and so increase the amount of energy you have when approaching the next map. If the level contains Guardians, try to remove them as soon as possible as they tend to cover one another, scattering you in union.

Remember that when you first enter a screen the Sentinel or Guardians do not move until you try to spend the energy balance of the plane.

Use the fact to assist the possible moves you can make and try to engineer a way of gaining height quickly.

Finally, always turn the cursor off when you want to move the robot's head left or right as this speeds up the process, as does using the U-turn facility in otherwise difficult situations when there seems to be no option but to use hyperspace.

Some of you may be a little impatient to get through the 10,000 levels, so here is a booster to these dark heights.

Level	Code
0001	70066376
0101	27300630
0201	84357050
0301	02141130
0401	86443867
0511	74454420
0614	71675390
0820	67060730
0890	85144667
0980	88309876

We are currently in the 2000 range, more codes to come next month, but for now the codes listed should have a mix of different situations that will put you in line form for the later levels.

## ELITE

(Firebird)

The key to anticipating which type of craft is attacking you, and whether to shoot back, can mean the difference between life and death.

Any ship that appears in your forward view are safe, unless you happen to be a fighter. In this case a forward shot will try to destroy you for the bounty.

If when the ship is more than just a blob, you see a point with three other points radiating out from it at 90-degree angles then shoot away.

After all, bounty hunters are the scum of the universe so there is no legal penalty, even if you shoot first.

Any ship appearing outside the forward view is free range, so blast away. BGA's have soft underbellies — they seem to have instantaneous gaps for a long time after trying to damage a BGA will break off the attack. Blast them for the alloy, but you have to be quick as they don't hang about.

Once you are a competent pilot, make sure you have a generic hyperspace at all times, as the first mission empties your fuel tanks.

## ACADEMY

(CRL)

Try to build a craft with the correct characteristics for the mission selected. Always go for a good shield and laser power, with steering being the next most important.

An infrared unit is lighter than flares. The IR unit does not have deflection of the flares but with a little practice it becomes easier to use.

ALWAYS take an AER unit, or you will be lost before you know it, and the chances of happening upon the base again are quite slim. It is possible, however, to navigate by the stars, but just like the real thing this takes months of practice.



# AVENGER

(Gremlin Graphics)

This time Cy makes it much easier to complete the game by allowing you to always call Raven in your hour of need, among other things. Just use

