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October 1987
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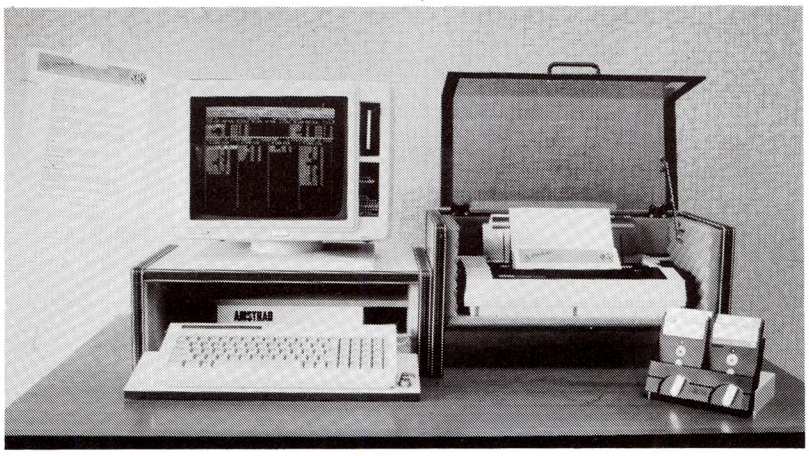

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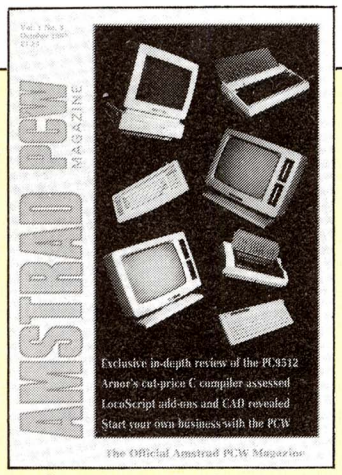

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Editor
Gabriel Jacobs
Deputy Editor
Dave Oborne
Editorial Assistant
Martin Woolley
Advertisement Manager
Jane Nolan
Advertisement Assistant
Lorraine Day
Assistant to Editors
Elaine Rawlins

**Amstrad PCW,
169 Kings Road, Brentwood,
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Tel: 0277 234459 (Editorial)
0277 234434 (Advertising)
061-480 0171 (Subscriptions)
Telecom Gold: 72:MAG021

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PCW CONTENTS

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REVIEWS

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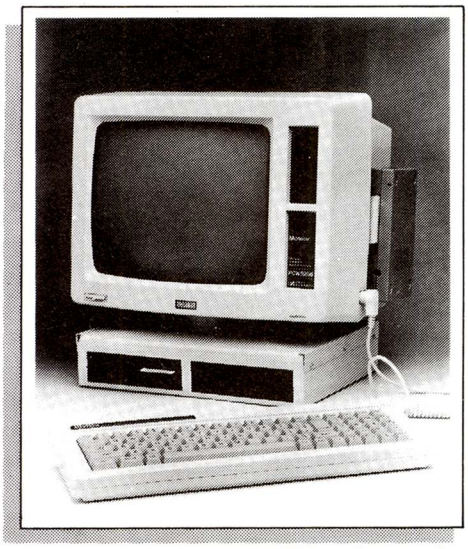

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PCW COMMENT

Heather, golden eagles ... and Prestel

MY annual ten day's leave from *APCW* was spent as far away from it as I could get without committing the rest of the year's salary to a holiday in distant foreign parts. For the money I had available, the north of Scotland seemed to offer sufficient remoteness from the world of the PCW and all aspects of high technology. Once beyond Inverness, I thought I would be well and truly incommunicado.

But Scotland has got even its tourist industry sown up. And by that I don't simply mean that round almost every bend there's a superb Tourist Information Office. Scotland is also trying to bring electronic data communications into its tourist initiative.

Every now and then – in the middle of nowhere – you find an exhibition centre. It's often a wooden hut full of ancient farm implements, crofter's birthing stools, 16th century peat-cutting spades and such like, all set out in a mock-up of a cottage scene, perhaps with a wax model of a crofter's wife sitting spinning in front of a day-glow-paper log fire. But talk about mixing the old with the new: On the other side of the exhibition you may well find a coin-operated micro linked directly to Prestel.

Take one such exhibition centre in an area renowned for its matured malt whisky. Pop a few 10-pence coins in the slot and you're online to the latest news about the incomparable nectar direct from the Association of Scottish Distilleries. Just the sort of thing you don't need if you can't afford a bottle of it.

I noticed in that exhibition centre that the visitors (outdoor-type families in hiking boots and dark green anoraks, elderly gentlemen in deer stalkers, salmon-rodded aristocrats, and yuppies disguised as hill-walkers) all gave the Prestel machine a momentary glance and moved quickly on to the wax crofter's wife. So I decided to carry out some unofficial market research for British Telecom.

I stood by the Prestel machine for about an hour, and as the visitors walked by I asked them if they knew what it was and what it did. Since then I have been unable to unearth any official statistics on the usage of such machines, but my on-the-spot inquiries revealed a wholesale ignorance of the very concept of data communications.

Only two of the people I questioned had even heard of Prestel, and neither of them knew any more about it than the fact that it was something like Ceefax, or maybe Oracle. Perhaps visitors to the Scottish highlands are untypical of the British public at large, but I doubt whether the results would have been much different if I had carried out a similar investigation in Paddington Station.

Cash cards are now part of our everyday lives. People key in personal ID numbers, get a current balance and even order a new cheque book by pressing a couple of buttons. And many probably don't realise that while the machine has got their card in its innards, they're online to a mainframe computer. They would be perfectly capable of coping with other online links such as Prestel or Email systems, but they have never even heard of them.

Estimates vary as to the number of PCWs in regular use in this country, but the figure is certainly in the hundreds of thousands, and there are hundreds of thousands of other micros. Then there are those people who don't own a micro but who know people who do. Millions of Britons have or have access to (most of) the basic equipment for getting online, and the vast majority of them have no idea what it means.

I'm not the first to point out that the situation is different in France, with its successful Minitel-based comms network. Nor am I the first to blame British Telecom for what I don't hesitate to describe as its spectacular failure to sell the idea of Telecom Gold, and even more so of Prestel, to the public. Indeed, BT-bashing in the press, on all kinds of fronts including (and especially) that of data communications, is becoming a kind of national pastime. But not being the first to say such things doesn't make them any the less worth repeating.

In his comment on the Midnight Line in this issue of *APCW*, Steve Gold points to some of BT's deficiencies in marketing the service. Now, whether or not BT chooses to publicise and generally sort itself out with Midnight Line makes a difference to the pockets of some of its customers. But when it comes to something like Prestel, or providing cheap and efficient Email services, BT has a far wider responsibility – that of promoting the important potential of computer communications for the good of us all.

If it fails to meet that responsibility head-on, Britain will be the worse off for it. We'll be left behind France, Germany and other advanced European nations, and we'll be thought of in yet another area of technology as an underdeveloped partner.

Gabriel Jacobs

Dr Gabriel Jacobs lectures in the University College of Swansea

The 8th official

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A134

PCW NEWS

The latest from Amstrad – and a first look at the newest PCW products

The world's cheapest facsimile machine?

A LOW-cost scanner which effectively converts the Amstrad PCW into what industry experts are claiming to be "the world's cheapest fax machine" has been launched by Database Software.

MasterScan clips on to the PCW printer, enabling text or illustrations – when fed into the printer – to be transferred automatically on to the computer screen.

Within a week of its launch it was chosen as a finalist in the British Micro Computing Awards.

By using a suitable modem and software, scanned images can then be transmitted to another PCW anywhere in the world.

MasterScan also offers a real alternative to spending hundreds of pounds on a video digitiser.

The optical scanner attached to the print head captures the image line by line. The result can then be combined with text or other graphics to create newsletters, leaflets, posters and so on.

Using MasterScan any part of an A4 page can be reproduced in a range from half normal size right up to six times magnification.

MasterScan can also be used with such do-it-yourself publishing packages as Fleet Street Editor Plus, The Desktop Publisher and Newsdesk International, to produce high quality artwork.

MasterScan comes with its own easy-to-use software for £69.95.

Gem of LocoScript 2

THE new version of LocoScript 2 will be distributed by Gem Distribution (0279 442842). Managing Director Paul Donnelly said: "We are very glad that LocoScript 2 has been added to our range of PCW software. We will be fulfilling the substantial quantity of back orders immediately, and we can see this becoming one of the fastest moving business products in our PCW range."

Iankey price reduction

IANSYST, publisher of the popular Iankey range of computer-based typing tutors, has just announced its prices for the next academic year.

Managing Director Ian Litterick says he is pleased that for the most part he has been able to keep prices at the same level, and in some cases reduce them.

For readers not already familiar with Iankey, there are two training courses: The Crash Course in Typing for beginners, and the Two Fingers to Touch Typing Conversion Course for experienced keyboard users who want to learn good typing skills.

Prices for the courses on the PCW are £24.95. Iansyst also offers multi-user licence terms which make Iankey accessible for the whole classroom.

Iansyst can be contacted on 01 607 5844

Hackers take note

MOSAIC Publishing (0425 57077) is soon to launch its computer game Yes Prime Minister for the PCW. In the game you play Jim Hacker, MP. You have the world at your feet and Sir Humphrey and Bernard behind you.

Your aim is to steer the leaky ship of state through a turbulent week in Westminster.

Do you have the ability, the guile, the sheer political will to stay on top?

A brand new television series is due to begin in November.

The programme's originators, Anthony Jay and Jonathan Lynn, have pronounced the game "remarkable". Sir Humphrey Appleby has also been heard to comment that it's "rather too courageous for its own good, if I may say so".

Ask me another

FOLLOWING on from their TEA event analyser (see *APCW*, August) the software company HeptaCon (01-734 5351) has brought out another innovative package. This time it is asking people to consider a Second Opinion at £35.

Second Opinion is a decision aid – a package which helps you think through the process of defining a decision problem (identifying your options, setting relevant criteria, and so on), and then analyses the problem to give you an indication of which of your options is the "logical" one.

It can be used in virtually any situation where a decision needs to be made.

Yearbook for desktop publishing

The world's first yearbook dedicated to the rapidly-growing desktop publishing industry is about to be published by Database Exhibitions.

Publication of The Desktop Publishing Yearbook is timed to coincide with the most important exhibition event in the DTP calendar – The Desktop Publishing Show 1987 – to be held at the Business Design Centre, London, from October 15 to 17.

Produced with the cooperation of PIRA, the UK Technology Centre for the Printing and Publishing industry, the yearbook will become the "bible" of Desktop Publishing.

