

# Computing *with the* AMSTRAD

Vol. 2 No. 9  
September 1985  
£1

The independent magazine for Amstrad computer users



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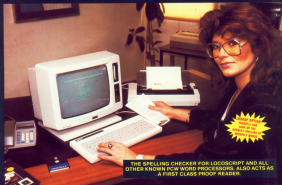
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Advanced Memory Systems	Reliance Text/Co
AP Marketing	RMK Systems
Aspec	Seasat Software
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## Adverts budget doubled

AMSTRAD has increased its advertising budget by over 100 per cent to £12.5 million this year.

Last year's £5 million mainly went on making the PCW the UK's best selling micro. Amstrad's new range of audio products was also heavily supported with TV spots.

The dramatic increase is thought to be due to the acquisition of Sinclair, the forthcoming IBM compatible PC and the continued success of the PCW word processors.

Of the £12.5 million, £3 million will be used to advertise Sinclair-based machines.

# Amstrad challenge to IBM lined up

AMSTRAD is to launch its top secret IBM clone in London on September 2 according to a well informed source.

It has been scheduled for then so that it can be seen by the public for the first time two days later at the opening of the prestigious POW Show.

With the price still expected to be below £400, the Amstrad winner is getting itself up to roll out the red carpet.

Dealers in particular are convinced that the new machine will prove to be yet another Alan Sugar master stroke.

A telephone survey of leading

dealers conducted by Computing with the Amstrad revealed that almost all felt to be an to another winner with the IBM compatible machine.

### Genius

For they are convinced that his marketing genius will allow Amstrad to make dramatic inroads into what is recognised as a highly sophisticated market place.

"If it has the Amstrad name on it, it will sell", says Richard Blatcher of The Village dealership in Kent.

"The man just can't go wrong

at the moment. Admittedly it is a highly competitive market, and a new one for Amstrad, but we are convinced that if anyone can do it it will be Alan Sugar".

Commented another "Like him or hate him, the man knows what he's doing when it comes to selling computers. In fact he's the only one in the UK who is a match for the Americans".

### Unconvinced

However at least one dealer remains unconvinced that the IBM clone will be a success.

"I've got a lot of nagging doubts", says Trevor Priestley, of Manchester-based Microval, a mail order house specialising in the Amstrad.

"The PC market is very different from the one that Amstrad has been in up to now. So if he's looking for volume sales, he might well come unstuck".

# TREBLE SUCCESS FOR THE BIG SHOW

FLOOR space at the fifth Amstrad Computer Show which takes place next month was virtually sold out within a month of the previous show in June.

This means there will be a record 75 exhibitors at the National, Harrogate, on October 3 to 5, among them several suppliers who have not previously marketed their products in this manner.

At least five of them missed out last time and had to go on the growing waiting list at Database Exhibitions, queuing for a place in the Amstrad market's most effective shop

window. This time there will be 100 stands packed with new products and bargains.

Once again a major attraction in the show will be the Amstrad Theatre, a continuous presentation of latest developments and technology with a mainly business theme.

The new IBM compatible machine is bound to be a big crowd-puller, but it is the ongoing success of Amstrad

products in general that makes the organisers predict a record turnout of 15,000 enthusiasts at the show.

Head of Database Exhibitions Derek Mackin said: "Since we began this series of Amstrad Computer Shows the response we have taken has nearly tripled.

"It is an indication of the continuing Amstrad success story that we will be spread over 32,000 sq ft of the Hovosol in October and it still won't be enough to accommodate all the firms who are clamouring to be there.

"At the last show exhibitors reported takings with deals worth in excess of £100,000 being struck over the weekend.

"One firm negotiated an export contract worth more than £50,000".

## 'Legal' transfers

NEWLY-released from Mirage Microcomputers is Microdriver, a tape-to-tape transfer device for the CPC464 that connects to the expansion port.

A precaution against piracy is that saved files are unread-

able unless Mirage Image is present.

A feature for adventure addicts is the ability to freeze games at any point and save and resume them later. Price: £49.95

## French invasion

FRENCH games software house Infogramme has set up a UK operation headed by ex-computer journalist and PR man David Croweletter.

First release was Man-shogon, a role playing game available for the Amstrad at £12.95.

Also available is L'Espeir's Cross, a crime thriller, and The Inheritance which Croweletter says is the most stunning of the three.

## Disc winner

WINNER of a 25th anniversary disc in De'bronic's free show at the June Amstrad show was Albert Peck of Hawaii, Hants.

# Great News from GARWOOD

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## All lit up by the 6128

HOLIDAYMAKERS visiting the Adriatic coast resorts of Yugoslavia are more than likely to find themselves being entertained at times courtesy of the CP6128.

Not that they will probably be aware of this, for the machine is playing a background role, controlling the lighting in many of the leading discotheques.

It is the brainchild of Andrej Grobler, a lecturer from Ljubljana. He is the joint head of Soralis Software, the Anglo-Yugoslav company producing the software for the package.

With his partner Tony Wins, managing director of Profes-



Andrej Grobler (left) and Tony Wins, joint heads of the Anglo-Yugoslav company Soralis Software

sional Data Services, he has been successfully marketing the Amstrad-based lighting light

system in his home country.

The unusual business partnership was struck after Tony met Andrej during a London show. "He showed me some software he had written - and it was great", recalls accountant Tony Wins, "so we decided to capitalise on his Yugoslav connections and set up Soralis Software.

"The result is that at the moment the CP6128 - with our software - is the package that is making the lights go on and off in most of the popular clubs out there. It's a market we hope will expand a lot more by next season".



Richard Chamberlain, one of the TV series Shogun

## Shogun adventure

A 17th century shipwreck forms the basis of the adventure Shogun released by Virgin Games for the Amstrad CPC484, 664 and 6128.

It is set in 1600 when Englishman John Blackthorne was shipwrecked off the coast of Japan and is based on the best-selling book - and TV series - by James Clavell.

There is a choice of being one of 28 characters including lords and ladies, servants and samurai, priests and bandits. The people that in the game have to be manipulated and persuaded to follow you.

Nick Alexander, Virgin Games' managing director, said: "It took 10 months to develop and justifies the much-abused term mega-game.

"It is not easy to play immediately, but once you get the hang of it it is a thoroughly impressive and enjoyable experience".

The cassette version is £9.95 with the disc costing £14.95.

## 8256 explained

A BOOK for inexperienced users of the Amstrad POW8256 comes from Flat Publishing.

Using the POW8256, by Mike Garsed, includes aspects omitted from the machine's manual.

The book avoids jargon and assumes the reader has had no previous knowledge of computers or word processing. The price is £5.95.

# Amstrads bring new hope to refugees

A TRIO of Amstrad computers is being used to bring hope to thousands of distressed Vietnamese refugees living in the UK.

Their plight largely ignored, these former boat people have become forgotten have-nots crowded into substandard dwellings, their families dispersed, unable to find work or obtain help from social agencies because of language difficulties and their ignorance of "the system".

But an advice centre staffed by volunteer social workers has been opened in London to help them using a CP6128 and two PCs to control and coordinate its efforts.

Using the MicroLink elec-

tronic mail system, the modern-equipped micros keep the centre in touch with refugee agencies in other parts of the world and help to re-unite families.

The centre is needed because of a series of blunders by the authorities when the boat people first arrived in this country.

Members of the same family who arrived at different times were scattered as far apart as Rio and Portsmouth, and no effort was made to put relatives in touch with each other.

Because three quarters were of Chinese origin and knew only a form of Cantonese, they couldn't understand the Vietnamese-speaking instructors

hired to teach them English.

The end result was that thousands of refugees were written off as "incapable and illiterate", and many suffered severe psychological disorders as a consequence.

"By the time the problem was recognised the special agencies and funds set up to help the boat people had largely finished". Alf Jackson, one of the centre's workers, told Computing with the Amstrad.

Large numbers of them have been reduced to living in squats and hives, shunned by both the Vietnamese and Chinese, unable to find work or even use the normal social assistance channels.

"This is why we set up the Chinese Vietnamese Advice Centre and I'm pleased to see that with the help of our Amstrads and MicroLink we have been able to help many boat people.

"In particular, MicroLink's facilities have enabled us to establish better communications with refugee agencies all over the world - particularly in Hong Kong - and get dispersed families in touch with each other".

## TYPING TUTORIAL

TYPING Tutor from Computer One for the PCjr 8612 and 8256 is aimed at beginners.

It covers full keyboard familiarisation and gives more than 370 informative or amusing sentences to be copied.

A continuous display shows speed and accuracy for the current lesson, and the pre-set

accuracy targets are adjustable.

Options include finger graphics which mimic the correct finger positions and illustrate how you have gone wrong, and a beep to draw attention to mistakes.

Typing Tutor, with learning game and manual, costs £24.95.



TOMMY Dixon, on the Government's £40 a week Enterprise Scheme, has just completed a \$5,000 word children's novel on his Amstrad PCW 8256.

It took him six weeks at his home in Darves, Walsall, West Midlands.

Said Tony: "If I had used a typewriter it would have taken me much longer."

"The word processor is so easy to use and enables you to

## Novel on the 8256

stop and rewrite at a touch, instead of whipping paper in and out for corrections".

An ex-Levland quality inspection worker, 33-year-old Tony decided last December to make a new career for himself and opted for the Government scheme, backed with his

£1,000 savings.

Although presently working on a strategic board game, Tony says: "I intend to take a course in computers so I can use my ideas for software."

"The £399 I spent on the Amstrad would really prove worthwhile in my new career".

## Digital music

RAINBIRD'S Music System released for the Amstrad CPC range, offers a complete digital music studio on one disc or cassette.

The edit mode allows modification of printed musical lines, and facility to compose, edit and rearrange tunes, using standard musical notation.

The keyboard enters notes, as if playing an organ, which can be recorded.

The system allow compositions up to 999 notes in length and 16 pre-set sounds are available.

It costs £19.95, cassette, or £19.95 disc.

## Midi interface

A MIDI interface for the CPC range comes from DCHP Electronics. It connects to the Amstrad's expansion port via a through-conductor to allow the use of other peripherals.

Midi connections for In, Out and Through are by standard 5 pin DIN sockets. It comes with implementation instructions and costs £50.

## Pat's reading



## landed a job

COLLEGE lecturer Patricia Belling's avid reading of *Computing with the Amstrad* helped land her a new job.

She read in the business section a review of Beazley's suite of programs especially written for use by contract cleaning businesses.

Patricia, of Pinner, Middlesex, 34 years a lecturer, and on a retraining computer science course at South Bank Polytechnic, casually mentioned the article when going for a new post as a lecturer in computing at a technical college. And she

landed the job.

She said: "When I was being shown around the college by the head of computer studies I happened to remark - after reading about it in the magazine - 'Do you use the Beazley suite of programs?'"

"They were amazed that I already took such an interest in an up-to-the-minute release in new technology. It helped to land the job, I'm sure".

Patricia, who has had eight years teaching communication studies, hopes to obtain a diploma in computer science before taking up her new post.

## Focus on fun

THE focus fight for the rapidly growing budget-priced games software market has intensified, with CPC884 and CP60126 users among the first to benefit.

Arlo has spearheaded a drive in the budget market with its first release for the CPC machines.

Voodoo Page, a 20 screen arcade game has the player in the role of a frustrated computer warden. It costs £1.99.

\*\*\*

GBL has just released its first games for the Amstrad PCW8256.

Blackstar is a text adventure, the objective being to return the power orb to the Lady Artemis. Treasures collected on the journey can be kept but only after they have been cleaned of evil.

A second game, S&S Raid, is a semi-graphic adventure, where secret plans have been stolen which give details of a home security base.

In one hour the plans will be opened by the enemy, allowing them to destroy the base. Each program costs £14.95.

\*\*\*

THE hunt for and sinking of the German battleship Bismark is simulated in a new wargame for the CPC range by PSE.

Another title in the series, Totenk, also for CPC machines, is set in 1942. The player is controlling the Allied command or leading the German and Italian troops.

Cassettes cost £9.95, disc £14.95.

\*\*\*

LATREY adventure released by Level 9 for the Amstrad CPC series - Price of Magic - comes in graphics and text versions.

You must take over the crystal ball and learn spells to control the enemy. Two programs on a single cassette cost £9.95.

AMSTRAD PROFESSIONALS  
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# Your Amstrad has 256k or 128k to play with.

The Amstrad 6256 and 6288 are extraordinary machines with random access memory that lifts them far above the home computer norm.

Now Digital Research, creators of the CP/M operating systems bundled with these business-calibre Amstrads, offer serious users professional program development power and applications portability via two high level Digital Research languages, PASCAL/MT+ and CBASIC COMPILER.

Both languages come as complete packages of standard Amstrad 3" disks with full documentation.

## The most complete PASCAL £49.95.

PASCAL/MT+ is full ISO standard PASCAL, extended to provide a comprehensive professional programming environment for industrial, business and educational applications.

It's faster, more versatile, more portable and easier to use in sophisticated applications demanding segmented development.

The package includes a compiler to generate relocatable object files; a linker to generate executable files from compiler outputs; a run-time support library covering transcendental functions, machine interrupts and other tasks; a disassembler and a symbolic debugger.

As well as standard ISO numerics, PASCAL/MT+ supports BCD and floating point real numbers for arithmetic precision. Special features reduce program size and enhance I/O capabilities. PASCAL/MT+ is the fully implemented PASCAL you can start with, stay with and never outgrow.

# It seems a pity just to play.

## Ten times faster with CBASIC £49.95.

CBASIC Compiler is a native code compiler that allows separate modules to be written, tested and combined to create a complete program. And it combines machine code speed with BASIC ease to produce programs that execute eight to ten times faster than the same interpreted programs.

A fully integrated set of device independent graphics statements and functions permits direct output to any graphics peripheral without recompiling.

Extended precision 14-digit decimal arithmetic ensures that fractional parts of pound amounts are exact and ledger balances to the penny.

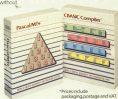
CBASIC Compiler also supports integer arithmetic, so you can use integer variables to increase execution speed.

Multiple line function capability with multiple parameter provides features found in block-structured languages. Local variables can be declared in an MUF. MUF functions may be declared as external, belonging to an entirely different program module.

## Development Potential.

PASCAL/MT+ and CBASIC Compilation on the Amstrad CPC 6288, PCW 8256, CPC 664 and CPC 464 with DD-1 disk drive. Use of graphics with CBASIC Compiler is only available on CPC 6288 and PCW 8256.

The Amstrad Professionals from Digital Research will allow you to explore and exploit your Amstrad computer's program development potential to the full.



\*Price includes packaging, postage and VAT.

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\*30 day telephone support for 30 days following receipt of registration card. Thereafter a full year's on-line telephone support is available for just £15.00 + 20% full details will come with your software.



**DIGITAL  
RESEARCH**  
The creators of CP/M™



AMSTRAD PROFESSIONALS  
FROM DIGITAL RESEARCH

NOW  
WITH FREE SUPPORT  
FOR 30 DAYS

# Your Amstrad can handle interactive presentation quality graphics. So here they are.

The Amstrad 8256 and 8228 don't simply have massive memory capacities that take them across the dividing line between home and business machines. They also have GSA graphics extension systems that make them potential producers of high quality (and highly exciting) graphics for business, educational, scientific, industrial or pure pleasure purposes.

Now Digital Research, creators of the CP/M operating systems that make the graphics capability possible, offer you two professional graphics software packages which exploit it to the full: DR GRAPH and DR DRAW.

## Data comes alive with DR GRAPH £49.95.

DR GRAPH lets you use data entered manually or created with popular spreadsheet programs such as SuperCalc to design vividly effective and professional line, bar, scatter and stick graphs and pie and text-only charts, quickly and effortlessly.

Simply choose options from menus and by filling in a form.

When you've completed your selections, you've completed the graph.

Choose from three different type styles (plus your machine's type) for titles, legend and annotation copy. Deploy different line styles, line and bar widths and eight filled patterns to add clarity and emphasis. Add borders, colours and labels. Bar charts can be stacked, clustered or arranged in steps or "sticks". Pie charts can include exploded "blows".

Annotation can be incorporated, modified, and moved anywhere you want. Different graph types can be combined with one chart (and as many as four different charts or graphs can be combined on a single page).

## Ideas become art with DR DRAW £49.95.

DR DRAW lets you create organization charts, flowcharts, business logos, technical diagrams, maps. Or just about anything or line drawing imaginable.

And each element can be enhanced or highlighted with a variety of colours and patterns.

Easy-to-follow menus let you select pre-programmed shapes—circles, bars, arcs, rectangles, polygons, and lines—or create your own pictures by modifying these shapes via mouse or keyboard. Add text anywhere you wish, selecting between a wide variety of type font styles.

Revise with the stroke of a key: fill a shape with colour or patterns.

Enlarge or reduce it. Move it to a new location or copy it.

Change type fonts, size, colour, and location with just a few simple keystrokes.

Zoom in for detailed work, then zoom back out.

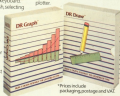
to view the entire picture. Or zoom out to fit your picture neatly in a 81/2" x 11" or 11" x 8 1/2" page layout. Or extra-large drawings; you can pan the screen back and forth over each section.

## See, store, print, present!

DR GRAPH and DR DRAW let you see exactly what you've designed on screen. Then store it on disk for recall or update later. Or print or plot on paper or overhead transparency film.

Either way you've got a totally professional presentation.

Both packages run on Amstrad CPC 8228 or PCW 8256 computers with one or two disk drives. Hard copy can be produced on any GSA-compatible printer or plotter, such as Amstrad Epson or Shinwell printers and the HP 2470A plotter.



\*Prices include packaging, postage and VAT.

## Amstrad Professionals from Digital Research. Now Professionalism begins at home.

Software is sold separately. Requires Amstrad/Talor Digital Research (UK) Limited, 20/201 House, Central Street, Peasbury, Buntingford, HUNTS 11 0J.  
Or telephone Peasbury (0438) 367976 or 043870 with your credit card details. Or contact your local Amstrad dealer.

\*FREE telephone support for 30 days following receipt of your software card. Thereafter a full year on-line telephone support available for just £10.00 + VAT. Full details available with your software.



**DIGITAL  
RESEARCH**  
The creators of CP/M

**Program:** Gunfight  
**Price:** £9.95  
**Supplier:** Ultimate, c/o US  
 Data Unit 2 & 3, Norfolk  
 Way, Hatfield, Birmingham  
 BB 76X. Tel: 021-358  
 3369

SILENCE falls over the Wild West town. You're standing in the main street facing the ugliest outlaw you have seen in months.

A twitch, a crash of gunfire and Terribstone Pete lies dead. If you've ever fainted yourself as a bit of a faint-hearted you must love Gunfight.

It is the latest release from Ultimate and as usual it employs their now famous 3D technique. Using this programming technique charac-

## Clean up the town

ters appear to walk in and out of the screen and around other characters.

In Gunfight you are the sheriff of a town which has been overrun by bandits. Your task is quite simple - track them down and shoot 'em dead.

Before you set out into the town you must collect your wages. This is done by shooting falling money bags.

This money is necessary to keep you in bullets and horses, and to pay the fines you incur for shooting innocent bystanders.

The game begins for real as

you set out from the jail. The streets contain many people and you must not bump into any of them or you lose one of your three lives.

Having located the gang-leader you must shoot him before he shoots you. Once he has been hit you enter the quick-draw stage of the game.

A large picture of the outlaw moves around the screen and your gun sights rest at the bottom.

When the computer flashes, draw, quickly take aim and fire. But if you move the joystick before you are told to you are branded a cheat and unfor-



tunately penalised.

Gunfight is the best Ultimate game to date - a simple theme which has been beautifully executed.

Steve Brock

Sound	7
Graphics	8
Playability	8
Value for money	9
Overall	8

**Program:** Kung-Fu Master  
**Price:** £7.95 (unrated),  
 £14.95 (rated)  
**Supplier:** US Data Unit 2 & 3,  
 Norfolk, Birmingham BB  
 76X. Tel: 021-358 3369

KUNG-FU Master, one of the latest original coin-op games for the Amstrad, comes from US Data. You are the Kung-Fu Master and have to ball to your way through the wizard's temple to rescue the maiden imprisoned there.

As you progress through the five levels the wizard sends out his minions to thwart you. These include headchoppers, who are easily defeated with one hit and knife throwers - whose knives you

## Addictive combat

have to dodge - requiring two hits to stop them.

There are also devils who possess an 'x' in the eye unless you can hit them first, and finally the guardians who are the strongest of the lot and require a number of well placed blows to defeat them.

If that isn't enough, pots drop from the ceiling. If you don't hit them before they land snakes crawl out and wriggle towards you. Dragons appear in a similar manner.

Killer bats come at you from both sides of the screen, and mystic globes descend and hover before exploding

into extremely dangerous fire-balls.

You start off with three lives, and the top part of the screen displays your energy level which rapidly gets down if you come into contact with any of the people or devils.

When you meet up with a guardian his energy level is displayed and it's up to you to defeat him before your energy runs out.

Kung-Fu Master is addictive, and needs skill, speed and good timing to be able to master the different levels. It is the sort of game where if you fail you'll decide to have one



more battle in an attempt to get further.

Overall a well-written, challenging game which will keep you going back for more.

Ian Gardner

Sound	8
Graphics	8
Playability	8
Value for money	8
Overall	8

**Program:** Graham Gosch's  
 Test Cricket  
**Price:** £9.95 (unrated),  
 £14.95 (rated)  
**Supplier:** Artic Design  
 Software, 12 Chiswick  
 Enterprise Centre, Station  
 Road, Uxbridge, Bucks, UB7  
 4AA. Tel: 0294 262862

THIS summer's bumper crop of cricket simulations have been released for many of the popular micros. Having just spent several hours playing Graham Gosch's Test Cricket I can confidently say that it is the best of the lot.

The program contains numerous statistics on the England and Australian teams.

These figures are an important part of the game as they

determine a player's strengths when playing in simulation mode. Every item of data can be edited before beginning the game should you want to keep the figures up to date.

The program's graphics are excellent, with you looking down the wicket from behind the bowler.

The game can be played in arcade or simulation mode. When batting in arcade mode your control is restricted to the timing of the stroke, achieved by pressing the fire button at the correct time as the ball approaches you.

When bowling you must

select whether you are bowling to legside or offside and then wobble your joystick like mad to get some pace on the ball.

Simulation mode doesn't involve any wobble when bowling.

Having selected legside or offside the player's statistics, combined with how often you have used him that innings, will determine how he performs.

When batting you must move the batman on to his front or back foot for an attacking or defensive stroke and get the timing correct.

## Testing cricket



Graham Gosch's Test Cricket is the first cricket game that I have played which actually rates heavily upon your own skills. I can score myself 11 without hesitation.

Jan Davis

Sound	7
Graphics	8
Playability	8
Value for money	8
Overall	8

**Program:** Green Beret  
**Price:** £9.95 (49494126),  
 £74.95 (later)  
**Supplier:** Imagine, 6 Central  
 Street, Manchester M2  
 6WJ. Tel: 061-424 2333

If you make Rambo look like a wimp I've got just the game for you. In Green Beret it's just you against an army, and what a challenge it is too.

In the majority of these combat games you are armed to the teeth with guns and grenades, but not this one.

Here you are sent out with only a knife and your skill for protection. You penetrate

## Make like Rambo

through four levels of enemy defences and rescue the prisoners.

To complete your task you must run from left to right across the screen. As you near the right hand edge the enemy stops and the screen scrolls to the left.

A smooth continual scrolling action would have been preferable, but you won't forget this minor niggle as you get into the game.

The enemy run at you from both directions. They also

climb down from the walls—see above.

Many of these men are armed, but fortunately for you they don't fire too many bullets.

Your aggressor can be dispatched with a well timed stab at the fire button. This causes you to whip out your weapon and throw it into the unsuspecting enemy.

Get it wrong and you end up on the sharp end of a bayonet. Green Beret is fast, colourful and requires much more



skill to play than some machine gun blasting games that I can think of.

**Jon Rees**

<b>Sound</b>	3
<b>Graphics</b>	5
<b>Playability</b>	5
<b>Value for money</b>	5
<b>Overall</b>	5

**Program:** Nodes of Pleas  
**Price:** £9.95 (49494126),  
 £74.95 (later)  
**Supplier:** Dain, Wellington  
 House, Upper St Martin's  
 Lane, London WC1N 3BG. Tel:  
 071-377 2333

EARTH scientists have intercepted coded messages being transmitted from the centre of the moon to some unknown destination. The messages tell of weaknesses in Earth's defences and must therefore be silenced immediately.

You, the famous explorer Challengerer Featherington, have been selected for this dangerous mission.

The local space shuttle deposits our space-sailed hero

on the surface of the moon.

The transmitter is in the shape of a large moonolith which is locked away in a huge cavern, and your task is to locate the right keys which solve this raven.

The weak gravity on the moon is most apparent when you try to jump — some very impressive leaps are possible.

You are not the only being down in the moon's caverns. You will encounter worms, cockroaches, fireballs and moon-munching moles.

All of these characters are beautifully drawn and cleverly animated. Some things just

disappear when you touch them while others cause you to bounce off in another direction.

The instructions do not tell you whether contact with any of the characters is detrimental to your health. Though you will soon learn that there is a limit to how far you can fall without loss of life.

Other characters of interest include an alien spaceman who will steal any key that you are carrying — if you can find any, that is. You will also find that a lunar mole is an essential item as it can chisel through the solid cavern walls.



The game reminds me of Starquake from Rubble Box Software — the graphics and story-line are both similar, but I found Starquake far more interesting to play.

**Steve Smith**

<b>Sound</b>	5
<b>Graphics</b>	5
<b>Playability</b>	3
<b>Value for money</b>	3
<b>Overall</b>	3

**Program:** Winter Games  
**Price:** £9.95 (49494126),  
 £74.95 (later)  
**Supplier:** US Gold, Unit 2 & 3,  
 Hafford Way, Hafford, BR-  
 1916ham, 26 TALK. Tel:  
 021-266 3366.

WINTER Games takes up two cassettes and, unlike some of the sport games, you can load whichever event you want.

The screen leader is the same on all titles of the cassette and depicts the ski-jump set against an alpine landscape. The graphics are stunning to see the leap.

If you have the disc version you can start off with a quite spectacular opening ceremony which unfortunately is not on the cassette version.

From then on you are presented with a menu which

## Stunning graphics

allows you to either compete in an event, practice events, select the number of players, change the playing controls or see the world records. Now on to the events.

In Bobsleigh you have to guide your machine through the twisting track at speeds of up to 30mph.

Hockey is aerobatics on skis. You control the skier down a steep slope and then, when in the air, can demonstrate a number of aerial manoeuvres such as backflip, swan, belly and forwardflip.

Speed Skating, as it suggests, is a race between two opponents round a track.

In Ski Jump you control the

launch and flight of your skier by watching the enlarged view of him in the top-left hand corner of the screen.

Figure and Free Skating are probably the most difficult of the events to master.

You control your skater and have to perform seven different manoeuvres including camel spin, double and tripleutz, double and triple axel and finally sit spin.

The last of the seven events, the Slalom, is the ultimate challenge.

You must guide your skier over a cross-country course carrying a .22 rifle and ammunition.

At intervals around the



course you will come to five targets. These have to be hit. You receive a five second penalty for each miss.

The excellent incidental music and sound effects add to what was already a top class piece of software.

**Ian Davidson**

<b>Sound</b>	10
<b>Graphics</b>	10
<b>Presentation</b>	10
<b>Value for money</b>	10
<b>Overall</b>	10

**Program Shadowfox**  
**Price:** £29.95  
**Supplier:** Beyond Software,  
 Wellington House, 8-9  
 Upper St, Marlow, Bucks,  
 London MK26 2NU. Tel:  
 01-275 1795

**AMBASSADOR** Krylix has been captured by the evil General Zoff, and unfortunately Krylix was carrying the plans for a revolutionary new starship, the Shadowfox.

As mission controller you must guide the Engine's Enigma team aboard Zoff's skyfortress and rescue Krylix before the plans are discovered.

None of the team has teleport ability, so you must

**Program Biggles**  
**Price:** £9.95 (assorted),  
 £14.95 (also)  
**Supplier:** Microsoft, Maxwell  
 House, 24 Monoplane Street,  
 London EC2A 2JX. Tel:  
 01-277 4800

YOU'VE read the Biggles books, you've seen the Biggles film, now play the Biggles computer game. Based on the new film, the action takes place both in war-torn 1917 and present day London.