the same technique to enter them as with Starblaster, but this time the code is for the tape version only, so save the code to a separate cassette.

```

000 RUN AVENGER HOME, TAP 003 OF 0000
1 1987
120 RUN
120 HANGUP 1100
120 00000000
140 READ 00:10 000-1 THEN 170
160 0000 001,001,0-001
180 000-000-1-0 000 140
190 001 000000
200 001 0000,000 000 0000,000
210 CALL 00000
220 RUN
230 DATA 00,01,01,01 : 000 000 00000 10
    10,0000
240 DATA 01,01,00,00,01,01,01,00,00,01 : 00
    0000 00000
250 DATA 01,01,01,00,01,00,01,01,00,00 : 00
    0000
260 DATA 00,00,00,00,00,00 : 000 00000 000
    0000
270 DATA 00,00,00,00,00 : 000 00000 000
    0000
280 DATA 00,00,00,00,00 : 000 0000 000
    0000
290 DATA 00,00,00,00,00 : 000 0000 000
    0000
300 DATA 00,00,00,00,00 : 000 0000 000
    0000
310 DATA 00,00,00,00,00 : 000 0000 000
    0000
320 DATA 00,00,00,00,00 : 000 0000 000
    0000
330 DATA 00,00,00,00,00 : 000 0000 000
    0000
340 DATA 00,00,00,00,00 : 000 0000 000
    0000
350 DATA 00,00,00,00,00 : 000 0000 000
    0000
360 DATA 00,00,00,00,00 : 000 0000 000
    0000
370 DATA 00,00,00,00,00 : 000 0000 000
    0000
380 DATA 00,00,00,00,00 : 000 0000 000
    0000
390 DATA 00,00,00,00,00 : 000 0000 000
    0000
400 DATA 00,00,00,00,00 : 000 0000 000
    0000
410 DATA 00,00,00,00,00 : 000 0000 000
    0000
420 DATA 00,00,00,00,00 : 000 0000 000
    0000
430 DATA 00,00,00,00,00 : 000 0000 000
    0000
440 DATA 00,00,00,00,00 : 000 0000 000
    0000
450 DATA 00,00,00,00,00 : 000 0000 000
    0000
460 DATA 00,00,00,00,00 : 000 0000 000
    0000
470 DATA 00,00,00,00,00 : 000 0000 000
    0000
480 DATA 00,00,00,00,00 : 000 0000 000
    0000
490 DATA 00,00,00,00,00 : 000 0000 000
    0000
500 DATA 00,00,00,00,00 : 000 0000 000
    0000
510 DATA 00,00,00,00,00 : 000 0000 000
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520 DATA 00,00,00,00,00 : 000 0000 000
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530 DATA 00,00,00,00,00 : 000 0000 000
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540 DATA 00,00,00,00,00 : 000 0000 000
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550 DATA 00,00,00,00,00 : 000 0000 000
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560 DATA 00,00,00,00,00 : 000 0000 000
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680 DATA 00,00,00,00,00 : 000 0000 000
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690 DATA 00,00,00,00,00 : 000 0000 000
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700 DATA 00,00,00,00,00 : 000 0000 000
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710 DATA 00,00,00,00,00 : 000 0000 000
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720 DATA 00,00,00,00,00 : 000 0000 000
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730 DATA 00,00,00,00,00 : 000 0000 000
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740 DATA 00,00,00,00,00 : 000 0000 000
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750 DATA 00,00,00,00,00 : 000 0000 000
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760 DATA 00,00,00,00,00 : 000 0000 000
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770 DATA 00,00,00,00,00 : 000 0000 000
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780 DATA 00,00,00,00,00 : 000 0000 000
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790 DATA 00,00,00,00,00 : 000 0000 000
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800 DATA 00,00,00,00,00 : 000 0000 000
    0000
810 DATA 00,00,00,00,00 : 000 0000 000
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820 DATA 00,00,00,00,00 : 000 0000 000
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830 DATA 00,00,00,00,00 : 000 0000 000
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840 DATA 00,00,00,00,00 : 000 0000 000
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850 DATA 00,00,00,00,00 : 000 0000 000
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860 DATA 00,00,00,00,00 : 000 0000 000
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870 DATA 00,00,00,00,00 : 000 0000 000
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880 DATA 00,00,00,00,00 : 000 0000 000
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890 DATA 00,00,00,00,00 : 000 0000 000
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900 DATA 00,00,00,00,00 : 000 0000 000
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910 DATA 00,00,00,00,00 : 000 0000 000
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920 DATA 00,00,00,00,00 : 000 0000 000
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930 DATA 00,00,00,00,00 : 000 0000 000
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940 DATA 00,00,00,00,00 : 000 0000 000
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970 DATA 00,00,00,00,00 : 000 0000 000
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980 DATA 00,00,00,00,00 : 000 0000 000
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990 DATA 00,00,00,00,00 : 000 0000 000
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```



## WIZARD'S LAIR (Bubble Bus)

If you are still stumped on how to use the magic life, try using the codes listed here, and make the journey less hazardous.

LEVEL	LOCATION
1	CAVE
2	HAVIL
3	CRYPT
4	DUNGEON
5	VAULT
6	LAVER
7	LYONS

## BIGgles (Mirusoft)

To play the helicopter section properly use the code WREN. Red dots on the map indicate places of interest, so search them out whenever you come across them.

You will also benefit by drawing yourself a map.

Just when I thought the Avenger would be devoid of games, who should I bump into but Cy Books, the man who FORGOT in the novel. Cy is a regular in these pages and you should be reading it by now of him in the future. If you have a game which you think needs a guide, drop us a line and Cy should be able to do the rest.

## RESCUE ON FRACTALUS (Activision)

Try to perfect shooting sessions at long range, or fly in fast, tight circles until they leave the area. If you see a pilot with a green helmet, don't waste time - just burn the airplanes back on.

When searching at night it is better to fly high and slow. When a pilot comes into range, decrease height carefully, watching the ground level indication. Flying at night is an essential skill, so once you get the hang of flying, jump straight to level eleven.

If you just going for a high score stay on the lower levels, collecting as many pilots as possible before returning to the mother ship.

## KORONIS RIFT (Lucasfilm Games)

(Lucasfilm Games)

When collecting artifacts, don't dismantle them until you know you have no use for them. This way an armoury can be built up quite quickly, and eventually you should have a complete range of differing lasers and shields.

The manual is right about the better equipment avail-

able in the opposite direction to the one you are firing on landing, but make sure you already own a fairly good laser and shield so you will be attacked by two weapons (yellow and blue) the moment you land.

On the first rift, beware the Redbeavers, but you find one it is booby trapped.

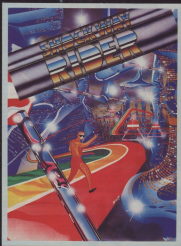








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**I**n the March 1987 issue of *Computing with the Amstrad* Ian Sharpe introduced you to a branch of mathematics known as fractal geometry.

You may have seen similar intricate patterns created as a demonstration of the speed of expensive mainframe computers, or played computer games such as *Pascal on Fractalus* which use fractal techniques to create landscapes.

But now we can quite easily generate impressive fractal pictures – and you don't need a degree in maths to appreciate them.

CPC Fractals is a program designed to draw different parts of the region around a set of numbers known as the Mandelbrot set, named after B.B. Mandelbrot who has done much of the work in fractal mathematics.

You can think of the Mandelbrot set as a two-dimensional shape and you can see the idea in Figure 1.

The interesting thing about the set is that if you zoom in on its edge you can see that the knobby bits are made up from even smaller knobby bits.

Greater magnification reveals an intricate arrangement of fine fibres and swirling patterns which connect the main Mandelbrot shape to tiny features on its extremities.

Some of these fibres are like miniature versions of the whole Mandelbrot shape. The edge can be magnified again and again to reveal more and more detail.

Although the area of the Mandelbrot shape is finite, its edge is infinitely complex and has infinite length. In mathematical jargon the shape is "fractal".

This talk of infinitely complex edges may sound as if producing the Mandelbrot set is beyond the poor old Amstrad – it would take an infinite amount of time. But the method, or algorithm, for working out which numbers are in the set is surprisingly simple.

Put mathematically, the Mandelbrot set is the set of complex numbers  $z$ , for which the iteration  $z^2 + z$  converges.

If that sounds confusing think about it this way. Let's take two numbers, say  $x$  and  $y$ , which we will use as constants, and two variables,  $a$  and  $b$ , which we will change and update in a loop.

The formulae for updating  $a$  and  $b$  are:

$$\begin{aligned} \text{new } a &= (old\ a)^2 + old\ b^2 + a \\ \text{new } b &= 2 * old\ a * old\ b + y \end{aligned}$$

We give  $a$  and  $b$  initial values of zero and put them into the formulae. This will give us new values of  $a$  and  $b$

# Fractal techniques

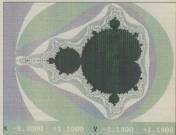


Figure 1: The Mandelbrot set

## CHRIS RATCLIFFE zooms in on the knobby bits of the Mandelbrot set

which are then fed back into the formulae in the next iteration of the loop.

If this is done repeatedly one of two things can happen:

- $a$  or  $b$  could "get out of hand" and head off towards infinity.
- $a$  and  $b$  can settle down to constant values.

We take lots of different values for  $a$  and  $y$  and use the loop to see which type of result they give.

If it's the first type we colour the point  $a$  white, but if the values give the second type we colour it black. Doing this for a suitable range of values for  $x$  and  $y$  will give the shape shown in Figure 1.

This is how the program works: first select a range of values to be examined for  $a$  and  $y$ . Each pixel on the screen is then plotted in the appropriate colour depending on whether the loop gives result one or

two for the corresponding  $x$  and  $y$  values.

To add some variety to the picture, instead of just using white the pixel is plotted in a colour which depends on how fast  $a$  and  $b$  are heading off towards infinity. This gives a lovely halo of colour around the black edge of the Mandelbrot set.

A good way to decide whether  $a$  and  $b$  are converging to fixed values is to put a check in the loop to see if the sum of their squares exceeds four.

The number of times the loop has to iterate for this to happen can then be used as a measure of how quickly  $a$  and  $b$  are heading towards infinity. If four isn't exceeded after 100 times round the loop they have almost certainly settled at fixed values.

A program to do all this can be written in Basic fairly easily but the logic

## From Page 28

number of calculations needed, especially the 100 calculations for values in the Mandelbrot set, means that the process would be very slow.

To get good results in a reasonable time the main calculation and plotting loops are written in machine code, with some Basic attached to set up tables and so on.

This allows most patterns to be produced in a few hours. Considering the program works in Mode 1 and calculates the colour of some 60000 pixels, this is good going.

The machine code is held in data statements and if you make any mistakes typing it in you will be told which line contains the error - though it is still a good idea to save a copy of the program before testing it for the first time.

When the program is run it will spend a few seconds initialising, then you will see a menu at the bottom of the screen. The available options are: **SAVE** - saves the current pattern to disc or tape. Colour and parameter information is also saved with the pattern. **LOAD** - loads a previously saved pattern.

x1=-1.7918	x2=-1.7087	y0=-0.0183
x1=-0.5504	x2=-0.2887	y0=-1.1630
x1=-0.6767	x2=-0.5600	y0=-0.5863
x1=-1.2988	x2=-1.2913	y0=-0.0768

**RUN** - draws a pattern using parameters entered from the keyboard. The last x value will be calculated by the program to keep the pattern correctly proportioned.

**zoom** - allows you to zoom in on an area of the current pattern. Define the bottom left and top right corners using the cursor keys, pressing Enter to confirm. The program keeps the proportions of the area constant.

**MIN** - pressing the 1, 2 or 3 keys on the main keyboard will cycle the corresponding bits through the whole range of colours.

A good way to explore the Mandelbrot set is to first use the Run option to get a picture of the whole set. Enter x1=-2.0 x2=-1.1 y1=-1.19 and when it has finished save it.

This pattern will act as your map of the fractal terrain, so you can magnify interesting areas with the Zoom option.

In general, areas close to the Mandelbrot set are the most attractive, so try and include some black in the picture.

Also it is best to make the difference between x1 and x2 greater than about 0.002 to avoid spilling the shapes with rounding errors in the calculations. Some good spots to try are shown in Table 1.

Due to the nature of fractals the program can be used to look at literally millions of interesting areas around the Mandelbrot set.

When you have created and saved fractal pictures Program 8 can be used to produce fascinating animated displays. It will load a pattern and cycle the ink values so that the fibres appear to flow into the screen.

**Full listing starts on Page 32**

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**JUST COMPARE THE FACTS FROM AN INDEPENDENT TEST ON MICROSET:**

MICROSET (listed at four back-up devices currently on the market: ACTION REPLAY, THE GAMES, DISC WIZARD, and EVEREST MOVIES, SIMULATOR by Mirage and MULTIFACE 2 by Romantic Robot). They were all tested on the TOP 10 GAMES for the week ending January 1987. Each copy was tested at the same point in each game and in the event of a failure the reviewer tried twice more. These are some of the results:

Out of overall 100% success claimed, the actual percentage was:

ACTION REPLAY - 80%	DISC WIZARD - 60%	MIRAGE - 95%	MULTIFACE - 100%
---------------------	-------------------	--------------	------------------

MULTIFACE was confirmed as the ONLY TRULY AUTOMATIC back-up device - all other copies require manual setting of colour, screen mode, windows, etc. - provided they do not crash in the first place! This value tested on 10 games took altogether:

ACTION REPLAY - 11 mins	DISC WIZARD - over 175 mins	MIRAGE - over 95 mins	MULTIFACE - not applicable
-------------------------	-----------------------------	-----------------------	----------------------------

The Actual SAVING time was in seconds:

ACTION REPLAY - 31.4	DISC WIZARD - 44.0	MIRAGE - 36.5	MULTIFACE - 22.0
----------------------	--------------------	---------------	------------------

Naturally, you should add the SAVING time and the SETTING UP time together to get a true saving time per each game:

ACTION REPLAY - over 2 mins	DISC WIZARD - over 19 mins	MIRAGE - over 7 mins	MULTIFACE - 22.0 seconds
-----------------------------	----------------------------	----------------------	--------------------------

The loading time took on average in seconds:

ACTION REPLAY - 21.7	DISC WIZARD - 26.1	MIRAGE - 26.0	MULTIFACE - 16.7
----------------------	--------------------	---------------	------------------

Each device made a back-up of a different file size - on average:

ACTION REPLAY - 8K	DISC WIZARD - 32K	MIRAGE - 32K	MULTIFACE - 48K
--------------------	-------------------	--------------	-----------------

The summary of the tests on MICROSET IT

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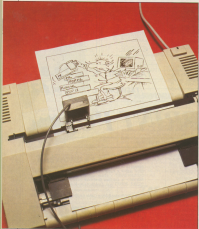
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# IMAGINATION

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**A** **PRINTER** is an output device which prints words and pictures. Wrong! Take one Amstrad BMP printer, add a Dart Scanner and your printer is now an input device which will read words and pictures into your computer.

Impossible? Impossible? Of course it is, but we are used to doing the impossible with our CPCs aren't we?

The Dart Scanner is a box which clips on to the printhead of the printer. It is connected by a cable to an interface which plugs into the expansion port of your rear.

Using the software provided (on both disc and tape) you get the printer mechanism to scan a picture and "digitise" it.

The hardware is in three distinct pieces. The scanner head is a sealed unit which appears to contain a bulb and a photo-diode.

In comparison to the printer is a small plastic moulding which has to be mounted on the extreme left hand end of the scanner's travel by means of a piece of double-sided adhesive tape. Although this appears to be a funny arrangement, it gave no trouble at all.

The scanner head is linked to the interface box by about a metre of cable. This is rather short, allowing little choice as to where to position the printer, but as the cable is wired in, there is no scope for extending it.

The only hardware control is a "brightness" knob, used to set the threshold at which the scanner decides that the grey level it sees is either black or white.

On the back of the interface box is an edge connector. Don't be misled into thinking that you can add your usual peripherals to it. The scanner is very sensitive to "noise" picking, and may produce random black lines if anything is plugged into it.

On any CPC 464 system the disc drive interface was tolerated, but the rear board wasn't.

The operating software works satisfactorily, but has considerable scope for improvement. It works only in two colours in Mode 2, which may give legibility problems with some colour monitors.

You use an overlay menu system to

## When a printer becomes an input device

**TONY HUNTINGDON** examines an alternative to the video digitiser



select one of 12 functions. You're then prompted for any extra information that the hardware needs. Some entries have default values — although you're not told what they are — while others, which might have default values, don't.

If you change your mind part way through entering data, you can't always escape back to the main menu. If you, as I did, attempt to save a picture to a write-protected disc, you will see the standard Amstrad error message. Unfortunately it overwrites, and becomes part of your picture.

Editing facilities are limited. You can copy one area to another, flip left to right or top to bottom, scroll an image in any direction, and add text.

You can create a permanent box frame for any part of the image so that anything outside that area can be deleted, and there's a zoom facility for magnifying a selected area of the screen for pixel editing.

Also the final image can be produced on paper three half to six times the size of the original.

If these facilities aren't enough, as pictures are saved as binary screen images you could use this software to acquire and save the pictures and then use another graphics package to edit them.

The lack of idiosyncrasy in the software often caught this idiot out. I lost quite a few pictures by pressing the wrong keys before I could save them properly.

The manual, consisting of eight A6 pages plus an addendum sheet, is very poor. It appears to have been written by someone who knows what he's talking about and assumes that we do too.

- Important information was missing:
- Warnings on removing peripherals



Using the Dart Scanner, these two cuttings from a magazine (above) and a photograph (right) were reproduced on the Dart printer.

from the expansion part to avoid noise pick up.

- Advice on the best kind of pictures to copy (whether glossy photos or newspaper cuttings).

- How to incorporate these into your own programs. I had quite a few unsuccessful attempts until Dart put me on the right lines.

However the manual does contain enough hints to enable you, with a little common sense, to install the scanner. And as the software then prompts you for all the data required, you'll soon abandon the book altogether.

So who's going to get the benefit from this product? Anyone getting involved with desktop publishing in order to produce low-budget adverts, letterheads, news sheets or brochures, using a product such as AMR PageMaker, would have an alternative way of reproducing black and white "digitised" pictures.

It should even be possible to simulate the facilities by digitising a picture or a sheet of text, saving the file to disc, then transmitting it down the phone line using a modem.

There is very little around to

compare with this device. It's not a printing digitiser in the true sense, as it only produces black and white pictures with no attempt at interpreting grey scales.

The concept of using the printer mechanism to scan pictures is very clever, but it could have been implemented better. The hardware suffers from noise problems, and the cable to the scanner head is a little too short to be convenient.

Even though I had problems with the software, at least it's partially written in (unprotected) Basic so you could attempt to improve it.

I find it difficult to see how Dart justifies the high retail price as there are few components, the software needs improving and the manual is minimal.

If you don't have video equipment and are looking for an alternative to a video digitiser, and you're happy with reproduction in pure black and white, then look no further.

You could well find this interesting piece of equipment from Dart will meet your needs. But try and see a demo first — it will make life so much easier. ■





## Adventuring with Gandalf

# Tips from the past that pay

**Q** UITE a lot of the problems sent to me recently have already been answered in previous columns. If you are stuck in an adventure you could save the postage by checking through your back issues before writing in.

Anthony Robinson wants to know how to bribe the guard in *Heroes of Kara*. Get the money by killing the baronright with the Underbo, take the money and when put into the cell give the money to the guard.

Matthew Green is having trouble finding his way through the maze to the seat in *Returns to Eden*. From the river bank go N, E, W, S.

Juliah McCowan says she can't get started in *Castle Blackstar* or kill the invisible in *Jewels of Babylon*. In the first you must get the bow and arrow and fire at the rope holding the

drawbridge up. In the second, you must throw the keg at it and then light the match and throw that at the guardtower.

A reader who wishes to remain anonymous has written in to ask for help with *Hitchohiker's Guide to the Galaxy*.

You will be given the peanuts later. Buy the sandwich. When transported to the void, try typing in half a dozen responses and see if any of the room descriptions change.

He also wanted to know whether to buy a book to learn to program adventures or buy an adventure creator. I think it is better to learn how to pro-

gram but if you must buy a creator I would recommend the *Quest*.

Sandy Cunningham has a lot of problems in *Gungoon Adventures*. I printed a full solution to this adventure beginning in the November 1985 *Computing with the Amstrad* and ending in March 1987.

Anthony Hawkins is stuck in two adventures in *Lords of Time*, to prevent overheating in the hypocaust you must carry the drinking horn (H) and drink from it if it gets too hot.

To get into the starship you need the gear from the top of the Milky Way. In *Colossal Adventures*, the map shows the planet's chest E, NW from the orange pillar.

P. Gill is stuck in *Snowball*. After getting through the 6th trapdoor and exploring the tales you should have the toolbox.

Go to the top floor, get a message, follow the dead to the stores, examine a book, then make use of what you find. Without more detailed information about where you are stuck I can't be more specific.

Diggs Ladopeuluis has written from Greece to get help with *Castle Blackstar*. Examine the mirror in the Duke's bedroom and be friendly.

She would also like help in getting out of the smooth pit when she goes in to get the crown. Why not go West?

Peter Latta can't get past the waterfall in *Mordor's Quest*. There are no easy answers here, you must explore each area thoroughly. For instance, from the beach you should go south diving.

Phil Ferris and Ian Stabler have provided the solution to Stephen Rowson's *Spyrex* problem mentioned in my February 1987 column.

Get the onion from the pocket of clips in the bar and the knife from the drawer in the steward's cabin and put the onion in the cockpit.

This will make the pilot cry and his eyes will close, enabling him to stop the plane from crashing.

## REVIEW

**0000Y** *Genesis* is yet another release from the programming team that brought us *Terror-Molins* and *Hampstead*.

Once again the adventure is very much tongue-in-cheek and casts you in the role of a newly-released criminal. Your task this time is to recruit a gang and mastermind a crime.

Regular readers will know that the humour of these games has usually gone over my head and, sadly, this is also the case here.

The first part of this graphic adventure has about 50 locations I didn't get to the second part, some of which are illustrated.

Entering commands in a location that has graphics usually results in the picture scrolling up all the screen, dating the course of which it changes colour.

There are plenty of locations to visit but very few objects to manipulate, though the number increases as you solve problems.

I spent only a comparatively short time playing this game, so I

didn't get deep enough into it to provide you with the comprehensive review you are used to.

The main reason for this is that for me there simply wasn't anything exciting or different about it. I disliked having to wait for pubs, restaurants and shop shops to open, and consequently very quickly got bored.

However, I felt the same way about this team's previous games—and they turned out to be best sellers.

Overall, I didn't like it, but since *Terror-Molins* and *Hampstead* were such big hits, you should at least check it out.

What's wrong? Maybe I'll be proved wrong about this one as well. As the copy supplied was a pre-production version I have not included a mark for presentation.

Presentation	0/5
Atmosphere	2
Plot/Action factor	2
Value for money	2
Overall	2







By Martin Ridout

## Find a safe abode for your code

**O**NE of the problems with writing machine code subroutines on any Amstrad CPC machine is finding a permanent address at which to locate them — unfortunately there is no guaranteed safe area of memory.

Obviously, it must lie above HIMEM — you can't load it to below. So you could lower HIMEM by the length of your machine code and load and run it there.

But the power-on value of HIMEM is not fixed because sideways roms will usually allocate themselves space at the top of the memory pool and after HIMEM when the machine is switched on.

This means that you may not always be able to load your code into the same address, depending on which hardware add-ons you have connected.

Besides, you may have written several different routines such as those to provide screen dumps or to scroll the screen in all directions, only some of which will be required at any one time.

When the Amstrads were conceived a very sensible approach was taken to the allocation of memory.

Amstrad made it clear in the Reference specification that all machine code routines designed to work in conjunction with Basic or with other machine code should be made relocatable, and that each should allocate itself the next available chunk of memory from the top of the memory pool.

Relocatable machine code sounds frightening, but it is really very simple.

If your machine code contains any CALL or JP (jump) instructions, or if it loads data to or from absolute memory locations, or refers in any way to an address within itself, all those instructions will need changing to account for the current location of the code.

A relocation routine will not only need to know where in memory it is currently residing, but also the addresses of all the instructions to be changed, and a means of calculating

the correct new values in those instructions.

This can be achieved by adding a short routine to the beginning of your own machine code which is called only once, immediately after loading, to modify your code to suit the current loading address.

This means that you can use a Basic loader for your machine code that lowers HIMEM by the length of your code, loads it in one byte above that new HIMEM and calls the relocater in at its load address.

Machine code routines can now stack themselves one under another from the top of memory and can be loaded in any order.

To avoid confusion over the current location of a particular routine, Amstrad devised a method of accessing machine code routines by name rather than address.

Hence the Resident System Extension (RSE) or *isa* command. Amstrad

## MARTIN RIDOUT tackles the thorny problem of locating machine code subroutines

also conveniently allowed machine code to be called from Basic with a means of passing values to it.

All you need now is a relocater to add to the beginning of your own machine code that will take the load address and use it to recalculate all the absolute addresses in your code and then set your code up as an RSE.

The layout of the code for a relocatable RSE command will be made up as shown in Figure 1.

Finally, the relocation routine will need to know where in memory the code has been loaded. When running the code the load address is passed from Basic using the CALL command in the form:

```
CALL address, address
```

where address? is the run address of

0000	00	0
0001	0000	00 00 0000
0002	00	0 000000
0003	0000	00 0 0000
0004	0000	0000 00000000
0005	00	00 00
0006	0000	0000 0000
0007	00	0000
0008	0000	0000 0000 0000
0009	0000	0000 0000
000A	0000	0000
000B	0000	0000
000C	0000	0000
000D	0000	0000
000E	0000	0000
000F	0000	0000

Listing 1

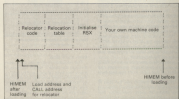


Figure 1 Block diagram of relocatable RSE machine code

## From Page 79

the relocater, and address2 is the load address. You must not use the form:

```
(R1, address1, address2)
```

Once the relocater has been accessed, the Amstrad firmware uses the Z80's IX register to point to the value passed to it, and the R register contains the number of parameters passed.

Amstrad's firmware specification gives full details of how this feature works, but for our purposes, where a fixed number or variable is given, IX points directly to the last value passed. In this case, as only one value is involved, IX points to a two-byte word containing that value.

The two lines of machine code:

```
LD HL,(0)
LD H,(0+1)
```

will load 0 into the HL register. This value can now be used to find the instructions that need altering and to alter them.

Next we must give the relocater a means of finding each instruction to be relocated. The simplest way is to create a table containing the offset from the start of the code for each instruction to be treated. Most assemblers can be made to do this for you.

Those of you already familiar with using one will know that ordinary labels in the source code are given a value equal to the current memory address of the start of the instruction they are labelling.

The defined values are based on the ORG at the beginning of the assembler's source code and each label is therefore the ORG address plus an offset into the program.

For instance, if the ORG was given as \$0000, and a label defined 8 bytes into the program, its value would be \$0008. Consequently setting the ORG to 0 would give us a simple way of defining labels directly as an offset from the first byte of the program.

When a label is used as an operand, for instance the *MISC* in `LD HL,MISC`, an assembler will write the value it has defined for the label into the last two bytes of the instruction.

If the code is assembled with ORG 0, those last two bytes represent the offset of that label from the first byte of the program.

The use of ORG 0 can be used to build up a relocation table containing the offsets of every instruction that will need changing, simply by giving each instruction a label and putting

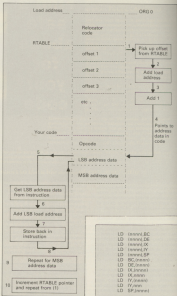


Figure 1: Flow diagram of relocater operation

Table 1: Absolute address four-byte instructions

them into a table.

The relocater routine can then work through the table - which consists of many two-byte values - and by adding the current load address (as supplied by `Load`) to each entry in the table, can calculate where each of those instructions actually is in memory.

Having found the instruction, it can then add the current `Load` address to

the data in that instruction to give the new value.

Confused? Well consider the short example in Listing 1 which prints a message to the screen.

It has been assembled with ORG 0 and contains only one absolute address that would need changing by a relocation routine. That address is the label `MISC` that is loaded into HL, in



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# CRANE CRAWL

By ROBIN NIXON

**N**o tea for you tonight — you've had to stay late in the brick factory where you have to do some overtime. Normally it's money for old rope, but tonight, as you are inspecting the warehouse floor the crane suddenly goes haywire and the ground level exit doors are automatically locked.

They're computer controlled, and the computer's no fan of yours, to say the least.

You find yourself being bombarded by bricks, your only hope of escape being to climb up the stack of fallen bricks in order to reach a higher level exit.

Before long you discover that the crane seems to have an uncanny knack of knowing exactly where you are (that computer really has it in for you). This can be helpful, as you can stand where you want a brick to fall and run as soon as it is dropping. But beware, the computer's on to you and the bricks do not always fall where you expect.

And, life being as it is, even if you manage to escape from a warehouse into the one next door, the malevolent micro continues its attack.

The object of the game is to survive as long as you can. We can at least guarantee you'll enjoy trying!



Full listing starts on Page 84





# Nº1

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#### PELICAN

Teach your children to cross the road safely at a Pelican crossing



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Food's Words  
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Number Signs  
Seawall  
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Provide the correct arithmetic sign and aim to score ten out of ten



#### BALANCE

Learn maths the fun way. Tip in the answer to balance the scales

### Ages 8-12

Anagram  
Cribmaker  
Dog Back Care  
Guessing  
Hangman  
Maths Hike  
Nim  
Odd Man Out  
Polynomial  
Towns of Hamel



#### HANGMAN

Improve your child's spelling with this fun version of the popular game



#### ODD MAN OUT

Find the word that does not fit - before your time runs out

**TO ORDER, PLEASE USE THE FORM ON PAGE 109**



**H**AVING previously been a BBC Micro user I was pleasantly surprised on my first encounter with the Amstrad, which has 40k available for Basic programs, a true 16 colour mode and a choice of 27 colours.

The 16 colour mode on the BBC Micro has eight normal and eight flashing colours selectable from eight and only leaves you 10k free for Basic.

Other Amstrad features I was impressed with were the comprehensive jump block, the ease with which you can add resident system extensions (RSEs), and the logical way the screen is laid out, facilitating simple development of machine code sprites.

But, and there's always a but when you compare two micros, there were one or two features I was used to on the BBC Micro which I missed when I started programming the CPC.

The first was the in-built assembler, but this has been overcome by a number of assemblers that are now available commercially.

Second came the use of procedures. The closest the Amstrad gets to procedures is the GOSUB statement which is fine for writing an small program but can make development trickier the longer a program gets. As you add more and more subroutines, remembering where a particular one is located becomes quite a headache.

The problem is avoided on the BBC Micro because procedures can replace GOSUBS and are not line dependent. If you look at Program 1, which is written in BBC Basic, you'll see that line 40 is actually the equivalent of GOSUB 1000. However, the substitute at line 1000 is identified by "name" and when working on a program you never need know where PROCname is in order to call it.