As well as comprehensive details of price-performance of all the most important hardware and software in the field, the yearbook will also carry detailed practical articles aimed at both the newcomer to DTP and the experienced user.

Topics covered will include single-user and multi-user systems, publishing software, laser and other printers, dot matrix printers, digitisers and scanners, computer typesetting, magazine and newspaper composition, documents and forms creation, bureau services, word processors, and many other key topics.

The yearbook will be on sale, price £5, at bookstalls throughout the country.

But visitors to the Desktop Publishing Show will receive a free copy.

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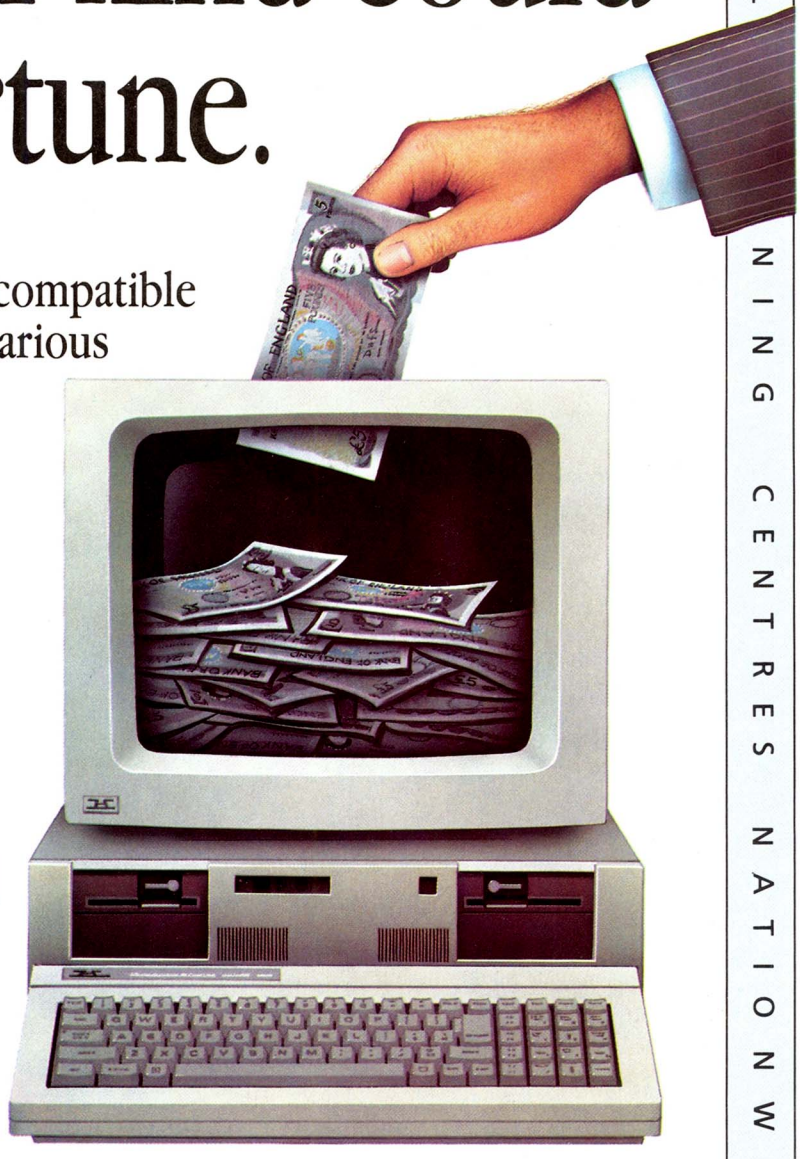

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PCW NEWS

Address database

ENDURANCE Software has recently made an entry into the PCW market in the form of The Mail Genius, an address database for label printing. Written in Mallard Basic, it includes extras such as a calculator, a real-time clock, and an alarm clock.

Conditional searches can be made when viewing or printing records, or alternatively all records can be viewed or printed. Any number of copies of a label can be printed or, if desired, text can be entered at the keyboard for one-off labels.

The Mail Genius will retail at £9.99. Endurance Software can be reached on 0477 37048.

Pocket Protext

TAKING a leaf out of Micro-Pro's WordStar book, Arnor (0733 239011) has produced a "pocket" version of Protext, its popular PCW word processing package. At £39.95 it's a stand-alone word processor, exactly the same as Protext but without the spelling checker and mailmerge options. The CP/M version of Prospell (£29.95) will still be compatible with Pocket Protext for those who might need to add a spelling checker later.

New products are detailed here only as a service to our readers and to dealers. Mention in the news pages neither endorses the products nor represents a review of their facilities.

New products lined up for the show

THE coming Amstrad Computer Show in Manchester will include the Amstrad Theatre, scene for non-stop presentations of all that's new for the PCW.

It is the first time the highly popular attraction has been a feature of an Amstrad Computer Show outside London.

The auditorium includes seating enabling 150 to watch and listen in comfort while experts demonstrate the latest hardware and software and conduct question-and-answer sessions.

In addition, there will be no fewer than eight feature stands occupied by Amstrad itself, the Official Amstrad User Club and major suppliers.

These impressive focal points – just part of the total of 70 exhibitors – are made possible by the show's location. The 100,000 sq ft Greater Manchester Exhibition Centre was specially chosen to house the UK's biggest computer specific show ever held outside London.

Already a number of firms have said they will bring exciting new products to the show.

Nabitchi is unveiling an enhanced version of its X Basic program for the PCW. Called X Basic Plus it is an extension to Mallard Basic allowing a total of 120 graphic functions to be performed. Price £19.95.

An enhanced PCW version of its database package First Base will be available from Minerva, price £29.95.

The Amstrad Computer Show at G-Mex, Manchester, runs from Friday to Sunday, October 23 to 25.

Money-saving advance ticket details are given on Page 6.

UK software invades American market

A NEW transatlantic deal will see a British software house reverse recent trends by establishing a major presence in the United States.

Database Software of Cheshire has reached agreement on a joint venture with ShareData, pioneers of budget packages in the States and a public company valued at $28 million.

The end result is the formation of Database Software Inc in Phoenix, Arizona.

The new corporation aims to market the best British and European titles through ShareData's 22,000 outlets in North America.

As a software house, Database first sprang to prominence in Britain in October, 1984, with the release of Mini Office. This is now available on a wide range of computers and a version for the PCW is about to be released.

Database is recognised as one of the fastest growing companies in its field in the UK. The last 12 months have seen its turnover increase more than five times.

Similarly, ShareData in the States has a track record second to none. It has become the pacesetter for the American industry, recording sales of more than 500,000 units in the last three months.

Michael Meakin, joint managing director of Database, flew to Arizona to complete the British-American deal.

"We have spent a long time looking for a suitable partner in the States to make us a truly international company", he said, "and in ShareData we believe we have found the perfect answer.

"Now the search is on to find the hottest software properties in Europe and Britain to sell in America.

"It is a huge market with an insatiable thirst for good software".

DESKTOP PUBLISHING AWARDS 1·9·8·7

THE search is now well under way to find the best examples of Desktop Publishing using home and business micros – including the Amstrad PCW.

Desktop Publishing is the biggest growth area in microcomputing today.
It has enabled people from all walks of life – owners of small businesses to club secretaries and community groups – to become publishers in their own right.

PIRA, the UK technology centre for the printing and publishing industry, is to sponsor annual awards for the best examples of Desktop Publishing.They will be presented at the first Desktop Publishing Show to be held at the Business Design Centre in Islington, London, from October 15-17.

There will be three categories:

- *Best newspaper or magazine.*
- *Most outstanding company report.*
- *Best leaflet, newsletter or brochure.*

For further details phone 061-456 8383 or write to:
Desktop Publishing Awards, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY

All entries should be received by Thursday, October 1.

The pound in your pocket

Rex Last looks at an educational strategy game, and tries (unsuccessfully) to run the economy as well as the man in 11 Downing Street

LISTEN to the gossip in the checkout queues, bus shelters and public bars around election time, and you'll find – surprise, surprise – that everyone knows how to run the economy far better than all the Government and Opposition parties put together.

Exactly the same situation obtains with that other national institution, the Football League. There – if the armchair heroes on the terraces are to be credited – referees blind from birth vainly seek to control two teams consisting entirely of cripples, mental defectives, and individuals who have contrived to grow two left feet each.

But take the complainants on the sidelines of football or government and put them into the hot seat, and the situation changes instantly. We all rapidly discover that getting a ball into a net against the combined will of 11 men determined (a) to stop you and (b) to get the ball into your net is far from being a piece of cake.

Even more problematical is seeking to confront the problems of the economy head on for real. But fortunately for us, computer simulation has come to the rescue in the shape of an attractive little package written by Tom Tuite (CBE, and ex of the Inland Revenue) and aptly entitled *Yes Chancellor!* Happily, this is a game which can be approached in a number of different ways, from just for fun at one extreme to a serious analysis of economic modelling at the other. It avoids that common pitfall of educational computing software, that is of being narrowly targeted on a small group of learners at a particular level of knowledge and ability.

Yes Chancellor!

Topologica, PO Box 39
Stilton
Peterborough PE7 3RL
Tel: 0487 831153

£17.50

That is why, I believe, that so much educational software is caught in a vicious circle of low sales, poor profit margins and precious little incentive for software writers to dedicate their skills to this area when the rich pickings are to be found elsewhere in the word processing or space invaders end of the market.

On the other hand, Yes Chancellor! copes smoothly with everyone from the nearest beginner to the most advanced expert. I wonder if there's a copy in number 11 Downing Street.

With this program we can put our pet theories to the test without actually having to take the consequences of running them for real. Life, as has been stated more than once, is not a rehearsal. Mistakes made in the real world are far less susceptible of correction than blunders at the keyboard. And at the end of the day, we may just acquire a little modesty and perhaps a tinge of respect for the people who actually do have to run the economy.

Somethin's gotta give

The package is loaded from Basic by chaining a program called "Disc". In this, as in the case of many other programs, I prefer black on green, so I always start by typing from the CP/M prompt **Palette 1 0**.