The complete program consists of four interconnected games which occupy both sides of the cassette.

The first program is *Timeaway*, which actually contains three of the four games.

In section one of *Timeaway* you are at the controls of a

**Program Ghosts in Gables**  
**Price:** £9.95 (assorted),  
 £14.95 (also)  
**Supplier:** Elite, Archer House,  
 Archer Road, Althridge,  
 Westad. Tel: 0832 88185

**GHOSTS** in *Gables* is the latest coin-op video game to be released by Elite, following on from others such as *Bomb Jack* and *Commando*. It is typical of the platform and *adventure* type seen in the amusement arcades around the country.

In this lightning fantasy story you control a knight who has to fight and dodge his way through many perils in order to rescue the damsel from the

## Pause for yawns

first get a transport docked at the skyfortress. This can then be used to beam your chosen few across to the ship.

The first problem you will encounter is a locked door. I would suggest that you provide Bertha, the humanoid female, with a few tools. Once the door is open you can begin to move each of the characters deeper into the ship.

Each character has a minimum icon, and accessing this will display the directions currently available.

This method of moving the characters around gets pretty

tiresome, one good reason for only taking a couple of the Enigma force on board.

As you wander around the skyfortress you will be attacked by aliens.

Having been told which member is under attack you must select that character's icon, then their battle icon and finally inform them whether to attack or retreat.

Once completed you just sit back and wait to be told whether they survived or not. There is no onscreen type sheet-out, just computer-mediated feedback, and the



game carries on in this way of infotext. It is a great pity that such excellent graphics have been wasted on a mediocre game such as this.

**Carol Barrow**

Sound	5
Graphics	5
Playability	5
Value for money	5
Overall	5

## A Biggles too many

First World War biplane. Flying over enemy territory you must shoot down enemy planes and bomb fuel tanks and ammo dumps.

Section two is a crude version of *Commando* in which you guide Biggles on foot behind enemy lines.

Part three takes place in London 1988 and is the most boring of the three sections. You and your time twin Jim are involved in a roof-top chase over London town.

You must both leap from roof to roof while avoiding the boys in blue. Your objective is to locate a secret code which will prove useful back in 1917

in the game on the second side of the cassette.

These first three games are not played in any particular sequence. As benefits the name, *Timeaway*, you can be whisked from one game and dumped in the middle of another at any time.

Side two of the cassette contains the fourth game *The Sound Weapon*, which is better than the first three. It is a combination of flight simulator and strategy game.

You must pilot a modern day police helicopter over enemy lines back in 1917, the aim of the game being to locate and destroy the cell,



destructive sound weapon. Despite the redeeming efforts of the final game I'm afraid this Biggles is doomed to failure.

**Carol Barrow**

Sound	2
Graphics	2
Playability	2
Value for money	2
Overall	2

## Rescue a damsel

stitches of the demon's overlaid.

As you can well imagine the overlaid has got all the obstacles in your path that he can think of.

These include barriers such as ascending ladders which rise up from the ground, numerous rooms that swoop down on you and giant man-eating plants.

As you progress further towards your goal you will come across other obstacles such as ghostly knights, little red devils, floating ghosts and

many more frightening fiends.

The control of your character is relatively simple with left and right movement, the ability to jump and duck and finally your trusty sword which throws bolts and can destroy some of the creatures.

If you come into contact with any of the overlaid's demonic beings you are instantly turned into a pile of bones and will lose one of your five lives.

At first I thought it was just another platform game that you would play a couple of times and then put away, but



in fact it is addictive and could well rival *Mean Mine* and *Jet Set Willy* as one of the best of this type of game on the market.

**Ian Dawkins**

Sound	5
Graphics	5
Presentation	5
Value for money	5
Overall	5



**Program:** *Mandrags*  
**Price:** £14.95 (suggested retail)  
**Supplier:** *Integrations, Mike  
 Kopp, Abbey Road,  
 Isleham, Middlesex*

**INFORMAGES'** first UK release is a full-blooded Dungeons and Dragons adventure.

The game is set in a distant land, Mandragos, where the kindly King Jolan has been killed by a shocking evil.

Out of nowhere arrives Xaxal-Nar, assuming gloves and bringing a reign of terror upon this once peaceful land.

You have to free the country of this tyrant by forming a team of four characters who have to roam the land and solve the mysteries of the nine chateaux, then confront Xaxal-Nar in his own chateau.

There are four modes of

## Dungeon adventure

play, the first being the map mode where plains, forests, hills, swamps, seas, mountains, villages, chateaux and your character are graphically displayed on the main screen.

As you move around the screen you will sometimes enter wandering minster mode in which you have to either fight and kill whatever creature is there or attempt to run away.

The villages are represented by a house symbol. Here you can enter village mode where you can buy, sell, barter and even steal things to help you on your quest.

Finally if you come across a castle you can search the rooms/grounds in an attempt to solve the mystery of the chateau while picking up any

treasures you may find and avoiding or fighting any creatures you come across.

To control a character you input his or her number then a verb, and finally the letter which describes the object or creature. It sounds a little complicated, but is in fact quite easy once you've got the hang of it.

The graphics are a little block-like and there is no sound apart from the opening credits. However, dungeon-type adventures rely on the imagination of the player, so the sound and graphics are secondary.

The game plays well once you become acquainted with the instructions and is quite a challenge.

The main drawback is that if



you are using tapes there is a lot of getting up-to-do and a fair amount of loading time involved.

But don't let that put you off what is a very good game which will keep even the keenest adventurer happy for many hours. I thoroughly recommend it.

**Ian Davidson**

Sound	0
Graphics	7
Presentation	0
Value	0
Overall	0

**Program:** *Speech*  
**Price:** £8.95 (suggested), £14.95 (list)  
**Supplier:** *Superior Software, Anglet House, Altonair Lane, Leeds LS7 1AQ. Tel: 0532 498432*

A **SPEECH** synthesiser is one device that will eventually find its way on to most computer users' birthday present lists.

By plugging a little box of electronics directly on to the back of your machine you can incorporate the spoken word into your own programs and amaze your friends.

The main problem that I have found with little black boxes is the fact that they soon pile up. If you're not careful you could find a waddling column of speech synthesiser, RAM expansion and light pen units protruding shabbily from the rear of your machine.

All you need then is a program like **CYRUS** if there is to be anything you remove them all before it will run.

**Speech!** from Superior Software gets around such problems by doing away with the hardware altogether. It performs its vocal magic using software alone, and all you forfeit is 3.8k of memory.

The program consists of two main sections, the first being the dictionary file. This

## A word in your ear

file contains a list of English words and part words and their phonetic counterparts.

Initially it contains 288 entries and occupies 3,172 bytes of memory.

**Superior** has provided a simple to use editing program which allows you to add your own words to the dictionary.

The second part of the speech system contains the mechanics of the program, the English text to phonetics translator, the PDS4 operating system interface, and the phoneme pronouncer.

**Speech!** can be used via the two bar commands, **SAY** and **SPEAK**. Both are subject to the normal constraints imposed on PDS4 commands by **Basic** versions 1.0 and 1.1.

That is 488 users must send their speech to the program using a string variable, whereas 664 and 6128 owners can enclose their text in quotes directly after the command.

**SAY** is a very competent command which makes sense of about 90 per cent of the text presented to it. This is demonstrated by the utility program **SAYFILE** which is supplied with the package.

**SAYFILE** will speak the text

which is held in a word processor file - it speaks my **Answerdot** documents with no trouble at all.

Should you find that the program has difficulty with any particular PDS4 you can overcome this in two ways.

Your first option is to use the editor (program supplied) and add the new word to the dictionary file. Having loaded up the required dictionary file you can edit it using any of the editor's 18 commands.

A new word can be added using the insert command. Words are input using the format / English word = Pronounced, for example:

/ TOMM = TUMMM

The complete dictionary can then be re-saved to tape or disc. Using this technique you can build up specialised dictionaries tailored to suit your own interests.

If the word you wish to pronounce is not one which you are likely to use on a regular basis a less permanent solution is provided by the second speech command, **SPEAK**.

This allows you to put together a sequence of



phonemes which will give a perfect pronunciation of the word you require.

At your disposal is an array of 49 phonemes, and the documentation provides an example word with each phoneme to illustrate its sound.

Here is a program which is a must for every limited user. It can take a lot of getting used to at first, but you will soon get accustomed to its accent. **Speech!** is cheap, elegant, and has a great deal to say for itself.

**Jon Revis**

Sound	10
Graphics	10/4
Value of use	10
Value	10
Overall	10

Product: Real Time Audio  
Tutor for LogoScript  
Price: \$29.95 (two audio cassettes)

Company: Amiga User Cam-  
munications, Five Floors, 2  
Foster Street, Newcastle NSW  
048. Tel: (043) 275732

It may at first seem rather a strange idea to use an audio tape for teaching what is normally an entirely visual activity like word processing, but in fact a talking book can offer considerable advantages over printed material.

First, a cassette tape cannot replace a reference manual, but it is the ideal medium for step-by-step tutorial sessions, mostly because you can keep your eyes on the screen or the keyboard while listening to instructions and taking appropriate action.

Of course much depends on the quality of the author, so let me say right away that this is one of the best audio com-

## Tutor with flair

puter courses I have come across, both in presentation and in the selection and organization of material.

The course is aimed at the novice, and therefore assumes absolutely no knowledge of either the PCW or LogoScript.

You are taken from loading paper into the printer, and using the Direct Printing mode — certainly the best way of introducing both hardware and software — via Cut and Paste, find and Exchange, Set and Clear, block operations, copying files and so forth, to an overview of templates and letters.

Obviously the full details of LogoScript's many features cannot be covered in just two hours of spoken tutorial. However all the basics are there.

At the end of the course a

beginner should be able to generate professional-looking hard copy, and be fairly competent in disc and file management, some of which can be guaranteed after a new user has ploughed for the first time through the official LogoScript documentation.

The tutor has neither the pompous seriousness of Radio 3 English nor a childlike, lachrymously humorous whiff in the and only insults the intelligence of the learner.

In the Real Time course everything is explained with admirable clarity, and the material has been carefully paced to maintain interest without the risk of saturation.

There is neither too much recapping, nor too much emphasis on introducing new concepts as quickly as possible. The course comes on two



tapes, with full instructions and a LogoScript command reference card.

The price is far from exorbitant for such a polished and effective product, and indeed a bargain if you consider the work that has clearly gone into it.

Gabriel Jacobs

Program: Batman  
Price: \$14.95  
Developer: Ocean, 8 Central  
Express, Manchester 973  
NSW. Tel: (01) 435 4353

THOU'ST ain't Batman, ain't no games on the PCW.

"Yes, I'd say Wonder, it's not just a word processor you know", I always knew it was possible, I just wondered how long it would take.

Well now it's finally happened, and you can take a break from accounts/payroll/spreadsheets to play up 'em shoot 'em ups and arcade adventures on your PCW — when the time isn't yours.

The caped crusader's latest adventure, originally written for the CPC range of micros, has been converted for the PCW. If you're wondering whether a word processor which runs CP/M could ever produce a good arcade game, there's no need to worry.

Naturally the sound is somewhat limited since the PCW isn't capable of the range notes or effects available on the CPC micros. What sound there is is good, and certainly adds atmosphere to the game.

Now on to the game itself. Gotham City's super villains have gained entry to the

## Now PCW goes bats

batcave, and have hatched a fiendish plot to rid the city of the caped crusader.

The batmobile has been stowed into small places and hidden deep within the labyrinth of the batcave, and to make things more difficult many loose traps and devilish monsters have been placed within the cave and must be avoided at all costs.

There's no time to waste. Mild-mannered multi-millionaire Bruce Wayne dashes into his study, jumps on to the batbat and slides down to the batcave, donning his suit on the way.

This is where you take over. You start by dropping into the batcave, and you must find the pieces of the batcar and glue it back together with super batglue.

The screen display shows a superbly detailed 3D view of the cave and its contents. The graphics are state of the art and couldn't be better.

You can walk in front, behind and around objects, jump on top of them and even kick them around. Bowers though, some are deadly and

you'll disappear in a puff of smoke if you try.

Initially all you can do is wander around the many rooms in the batcave, it's best to forget about the batmobile to start with and map the batcave. This is essential since it's very easy to get lost.

You'll find several objects that will help you in your quest. On entering certain rooms a small Batman floats down from the top of the screen. These are useful, so if you see one run over and give it a kick.

Some provide you with super batenergy enabling you to run at lightning speed for a limited time and is useful for dodging monsters.

Others provide you with protection against danger such as falling on spikes, bumping into exploding rocks and blow from vicious dogs.

In one of the rooms you'll find your batbat, which enables you to jump.

Your batbackpack is useful for storing objects, a batruiser will enable you to steer when falling and an anti-gravity belt will slow your rate of descent. Some rooms look



fairly straightforward at first sight, but can be quite tricky.

There are sliding conveyor belts which which you off in the wrong direction — usually to a horrible untimely death.

Batman is a superb multi-screen arcade game. The many locations and puzzles will keep you occupied for weeks.

I did miss the Riddler, Joker, Penguin and friends, along with the Zap, Kaper! Thank! of the original TV series, but even so it's an excellent game.

If you want a change from word processing I can thoroughly recommend Batman.

Richard Westblome

Sound	4
Graphics	10
Playability	10
Value for money	10
Overall	9

# FLEET STREET

CITY OF LONDON EC4

## Editor

# PUBLISHING TYCOONS START HERE!

**FLEET STREET EDITOR** is designed to give you everything you need to produce professional-looking printed materials - in one package!

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The different stages in newspaper and other types of print production are represented by different 'departments' in the program. Following these stages and using the comprehensive manual will enable you to blend words and pictures to produce printed materials for a wide range of applications.



By now, megalemania should be setting in - so jump to it and get the coupon off to us for more details now!

**FLEET STREET EDITOR** will be available late June/early July for the CPC 4128, price £49.95 (disk only)

## MIRROSOFT

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Mirrosoft Ltd

**D**o you remember dealing with subroutines — sections of programs that can be used over and over again from the main program?

This is done courtesy of the keywords GOSUB, which sends the program to a subroutine, and RETURN, which sends control back to the main program. We saw how one subroutine can call another.

This month the subject is once again subroutines, as you'll see if you take a look at Program 1.

In this case the program is more subroutine than anything else. Line 20 calls the subroutine and, as it so rightly says, it is a very silly subroutine indeed.

All it does is print the message and then GOSUB 100 again. In other words the subroutine is called again from within itself. While we might find this a bit mind-boggling the Amivoid takes it in its stride.

What happens is that the program goes to line 100 as instructed and starts again from there. Line 100 prints the message and the next line calls the subroutine once more.

This happens over and over again. Notice that the program never meets the RETURN of line 130. The previous line always sends the program off round the subroutine again. The result of all this is that a series of:

This is a silly message

messages appears. And then things grind to a halt with a:

Memory full (in 10)

The program has disappeared up its own subroutine.

What's happened is that the micro has run out of room. As we learnt last time, after each GOSUB the computer makes a note of the next line

```
10 REM Program 1
20 GOSUB 100
50 END
100 REM A silly subroutine
110 PRINT "This is a silly subroutine"
120 GOSUB 100
130 RETURN
```

Program 1

# Divide and conquer for pretty programming

By PETE BIBBY

number so that it can find its way back after it meets a RETURN.

But as we've seen in this case the program never meets a RETURN. There's only so much memory available to keep track of the return addresses and when this is eventually used up the program crashes.

However don't let this put you off having subroutines call themselves. It can be a very powerful technique, so long as you stop the process before the memory gets full. Program 2 shows the technique.

The program uses the numeric variable count to keep track of the number of times that the subroutine calls itself. So long as count is less than 10 the IF of line 130 allows the routine to call itself. In effect it behaves like the previous program.

The crunch comes when count is equal to 10. Now the part after the IF is ignored, so the GOSUB isn't obeyed. The program goes on to the next line and finds a RETURN.

This tells it to go back to the line following the line containing the GOSUB that called that subroutine. Well the line that called the

subroutine was line 130, so the line after it is line 140. This is a RETURN, so the whole process begins again.

This happens nine times in all as the program keeps hitting the RETURN of line 140 and the subroutines unwind. Finally the RETURN sends the program not to line 140, but to line 40, the one after the original subroutine call. As this is an END the program stops.

Don't worry if you find that a little difficult. It's one of those concepts that takes time to sink in. It's worth the mental effort though, for it allows us to use a powerful programming

```
10 REM Program 2
20 count=0
30 GOSUB 100
40 END
100 REM A silly subroutine
110 PRINT "This is a silly subr
outine"
120 count=count+1
130 IF count<10 THEN GOSUB 100
140 RETURN
```

Program 2

```

10 REM Program 11
20 PRINT "How old are you?"
30 INPUT age
40 GOSUB 100
50 END
100 REM messages
110 PRINT "No matter what your age, I
120 if you read, you can read this mag
azine."
130 IF age < 18 THEN RETURN
130 PRINT
140 PRINT "Why not read it in the pub
with a pint?"
150 RETURN

```

Program 11

technique known as recursion.

If you want to know more about that have a look at *Analysis in the April 1988 Computing with the Amstrad*, but not before you've dived to the strange delights of Program 11.

Take a close look at the subroutine defined between lines 100 and 150. Can you see anything unusual? If you can't, try counting the number of RETURNS. There are two instead of our usual one. Let's see how it works.

The first line of the program just asks your age and stores it in age. Then the subroutine is called and the program goes to line 100.

Ignoring the REM it moves on to the next line, displays the message it finds there and moves on to line 120. What happens now depends on the value of age.

If age is less than 18 the condition is true and the instruction after the IF of line 120 is obeyed. Since this is a RETURN it means that if age is less than 18 the subroutine ends at that point.

However should age be 18 or over the condition is false and line 120 is effectively ignored. In this case the program goes on to lines 130 and 140 printing a second message for those over 18 who can legally buy a pint. The RETURN of line 150 ends the routine.

So that's how you can have more than one RETURN in a subroutine. In fact you could have a whole battery of them, tucked away behind IF statements. But no matter how many you

have, the first condition that's true brings into play the RETURN that ends the subroutine.

Try adding further messages aimed at the over 40s and over 60s to the subroutine in Program 11. As a word of warning never use a GOTO to jump out of a subroutine. Madness lies that way. Always use RETURN.

That's where we'll leave the mechanisms of subroutines and go on to see how they can help us create programs that work.

To do this let's suppose that we want to write a very simple program, one that just takes two numbers, multiplies them and gives the result. Almost immediately you should be able to see that the program divides naturally into three areas:

get the numbers  
do the calculation  
display the results

and each of these tasks could be handled by a separate subroutine, such as:

```

10000 get the numbers
10000 do the calculation
10000 display the results

```

This leads naturally to something like Program 12.

It's fairly obvious what's happening. The lines from 10 to 29 contain our three subroutine calls and form the main part of the program. The subroutines themselves are to be found in lines 100 to 199, 200 to

```

10 REM Program 12
20 GOSUB 100
30 GOSUB 200
40 GOSUB 300
50 END
100 REM get the numbers
110 PRINT "Give us the first number"
120 INPUT first
130 PRINT "Give us the second number"
140 INPUT second
150 RETURN
200 REM do the calculation
210 PRINT "do the calculation"
220 RETURN
300 REM display result
310 PRINT "display result"
320 RETURN

```

Program 12

200, and 300 to 399.

Notice how I've arranged that the subroutines start on a "hundreds" line number and end with a RETURN on a "ninety-nine" number. Also notice that at present the subroutines do nothing but display what they are supposed to do.

So that as it may, Program 12 is a program that works. Not only have we constructed it logically using subroutines, we can also run the program and check that it is performing as we expected and that the subroutines occur in the right order.

In this example it's easy enough to see what will happen without bothering to run the program. Yet imagine what it would be like if the subroutines called other subroutines or even themselves.

This use of dummy subroutines, or stunts as they are known, comes in handy to keep track of the logic of a program and to check that it makes sense before spending a lot of time on the actual coding.

Once we've got a listing in the form of Program 12 we can then go on to make our programming life simpler by practicing the age old technique of divide and conquer.

Obviously we need to put some proper working code into the subroutines to replace the messages, but

```

10 REM Program 13
20 GOSUB 100
30 GOSUB 200
40 GOSUB 300
50 END
100 REM get the numbers
110 PRINT "Give us the first number"
120 INPUT first
130 PRINT "Give us the second number"
140 INPUT second
150 RETURN
200 REM do the calculation
210 PRINT "do the calculation"
220 RETURN
300 REM display result
310 PRINT "display result"
320 RETURN

```

Program 13

## From Page 23

rather than attempt to write all the subroutines at once let's take one at a time.

This not only makes the task less daunting, it also allows us to test each stage separately. After all, if we code all three subroutines at one time and then find that there's a mistake in the program the mistake could be in any of the subroutines.

If we only code one routine at a time and then test run the program, if there's a mistake it must be something to do with that routine. The error becomes easier to find and correct. Program 'V' shows the results of this approach.

Here lines 110 to 140 have replaced the previous stub. The result is that the subroutine now collects two numbers and stores them in *first* and *second*. This part of the program can now be tested and seen to work. If necessary temporary lines such as:

```
145 PRINT first;second
```

can be added to make it clearer what's happening. As a rule I always number these test lines with a line number ending with 5. This makes them easier to spot and delete in the final, tried and tested listing.

Once we're sure that the first

subroutine has done its job we can continue in the same fashion. One by one we code the following subroutines, testing each one as they are written. In the end we'll have a program such as Program 'VI'.

This does the task asked, and from the fairly logical task by task way it was created we can be fairly confident that it will work. Also in this modular form, as it's known, the program is easy to change.

Suppose that now we had to take the two numbers and multiply the first by 10, the second by 12 and subtract one from the other. All we'd have to do would be to change the expression in the second subroutine and the message in the third. The rest of the program would remain unaltered.

It's the same if we decided that *first* and *second* could only take values between 1 and 10. All we have to do is slot in another subroutine as Program VII shows.

Now the program has a new subroutine call at line 150. This calls the subroutine defined following line 400 which just uses a *compare!*

```
10 REM Program 'III'
20 PRINT "What's your age?"
30 INPUT age
40 IF age>18 THEN GOTO 100
50 IF age<18 THEN GOTO 300
60 END
100 REM too young
110 PRINT age, "too young"
120 RETURN
300 REM can vote
310 PRINT age, "can vote"
320 RETURN
```

Program 'VII'

condition to check that both numbers are in range. If they're not they have to be re-entered.

I hope you'll agree that this modular method of writing programs makes things easier. Taking things one at a time allows even the most modestly gifted programmer to write quite complex programs, and if you find a better way of doing things later you can go back to the appropriate subroutine and modify it.

We'll finish this month with an example of how stubs can help to find program errors. Have a look at Program VIII.

This is intended as a program that decides whether or not you can vote, but in practice there might be all sorts of information in the subroutines — when you'll be eligible to vote, where you can vote and so on. Yet it has a fault. Try entering test values into the program and see what happens.

The problem lies in the test that when you have age equal to 18 neither subroutine is called. The value of age drops through the conditions. (Obviously the condition in line 60 should be  $\geq$  rather than  $>$ .)

So as you can see stubs not only help you write programs more easily, with the right test data they can also spot mistakes before you waste a lot of time and trouble coding.

■ That's where we'll finish this month. Try the divide and conquer method of programming for yourself — you'll soon see how it helps your programs improve. Next month we'll be looking at more specialised uses of subroutines.

```
10 REM Program 'I'
20 GOTO 100
30 GOTO 300
40 GOTO 300
55 END
100 REM get the numbers
110 PRINT "Give us the first number"
120 INPUT first
130 PRINT "Give us the second number"
140 INPUT second
150 RETURN
300 REM do the calculation
310 result=first*second
320 RETURN
330 REM display result
340 PRINT first " times " second " is "
    result
350 RETURN
```

Program 'VI'

```
10 REM Program 'III'
20 GOTO 100
30 GOTO 300
40 GOTO 300
55 END
100 REM get the numbers
110 PRINT "Give us the first number"
120 INPUT first
130 PRINT "Give us the second number"
140 INPUT second
150 GOTO 400
160 RETURN
300 REM do the calculation
310 result=first*second
320 RETURN
330 REM display result
340 PRINT first " times " second " is "
    result
350 RETURN
400 REM check range
410 IF first<1 OR first>10 OR second<1
    OR second>10 THEN GOTO 100
420 RETURN
```

Program 'VI'

# Robot Ron and the Ice Monsters

By STEPHEN MARTIN



**N**OT content with the scalp of many a sorry Weevil, Robot Ron goes in search of greater excitement and danger.

He stumbles into a huge ice maze inhabited by extremely dangerous super pink furry monsters — just what he was looking for.

Unfortunately in the extreme cold of this region Ron's trusty zap gun will not function, so he has to rely on his immense strength to push ice blocks over passing ice monsters.

Any keys or the joystick can be used to control Ron. You define the keys which suit you best by choosing option 4 on the menu. However the movement keys are set to the following when the program is first run:

Z left  
X right  
I up  
J down

Enter/Return push/crush

To pause the game press the Escape key once, then press any other key to resume.



## VARIABLES

xy	Ron's coordinates.
map(20,20)	Screen map.
mon(10,1)	Monsters' coordinates.
names	Hi-scores' names.
total	Hi-scores' scores.
score	Score.
level	Level reached.
map	Level reached.
dead	Death flag.