```

10 DEF PROC p1
20 DEF IN example of using procedures
30 END
40 PROC name
50 DEF test of program....
...
100 GO
1000 DEF PROC name
1010 DEF testof
1020 DEF test

```

**Program 1**

Without a GOSUB in sight I think you'll agree that this lends itself to structured programming as well as making your listings more legible to other people.

Program 2 is a routine that will give you procedures on the CPC. Save it before you run it, it sets up the PROC, DEFPROC, ENDFPROC and START, PROC words in exactly the

# The procedure to follow is...

## ROBIN NIXON shows how to take a more structured approach to your CPC programming

the syntax is slightly changed. In place of typing:

```
CALL name
```

you enter:

```
PROC name
```

The same goes for DEFPROC.

You also have to enter :START as one of the first lines before you use any PROCs or DEFPROCs. This is because you are allowed to nest procedures up to 10 deep, which is achieved by storing the return address each time a procedure is called.

:START restores the pointer to the return addresses to 0 so you start at the first level of nesting each time you run the program.

If you leave :START out and press Escape, or the program stops in the middle of a few layers of nesting due to an error, the pointer won't be restored when you re-run the program. The next ENDFPROC encountered will take you back to the procedure that was executing before you pressed Escape or the error occurred.

If you try to nest procedures more

than 10 deep, "Too many PROCs" will be reported and you will be returned to Basic with a syntax error. A true Basic error occurs and the program doesn't attempt to continue execution.

Another way this error could occur is if you forget to enter the correct ENDFPROC for each procedure, or put it in the wrong place.

Two other errors can be reported. The first is "Undefined PROC," which will happen if you type:

```
CALL name
```

when you mean:

```
PROC name
```

or if you type :PROC anything when you haven't defined any procedures.

The second error is "No matching PROC." This happens when the program encounters :ENDPROC when it is not executing a procedure.

To use procedures correctly you must also remember the following points:

- A DEFPROC must be the ONLY statement on a line because once the

```

10 DEF PROC name
20 DEF IN example of using procedures
30 END
40 PROC name
50 DEF test of program....
...
100 GO
1000 DEF PROC name
1010 DEF testof
1020 DEF test
1030 DEF test2
1040 DEF test3
1050 DEF test4
1060 DEF test5
1070 DEF test6
1080 DEF test7
1090 DEF test8
1100 DEF test9
1110 DEF test10
1120 DEF test11
1130 DEF test12
1140 DEF test13
1150 DEF test14
1160 DEF test15
1170 DEF test16
1180 DEF test17
1190 DEF test18
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1210 DEF test20
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**Program 2**



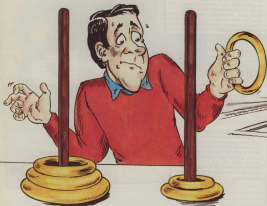




## Take up the challenge of the

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A clever interpretation of the ancient Rings Puzzle by WILLIAM USSHER



**D**ARE you take up the challenge of the Sultan's Rings?

In front of you are three poles. On one are stacked coloured rings each of a different diameter.

By moving one ring at a time you must restack the rings – in the same order to make things difficult – on one of the other poles.

You may only place a smaller ring on top of a larger one and you must complete the challenge in the least moves possible.

Although simple in concept, the game is not as easy as you might think.

On turning the program, you are asked for the number of rings you want – from three to six.

To play you move the rings using the numeric keys 1, 2 and 3 to show which poles you want the ring moved from and to. The top ring on the pole is the one which will be moved in each case.

The number of moves you have taken is recorded and when you have restacked the column you are told if you have solved the puzzle or not.





# INTRODUCING THE BIG



**On target  
... for  
CPC  
users!**

Next month sees our re-launch... as *Computing with the Amstrad CPC* it will be 100 per cent devoted to owners of the CPC484, 664 and 6128 machines - the people who have so loyally supported this magazine since it first appeared in January 1985.

For games lovers there will be more pages containing the best features from Amstrad! This month you've already seen a taste of what's to come. From now on you'll see lots more frank, in-depth reviews in the style that Amstrad fans have become used to - in full colour, and with up to a full page on many of the top games.

We'll also be supporting the now-famous and highly coveted Amstrad Accolades. And Amstrad will be there to help you get more fun and excitement from your favourite games.

Within the Amstrad section you will also find Gendall's extremely popular columns, given a magical new appearance. This feature has guided intrepid adventures through mazes of twisty passages for nearly two years now, and judging by his bulging sashbag it's going from strength to strength.

Also from next month there will be many more pages



**On target  
... for  
PCW  
users!**

An independent magazine devoted entirely to the needs of the PCW user. That's the exciting prospect in store with next month's launch of *Computing with the Amstrad PCW* as a magazine in its own right.

The new magazine is the result of a growing demand from users who want to know a lot more about their machine and what it can do for them. Many are confused by the competing claims of software packages and are looking for impartial, independent advice before deciding what to buy.

This is where *Computing with the Amstrad PCW* will offer an expert, helping hand.

Learning through the experiences of others is an ideal way of discovering more about the potential of your machine, so in each issue we will be taking a revealing look at how other people use their PCWs, at work and at leisure.

Many readers will already be experienced PCW users. Others will have just bought their first computer. *Computing with the Amstrad PCW* will cater for both, guiding beginners along the right tracks as well as challenging long-time users to become even more



**On target  
... for  
PC  
users!**

PC Amstrad is our exciting new magazine for users of Amstrad's latest record-breaking micro, the PC1612.

We'll be catering for ALL users - from those who've never touched a keyboard before and are wondering how to get started, to enthusiastic computer hobbyists, from those using a computer at work for the first time to experienced professionals who want to get the very best out of their investment.

Whatever your interest, if you use a PC1612 our first features-packed issue will have plenty of reading for you.

For instance, our guide to that important first hour with your PC will prove invaluable for newcomers to micros, as will our overview of operating systems.

And if you haven't yet got your PC, we'll show you the real costs involved, before you part with your money.

Those of you trying to make up your mind about integrated software and accounting packages will be glad of our guides to features to look for, as well as our detailed evaluations of two typical products: Ability and Budget Accounts.

And these are only two of the in-depth reviews featured

# THREE ...

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packed with features to fascinate, entertain and instruct CPC users.

Among them will be two new tutorials - A step-by-step guide to using DR Logo, showing it's far more than just turtle graphics, and a longer-free introduction to electronic mail services such as MicroLink and ProMail.

And there's our 150 lines in which we invite you to demonstrate your own programming ingenuity and initiative with some easy-to-type, clever routines - and win cash prizes at the same time.

Plus there will be many more games, utilities and educational listings for you to type in. Expert reviews of the latest hardware and software releases will next month include an evaluation of two interfaces to control synthesizers using your CPC - together with an authoritative explanation of Midi.

Future plans include series on using GYM Plus, composing music, and creating animations. As well as a regular look at the technical side of your Amstrad, there will also be hints on programming techniques for the fast learner.

In short - something for just about every CPC user!

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editorial. Special series in preparation include:

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3 The magic of DR Logo, illustrating how there is far more to this friendly language than just an easy way of presenting turtle graphics on the PCW.

Plus detailed, hands-on reviews of all the latest software now being written for the PCW, and advanced news of forthcoming developments being planned that will enhance even further the versatility of the PCW £150 and W12 - two machines that have added a completely new dimension to home and business computing.

Issue by issue, Computing with the Amstrad PCW will build up into a indispensable source of reference for all PCW users. Make sure you don't miss a copy by taking out a subscription now.

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level in the first issue. Also covered are Parker - a portable filing-management system, Wordstar 1012 - the Amstrad version of the classic word processor; Comdex Jr - the database, and BBC Basic - the language used in education.

We'll be taking a look at the language that comes with our micro, Basic 2. Newcomers will find our step-by-step approach to programming simple and enjoyable, while experienced users will benefit from our look at Basic 2 in the light of other, more familiar Basic's.

For real hackers there's an assembly language screen capture utility. The C program in our workshop should also give them something to think about, as will the future on pipes and filters.

And everyone will find our introduction to public domain software plus the survey of programs specially written for the PC1512 useful, money saving reading. And our reference guide to MS-DOS shouldn't be missed.

All in all, there are articles for everyone in the first issue of PC Amstrad. However you use your PC1512, you'll find something to interest, entertain and inform.

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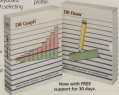
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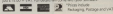
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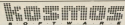
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## Every home a ticket office?

FREELANCE journalist and MicroLink subscriber Roger de Freitas travels a lot during the course of his work.

So naturally he finds MicroLink services such as the Official Airlines Guide to flights and hotels, and the British Rail booking facility a great help.

"I see my micro as a word processor and MicroLink to send and receive information", he said. "And I use the system a lot for planning my travelling arrangements."

"And even when I'm not actually going on a trip I enjoy just scrolling through the flight schedules and train timetables."

"It occurred to me that it would be rather nice if one could obtain the ticket at the same time as booking a train journey."

"The present MicroLink system of booking with British Rail is very good, but I still have to queue for 20 minutes at Waterloo Station to pick up my

tickets.

"I look forward to the day when BR and MicroLink will allow me to print out my own ticket from the system so that I don't have to stand in line any more."

"I'm sure I'm not the only MicroLink subscriber who would appreciate such a facility, and with the way technology advances these days we will hopefully see it happen in the not too distant future".

## Library logs on

IAN McGowan has five million books in his library, and the total is increasing by about 70,000 volumes a year.

He's thankful he doesn't have to dust them, but he does have to keep track of them — which is where MicroLink comes in.

As a Keeper of the National Library of Scotland, Ian is one of seven people charged with managing the contents of the 300-year-old institution.

With the library dispersed among five different locations, this is no mean feat. But Ian intends

that MicroLink's text and electronic mail will soon allow the various buildings to communicate with each other swiftly and efficiently.

At present there is a sophisticated tape set-up in the main building, but it is not linked to the other sites so a messenger has to go between them with pieces of paper. Eventually, however, there will be a MicroLink mailbox at each location.

## Emergency hot lines

MICROLINK has joined the emergency planning team for Shropshire, providing the county's civil protection group with additional communications options for use in crisis situations.

County emergency planning officer Gordon Tipler explained: "Communication is vital in a disaster, and the general rule is the more alternative means you have at your disposal the better. MicroLink will give us extra options through electronic mail and telex."

"In addition its database will prove very useful — for instance Save a Life as a training aid for our emergency service volunteers and other technical material for our team of scientific advisers".

## Bridging culture gap

HARVEY Street dentist Dr. Hesham El-Fassary finds strength that Muslims get a raw deal from the British media, and consequently are misunderstood by the general public.

"I put it down to ignorance of the Islamic world", he says. "If we could overcome this through educating people we should be on the way to achieving tolerance and understanding".

Dr El-Fassary is chairman of the Islamic Society, an organisation set up to promote religious tolerance in the UK. It has 300 active members spread

throughout the country, and also a large number of associate members — mostly Christians — who are aiding the cause.

"We use using MicroLink telex, electronic mail and telemessages to maintain a flow of information about Islam to the media and various other organisations", he said.

"A large number of our associate members are schoolteachers, and it is important to get our message over to the schools. Thankfully most British schools are on-line so we can reach them through MicroLink".

## Micro chessmen on the board

The great computer chess challenge is underway on MicroLink. First battle pits the reigning world champion, Colossus 4 Chess — undefeated in 21 contests — against the leading contender Polon Chess.

The contest stems from an open challenge to all comers by aircraft engineer Graham Laing, who threw down the gauntlet on MicroLink's bulletin board because he wanted to find out just how good his Colossus 4 Chess program really is. Property consultant Eric Ericsson was one of three subscribers who offered to do

battle by electronic mail.

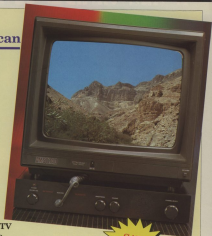
The software a software contest is "a marvellous idea, tremendous fun — I've been putting a blow-by-blow account of it on the MicroLink bulletin board", says Eric. "I hope we'll see more chess played on MicroLink as a result of this — perhaps we could even get a league going if enough people are interested".







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**T**HE worst thing about magazine listings is having to type them in, particularly reams of meaningless data statements containing machine code. At least Basic makes some sense as you enter it.