Your first option is to start the program running or to find out how it functions. If you opt for the explanatory screens, you're presented with two memos. The first is addressed to the Chancellor from the Prime Minister (a certain Mrs Thatcher), and contains the words: "Low taxes create prosper-

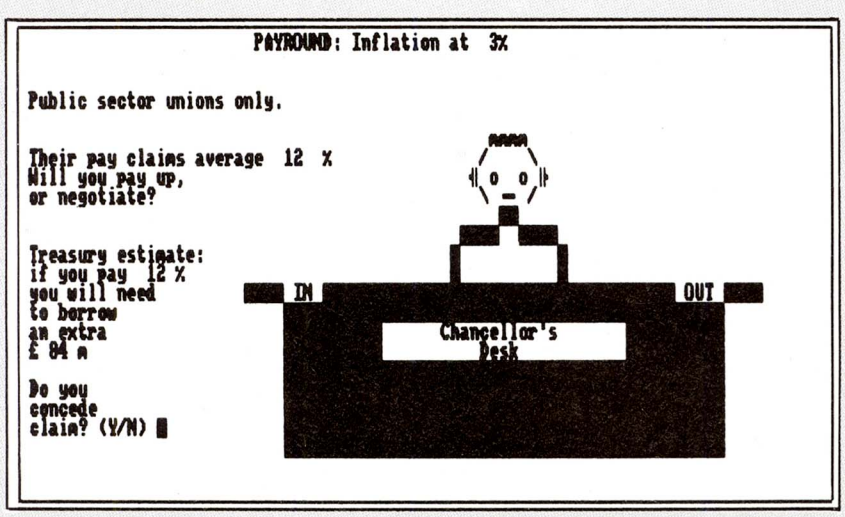

Figure 1: It's a constant round of decisions

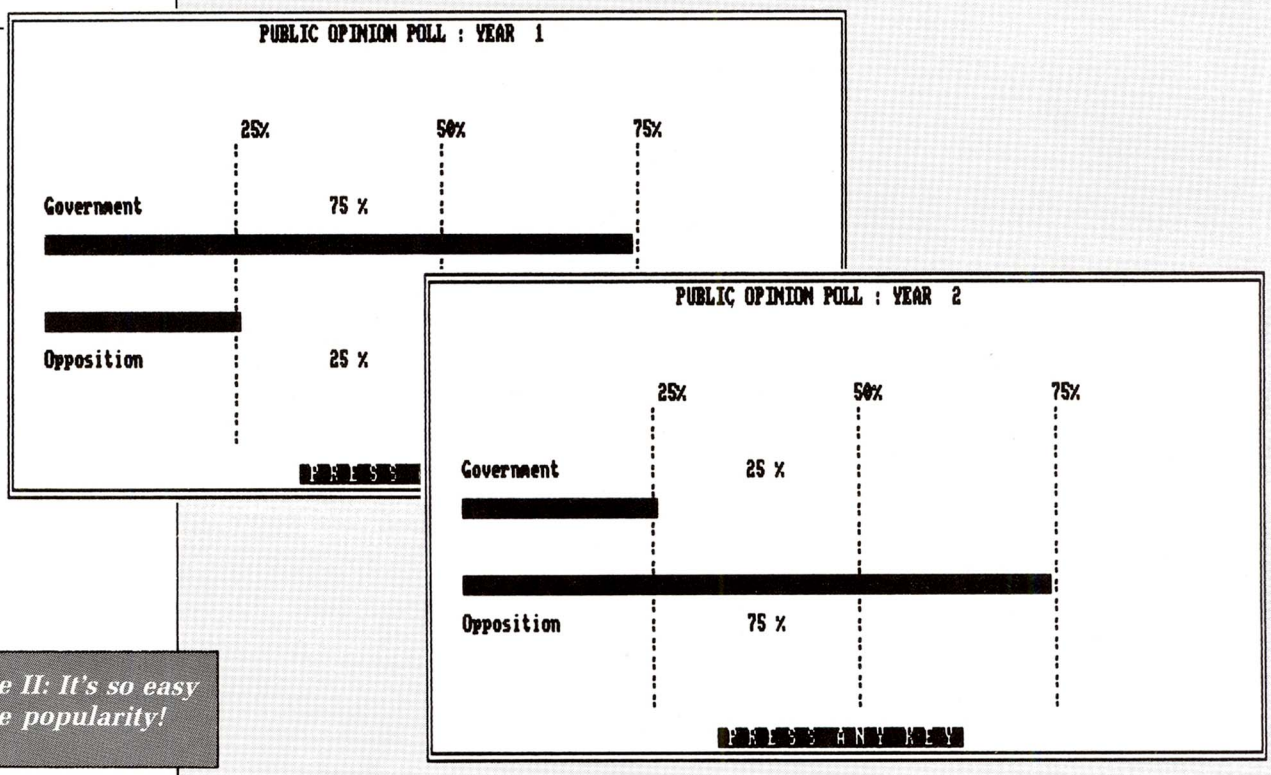

Figure II: It's so easy to lose popularity!

ity, but borrowing causes inflation. CONTROL PUBLIC EXPENDITURE."

Memo number 2 contains the Chancellor's rejoinder: "Don't forget the coming ELECTION! People LIKE spending money."

The Chancellor has to wrestle with seemingly irreconcilable conflicting interests. How, for example, can growth be sustained in the face of wage claims, strikes, foreign trade problems and threats to the reserves? In the words of the song, when an irresistible force meets an immovable object, somethin's gotta give.

And what gives depends on your skill in juggling with all the imponderables of the economy over a five-year period of government. If you last that long, that is: The first couple of times I tried the program I was slung out of office by the end of my second inglorious year.

We set off with a Hall of Fame with you on zero. Then comes a choice of difficulty level, from beginner's at Level 1 to "Can you walk on water?" as the descriptor for Level 4. But there really ought to be a Joviality Level control on this and on many other packages: If you're turned off by a forest of exclamation marks and jokey asides when running through what is supposedly a quasi-serious exercise, then you may well be a little put off by Yes Chancellor!

The Chancellor appears at his desk (looking rather like that metal man from Star Wars) together with a screenful of the problems to be faced in the year ahead. The borrowing level is established, and then expenditure has to be parcelled out among Defence, Law and Order, Education, and Social – all of which may have comments against them highlighting particular areas of difficulty (for instance, "Report criticises waste", or "Scroungers exposed").

Then the annual spanner in the works of the public-sector pay round has to be tackled. Here, as elsewhere in the package, I had the uneasy feeling that the fine tuning was not all it might be, since I managed to get the strikers back to work with a 0 per cent offer when they had asked for 15 per cent (and that was at level 4!).

Also at level 4, I managed to survive an entire term of office (five years) with a tax rate of zero and null expenditure in the four main areas. Maybe I'm on to something. . .

Anyway, the year continues with reports on public opinion, inflation, and so forth, with some pretty scathing comments from the public accounts committee if you allocate nothing for expenditure in certain areas, and an annual pattern of events begins to build up.

For those of you with long memories and a copy of the BBC Micro's Welcome tape, it's all rather like the game Kingdom and its many relatives. In this case, however, the pattern is sufficiently complex and varied for tedium to be avoided, and the set of

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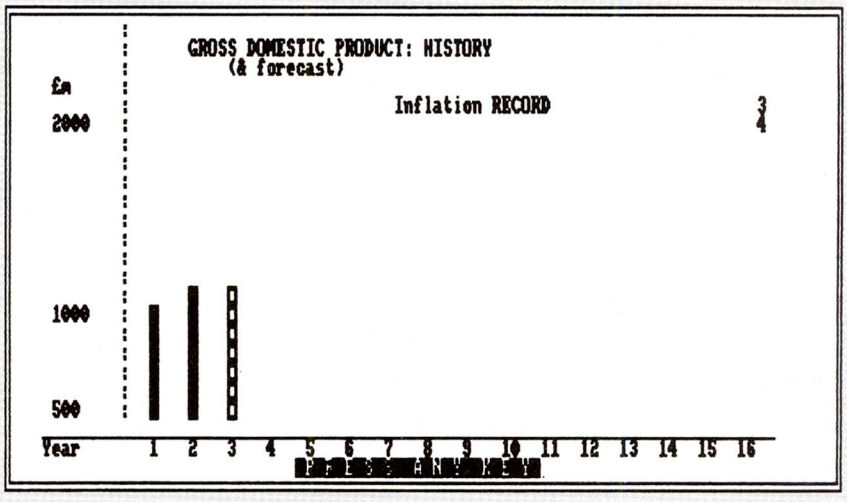

Figure III: You're given full updates on your position. Here's one for GDP

```
**********************************************
*  INTEREST  DECISION  NEEDED  *
**********************************************

Inflation is currently    8
                  per cent.

Total borrowing (£m) is now  272
Borrowing adjusted for Inflation:  250

Your Government pays interest on this, & the Bank recommend 10
                                                    per cent.
A lower rate might expand the economy at the risk of
        Inflation, and a fall in the Exchange Rate.
A higher rate may do the opposite!

So - what Bank Rate (%) will you set?
```

Figure IV: You're provided with masses of information to help you on your way to success – or financial crisis.

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notes accompanying the package does elevate the proceedings to a game of strategy with a high learning factor.

Critical approaches

At the more advanced level, Yes Chancellor! can be used as a focus for classroom discussion on the economy. As the manual puts it: "There is as much to be learned from picking holes in the program as from playing the game uncritically".

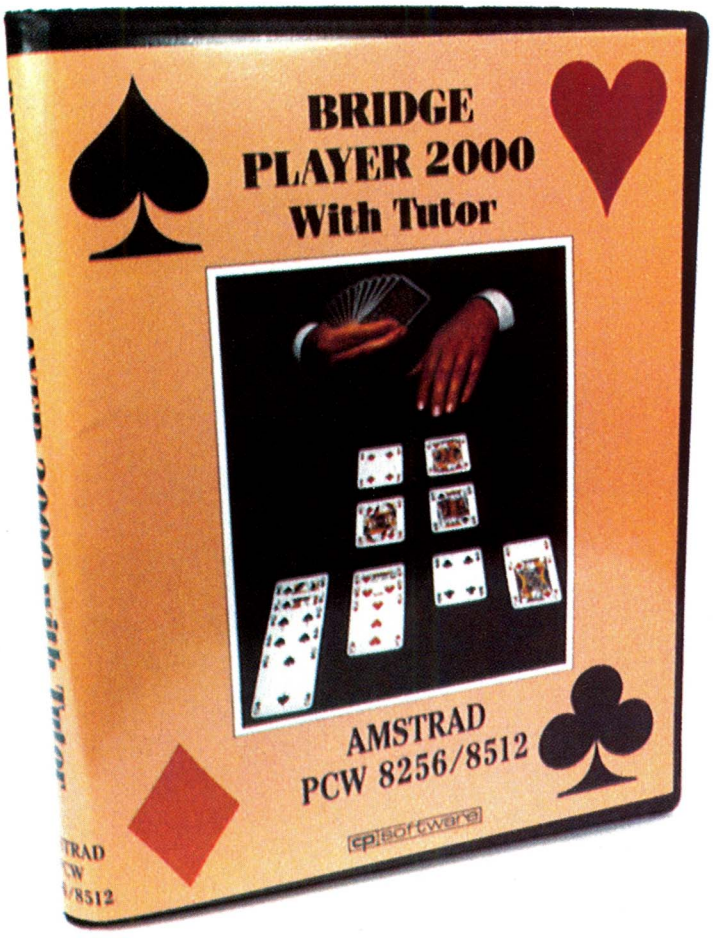
The debate can cover a great deal of ground, from the Gross Domestic Product to Government borrowing, via inflation and interest rates, to aid to industry, overseas trade, exchange rates, public sector pay, strikes, and political strategy.