Full listing starts on Page 26

## From Page 25

```

10 REM Robot Run - Job Numbers
20 REM By Steven Martin
30 REM (c) Computing With The Robot
40 REM
50 MODE 1:CALL SCREEN:PRINT "MYST"
60 REM (c) Computing With The Robot
70 GOSUB 620:REM initialization
80 GOSUB 640:REM title
90 GOSUB 1900:REM title screen
100 GOSUB 2000
110 MODE 0
120 GOSUB 2400:REM speed selection
130 MODE 0
140 GOSUB 2400:REM menu
150 GOSUB 2000
160 MODE 0
170 GOSUB 600:REM set variables
180 GOSUB 640:REM wipe
190 GOSUB 140:REM set screen
200 GOSUB 1200:REM menu constants
210 GOSUB 1900:REM position
220 IF 1=1 THEN GOSUB 320:MODE 0:FOR
  x=1 TO 200:NEXT y:GOTO 100
230 IF 1=1 THEN GOSUB 150:MODE 0
  FOR x=1 TO 200:NEXT y:GOTO 100
240 GOTO 100
250 REM ----- start screen -----
260 MODE 1:CALL SCREEN:CALL SCREEN:PRINT
  0,270,410:CALL SCREEN:PRINT 0,270,410
  0,0:FOR x=1 TO 200:FOR y=1 TO 200:IF
  x=1 OR x=200 OR y=1 OR y=200 THEN
  PRINT "MYST"
270 FOR x=1 TO 200:FOR y=1 TO 200
  GOTO LOCATE 0,0:PRINT "up" : "down"
  GOTO 400
280 LOCATE 0,0:PRINT "down" : "up"
  GOTO 400
290 LOCATE 0,10:PRINT "left" : "right"
  GOTO 400
300 LOCATE 0,15:PRINT "right" : "left"
  GOTO 400
310 LOCATE 0,15:PRINT "up" : "down"
  GOTO 400
320 REM 4
330 LOCATE 4,15:PRINT "Space or Fure's"
  LOCATE 7,20:PRINT "to play"
340 LOCATE 0,20:PRINT "for options a"
  menu"
350 IF (INKEY$)=1 THEN g:=g+1:IF
  g=1 THEN g:=0:IF g=1 THEN g:=0:RETURN
360 IF (INKEY$)=1 THEN g:=g+1:IF
  g=1 THEN g:=0:RETURN
370 IF (INKEY$)=1 OR (INKEY$)=1 THEN
  REM GOTO 110
380 GOTO 340
390 REM 5
400 REM 5
410 REM 5
420 REM 5
430 REM 5
440 REM 5
450 REM 5
460 REM 5
470 REM 5
480 REM 5
490 REM 5
500 REM 5
510 REM 5
520 REM 5
530 REM 5
540 REM 5
550 REM 5
560 REM 5
570 REM 5
580 REM 5
590 REM 5
600 REM 5
610 REM 5
620 REM 5
630 REM 5
640 REM 5
650 REM 5
660 REM 5
670 REM 5
680 REM 5
690 REM 5
700 REM 5
710 REM 5
720 REM 5
730 REM 5
740 REM 5
750 REM 5
760 REM 5
770 REM 5
780 REM 5
790 REM 5
800 REM 5
810 REM 5
820 REM 5
830 REM 5
840 REM 5
850 REM 5
860 REM 5
870 REM 5
880 REM 5
890 REM 5
900 REM 5
910 REM 5
920 REM 5
930 REM 5
940 REM 5
950 REM 5
960 REM 5
970 REM 5
980 REM 5
990 REM 5

```

```

700 FOR x=0 TO 200:FOR y=0 TO 200:
  PRINT "MYST"
710 CALL SCREEN,10,20,20,20,20,20,20,20
720 CALL SCREEN,10,20,20,20,20,20,20,20
730 CALL SCREEN,10,20,20,20,20,20,20,20
740 CALL SCREEN,10,20,20,20,20,20,20,20
750 CALL SCREEN,10,20,20,20,20,20,20,20
760 CALL SCREEN,10,20,20,20,20,20,20,20
770 CALL SCREEN,10,20,20,20,20,20,20,20
780 CALL SCREEN,10,20,20,20,20,20,20,20
790 CALL SCREEN,10,20,20,20,20,20,20,20
800 CALL SCREEN,10,20,20,20,20,20,20,20
810 CALL SCREEN,10,20,20,20,20,20,20,20
820 CALL SCREEN,10,20,20,20,20,20,20,20
830 CALL SCREEN,10,20,20,20,20,20,20,20
840 CALL SCREEN,10,20,20,20,20,20,20,20
850 CALL SCREEN,10,20,20,20,20,20,20,20
860 CALL SCREEN,10,20,20,20,20,20,20,20
870 CALL SCREEN,10,20,20,20,20,20,20,20
880 CALL SCREEN,10,20,20,20,20,20,20,20
890 CALL SCREEN,10,20,20,20,20,20,20,20
900 CALL SCREEN,10,20,20,20,20,20,20,20
910 CALL SCREEN,10,20,20,20,20,20,20,20
920 CALL SCREEN,10,20,20,20,20,20,20,20
930 CALL SCREEN,10,20,20,20,20,20,20,20
940 CALL SCREEN,10,20,20,20,20,20,20,20
950 CALL SCREEN,10,20,20,20,20,20,20,20
960 CALL SCREEN,10,20,20,20,20,20,20,20
970 CALL SCREEN,10,20,20,20,20,20,20,20
980 CALL SCREEN,10,20,20,20,20,20,20,20
990 CALL SCREEN,10,20,20,20,20,20,20,20

```



```

1150 GOTO 1840
1160 REM ----- options menu -----
1170 MODE 8:CALL 88940:CALL 88950:CALL
   8,298,8:DRAW 628,298:DRAW 628,8:DRAW
   8,8:PRINT LOCATE 4,2:PRINT "Options
   menu"
1180 RESTORE 120:GOTO 8:FOR n=1 TO 4
1190 READ n
1200 LOCATE 3,10:G+1
1210 PRINT n;" "
1220 NEXT
1230 MODE "High Scores", "Redline Key
   s", "Instructions", "Main Menu"
1240 FOR i=LOCATE 4,2:PRINT "Select
   Option"
1250 G+1
1260 G+2:GOTO 7
1270 IF n=1 THEN GOTO 220:GOTO 8
1280 GOTO 1150
1290 IF n=2 THEN GOTO 230:GOTO 8
1300 GOTO 1150
1310 IF n=3 THEN GOTO 240:GOTO 8
1320 GOTO 1150
1330 IF n=4 THEN GOTO 250
1340 GOTO 1140
1350 REM ----- print score -----
1360 n=HIGH(score):LOCATE 4-LEN(n),2
   :PRINT score:RETURN
1370 REM ----- print top -----
1380 n=HIGH(hi):LOCATE 39-LEN(n),2
   :PRINT hi:RETURN
1390 REM ----- print low -----
1400 n=LOW(lo):LOCATE 9-LEN(n),2
   :PRINT n:RETURN
1410 REM ----- print act -----
1420 n=ACT:LOCATE 12-LEN(n),2
   :PRINT n:RETURN
1430 REM ----- save scores -----
1440 FOR n=0 TO 3
1450 IF dead=n THEN RESTORE 50:REM see
   8 mem
1460 WRITE hi:G+1:G
1470 IF n=0 THEN 1480
1480 IF n=1:CALL 88940:CALL 88950
   :DRAW 628,298:DRAW 628,8:DRAW 8,8
   :DRAW 8,8:GOTO 21:PRINT "New Hig
   h Score"
1490 PAPER G:FOR i=LOCATE 18,2:PRINT
   "Please Enter Your Name"
1500 PAPER 8:G+3
1510 LOCATE 18,2:PRINT"-----"
1520 -----
1530 LOCATE 18,15:n="":GOTO**
1540 WHILE (INKEY)="":GOTO
1550 WHILE (INKEY)=""
1560 IF (INKEY)=C1 AND n=C4 AND LI
   NESTOR=0 THEN write:high:hi:PRINT
   hi
1570 IF n=C2:PRINT AND LEN(n)=1 T
   HEN write:hi:G+1:CALL 88940:CALL 88950
1580 n=INKEY
1590 WHILE IF n=C1 THEN write:hi:G+0
   :n,n="":Goto next
1600 write:score:FOR n=1 TO 3 STEP-1
1610 IF hi>hi(n)-1 THEN write:hi(n)
   :hi=hi(n)-1:score=hi(n):G+1
1620 G-3:score
1630 NEXT:RETURN
1640 REM ----- title screen -----
1650 MODE 8:CALL 88940:CALL 88950
1660 RESTORE 2000
1670 PAPER G:FOR i=LOCATE 1,4
1680 FOR n=1 TO 5
1690 READ n
1700 MODE dead:-----
1710 FOR n=1 TO 17
1720 IF n=1:CALL 88940:CALL 88950
   :DRAW 628,298:DRAW 628,8:DRAW 8,8
   :DRAW 8,8
1730 FOR i=1 TO 100:PRINT "Redline Key
   s"
1740 PAPER G:FOR n
1750 LOCATE 3,7:PRINT "up = "
1760 n=n-1:GOTO i+1:GOTO 2400:n
   G:Goto
1770 LOCATE 3,7:PRINT "down = "
1780 n=n-1:GOTO i+1:GOTO 2400:n
   G:Goto
1790 LOCATE 3,11:PRINT "left = "
1800 n=n-1:GOTO i+1:GOTO 2400:n
   G:Goto
1810 LOCATE 3,15:PRINT"right = "
1820 n=n-1:GOTO i+1:GOTO 2400:n
   G:Goto
1830 LOCATE 3,19:PRINT"push = "
1840 n=n-1:GOTO i+1:GOTO 2400:n
   G:Goto

```

# Game of the Month

## From Page 27

255B FOR SLOCATE 5,20:PRINT "Correct"  
??"  
257B IF (INKEY)=1 THEN RETURN  
259B IF (INKEY)=1 THEN GOTO  
259B GOTO 257B  
260B RESTORE 249B:FOR w=1 TO 71  
261B GOTO 5  
262B IF (INKEY)=1 THEN w=PRINT "a  
b c d e f g h i j k l m n o p q r s t u v w x y z"  
263B GOTO 260B  
264B GOTO w,25,27,28,29,30,31,32,33,  
34,35,36,37,38,39,40,41,42,43,44,  
45,46,47,48,49,50,51,52,53,54,55,  
56,57,58,59,60,61,62,63,64,65,  
66,67,68,69,70,71,72,73,74,75,76,  
77,78,79,80,81,82,83,84,85,86,87,  
88,89,90,91,92,93,94,95,96,97,98,99,  
100  
265B END ----- Instructions -----  
266B MODE 1:CALL M99B:CALL M90B  
267B GOTO 259B  
268B BORDER 14:PAPER 3:PEN 2  
269B LOCATE 13,2:PRINT "Robot Run"  
270B PAPER 8:PEN 2

255B PRINT:PRINT:PRINT:PRINT:PRINT "  
Robot Run has defeated all his previo  
us"  
257B PRINT:segments but now he has a  
at his watch."PRINT  
259B PRINT "Ice wonders are the most  
fearful beasts"  
260B PRINT "is the galaxy, and they ar  
e extremely."PRINT:PRINT:PRINT:PRINT  
a lot."PRINT  
262B PRINT "The only way this can be  
achieved is to"PRINT:PRINT:PRINT:PRINT  
a setting on ice cube over"PRINT  
264B PRINT "Yes, GOOD LUCK!"PRINT  
257B PAPER 1:FOR SLOCATE 14,24:PRINT  
"Space for Men"  
259B GOTO 257B  
267B w=INKEY:IF w=1? THEN 259B G  
L:GOTO 257B  
268B END ---- speed selection ----  
269B FOR SLOCATE 3,2:PRINT "Speed Se  
lection"  
270B RESTORE 264B:FOR x=1 TO 5  
271B GOTO w=INKEY:GOTO 3,(3)+5:PEN 5:5

PRINT w=INKEY?  
264B GOTO 71, "Bad Breeding", 71, "Bro  
to Sailing", 72, "No Storage", 73, "How  
er", 74, "The 4 Year", 75  
265B w=INKEY?  
266B IF VAL(w)=0 OR VAL(w)=1 THEN I  
=5  
267B GOTO 70, "Bad Breeding", "Storage", 70  
268B RETURN



Give your fingers a rest...

All the listings from this month's issue are available on cassette. See our special offer on Page 60.

## BrunWord

including a "Spelling Check" routine!



### Introduction

This comprehensive processor is a completely original programme designed to assist the Commodore and other releases associated with many word processors. One of the programmes, spelling checker and dictionary are loaded on disks to the disk to assist editing means to their delays for any reason. This, and being 100% machine code help to give an instant output response.

And now BrunWord has been extended to work equally well to both 80 and 85 column modes with the ability to search modes at the touch of a key, keeping the same basic operation and paragraphs made easy to edit. Capable to assist text going around off the screen.

### Words processor

Text is normally entered on the 80 column mode and in this case the text print format is always displayed. Insert and delete modes are available and even word-wrap will be available to edit the programme.

The screen can be split up by the way letters being laid out will edit up given letters the display can even move from the upper to the screen. Word wrap means that when the text word reaches the right margin the whole word instantly transfers to the next line. If this happens just wrap through a paragraph then the following words are instantly grouped onto the full line.

Extensive control is based on the screen face using control, SHIFT and CTRL, white, END, and CTRL+single letter keys. Basic text editing is easy with the word abbreviations commands and block save, lines copy, merge and where can be useful on text and paste functions as a single code.

Word wrap can be set for each paragraph and the whole text and just one paragraph can be left justified with one command. BrunWord can a simple program for justifying that sets spaces after punctuation and then between words alternating left and right margins throughout the line. This ensures that the printed text looks balanced. Some word processor programmes always add spaces right in left, which makes the left side look uneven!

Other features to the editor include search routines. Line/Col/Pg display, line word count, line history display, line display, paragraph/line numbers, RAM disc, adjustable TABs, security code and help menus.

### Spelling Check

This uses the spelling checker is supplied with a 21,000 word dictionary available to over 100,000 words. It takes just 10 seconds to check a 450 word page and as the words are listed they are flashed onto the face of the screen. When a possible error is found the programme stops and the user can edit, save the word, continue the text or quit for help. The help routine contains the option to the program's word list from 48,000 to 99,999. The program's dictionary, NOVEMBER, 90,000 will add you a list that includes WORDLIST. This only takes a few seconds. The spelling checker takes 60 seconds on a CP/M disk with memory expansion as it needs to access the disk. The complete version for 10,000 words expansion is 12,000!

### Printer

BrunWord will work correctly with any printer even printers with no font files. When requirements are added for with additional printer commands for special functions, a sequence of up to five codes can be used to the printer before printing. The extended codes are useful for Epson compatible printers and can work in just 100 or any other. All printer codes are saved with each file. The printer facilities include: page three markers, multiple copies, page numbering, left and right hand headers and footers and for very long articles, these can be printed in sequence either on a new page or following an article with correct paging.

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## Adventuring with Gandalf



# BUGGED BY AN EXIT FROM THE EMPTY PLACE...

**T**HIS month Allan Dickinson and P. Tiedeman have written in with information about Tim O'Connell's problem with *The Hobbit*. You'll remember that Tim had gone through the mountains and reached an empty place, but couldn't find an exit.

Apparently the program has a bug here. You should be able to leave, but can't. It seems the answer is not to go there in the first place.

Pat Winstanley has written in to say that Emma Larkin can get the pills in *Subnank* by tipping the bottle, but since she won't be able to see them on the white floor of the skidsteer, she will have to drop the black rubber mat first.

Pat goes on to say that the combination to the safe is on the map once you have stuck it together and

that you need the molten yogurt, toast scrapings, test tube and the spatula to do that.

### Contact Corner

*P.J. Henry, 36 Raphael Avenue,  
Tisbury, Essex RM10 8LE.*

*Category: welcomes letters from anyone.*

*Pat Winstanley, 23 Haddington  
Way, Wigan, Merseyside W13 9LE.*

*Category: welcomes letters from any adventurer. Can help with Subnank, Red Moon, Snowcat, Mover in Paradise and many others. Also interested in anyone using the Graphics Adventure Creator, or Basic/machine code to write their own adventures.*

## PROBLEMS... PROBLEMS

**In Game of Strada:** Carl Peters can't get the second time lock number to open the first time lock door or open the door after he has dealt with the viper. Read the paper for the number and find a key that is the same colour as the door that you want to open.

**W. Jackson and son are stuck in Message from Andromeda.** You can't leave the planet because you haven't destroyed the reactor.

You must find the reactor and start its destrual sequence and then find a way back to the ship. You will now be able to leave the planet.

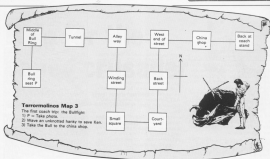
**S. Saltmarsh has a few problems with Heroes of Kern.** To get the

money from the long borrow you should **ATTACK BARROWIGHT WITH BIBLE**. Give the money to the guard to get out of the dungeon. The frog is Bares, kiss him.

Pat Griffin is stuck in several adventures. In *Quarrels* press the camera button in the bar, light the flashlight and put it in the mail box and weld the controls on the snow plough.

In *Message from Andromeda* cut the ropes in the torture chamber and see what you find to get across the crystal bridge. Pat is also stuck in *Meadley*.

Can anyone tell her how to find the identity card?



### Tarramolence Map 3

- The first coach into the Battlego  
 1) P = Take glass.  
 2) Move an uncoloured family to save fat.  
 3) Take the Bull to the china shop.

### Robin of Sherbrook

This is another wickedly funny adventure from Delta 4 who were also responsible for my having many a late night with Bored of the Rings.

Dorothy has been attacked on the Yellow Brick Road and her dog, Toto, has been taken and is being held to ransom.

Your task is to track down the doghappens and solve incidental puzzles along the way, such as who is responsible for respaying the Smurfs and selling them as garden gnomes.

The game is split into three parts and you can move between them at will. I can't tell you much about the game, as I'm still trying to make sense out of it.

I will say that there are spoofs on almost everything and that Maid Marion does not take kindly to you hiding her clothes. Also the Kentucky Fried Squirrel needs a new chef. What is a barf bag anyway?

This is definitely destined to be one of the classics and is a must for adventure freaks. Overall, a wickedly funny adventure.

Presentation	8
Atmosphere	8
Immersion Factor	7
Value	8
Overall	8

### Lord of the Rings

I have to confess that I have put off writing this review in the hope that I would find something favourable to say about it.

I imagine that the plot of the game is sufficiently well known for me to be able to go straight into the gameplay.

There are two cassettes in the package with a volume control adjustment program, a beginner's level introduction and parts 1 and 2 of the game itself.

When part 1 has loaded you are asked which one of the four main characters you want to play. It is possible to play all the characters or even get members of the family or friends to play the parts.

Having done this you begin the game proper. The opening location will be familiar to players of the Hobbit, but there the similarities end.

Within about seven moves you are likely to have either died or found the first bug in the game. If you die you are prompted to start tape and press any key.

There was nothing in the documentation to cover this eventuality, so when it happened to me I had to wind the tape back to the beginning. The bug crashes the game necessitating your having to switch off the machine and reload from the start.

In play the game is very slow, often

taking up to half a minute to update the screen after a move and return control to the keyboard to allow you to type in your next command.

The packaging and documentation is superb, and at the price it should be. I must admit, I still can't understand who you have to pay to get the book with the game through.

I found the game itself to be boring. This was mainly due to the updating of the screen as the narrator made the moves for all the characters that I hadn't chosen to play.

I daresay that a true Tolkien freak would have the patience to play the game to the full, but I was bitterly disappointed. Since this is only the first part of the trilogy I hope that the next part is a considerable improvement.

I found this glossily packaged, intricately explained adventure so slow that it couldn't hold my interest beyond the first few locations.

Presentation	8
Atmosphere	7
Immersion Factor	7
Value	7
Overall	3

## Fourmost Adventures

This is a compilation of four adventures released on one cassette. Ring of Darkness is a Dungeons and Dragons type of game with over 10,000 locations to explore.

I can't see much about it other than if you are a C&D fan you'll probably like it. I'm not, and I didn't.

The object of The Mural is to find and paint over an obscene mural. As you might imagine, the game doesn't take itself too seriously and is in fact very enjoyable to play.

Galaxia is an early adventure from Ferguson McNeill - the writer of Bored of the Rings and Robin of Sherwood - and it shows. There are no traces of the humour which distinguishes his later games. Having said that, it is still better than some of the other Gullied games that

have found there way to me recently.

The plot of Project X - Micro Man is that you, Professor Richards, have been reduced to an inch in height through exposure to radiation, and you have to reverse the effect.

It is very similar to an old game called the Shining Professor from A&F Software. Their version wasn't a success and, alone, neither would this be.

Individually none of these games would be worth the price, but as a whole the package is value for money and provides an incentive for other software houses to release compilations of adventures. The following marks are for the package as a whole.

Presentation.....	F
Value.....	B
Overall.....	F



## HALL OF FAME

### *Lords of Midnight (cast)* - John Astor

Defence of Kajorith: even though it is unnecessary it is fun to try to defeat Kajorith, and gives a nice contrast to the straightforward offensive campaign required to capture Uthgaras.

This can be done for at least 20 days - and probably for more than 30 - by four lords and forces totalling 8,000 including garrison troops at Kajorith and other keeps.

The mobile soldiers should be concentrated under one lord to improve supply because a lake will slowly infiltrate any army of any size - but only one.

The other lords can monitor the approach of the enemy forces towards Kajorith, and the situation at the capital, while the main force switches from flank to flank to attack and destroy each enemy thrust as far from the capital as is practicable.

As the enemy tends to advance

and attack piecemeal this strategy can work as long as the timing of attacks is spot on and the resupply carefully arranged.

Route to Uthgaras: The eastern approach route via Wispers, Nitrom and the Plains of Laignin, has the following advantages - it is already held by the Free/Pay and it has good resupply - many villages, keeps and lakes.

It also has good going, much open ground - note the clear route through the Forest of Wispers. Most Free/Pay lords are already situated on the eastern side and, finally, it is not a route used by the enemy armies in their move south.

Factars: What a useful shop he is. Use him as a minder for Moxin, a scout for the main armies or to capture keeps single-handed.

Conclude: Pick out the fearful lords early. Make them give up their soldiers at keeps and citadels and allow more reliable lords to mind them.

### *Return to Eden (cast)* - Richard Myrton

When you have finished in the shops wait for the train. When on the train pull the emergency brake card and then walk along the track to the next station.

When in the corridors of power go West, North and then East. To operate the screen when sitting in the seat of power look at the number and blink.

Kick the machine gun in the Habibiens. Drop the round plate in the shower and open the grate with the snowdrill.

When you are out of the airport head for the cupboard as fast as possible. From the soft tube it is West, West, North and East. Start the satellite which is outside of the airport south of the long tube-way.

When you get into the Snowball go as quickly as possible from the thin ledge around the red cylinder up North, West, North and East. Make sure you have the redoubt.

# Help for the caped crusader

**ALEATOIRE unveils the mysteries of this popular arcade adventure**

**L**ET'S see how we can win as Batman without cheating, with a few hints and wrinkles that should prove interesting even to those who have solved this classic arcade adventure from Ocean.

There are 151 rooms in the game and the maximum score is at least 8816 - if anyone has done better than that I would certainly like to know how they did it.

In order to solve the game you don't need a complete map of all the rooms, so Figure 1 shows just the main part of the Batcave which you are forced to enter via room 05 complete with Batbag, boots, belt and thruster.

The rooms with the circled numbers indicate what I consider to be the best order in which to move around collecting the seven bits and pieces of the Batcraft.

I chose this order because it allows me to pick up part 1 and maximise the number of lives (L) to 10, and then save that state via the Batstare in room P3.

This means having to travel through room M3 in both directions, but did you know that you only need to use one foot to travel west in M3 - is the other foot a red herring?

To get part 2 requires another foot and ball manipulation - or is that over-pedantic? - and it certainly helps to collect the Red Robin in room D1 to avoid the nasties in this area.

To get part 3 you need a yoke and then it's down the lift shaft at G6 to get part 4 - drop the spring on the dog - and part 5 - all you need is the foot, so jump to it and the part falls at your feet.

Eventually you emerge at K7 and you can go for part 6 via the foot

tables in K9 - just keep cool and rebuild the stack.

This room is protected by another dog, but it is possible to collect the part without losing a life - it's merely a question of putting your thinking cap on and then using it to divert the dog.

Finally part 7 just requires patience and then it's off to the assembly room for one last rendition of the Batman theme - you didn't actually expect the Batmobile to really be mobile, did you?

But success still leaves a couple of mysteries. The first is what are the properties of the two Robins in room H8 - particularly the one out of speech on the table?

There is a way of finding out, but



first you need the jumps in room P11 and to work out how to get over to room H8 without wasting all 10 jumps.

Hint - it is possible to get through room 19 without using any jumps at all, but you have to time it and be quick.

If you do manage to make this very hazardous journey try taking the Robin on the table first then go out of and re-enter the room. Is what has happened a bug in the program?

The second mystery is how the

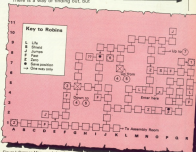


Figure 1. Batman Map - main level

## From Page 33

game is scored. Creating a new room seems to give you 16 points, but this is increased by other actions in a rather unpredictable way and I must confess that a maximum of 6814 is just a guess on my part.

One thing I am sure of is that no one knows, not even the authors, exactly what the winning minimum score is - that is, how to complete the game with the least number of points. Would anyone like to enlighten me on how to (under)achieve this?

If you haven't got a copy of Batman you could write in and tell me how to achieve the maximum and minimum scores at some other popular games - Sorcery in particular because I still can't score more than 82,500.

And if you haven't got any games at all why not try solving this month's prize puzzle given in Program 1?

Once again you will have to be

computerate and work out what problem the program presents and represents. To help you I have given a test set of data in line 290 which will satisfy the program, but it contains repetitions.

Your puzzle, should you attempt it,

is to reorder the 21 different numbers in the second set of data in line 290 so that the program will again halt.

A couple of hints - it is really a two dimensional problem, and there are therefore eight ways of correctly ordering the 21 numbers. ■

```

10 ON ERROR GOTO 30
20 PRINT "OK"
30 REM Restart here
40 FOR j=1 TO 1
50 GOTO 10
60 NEXT j
70 FOR i=1 TO 20
80 PRINT i;"*";DPVT i
90 IF i=1 THEN GOTO 10 ELSE GOTO 10
100 j=0
110 REM Find next min v,j
120 FOR j=1 TO 1
130 IF v(j)+DPVT j < v(j+1)
140 NEXT j
150 FOR j=1 TO 20-1
160 IF v(j)+DPVT j < v(j+1) THEN GOTO 150
170 GOTO 10
180 PRINT "Data just covered is:DPVT
190 DATA 44,48,14,16,18,49,13,48,8,
200 DATA 8,16,8,8,8,8,8
210 DATA 18,42,17,18,15,21,27,28,24,1
220 DATA 9,18,17,16,15,11,9,8,7,4,4,2
    
```

Program 1: The 21 tiles puzzle

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**W**ITH most computer systems in commercial use there is a facility to back-up program and data files to some form of tape device and have the option to restore the disc at a later date.

This provides a fairly reliable back-up for important or archived data and also frees expensive disc space.

Archiver is a program for the Amstrad CPC series which will allow whole discs to be recorded on tape and restored at a later date.

If the disc to be archived is fairly full it is a good idea to use a larger than normal cassette, such as a C80, for dumping the data, otherwise you may run out of tape halfway through.

The program is designed to work on system discs, but it could be altered for data discs quite easily by those who wish to modify the sector numbers.

When restoring a disc from tape it is important to use a disc which has nothing valuable on it as the first thing Archiver does when restoring is to wipe the disc on to which the tape data is going to be loaded.

To use the routine first type in the Basic program, Program L and save it. If you have an assembler for the machine code use the source listing - Program II - and save the object code as **Maincode** with the origin at &B078 - the code length is &B8.

If you do not have an assembler type in Program III, save it and run it

# Back up your discs - and free valuable space

Nick Hinde describes Archiver, a disc to tape spooler for the CPC

to produce the machine code, which will automatically be saved to disc as **Maincode**.

When you run Program II it will load the machine code and ask you for the date. It then gives you the options to archive or restore a disc. If you choose option 1 - archive a disc - it will ask for the disc to be archived to be installed in the drive, and a tape to be put in the cassette.

It will read the disc and check for empty spaces and write this information to the tape. Next it will read all the bytes from the useful sectors in a maximum of 48 sector chunks and

save them to tape.

Bear in mind that when you delete a file from a disc you only remove its name from the directory. The program will still be physically there on the disc, although inaccessible, and the sectors it occupies will be read as live during the archiving process.

If you choose option 2 - restore a disc - the program will ask for the archive cassette and a spare disc, and will then wipe the disc and read the tape for the sector data. It then restores the new disc to the same state as when originally archived.