Normally we manage to get 13 bytes and a checksum on each line with our current 40 characters wide width. The hex numbers are in a string and MDS is used to extract each byte when the code is being printed.

Wouldn't it be nice if there was a way of compressing the information so that there were fewer characters to type in?

Program 1 will turn an area of memory into data statements and include them in a Basic loader. It has the added bonus that two bytes (or a word) will only occupy three characters (rather than the usual four).

This allows us to get 18 bytes in a data statement and there is still room for the checksum. The compression is achieved by working in base 64 instead of base 16 (hex).

There are two main uses for this program. Subverting work to Contender with the Amstrad is the most obvious, but whenever you mix Basic and machine code and don't want a separate binary file, this method will use less memory than a hexadecimal loader.

On the Amstrad it is possible to deal with numbers as single bytes in the range 0 to 255 (FF in hex) or as double byte words between 0 and 65535 (FFFF in hex). A normal loader writes a single byte at a time or at best reads whole words and then splits them into two bytes.

When writing down hexadecimal we use the letters A-F to show the extra digits that do not appear in base 10. If we extend this idea to use other characters it is possible to write numbers in bases greater than 16. A minor problem is that if one of these characters is a colon the data would be cut short because Basic takes this as the end of a statement (or delimiter).

A look at the character set reveals that the range of characters starting just after the colon at the semicolon and ending at lower case z is just enough to represent base 64.

The advantage of this is that the maximum number we need - (FFF) has - is only three digits in the higher base so we can put more bytes on a line. Figure 1 shows how two bytes can be split into three characters.

The only drawbacks are that the data is a bit less legible and the Basic

# Compacted listings are easier on your fingers

**IAN SHARPE** shows how to cut the key tapping

needed to unravel it is longer than before.

For machine code that runs to more than a few lines of data there is an overall saving in size with the new loader, and the longer the code the greater is the saving.

Dosak uses some machine code to speed things up and get round the problems Basic has with numbers greater than 32767. The loader for this is at the start of the program and is an example of base 64 output.

I assembled the code below Basic because any location above it might be in the area you want to turn into data.

Before you run the program, lower MEMM and load your machine code above it. If there is an installation routine such as finding out which model of CPC it is sitting in or setting up an RGB, then don't call this before you turn the memory block into data.

The program is written with a 40

character wide column in mind but is easily adapted to other widths by altering the values of the loop counters. You will be asked for the start and end addresses of the area of memory you want to save as data, so make a note of this when you are assembling.

Conversion is fairly rapid and the results are saved to tape or disc. If you subsequently reassemble the program the value of the line number variable in the error checking routine will need altering. Line 66 in Program 1 is an example of this.

The only unfamiliar character in the data is - which can be obtained by pressing Shift and I. If your loader uses this loader for all but the shortest listings we can save space in the magazine for other things and, of course, you'll do less typing.

**Full listing starts on Page 112**

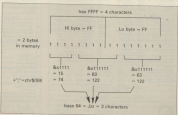


Figure 1: Splitting two bytes into three characters





## From Page 113

also. Melbourne House, CPE, Bebbagecroft and Amtek all have good drawing packages at around £15.

One of the best packages around is the AMK Art plus AMK Mouse package from Advanced Memory Systems. It costs a lot more than you want to pay at £79 but is excellent value for the extra and was reviewed in the June 1988 issue of *Computing with the Amstrad*.

If you don't mind the typing we published an excellent drawing utility in our June 1988 issue.

To use the variable dump program you simply run it and then CALL B4009 to set up the new RSR command. Then run the program you wish to check out, escape from it if necessary - it may stop with an error message - then issue the command-WARDUMP in direct mode and all your variables will be listed to the screen.

If this does not work then somewhere in your version you have made a typing error as the published listing is correct. Remember that even though the checksum

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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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**Europa House**  
**88 Chester Road**  
**Hazel Grove**  
**Stockport SK7 5NY**

might indicate everything is apparently in order, it's always possible for one error in a DATA list to cancel out another.

## Split mode screen utility

I FOUND Roland Maddison's split mode access utility in the May 1988 issue of *Computing with the Amstrad* and thought "Great, just what I need". So I typed it in and it worked.

However, what I was after was Mode 3 or 1 at the top with Mode 2 at the bottom. As I know nothing of machine code and cannot

customise the routine, please can you tell me how to do this? - R.C. Owershaw, Bolebourn, Kent.

■ It is possible to change the modes in operation and you need to modify the Basic loader. First decide which modes you want in each half of the screen and use the hex codes from the following list:

```
Mode 0: 12010000
Mode 1: 12010001
Mode 2: 12010002
```

To alter the upper mode, replace the last two characters in line 200 before the command and the first six in line 200 with the relevant sequence.

The lower mode can be

changed by substituting the last six characters in line 410 before the command and the first two in line 420.

You will also need to delete line 310. Save it before you run it. The position of the split can be controlled by POKEing B4004 with a number between 1 and 5.

## Problems with Life

In the March 1987 issue of *Computing with the Amstrad* you published my letter entitled *Life in the River*, but some errors seem to have crept in.

In line 7505 there is a semi-colon missing and it should read:

```
100 IF ...10 ...100 ...100
PRINT ...10 ...100
```

At the bottom of column one D100 D000 should be D100 D000.

In the third column:

```
PRINT ...100 ...100
```

should be:

```
PRINT ...100 ...100
```

I hope this clears up any confusion that may have arisen. - P.S. Leach, Marlin, Herts.

■ You are quite right, the mistakes were mine. The editor's getting old - his fingers aren't quite as nimble as they used to be.

## Alternative language

I WAS very interested to read Ian Shaper's *Dragon Curve* article in the March 1987 issue of *Computing with the Amstrad*.

As the saying, *Language Spain* is not the best language for recursive programs. However, every Amstrad owner with a disc drive also has an alternative language which is ideal for this sort of work - Logo.

Here is the translated program, and I think you will agree that it looks much neater, even if it does run

# Printing Minifile records

I WAS very pleased with the Minifile program that I typed in from the February 1987 issue of *Computing with the Amstrad*. The only thing missing is an option to print out records.

The following routine is my solution and adds a window to the display option giving you the choice of either printing the displayed record or exiting.

The only limitation is that each entry is on a new line rather than across the page as on the screen. - B. Southey, Hants.

■ Another useful modification to one of our programs. Not only does it prove that the original listing was correct as published, it demonstrates once again

the ingenuity of one of our clever readers, and wins her a banner.

## £10 Prize letter

```
1000 GOTO 8000,10,50,8000
4000
1100 8000,000
1200 81000
0000 00 110000
0000 000000,00,71,2,0,00
0001,0 1100
0000 001 00,50,1000 0,
0,0000 0,0
0000 0000 0,0,0000 0,00
10000 00,0
0000 00000, 00000 0
0000 00000, 0000, 0000
0000 00,00,000000,000
0000 0000 000
0000 000, 0000,00,0,000
0000, 00,00,0000,0
0000 00,000000,00 00
00 000 0000
```

```
0000 10 00000000 00 00
00 00000
0000 10 0000000000 000
000
0000 10 00 0000 000
0,00,00000,000000,00
000,00,00,000,0000 00 00
00
0000 00 00 0000 000 000
0 0000
0000 000 0,00
0000 0000, 00000, 00000
0,0000 000, 0000, 00000
000000
0000 00000
0000 000 000 000000 000
0000 00000, 0000, 000000
000 00000, 0000000, 00
000 00000
```











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No. 1 Vol. 1 May 1987

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## The PCW down on the farm

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# Amstrad is the first of the big spenders

AMSTRAD is on top again. The company's £3 million plus PCW promotion campaign puts it at number one in the advertising league of computer big spenders.

In the Media Register list of the 500 most advertised products, the PCW was miles ahead of any other computer. The list showed that Amstrad had spent more than £3.1 million last year pushing the PCW.

This news is more ammunition for the company as it hits back at critics who complained that the PCW would be forgotten once the PC1512 was up and running.

It also shows a commitment to a product which Alan Sagar always expected would be in a totally separate market from the PC range — the word processing sector for typewriter replacement as opposed to the personal computer sector.

Proving that once again Sagar's marketing instincts were correct, the continued success of the PCW helped raise per-unit profits of £75.3 million in 1988. This was on sales which increased by 112 per cent and represented a 158 per cent increase in profits.

"There are a few pundits walking around with red faces at the moment", said sources close to the Amstrad engine room. "They spent all last year bleating that we were going to let the PCW slip away gracefully. These fly ones show just how wrong they were".

## LocoScript takes wings

CRITICISMS of the LocoScript word processing package for the PCW have been taken to heart by Locomotive Software. In the new LocoScript 2, due out this month, it has responded with a series of features aimed at appeasing the critics.

Locomotive director of marketing Howard Fisher said the new program would run up to between two and three times faster than its predecessor.

"We have looked at ways of dealing with long documents and have come up with a 'find page' feature. The menu offers this option each time you approach a document", he said.

The company has added a whole series of commands to ensure the program can work with all sorts of

printers. "We haven't found a single printer which LocoScript can't drive. We have, however, found some printers which cannot use all the features of the package".

The normal character set has been modified. The complete modern Greek alphabet and the major Cyrillic characters have been added. "It now offers all the major European languages, including all the accents", said Fisher.

## Read on . . .

A MANAGEMENT Journal has ensured the future of the Glentop computer book list. Glentop Publishers, whose best seller was Program Your PCW, has been replaced by Glentop Press.

The new company has promised to support the existing list which recently included four of the top 10 best-selling computer books.

## Deutsch drive

AMSTRAD is poised to challenge for the number one spot in the German micro market, the position currently held by Commodore. Through its associate Schneider, Amstrad to date has sold some 268,000 CPCs and around 70,000 PCWs.

But its major push is out Commodore from the dominant position in its European stronghold will centre on the PC1512.

Per Schneider has already reached set sales of more than 50,000 units of the new machine since its launch.

"We expect to sell well in excess of 200,000 PCs this year", Werner Lehn, Schneider's software development manager, told Computing with the Amstrad PCW. "It is going to be a very good year for us indeed".

However, the Schneider man admits it will be an uphill struggle to topple Commodore. "Here in Germany, Commodore is the big name in personal computers but we are starting to breathe down their necks", he said.

## Light relief

HEWSON has converted its two most successful simulations to the Amstrad PCW. Southern Belle and Heathrow Air Traffic Control were designed as fee programs "with an overriding element of realism". The company's

Shape of things to come . . .



NEXT month Computing with the Amstrad PCW becomes a fully independent magazine — entirely devoted to the needs and wishes of users of the PCW856 and 8512. What you see in these pages is just a taste of what is to come.

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Southern Belle was the first real realistic simulation. It is based on a 1930s King Arthur class engine on the London to Brighton run. Designed by railway expert Bob Hillyer, it features detached moving graphics with hidden line removal to reproduce the route's more famous landmarks.

Heathrow ATC has seven levels of play and an extra demonstration exercise to give an appreciation of the operators before the game begins.

The two games are packaged together for £39.95.

## Courses approved

THE Federation of Microsystems Centres has won official approval for its PCW training courses.

The Amstrad User Club's Learning Centre, which operates under exclusive license from Amstrad, said the Federation has "no trouble in meeting the stringent code of practice quality requirement".

The Federation, which has 28 centres nationwide, has already developed 28 structured courses for the PCW and PC. The first centres to run the courses include Birmingham, Coventry, Leeds, Newcastle, Sheffield and Wokingham.