In other words, and it's particularly pleasing to see this – the package is designed not just to stand as an isolated educational tool, but as part of the wider educational process, encouraging learners to discuss the issues among themselves rather than to sit in splendid isolation at an impersonal computer screen. It may even help to make better economists of those destined to run our affairs from the offices of Whitehall.

At the end of the day, the best I could muster was losing the election after five years and scraping together a score of 66 (one more than Lord Sutch, and second last in the Hall of Fame). And, as they say in the case of that other national institution, I wasn't over the moon, but sick as a parrot. Let the politicians run the economy.

Cards on the table

Bridge is more than a game of strategic moves and defensive placements – it's also a game of sensitivity and cunning. Jen Beaumont tests Bridge Player 2000 and Bridge Tutor to see how it matches up



IF you enjoy a game of bridge, but don't always have the right opponents, Bridge Player 2000 from CP Software could well be the program for you. It provides two options – you can either play simulated rubber bridge with three imaginary friends, or you can choose the Bridge Tutor.

The Bridge Player uses randomly-dealt hands, and you have a choice of strong, weak or variable no-trump Acol conventions. The idea is that you are playing rubber bridge, and the results are scored at the end of each hand. Using it in this way gives a good simulation of bidding and play.

You may choose that you and your partner will usually, or even always, have the majority of high card points, so that you can practise the play of contracts rather than defending them. Of course, if you do use this option it warps the scoring.

Other options change the speed of play, and let you dispense with the bidding by nominating the contract. You can also see all four hands, and even play them if you wish.

Bidding is straightforward – you enter the level of bid followed by the suit. Your "partner" understands the no- trump range you're using, and also the Stayman (over 1NT and 2NT) and Blackwood conventions. The bidding can be restarted whenever it is your turn to bid.

Bridge Player 2000 with Tutor

CP Software, Stonefield, The Hill, Burford, Oxfordshire. Tel: 099382 3463

£19.95

Playing the game

The play of the cards uses a fairly standard representation of a card table, and you soon get the hang of entering the suit to be played before the card. There are some nice touches – which speed up the play – such as just entering the card when you are following suit, and pressing the Return key to enter the lowest card in the suit being played. When there is only one possible card, the computer plays it for you.

When it's your turn to lead during the play you can cheat slightly by reviewing the bidding, seeing the play to earlier tricks, or even peeping at other players' hands – different from the real world, but very interesting!

An even greater cheat is to claim the rest of the tricks, which the program accepts quite calmly whether justified or not, and scores accordingly. This is a rather unnecessary option as you can also restart the play of the hand – surely a much better learning aid. Some of this is no doubt useful, but it did feel rather like looking at the solutions in the back of a crossword puzzle book.

The play of the cards seemed fairly normal, although I did miss the actual holding of the cards, as I would with any computerised bridge game. But the main deficiency was that there was no apparent signalling with leads or discards when defending – this is usual even in ad hoc partnerships. The program must have some rules for choosing leads and discards, but I could find no indication as to the methods it uses.

At the end of each hand the score is shown in the normal rubber bridge format, although no scoring is done for hands which have been abandoned or replayed. You can replay or rebid the hand, go on to the next hand or back to the list of options.

Bridging the gap

The second main option in the package – the Bridge Tutor – consists of 20 set hands. After selecting one you then bid as South, using the strong no-trump convention. The computer will accept only the "correct" bid (as it sees it) which is frustrating if you happen to

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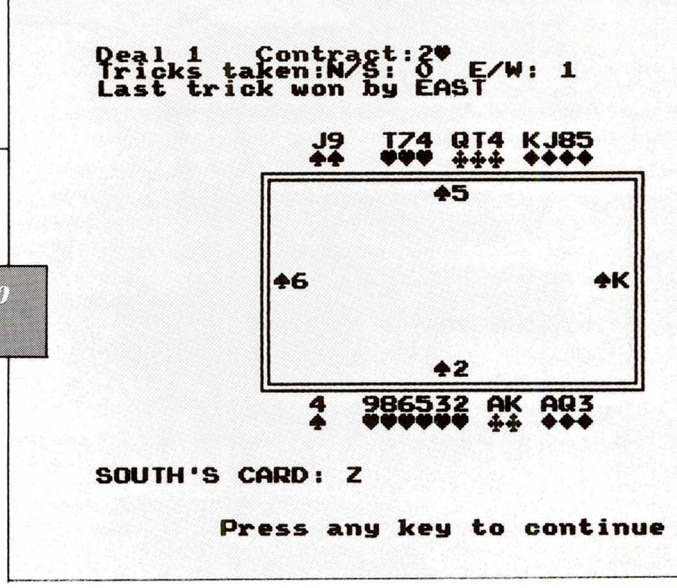
disagree. If you can't fathom out what response to make, the program will make the bid for you.

Similarly, the play of the cards can only be done in the way recommended by the program. At the end of each hand there is an explanation of the particular points which the hand was intended to illustrate, followed by the chance to replay it, or a different one.

The explanations follow accepted Acol rules and cover a wide variety of situations. However, once you have grasped the ideas, this section of the program is probably of little further use.

Bridge Player 2000 card table



Verdicts

The Bridge Player claims to be for both the beginner and expert. Yet the tutorial section would not be useful to a complete beginner as you need to know the basics of card play and Acol bidding before you can make any sense of it. Similarly, an expert would find the program very limited for bidding practice, since the conventions are not extensive enough.

But that does leave the majority of bridge players who should find the program entertaining and useful. In particular, two types of player spring to mind. Those who have not played for some time and want to brush up their bidding and play; and those who have learned to play recently and wish to improve their bidding and play without the inevitable public faux pas. And both could benefit from using the Bridge Tutor to remind them of some of the rules.

The instructions supplied with the package are clear and accurate, with a useful crib page for the keys to use when bidding and playing. But it would have been nice to have a similar page for the Bridge Tutor – I didn't find out how to terminate the program, even after swearing, until I eventually found the instructions buried in the manual.

My overall reaction to this program, and to computerised bridge in general, is favourable. But I wish someone would discover how to program a real live partner for me who will bid and play as consistently as the computer, without glaring at me when I make mistakes.

Bolt-on accessories

Katherine Cranford picks some examples of a new crop of PCW add-ons of interest to LocoScript users

WHEN I was employed to write this column for *APCW*'s parent magazine *Amstrad Professional Computing*, I would occasionally look at a selection of third-party accessories.

It's the sort of exercise which any self-respecting reviewer has to carry out from time to time, since in its relatively short existence LocoScript has generated a huge mass of third-party material.

I have found, quite frankly, that much of it is more trouble than it's worth. And I can only conclude that many third-party suppliers are either so wrapped up in themselves that they can't see the glaring faults of their products, or are simply unable to resist trying to cash in on the LocoScript phenomenon regardless of any thought of quality or usefulness.

Such firms presumably believe (probably with some justification) that with so many LocoScript users out there, some of them just have to be foolish enough to buy anything. For such people, I created a *Really Daft* category into which a number of accessories readily fall.

I'm happy to say that none of the products reviewed here would fit into that particular pigeon hole, though some are less to be recommended than others.

Simplified mailing

Multi-Mail Plus

Tiger Software 66, St. Michael's Lane Bridport, Dorset. Tel: 0308 27691

£14.95

Like many products of its ilk, Multi-Mail Plus is only a LocoScript add-on in the sense that it handles an Ascii file produced by LocoScript (in this case a Page Image file). It will not handle a LocoScript document directly.

That's often a bad sign for two reasons. First, it can mean that the programmers have not had the skill to deal with the complex control codes contained in a LocoScript document – not a good start. Second, it means that files have to be handled under CP/M, with all the consequent disc swapping and re-booting.

But if you're willing to put up with that, then Multi-Mail may be of use to you. It is a relatively simple toolbox for carrying out relatively simple tasks. It consists of a rudimentary mailmerge program for doing standard mailshots, a labelling utility, a word counter, a line counter, and a routine for producing multiple copies of documents.

It's hard to say much about these last three modules, since they're absolutely standard in the world of computing. I imagine that they have been been included on the distribution partly because they fill some gaps in LocoScript Version 1 (LocoScript 2 has a built-in multiple copy facility). But they are all available in many forms both commercially and in the public domain.

The word counter is fast and accurate. But you often need a rapid word count while writing, and using the Multi-Mail version involves creating an Ascii file, copying it to another disc, booting CP/M, running the program, re-loading LocoScript, then re-loading the original document – hardly convenient.

The same is true of the line counter, which offers the option of counting or discounting blank lines – a nice touch – but which is just as laborious to use.

The multiple copy routine will handle up to 99 copies of (Ascii) documents up to four pages long. It does fill a gaping hole in LocoScript 1, and I suppose that once a document is complete it's not so important to remain in LocoScript, though that clearly would have been preferable.

However, this routine has also been included for another purpose – it forms part of the core of Multi-Mail, that is to say the mailmerge facility. This is composed of three modules: Mailmerge itself, a data file creator, and the multiple copy generator. The facility is nothing like as flexible as Locomail, but it does offer an easy-to-understand way of doing simple personalised mailshots.

First, a letter is created in LocoScript containing up to nine "/" (slash) commands (see Figure II) followed by a number. This is then (of course) converted to Ascii. Next, a special data file is created separately, with each "record" containing the text of the numbered variables to be inserted into each letter (see Figure I). It's then simply a matter of using the multiple copy facility to print out the mailshot.

It's all pretty basic, and you're limited in many ways, for instance by having to put variables at the beginning of a line, thus more or less eliminating the possibility of including, say, a variable product name in the middle of a sentence. But it does work, and it's genuinely easy to handle, which is more than you could claim for many mailmerge programs.

The label utility will print out up to six variables ("fields") of the records in a Multi-Mail data file as single-column (one-across) labels. Again, this is not the most sophisticated of routines, but it's one which may well do the job for you if your envelope needs are modest.