## MAIN VARIABLES

<b>track</b>	Current read/write track number.
<b>sector</b>	Current read/write sector number.
<b>date#</b>	Date.
<b>archive#</b>	Date last archived (used from tape on restoring).
<b>logsec#</b>	Logical sector number counter - 1 to 399.
<b>logsec</b>	Length of binary file to be saved (current batch of data).
<b>tblack</b>	Number of tape blocks remaining to test/tape.
<b>clark</b>	Disc names being archived/restored.
<b>start</b>	Markers for areas of memory to place sector information for reading/writing to/from tape.
<b>offset</b>	
<b>count</b>	Holds a map of the live and dead disc sectors.
<b>live</b>	

## Program I

```

10 000 #####
20 000 +
30 000 + Archiver +
40 000 + +
50 000 + by S.J.Hinde +
60 000 + +
70 000 #####
80 000 ***
90 000 | Computing with the Amstrad
100 000 #####
  
```

## From Page 36

```
120 REMOY A2475
130 DIM line$(255)DIM #this array to
140 flags for all line numbers
140 word=1
150 wip=INT(255/4)+1,wid,1,4,INT(255/4)
2,1,wid,2,25
140 LOAD "mainline",A$E15
170 POKE #PMSD,ADDPOKE #PMSB,ADDPOK
E #PMSD,ADD
180 CALL #PMSB
190 LOCATE #1,2,4:PRINT#1,"Write Disc
Archive#Numbers 1"to
200 LOCATE #2,2,4:PRINT#2,"Please wait
or Data "ydata
210 CLOSE
220 LOCATE #2,2,4:PRINT#2,"Select opt
ion....."
230 LOCATE #2,2,5:PRINT#2,"-----"
240 LOCATE #2,2,7:PRINT#2,"1. Backup
disc to tape"
250 LOCATE #2,2,9:PRINT#2,"2. Restore
disc from tape"
260 a$=INSTR$(1) a$="" THEN 240
270 IF a$="1" AND a$="2" THEN 240
280 ON VAL INT( 50000 *RND(1))
290 GOTO 240
300 REM #Backup Disc To Tape**
310 LOGO=#thisline#
320 #DISC:IN:TYPE:OUT:SPACE WRITE 1
330 CLOSE
340 LOCATE #2,2,4:PRINT#2,"Insert disc
and a record tape"
350 LOCATE #2,2,4:PRINT#2,"Press REED
RD and PLAY"
360 LOCATE #2,2,8:PRINT#2,"Enter file
name for tape "ydata#thisline#
370 LOCATE #2,2,10:PRINT#2,"Put any 4
or when ready to start backup...."
380 WHILE INKEY=""#END:CLOSE
390 GOSUB 1200:REM #Check For Good B
ectors And Put Flags In Array (line#
)
400 LOCATE #2,2,4:PRINT#2,"Writing di
sc sap to tape"
410 #PMSDUT "DISCAM" #REM #write Dis
c Sector Family To Tapes**
420 FOR #=1 TO 255:PRINT#1,linesline#
430 #PMSBUT #write:CLOSE#
440 track=#sector#idstart+420:line#
sect#
450 CLOSE:LOCATE #2,2,4:PRINT#2,"Read
ing disc....."
460 FOR count# TO 44
```

```
460 LOGO=#logo#:#IF LOGO=#1 THEN
# 500
470 IF line#logo#=# THEN GOSUB 1240
480 IF LOGO=#1 THEN 500 ELSE 470
490 LOCATE 2,2,10:PRINT#2"Track "ytrack#
Sector "ysector
500 #PMSB=#DISC:out:restart
510 GOSUB 1240:REM #Get 16-byte #1-#
j#s For PMSB**
520 POKE #PMSB,16:byte
530 POKE #PMSB,track#POKE #PMSB,16:POK
E #PMSB,sector#POKE #PMSB,16
540 CALL #PMSB:REM #read Sector To B
in 170 Buffers
550 CALL #PMSB:REM #position Sector
In Cassette 170 Buffers
560 sector=sector+:#IF sector=#4 THEN
sector=#id+track+track#
570 NEXT count
580 CLOSE
590 LOCATE #2,2,4:PRINT#2,"Writing da
ta to tape....."
600 #sector=#255#
610 block=#thisline#
620 IF block#line THEN block#sect#
630 LOCATE #2,2,4:PRINT#2,"Mount "y#
block# block# "
640 #PMSB=#2,2,4:IN:IN:IN:IN:IN:IN:
650 IF track#48 THEN 440 "
660 RETURN
670 #REM # Restore Disc From Tapes
680 LOGO=#thisline#
690 #PMSB:IN:DISC:OUT
700 CLOSE
710 LOCATE #2,2,4:PRINT#2,"Insert rec
ord disc and tape"
720 LOCATE #2,2,8:PRINT#2,"Press PLAY
"
730 LOCATE #2,2,8:PRINT#2,"Put sap be
y when ready to start restore...."
740 WHILE INKEY=""#END:CLOSE
750 LOCATE #2,2,4:PRINT#2,"Please wait
t... "yLOCATE #2,2,4:PRINT#2,"Clearing
restore disc "yGOSUB 1200:CLOSE#
760 LOCATE #2,2,4:PRINT#2,"Reading di
sc sap from tape"
770 OPEN# "DISCAM" #REM #read Disc
Sap From Tapes**
780 FOR #=1 TO 255:PRINT#1,linesline#
790 #PMSBUT #data#CLOSE#
790 total=#of#=#=1 TO 255
800 IF line#=# THEN total#total#
810 NEXT #
820 IF total#48 THEN line#=#255#sect#
1 ELSE line#=#255#
```

```
820 track=#sector#idstart+420:line#
sect#
830 CLOSE:LOCATE #2,2,4:PRINT#2,"Rea
ding tape....."
840 #over=#PMSB #logo#=# TO 255
850 IF line#=# THEN #over=#
870 NEXT
880 IF #sect# THEN line#=#over#21
890 #sector=#255#
900 block=#thisline#
910 IF block#line THEN block#sect#
920 LOCATE #2,2,4:PRINT#2,"Loading "y
block# block# "
930 LOGO "1",2,4:IN:IN:IN:IN:IN:IN:
940 #sect#=#PMSB:line#=#255#
950 IF #PMSB#=#255# THEN #sect#=#
960 #PMSB:line#
970 NEXT title
975 CLOSE
980 LOCATE #2,2,4:PRINT#2,"Restoring
"ydata
990 LOCATE #2,2,6:PRINT#2,"Mount disc
"ydata#
1000 LOCATE #2,2,6:PRINT#2,"Writing d
isc....."
1010 FOR count# TO 44
1020 LOGO=#logo#:#IF LOGO=#1 TH
EN 1140
1030 IF line#logo#=# THEN GOSUB 124
0:IF LOGO=#1 THEN 1140 ELSE 1030
1040 LOCATE #2,2,10:PRINT#2,"Track "y
track# Sector "ysector
1050 #PMSB=#DISC:out:restart
1060 GOSUB 1240:REM #Get 16-byte #1-#
j#s For PMSB**
1070 POKE #PMSB,16:byte
1080 POKE #PMSB,16:byte
1090 CALL #PMSB
1100 POKE #PMSB,track#POKE #PMSB,16:PO
KE #PMSB,sector#POKE #PMSB,16
1110 CALL #PMSB:REM #write Sector To
Disc 170 Buffers
1120 sector=sector+:#IF sector=#4 TH
EN sector=#id+track+track#
1130 NEXT count
1140 IF track#48 THEN 840
1150 RETURN
1160 REM #LS:IN:IN#
1170 #PMSB=#thisline#
1180 line#=#thisline#
1190 #PMSB:#thisline#
1200 #byte=#17#:#thisline#
1210 #byte=#17#:#thisline#
1220 #line#=#thisline#255:REM ##screen
of same length of case 170 buffers
1230 RETURN
```





# NEWSLETTER

## Travel talk

One of the jewels in the crown of British Rail is the Euston Travel Centre which offers the most comprehensive travel information service imaginable.

Now that info of information is available to computer owners in their own homes through the medium of MicroLink.

The latest addition to MicroLink's British Rail section is a facility for obtaining information from the Euston Travel Centre by completing a simple electronic request form.

Information requested is swiftly transmitted by return to the subscriber's mailbox - or sent by snail mail if preferred.

## The security connection

ALL the many facets of MicroLink's value added services are proving useful to one of the world's most prestigious independent watchdogs on security affairs.

The London-based International Institute for Strategic Studies has for 20 years monitored shifts in the balance of power and in the arms race, and has provided a forum for unbridled discussion of the global strategic situation.

It uses MicroLink's tele facility to keep in touch with its 3,500 members in 80 countries, to correspond with those who have attended its conferences, and to make travel and hotel arrangements for its 28 permanent staff and 12 researchers, as

well as for handling membership renewals and ordering publications from around the world.

But the Institute also appreciates the more subtle aspects of the services which MicroLink provides.

Says ISSG systems man-

ager Helen Rayner: "We find some of the other facilities like the International Official Airline Guide - and personally I find Theatrolink fascinating for its up-to-date information on the London shows".

## ... and research

THAT eminent government research establishment the National Physical Laboratory is using MicroLink to move the data it requires for its important research and development projects.

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tronic mail facility.

Thirteen mailboxes have been distributed among the establishment's various divisions, which are mainly involved with high-level physics.

Previously the Laboratory subscribed to the Cassin Telecom Gold service, but finds MicroLink more economical and has more facilities.

## Link with stars

WRITER and photographer David Cotton leads a busy and sometimes glamorous existence as a freelance journalist based on the Continent.

Everywhere he goes on assignment he takes along his portable Brother SP44 typewriter/terminal and automatic coupler to file his articles using the MicroLink tele service.

"I write my copy on the portable, which has limited word processing facilities for up to about 800 words, then dump it in batches to my mailbox for relay transmission and for further processing later on my BBC Micro when I get back in my office in Holland", says David.

"A lot of my work is for

magazines and involves TV and film work, and I use MicroLink to contact people like those who I need to interview and photograph".

David has a useful tip for globe-trotting, portable-carrying MicroLink users: "International travel with a computer can be a disaster.

"The word computer to customs officers is guaranteed to cause all sorts of problems as they try and decide if that Electron you are carrying back for your 7-year-old son is an illegal import full of plastic IBM software.

"I thoughtfully point out that my machine is nothing more than a typewriter, and hide the automatic coupler at the bottom of my clothes bag".

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# Going round in circles to retrieve information at speed



**L**ET'S take a closer look at what discs are, how they work and how CP/M stores information and programs on them.

Our Amstrads use 5 1/4" single sided, double density discs. This means that although we can use both sides of a disc our disc drive can only look at one side at a time without us turning the disc over - much like a cassette tape.

More expensive disc drives than the ones Amstrad use are double sided. This means that both sides can be accessed without having to remove the disc and turn it over.

Double Density refers to the method used to physically record data on the disc. All modern disc drives use the double density FPM method which gives twice the amount of storage space on a disc than that provided by the original Single Density FM system standardised by IBM when floppy discs were first invented.

So much for the history lesson. How do discs actually work? A floppy disc is simply a disc of plastic - 5 1/4" in diameter in our case - made in the same sort of magnetic material as a tape.

Before a computer can use a disc it must be formatted. This process writes a preset data pattern all over the disc, dividing it up into areas which the computer can then address by number. These areas are called sectors, and on the Amstrad they can each hold 512 bytes of data - 0.5k.

On a record the music is engraved serially in one long line, which spirals in from the outside of the record to the centre to pack as much information in as possible.

We could obviously use a similar system to store our sectors on a magnetic disc. However, unlike a record, we rarely want to listen to the first half of the disc to get to some information stored in the middle.

Also, without some sort of complicated indexing system the computer would not be able to GO TO a particular sector if they were recorded serially. Instead a slightly different system is used - we split the disc up into 40 concentric circles of data called tracks, rather than a single long spiral.

Each track then holds nine sectors

of information, and we can get at any one of them effectively as fast as any other simply by stepping the read head of the disc drive out to the required track and waiting till the sector we want passes under it, allowing us to read it.

As the disc rotates at 300rpm, this doesn't take long. This system is called random access to distinguish it from serial access as used in records, compact discs and tapes.

Figure 1 shows the layout of tracks and sectors on our disc as a diagram. One point to note is that the first track, Track 0, is the outermost circle on the disc and track 39 is the innermost.

So far we have described the physical format of our disc – how and where the information on it is stored physically.

Different computers may use variations on this by having a different number of tracks – 80 is common – and different sizes of sectors – anything from 528 bytes to 16Kbyte – with anything from 4 to 28 sectors per track. This is the basic reason for incompatibility between discs from different computers.

These differences are, however, caused more by the whims of hardware manufacturers than by any inherent requirements of different operating systems. Similar basic recording systems of tracks and sectors are used on all systems from CP/M micros such as ours and IBM PCs running MS-DOS to large mainframes.

This leads us on to logical formats. These have nothing to do with the way data is actually written on the disc but rather control the way sectors are grouped together – purely abstractly – by an operating system to create files.

Logical formats also control the method used to build a directory – a group of sectors which instead of holding data contain an index of files which points to their locations on the disc.

CP/M is designed to run on any 8080 or 8080 based computer, and therefore has to be immune to the chaos caused by the vast variety of physical disc formats used on different micros. To make this possible the BIOS – the machine-specific part of CP/M – does all the

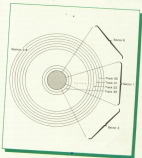


Figure 1: Tracks and sectors

worrying about physical format.

CP/M – and all programs written to run under CP/M – treats all discs as having an idealised sector size of 528 bytes. Thus as far as CP/M is concerned we have 36 sectors of 128 bytes per track and our BIOS has to translate this into the physical layout of nine sectors of 512 bytes per track whenever CP/M wants to read or write a 128 byte sector from or to the disc.

The process of buffering carried out by the BIOS to do this is known as latching and deblocking, and I won't go into it in any more detail here. To avoid confusion, if I haven't caused it already, we'll refer to CP/M's 128 byte logical sectors as records, and treat our disc as having 36 records per track.

On a system format disc tracks 0 and 1 are reserved to hold the code which makes up CP/M itself, and are therefore not used to hold data. The first 16 records on track 2 then

become our directory.

This is a list like the contents page in a magazine – it tells us where to look on the disc to find a particular file of data or program.

To reduce the amount of information the directory needs to hold, and so also its size, CP/M imposes an extra level of organisation on itself by grouping records together into blocks, each of eight records and so 1k in size.

These blocks are an abstract concept and invisible to programmers in the normal course of things – they just exist to make CP/M's job easier. However we have to be aware of their existence to understand how the directory is constructed.

Each record in the directory contains four 32 byte File Control Blocks, each of which is of the form shown in Figure 2. Each FCB contains information on the location on the

Byte	:	0	1	2	3	4	5	6	7	8	9	10	11
Contents:	:	user	F	I	L	E	N	A	M	E	T	Y	P
Byte	:	12	13	14	15	16	.	.	.	.	.	.	31
Contents:	:	ex	0	0	to	d0	.	.	.	.	.	.	d15

Figure 2: Contents of a directory FCB

## From Page 47

disc of one part, or extent, of a file.

The first byte contains the user number of the file. A value of &E5 means that the file has been deleted. When CP/M deletes a file it doesn't actually wipe out the contents of the file on disc. It simply sets the user byte in all the file's extents to &E5. This allows us to write clever little programs like UNERASE.COM to recover files we've accidentally blown away.

Bytes 1 to 8 contain the filename in Ascii upper case and bytes 9 to 11 hold the file type, again in Ascii upper case. Note that the "." is normally put into "filename.type" is not put into the directory.

Bytes 12 and 16 are the extent number and record count values respectively - we'll return to these later. Bytes 13 and 14 are always 0 - they are reserved for internal use by the BIOS during file operations.

Bytes 16 to 31 are the index, which tells us where to find the data for the file. Each byte is the number of a block which has been allocated to the file.

As we saw previously CP/M on the Amstrad uses a 16 block size. Each PCB has 18 bytes reserved for holding allocation information and so can map up to 16k of a file into each of its extents.

If the file is 16k or less in size then obviously it only requires one extent and its extent number - byte 12 of its PCB - is set to 0. If a file is larger than 16k it will need more than one extent to hold its directory information and subsequent extents will be numbered 1, 2 and so on.

Byte 15 of the PCB, the record count, is the exact number of records which contain valid data held within the blocks pointed to by an extent. As

an extent can index up to 16k, and a record is 128 bytes in size obviously the maximum number of records held by an extent is 16 x 8, or 128 (&80).

Thus extents of large files which are completely filled will have record counts of &80. If the last extent of a file is not completely filled it will have a count less than this.

You may well come across terms in CP/M literature such as extent folding, and information which suggests that the structure of extents is more complex than I have described here. Unfortunately life is rarely as simple!

The problem here is to do with the fact that most computers use different logical formats on their discs, many of which have block sizes larger than 1k.

This means that each extent can then in theory index more than 128 records, and we have to fold logical extents into each physical extent. Yes my eyes have started to glaze over too. Fortunately on the Amstrad we don't have to worry about this sort of thing.

I said earlier that our directory is 16 records, or 2k, in size. It actually takes up the first two blocks on the disc - 0 and 1. This therefore means that it can hold 4 x 8 x 2 entries, which makes 64.

Note that this is the maximum number of 32 byte entries - that is, extents, not files. If the directory gets full we can't put anything else on to the disc until space has been made by deleting something.

This is a separate problem to the more common one of simply running out of data space on disc. The directory size of 2k is an arbitrary one, determined by Amstrad when they designed the disc format. Other CP/M computers use different sizes of directory. For example 128 entries

using a 4k directory is common.

So that programs can find out information like this about the system on which they are running the BIOS maintains a table of data called the Disc Parameter Block, or DPB. This contains information on our logical disc format.

Figure 11 lists the contents of the DPB by the shortened mnemonics by which they are known. I'll now explain what they all mean.

SPT is Sectors Per Track. This however refers to CP/M's logical sectors of 128 bytes - our records - not our real physical sector size of 512 bytes. As we saw earlier CP/M considers us to have 36 (8\*24) records per track.

BSH - Block Shift factor - and BLM - Block Mask - are concerned with the size of our data blocks - 1k each on the Amstrad. This requires a Block Shift factor of three and a Block Mask value of seven, but I'm not going to try and explain how these are derived here.

DSM is the Extent Mask, and is used to control the extent folding I mentioned earlier. On our nice, simple Amstrad this value is just 0.

DSM is one less than the total data storage capacity of the disc in units of blocks. So far we have 36 records, or 4.5k, per track times 36 tracks - we can't use the reserved system tracks - which gives a total of 171k. As our block size is just 1k we have a DSM value of 170 (&AA).

DSM is one less than the maximum number of directory entries. We saw earlier that we could have 64 entries because of our 2k directory size, so our DSM is 63 (&3F).

ALD and ALI make up a 16 bit word - with ALD as the more significant byte - which tells us how many blocks are allocated to the directory. It does this by setting a bit of the word, starting at the most significant end of ALD, for each block allocated. We use two blocks - 0 and 1 - which gives us a word value of &C000 for ALD/ALI - binary 1100 0000 0000 0000.

CRS - Checked Sectors - tells CP/M the number of directory records which must be read and checked when a disc is accessed to discover if a different disc has been inserted into the drive without being logged in - the cause of the infamous BIOS ERR OR A. Obviously, with simple

Byte	Contents	Hex	Value
0,1	SPT Records per Track	36	&24
2	BSH Block Shift factor	3	&03
3	BLM Block Mask	7	&07
4	DSM Extent Mask	0	&00
5,6	DSM Total Storage Capacity	170	&AA
7,8	DSM Max. directory entries	63	&3F
9	ALD Directory Blocks	192	&C0
10	ALI Directory Blocks	0	&00
11,12	CRS Checked Records	16	&10
13,14	DPB Reserved Tracks	2	&02

Figure 11: Contents of Disc Parameter Block (DPB)



removable floppy discs such as ours we would need to check the entire directory on a disc to be able to be sure it hasn't changed, so we have a ODS value of 16 (510) records.

The last entry in the standard DPB is ODF - ODFact. This tells CP/M the number of tracks which we have reserved on our discs to hold the code for CP/M itself - two in our case.

This is what makes the difference between system and data formats on the Amstrad. Data format discs don't have CP/M on them and so have an ODF value of 0 to give them an extra two tracks, or 5k of data space.

However Amstrad has gone one better than standard CP/M. We have an Expanded Disc Parameter Block, or XPB, which gives us more information than normal on CP/M systems. The XPB follows immediately after the standard DPB in memory.

Our programs can discover the base address of the DPB by executing

Figure IV: Contents of Expanded Disc Parameter Block (XPB)

Byte	Contents	Value
16	First (physical) sector number	06
16	(Physical) sectors per track	9
17	Gap length (N/A)	42
18	Gap length (Format)	82
19	Filler byte	229
20	log <sub>2</sub> (sector size) - 7	2
21	Records per (physical) sector	4
22	Current track (BIOS variable)	0
23	Not aligned/Aligned (BIOS variable)	0
24	Auto format select (BIOS variable)	0

a BIOS function call 31 - we'll be looking at disc function calls next month. Figure IV shows the contents of the XPB, addressed by offset from the start of the standard DPB.

The XPB give programs information about the physical format of our discs, whereas the DPB only describes the logical format. We'll look at these values more closely in a future article, when we move on to

look at the BIOS and disc controller hardware in more detail.

However you will already recognise the significance of some of the entries - physical sector size, sectors per track and records per sector, for example.

Next month we'll see what additional function calls are available to us from the BIOS to let us read and write files on disc.

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With a professional appearance and user-friendly facilities TASWORD 6128 offers the most powerful for the Amstrad CPC computers.

TASWORD 6128	
THE ELECTRONIC DIARY	
DATE	1980 12 12
TIME	10:10
DAY	THURSDAY
MONTH	DECEMBER
YEAR	1980
WEEK	52
DAY	12
MONTH	12
YEAR	1980

7 1122 1 1222 1222 1222 1222 1222

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THE WORD PROCESSOR - WITH DISK DRIVE

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This is the new TASWORD 464-D especially developed to utilize the capabilities of the CPC 464-D's double disc drive. The additional facilities include a larger text file size and automatic save-in-process also automatic date/time and last operations. A major new feature is the word-processor facility. This gives complete control over standard letters, forms, etc., without copy re-writing. For example, names and address automatically taken from a file by comparing the data. The editor can be entered using TASWORD 464-D, or entered using the Master/Program Editor's menu package. A powerful and useful conditions printing facility is included - parts of a document can be printed according to user-specified criteria. TASWORD 464-D will only run on the CPC 464-D only supplied on disc.

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Spelling problems and fixing them soon! Any document whether it is a private letter or your latest report WITH TAS-SPELL, you are free to be creative in the confidence knowing that your spelling will be spot-on!

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TASWORD 464	
THE STYLE WRITER	
DATE	1980 12 12
TIME	10:10
DAY	THURSDAY
MONTH	DECEMBER
YEAR	1980
WEEK	52
DAY	12
MONTH	12
YEAR	1980

7 1122 1 1222 1222 1222 1222 1222

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POPULAR COMPUTING WEEKLY  
MAY 1981 p. 108

Four 464 becomes a professional standard word processor with TASWORD 464. Supported completely with comprehensive and user-definable customisation with the program and TASWORD 464-D. The basic file management using TASWORD 464 whether you have one or more applications or simply want to have a national word processor. TASWORD 464 and 464-D for the word and style and response.

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# GET YOUR PROGRAMS TICKING OVER FASTER

**S**LOWER or later one problem that faces everyone who writes computer programs is how to make a program run faster. Obvious solutions are to rewrite the program in machine code, or use a compiler to do this for you. However 99 per cent of the time a program takes to execute will usually be spent in a small section.

Rewriting this part of the program in a more efficient way will often give the required improvement in speed. This leaves the problem of finding where a program spends most of its time. The easy way to do this is with a program called a profiler and this article describes one which can be used with Basic programs on the CPC range.

1 Run Profiler 1  
2 Run by J. Rawlinson  
3 Run (c) Computing with the Rest of a Run

```
1# CODE=30000
2# MEMORY CODE
3# READ #
4# IF (LEN(LIN)=) THEN 70
5# FOR I=1 TO 20 STEP 3
6# PRINT "I"=I; "L"=L; "C"=C; "P"=P
7# FOR CODE, I
8# CODE=CODE+1; NEXT I; GOTO 20
9# IF #1; "C"=C; "P"=P; "C"=C; "P"=P; "C"=C; "P"=P; "C"=C; "P"=P
10# CALL 30000
```

```
0000 DATA 8117F9C11F9C3C1000000000000000
0010 DATA 14C209F4C209F4C209F4C209F4C209F4
0020 DATA 4F00000110F0210F00000000
0030 DATA 800200000000000000000000000000
0040 DATA 00F0C0C0F0C0F0C0F0C0F0C0F0C0F0
0050 DATA 01C0C0C00000000000000000000000
0060 DATA 00F0C0C0F0C0F0C0F0C0F0C0F0C0F0
0070 DATA C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0
0080 DATA 000000000000000000000000000000
0090 DATA 213A0F00C0C0110A0C0000000000
0100 DATA 140200000000000000000000000000
0110 DATA 200000000000000000000000000000
0120 DATA 150000000000000000000000000000
0130 DATA 707200700000000000000000000000
0140 DATA 000000000000000000000000000000
0150 DATA 000000000000000000000000000000
0160 DATA 000000000000000000000000000000
0170 DATA 000000000000000000000000000000
0180 DATA 000000000000000000000000000000
0190 DATA 740000000000000000000000000000
0200 DATA 1
```

Program 1

**JOHN RAWLINSON** offers a neat way of shifting into top gear on your CPC

It comes in two parts, a small machine code program which sets up two new RSK bar commands, and a chunk of Basic which is added to the program being profiled in order to display the results.

Program 1 enables a fast ticker – 1/3000th of a second – event. It looks for the line the Basic interpreter is currently handling 300 times a second and increments a byte count for that particular line number.

The machine code for this program is contained in the data statements. The program should be typed in and then saved. When it is run two new bar commands will be set up – GSTART and ISTOP. ISTART clears the count for all lines to zero and sets off the fast ticker event, while ISTOP switches off the event and halts the line incrementing.

The code works by looking at a Basic interpreter variable – stored in location 1A030 on a 464, or 1A01D on a 664 or 8128 – which contains the start address of the current Basic line. It is then fairly simple to look a couple of bytes further along the line and discover its number.

Program 2 is the Basic section of the profiler, and it should be typed in and saved in Accl form using:

SAVE "prof1.a",J

The procedure for profiling a program, is as follows. Firstly if the one you wish to profile contains a SYMBOL, AFTER command REM it out along with any MEMORY

command that attempts to raise MEMEM above that set by Program 1. Then in direct mode type in the SYMBOL, AFTER command you have just removed and run Program 1.

Next the program to be profiled must be loaded and renumbered if necessary – (see later) and then Program 2 MERGED with it. A GSTART command should then be added to the beginning and a ISTOP command entered at the point where it finishes.

Inserting the ISTOP command is not too critical as the program can be halted by pressing Escape before this command is met.

Finally run the main program and when the ISTOP takes effect or you press Escape type RUN 30000 and this will execute the results section of the profiler.

The first thing you will see is a menu allowing you to select one of three options – a display of the same information either by individual line numbers, groups of 10 line numbers or groups of 100.

The information presented is the number of ticks for that line or group and the percentage of the total time spent executing the program that was expended on the line or group. A tick is recorded each time the line is seen by an event.

As set up the program can only

## From Page 47

hardly line numbers in the range 0 to 1000 which means that your program must be renumbered to fit into this range before the profiler is used on it.

The variable *n* in line 30090 sets the number of lines the profiler displays results for. This should be changed to a value between 100 and 1000 in steps of 100 depending on the size of your program.

Keeping it small will make the analysis process quicker. The use of the fast ticker event means that the profiler will spot all but the simplest lines.

However it also means that the two byte count may overflow if the profiling session lasts more than 3½ minutes. The programs time range can be extended by using the 50Hz frame sync event instead. This can be done by making the following changes to Program 1:

```

10 IF @CLOCK THEN PRINT "Clock use a
11   rrr " ; @CLOCK
1200 DATA "000000000000000000000000"
1
1300 DATA "000000000000000000000000"
1
1400 DATA "000000000000000000000000"
1
1500 DATA "000000000000000000000000"
1

```

When all the results have been displayed pressing any key will return you to the menu.

By using the profiler line and group options you should be able to locate where any program spends most of its time. Having done this the normal techniques for speeding up a program can be applied.

The most common of these is to remove as much computational work as possible from inside loops. Although this may sound obvious most improvements in program speed come from just this. For example, consider this fragment of Basic:

```

10 FOR I=1 TO 100
20 SUM=0:SUM1=0
30 NEXT

```

This could be made faster by

placing the multiplication by 0.1 outside the FOR loop as follows:

```

10 FOR I=1 TO 100
20 SUM=SUM+SUM
30 NEXT
40 SUM=SUM*.1

```

Other standard tricks to speed up programs are to use integer variables whenever possible since these can be manipulated much faster than floating point, and to calculate things in advance – if possible.

For instance, if you want to draw a circle on the screen you may well end

## 'Other standard tricks to speed up programs are to use integer variables . . .'

up using the SIN and COS functions. However a quicker way is to store all the sines and cosines required in an array and use this to supply the values

when the circle is drawn. Such an array is called a look-up table.

Although the Basic interpreter on the Amstrad is fast there is a rather surprising bottleneck which makes the execution of many programs much slower. This is because the operating system prints characters on the screen painfully slowly.

The only way around this is to buy one of the Basic extension programs which contain a new routine for doing the job, a typical example being Redgrave's Toolkit ROM.

Don't gain the impression that moving things out of all loops will improve the speed of programs. If a loop is only executed a few times no amount of work on it will speed it up.