## Gap bridged

A BRIDGE between the Amstrad PCW and PC1512 has been built by Meridian Computer Systems. MRAF, the file transfer package designed to operate between two different micros, has been adapted for the PCW.

It comes with disc configured to the relevant micros and a cable for communications. Instructions are documented within the program.

# MASTERFILE 8000

FOR ALL AMSTRAD PCW COMPUTERS

MASTERFILE 8000, the subject of so many enquiries, is now available.

MASTERFILE 8000 is a totally new database product. While drawing on the best features of the CPC version, it has been designed specifically for the PCW range. The resulting combination of control and power is a delight to use.

Other products offer a choice between fast but limited-capacity RAM files, and large-capacity but cumbersome fixed-length, direct-access disc files. MASTERFILE 8000 and the PCW RAM disc combine to offer high-capacity with fast access to variable-length data. File capacity is limited only by the size of your RAM disc.

A MASTERFILE hallmark is the provision of multiple, user-designed display formats. This flexibility remains, but now it's even easier. With MASTERFILE 8000 you design your formats "live"; no more questionnaires, just move your format effects around the screen using the cursor keys!

Record updating is even easier than before — just steer your cursor to any field on the screen and then insert/erase/delete as required.

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All screen work is done graphically — and hence we offer unique panel, box, and ruled line options. Choose the line spacing at pixel resolution — you will be amazed how much clearer 8-pixel lines are than the usual 4-pixels. (Study the picture.) And all this faster than CP/M normally lets you point the screen! PCW printer functions, under menu control, are provided.

The screenshot shows the 'Customer Details and Orders' window. It contains a table with columns for 'Customer', 'For each', 'Amount', 'Date recd', and 'To'. The table lists several customers with their respective order details. To the right of the table is a menu with options like 'Print', 'Sort', 'Find', etc.

Customer	For each	Amount	Date recd	To
1000	10 Oct 87	100.00	10 Oct 87	...
1001	11 Nov 87	120.00	11 Nov 87	...
1002	12 Dec 87	140.00	12 Dec 87	...
1003	13 Jan 88	160.00	13 Jan 88	...
1004	14 Feb 88	180.00	14 Feb 88	...
1005	15 Mar 88	200.00	15 Mar 88	...
1006	16 Apr 88	220.00	16 Apr 88	...
1007	17 May 88	240.00	17 May 88	...
1008	18 Jun 88	260.00	18 Jun 88	...
1009	19 Jul 88	280.00	19 Jul 88	...
1010	20 Aug 88	300.00	20 Aug 88	...

Keyed files are maintained automatically in key sequence, with never any need to sort. You can have unkeyed files too, where records can be inserted at any point in the file.

Any file can make RELATIONAL references to up to EIGHT read-only keyed files, the linkage being effected purely by the use of matching file and data names.

You can import/merge ASCII files (e.g. from MASTERFILE III), or export any data (e.g. to a word-processor), and merge files. For keyed files this is a true merge, not just an appended operation. By virtue of export and re-import you can make a copy of a file in another key sequence. New data fields can be added at any time.

File searches combine flexibility with speed. (MASTERFILE 8000 usually waits for you, not the other way around.) You can even assign subsets of a file into one or more of seven pigeon-holes for subsequent reference or further manipulation.



FIELD-TO-FIELD CALCULATION is available, using any mixture of terms and arithmetic operators + - \* / ( ).

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MASTERFILE 8000 costs £49.95 including VAT and P&P to anywhere in Europe. Elsewhere please add 20% for air-mail service. ACCESS/VISA/MASTERCARD orders are welcome, written or telephoned, quoting card expiry date. Make cheques payable to "Campbell Systems".

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# PCW DOWN ON THE FARM

Mike Gerrard finds a boom in customised software

NO one was too surprised to see *The Secret Diary of Adrian Mole* brought to the computer, but how about the *Diary of a Cow? Well, that's one of the options available to farmers using customised agricultural software, which like all other areas has received a boost since the advent of the Amstrad machines and their budget prices.*

The PCW in particular has made a great change to the way in which a company like Sum-It Computer Systems of High Wycombe goes about its business. Sum-It specialises in agricultural software, though when originally established just over five years ago the aim was to provide both hardware and software for all types of small businesses.

The founders, however, all had a background in farming and it soon became obvious that there was a gap to be filled in the agricultural software market, and so the company began to specialise.

"Before the arrival of the PCW", says Sum-It's support analyst Jan Leggitt, "most of our business was in supplying both hardware and software, installing complete systems such as *Apricots*, *8605*, *1886*, whatever was needed for the particular job."

"Up until the arrival of the PCW, though, most farmers were faced with spending at least a couple of thousand pounds to get an adequate system, and for many of them that was just too much.

"What's happened since the PCW is that the hardware side of our business has grown smaller, while the software side, particularly for the Amstrad, has really taken off.

"Farmers are going out and buying the PCW for themselves because it's affordable, and then looking round for suitable software, and as far as I know there's only one other company in the country providing farming programs for the Amstrad.

"We do deal with the 6108 as well and in fact sold a couple of systems based round that machine only last week, but that was unusual and in general we'd always recommend the PCW because of the extra memory.

"Some people insist on having a computer that will also provide lots of games for their children, and I'm sure

that will happen with the PCW in time, but if they are they've got to have a computer with sound and colour that we go along with that and help them with the 6108.

"With it, though, you need to buy either a second drive or a silicon disc, and a suitable printer of course, whereas with the PCW it's all there.

"Our software is designed to be read into the PCW's ram disc, and then it writes the data back to the real disc at the end of the session, so the 8056 is perfectly adequate — although it's always worth spending the extra £100 to get the 8512 because you can store so much more information on it".

Richard Waring is a farmer in Lincoln, part of the family firm of the John Waring Group, with Richard in charge of both beef and pigs. Though the Group already had a mini-computer, Richard Waring wanted a stand-alone system for his own particular applications and opted for a PCW80256 with a cattle management program.

"There are 500 animals on the farm at any one time", he explains, "and with these kinds of numbers any analysis on paper is very slow and tedious. I thought about the possibility of a computer system for dealing with the beef animals, and I'm pleased with the Amstrad because it's fairly easy to operate and you can also move it about from place to place if the need arises.

"The details of each animal are held

in the computer, and at regular intervals I input the weighings on these animals to see how much they're putting on. The program also keeps a track of what food each animal is eating, and so I can see which feed gives the best weight gain.

"What I like is that at the press of a few buttons you can look at whatever information it is that you want. It's all there in the same place, so I can analyse things like which supplier's calves do the best, who buys my best animals, that type of thing.

"As the information you put into the system builds up, obviously you get more out of it and the more details you have on which to base your management decisions.

"Before getting the computer I would say that it took one person one full day each week to deal with all the information, and now we put it in three times a week, for about 20 minutes each time, and not only are the results more comprehensive they're also available almost immediately".

Since getting the original system, Richard Waring has added a copy of *Supercat 2*, and this he uses to deal with food conversion rates, among other things. Information on weight gains from the cattle management program is entered into *Supercat 2* and used to make comparisons of different feed types.

Diaries in the dairy is an option open



Richard Waring... calves and calves



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# TYPE SANS TEARS

*Having files typeset commercially can pose many tricky problems. Richard Elen explains the WordStar solution.*

ARTICLES in the January and February 1987 issues of Computing with the *Amstrad* showed you how it is entirely possible to typeset from an ASCII file generated by LaserScript. However, this approach has one disadvantage — the creation of an ASCII file strips from the text all the control characters originally put there to indicate the different typesizes to be used.

As a result, it's necessary to send to the typesetter, along with the text on disc, hard copy of the material to indicate where these changes should occur.

Such a procedure means that the typesetting company has to "intervene" to make those changes, which takes time, and therefore costs money. If you are producing repeating work on the PCW regularly and you're prepared to go to a typesetting company equipped with the relevant software — TypeSet from WordSmiths — you can short circuit that intervention.

You can produce a file which can be typeset directly, with you specifying the faces, sizes, position of text, in fact all the parameters that affect the final appearance.

All this for the cost of one piece of Amstrad software — WordStar. It's available from many dealers who supply the PCW system, and generally costs around £89.95.

It is the single most popular word processing program in the world, and is available for virtually all MSDos and CP/M computers, so the process described here is equally applicable to the Amstrad PC1612. In fact, once you've set up the program on either machine, the procedure for using it is identical.

WordStar for the PCW is a slimline version called Pocket WordStar, leaving out some of the more sophisticated functions available on the MSDos version. It does include mail merge facilities, and you can also obtain SpellStar, the spelling checker that goes with the package.

Pocket WordStar is entirely capable of utilising all the functions of the PCW standard printer (with the exception of true proportional spacing in fully

justified text, which is normally handled by introducing extra space characters between words), or any Epson-compatible.

It will also handle a number of delaywheel and other printers if you use the supplied install program to configure the system before you make up your work disc.

LocoScript files can be used in a similar fashion to that discussed here, but WordSmiths recommend the use of WordStar wherever possible, as it is more amenable to direct setting. This is partially because of the way LocoScript stores typeface specification data in the file.

New Word, which is compatible with WordStar files and is available for the Amstrad, can also be used for typesetting, and it has certain advantages, for example, skewing underscored and bold areas of text. However, it has been known to suffer problems with large files on full discs.

WordStar is available on so many machines that the setter doesn't need to own an Amstrad to use a file generated on one. It's a simple matter to convert the file from one disc format to another.

In WordStar a file contains the words of the text, with the high bit set on the last ASCII character of every word. Changes of typeface are embedded in the text by means of control codes, and are often legible. For instance, **S** in the text meaning Control+51 indicates a change to underscore mode (usually interpreted as italic by the typesetter). The same character indicates a return from underline mode to whatever the style was before.

It is entered into the text by pressing **RL**, or Alt+P then **S**. The letter is the general form for entering a print command in WordStar — Alt+P followed by another letter, such as **B** for underline, **B** for bold, and so on.

The multiple spaces which pad out the text for justification are ignored by the setter, as are line spacings except in special cases.

WordStar is very easy to use if you are already used to LocoScript. Depending on your expertise with word processing, it will take you

between a couple of hours and a couple of days to become familiar with the new addition to your software library. Once you've learned WordStar you can use the same program with ease on a multitude of other machines.

It should be remembered, of course, that in saving time and money at the typesetter, you are also taking on an added responsibility, in that any errors that occur are yours.

Correcting those errors can cost more than the original setting. It's therefore important to get the hang of typesetting, and to practice on small jobs to begin with to avoid expensive mistakes.

To my knowledge, there is currently only one fully implemented direct conversion typesetting system designed to work with WordStar files, and that's TypeSet from WordSmiths Typesetting. WordSmiths was one of the originators of typesetting from computers in the UK, and its system is quite widely used.

The firm can advise you at a convenient typesetting company using the system, or can accept material on disc or via a modem.

You should also obtain from WordSmiths the TypeSet booklet, which explains all the instructions and commands that must be inserted into the WordStar text file, and how to construct a specification form to accompany your file.

This indicates to the setter all the fundamental typesetting parameters you want to use.

You call those parameters into action by means of embedded characters in your file.

Also you get a sheet demonstrating the various faces available from your typesetter.

There are fundamental differences between the normal output from a word processor or a typesetter, and typeset text in a book or a magazine. For a start, many word processors, including WordStar, and most typesetters, use monospaced typefaces in which every character takes up the same width on the paper.