The documentation for Multi-Mail is skimpy (and full of typographical errors), but in fact it's hardly necessary, especially since a number of sample files are provided for you to copy and experiment with.

```
                MULTI-MAIL PLUS  DATA FILE CREATION


        Variable 1 (30C) :Datadat Electronics
        Variable 2 (30C) :999, Which Road
        Variable 3 (30C) :Somerton
        Variable 4 (30C) :Devon
        Variable 5 (30C) :SO12 18ED
        Variable 6 (30C) :Dear John
        Variable 7 (30C) :Best wishes
        Variable 8 (30C) :
        Variable 9 (50C) :
        Are Entries Correct (Y/N) y
```

Figure I

```
A:group0/MULTI.SHP       Editing text.                  Printer idle.  Using A:
-Layout     -Pi12   -LS1   -LF6                                Page    1  line 18 of 54
f1=Show   f2=Layout   f3=Emphasis  f4=Style  f5=Lines  f6=Pages  f7=Modes  f8=Blocks  EXIT
L.....!.....!.....!.....!.....!.....!.....!.....!.....!.....!.....!.....!.....!.....!
/1
/2
/3
/4
/5

/6
This is an example of a letter produced as a LocoScript document ready for
conversion to a Page Image Ascii file for use by  Multi-Mail Plus Mailmerge.

Note that all / commands (up to nine maximum) must start in Column 0, which
restricts the use of variable data to the beginnings of lines. The / commands must
also appear within the first 66 lines of the document.

/7
```

Figure II

Figure I: A Multi-Mail Plus datafile record

Figure II: Slash commands inserted into a LocoScript letter ready for use by Multi-Mail Plus

Legs, feet and plonkers

Printer legs, keyboard feet and Plonker Box

Kador, PO Box 20, Ashford, Middlesex TW15 3QE Tel: 0784 252662

£6.99, £2.99 and £4.99

Kador's printer legs and keyboard feet (I'm not kidding – they're real) are not, strictly speaking, LocoScript add-ons. But they might come in useful for Loco-Scripters who prefer an angled keyboard and/or who use continuous stationery. I was tempted when I received them to put them in the Really Daft category. Then I tried them out, and now I have them permanently attached to my PCW.

There's really little to add to that. The legs give plenty of room under the printer for fanfold paper, and the feet tilt the keyboard slightly towards you (in the same way as the built-in feet do on the Amstrad PC keyboard and on that of the new 9512). Fitting is just a case of doing up a few supplied self-tapping screws.

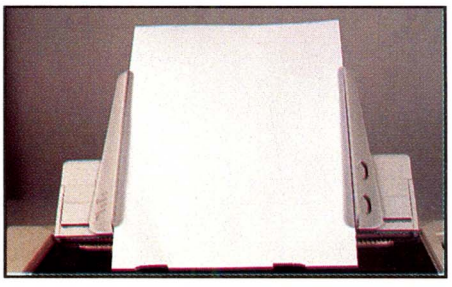
My only adverse comment about these products is concerned with their price. The feet in particular seem rather expensive for two bits of plastic and two screws.

That's not quite the case with the Plonker Box at £4.99 because disc holders have traditionally tended to be pricey, and this is in fact comparatively cheap. The Plonker Box will hold up to two sets of five 3in discs, and turning a little handle will display their labels one behind the other. The whole thing folds up into a neat carrying case.

The advertising blurb for the Plonker Box proclaims authoritatively that "having discs scattered over a desk is a dangerous practice". I wouldn't go that far (I know of nobody who has died of scattered discs), but the box is a handy way of protecting data, and if you do lots of disc swapping it's also a neat way of keeping track of where your discs are.

Kador also produces brackets which allow the printer to sit on top of the PCW monitor (£6.99), and a monitor tray (£10.99) for holding papers, potted plants or whatever takes your fancy. The company has clearly gone in for unusual PCW bits and pieces in a big way, and I can't wait for its next piece of imaginative thinking. How about a drawer which fits between the keyboard and the monitor and folds out to make a double bed?

Keep it straight



MM3 Margin Maker

Box 121 Gresham Road, Staines, Middlesex, TW18 2AJ

£12.50

From the underside of the PCW and continuous stationery to the upper part of the printer and single sheets. The MM3 Margin Maker is a sheet locator designed to overcome the notorious problem of mis-alignment on the PCW printer – paper which seems to be straight when you drop it on to the back of the roller emerges askew when it re-appears at the front.

MM3 cures the problem immediately, but there again so do other paper guides which cost considerably less. There's even an ultra-cheap DIY solution which is to attach bulldog clips to the ribs of the smoked-plastic printer cover.

So what does MM3 offer for £12.50, a rather high figure even given that it includes VAT and postage? Well, for a start it's extremely well made from

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precision moulded cream-coloured plastic, and when fitted it looks as if it has always been an integral part of the printer.

It has also been very well designed:

- There are no sharp edges or bits sticking out for the paper to catch on.
- The guide arms lock firmly in position, and are long enough to keep A4 paper squarely in place throughout its passage round the roller.
- The fixing brackets can be bent just enough to accommodate slight differences in the width of individual printers (they do differ slightly) yet still hold the guide firmly in place.
- The surface of the plastic can be easily written on with a soft pencil if you want to mark your own margin settings.
- The holes in the guide arms (there to accommodate the two standard paper supports supplied with the PCW) are shaped so as to allow accurate margin readings to be taken on ruler lines running along the horizontal bar. These are marked out in settings of 10, 12, 15 and 17 pitch. Only the 12 pitch reading can be used with LocoScript 1 because the screen scale pitch can't be altered. But with LocoScript 2 (in which the screen scale pitch is variable) all four settings can be used – a major plus point.

All in all, you get the feeling that a great deal of thought went into the drawing board stage of this product. You would therefore expect it to work well, and it does.

It will feed a piece of paper through the printer so firmly that you can confidently re-feed it through for overprinting, form filling and so on. And if you need accurate margin re-positioning (say for producing tables within text already printed), MM3 will do the job without you having to guess where the middle of the print head will start printing.

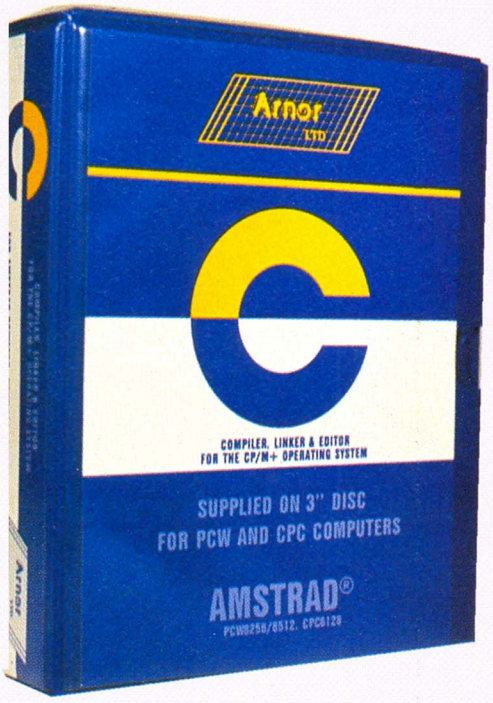
I have only two criticisms. The first is that, unlike those of some of its competitors, the guide arms are not designed to slide along the horizontal bar – they have to be removed, replaced, then locked into position. This means you can't easily put a piece of paper between them, then adjust them. You have to plan in advance.

My second criticism is concerned with the assembly instructions. I wish I had the space to quote them in full because they make a lovely example of how to say in several hundred densely packed words what could have been said so easily in a couple of line drawings.

According to the makers of MM3 "the brackets are fool-proofed – wrong assembly is virtually impossible". This is correct. But for many of us it's also true of right assembly – the assembly instructions would make a good test for contestants in the Krypton Factor.

On the other hand – to end on a positive note for a product which deserves it – the instructions for actually using MM3 are clear and helpful.

Lack of space prevents me from reviewing other add-ons which have recently come my way, but I'll try to give one or two of the more interesting ones a run for their money in next month's article.



A nice little Arnor

Have you ever wanted to program your PCW in a language other than Basic? Ian Johnston reviews Arnor's C compiler and discusses the advantages of the C language

IF you have a PCW (or a CPC6128) and want to write in C, then the answer to your prayers has arrived in the shape of Arnor's C compiler. This is a full specification compiler (although like most compilers bit fields are not implemented) with a large library of functions.

Three versions of the library are supported – minimal, small, and standard – so that your programs only have to include the functions they require. The library also has some functions which have been specially written for screen handling and windowing, and there's a separate maths library.

Arnor C doesn't generate native machine code. Instead, it converts the source code to a pseudo code called Basic Stack Code, which then runs under an interpreter as part of the run-time system.

The package comes complete with compiler, linker, joiner (to join various link files together), a program editor called Aped, as well as some sample programs and compiled utilities. The compiler, linker and joiner are themselves written in C, so they run under the auspices of the run-time system.

Installation

Installation is quite straightforward, provided you follow the instructions in the manual meticulously. I tried to copy the entire contents of the first side of the master disc to a new disc, along with the CP/M system and Submit .com, but it wouldn't all fit.

Only after the third attempt did I read the manual closely enough to find I wasn't meant to copy everything to my working disc. You have to use a supplied program, called Dcopy, to copy the second side of the master disc

Arnor C Compiler

Arnor Ltd, 118 Whitehorse Road, Croydon. CR0 2JF. Tel: 01 684 8009

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(which contains the compiler, linker, joiner, libraries, utilities and examples).

The editor

The editor is a cut-down version of Arnor's Protext word processor – but cut down only in that it doesn't support the fancier word processing features like bold or underlined text.

Whether or not you're a Protext fan, when it's used as a program editor I found Aped to be fast and bug-free. The only problems were finding out which keys generate the vital C characters "|" (Extra + Half) and the double bar (Extra + Minus), which are not characters you usually need.

The editor has numerous ways of moving the cursor. You can jump to any line or column number, and there are ten place and two block markers – vital for skimming around when you've forgotten the parameters for a function. there's also a handy Undelete function in case you delete a block, line or part of a line by mistake.

The usual block operations are available, and there's a Search and Replace feature to allow you to search forwards, backwards, globally, match whole words only, or replace every *n*th occurrence. The search can be case-sensitive, and wildcards are allowed – even for non-printable characters like Return – by using the Escape character "!". Unfortunately this isn't the same Escape character as used in programming key strings, something which can be confusing at first.

Keys can be programmed to produce a whole string of characters, useful for longer keywords, and also for some of the operators which are more fiddly to type, like "!=". The Escape character (here it's an up-arrow) can be used to enter codes into the string, so you could program a key, say, to switch from Edit to Command mode and then list all the key definitions.