The loops to concentrate on are those that are executed the most number of times – the so-called inner loops of the program. Using the profiler presented here will help to locate these, and hence should help you to increase your running speeds by a fair amount. ■

```

30000 REM Profiler 00
30010 REM *****
30020 REM By J. Redgrave
30030 REM 1st Computing with the
30040 REM   Amstrad
30050 REM *****
30060 @=000
30070 @=30000:0000:0000
30080 MODE 1:FOR @LOCATE @,1:PRINT "
30090 PROFILER READY:PRINT@PER 1
30100 PRINT "B. Individual Line Use
30110 "
30120 PRINT "C. Group of 10 Line Use
30130 "
30140 PRINT "D. Group of 100 Line Use
30150 "
30160 PRINT@PER "Selects 1)
30170 @=@-1000:IF @=" THEN @=0
30180 PRINT @:FOR @=0 OF @:FOR @=0
30190
30200 ON @:GOTO @ AND @:IF @=4:GOTO 2
30210 @=@,0:SUM,0:SUM1
30220 @=@:GOTO 30000
30230 @=@+1:GOTO 30170
30240 @=@
30250 @=@
30260 @=@
30270 @=@
30280 @=@
30290 @=@
30300 @=@
30310 @=@
30320 @=@
30330 @=@
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30350 @=@
30360 @=@
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30910 @=@
30920 @=@
30930 @=@
30940 @=@
30950 @=@
30960 @=@
30970 @=@
30980 @=@
30990 @=@
31000 @=@

```

Program 1



**p  
h**

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# Count your blessings

**JOHN MILSON** writes a word counter for LocoScript

ALMOST a year has gone by and we still haven't seen any additions for LocoScript. One of the facilities sadly missing from it is a built-in word counter, and though such programs are available commercially for the PCW they all come as part of other packages like spelling checkers and alternative word processors.

So until now if you didn't feel like spending money on software you don't really need, you had to be content with counting your blessings and making rough estimates of the number of words in a file.

But here's a word count program offered by Computing with the Amstrad for free. It's written in Multid Basic, which every PCW owner has. It won't handle an unmodified LocoScript file — there isn't yet a program of any description that will — but it can be used with an Ascii file created using the 17 option on the disc management screen. Use the simple Acii, not the page image option.

First type the Basic program into the machine and save it on a blank, formatted disc with the name WCOUNT. Then using the Pip utility copy from the system disc the files

J114CPM3.EMS, BASIC.COM and SUBMIT.COM.

Should you have another version of CP/M, then its filename would be slightly different. The name would also need to be corrected in line 220 of the program.

Now using the Basic RPED utility set up a file with the name PROPLESUB containing the single command line BASIC WCOUNT. The use of these utilities is described in the manual. The word counter is now

complete, with all the necessary files on the one disc.

Let us suppose that you are using the word processor and want to count words. First you have to copy your document into the first group of drive M, using the G option of the disc management screen. If you have two disc drives or a PCW8812, this step can be bypassed.

Next you replace the LocoScript disc with your word counting disc, not forgetting to press 11. Then you make a simple Ascii text file, using the menu called up by 12. The destination of this must be the first group — Group 0 — of drive A.

This procedure is explained in the document called README. Now you have a suitable version of your document on the same disc as the word counting program. Just reset the machine with Shift+Extra+Exit and watch things happen.

The screen should come to rest showing an option menu and notes, and the word counter is now ready to use. Just follow the instructions, requiring merely a few single keystrokes.

The use of the program could be simplified a little by modifying it to run, after resetting, without a pause through the file finding and word counting routines. However as it is you can handle documents in batches. If you wish, or if you have a very large document — say, more than 90k — you can put it on a disc of its own.

## PROGRAM STRUCTURE

- 220 Pipprog file returns zero unless it holds the name of one of the program files. This is used to hide from view the files that do the work.
- 1000 Multid Basic automatically adjusts the return stack when a jump is made out of a loop. In the absence of a Pascal style block structure this seems the easiest way to handle these options.
- 2000 Gives you something to pass the time while the machine is churning — calculating how long it will take seems as good an occupation as any.
- 2200 This seems a good place to force a garbage collection, while you are sorting the mess, it might save a little time if a second document is to be counted.
- 3010 Names of read-only files have bit seven set in one character. This line formats a Basic error.
- 4100 Batty would report the error. Cancel would return you to the system, using Basic. Ignore returns you to Basic where the program can easily be restarted using RUN.
- 5000 Files must not be left open. As the return from the error routine is not back into the subroutine where the error occurs the return stack must be cleared by changing its size. Merely restoring the size won't do, hence the two memory statements.
- 5040 Allows the printing of the Basic error message.

## From Page 57

```

12 ***** WORD *****
34 WORD COUNT FOR LOCATION
35 *****
36 * John Wilson April 1984 *
37 * East Brimstead *
38 *****
39
40 ON ERROR GOTO 3999
41 WITH 10
42
43 *** 'Find' controls etc. ***
44
45 word = DIR$(1); ball = DIR$(1)
46 head = word + " " + " (1) = word + "
47 " : tail = ball = head
48 IF NOT (Len(word) <= Len(ball)) GOTO 488
49 PRINT tail; word; 4000
50
51 ***** Option Point *****
52
53 WHILE 1
54 PRINT tail; "Press key for required option.";
55 IF ball = " " THEN PRINT " You need to choose a file. Option 1 or F "
56 ELSE PRINT " To show files, press B or N. " PRINT "Current file is " file;
57 " "
58 ball = " "
59 WHILE 10 = " " : ball = INPUT$(0)
60 PRINT ball
61 ON ERROR GOTO 3999; word = ball;
62 ON 4000, 4001, 4002, 4003, 4004, 4005, 4006, 4007, 4008, 4009, 4010, 4011, 4012, 4013, 4014, 4015, 4016, 4017, 4018, 4019, 4020, 4021, 4022, 4023, 4024, 4025, 4026, 4027, 4028, 4029, 4030, 4031, 4032, 4033, 4034, 4035, 4036, 4037, 4038, 4039, 4040, 4041, 4042, 4043, 4044, 4045, 4046, 4047, 4048, 4049, 4050, 4051, 4052, 4053, 4054, 4055, 4056, 4057, 4058, 4059, 4060, 4061, 4062, 4063, 4064, 4065, 4066, 4067, 4068, 4069, 4070, 4071, 4072, 4073, 4074, 4075, 4076, 4077, 4078, 4079, 4080, 4081, 4082, 4083, 4084, 4085, 4086, 4087, 4088, 4089, 4090, 4091, 4092, 4093, 4094, 4095, 4096, 4097, 4098, 4099, 4100, 4101, 4102, 4103, 4104, 4105, 4106, 4107, 4108, 4109, 4110, 4111, 4112, 4113, 4114, 4115, 4116, 4117, 4118, 4119, 4120, 4121, 4122, 4123, 4124, 4125, 4126, 4127, 4128, 4129, 4130, 4131, 4132, 4133, 4134, 4135, 4136, 4137, 4138, 4139, 4140, 4141, 4142, 4143, 4144, 4145, 4146, 4147, 4148, 4149, 4150, 4151, 4152, 4153, 4154, 4155, 4156, 4157, 4158, 4159, 4160, 4161, 4162, 4163, 4164, 4165, 4166, 4167, 4168, 4169, 4170, 4171, 4172, 4173, 4174, 4175, 4176, 4177, 4178, 4179, 4180, 4181, 4182, 4183, 4184, 4185, 4186, 4187, 4188, 4189, 4190, 4191, 4192, 4193, 4194, 4195, 4196, 4197, 4198, 4199, 4200, 4201, 4202, 4203, 4204, 4205, 4206, 4207, 4208, 4209, 4210, 4211, 4212, 4213, 4214, 4215, 4216, 4217, 4218, 4219, 4220, 4221, 4222, 4223, 4224, 4225, 4226, 4227, 4228, 4229, 4230, 4231, 4232, 4233, 4234, 4235, 4236, 4237, 4238, 4239, 4240, 4241, 4242, 4243, 4244, 4245, 4246, 4247, 4248, 4249, 4250, 4251, 4252, 4253, 4254, 4255, 4256, 4257, 4258, 4259, 4260, 4261, 4262, 4263, 4264, 4265, 4266, 4267, 4268, 4269, 4270, 4271, 4272, 4273, 4274, 4275, 4276, 4277, 4278, 4279, 4280, 4281, 4282, 4283, 4284, 4285, 4286, 4287, 4288, 4289, 4290, 4291, 4292, 4293, 4294, 4295, 4296, 4297, 4298, 4299, 4300, 4301, 4302, 4303, 4304, 4305, 4306, 4307, 4308, 4309, 4310, 4311, 4312, 4313, 4314, 4315, 4316, 4317, 4318, 4319, 4320, 4321, 4322, 4323, 4324, 4325, 4326, 4327, 4328, 4329, 4330, 4331, 4332, 4333, 4334, 4335, 4336, 4337, 4338, 4339, 4340, 4341, 4342, 4343, 4344, 4345, 4346, 4347, 4348, 4349, 4350, 4351, 4352, 4353, 4354, 4355, 4356, 4357, 4358, 4359, 4360, 4361, 4362, 4363, 4364, 4365, 4366, 4367, 4368, 4369, 4370, 4371, 4372, 4373, 4374, 4375, 4376, 4377, 4378, 4379, 4380, 4381, 4382, 4383, 4384, 4385, 4386, 4387, 4388, 4389, 4390, 4391, 4392, 4393, 4394, 4395, 4396, 4397, 4398, 4399, 4400, 4401, 4402, 4403, 4404, 4405, 4406, 4407, 4408, 4409, 4410, 4411, 4412, 4413, 4414, 4415, 4416, 4417, 4418, 4419, 4420, 4421, 4422, 4423, 4424, 4425, 4426, 4427, 4428, 4429, 4430, 4431, 4432, 4433, 4434, 4435, 4436, 4437, 4438, 4439, 4440, 4441, 4442, 4443, 4444, 4445, 4446, 4447, 4448, 4449, 4450, 4451, 4452, 4453, 4454, 4455, 4456, 4457, 4458, 4459, 4460, 4461, 4462, 4463, 4464, 4465, 4466, 4467, 4468, 4469, 4470, 4471, 4472, 4473, 4474, 4475, 4476, 4477, 4478, 4479, 4480, 4481, 4482, 4483, 4484, 4485, 4486, 4487, 4488, 4489, 4490, 4491, 4492, 4493, 4494, 4495, 4496, 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4663, 4664, 4665, 4666, 4667, 4668, 4669, 4670, 4671, 4672, 4673, 4674, 4675, 4676, 4677, 4678, 4679, 4680, 4681, 4682, 4683, 4684, 4685, 4686, 4687, 4688, 4689, 4690, 4691, 4692, 4693, 4694, 4695, 4696, 4697, 4698, 4699, 4700, 4701, 4702, 4703, 4704, 4705, 4706, 4707, 4708, 4709, 4710, 4711, 4712, 4713, 4714, 4715, 4716, 4717, 4718, 4719, 4720, 4721, 4722, 4723, 4724, 4725, 4726, 4727, 4728, 4729, 4730, 4731, 4732, 4733, 4734, 4735, 4736, 4737, 4738, 4739, 4740, 4741, 4742, 4743, 4744, 4745, 4746, 4747, 4748, 4749, 4750, 4751, 4752, 4753, 4754, 4755, 4756, 4757, 4758, 4759, 4760, 4761, 4762, 4763, 4764, 4765, 4766, 4767, 4768, 4769, 4770, 4771, 4772, 4773, 4774, 4775, 4776, 4777, 4778, 4779, 4780, 4781, 4782, 4783, 4784, 4785, 4786, 4787, 4788, 4789, 4790, 4791, 4792, 4793, 4794, 4795, 4796, 4797, 4798, 4799, 4800, 4801, 4802, 4803, 4804, 4805, 4806, 4807, 4808, 4809, 4810, 4811, 4812, 4813, 4814, 4815, 4816, 4817, 4818, 4819, 4820, 4821, 4822, 4823, 4824, 4825, 4826, 4827, 4828, 4829, 4830, 4831, 4832, 4833, 4834, 4835, 4836, 4837, 4838, 4839, 4840, 4841, 4842, 4843, 4844, 4845, 4846, 4847, 4848, 4849, 4850, 4851, 4852, 4853, 4854, 4855, 4856, 4857, 4858, 4859, 4860, 4861, 4862, 4863, 4864, 4865, 4866, 4867, 4868, 4869, 4870, 4871, 4872, 4873, 4874, 4875, 4876, 4877, 4878, 4879, 4880, 4881, 4882, 4883, 4884, 4885, 4886, 4887, 4888, 4889, 4890, 4891, 4892, 4893, 4894, 4895, 4896, 4897, 4898, 4899, 4900, 4901, 4902, 4903, 4904, 4905, 4906, 4907, 4908, 4909, 4910, 4911, 4912, 4913, 4914, 4915, 4916, 4917, 4918, 4919, 4920, 4921, 4922, 4923, 4924, 4925, 4926, 4927, 4928, 4929, 4930, 4931, 4932, 4933, 4934, 4935, 4936, 4937, 4938, 4939, 4940, 4941, 4942, 4943, 4944, 4945, 4946, 4947, 4948, 4949, 4950, 4951, 4952, 4953, 4954, 4955, 4956, 4957, 4958, 4959, 4960, 4961, 4962, 4963, 4964, 4965, 4966, 4967, 4968, 4969, 4970, 4971, 4972, 4973, 4974, 4975, 4976, 4977, 4978, 4979, 4980, 4981, 4982, 4983, 4984, 4985, 4986, 4987, 4988, 4989, 4990, 4991, 4992, 4993, 4994, 4995, 4996, 4997, 4998, 4999, 5000

```



# POPping and PUSHing —not to mention the odd EX (SP), HL— gets your message across

**I**f you take a look at Program 1 you might think I've made a mistake. Not so — it really is meant to be identical to the first program in last month's article.

You see this month we're going to take a closer look at printing out strings, so we may as well start on familiar territory. You'll recall that it prints out the string *message*.

The essence of Program 1 is in the subroutine *print*. You enter this with the length of the string to be printed in *B*, and the address it is stored at in memory in *HL*.

We put the length in *B* so we can use it as the counter of a *DNZC* loop that, each time through the loop, prints out a character of the string. The mechanism for printing out a single character uses:

```
LD A, (HL)
CALL CharOut
```

Having printed it out we then increase the contents of *HL* to point at the next character along. Essentially we'll have printed *B* characters, so the *DNZC* will have decreased *B* to zero and we drop out of the loop.

Obviously if we want the micro to print out a string we need to tell it two

## Part XVIII of MIKE BIBBY's guide to machine code

things — where the string is and how long it is. For instance, instead of actually spelling out the length by giving it a number you can put a special marker character at the end of the string and let the micro work out itself when it's reached the end.

This is what we do in Program 11.

We still use *HL* to point to where the string is in memory, but we mark it and with an asterisk — *Acdl* code & 2A.

We're going to print out *message* as in Program 1, so this time our string is *message\** stored at an address labelled *string*. The first thing we do is to load the initial character into the *A* register and then check to see if it's an asterisk with:

```
LD A, (HL)
CP *0A
JR Z, finish
```

If *A* does contain the *Acdl* flag for an asterisk after the *CP* the zero flag will be set and the code will branch to

```

Pass... 1      ORG 10000

0000      .CharOut+4005A
0000      .length#9
0000:00 0F      LD B,length
0001:01 11 00      LD HL,string
0002:02 0F 00      CALL print
0003:03 0F      RET
0004      .print
0004:04 7C      LD A,(HL)
0005:05 5A 00      CALL CharOut
0006:06 23      INC HL
0007:07 1F      SBCI print
0008:08 0F      RET
0009      .string
0009:09 0F      DEFN 'message'
000A:0A 00      DEFN 13
000B:0B 04      DEFN 10
000C:0C 00      END

```

Program 11

things — where the string is and how long it is.

However there's more than one way to tell the micro how long a string is. For instance, instead of actually spelling out the length by giving it a number you can put a special marker character at the end of the string and let the micro work out itself when it's reached the end.

This is what we do in Program 11.

We still use *HL* to point to where the string is in memory, but we mark it and with an asterisk — *Acdl* code & 2A.

We're going to print out *message* as in Program 1, so this time our string is *message\** stored at an address labelled *string*. The first thing we do is to load the initial character into the *A* register and then check to see if it's an asterisk with:

```
LD A, (HL)
CP *0A
JR Z, finish
```

If *A* does contain the *Acdl* flag for an asterisk after the *CP* the zero flag will be set and the code will branch to

```

Pass... 2      ORG 10000

0000      .CharOut+4005A

```

```

0000:01 14 00      LD HL,string
0001:02 0F 00      CALL printer
0002:03 7C      LD A,(HL)
0003:04 5A      CP *0A
0004:05 3B 0F      JR Z,finish
0005:06 5A 00      CALL CharOut
0006:07 23      INC HL
0007:08 0F 00      JR printer
0008:09 0F      finish
0009:0A 04      LD A,10
0010:0B 5A 00      CALL CharOut
0011:0C 00      LD A,13
0012:0D 5A 00      CALL CharOut
0013:0E 0F      RET
0014      .string
0014:0F 0F      DEFN 'message*'
0015:10 00      END

```

Program 11

*Basic* — we'll cover exactly how that rounds things off in a minute.

If no asterisk is found the character needs to be printed out, the HL register increased to point at the next character in the string and a branch taken back to the start of our printing routine — *printer* — where we once more check for an asterisk and so on. The code that achieves this is:

```
CALL CharOut
INC HL
JP printer
```

Of course eventually we'll reach our terminal asterisk — assuming we've remembered to put one there — and branch to *Basic*.

This just tidies things up by printing a line feed and carriage return. Notice, by the way, how the code is arranged to avoid printing out that last asterisk. For convenience I've put the string I want printing out at the end of the code with a:

```
DB "message"
```

This is the way *K&W* — Roland Weddlove's assembler, described in the July 1988 edition of *Computing with the Amstrad* — puts sequences of bytes into memory.

Other assemblers may use different assembler directives. For instance, with *Maxon*, the assembler from Amstrad, the code would be:

```
DB "message"
```

And of course we could place the string wherever we want it in memory, so long as HL points to it.

Just as we can get round the need to know the length of the string we're printing by using a marker character, so we can do away with the need to use HL as a pointer.

The trick is based on the fact that when we *CALL* a subroutine the address of the next instruction after the *CALL* is put on the stack.

Instead of placing an instruction there to return to after the *CALL*, however, we put the sequence of bytes we want printing, again with a terminal asterisk.

So when we jump to the print routine we know that the last address on the stack points to what needs printing — we've arranged it that way.

We take advantage of this in Program 8L. Here the first instruction is a *CALL* to the print routine, *printer*, followed by the string we want

Pass... 2	ORG 8000H
0000	CharOut+0000H
0000C0 0C 00	CALL printer
0000C1	DB "message"
0000C7	RET
0000C8	printer
0000C9	POP HL
0000CA	CharPrint
0000CB	LD A,HL
0000CC	INC HL
0000CD	CP 02H
0000CE	JR L,exit
0000CF 04 00	CALL CharOut
0000D0 05 00	JP CharPrint
0000D1	and
0000D2	PUSH HL
0000D3 04 00	LD A,HL
0000D4 04 00	CALL CharOut
0000D5 05 00	LD A,AI
0000D6 04 00	CALL CharOut
0000D7	RET
0000D8	END

Program 8L

printing out, after which comes the final *RET* of the whole program.

The first thing *printer* does is to *POP HL*. That is, it gets what appears to be the return address off the stack. The way we've fixed things this means that HL now points to the start of the string we want to print out — a familiar situation.

We then proceed to print the string out with the routine *CharPrint*, which is virtually identical to *printer* of Program 8I.

The difference is that instead of waiting until we've printed the character before increasing HL we do it directly after the *LD A,HL* and before checking if the character we've loaded is an asterisk.

If you think about it you'll see that this makes no difference to the printing of the string — all that's

needed is that HL is increased at some stage to point to the next character when the loop's repeated.

It does affect things though when the asterisk is found and you branch out of the loop to exit. Unlike Program 8I you'll already have increased HL so that it points past the asterisk. That is, HL will contain the address of the byte after the asterisk.

A quick look at this address — in this example it's 8000H — shows it to contain the first instruction after our string — here it's the *RET* that terminates the whole program.

This is quite useful because having printed out our message we want to get back to our main program. Admittedly when we get there we're only going to *RET* to *Basic*, but this won't always be so. Normally we'd be carrying on with things, perhaps expecting some input in response to what we've printed out.

Anyway HL points to where we want to return to, so to get there we *PUSH HL* and then *RET*. After all the function of *RET* is to continue the program from the address on the stack.

By *PUSH*ing HL, we ensure that the *RET* takes us back to the instruction after the final asterisk of our string, in effect we force a jump to where HL is pointing by pushing it on the stack and then returning.

This is what the routine *end* does, although before the *RET* we take the opportunity to print out a line feed and carriage return.

Play around with Program 8L until you really have a feel for what is happening. For instance, try adding a loop before that final *RET* to prove that *CharPrint* really does return to the main program.

The techniques of Program 8L allow us to embed the strings we want printing out in our code having

**'We can do away with the need to use HL as a pointer'**

## From Page 66

Just one routine, *printer*, to print the list out.

Program IV uses exactly the same

Hex...	DIS M8086
0000:	.charOut=M8086
0000:00 0C 00	CALL printer
0000:	SPH 'message'
0000:07	RET
0000:	.printer
0000:03	DI SP,HL
0000:	.charPrint
0000:06	LD A,(HL)
0000:03	INC HL
0000:09 24	CP 24h
0000:0B 05	JR 3,amd
0000:03 54 00	CALL CharOut
0000:06 72	JR charPrint
0000:	.amd
0000:03	DI SP,HL
0000:06 04	LD A,04
0000:03 54 00	CALL CharOut
0000:06 00	LD A,00
0000:03 54 00	CALL CharOut
0000:07	RET
0000:	END

Program IV

idea, but we replace PUSH HL and POP HL with the new instruction EX (SP),HL. This exchanges the contents of the stack pointer with HL, which means that whenever it is in HL, it is swapped with the address - that is, the two bytes - on the top of the stack.

So after EX (SP),HL, the address on top of the stack becomes set to the contents of HL. Note that this is not the same as PUSH HL for two reasons:

- The contents of the last two bytes of the stack are changed, but the stack itself has nothing added on top of it, unlike a PUSH. This means the value of SP is unchanged.
- Unlike a PUSH HL, the value of HL itself is altered, becoming what occupied the last two bytes of the stack.

So as soon as we enter *printer* we encounter an EX (SP),HL where the old POP HL was. As far as the logic of the program is concerned the effect is the same - HL will contain the address that was placed on the top of the stack by CALL *printer*. What's on



One possible cause of error: but you forget that the IX register has an offset!

the top of the stack is admittedly the immediate initial value of HL, but we're not going to use it anyway. This means that we can then proceed as normal to print our string out.

When we reach *amd* we have to replace the address on top of the stack (which contains garbage - the

old value of HL) with the new value of HL, so our subroutine returns to the right place. A simple EX(SP),HL takes care of this.

Program V is another variant on the theme, except that here we're using the IX register we met last month instead of HL. Fortunately there's an EX (SP), IX instruction that's made for the job.

One possible cause of error (though it is if you forget that in load operations the IX register has an offset). This means you cannot replace LD A,(HL) with LD A,(IX) but have to use LD A,(IX+0).

Apart from this things are pretty similar to Program IV. For practice you might try to adapt it so that it uses the IX register.

Another variant you could try is to use the IX or IV registers in place of HL in Program III. Remember you can PUSH and POP IX and IV.

Actually Programs III, IV and V all assume that CharOut doesn't affect the HL register pair. If it did we'd have to safeguard them before calling CharOut. Can you see how to go about it? Here's a hint - the program's going to do a lot of PUSHing and POPping.

- That should keep you busy for a fair time. Next month we'll be investigating a varied set of ideas including the screen memory and passing parameters to machine code routines from Basic.

Hex...	DIS M8086
0000:	.CharOut=M8086
0000:00 0C 00	CALL printer
0000:	SPH 'message'
0000:07	RET
0000:	.printer
0000:03 03	DI SP,IX
0000:	.charPrint
0000:06 76 00	LD A,(IX+0)
0000:03 03	INC IX
0000:09 24	CP 24h
0000:0B 05	JR 3,amd
0000:03 54 00	CALL CharOut
0000:06 72	JR charPrint
0000:	.amd
0000:03 03	DI SP,IX
0000:06 04	LD A,04
0000:03 54 00	CALL CharOut
0000:06 00	LD A,00
0000:03 54 00	CALL CharOut
0000:07	RET
0000:	END

Program V

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The word processor is heavily conforming with excellent features... The database is very easy to use and extremely powerful... The spreadsheet program is the most likely gem... Having used *Mini Office II* for the past few days I cannot praise it too highly... (Popular Computing Weekly).

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**W**HEN you turn on your Amstrad Basic is instantly waiting for you. There is nothing magic about this — the Basic interpreter is just a machine code program in a ROM.

Theoretically you could unplug that ROM and replace it with another containing Pascal, say, or a word processor and that program would then always be instantly available.

In practice things are not so easy. The Basic ROM also contains the operating system for the micro, so you can't unplug just Basic. Also it is inconvenient to keep opening up your machine to change programs.

Luckily the people who designed the first Amstrad CPC built into it an arrangement for switching in and out additional ROMs without having to disturb Basic. All you need to do is provide a suitable board to hold the ROMs with a little bit of electronics on it.

However the Amstrad CPC is also capable of expansion in many more ways than have so far been realised. All of the key electronic signals have been brought out to the expansion port for you to use. However they have not been buffered, so the more you hang off this port the more chance you have of corrupt signals, errors and crashes.

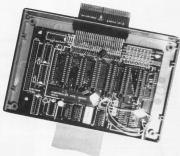
To overcome this problem Maplin Electronics has produced a kit for a ROM board which also has space for buffering components.

It also plans to produce a motherboard which plugs on to this board and will allow you to add up to six more peripheral boards such as V/D ports and an option programmer.

If you do not have solder flowing in your veins — and pains in all the clodes in your left leg — you can be forgiven for not having heard of Maplin before.

It is a large distributor of electronic components specialising in supplying home constructors, and is also well known for its large range of electronic kits and projects.

The ROM board kit comprises a main printed circuit board and all of the components necessary to get the ROM section working — excluding any



## Solder on, and build yourself a ROM board

actual ROMs — together with a plastic box to house the finished board, a project description leaflet and a constructor's guide.

There is also a jack plug and socket which conveniently brings the light pen connection out from the expansion port, and a description of the buffer section to enable you to buy the correct components and add them to the ROM board if you wish.

Resisting the temptation to open up all of the little bags of components — and drop them all over the floor — I first read the constructor's guide, a

brief A5 booklet packed with good advice for beginners and others on building electronic projects successfully. It also contains useful tips on what to do if your efforts don't work first time.

There is an excellent section explaining the techniques of soldering, and good descriptions of the different types of components to enable you to put the right pieces in the right holes.

From this booklet you will learn that, to assemble the kit you need a

**TONY HUNTINGTON**  
tries out a Maplin kit





## END Prize letter

AFTER attempting to run the character generator listed in the May 1988 issue of your magazine I stumbled across a minor problem.

I now have a 6128 having previously gained a 484. The problem lies in the memory used by the disk interface causing the address of the RAM copy of the CDG's to be incorrect by about 1800 bytes after a `!VARDISK, AFTER` command.

The address is now 8097C instead of 84500 and the 870 should read:

```
870 WTA MB,AMB,MB,MB,MB
C,MB,MB,MB,MB,MB
```

This solved the problem as far as I can see as there is still enough room below the CDG's for the second copy of the characters which is made by the program.

To load a saved set into your own program you must use:

```
!VARDISK, AFTER !LOAD"CDG"  
!VTC
```

I hope this solved the problem as it is truly an excellent utility with a really neat display on screen. — **John Thompson, Paisley, North-ahya.**

## !VARDUMP erased

I AM having a problem using !VARDUMP as when I `!LOAD` the program I want to debug it erases out !VARDUMP after

All programs printed in this magazine are exact reproductions of listings taken from working programs which have been thoroughly tested.

However, on the rare occasions when mistakes occur corrections are published as a matter of urgency. Should you encounter error messages when you type in a pro-

# Character generator snag ironed out

gram, they will almost certainly be the result of your own typing mistakes.

Unfortunately you can no longer receive personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the next pages.

My 3D Grand Prix, for example, won't load unless I

change the modem from the back of the machine.