Typesetting, on the other hand, uses proportional spacing. Examining the



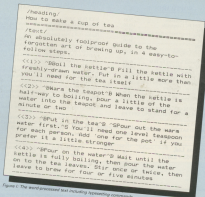


Figure 1: The word-processed text including formatting commands

text on this page and compare the amount of space taken up by an I and an n, for instance.

A word processor also limits the number of type styles you can use. You may have some variation on a modern dot matrix printer, with about two or three basic faces, and the capability to use underlining, boldface, expanded and perhaps italic versions. You may even be able to use a couple of different sizes.

In typesetting there are literally thousands of faces at your disposal, and a wide range of sizes. That writer of possibilities can be confusing to begin with, as can the apparent complexity of the way in which typesetting information is specified.

In addition, some things that work on a typewriter or word processor don't necessarily look that good when typeset, for instance a title in capital letters. In typesetting, you would probably use a different typeface, in bold, and a larger size.

Fundamentally, there are two parts to using TeXset, the specification form and the embedded commands.

Figure 1 shows just how simple typesetting from WordStar can be. It is taken from the TeXset booklet and describes a simple, yet essential process. It shows some of the com-

mands and special character combinations that instruct the typesetter to use different specifications. Alongside in Figure 2, is an example of how it might look when typeset.

You'll notice from the word processor file that two types of commands are embedded in it. There are the regular WordStar ones, like "bold" and "bold", which are used in exactly the same way by TeXset as they are by WordStar. But there are also some other commands which relate to parameters determined in the specification sheet.

Up to seven completely different type specifications can be used in each file. They can be called by a number embedded in the text like "P1" and "P2" but it's a good deal more understandable to use a name such as /heading/ and /text/. Each format covers every aspect of typesetting.

Within each format, you can determine:

- The line-length in lines (1/6in) and points (1/72in).
- The name of the normal font - used when a new format is called, or if the control character "N" is placed in the text.
- The type size in points.
- The line spacing.
- The justification mode (left, right,

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- 2 Warm the teapot (when the kettle is half-way to boiling, pour a little of the water into the teapot and leave to stand for a minute or two).
- 3 Put in the tea (pour out the warm water first. You'll need one level teaspoon for each person. Add 'one for the pot' if you prefer it a little stronger).
- 4 Pour on the water (wait until the kettle is fully boiling, then pour the water on to the tea leaves. Stir once or twice, then leave to brew for four or five minutes).

Figure 2: The typeset result

center or both).

● Alternate font faces, which enable you to call up a different face, size, line spacing and/or justification mode within the format, just by entering "A" in your text.

Then you include on the form what face is to be used when the "underscore" (italic instruction "I") is encountered, and the same for bold



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## From Page 15

Typset to cover the indentation of whole paragraphs. At the front of the file you determine the type of indent you want - left, right or both - and how many picas the indent is to be.

Typically, you might enter "L,12 to indent left by two picas.

But nothing actually happens until you call the indent by including the characters <> (greater followed by greater-than, forming a right arrow) in the file. You cancel the indent by entering <= and the indent type and amount can be changed at any time with further "I" instructions.

If you intend to print out your file before sending it for setting - a good idea, as you should check, for instance, that toggles have been turned on and off properly, otherwise you may end up with half your text in bold italic because you used "B" at the start of a phrase and "I" by mistake at the end - you may need to be able to display the typesetting instructions.

Embedded control characters will usually cause an effect, rather than

being visible, but you can make them print by turning off WoodStar's formatting during the print setup sequence.

Tags and format names can be suppressed in normal printouts by preceding them with two dots and placing them on their own line - this is WoodStar's method of indicating non-printing comments.

Again, they can be seen by debating the page formatting.

On the subject of page formatting, remember that WoodStar's centering command does not work in typesetting, you use "JC (justify central instead.

But forced page breaks in WoodStar (using the command <=) do have an effect in that they cause a half-inch gap to be left in the setting, making it easier to identify blocks of text when it comes to laying out the setting and pasting it up as camera-ready artwork.

Alternatively, you can be used with a pagination program at the writer's for the end of a page, so in WoodStar, which can also perform the setting of running heads and page

numbers.

The fundamental point about Typset is that it is a method of conversion at the typesetter - you need no extra software (other than WoodStar itself) or hardware to include control characters (all of which, incidentally, are accessed into the file as print commands, by pressing Alt+P followed by the letter.

So, to produce "Y, you type Alt+P Y) or names, formats and special instructions. You do, however, need to learn what they do. Luckily, this is relatively easy.

Once you have grasped the technique - and most importantly, once you begin to think typographically - you are well on the way to being able to originate text files complete with all the information needed to typeset them directly, to your specifications.

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• This is the fastest storage system available for Acornstronic computers and is compatible with CPM 2.2, CPM+ and all DKTronics peripherals including the 640/256K memory expansions. When used with CPM+ and our 256K memory the silicon disc

capacity is a massive 647K (more than the PC's 8012 Hard Disc). It automatically tags on as drive B or drive C in two drive systems and does not require extra power supply.

• The 256K Silicon Disc is designed to be used with at least one normal disc drive attached. When fitted the directory uses 2K thus leaving 254K for storage, over 70K more than the normal discs.

• Data and programs can be exchanged between the Silicon Disc and a normal disc; application programs can then work on the data at vastly increased speed especially on systems with only one normal drive.

• Software is contained in an expansion ROM and there are two environments in which the Silicon Disc can be used: BASIC under MAFDOS where all the normal MAFDOS commands are fully supported (LOAD, SAVE, MERGE, COPY etc) and within CPM 2.2 CPM+ where commercial programs are designed to run on multi drive systems.

CPM+ including VAT (464 and 6126)

## 64K and 256K MEMORY EXPANSIONS



• The memory expansions increase the Acornstronic 464's internal memory to give a total of 128K or 320K. The 64K's memory is increased to 128K. It is compatible with all DKTronics peripherals including the 256K Silicon Disc.

- It is supplied with bank switching ROM software (464 software on cassette \$126 on disc).

• The software adds some BASIC commands which makes it possible to use the second 64K (or 320 or 640) and 16K in the case of 320K) for storage of screens, windows, graphics and basic arrays. This ability means that you can write much larger files, programs and sophisticated programs that use full down menus with ease.

• With an expansion fitted on the 464 it then has the same memory configuration as the CPC 6126. It will then run CPM+ with its massive 61K TPA area, opening up an even larger software base to 464 users. When using either of the expansions with CPM 2.2 on the 464 and 6126 computer the TPA is increased to 61K.

• The MMU is accessed by means of bank switching using a single MD port. Memory is actually switched in and out of the 64000 address space in 16K sub blocks (so are the ROMs). The port determines which particular combinations of the original four 16K sub blocks and any new sub blocks from the expansion MMU will occupy the 64K address space at any time. All of this switching is done automatically by the software supplied.

• The contents of the expansion RAM are retained if the computer is reset and if the MMU is used for machine code the contents will remain even if the computer crashes.

64K £89.95 including VAT (464 only)

256K £99.95 including VAT (464 and 6126)



# LEAD FROM B

DKTronics have produced this ingenuity to enlarge the potential of the 464 and have been designed to complement





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- There is a cassette version for the 484 and a ROM version for the 484 and 6128.

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- The wording of the words is completely user transparent and the computer can carry on its normal running of a program while the chip is talking. The speech output from the SPQ/256 is mono and directed to both speakers.
- There is a cassette version for the 484 and a ROM version for both the 484 and 6128.

Cassette **£29.95** including VAT (484 only)  
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# HELPING YOU TO SPELL IT ~~RITE~~ WRITE RIGHT

*Michael Sterne reviews a spell checker  
with the LocoScript seal of approval*

**UNLESS** you're an expert proof-reader and a perfect typist, you'll certainly benefit from using a spelling checker. LocoSpell is the official, Amatec-approved checker for LocoScript.

To use it you must prepare a start-of-day disc and the method is fully described in the clear and comprehensive manual.

Your start-of-day disc, if you are using the PC80286, will have to contain the LocoScript software, your PHRASES.STD and TEMPLATE.STD files, the LocoSpell software and the 32,000 word dictionary.

Everything you need is provided and takes up the whole of a 3.5 disc. Indeed, you may not have room for all your templates. With an 8012, or a second drive, the dictionary can be on a disk in drive B.

When you boot, the dictionary, whether on the start-of-day disc or in drive B, is copied to drive M. The 32,000 word dictionary, supplied on the reverse side of the software disc and requiring 198k, is only available for use in this way with the 8012.

You will find it easy to use LocoSpell. Pressing **F7** provides an expanded menu with the additional options shown in Figure 1.

Choose either of the first two options for a spelling check of the whole or part (a very useful facility) of the document currently being edited and displayed on the screen.

As usual, you can choose the option either by using the cursor keys or by typing the code represented by the capital letter.

When the program encounters a word it doesn't recognise, the menu shown in Figure 1 is displayed, showing the word and a suggested replacement.

This feature applies most frequently to the correction of typing errors or minor mistakes where the word typed is reasonably similar to the correct word: it is a considerable convenience.

Making the word as correct places the code "SAC" in contact with it so

Program: LocoSpell  
Price: £29.95  
Supplier: Amatec, Brentwood House,  
109 Kings Road, Brentwood, Essex  
SS16 4JF  
Tel: 0277 280222

that the checker will accept it, even if it is not in the dictionary. You can also place the code from the set menu or by using the set key and the alternative "SC".

Consulting the dictionary accesses 18 words at a time - you move the menu to the appropriate section by entering a word or some initial letters at the head of the menu.

You can look up a word while you are editing by typing all or part of it and choosing the single word option from the Master menu. A single keypress then inserts the word.

The program has a facility for creating and amending user dictionaries. You choose the final option to store an unrecognised word in a specially cre-

ated dictionary from which it will be recognised from then on: it is not saved permanently until the completion of the check.

The final menu gives a word count, an analysis of the spelling check and the option of updating the user dictionary.

You can create user dictionaries for all system users. And although you can add a user dictionary to a system dictionary you can then no longer amend it.

All user dictionaries use the same filename and extension so that the only way of distinguishing between them is by their location in different groups - which can cause complications.

As the manual indicates, by recommending an upgrade, the 8254 is not really suitable for LocoSpell. The software uses 24k of drive M and the dictionary another 68k so that "disc" drive full" messages abound and you



Figure 1: The expanded **F7** menu



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TO ORDER, PLEASE USE THE FORM ON PAGE 109



# STARTER SYSTEM

*Jo Stork discusses the problems involved in picking the right accounting system, and looks at one system*

**SELECTING** the right accounting system for your business requires far more care than choosing a spreadsheet or database, because it involves much wider issues than merely cataloguing the package's facilities.

These secondary issues are the hardest for a typical user to assess, it is virtually impossible for you to test a low-cost package thoroughly for yourself before you buy it.

The first of these criteria is that in many cases it is your subjective responses to the screen design, initial organisation or key sequences, rather than the precise specification which has the greatest bearing on your ultimate satisfaction. Sadly, it is these very factors which only time at the keyboard can highlight.

This gives specialist computer shops a considerable advantage over the High Street chains. The former only stock the brand leading packages, but at least you can spend a limited time trying them out and also call on somebody for assistance who has moderate experience in their operation.

Consequently the Sage, Compaq, Comsoft and the like have a huge in-built marketing advantage over newcomers.

The next aspect is that even though suppliers may not consider the products in quite the same way, I believe that apart from the occasional package designed for a specialist vertical market such as garages or general practitioners, all accounting systems for the PCW fall into one of the following main classifications:

- Those better suited to companies employing a book-keeper/clerk. This may well be a part-timer, but nevertheless will spend several hours per week operating the system.