The editor has online Help facilities to remind you which keys do what, and it supports the vital functions of formatting or cataloguing the disc, as well as copying, deleting and renaming files.

Compile and link

As the compiler is itself written in C, it has to be run from within the run-time system (more about this later), or from the editor.

The compiler isn't blindingly fast but it achieves a respectable speed, and it certainly keeps up with the mainframe compiler that I use. It has all the pre-processor commands set out by Kernighan and Ritchie in the standard C reference book *The C Programming Language* (Prentice-Hall, 1978), with the addition of **#assert**. This stops compilation if the value of a given variable is zero. So a command line like: **#assert debug > 0** will stop compilation if "debug" is zero.

The compiler lists the name of each function as it's compiled, and error messages are clear and comprehen-

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sible. Compiler options are available to do a number of things, such as specifying the working drive for temporary files, or suppressing the summary information and warning messages. The most useful is the −l option, which runs the linker automatically after successful compilation.

The linker takes the ".L" file produced by the compiler, and links it with particular libraries to produce a ".O" file which can then be executed by the interpreter. By default, the standard library is linked, but this can be changed to either the minimal or small library by specifying the −l option with an accompanying library name. For example, the line:

link list smlib −l

would use the small library when linking the program called *list*.

Functions can be listed as they're linked by using the −n option, and the −r option specifies that the program is to be run after successful linking.

Run time

As I mentioned earlier, the code runs under an interpreter and so requires the Runc.com program. Once this is loaded and run, a banner appears at the top of the screen indicating that you're in the Arnor C environment, and an "a>" prompt appears showing that drive A is in use. From here C programs can be compiled, linked, or run.

To compile a program using Runc is simple: Just enter **compile *progname*** and indicate any compiler options you want to use. Seven compiler options are provided, including the ability to call macro definitions, suppress creation of a global table (useful if files consist solely of data), influence error reporting, and indicate drives for temporary files.

Once the compiler has finished, you enter **link *progname*** to link the compiled code, along with any linker options you want. Or you could include the −l option with the compiler for automatic linking. If you're content to use the standard library, you don't need to specify any options.

Alternatively you can compile a program from the editor with the **ac** command. Specifying a file will compile, link, and run that program, otherwise the program in memory is used. Once the program has run, you're returned to the editor, making it very easy and quick to edit, compile, and test programs.

The run-time system also looks after a few other aspects of running a program, such as checking for the fatal error of dividing by zero.

When it has been compiled, running a C program (the .O file) simply involves typing the program name (without the .O extension) and providing any parameters the program requires.

Library functions

The functions provided include all the standard ones, with additional string manipulation ability like converting strings to upper or lower case, duplicating them, and comparing two strings (ignoring their case).

Arnor-specific functions include ones that provide memory status information, allow drive manipulations, access time features, and make calls to machine code and Bios routines, as well as other functions such as cursor and window control, inverse video, read a character from the screen, and get or set character definitions.

Keyboard Escape checking can be turned on and off, the keyboard can be polled to see if any input is outstanding, and a function exists to check whether the printer is busy or idle.

Maths functions include sine, cosine and tangent along with their inverse and hyperbolic cousins, random numbers, powers, square roots, logs, and functions to handle the mantissa and exponent parts of numbers.

Documentation

The manual is clear and comprehensive, but has two flaws. First, there's no index, which makes it difficult to find that little piece of information you know is buried in there somewhere. However, there are appendices summarising the compiler and editor commands and the library functions.

Second, the manual follows the irritating American convention of numbering pages within each section rather than throughout the text.

Still, at least it's properly typeset (instead of the awful dot matrix or slightly less awful daisywheel output found in some manuals). I understand that it was produced on a laser printer from Protext source files.

Support

Arnor support for this program is excellent, and here's an example. In my case the system worked fine for a few days, but then something went wrong: After setting up, I was able to compile and link once, but any subsequent attempts resulted in the message "Disc missing or read fail" part way through either compilation or linking. The only way round this was to reformat the working discs and make new copies of the master each time.

A phone call to Arnor on Thursday morning elicited a new copy of the latest compiler version on my desk by Friday lunchtime. This level of support is all too rare these days.

Conclusion

My only quibble with this package is that it can't produce native machine code, and there's no mention in the manual of any future release of a stand-alone generator.

Nevertheless, at £79.95, this full-specification C compiler is not expensive – compare that price with the £350-odd you'll pay for some PC1512 compilers. And the add-ons Arnor has included provide an extremely comprehensive capability to make programs user-friendly and powerful.

So it's certainly very good value for money for experienced C programmers and not wildly expensive if you just want to learn more about C. Considering that you get a powerful program editor thrown in as well, this is definitely one for the program shelf.

What is C?

Some computer languages, such as Fortran, are particularly good at handling numbers; others, like Snobol, are better at dealing with strings. Some are highly structured, like Pascal; and the knowledgeable programmer can also poke around in the guts of the machine and produce very fast programs by writing in assembler. You may wonder why no-one has designed one language which could do all these things.

C is a language that comes close to that objective. It supports integer and floating point numbers. It has strings. It is structured and supports recursion for those tricky Artificial Intelligence applications. It allows programmers access to all parts of the machine, it's fast, and it can be very efficient if you know what you're doing.

It's also very easy to transfer C programs from one machine to another; in fact the Unix operating system is written almost entirely in C. It has been used to write all manner of packages like word processors and databases (dBase III).

So what makes C special?

Well, it has a good range of data types: Short, normal and long integers, normal and long (called double) floating point numbers, characters, strings, structures (equivalent to Pascal

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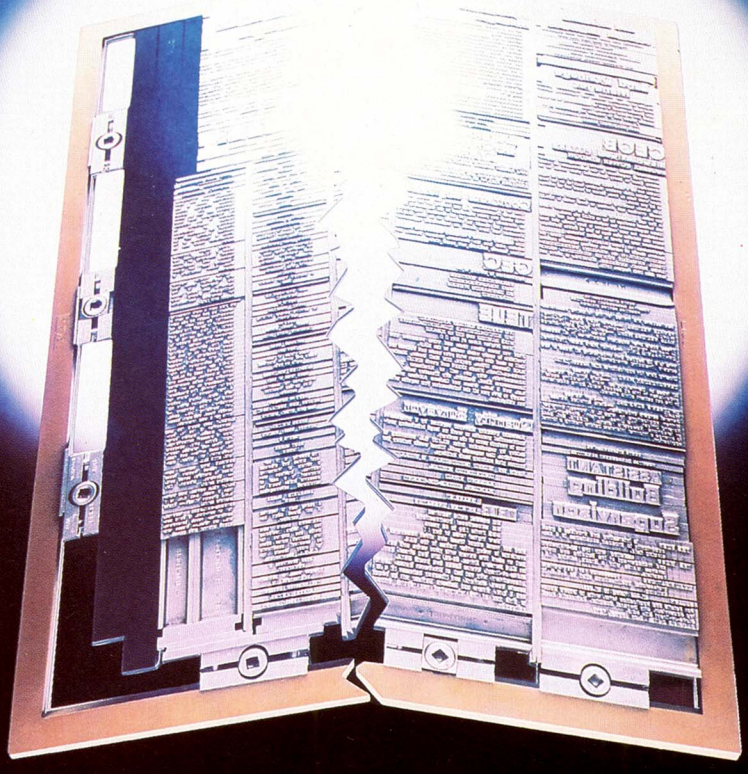

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C	8086 Machine code
x = x + 1	CALL getaddr CALL pushvar CALL getaddr LODSW DEC si DEC si ADD ax,1 CALL popvar STOSW
x += 1	CALL getaddr LODSW DEC si DEC si ADD ax,1 STOSW
x++	CALL getaddr INC [si]

Figure I: Three ways to add 1 to the value of a variable

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records), and unions which are variables that can have any data type as their value.

It also has a very important data type called the pointer – a variable which can point at any memory address (including the place where other variables are stored). Most data types can be used interchangeably, particularly integers and characters.

C has functions with parameters which may or may not return a value. It has For loops, and While and Do-While loops. It has a Case statement (called Switch) for multiple choice decisions.

It's also designed for optimising machine code. For example, in C there are three ways to add 1 to the value of a variable: `x = x + 1; x += 1; x++`. The last is by far the most efficient method as it requires much less machine code to perform. (See Figure I).

These are simplified examples, where *getaddr* gets the address of the variable *x* and stores it in location *si*; *pushvar* puts the address on a stack; and *popvar* pulls it back off the stack.

C may look a little strange at first (which computer language doesn't?) but many of C's apparently most impenetrable constructions are just shorthand for longer commands to make the compiled code smaller and faster. For instance, to open a file you can write:

```
handle = fopen(file,"r");
if (handle == NULL) printf("Not
found\n");
```

or, more economically,

```
if ((handle = fopen(file,"r")) == NULL)
printf("Not found\n");
```

Note the "==" to test a variable's value, and the "\n" in the *printf* statement which means "print a carriage return and line feed".

Finally, C is like assembler language in that with it you can do anything that the machine is capable of. But it removes all the disadvantages of assembler by giving you the environment of a high level language.

C is all about being compact (even to the name) and for these reasons it's becoming increasingly popular.

In a future series I hope to be able to introduce you to the C language in more detail. In particular I'll look at C itself, C libraries, and basic data types. I'll also delve into files, filing, decisions and arguments. Then I'll look at pointers and operators, structures and some of the more complex features of this most useful language.

Strip charts on your PCW

Have you seen those strip charts which convert litres to gallons at petrol stations? Andrew Walkland shows you how to print them on your PCW – and make any other conversion chart you might find useful

MANY people have said it – the PCW and its printer can do things way beyond the word processing functions it was originally designed to do. With the graphics capability, and the control you have over the design of lines, spaces and characters, the printing world is very much your oyster. All you need is a little computing know-how.

In this article I'll describe a program which will let you print a series of strip conversion charts on your PCW printer. So you can convert any unit – currency, volume, length, or whatever – to any other. All you need to know is the relationship between the two units, like £1 = $1.6, or Degrees Centigrade = 0.56 x (Degrees Fahrenheit – 32).

In the program, currency conversions are dealt with as a special case, but for the others, the program asks for the names of the units involved, the relationship between them, and how you want to organise the scales.

The program will only work satisfactorily when the units of the lefthand scale are larger than those of the righthand scale. In its present form it can deal with numerical values up to plus or minus 9,999,999, but it won't expand its scaling to deal with numbers with values much less than 1.

In such cases you should be ready to do a bit of mental calculation – for example to multiply everything by 10 to ensure that the scale values are greater than 1.