It's a pity because software companies don't make allowances for everyone's idiosyncrasies.

Can anyone cure my 3D problem please? — **D.G. Winston, Glen Darrig of Appin, Argyll.**

It's virtually impossible for software houses to make allowances for everyone's idiosyncrasies, mainly because they don't know what idiosyncrasies everyone's got!

Apart from that, 3D Grand Prix was written long before the Nightingale modem even saw the light of day.

We're afraid it's a fact of life that certain peripherals will always need memory reserved by various games. You have accepted that fact in relation to the disc drive and you must now accept it for the modem.

However utility ROMs such as Amn's Utopia have the ability to disable both itself and any other ROMs in your memory.

This can be used to replace the memory and should allow you to run your softwares.

Anyway, the modem from the back of the machine.

It's a pity because software companies don't make allowances for everyone's idiosyncrasies.

Can anyone cure my 3D problem please? — **D.G. Winston, Glen Darrig of Appin, Argyll.**

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This can be used to replace the memory and should allow you to run your softwares.

## Question of style

I WAS honoured to see the contents of Abbot's column in the June issue of Computing with the Amstrad.

The theme is about proficient programming and he particularly makes the point that the best way to learn programming is to study and analyse good examples, and then to emulate their style.

He then proceeds to give four of the worst possible examples of programming that I have seen in a long while.

It is only to be hoped that Abbot's refusal to react at

## Win a tenner

As you can see, this month we've started to award £10 prizes for the three most interesting letters sent to us.

So now there's more reason than ever to contribute to our lively letters page.

Get your pens out, start writing and you could be one of the winners.

The address is: Postbag, Computing with the Amstrad, Europa House, Chester Road, Hazel Grove, Stockport SK7 5BN.

the many people who have asked him over the last 20 years!

Looking at the listings I can only assume that his experience was gained on the Spectrum — one of the few machines which will not complain at the examples that he gives.

One of the first principles of programming is that you should never jump out of a FOR...NEXT loop. With the majority of computers this will cause the stack to fill up, causing eventual memory problems.

Every example in the column jumps out of loops prematurely. Unconsciously I have supplied with WARE-MIND expressly for the purpose of carrying out an indeterminate number of

## From Page 69

loops, leaving FOR...NEXT for its intended purpose of carrying out a set number of loops.

It's not necessary to jump out of a FOR...NEXT loop — at least to be done with some BASICs not provided with alternatives — it can be done fully by simply increasing the loop counter variable to its highest possible value.

The loop will then be exited properly, taking the track to the process.

The reason I suspect that Altavista is used in a Spectrum is that, rarely, except with Spectrum programs, have I seen so many GOTO statements in such short programs.

Again I am not providing alternatives. Good programming does not hop all over the place. All the programs could have been rewritten in a much better fashion. — David Foster, Hemel, Cambridgeshire

■ The column said: "The idea is to write a short program — the shorter the better, in any language — Basic is the easiest".

If you rewrite any of the four

## Computing with the AMSTRAD Postbag

We welcome letters from readers — about your experiences using the Amstrad, about tips you would like to pass on to other users... and about what you would like to see in future issues.

The address to write to is:

**Postbag Editor**  
Computing with the Amstrad  
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examples in "better fashion" they will all get longer — try it and see.

I agree that using GOTOs certainly helps to busy the meaning of the program, but wasn't that the idea?

**Altavista**

## Erased programs

We are two 20-year-old Slovak Amstrad 6728 users who are wondering if you can help us

with a couple of things.

If we erase a program with DMA can we run it again? Can you tell us if the POP command can make a copy of a program even if it is protected, and how can we do this?

We are also looking for Amstrad pen pals. We would like to swap general information on the machine, tips, PDAs and software. — Dennis Retala and Petrus Korntentinnu, Mattilala 4, Ahtisa 11882, Greece.

■ There are two ways to restore an erased program on...

disk. The best way would be to use a disk editor to alter the directory and restore it to its previous state.

The easy way is to use a utility like Copylok from Pico Utilities.

We don't publish programs to copy protected discs as this could lead to piracy of commercial software.

## Spanish contact

I AM a 21-year-old Spanish user and own an Amstrad CPC432.

I would like to contact British users of the CPC432 and PCW525 to exchange useful information — Juan Antonio Sanchez, c. 614, 3-514 Miraflores De Sierra — (Barcelona, Spain).

## Source of error

TWO other users I ordered some back copies from you, one of which contained the all singing, all dancing character generator program from the May 1985 issue of Computing with the Amstrad.

I duly typed it in, sorted out all my inevitable system errors and tried it out.

It worked beautifully until I tried to use the DMA facility, and then I got "NEXT MISSING IN 505".

I tried it out further and got "NEXT MISSING IN 600". I looked carefully through the program and counted all the FORs and all the NEXTs, and discovered there were two fewer NEXTs than there were FORs.

I am at a loss to understand how a program could be printed with such an obvious error in it. Can you help? — A. Entinella, Cardiff.

■ There is no error in the program. You haven't copied the listing exactly as printed.

You will have almost certainly missed the small REM tick before the ELSE in the

## Improved disassembler

### Prize letter

CRIPTE owning two perfectly good disassemblers, including Maxon, I typed in Roland Middleton's compact Basic version, so that I could modify it to disassemble into an ASCII file with automatic label-generation.

Can I suggest a couple of improvements in July's Postbag Mr Brewer pointed out a couple of problems, and I had used his and Roland's solutions to them.

Unfortunately after testing the program exhaustively on a disk file containing the entire 280 instruction set, documented and otherwise, I turned up two more opcodes which don't quite make it.

These are C6,C8 hex Fd and D1,80 hex 21. The first can

be dealt with by changing the 240 to read:

```
340 IF (byte4) THEN IF (d1 AND 0) THEN (d1) AND 0 ELSE 0
```

To deal with the other one change line 1580 to read:

```
1800 G=CHR$(M*(15 G=CHR$(M AND 0) OR (M AND 0) AND 0) AND 0)
```

The last 042 should start at the 77th character of the string.

A further point is that the program generates lots of string garbage, and if you use it extensively it will build up as far as 65535 and there will be a length pause while Basic reclaims the odd 20k of memory.

To prevent this garbage should be collected on each

pass through the main loop by

```
270 SPARE=0
```

The variable must begin with letter a, since 0-9 are defined as type integer, and won't accommodate the value returned by AND.

Mr Brewer's line to delete uncontrolled opcodes are a welcome addition to the program. As you say the DMV instructions are OK, but the if is always mixing them instructions involving JM and XL.

To overcome this difficulty the second condition in Mr Brewer's line 375 should be amended so that it begins:

```
375 IF (d1 AND 0) THEN (d1 AND 0) AND 0
```

— John Blackburn, Cambridge.

505, and the one before the FOR in line 620.

If you copy the program exactly as printed it works perfectly.

## Binary to Ascii

I RECENTLY use my CPC464 for maintaining the names and addresses of the members of a club, and for this purpose I found the Textfil program you published in the February 1985 issue of Computing with the Amstrad to be perfect for trying them by myself.

I recently bought the Amstrad word processing package in cartridge form. This is useful for my requirements, but I have one problem concerning my Amstrad address.

The Textfil program has saved me well but Protext would make life so much easier if there any way that the information - over 800 names and addresses - can be transferred into Protext? - A.B. Street, West Sussex.

The following short program will convert a binary file into an Ascii file. This should be acceptable to most word processors and text editors.

Run it and enter the name of the Textfil file you want converting and its length. A new Ascii file will be created.

```

10 REM Binary to Ascii
20 MEMORY 12700
30 INPUT "File to load" :in$
40 LEN=LEN(in$)
50 INPUT "File to save" :fn$
60 INPUT "name"
70 INPUT "length" :length
80 FOR i=0 TO length
90 J=ASC(in$(i))
100 IF J=102 OR J=104 THEN
110
120 PRINT in$(i)
130 IF J=1100 AND THEN FN
140 in$(i) : J : FN : FN
150 NEXT
160 CLEAR
  
```

## Tasword margin adjustment

A FEATURE not present in Tasword that I had to include myself is loading a textfile so that the left and right margins are automatically adjusted.

It is obvious that the margin values must be saved along with the textfile itself, so that when loading this file afterwards the default margin settings of the system are overwritten.

The locations of these two values can be found at the following addresses:

Left margin 29124 or 87104 or s=2D

Right margin 29128 or 87108 or s=24

Lines 1610 and 1700 of Tasword can be amended as follows:

```

1610 MEMORY ANDOPENOUT AND
1700 IN$(i) : (i-1) : (i-1)
  
```

```

1700 MEMORY ANDOPEN AND
1800 IN$(i) : (i-1) : (i-1)
  
```

Insert some commands in the original lines and load up Tasword. Do not use the version of Tasword in combination with your old textfiles because of the awkward effects arising from corrupted left and right values.

Furthermore the first two

## No half measures

AFTER using a CPC464 for nearly two years I decided to buy my first major edit-on - an Amstrad CMP 2000 printer.

I then re-installed the Textfil program in the February 1985 issue of Computing with the Amstrad, as I intended to type it in. I found it easy

### Prize letter

Amstrads will have disappeared from the file.

There is a simple method for making a hard copy of the Composed Reference Guide in Microsoft Word 4.0's DCLC.

Everything will fit nicely on one page and you need no more than type Ctrl+J to obtain a list of all possible references, thereby obscuring the actual source text you are editing.

Type the following after the Ctrl+J prompt:

#### Keycode 008,10

Delete the two messages "Done for more (ENTER) to quit" and the empty lines below it. Put a title at the beginning and finally press Ctrl + D + G.

Replace in the right upper corner the filename 0080.MCP by 120 - Note the colon - and press Enter to start printing.

For anyone with the Amstrad Device 484 here is a solution for the missing 255 code programmer faced with the problem of using two - ORG - assembler directives in one assembly text and saving the two sections of object code.

Why not split the assembly into two independent sections?

Doing so disables the cross-referencing at labels set up in

asm1 - in fact it proved far better than one I thought for it.

However I soon found out that I was unable to produce characters such as halves and quarters. I tried in vain for hours on end with no success. Can you help? - A. Atkinson, Oldham, Lancs.

Unfortunately you can't print halves or quarters. There are two problems.

Firstly the Amstrad's printer

the other part. For example:

```

ORG 30000 part 1
LJ R,orga
LD A,0A1
JP 000A
align: DFF 'R'
;
ORG 30000 part 2
LJ R,align
JP 000A
  
```

Using ORG saves only the machine code of the second part, even when option 10 is chosen. Fear not, there is a way out.

Save the second part as usual - O.PARTTWO.

For the first part when option 10 is used. Note the address of the end of the assembly text and use the R-command [R].

Note also the symbol table length [S] and deduct from the assembler for the length of the object code of part one [C]. Go to Basic and enter the command:

```
SAVE "PARTWO",S,30000+L,C
```

For the first part when option 0 is used it is the same as the second step of the relation, but replace the start address [R]-[R]-2 by the ORG value of the first part, or, as in this example, 30000 - Patrick De Geest, 1970 Wazzenhoek-Oppean, Belgium.

point is only 7 bits wide and the code for a half is 150 which is an eight bit number. It is therefore impossible to send it to the printer.

The second problem is with the printer - does it have a half in its character set?

We haven't got a CMP 2000 manual to check this, but it is unlikely, so even if you could send the code for a half or quarter it probably would not print as one.



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#### Factsheet Focus

The following is an extract from our factbook on BASIC compilers available on CP/M-80 computers. Firstly, the PC79 benchmark timings and then some facts about each compiler in turn.

Test	ZBASIC	MBASIC	CBASIC	Method
1	0.8	0.4	0.2	7.1
2	1.0	0.4	0.3	20.4
3	4.9	44.0	22.0	180.8
4	4.7	39.0	20.0	64.1
5	4.8	28.8	20.1	104.9
6	29.8	29.8	21.7	230.7
7	31.4	33.0	21.7	270.9
8	103.3	73.1	374.1	35.4

Note: Benchmark 8 was done with a loop of 1000 rather than 10000. Method BASIC is an interpreter and its timings are shown for reference. The variables used as loop-counters were declared as integer in all cases.

**ZBASIC** is a fully interactive compiler which allows you to type in and test your program directly as you would with a standard BASIC interpreter. Typing, RUN completes and runs the code in memory and various options exist to save the compiled code to disc to be used as a stand-alone program. Overall, ZBASIC is easily the fastest compiler in our list. The syntax required and keywords present are very similar to those used in Microsoft BASIC, so converting existing programs is not very much of an effort. ZBASIC is also available for the IBM PC and the Macintosh, at the same price. The Advanced version of the ZBASIC compiler incorporates forward graphics routines for the CPC464, CPC664 and CPC6128 machines.

**MBASIC** is Microsoft's BASIC compiler and is available too on any CP/M machine for a new, lower price. MBASIC is one of the oldest BASIC systems around and its syntax is so widely recognised and learned that it is used enough the standard BASIC. The package includes the code: Micro-80 assembler system, incorporating the M80 macro assembler, the LIB linker and loader and the LIB80 object module library.

**CBASIC** is Digital Research's popular Commercial BASIC compiler and comes complete with GDS graphics, Good value.



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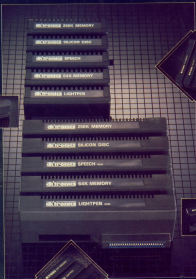
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# BUSINESS COMPUTING

---

## WITH THE AMSTRAD



## Breaking into Europe - with the PCW

**Review**

### NETWORK

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**Review**

### SPREADSHEET

Virtual memory plus variable grid plus multiple windows add up to Scratchpad Plus

**Review**

### COMMS

All-in-one package to link your CPC to the outside world - we go on-line with Connector

**Review**

### ACCOUNTS

From stock control to purchasing - MAP's integrated suite handles it all . . . and more



# Paula plus PCW starts two firms

A REDUNDANT law clerk's investment in a PCW8256 has been transformed into a legal business serving the whole of the North West of England.

Today 24-year-old Paula Bradshaw finds herself the boss of not one but two companies operating from plush offices in the centre of Manchester. Yet it wasn't so long ago that she was on the dole.

It was while she was browsing through a legal journal looking for another job that she got the idea which was to change her life.

This came from an advertisement for a company offering a unique service to solicitors in the London area. "So I thought I would try the same in Manchester - only better", she says.

With a grant of £1,000 from the Enterprise Allowance Scheme, a bank loan and £700 of her own savings, she founded the city's Lawyer's Legal Bureau - a comprehensive service offering do-anything, go-anywhere style staff to the area's hard pressed legal firms.

To help her achieve this her first purchase was the PCW8256. "Business was very slow at first", she recalls. "I would sit in the office from 9am to 5pm waiting for the phone to ring".

But one day the phone did start to ring and it hasn't stopped since.

"It really has taken off", she says. "I had no idea that solicitors and barristers would need us so much".

The office PCW8256 contains details of all personnel on the Bureau's books - from women clerks only able to work limited hours through to ex-policemen anxious to undertake investigations. "We simply wouldn't have been able to handle half our business without our Amstrad", insists Paula. "It has nursed us along all the way".

Now she has even found it a new



Paula Bradshaw... scores with a PCW8256

job. She has just opened a reservation service to take care of hotel bookings, restaurant reservations and chauffeur driven cars for visiting businessmen.

"Our PCW workhorse is taking care of this as well", she says.

## Silicon discs get new OS

A NEW operating system from DR'Tronics enables the firm's silicon disc to work as Drive C with CRM+ on the CPC464 and CPC6128. The new software also allows users with both the 256k memory and the silicon disc to configure the system as 442k silicon disc.

It automatically probes the machine to find out how much memory is fitted and sets the system accordingly.

The enhanced version has 128 directory entries with 2k block size as in the PCW8256 RAM disc, and automatic initialisation and configuration to use the maximum amount of expansion RAM - including the additional RAM provided by the 256k RAM expansion.

This allows three possible configurations: silicon disc, expansion

RAM or both expansion RAM and silicon disc RAM.

Customers who want to update their 1.0 version of the silicon disc operating system should return it to DR'Tronics. The silicon disc operating ROM has also been released as a product on its own, enabling users of the 256k banked switched memory to use it as a 254k disc from Basic/CPM 3.2 or 190k with CP/M+. Price £29.95.

In addition DR'Tronics has updated the software supplied with its memory expansions to allow 81k TPA area with CPM 3.2. A free upgrade service is being offered for this facility to customers returning their bank switching software to the company.

## Training

TWO firms have joined forces to open 75 "PC Learning Centres" to train business users on the PCW8256 and PCW8912.

Headline Communication and RT Computer Training will base their centres on an existing network of secretarial training venues. New courses have been designed which embody the techniques of Headline's Real-Time audio tutors.

Headline has recently published a range of Real-Time audio tutorials for the PCW8256 and PCW8912 covering Locomot, CRM and Basic, and Supercalc 2.

A division of Real-Time/Teacha, which has been offering audio-visual training packages for more than 12 years, RT Computer Training has a chain of 50 franchised secretarial training centres.

## Exporting

AMSTRAD and PC business software sales continue to go up down under. Sagesoft claim their UK software demand has winged to Australia and Europe.

Orders from Australian Amstrad users for their range of business software - Accounts Plus, Stock and Invoicing, Payroll and Retrive, at



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AD 2

### From Page 3

well as the award-winning data communications package, Crit-Crit - have been met by shipments to PC Services, their distributor in Sydney.

The company's overseas trade is also expanding in Europe. In the last two months 1,000 copies of the Italian language version of Retrieve has been sold via CIS in Milan.

David Goldman, the company's managing director, says: "We see Segsoft as becoming an increasingly internationally-oriented organisation".

## Database for tyros

USING a simple menu system, File Manager from Sandpiper Software is designed to enable first time users to create a database system within hours rather than days.

The program allows the user to begin with simple systems and then expand into fully interactive databases with automatic transaction processing and report generation.

The database is fully relational and interactive, permitting function processing, rapid screen creation and screen formatting.

An interface is built into the system for the creation of external flat files for processing by other software systems, and an eight character encryption code is available which allows full data security.

Data usage is minimised typically by two-to-one compression of all

numeric data into the records held on discs.

A launch date is imminent and File Manager, claimed by Sandpiper to be as powerful as systems costing more than £500, is expected to cost around £150.

## Free help, too

INTEGRATED Accounting, a low-cost business package, has been launched by MAP Computer systems for the PCW 8256 and 8512.

Free after sales support and advice from MAP Hotline is included with



the package which costs £148, with individual modules available at £48.

Also available from MAP is Payroll, a suite of programs which store employees and payroll data, calculates gross and net pay, and produces pay slips. Price: £49.

## IBM loses out

A LEADING financial software house that made its name in the IBM PC market now finds that this section of its business is overshadowed by demand from Amstrad users.

Compact Software, the specialist

company set up by accountants, is currently achieving record sales thanks to the PCW8256.

"I've recently announced it had notched up the 3,000th sale of its accounts package for the machine.

"We now find that the Amstrad side of our business is outstripping IBM," says Danny Underley, a Compact director. "So we are obviously very well pleased with the market".

The company has recently reached agreement with three major distributors - GRM, Proteus and New Star - to handle its range for the Amstrad market.

Nor has its success linked to Amstrad been confined to the UK. Compact has just revealed that it has signed distribution agreements in Australia and Spain. These involve Proteus, Compact's first Amstrad winning package, which is a report and program generator.

"Our newly appointed distributors out there are very enthusiastic about Nucleus", said Danny Underley. "But even more so about the future of the PCW in their respective markets".

Nor does Compact share the concern of some companies that the impending Amstrad IBM clone may damage the PCW market. "If this does happen, it will not affect us at all", insists Danny Underley.

"All our product can be upgraded to IBM compatibles. After all that's the very market in which we started out".

## Latest Pascal

OXFORD Pascal - the fully extended implementation of standard Pascal - is now available for the CPC 8128 and the PCW 8256.

Systems Software (Oxford) offer the compiler, which supports every feature of Pascal, for £24.95, including a comprehensive tutorial and reference manual, making it suitable for those new to the language as well as the experienced programmer.

Oxford Pascal, running under CP/M+, features a range of extensions designed to get the most out of the Amstrad models including file constants and I/O, bit manipulation, random access files and program chaining.

## Delta 1 gets a boost

THE outstanding success of the PCW8256 has given a new lease of life to Delta 1, the earliest version of Compact's best selling Delta database management system.

High Street demand for the Amstrad machine, coupled with a major Compact advertising campaign, has generated massive sales for the package.

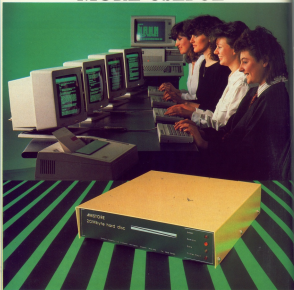
Delighted Compact marketing manager Wendy Berry told *Business Computing with the Amstrad*: "There's a new attitude among micro

buyers. Database software is now the thing so we've increased our output of Delta and appointed additional distributors, particularly those experienced in High Street retailing".

Launched in 1983, Delta 1 was developed for the earlier generation of 8 bit micros and had been superseded by versions for 16 bit computers, the latest being Delta 4. But the arrival on the scene of the 8 bit PCW8256 has resurrected Delta 1 and, says Berry, "demand has been mushrooming since 1st November".

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**IN writing what will be by far the longest review I have produced for *Business Computing with the Amstrad*, I have attempted two quite separate tasks.**

Readers with no interest in this device's many facilities can regard what follows as an article on networks, using Amstore as an example.

Alternatively those who are in the market for more storage or a network will also be given the basic computing principles by which any product of this type must be judged.

In the early days of data processing, users employed a roomful of electronics to perform one simple task at a time. As developments raced ahead the electronics became fast enough for several tasks, such as printing invoices, data entry of deliveries into and out of the warehouses, plus a file sort, to be carried out simultaneously.

The term time sharing was coined to represent this type of computing, since the processor was fast enough to split its attention between the various tasks it needed to carry out.

When micro were first produced it was in some respects a retrograde step. They certainly brought computers into organisations which hitherto would no more have entertained their use than fle to the moon, but they also returned the users to the one processor, one task situation of 10 years earlier.

Only as microprocessor power grew did they become capable of time sharing or multitasking. An obvious example is the PCW, which can edit one document while printing another, with only a marginal drop in performance of each task.

So much for the past. Turning to the present and given a £10,000 budget, you can buy a single processor and then hang a wide variety of separate keyboards, printers and discs on it. This will work fine until such time as the processor becomes psychotic or a memory chip suffers amnesia. When this happens all £10,000 of equipment stands idle and every task is delayed until the replacement is fitted.

Or for the same £10,000 you can buy a variety of smaller systems, each having their own processors and memory, and then tie them all together so that data produced on

# AMSTORE

**Not just extra storage plus networking, but a massive leap in functionality for the Amstrad user, says JO STORK**

one is made available to the rest. With this approach, if any single unit needs repair only a small part of your work is delayed. All the other units continue unaware of their aberrant neighbour's malfunction.

It is this second approach which has been given the buzzword of networking. In my view it is a much better way of performing separate tasks since it overcomes this reliance on a single piece of hardware.

Purists may quail at this simplistic description, but it is perfectly adequate. The only thing to add is that the units which may be hung on to a network do not all require internal processors.

Many will be intelligent devices, but others can be anything a computer needs to access, such as printers, plotters, electronic mail, telex and of course discs. Providing everything understands a common language there is little problem.

The next buzzword you are likely to meet when considering networking is node. Each unit connected directly on to the network is a separate node. Consider the PCW, which comes with its own printer. This printer can never be a node since there is no way of connecting it directly to the network.

A stand-alone printer however, such as the DMP 2000 or a laser printer, can be hooked directly into the network and therefore may become a node. Similarly the PCW itself is an ideal node.

Another buzzword is ring. There are many different ways in which the various nodes can be wired up, but the simplest is in a loop. The advantage of such a system is that no single unit on the ring has dominance over another. All you have is a loop of wire, with a network controller

somewhere along it and sockets at any convenient point.

A certain amount of circuitry needs building into each socket, so that data which in some cases may only need to travel one degree round the loop and in others 360 degrees, ends up at the right place. Nevertheless, as far as the user is concerned all that is required is to plug the equipment into the sockets.

The theoretical beauty of the ring system is twofold. Should you need an extra node at a later stage all that should be needed is to cut the wire, insert a new socket in the gap thereby severing the ring, and plug the new bit into the socket.

Alternatively if you need to move equipment, you can have sockets distributed throughout the organisation and the ring works whether equipment is plugged into them or not.

Until now the practice never lived up to the theory, since there was always a need to re-configure the nodes whenever the ring itself or the equipment on it was changed.

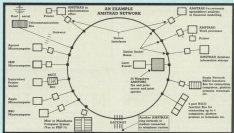
Depending on the design and the number of different types of devices hooked into the ring this could be a time-consuming chore. The beauty of the Amstore system is that theory is fact. Re-configuring is a thing of the past.

When you need to send data from one node to another some requirements must be handled automatically. The data passing round the ring must be in a form which the network can handle and the ring must be ready to receive this data.

The automatic data preparation is handled as follows, bringing us to the last buzzword, packet: The data, no







**From Page 7**

matter what its length, is broken up into segments or packets.

No matter what device is the sender or what and where the receiver, all packets are basically identical and preceded by a header with information regarding the destination node.

Think of this as having a fleet of identical 10 ton trucks. If you need to deliver 18 tons, one truck will be full and the other only partially so. If you need to deliver 121 tons then 12 trucks will be sent, of which 12 will be full and one almost empty.

The two drivers in the first example and the 12 in the second are the equivalent of the headers, since they know the route. Just as trucks can be loaded with pig iron or ping-pong balls so the packets can contain any kind of data.

The importance of the circuitry in each socket now becomes evident, since it is constantly listening to the ring, analyzing each header as it passes and checking if it is the node for which the data is intended.

If a socket is the destination the electronics diverts the packet from the ring into the equipment, rather like points at a junction on a railway track.

Before a packet is inserted into the ring a check is made that it does not run the risk of being gobbled by other packets already scuttling round.

If the risk exists a further attempt is

made after a brief delay. From this it should become clear that the data limit of a network is never the number of nodes on the ring, but the amount of traffic the ring must bear.

The analogy I used in a recent lecture was of a country lane between two major towns being adequate if no one ever wishes to go from one to the other. Conversely a motorway would rapidly become choked if both populations decided to travel simultaneously.

Similarly with a ring, if each node works in a virtually stand-alone mode, you can have a vast number of nodes.

If a laser printer is in constant use while a central file store is repeatedly being accessed then the traffic pouring round the ring, or waiting for it to become free, can be considerable. The number of nodes that can then be handled with acceptable response times is significantly reduced.

Before looking in detail at Amstrads, a final point about packet based rings needs making. IBM, Amstrads, BBC Micros, Apples and so on use totally different internal data formats, but can be attached to a ring if some common format, a kind of binary Esperanto, can be created. When this is provided there is no restriction as to the data passed round the ring.

Networking can therefore be a superb method of integrating equipment from diverse sources in organisations where separate departments followed differing purchasing policies

and finished up with otherwise incompatible kit. Furthermore, it can often be more cost-effective to place older equipment on to a network than replace it with new kit.

While testing a network for a customer recently, spreadsheet results produced on an IBM PC were merged with documents and graphs produced on a Macintosh and then listed on an Apple printer.

The CPC range of computers has many merits, but its disc storage is definitely one of its weaker features. 176k maximum file space is inadequate for many applications which its 280 processor is quite capable of handling.

The PCW with a second drive, despite its shortcomings, is much better in this respect but even so there is no point having 700k of data on one machine when it is also needed on others. If still more storage is needed you currently have to look for sources of supply other than Amstrad.

Amstron - a unit about the size of a typical hard-backed novel - holds 20 megabytes, on a high performance fixed disc. This is more data than early mainframes could handle and is enough for the majority of company's storage requirements. If still more is needed extra Amstron units can be added when required.

Even though this is a vast improvement on what Amstrad



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## From Page 9

provide, the more I learnt about the Amstore the more I began to feel that Northern Computers do themselves a grave disservice on two separate counts. The first is the name they have chosen - Amstore. It implies that all you get is extra storage from the 30 megabyte disc.