- Those better suited to companies where the entrepreneur runs the books himself, as well as performing a blizzard of other commercial tasks. This user is more likely to use the system for only a few hours a month.

Almost all the more successful packages fall into the first group. They tend to be much clearer, considerably larger, and generally more sophisticated, but unfortunately require a deeper practical knowledge of accounts.

#### PRODUCT ACCOUNTS System

Price £39.95

Supplier: Linkup Systems, 116 Perryfield Road, Ayrshire, Bucks HP19 8JJ  
Tel: 0296 422781/421827

Set against this, they do provide much improved financial analysis and more complete final accounts, including items such as fixed assets.

I must stress that in talking about sophistication, I do not include features such as invoicing, payroll, stock recording and the like which can be grafted on to either type.

The second class, while needing far less time to learn and in the preparation of files, invariably omit some aspects which then need to be incorporated in the final audit by the accountant's professional accountant.

Consequently when assessing any book-keeping package, the first task is to ensure that you determine if it is the right type for you.

Assuming you need a one-man system, it would be totally wrong to criticize a product which falls firmly in the second group, for not providing a full range of features.

Nevertheless, a minimum set of features must be provided in order that your time and effort is worthwhile.

Assuming that the package you are considering contains these minimum features, you must assess two other essential criteria for a one-man system.

The package must be extremely

easy to use even for people who, apart from simple three column entry in an exercise book, have no book-keeping experience whatsoever; and its speed or programming efficiency must not be sacrificed in the interests of meeting a low price.

It is the former which principally governs user-friendliness, and therefore ultimately determines the long-term satisfaction.

On the subject of user-friendliness, since a host of menu items will seem daunting to the complete novice, it becomes vital that the manual is of the very highest quality.

Particularly in the early days, there is no point having a system which is easy to use as regards data entry or report production which still leaves you wondering what option to select, when it should be run, and what the option's real purpose is. This is where most accounting packages are let down.

With these principles in mind we can look at an accounts package that fits neatly into the one-man business group.

The Accounts System suite from Linkup Systems provides a good range of facilities. Something in the region of 40 actions can be taken, ranging from recording payments to listing stock valuations, from creating invoices to producing cash flow analysis, balance sheets or account summaries. At the price, it therefore



Figure 1. The invoicing/stock control menu



Figure 3: One of Linkup's main menus

## From Page 25

represents good value for money.

Furthermore, the reports are clear and well laid out, whether sent to the screen or printer. Consequently the basic assessment is highly favourable since it easily passes my "minimum features" test.

The manual is reasonably helpful in that it explains the operations clearly and concisely. Unfortunately, like so many others at this end of the market, it does not contain a book-keeping primer to explain the purpose of these actions.

Neither does it come with the only practical alternative which is to supply a complete set of training files on the disc. If this had been the first accounting system I had met, I might well have struggled.

I particularly liked the way the various sections were produced on different coloured paper, even though the effect was spoiled by the absence of an index.

Leaving aside these purely subjective views on user-friendliness, I am totally objective in expressing my

views about Linkup's attention to detail. This problem is common to most small software houses where the system's operators also do the testing. Even if like me they are also typists, they become so familiar with the operations that everything to them appears very slick. More importantly they fail to detect the quirks.

In this case, and most unusually, I found myself making far more errors than normal through actually typing ahead. Even though Linkup's basic design is sound, an inexperienced user who may spend more than a week between sessions could become very frustrated, I know I did.

Entering data can be very rapid, and, just when I believed I was going great guns, the system froze me in error and I had to start unspooling my input.

A typical reason was that a reply of Y or N to a question sometimes required Return to be pressed and at others it did not. I found it interesting to find myself pressing it unnecessarily and then disappearing into an untagged menu or part way through another transaction which now had a blank field in it.



Figure 4: Part of a new ledger entry

On such small details my selection and satisfaction ultimately depend, even if many users may never notice my example as others may discover different idiosyncrasies which I ignored or even missed. This explains why pre-purchase testing is so essential.

Consequently I fully accept that my quibbles about Linkup's Accounts are mainly due to its personal preferences about the way I interacted with it.

For this reason alone I have only listed one of the many. It would have been grossly unfair to cite them all just because I prefer many other systems of this type.

This is especially important since it is no worse than the other accounting packages, and in some cases offers a considerable increase in functionality.

In conclusion I would say that Linkup's package provides all that is required of a starter system, and should significantly assist the small businessman to assess the financial wellbeing of his organisation.

For this reason alone it deserves serious consideration - if you can find a statistic who will let you compare it with the competition.

28.02.87		TRADING SUMMARY	
OPENING STOCK	982.00	SALLES (GROSS)	5022.41
ADDED	0.00	LESS 10% V.A.T.*	502.24
LESS CLOSING STOCK	1279.27	GROSS PROFIT =	5915.95
	-997.27		
For Returns	6000.00		
Discount	121.71		
Power	6000.00		
rental/light	114.71		
supplies/office	2000.00		
office	0.00		
Telephone L	0.00		
Bank Int	0.00		
Small Int	254.44		
Interest	0.00		
Bank	00.57		
	6073.08	LESS EXPENSES	6073.08
Cash From Bank	0.00	NET PROFIT	-157.99
Balance owed to creditors	6000.00	PRESENT BANK BALANCE	1000.10
		Balance owing from debtors	5769.99

Figure 5: A trading summary

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12 months of entries are kept in a file attached to your file. At any time, you may tend to review the computer memory, delete or add the entries, analyse them, print statements, and then save the updated file for later use. Entries may be filtered (by month/quarter) or forecast (for budgeting). You may have any number of separate files, and make copies of files for archive purposes. You may archive the period covered by a file month by month.

Up to 100 separate transactions may be entered per month. Each entry consists of:

- The day of the month, e.g. 31st of June
- An account number, and it up to 8 defined by you to suit your circumstances e.g. 1-officers, 2-wives, 3-children, etc.
- Reference e.g. 000123 for a cheque number or bank reference.
- A memo field, one of up to 80 optional for use to suit your circumstances e.g. 00-annual salary, 01-Money for 02-travel in 03-production, 04-office materials, 05-00000000, 06-00000000, 07-00000000, 08-00000000
- A description of what you can see what each transaction was for, e.g. "New garden" or "Bus of 10 days"
- An optional single-transaction form which you may include for further classification, e.g. 00-transport, 01-entertainment, etc.
- The amount of the transaction, which may be plus or minus.
- A check to indicate whether the entry is exempt (you need to declare for VAT), or alternatively the actual VAT rate.

You may define 10 categories according to account, class and bank (if all cards), or 20 categories according to account using a credit card, PCW and various reports on the screen or printer as follows:

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# JUST YOUR TYPE?

*Niels Reynolds inspects a package which claims to provide eight new styles for your printer*

**SUPERTYPE** is a package offering PC/M users a choice of eight typefaces which may be used in either LaserScript or CP/M. As such, it could prove useful for a wide range of applications.

To set up Supertype you have to copy the relevant parts of CP/M and the program disc on to a convenient working disc. The procedure is relatively straightforward, though the instructions may be slightly confusing to users new to such things.

This mild rebuke is aimed at the accompanying booklet, as there must be many PC/M owners who have come to the machine via the typewriter rather than the home mixer and who have little or no knowledge of CP/M.

Digital has set the instruction booklet using a dot matrix printer, but strangely not using one of their own fonts.

On loading the working disc you are offered a choice of the eight type faces, or fonts as they are known in the trade. They are Business 1 - 4 (all sans serif), Old English, Outline, Yaudeville in style with a 1930s feel to it and Stencil.

Having made your selection you install the type face on a disc, specifying whether it is LaserScript or CP/M - a simple enough procedure.

After selecting, say, Stencil, and choosing a LaserScript disc, any document on the disc will now print out in Stencil. However, having selected a particular font, the instructions don't tell you how to restrict the original LaserScript typeface.

The pack reads: "Simply install Supertype on your current work disc and choose from any of these eight fonts". This suggested to me that, while working on a document within LaserScript, any or all of the styles can be selected.

This is not the case, only one style can be used at any one time and cannot be mixed within the disc, let alone a specific document.

This impression is further backed by an illustration on the packaging that shows a printer rolling out a printed sheet with all eight type faces displayed. This is just not possible.

To change type faces you must finish editing, replace the work disc with Supertype, roll up the required font and install it on the work disc. Once familiar with the procedure this

Program: Supertype  
Price: £79.95  
Supplier: Digital, Rakey House, 18ms  
Road, Buntingford, Cambridgeshire, Seven EOX  
6NU  
Telephone: 02254 5659

takes three or four minutes, which though not a long time in itself, can be annoying.

I have said that there is no explanation in the manual as to how the original LaserScript style can be recalled. If there are only a few documents on the affected disc, they can be moved (M) to another disc through drive M.

If you feel this is too fussy, or there are too many documents to move, there is another way. Return to the management screen with the Supertype font installed and call up hidden files (H).

Erase (E) the file MATRIX.STD in group A. Then, changing to the original LaserScript system disc, or preferably a backup if you have one, copy (C) file MATRIX.STD to drive M, then move it to group A of the previous work disc.

Digital warns that the system is designed to work under proportional spacing. Top line forms of the letter spacing in other pitch sizes is useful, especially those involving i and l.

It is claimed that all printer modes are supported - Enlarged, bold emphasised, italic, proportional and so on. Yet pitch sizes 15 and 17 are not supported and, because of the letter

spacing problems, pitch sizes 12 and 13 can become awkward to read.

Although some fonts are worse than others in this respect, to my mind that makes them unusable in those particular pitch sizes. However, there are none of these problems if proportional spacing is used - even if italicised or enlarged - although some letters may still be when used in bold.

Despite these complaints, I liked Supertype and could imagine using it for various applications - club newsletters, college magazines, whatever.

I must admit for day-to-day use I would stick to LaserScript, but would enjoy having Supertype around just for the choice.

Digital's packaging and advertisements suggest that Supertype is rather more versatile and simpler to use than it actually is, and having read all the blurb, my expectations were perhaps set too high. This is a shame, as Supertype has a lot to offer for the price. The additional type is notably unnecessary.

I think people may well buy this package on the strength of Digital's rather loose sales pitch and could possibly be disappointed. I for one would happily buy Supertype on its own merits.

Digital has just announced an upgrade to this package, which as well as including several pitch, style and proportional spacing improvements, makes the software compatible with LaserScript and LaserMail, and provides a redesigned Business 1 font for use with SuperCalc.

'Business 1' N.L.G. bold, *italic*, enlarged  
'Business 2' N.L.G. bold, *italic*, enlarged  
'Business 3' N.L.G. bold, *italic*, enlarged  
'Business 4' N.L.G. bold, *italic*, ENLARGED  
'Old English' N.L.G. bold, *italic*, enlarged  
'Yaudeville' N.L.G. bold, *italic*, enlarged  
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The Supertype fonts



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Sage Invoicer Complete (A-B-C)	£75.00			<b>Typing Editors</b>	
Comark Accounts (D)	£55.00	<b>Databases</b>		Touch'n Go	£24.00
Comark Invoice plus Stock		Delta 1/2	£55.00	Intexyl Graph Typing	£24.00
and sales ledger (E)	£55.00	Class 4	£175.00	Intexyl Text Programs	£24.00
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		Multiplex	£55.00		

## Software on 5.25" Disc Amstrad PC1512

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Sage Accounting	£45.00	Wordstar PC Writer	£55.00	Cardbase 2	£55.00
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