The program

In my article on using the PCW to print log paper (*APC*, August), I described how to use and understand the PCW graphics printing system. And I'll be using much the same system in this program.

As before, if you don't understand a lot about Basic programming you can skip this next section of the article and go straight to **Using the program** below. But readers who find the intricacies of Basic fascinating might discover a few tips.

The program uses the single-density graphics mode, so each line contains 480 sets of dots. The subroutine at line 2000 takes the array *row%[0 to 479]* which contains the graphics data, feeds the contents to the printer, and zeros the array ready for the next line's data.

The extreme ends of the row (*row%[0, 1, 478, 479]*) always contain the value 255 (all pins firing) to form the sides of the box drawn around the printed scales.

Line 2030 provides a means of interrupting printing without getting into the printer-reset problems you may have experienced with the log paper-producing program. If you press the Stop key to stop the program while it's still feeding graphics data to the printer, a printer reset from Basic may not work because it's interpreted as graphics data. A Printer Control State reset will be necessary instead.

With this new routine, however, you can press any key *except* Stop while graphics printing is in progress and the function *Inkey$* will find this key press at line 2030, which is after the printer has finished the row. If a key has been pressed, the variable *error%* is set to 1, and this error condition is checked after every call to line 2000.

So, pressing a key provokes an orderly return back through the program to wherever 2000 was Gosubbed from – ultimately to line 150 where a printer reset from Basic can be guaranteed to work. The *error%* flag is initialised to zero at line 110 before the program starts, and a dummy *Inkey$* call in the same line flushes any pre-existing keypresses.

The main problem for this program is to produce sensibly numbered scales for widely different ranges of numerical values with reasonable resolution. The printed scales are effectively 450 dots long (451 including a zero mark) and are printed at *row%[10 to 460]* to give some room at each end for numbering.

So a numerical range of, say, 0 to 20 gallons is mapped on to the scale of 0 to 450 dots, giving a scaling factor of 22.5 dots/gallon. 20 numbered points would look rather crowded (each number takes up 7 dots), but 10 can easily be fitted in. Similarly, the number of marked subdivisions shouldn't go above 50 or 60, which would mean a separation of 9 or 7.5 dots.

Using double-density mode would relieve the dot-crowding problem (with 900 dots available). But since only the same width of paper would be available, the scale divisions still couldn't be too close.

The solution adopted here is as follows: The number of major subdivisions of each scale (marked by a big dash and a number) and of minor ones (marked by a small dash only) are determined automatically by the subroutine at line 9000.

This routine is given the range of numbers to be accommodated on the scale (the value at the top of the scale minus the value at the bottom) in the variable range, and responds with the intervals at which the major and minor subdivisions will be marked. These values are put into the variables *majd* and *mind* respectively.

This variable *range* is compared successively with the numbers in *divs[0,0]* to *divs[3,0]*, which are initialised with the values of 10 to the power 0.25, 0.5, 0.75 and 1 respectively at line 9010.

If *range* is less than or equal to one of these values then *majd* and *mind* are loaded from the corresponding *divs[x,1]* and *divs[x,2]*.

So, for instance, if range=3 (which is greater than $10^{0.25}$ (1.78) but less than $10^{0.5}$ (3.16)) *majd* will be *divs[1,1]* which is 0.2, and *mind* will be *divs[1,2]*

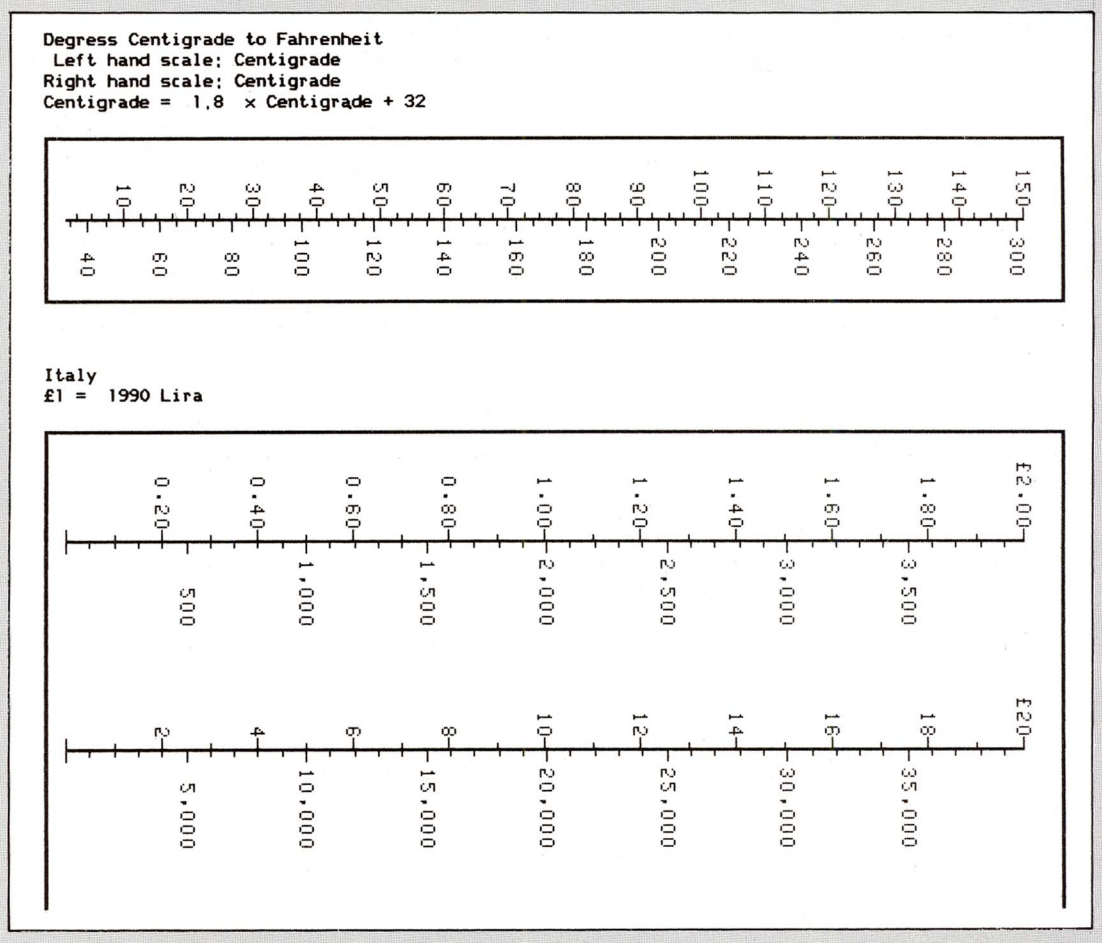

Figure I: Some printed outputs

which is 0.1, as initialised at line 9020. So the scale will end up with 15 major divisions (3 x 0.2) and 30 minor ones (3 x 0.1).

If *range* is greater than 10, all the values in the divs array are multiplied by 10 and the whole process is repeated. This is necessarily rather arbitrary, but you can modify its behaviour by changing the numbers loaded into *divs[]*.

One disadvantage is that all ranges up to 1.78 are only given subdivisions at intervals of 0.1 and 0.05, so ranges less than 0.5 are not handled very usefully. But an advantage is that not more than 17 major divisions and 56 minor divisions should be generated.

After asking for a title and the name of the units for the lefthand scale (lines 9515, 9520), the program requests the numerical values required for the two scales in the subroutine at 9500. At lines 9530 and 9540, the "low limit" and "high limit" (bottom and top values of the scale) are put into the arrays *lolim* and *hilim*. Then the routine at 9000 is called to determine the default subdivisions of the scale.

The program tells you all about this between lines 9560 and 9570, and you can change the number of minor subdivisions – as long as you don't want more than 60 along the whole scale (just press Return to choose the default at line 9575).

The guts of the conversion from left to righthand scale units is at lines 9715-9750, where a conversion of the form:

(right-hand unit) = slope x (left-hand unit) + intercept

is specified. The "slope" must be positive, and preferably greater than 1, but the "intercept" can be anything, usually 0. This defines the range and markers for the righthand scale.

For instance, to convert temperature in degrees C on the left to degrees F on the right, the "slope" is 1.8 and the "intercept" is 32 (remember, the formula is F = 1.8C + 32).

In the case of currency conversions, most of this process is automatic and the program just needs to know the currency units and the number equivalent to £1 (the "slope"). The routine at line 7000 deals with this.

For currencies, three scales are printed, covering £0-2, £0-20 and £0-200 so as to get reasonable resolution over these price ranges. This is the purpose of the "How many scales?" question at line 9900. But you could extend this scale to request distance conversions of 0-20 and 0-200 miles to kilometres, for instance.

In the routine at line 5000, the scale positions of the major subdivisions and their associated numerical markings are calculated and loaded into arrays *centre%* and *value*. The former holds the actual dot position for the mark, derived using the function *FNdot%* at line 95.

For both major and minor subdivisions of the scale, marks start at the first available integral multiple of the defined major and minor subdivision intervals. So, for instance,

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There is a Basic problem which concerns rounding errors with real numbers. Try the command **PRINT 9 * 0.2** and you will get 1.8, but **PRINT 1.8 – (9 * 0.2)** doesn't give you 0 as it should do.

For this reason, For and While loops which depend on comparisons between real numbers sometimes don't work as expected – try **n%=1: WHILE n% * 0.2 <= 1.8: PRINT n%, n% * 0.2: n%=n%+ 1:WEND**. Comparing two numbers for true equality may not work either. Hence the appearance in the program of 0.0001 at lines 1015, 5050, 5060, 5070.