Nothing is further from the truth. I suppose it could be used like this but it would hardly be cost-effective, since Amstore is not merely the heart, but also the brain and central nervous system of the network. I would have thought it much more sensible to have given it a name reflecting this role.

The second is that the more I learnt about the internal design and capabilities of the circuitry, the more I came away convinced that it is grossly under-used. This is not to say that it is not doing an admirable job at the time of writing, merely to say that with even minimal development it could become an international standard.

I rate the flexibility and potential of this device as highly. It like me to see Northern Computers merely scratching the surface of the device's potential.

Leaving these background topics aside, the two obvious questions are:

- What is Amstore?
  - What use can it be put to?
- Amstore is made up of the following: A 20 megabyte flat-plate network server, a network station (junction) socket, a network interface plus lengths of 2-wire network cable. To all practical purposes you can have as many as or as few as you need.

Looking at each element in detail, it must be understood that a file server is much more than just a central data repository. Obviously it needs sufficient independent intelligence to construct a header in order that the data requested is dispatched to the correct node.

I have no quibbles whatsoever with how Amstore does this part, but there are two other, arguably even more crucial factors to consider and these are still only under development by Northern Computers.

The first of these factors is that when a wide variety of individuals is accessing a central store data security becomes crucial, and must never be compromised by any

improvement in flexibility. Consequently the restriction of unauthorised accesses is a vital task. At its simplest this is no more than locking some users out of a file while others may access it.

In practice a more sophisticated set of privileges or access rights are highly desirable. In order of priority these are the ability to alter or even delete data, add to it, look at it and - the ultimate sanction - be barred from access.

A system as outlined above is still not perfect, and would not serve a busy network satisfactorily. The reason is that a considerable amount of automatic protection of records is necessary when a single file can be accessed by more than a single user at a time. If you do not understand why a file server must meet this second requirement, then consider this data:

A stock record indicates 20 items are still available for sale. User A accesses the record and commences re-writing it to show that 10 items have been allocated to a particular sale. In other words the free stock is now only 10.

While user A is keying in the allocation user B accesses the record in respect to a query from a customer as to how many are available for immediate delivery.

If the file server is up to the task, whenever two users attempt to access the same record simultaneously the second receives a 'Record busy' message. In the example above this message should be passed to user B. After a slight delay, which would depend on how much longer user A kept the record, it would be re-accessed by user B who could then inform the customer that 10 can be delivered immediately.

If the file server does not handle such a situation the customer will be misled, albeit innocently, into believing that he could have 20 items.

While this situation is not a frequent event, it is statistically significant. I leave you to imagine what potentially calamitous situations could occur in your organisation if this record locking is not enforced.

Amstore's electronics are quite capable of providing these protections, but currently they are not implemented, despite a pair of 280s and a cluster of ROMs. Potential

users, particularly those who have worked with minis or mainframes, must therefore realise they will not get the facilities they may have become used to. Even so as we will shortly see, it can prove highly satisfactory and cost-effective.

Compared to the task the file server has to perform, the other three components are much simpler to understand. The junction box could be mistaken for a standard Telecom wall socket. What makes it different is the simple circuit inside it and the fact that any piece of equipment in the ring may be plugged into any one of these sockets.

As I said earlier, the beauty of the Amstore system is that it is invariable what is connected where.

The interface unit had me fooled for a while. I mistook it for an RS232 interface. This is understandable, in that it provides much the same function, that of converting the computer's internal codes into the protocol required by the ring.

It is about the size of a packet of 20 cigarettes and slots into the Amstore's expansion socket. A couple of metres of wire leads from it and is plugged into the junction box.

This unit also contains another 280 and still more ROM, since it also has to have sufficient intelligence to decide when it is safe to place a packet of data on the ring.

If a delay is required there is sufficient memory to buffer the packets, thereby ensuring that unless the delay is unusually lengthy the user need never know that a packet has not yet been transmitted.

As far as the wire is concerned there is little to say, except that there must be laid in a complete ring, and that no active socket - that is, a junction with a unit connected and working - can be more than one kilometre from the next active node.

My guess is that wiring up the ring will require about half an hour per node, providing they are not too far apart. This includes stripping the two core, colour coded wires, attaching the socket to the wall, attaching the wire to the socket's circuit and pinning the wire neatly to the wall.

There is only one word to describe this - impressive.

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## From Page 71

with the network. For this section I will assume that a couple of PCs, a couple of PCWs and a couple of IBM PCs are connected to the ring from different offices.

Somewhere in the ring there is an Amstrad and a high speed, high quality printer. I have purposely chosen this combination, not only because it is typical, but because it contains a mixture of 8 bit CP/M and 16 bit MSDOS computers.

It must be clearly understood that while all the programs the users require could sensibly be held on the Amstrad, and then sent round the ring to whoever needs to run them, you must not be fooled into thinking that the PC software will run on your PCW or vice versa.

The PCW could request it, the Amstrad could send it, and the PCW could receive it into its memory but it couldn't actually run it. The problem arises because the machine instructions of one are meaningless to the other.

I am a great believer in courses for courses. If an organisation has a need for several micros, it is eventually more cost effective to get ones which are best suited to the particular tasks to be carried out, rather than a cluster of identical, general purpose computers.

This approach until now leads to a blizzard of incompatibilities. Only with a network can you share the benefits of their individual attributes.

Where a network wins is in its ability to move data or the results anywhere round the ring, no matter what the originating processor.

A PCW is admirable as a word processor or as a cheap data entry device. Its printer is however built to a price, and its processor not beefy enough for large, complicated calculations unless you have considerable patience.

Consequently you can prepare the reports, correspondence and publicity material on the PCW but push it out to the high speed, high quality printer for final output. Similarly the PCs can be used for the more complex spreadsheets and the results sent back to the PCW.

No longer need a secretary at a PCW preparing a document feel restricted. An engineering drawing produced on a PC AT can be merged

into her work almost as easily as a piece of text on her own disc.

The reason I say almost is because much of the data produced by any computer is coded with special codes. Some may be purely of relevance to the software, some to the screen and many to the printer.

As currently stored on disc, this review is a mass of Tab, Margin, Form feed and other characters. They mean plenty to my PCW8512, but may be totally unintelligible to a CPC, PC or a laser printer.

Consequently data held on the Amstrad should either have these special characters stripped off or, if this is impractical, they should be the standard Ascii values which any device on the ring can interpret.

Alternatively, different versions of the same software, such as SuperCalc or Wordstar, should be used.

The disciplines which a network imposes are much greater than for a stand-alone micro. However they are not very limiting in practice, as the following examples show:

An educational establishment can have single copies of suitable software made available to a wide variety of students. Each can work with his own copy and return the results to a common point for assessment, or for merging into a group analysis.

Meanwhile each individual keyboard station need be no more than the simplest processor and a screen. For a 12 booth computer room, the savings can be anywhere from 20 to 40 per cent of the cost of providing each student with his own disc capability.

As an added bonus, any student would have immediate access to specialist devices such as a plotter.

An organisation can integrate the typing pool, design, sales and marketing, purchasing, production, personnel and wages departments into an efficient, single database.

Not only can the data be passed from one application to the next with little problem, but also each can be provided with the best computer for its specific task.

Software houses can greatly reduce development times, since modules can be created at various nodes and merged for final testing.

The reasoning behind this is that if only one copy of a module is stored any change to it is automatically

incorporated by all other staff.

The problem of programmer A working with version 2.1 and programmer B with 3.0 disappears. A further advantage is that specialist staff need not necessarily tie up expensive kit. Once again the costly units are available to all.

So far I have barely touched the subject of costs. Assuming that the PCs are the expected Amstrad IBM compatibles, the total outlay for the example system would be as follows:

2PCWs .....	£1,000
2CPCs .....	5000
2PCs* .....	£1,200
1 Amstrad .....	£1,400
4 printers** .....	£1,200
10 junction boxes .....	£150
incidentals* .....	£350
1 network printer* .....	£2,000
<b>Total .....</b>	<b>£8,000</b>
* Estimated	

There is no alternative I can think of at this price which even approaches it for flexibility or performance. When you consider that I allowed for only 10 nodes, and this ring can handle up to 120, it is obvious that it is only just the beginning. And, of course, it isn't micro specific: interfaces are currently available for Amstrad CPC/PCW, Apple II, Apple IIe, IBM PC/XT/AT, Agilent P/P/C and BBC Micros.

In conclusion I will only add that for users with the discipline to control the network properly, and who have the processing load to justify such an investment, there is currently nowhere else to look.

A tape streamer is under development, so that the Amstrad itself can be backed up. For the time being, backing up on the creator's own disc will prove adequate if not ideal. Once the data security aspects are tightened, I would have no qualms about recommending it to the next salvo of users.

As of now, if you keep the current limitations very much in mind, it still represents a massive leap in functionality for the Amstrad user.

My biggest regret is that this review will only be read by current or potential Amstrad users. The basic concepts behind this network are such that I rate it highly enough to suggest users of far larger micros consider this hook-up. ■

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CAXTON Software has chosen a curious name – ScratchPad Plus – for its spreadsheet program. It sounds as if it might refer to some kind of electronic notepad – in fact there is an ideas processor called Scratchpad, produced by Innovative Software, which runs on the BBC Micro.

But there's no obvious connection between making rough jottings – which is what a scratchpad is used for – and working with a spreadsheet.

Very briefly for the uninitiated, a spreadsheet consists of a grid of cells, each identified by a column number and a row number, with the screen acting as a window moving over the grid. Calculations can be carried out on values either entered directly into the cells, or deduced from formulae. For example, a formula something like:

**AVG (B1 – B3)**

entered into cell C1 – Column C, Row 1 – will display in that cell the average of all the values in the block of cells between B1 and B3.

Now Caxton describes ScratchPad as an "enhanced" spreadsheet, and the blurb in the introduction to the manual proclaims categorically that the program differs from all other spreadsheets on the market in three distinct respects.

First it uses virtual memory – overflow to disc – so grid size is limited only by disc capacity. Secondly it allows variable grid dimensions, in other words the number of rows and columns need not be fixed in advance, thus saving on memory.

Thirdly, it offers multiple window-

# Spreadsheet with a lot to offer

**GABRIEL JACOBS**  
**reviews Scratchpad Plus**

ing as shown in Figure 1. This enables you to view simultaneously and scroll independently as many separate parts of a worksheet as will fit on the screen – and therefore, incidentally, to lock labels in a variety of ways so that they are always displayed precisely as you want them – as opposed to the usual limit of two windows on a screen split either horizontally or vertically.

However these undoubted virtues do not explain the program's name. Nor, despite Caxton's unqualified claims, are they unique to ScratchPad Plus. To take just one example, MasterPlanner from Comshare, which runs on the PCW, has both multiple windows and virtual memory.

As for variable grid dimensions, some spreadsheets – admittedly running 16 and 32 bit machines – go one step further, using what is called a sparse-filled matrix, in which empty cells consume practically no memory.

Nevertheless ScratchPad Plus turns out to be in my view just about the best spreadsheet available for Amstrad machines. And at £69 –

which includes a free copy of Caxton's Smarties, a handy key-board-customisation program – it represents real value for money.

Those brought up on an industry standard spreadsheet like SuperCalc and Multilog will quickly recognise when they use ScratchPad Plus that it has been partly modelled on these packages – and you will not be surprised to learn, therefore, that it can easily read in and create SDF and DIF data interchange files.

But while incorporating the best ideas of its predecessors the package has also been endowed with many extra features, quite apart from the three already mentioned. What we have here is a powerful business tool which should satisfy the needs of most users.

For a start it has a wide range of mathematical functions and even a facility for reversing the order of calculation – that is, columns before rows – so fairly complex models can be handled.

It has a sort option which will arrange sections of a worksheet into ascending or descending alphabetical or numerical order and an interactive lookup function for finding values greater than a given search criterion.

There is also an intelligent replication facility, which translates formulae copied to another part of a worksheet so that they bear the same relationship to the new section as they did to the old and an option which enables one worksheet to be merged into another.

The grid itself is totally flexible. Any cell can contain text, values, a formula or a function call. Text automatically spills over into adjacent cells, so global column width need not be

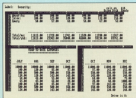


Figure 1: Multiple windowing facility

**From Page 15**

adjusted to accommodate it. Values can be prefixed with a E sign, shown with commas — for example, as 1,100 — and have their decimals truncated in the display without affecting the accuracy of a calculation.

Formulas can range from a simple total to a complex series of conditional functions dependent on other formulas in blocks of distant cells.

Yet with all that editing and formatting a worksheet on the screen are child's play. There are simple commands for changing the contents of cells, for inserting and deleting rows and columns, for protecting cells against unauthorized or accidental changes and so on. Also an on-line Help facility is always there for quick reference.

Above all, hard copy printouts have been made as easy as they could possibly be. To print out a section of a worksheet you merely select page parameters from a print menu, and specify the rectangle of cells to be printed.

If you design your printout carefully, all well and good. If you don't, ScratchFed Plus will make a

**LIMITS**

Max rows .....	255	Disk capacity .....	5,300 on the PCW
Max columns .....	84	Disk capacity .....	5,300 on the PCW
Max no. cells in memory .....	1,300	Max column width .....	84
Max column width .....	84	Max decimal places .....	8
Max labels/places .....	8	Max label size per cell .....	39 characters (but can extend into adjacent cells)
Max formula size .....	31 characters		

graceless effort to produce a readable output.

If a worksheet will not fit across a page the program will divide it into blocks by intelligently wrapping columns, then print these blocks one below the other. And of course you can print out a worksheet showing formulas rather than results, a useful option when building complicated models.

One big advantage for PCW owners — no doubt a sign of the times, and maybe of the future — is that ScratchFed Plus comes ready implemented for the machine, whereas on all other machines the program has to be installed with special peripherals.

The implementation takes into account the non-standard PCW screen size, allowing a bigger window on to the grid, and the keyboard has been fully configured in a CRM Setkey file.

For example, the function keypad the dedicated word processing keys can be used for frequently required commands, which means that single keystrokes replace most of the double-key operations normally expected by the program.

Furthermore the documentation, which includes a handy prompt card and would be just about perfect if an index had been included, is oriented

very much towards the PCW. There are helpful comments throughout for PCW users, and where a machine is used to exemplify a point the PCW is invariably the one chosen.

This does not mean that CP65120 owners should spurn ScratchFed Plus. Life is just made that much easier for the rapidly increasing number of people using the PCW for business purposes.

All this is not to say the ScratchFed Plus is beyond criticism. It does have its failings, and some of them could have been relatively easy to correct with a little more thought in the design of the program. Perhaps the worst shortcoming is that if the current worksheet has not been saved there is no trap to warn the user that loading a new one will overwrite it.

The other major weakness is slow disk access, particularly in loading and saving. This can be largely overcome on the PCW by using the RAM disc, as is suggested in the manual.

But a word of warning is necessary here — the RAM disc can certainly be used safely for the ScratchFed Plus command files, but in my opinion it should not be used to speed up access time with large worksheets which require the virtual memory facility.

This is far too dangerous a practice, since a minor spike or a disc full error could spell disaster.

These negative points however have to be set against the overall quality of the program, its price and the enormous amount it has to offer on the positive side. ■

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- ATN (arc tangent)
- AVG (average)
- CHOOSE(x,y,...) (depending on 1, returns one of the other arguments in the list xy...)
- COSine
- COUNT (counts the number of entries in a block of cells)
- EXPonent
- FACTorial
- IF... THEN
- INTeger
- LOG
- LOOKUP (compares values in two tables)
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- NPV (Net Present Value)
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- SINe
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# THE QUICK CONNECTION

ROBIN NIXON reviews Commstar

**COMMSTAR** from Pace Micro Technology is a communications program plus accompanying hardware which enables you to connect your Amstrad via a modem to databases such as Prestel, MicroLink and the numerous privately run bulletin boards around the country, as well as to other micro users.

Pace originally developed Commstar on the BBC Micro. The conversion to the Amstrad range includes some nice enhancements such as pop-up control windows and menus and simple cursor key selection of options.

You can buy a package including an RS232 interface which connects to the back of the Amstrad, a Nightingale modem and two pieces of software, Honeyview and Honeyterm. However these can be bought separately — the software either on disc or ROM.

Honeyterm enables your Amstrad to emulate a terminal connected to a mainframe or mini as in a commercial data processing environment. Honeyview on the other hand will only communicate with a viewdata host such as Prestel.

So if you wanted to download information from a messaging service such as Telecan Gold or talk to other

micros you would use Honeyterm, and if you simply want to scan pages of viewdata you would use Honeyview. These two programs comprise Commstar.

Honeyview is a very well designed program. The graphics are clear and the design of the pop-up menus is excellent. On selection of a control menu a black window appears on the screen with the control menu's title in a box at the top and the various options shown below.

Selection of an option is by use of the cursor keys and Return or Enter. Once you've selected an option, or if you press Escape, the window disappears redisplaying the area of the screen that was under it.

Some options have sub-options. Each time one of these is selected another window appears slightly offset from the previous one — the title of each menu remaining visible. This allows you to keep track of exactly where you are.

Using Honeyview is simplicity itself. Once you've connected everything up — which only takes two minutes — you simply dial the service you require, such as Prestel, and wait for the high pitched carrier tone. When you hear this you switch the modem on-line and the title screen appears.

On most teledata services you

then have to enter a security code and/or a password. If you have not yet joined Prestel you can enter 4444444444 for security code and 4444 for password. You will then be presented with a demonstration database which explains Prestel's main features.

If you take a look at Table 1 you'll see the set of preprogrammed functions you can call up using the function keys in conjunction with Ctrl.

Ctrl	
/	Screen format/control.
1	RS232 configuration.
2	File handling.
3	Teletextware downloader.
4	Exit mode.
5	Ready/On-line modes.
6	Carousel mode.
7	Print screen.
8	Disc ROM commands.
9	User key definitions.

Table 1: Honeyview's preprogrammed functions

These enable you to alternate between screen Modes 0 and 1 and change the links, reconfigure the RS232 and select one of the major file handling routines such as save and load screens to and from disc or buffer or download telesoftware. You can even add your own viewdata screens.

There are also facilities to select between On-line or Ready modes, display up to 10 (previously saved) screens in sequence — rather like a carousel slide projector — print an entire screen ignoring all graphics, select tape, disc or alternate between drives A and B.

In addition you can define your own function keys. This could be



## From Page 19

useful for storing your customer identities and passwords or your more commonly used page numbers and so on.

In Mode 0 the display is created using squashed characters, which are virtually identical to the slim characters explained on page 61 of the May 1988 issue of *Computing with the Amstrad*. The screens are printed quickly and are very clear.

Mode 1 having only four colours uses a system of dithering to obtain the full eight colours. This works by placing pixels of different colours adjacent to each other so fooling the eye into thinking it is seeing a new colour. This works fairly well, but some colour combinations are less clear than others.

Honeyterm operates in 80 columns. The other major differences between it and Honeyview are the lack of graphics, the scrolling display and the use of buffering.

The main purpose of Honeyterm is to act as an Ascll terminal for sending blocks of data such as documents and statistics, so there is little need to transmit graphics and it is impractical to stick to the 24 by 40 one screen at a time format of videotex. Also in place of having 10 buffers for 10 separate screens Honeyterm has only the one so that it can hold larger files in memory.

As with Honeyview, Honeyterm's main features are accessed via the function keys. As you will see from Table 2 some of these correspond to those used by Honeyview.

These features operate in roughly the same way as Honeyview's with



Ctrl	Function
/	Configure terminal characteristics.
1	RS232 configuration.
2	File management.
3	Transfer files.
4	Off-line mode.
5	Ready/On-line modes.
6	Spool to file or printer.
7	Print RAM, file or screen.
8	Disc management.
9	User key definitions.

Table 1: Honeyterm's programmer's functions

the following exceptions:

Ctrl 3 enables you to send and receive Ascll files to and from other users or mailboxes.

Ctrl 6 allows you to keep a copy of any files by spooling them directly to disc or printer as you receive them.

Ctrl 7 enables you to print a file from screen, buffer or disc. Of course all these disc operations will work with cassettes.

To complement the two programs, Comstar also provides you with a set of RSAs giving you access to communications from within your own programs. These are shown in Table 18.

The manual is well thought out and



includes an introductory section for absolute newcomers to Comstar. As well as detailed explanations of each feature there are example programs showing how to use the RSAs, a glossary of terms, full technical details and a section on how to use Comstar with CP/M.

I was very impressed with Comstar, as indeed I was with the BBC version. This fully professional product is exceptionally user friendly and is the ideal package for beginners and experts alike.

Product: Comstar Package  
Price: £750 (incl. VAT)  
Supplier: Ace Micro Technology,  
Jupiter Way, Altonna Road,  
Boreford SO11 2AG, Tel: 0274  
088211  
Requirements: CPC series micro

<b>IRONON</b>	Switches ROMs on and off.	<b>ICPRINT</b>	Selects the serial channel for printer output.
<b>ICBREAK</b>	Breaks communication for a specified time.	<b>ICPUT</b>	Transmits a single byte to the serial channel.
<b>ICCLOSE</b>	Closes the RS232 channel.	<b>ICREAD</b>	Reads a string from the serial interface.
<b>ICCOUNT</b>	Returns the number of characters transferred by the last ICNULL, ICREAD or ICWRITE command.	<b>ICREPORT</b>	Allows errors to be reported as soon as they occur.
<b>ICERROR</b>	Returns the error code for the last command used.	<b>ICSTATUS</b>	Obtains the hardware status of the serial interface.
<b>ICGET</b>	Gets a byte from the RS232 channel.	<b>ICTIMEOUT</b>	Specifies the time after which a command will stop attempting to transmit or receive a character.
<b>ICNULL</b>	Transmits a specified number of NULL (&00) characters.	<b>ICWRITE</b>	Transmits a string.
<b>ICOPEN</b>	Opens the serial channel.		

Table 2: Comstar's RSX commands

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- Software is contained in an expansion ROM and there are two environments in which the Silicon Disc can be used, ROM+ under ROM+2000 where all the normal ROM+2000 commands are fully supported (DAD, LAR, MERG, CRT etc) and within CP/M 2.2 CP/M+ where commercial programs are designed to run on multi drive systems.

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switching ROM software (ROM software on cassette 612B on disc).

- The software adds some BASIC commands which makes it possible to use the second 64K or 3rd or 4th and 5th in the case of 256K for storage of screens, windows, graphics and basic arrays. This ability means that you can write much larger basic programs and sophisticated programs that use pull-down menus with ease.

- With an expansion fitted on the 464 it then has the same memory configuration as the CPC 6128. It will then run CP/M+ with its massive 61K TPA area, opening up an even larger software base to 864 users, when using either of the expansions with CP/M 2.2 on the 464 and 612B computer the TPA is increased to 64K.

- The RAM is accessed by means of bank switching using a single 803 port. Memory is actually switched in and out of the 64K/200 address space in 16K sub blocks (as per the ROM+). The port determines which particular combinations of the original four 16K sub blocks and any new sub blocks from the expansion RAM will occupy the 64K address space at any time. All of this switching is done automatically by the software supplied.

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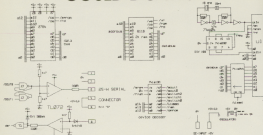
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It seems that each month more reasonably priced yet sophisticated software for the PCW series is coming on to the market. The latest of these financial packages is the MAP Integrated Accounting Suite.

In the words of the manual the programs are designed "to become a valued business asset", helping to control both the user's business and costs "more effectively". Having tested the sales, purchase and nominal ledgers, and stock control and payroll modules I believe this system should fulfil the financial accounting needs of most businesses.

The manual could also have added that small accountancy firms would find such a package useful. The low cost of the Amstrad and the programs themselves mean that such accountants can afford to offer computerised services and management accounts to their clients.

A nominal ledger would be particularly useful for those firms which have to produce figures from incomplete records.

Indeed the whole package is designed for people who know how to keep the books. The manual clearly states that it cannot "provide training in accountancy and book keeping practice".

You are advised that if you are less confident you should consider involving your accountants during preliminary stages. This should not merely be advice, but ought to have been made an instruction.

The fact that it is mentioned at all is, however, a clue to the general high standard of the manual. It is well written, and contains a lot of useful information other than the operation of the system. For instance, examples are given of suggested layouts of data entry forms.

These have one weakness in that they concentrate on the information needed by the computer. Spaces for the signature of the person authorising the data entry, confirmation that it has been entered and dates should have been added. However the system log suggested by MAP does have these features.

A lot of good thinking has also gone into the needs of accountants, and the audit trail is mentioned. It is no good having accounts produced by

# Ideal package for expert book-keepers

**PETER WALKER** reviews MAP's  
**Integrated Accounting Suite**, and says  
that it can greatly benefit small  
and medium size businesses

people or computers if, when the VAT officer calls, the sources of the figures in the books or printouts cannot be traced.

So that there can be such an audit trail you are advised to have seven files in which to store the various reports from the ledgers. More files are needed for the payroll and stock modules if these are added to the basic system.

Two more points could have been usefully added to the manual. Any business registered for VAT and using the MAP suite should inform the VAT office of this. Yet another VAT inspector is a nuisance, but it has to be done.

Furthermore a brief mention of the existence of the 1984 Data Protection Act would have been helpful. Although accountancy systems themselves escape that Act, you have to ensure that any personal data on your records is kept away from people not authorised to see it.

Once you've read the comprehensive manual it is time to set up the system. This is done with the aid of the three discs supplied by MAP. If you only use the sales, purchase and nominal ledgers you only need two. In addition to these, of course, data discs must be prepared.

The manual is obviously of general application, because the suite of programs has been designed for other operating systems including the IBM MS/DOS.

Amstrad seem need extra instruc-

tions. Three such guides were provided with the programs to be tested. Two were for the PCWB250 and the PCWB12 respectively, whereas the third was a general installation guide.

This was a little confusing because I had to go from one to the other while I initialised the disc on a PCWB12. It would be more helpful to have one set for each machine, but the process was completed successfully.

The instructions contained the following useful information on the capacity of the PCWB12 data disc:

**Sales Ledger:** 250 accounts, 2,000 file transactions.

**Purchase Ledger:** 100 accounts, 800 file transactions.

**Nominal Ledger:** 250 accounts, 2,500 transactions in each period, four cost centres.

**Stock controls:** 800 stock items with three sales and five cost prices.

With the exception of the nominal ledger the volumes can be reduced. This means that other volumes may be increased.

There was no such helpful summary of the PCWB250 instructions. By reading through them the equivalent figures for one data disc appear to be:

**Sales Ledger:** 750 accounts, 800 file transactions.

**Purchase Ledger:** 80 accounts, 300 file transactions.

**Nominal Ledger:** 250 accounts,

1,250 transactions in each period, one user/terminal.

**Stock control:** 50 stock records with two selling prices.

It is a pity that these PCW256 figures were not laid out so neatly because they are important to users. A data disc can, however, be used with each program module, so more data can be stored. The price for this has to be paid in that more discs have to be handled by the operator.

The figures also show the power of the programs. For a small business the PCW5512 is the better option because the capacity of the PCW256 is limited.

Some quite small enterprises, particularly if they are in the installation industry, can have more than 150 account customers, so the number of stock records available on a PCW256 is very small. Furthermore even if a different data disc is used for each module the file handling problems increase.

The procedure is firstly to load the operating system. This is followed by

Integrated Accounting Suite could pay for itself very quickly, provided that it is set up correctly with all the necessary accounting controls.

This means that time has to be spent in entering the details of customers. My experience of resolving computer problems is that people do not plan sufficiently for this process. There are no particular difficulties in doing this on the MAP system. Mistakes are easily put right.

The purchase ledger is a similar process because it is a mirror-image of the sales ledger. This means that certain information prompted by the system, such as contact name and telephone number, is usually not needed.

Posting entries is also an easy process, and the operator is led gently through it all. The system provides for statements and remittance advice if required. These can be printed on plain paper or on specially printed stationery.

If you have any special requirements as to layout the MAP dealer

will have to help because the programs as they are cannot deal with different formats. Similar considerations apply to printing cheques through the purchase ledger. However it is a sign of the great power of the programs that this can be done.

Businesses themselves usually show their potential through people who have to be paid and taxed. For a few people a manual system is probably just as effective as a computer, but an automatic system can be a real boon.

It needs to be set up correctly, and in this respect the MAP payroll, like most others, requires a detailed knowledge of the PAYE rules. That is because whenever tax or national insurance rates change, the computer data has to be altered. You are presented with a detailed list of the current rates and have to find your way round it.

This is actually a benefit because the system is very flexible. I hope that the chancellor never introduces as many tax bands as are available on this payroll. The fact that extra ones can be added shows that a lot of thought has gone into the program.

If the complexity of choice is too great for you then any competent accountant with a background in computers would update the records quickly. Once that had been done the rest is more straightforward.

Because of the need for flexibility in payroll systems it is essential that proper reconciliations of the figures are carried out. What can happen is that a mistake is discovered after the payroll has been completed. A manual calculation is done for an individual employee, and his or her



Figure 1: The user chooses the program to use from the main menu.

what was labelled as the Set Up disc - confusingly called the Start Up disc in the manual. From the menu the user can choose which program to use, and this involves a third disc.

Despite the number of discs the particular advantage of the system to small businesses is that invoices can be produced quickly, while at the same time the records are updated. That is not only an efficient use of employees' time, but it also improves credit control.

The quicker that invoices can be produced, the faster the money should come in. The purchase of an Amstrad computer and the MAP

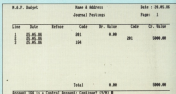


Figure 2: Posting entries... the operator is led gently through it all.

records concerning pay, tax and so on are updated.

Although the MAP system provides an audit trail in the form of printouts users should still keep check-totals of what they expect the computer to produce.

With tax calculations there is one complication that most payroll systems come up against. Some new employees may have had a spell of unemployment, so will be due for a tax refund in their first pay-check. The rule is that refunds of more than £50 should not be given in these circumstances.

The employer has to send a form to the Inland Revenue to get permission to make the payment. Computer programs cannot in general cope with this. In my test of the MAP payroll the fact of a refund of more than £50 was highlighted, but the employee would still have got the money.

The system is not the only one to do this. I have seen many others do so because it is simply not practical to stop a computer running to query whether or not the Inland Revenue procedure should be followed. It would be interesting to know of the reaction of the tax authorities to these problems.

There are riggles of another sort with the stock control module. According to the manual it "is a powerful and versatile system for controlling the movement and level of stocks in your company".

That is very true, but it is a complicated system. However this merely means that a lot of planning has to go into its installation. Once this has been done you have a powerful business tool.

For example, it is possible to record buying prices for various categories within a product. If lower prices are payable for bulk purchases the system can record this fact. These can be automatically changed each time the goods are bought for different costs.

The valuation and recording of stock can again pay for the cost of the computer and its program. If the right administration system is established there can be savings arising out of more efficient buying, such as holding lower stocks.

To this and the MAP system produces some useful reports. Apart from listings of stocks in general or of individual items there are price lists—

B.B.T.C.T.		Nominal RL Contents				B.L.R.H.	
Line No	Category	Quantity	Unit Price	Value	Quantity	Unit Price	Value
1	100	100	100	10000	100	100	10000
2	200	200	200	20000	200	200	20000
3	300	300	300	30000	300	300	30000
4	400	400	400	40000	400	400	40000
5	500	500	500	50000	500	500	50000
6	600	600	600	60000	600	600	60000
7	700	700	700	70000	700	700	70000
8	800	800	800	80000	800	800	80000
9	900	900	900	90000	900	900	90000
10	1000	1000	1000	100000	1000	1000	100000
11	1100	1100	1100	110000	1100	1100	110000
12	1200	1200	1200	120000	1200	1200	120000
13	1300	1300	1300	130000	1300	1300	130000
14	1400	1400	1400	140000	1400	1400	140000
15	1500	1500	1500	150000	1500	1500	150000
16	1600	1600	1600	160000	1600	1600	160000
17	1700	1700	1700	170000	1700	1700	170000
18	1800	1800	1800	180000	1800	1800	180000
19	1900	1900	1900	190000	1900	1900	190000
20	2000	2000	2000	200000	2000	2000	200000
21	2100	2100	2100	210000	2100	2100	210000
22	2200	2200	2200	220000	2200	2200	220000
23	2300	2300	2300	230000	2300	2300	230000
24	2400	2400	2400	240000	2400	2400	240000
25	2500	2500	2500	250000	2500	2500	250000
26	2600	2600	2600	260000	2600	2600	260000
27	2700	2700	2700	270000	2700	2700	270000
28	2800	2800	2800	280000	2800	2800	280000
29	2900	2900	2900	290000	2900	2900	290000
30	3000	3000	3000	300000	3000	3000	300000
31	3100	3100	3100	310000	3100	3100	310000
32	3200	3200	3200	320000	3200	3200	320000
33	3300	3300	3300	330000	3300	3300	330000
34	3400	3400	3400	340000	3400	3400	340000
35	3500	3500	3500	350000	3500	3500	350000
36	3600	3600	3600	360000	3600	3600	360000
37	3700	3700	3700	370000	3700	3700	370000
38	3800	3800	3800	380000	3800	3800	380000
39	3900	3900	3900	390000	3900	3900	390000
40	4000	4000	4000	400000	4000	4000	400000
41	4100	4100	4100	410000	4100	4100	410000
42	4200	4200	4200	420000	4200	4200	420000
43	4300	4300	4300	430000	4300	4300	430000
44	4400	4400	4400	440000	4400	4400	440000
45	4500	4500	4500	450000	4500	4500	450000
46	4600	4600	4600	460000	4600	4600	460000
47	4700	4700	4700	470000	4700	4700	470000
48	4800	4800	4800	480000	4800	4800	480000
49	4900	4900	4900	490000	4900	4900	490000
50	5000	5000	5000	500000	5000	5000	500000

Figure 10: A detailed knowledge of the MAP rules is needed

invaluable to sales staff, stockists and cost of sales reports among others.

All these records have to be coordinated, and this is done through the nominal ledger. All the entries processed through the other ledgers are posted here. Entries can also be made in their own right through a journal.

There are also some very useful features which accountants will like. There is a special system for entering accruals and prepayments. Once these have been established the system itself will continue them in subsequent periods without being reminded. This is a refinement which I have not seen in many programs, including those designed for main-frame computers.

The use of accountants' words such as accruals and prepayments highlight the fact that the preparation of final or periodic accounts through the nominal ledger requires accounting knowledge.

The book-keeper of a small business will be able to make the basic entries in the system, but may need guidance from the firm's accountants to prepare the rest.

Monthly accounts can guide the directors or proprietors of the business as to what to do in the future.

Economies can be made, salespeople can be pointed in the right direction and stocks can be controlled. Yet all this can be achieved at inexpensive equipment with this suite of programs.

However it needs care. The manual, which is fond of giving overviews of each module,

emphasises that the accounting suite could not replace an accountant. It has to be used by someone who knows what he or she is doing.

Businesses considering the use of the Amstrad with this package should bear this in mind. If its staff has computer experience and can plan ahead all will be well and good.

If not, then the accountant or computer expert should be called in. This will obviously increase the price of the project, but in the long run there can be savings.

If the accountant is presented with a set of figures with a good audit trail he or she is not going to charge so much. Another benefit arises out of more efficient invoicing and credit control.

In addition to this the MAP Integrated Accounting Suite is suitable for use by firms of accountants. It may not produce accounts in accordance with the Companies Act 1985, but it can take a lot of the slog out of preparing the figures from the incomplete records given to them by their clients — often known as brown paper parcel jobs. Smaller firms who do a lot of such work will find this useful.

Despite some of the criticism about detail the MAP Integrated Accounting Suite can be highly recommended. Small and medium size businesses should benefit from the extended use of their Amstrad computer it provides. ■

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**WHAT** do Portuguese love letters, Danish dairies and Italian novels all have in common? Why Joyce, of course. One of the lesser publicised aspects of the PCW is its ability to run a variety of foreign language sets under CP/M, and its access to a wide range of foreign characters and accents under *LocalScript* thanks to its additional shift keys of *Alt* and *Extra*.

I remember a writer friend of mine being overjoyed when he discovered, not that he could successfully print out the manual's recommended letter to Fred, but that he could print in *italics*, complete with accents, the phrase *coup de théâtre*.

Apart from its low-cost attraction to anyone doing any kind of word processing, these foreign characters make the machine particularly appealing to anyone involved in translation work of any kind. Mogens Bech runs a Danish translation service, and was immediately won over by the PCW's potential.

"In Denmark the price of the machine to us is the same as that of a good electronic typewriter, but for that of course you get much much more. We had previously been using brother daisywheel typewriters, on

## Getting to grips with foreign accents - the PCW way

By MIKE GERRARD

which there is no difficulty in using the different language typefaces that we need for our business, but we wanted to upgrade to full word processing facilities. Our only other choice when the PCW came along was to opt for an IBM system which would cost up to five times as much.

"I haven't seen any word processing system that serves us as well in Denmark. The machine is imported by a Danish company and reprogrammed so that the main keyboard is in Danish, but the other character sets and accents are still available as in the English version. The reprogramming has not been too wonderful though, and I think Amstrad should look into that.

"I represent a group of translators

who work mainly on business material in most of the European languages, and in addition to my own machine I have instigated the sale of a further 16 machines to other translators.

"We translate a lot of technical documents to do with food technology plants, dairies and other aspects of Danish industry. If a company is hoping to sell machinery or even build a complete plant abroad, we would translate the documents from Danish into French, Spanish or whatever language was wanted".

Mr Bech's only major complaint is over the print quality produced by the



Members of the Temple Translation cooperative at work in their north London offices.

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PCW printer, which he says is acceptable, but for professional purposes the machine really needs to be connected up to a printer producing letter quality rather than merely near letter quality results. His company, the Alliance Sprogservice of Aarhus in Denmark, has got the elusive interface but it is not proving compatible with the printer they want to link up to. "Still", he says, with great resignation, "I am sure we will fix it in time".

From the industrial to the intellectual, and author Stuart Hood, whose first task on his new PCW was to translate into English a novella by the Italian writer and film-maker Pasolini. Though Stuart didn't buy the PCW specifically for this purpose, he nevertheless found it useful to have a range of accents on the keyboard.

Although he is translating into English, many of the proper names remain unchanged and need to be accented and this can be done on the screen, where as previous translations done on the typewriter he would have to go through an entire typescript and add the accents in by hand. Another unexpected bonus was the Exchange facility.

"There was a term in the book which I wasn't quite sure how to translate, so I did it one way, but then when towards the end I decided it ought to be translated slightly differently, I was able to go through the manuscript and change every occurrence, which was delightful ease.

"The machine does make all my work easier. What I tend to do is write a preliminary version of something and run this off in draft mode, which is very quick, so it provides me with an in-between translation if you like. I then go back and correct this on the screen before printing out the final high quality version for sending off to the publisher.

"Many of the changes I make are only small — where I decide later that a different meaning would be more appropriate for one particular word on a page. Now I don't have to retype the entire page.

"It took me somewhere between 10 and 24 days to get to grips with the machine, partly because of the

**‘In companies where work is intensive but funds are limited the PCW is a godsend’**

infernal manual, but it's no real problem now. I found no problem in adapting from the typewriter to working at a keyboard and straight on to a screen — it would defeat the object of it if you didn't use it as it's meant to be used".

One of the delights of the PCW is that there is no one way in which it is meant to be used, and its potential is only just starting to be realised. In companies where work is intensive but funds are limited, the PCW is a godsend, or in the case of the Triangle Translations cooperative it was sent by the London Cooperative Enterprise Board, which bought 10 PCWs for distribution among the cooperatives that they advise and fund.

Triangle was lucky enough to get one of them, and though the machine is versatile it can't as yet help them with the Chinese, Vietnamese, Hindu, Urdu and other texts that they deal with on behalf of ethnic groups in north London.

It helps considerably with the other side of their work, however, which tends to be banking, legal, trade union and general business translations both into and out of the various European languages — not without a few difficulties, however, as Jutta Schettler explains:

"One thing that irritates me is that in German if you want to put an umlaut over a capital letter the machine thinks the letter slightly to make room for the umlaut. Mostly this is fine, except for the capital letter O, which it thinks to lowercase size so that it looks as if you've made a mistake", he said.

Another complaint is that if there were just another three characters on the keyboard, the PCW would provide a full Turkish alphabet, while the Greek alphabet is same size short of being complete, being limited at

present to those characters having mathematical relevance. Another of the members of the Triangle cooperative, Stephan Jaeger, points out that there is also a symbol missing from the alleged full French character set:

"It won't do the character which combines an o and an i into one letter, although the similar one which joins a and o is there".

Despite the complaints Triangle is delighted with the versatility of the machine. "If you have a piece of text that has to go out in a few different languages", says Jutta Schettler, "it looks good because you can maintain the same layout and so each translation will more or less correspond, and that is very difficult to do using a typewriter.

"We recently had to do some trade union work with instructions going out to printers in French, German, Italian, English and Spanish, and it was good to be able to present them in a uniform manner.

"Lots of the translations that we do are also very much the same every month, and here you can combine the translation work with the word processing without having to retype a lot of the same material month after month, which we did before".

One job which didn't turn into a monthly commission, although no one at the cooperative knows who, is the love letter mentioned at the start of this article. A romance had returned from a summer holiday, and wanted to write a letter to the love of his life in her native Portuguese, which Triangle was happy to help him with. That romance never returned, but if any of you out there have similar requirements this summer Triangle will be happy to oblige. And if you've ever wondered what the price of love is, it's about £40 per 1,000 words. Even with Jopier's help. ■

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## European characters

A PCW comments on the article by Gabriel Jacobs in the April 1986 Business Computing with the Amstrad may be of interest.

They are made by a computing ignorance with use the PCW 8286 solely for word processing with Laser-Script, and who aren't the slightest interest in exploring the capabilities of his equipment except as necessary to complete the word in hand.

"European characters can be accessed with no difficulty whatsoever". In one sense this is correct, but in my experience the locations of the keys make them awkward to use without the typing rhythm being interrupted - my a word like "difficult".

It perhaps doesn't matter for the said foreign word appearing in an English text, but readers contemplating doing much foreign language work may well find the keyboard less convenient than a "modified English" type-writer keyboard, and should weigh this against the advantages of the PCW 8286 for their particular work.

The new system disc is certainly a vast improvement on the original, which caused me a lot of trouble, but it has introduced a shortcoming not previously present - hard and soft systems can only be obtained through the menu, not by Set or Clear followed by hyphen.

This is a decided disadvantage when long words are frequent - particularly in certain technical or foreign texts.

I am glad to understand that there are no present plans for correcting this error. - G. Edgington, Burton Cumbria.

Like you, we do a lot of typing in foreign languages, so we know exactly what you mean.

But you have to remember that the vast majority of users



Business Computing with the Amstrad, Europe Hovers, 48 Chester Road, Hazel Grove, Stockport SK7 5NY.

in this country will want to print only the occasional word in a foreign language, and for them the PCW is about the best on the market.

With all other machines we have used, a complex install procedure is required to generate the scan codes which produce accented characters - and with a daisy-wheel printer you have the added problem of finding an appropriate wheel and getting your backspacing right without covering the screen in garbage.

The PCW handles all this in its article - a clumsy article, perhaps, but effective.

It is unfortunate that since LaserScript bypasses CP/M, the Setkeys utility can't be used to reconfigure the keyboard. If you try something like Peter Word combined with Caxton's Smartkey, you'll be able to generate accented characters with a single keystroke.

You'll have to experiment with getting the right control codes to the printer, but it will probably be worth the effort.

Hard and soft hyphenation can be speeded up by pressing the Set or Clear key as appropriate, followed immediately by the heated function key 12 on the numeric pad which brings up the menu, then holding down the down arrow cursor key.

Hard and soft hyphens appear as the last items on each menu, and the cursor will not proceed. By the time you've looked at the screen, you're ready to press Enter.

This is not as good as Set or Clear + hyphen, we agree, but

## Edited by Gabriel Jacobs

with practice it's almost as quick, particularly with the Clear menu which is the shorter of the two.

## Infernal device

I AM an author and writer aged 60 plus who moved quickly to electric typewriters and then to electronic machines (Olivetti 27721) and then finally succumbed to the use of the word processor.

I bought the one you can probably see, an Amstrad PCW 8286. All the pundits say "You get what you pay for". I did not want a vast accounting machine, mail merge and all the other "delights" which if an odd one now possible. All I wanted was a slightly more intelligent machine than the Olivetti or rather less so than what Olivetti had an offer.

After several weeks struggling with this infernal device I have come to the conclusion that it has cost me, so far, about £3,000, plus the actual cost of purchase. This is due to the amount of time I have wasted trying to get it to do what I want it to do.

I still my best is read the User Guide and the only thing I can say in its favour is that the pages fit flat.

I then bought the Clarity Guides WP on the Amstrad PCW 8286. This helped a little more, but still did not provide the answers to correct the mistakes I was making.

For example, I am using

CF200 discs in both drives since this is what I was supplied with. I format one set on A and the other in B and don't mix them up.

I was finding that trying to use drive B only produced an error message - Address mark missing. Therefore did I find any mention of this in the literature.

I rang up Clarity Guides, who did not know what the error message meant. Then I rang up Amstrad. They told me that I had formatted the discs on both sides in drive B and this was not intended, both sides are normally formatted at the same time. - Geoffrey Beestroyd, Glasgow.

You must be one of the very few customers who are wholly dissatisfied with the PCW and Laser-Script.

There are bound to be nitpicks when you first start using a complicated piece of equipment, but most new users are delighted that for straightforward applications the software is so easy to use.

For the most part, error messages are clear, though admittedly this is by comparison with other pieces of software that some of us were brought up on.

So we're afraid we can't recommend a simpler word processing package.

It's easy to fall into a persnick, but quite frankly it sounds as if you have persnicked enough. All we can hope is that your dreadful experience gives heart to other users who may be struggling but don't feel quite as discouraged as you do.

For them it will no doubt be comforting to think that there's someone worse off than they are.

## Secrets will out

I AM glad that my PCW8286 for about two months now and am beginning to realize that there are things in there that I haven't seen yet.

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## From Page 37

reminded by one of your correspondents has revealed to me the function of LROD.

Had I not known this is one of the manual's closely guarded secrets, I would like to know if there are others.

I wonder if you, or any of your readers, can help me with a few other questions it may be that there are other LocoScript users who are struggling with the same problems.

I keep one of my groups on the "last of last" disk as an address book containing, at times, all those addresses which I use regularly. If I am going to write to someone whose address is in this group, I copy the file with that address in it to drive M before I change to my data disk which has all my current letters on it.

Then, when I come to write my letter, I insert the address, and print the address label with **PRINT TEXT**.

I have tried keeping my address list on my data disk but it won't open too much directory and leaves me with a lot of space also area on the disk when all the file names have been used up.

I hardly use the ram disk M and so I wonder if anyone knows how to configure the start of the disk so that it will load files or groups in the same way that it loads files called **TRIMPLATE.DTD**.

It would do that my address book would always be in drive M, and I would save a great deal of filing.

An alternative would be to copy a whole group from drive M to drive M. This would be much quicker than moving my addresses file by file.

My other question is about communications. I have had various estimates from computer dealers for the cost of all the necessary kit required to adapt the basic **PC16250** so that I can access Prestel, Teletext Gold and Merlin, and use **ASB** to other stations.

Estimates vary from about £150 to £250. I expect that I am not getting the whole story. Can you tell me about a

cheap system for getting at these facilities? — **Squadron Leader G.J. Crosswell, Farnborough.**

■ Yes, there are many other users in the LocoScript manual — too many to list here. But keep an eye on these pages and eventually it will be revised.

It sounds as if you'd got your correspondence pretty well sorted out, and we would say there's little you can do to improve your system if you stick to LocoScript.

Unfortunately, LocoScript by-product **CP/M**, and **QUEST.COM** cannot be used with it, otherwise you could easily copy any files into drive M using a **PROFILE.SUN** file.

All stands, LocoScript will only look for those files at boot-up: **PHRASES.DTD**, **TEMPLATES.DTD** and **README** (which generates the sign-on message). For the latest information...

We assume you keep addresses in a single file or in grouped files, in order to save on directory entries, but sometimes transfer the whole file or files into drive M as you start up, use the **Find** facility to locate the address you want, track it, write it to another file, and read it in to the letter you are writing.

This is terrible fiddly, we agree, and if you have a great deal of correspondence, you might consider buying another word processing package with a mail merge facility which will do the job far more efficiently. Estimates are bound to vary when it comes to communications and software, and there's a wide choice of both.

First, you require an **85232** port (about £60). Next, a modem — anything from £30 to over £1,000. To access Teletext Gold, Prestel, Telelink and so on, you need at least a 300/300 baud modem, but a dual 300/300—1200/75 one would be better. These start at around £120.

Finally, you need some communications software which will handle both teletyped data (for databases and electronic mail) and slow-data (Prestel).

Mail232, which comes free

with the PCW, will only handle teletype. You will have to think in terms of at least £200.

We would say, therefore, that the minimum you would have to spend would be about £120, as has been suggested to you, but if you are willing to go to £200 you may well save yourself a nervous breakdown — some of the cheaper products seem to have been designed deliberately to create excessive mental strain.

## Superb service

I WOULD like the opportunity to comment on the letters in recent months from Simon Lantry & Co of Med-Clear and Freddie Nichols, both of operators at Swan Island Harbour, Trellech.

Having used the Med-Clear letter in the April issue with considerable enjoyment (and compelled to defend an unjustified and inconsiderate attack on an excellent program, and award points).

After writing and placing virtually empty software issues in Britain in the quest for the perfect database I finally found the holy grail — operator of Freddie Nichols & his Merlin program.

The first call to Operator was answered by Freddie Nichols, as have most of my subsequent ones. In the first few minutes of that conversation I learnt more about what I needed than all my previous inquiries put together.

We agreed on what we required of the system, and we brought his **CMRDOS** program after a visit to Swan Island and a demonstration, again by Nichols personally.

He said we a system capable of 20,000 records, with 80 fields to each record and 50 characters to the field. Whatever way you cut it it's big.

Obviously it is useless on its own — a good database will have to be able to create data structures simply, alter easy entry and editing of stored data, and make question time

as painless and full of choice as a day-time bar.

At the outset of negotiations we were told that the second disk would be needed sooner or later. This is now no more, and will be replaced in a half-hour visit to his shop.

In four months of constant use I — whose input is notably small — have never been able to imagine a crash the program.

All the letters have been short between my own — their explanation and solution a brief, friendly and protective short call away.

The **SI** page manual covers every feature in detail, and suffers from being written by a technician for other technicians to read. Remember this program originated on mainframes, and it was for the benefit of their operators.

However despite this at the site in store, and I found that a small degree of effort and persistence in front of the keyboard soon translates initial confusion into ordered and logical files.

You don't have to deal with accidents, there are no crash thoughts, and it won't let you put a foot wrong without telling you so and allowing you to change your mind.

This program and beloved Joyce have started a business where none could exist before. Clients phone us and we type in a series of references based on details they wish to include in the desired program.

We are able to ask for 20 such features at a time, and the speed is such that we usually don't need to call the client back — a selection from 2,000 records takes one to two minutes to arrive, depending on how many features are to be searched for.

I would not be surprised to find that **CMRDOS** sales rate a dip after such a glowing — Med-Clear should recognize publicly on behalf of their operators.

They may even consider actually loading the manual, and take out the software support material with Operator and call to a real expert. — **Laura Yobley, Lanchester City, Battersea.**

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## Setting up parameters

I WAS interested to read the article about the CP/M-86 and the Mail232 software supplied with the PCW 8248 which appeared in the May edition of Computing with the Amstrad.

As the writer correctly points out there is no facility in the software for setting the default values of baud rate and bit on.

I calculate that setting the communication parameters for accessing Telecom Data and identifying yourself to the computer requires a minimum of 48 keystrokes - more if you have a long password.

However, facilities are of the SETPDS.COM command file enables this to be reduced to just four keystrokes.

The first step is to set up a key definition file, as described on page 108 of the CP/M-86 manual. To do this you can use the file editor RIVED.8A.2 supplied on the system disk. It is suitable for Telecom Data should need as follows:

```

02 0 "" 000"
0 002 "call 000"
00 0 "" 000"
0 000 "00 000000"
13 0 "" 000"
0 000 "00000000"
00 0 "" 000"
0 000 "0000000000" 30
"0000000000" 30 "00"
"0" 30 "000"
    
```

In the above AA stands for your system number, 000000 for your customer identity and 00000000 for your password. You should insert the appropriate characters (initially RIVED requires 8x8=64 to create the control array.

Save the above file as, say, RIVED232. You can read it as a record file called RIVED232.DAT. This should read as follows:

write keyp.232  
call 000-000

and your console after should have an A CP/M-86, MAIL 232.COM, SETPDS.COM, SETPDS.COM, RIVED.232 and RIVED232.DAT.

When you load the disk Mail232 will load and run itself automatically, but here it waits the driver bit begins.

You have realised the Pause key to deliver all the keystrokes needed to set the transmission parameters, so press Pause.

The flashing menu appears, and like lightning the T and A keys are used to set themselves up to 300, the word length will become seven bits and the parity will change to even.

The menu vanishes, leaving you ready to dial up BT Data - if you want to check you can always press H.

Once the mainframe responds with the prompt P&Q> press X - this will automatically send call AA, then require H and 00 will send your customer identity and password respectively.

### David Thomas

■ An excellent idea, and one which can of course be taken further. For example, codes for VT32 emulation and appropriate login strings can be put into other keys which are unused in Mail232.

I personally always name a SEND.ASC file as it is to be sent by e-mail, since this will subsequently be deleted.

## On the right track

I FOUND the comparison of Locomotive Software's LocoScript with Microsoft's Wordstar fascinating.

The chief test is the effectiveness of a word processor. LocoScript has been designed from the outset to be natural to use. You tell it what you want to do and it just does it and remembers what you wanted to do.

Then when you change your text later LocoScript already knows how you want it laid out. Also at no time does LocoScript issue a document

incorrectly laid out.

We at Locomotive Software strongly believe this to be the best approach - one that is used by the best of today's word processors for the IBM PC.

In this way the well known problems with old word processor programs just can't happen with LocoScript. It will never run your printer with a file unless you forget to press Control-H, it will search or exchange text over a new line.

Locomotive Software has been working hard on producing some much requested additions to LocoScript. We would expand the list of those, LocoMail and LocoSpell, to be available by the time this letter is published.

LocoMail will provide sophisticated mailfile and built filing features. LocoSpell, which we have developed in conjunction with Computer's Dictionary Division, will provide an on-line 30,000 word dictionary, and a much larger thesaurus for more serious use.

Both will of course run alongside LocoScript and operate directly from LocoScript's editor.

Finally I should like to connect both Mr Wilkes' letter and your reply in the July issue concerning pagination of a single page document.

LocoScript provides very flexible features for headers and footers, and we have tried to make these work as naturally as possible.

Mr Wilkes is completely wrong when he suggests that LocoScript reads a document backwards. What it does do is to allow you to have different headers and footers on different pages - that different from rest, with different from even or all the same.

When different first or last has been chosen on a one page document LocoScript prints the header as if it were the first page and prints the footer as if it were the last page.

So to ensure that footers come out on a one page document do not disable the footers on the last page. This is

covered on page 107 of the user guide - in the supplement for the first edition. - Howard Fisher, Locomotive Software Ltd.

## Accounting program

WE ARE a small business, running an Amstrad 8612, and are having difficulty finding a suitable database.

We have tried Comdex, which would be perfect, but it does not have an arithmetic function.

Can you recommend a database program and in particular have you any experience of a program called Delta 1.25? Also, have you any recommendations for accounting programs? - J.M. Dorian, Warrington.

■ Delta produces a data management system called simple Database, which has some calculation facilities and which may well suit you.

Delta 1.25 is produced by Comsoft, costs about £100 and is a fairly powerful transactional database which will handle all kinds of data management applications, including integrated accounts, stock records, and so on.

Transactional means that sub-records can be attached to each record - in the case of Delta, up to eight - giving a kind of simulated multi-file handling capability.

Delta has a good label printing module up to five labels across 8 pages, with three fields per label line and will link quite happily to mail merge programs and word processors, but not to LocoScript.

It also saves its files in DRI format, which means that it can read in data from most up-market CRM spreadsheets.

However be warned that Delta is not for beginners who may expect instantaneous results. It takes some getting used to, and in fact is a set database on some university courses on information systems.

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