Figure II: A problem with Basic

Figure III: The chart-producing program

```
1 REM PCW LOG GRAPH PAPER PRINTER (C) A C Walkland 1987
10 esc$=CHR$(27): cls$=esc$+"E"+esc$+"H": WIDTH LPRINT 255: OPTION NOT TAB
30 LPRINT CHR$(24);esc$;"@";esc$;"M";esc$;"l";CHR$(0);esc$;"Q";CHR$(96);
40 LPRINT esc$;"C";"0";CHR$(11);esc$;"c";esc$;"d";CHR$(13);CHR$(10);
50 DIM divs[3,2], row%[479]: row%[0]=255: row%[1]=255: row%[478]=255:
    row%[479]=255
52 DIM format$[6]: RESTORE 55: FOR n%=0 TO 6: READ format$[n%]: NEXT
55 DATA "##.##","###","####","##,###","###,###","####,###","##,###,###"
58 DIM centre%[25,1], value[25,1], value$[25], char%[13,6]
60 RESTORE 70: FOR num%=0 TO 13: FOR byte%=6 TO 0 STEP -1: READ
    char%[num%,byte%]: NEXT: NEXT
70 DATA 14,17,17,17,17,17,14: REM '0' matrix
71 DATA  4,12,  4,  4,  4,  4,14: REM '1' matrix
72 DATA 14,17,  1,  2,28,16,31: REM '2' matrix
73 DATA 14,17,  1,  6,  1,17,14: REM '3' matrix
74 DATA  2,  6,10,18,31,  2,  2: REM '4' matrix
75 DATA 31,16,28,  2,  1,17,14: REM '5' matrix
76 DATA 14,17,16,30,17,17,14: REM '6' matrix
77 DATA 31,  1,  2,  4,  4,  4,  4: REM '7' matrix
78 DATA 14,17,17,14,17,17,14: REM '8' matrix
79 DATA 14,17,17,15,  1,17,14: REM '9' matrix
80 DATA  0,  0,  0,  0,  6,  6,  0: REM '.' matrix
81 DATA  0,  0,  0,  0,  6,  6,  4: REM ',' matrix
82 DATA  0,  0,  0,15,  0,  0,  0: REM '-' matrix
83 DATA 14,  9,  8,28,  8,  8,31: REM pound sign matrix
85 DIM vert%[1]: vert%[0]=1: vert%[1]=128
86 DIM minmark%[1]: minmark%[0]=15: minmark%[1]=240
87 DIM majmark%[1]: majmark%[0]=127: majmark%[1]=254
88 DIM lolim[1], hilim[1], mindiv[1], majdiv[1], ndivs%[1], firstmin%[1],
    fmt%[1], start%[1]
95 DEF FNdot%(x)=INT((x-lolim[side%])*450/(hilim[side%]-lolim[side%])+10.5)

99 REM main program
100 GOSUB 9200: PRINT: PRINT: PRINT "Press the space bar if you want to
    interrupt the program once printing has started": PRINT "Use Printer Control
    State Reset function if you pressed STOP"
110 ans$=INKEY$: error%=0: GOSUB 1000: IF error%=1 THEN GOTO 150
120 PRINT: PRINT: PRINT "Another one? (Y/N) ";: search$="YN": GOSUB 4500:
    IF reply%=1 THEN GOTO 100
150 LPRINT CHR$(24);esc$;"@";: END

1000 REM do it
1010 LPRINT esc$;"2";esc$;"E";esc$;"I";CHR$(1);title$: IF currflag%=1 THEN
    LPRINT CHR$(6);"1 = ";slope;unit$[1]: GOTO 1020
1012 LPRINT " Left hand scale:  "unit$[0]: LPRINT "Right hand scale:  "unit$[1]
1015 LPRINT unit$[1]" = "slope" x "unit$[0];: IF ABS(intercept)<0.0001 THEN
    LPRINT: GOTO 1020
1017 IF intercept<0 THEN LPRINT " -"ABS(intercept) ELSE LPRINT " +"intercept
1020 LPRINT: box$="L": GOSUB 6000: IF error%=1 THEN RETURN
1030 GOSUB 5000: REM GOSUB 10000
1040 FOR scale%=1 TO nscales%: IF currflag%=0 THEN GOTO 1060
1050 GOSUB 4200: IF error%=1 THEN RETURN: REM 'pound' row
1060 side%=0: GOSUB 3000: IF error%=1 THEN RETURN: REM print numbers
1080 GOSUB 4000: IF error%=1 THEN RETURN: REM print scales
1100 side%=1: GOSUB 3000: IF error%=1 THEN RETURN
1115 IF scale%=nscales% THEN GOTO 1170
1120 FOR gap%=1 TO 5: GOSUB 2000: IF error%=1 THEN RETURN
1130 NEXT
1140 FOR side%=0 TO 1: FOR n%=1 TO ndivs%[side%]:
    value[n%,side%]=value[n%,side%]*10: NEXT: fmt%[side%]=fmt%[side%]+1: NEXT
1160 NEXT scale%
1170 box$="R": GOSUB 6000: LPRINT: RETURN

2000 REM print row%[0 to 479] as graphics
2010 LPRINT esc$;"A";CHR$(8);esc$;"K";CHR$(224);CHR$(1);
2020 FOR n%=0 TO 479: LPRINT CHR$(row%[n%]);: NEXT: LPRINT CHR$(13);CHR$(10);
2025 FOR n%=2 TO 477: row%[n%]=0: NEXT
2030 IF INKEY$<>"" THEN error%=1
2040 RETURN

3000 REM organise numbers as strings and print them.
3010 FOR n%=1 TO ndivs%[side%]:
    value$[n%]=DEC$(value[n%,side%],format$[fmt%[side%]]): NEXT
3020 limit%=LEN(format$[fmt%[side%]]): numnums%=ndivs%[side%]
3310 FOR pos%=1 TO limit%: printflag%=0
3320 FOR num%=1 TO numnums%
3330 num$=MID$(value$[num%],pos%,1): IF num$=" " THEN GOTO 3360
3340 printflag%=1: IF num$="." THEN index%=10 ELSE IF num$="," THEN index%=11
    ELSE IF num$="-" THEN index%=12 ELSE index%=VAL(num$)
3350 FOR byte%=0 TO 6: row%[centre%[num%,side%]-3+byte%]=char%[index%,byte%]:
    NEXT
3360 NEXT num%: IF printflag%=0 THEN GOTO 3380
3370 GOSUB 2000: IF error%=1 THEN RETURN
3380 NEXT pos%: RETURN

4000 REM print scales
4010 FOR side%=0 TO 1
4020 FOR n%=10 TO 460: row%[n%]=vert%[side%]: NEXT
4030 n%=firstmin%[side%]: WHILE n%*mindiv[side%]<=hilim[side%]+0.0001
4040 row%[FNdot%(n%*mindiv[side%])]=minmark%[side%]: n%=n%+1: WEND
4050 FOR n%=start%[side%] TO ndivs%[side%]:
    row%[centre%[n%,side%]]=majmark%[side%]: NEXT
4060 GOSUB 2000: IF error%=1 THEN RETURN
4070 NEXT side%: RETURN

4200 REM pound sign
4210 FOR byte%=0 TO 6: row%[457+byte%]=char%[13,byte%]: NEXT
4220 GOSUB 2000: RETURN

4500 REM single keystroke answers
4510 ans$=INKEY$: ans$=INKEY$: WHILE ans$="": ans$=INKEY$: WEND
4520 reply%=INSTR(search$,UPPER$(ans$)): IF reply%=0 THEN PRINT CHR$(7);:
```

«

a scale starting at 14, and numbered at intervals of 10, would be numbered at 20, 30 ..., and not at 14, 24 ... Although this imposes the complications of lines 5020-5060, it looks much better.

In line 5020-5110, *nmaj%* and *nmin%* are the integral multiples of the values in arrays *majdiv* and *mindiv*, at which subdivision is to start. *Start%[]* is 0 if the zeroth major subdivision is to be numbered (that is, not 0) and 1 otherwise, and *ndivs%* ends up holding the number of major subdivisions and their values which are to be drawn.

Firstmin% holds the calculated value of *nmin%*, and *fmt%* holds the index into the array *format$* (line 52, 55), which determines how many digits are used in printing the numbers.

Number printing is done at line 3000, and involves turning the relevant values into strings (line 3010) using *format$[fmt%[]]* to control the formatting in a similar manner to the Print Using statement in Basic. For instance, a *format$* of "##,###" enables printing of numbers up to 9,999, right-justified in a field of width 6.

Because numbers will be printed sideways up the page, all the numbers have to be organised as strings. The entire first column is printed (the sign position), then all the "thousands-column" digits, and so on. At line 3020, there will be *limit%* columns to print, each consisting of a sign, space or digit from each of *numnums%* numbers. Spaces are skipped (line 3330), and a row consisting entirely of spaces is suppressed (line 3360).

The sideways character printing matrices described in my log paper article have been extended to include a minus sign, a comma and a full stop. the relevant rows of dots are copied into the array *row%*, centred on the values in the array *centre%*, in lines 3340-3350.

The scales themselves are printed at line 4000 (aspects of graphics printing are explained in Figure IV). The minor subdivisions are marked by starting at the first one, whose position is known (*firstmin%* at line 4030), and marking them in until *hilim* is reached. The major subdivisions have already been determined (line 4050).

The routine at line 4500 deals with questions expecting a single keypress answer, usually Y(es) or N(o). Finally, the optional routine at 10000 puts up

```
    GOTO 4510
4530 RETURN

5000 REM set up scale divisions, numbers etc
5010 FOR side%=0 TO 1
5020 IF ABS(lolim[side%])<0.0001 THEN centre%[0,side%]=10: nmaj%=1: nmin%=1:
    start%[side%]=0: GOTO 5070
5030 start%[side%]=1: nmaj%=FIX(lolim[side%]/majdiv[side%]):
    nmin%=FIX(lolim[side%]/mindiv[side%])
5040 IF lolim[side%]<0 THEN GOTO 5070
5050 IF ABS(lolim[side%]-(nmaj%*majdiv[side%]))>0.0001 THEN nmaj%=nmaj%+1
5060 IF ABS(lolim[side%]-(nmin%*mindiv[side%]))>0.0001 THEN nmin%=nmin%+1
5070 i%=1: WHILE nmaj%*majdiv[side%]<=hilim[side%]+0.0001
5080 centre%[i%,side%]=FNdot%(nmaj%*majdiv[side%]):
    value[i%,side%]=nmaj%*majdiv[side%]
5090 nmaj%=nmaj%+1: i%=i%+1: WEND
5100 ndivs%[side%]=i%-1: firstmin%[side%]=nmin%
5110 fmt%[side%]=INT(LOG10(ABS(value[ndivs%[side%],side%])))
5120 NEXT side%: RETURN

6000 REM box sides
6010 IF box$="R" THEN GOTO 6030
6020 FOR n%=2 TO 477: row%[n%]=192: NEXT: GOSUB 2000: IF error%=1 THEN RETURN
6030 FOR n%=1 TO 3: GOSUB 2000: IF error%=1 THEN RETURN
6040 NEXT: IF box$="L" THEN RETURN
6050 FOR n%=2 TO 477: row%[n%]=3: NEXT: GOSUB 2000: RETURN

7000 REM currency conversion data
7010 PRINT cls$"CURRENCY CONVERSION": PRINT: PRINT: PRINT "Position the
    paper..."
7030 PRINT: PRINT: INPUT "Country? ",title$
7040 PRINT: PRINT: INPUT "Currency? ",unit$[1]
7050 PRINT: PRINT: INPUT "How many to the pound? ",slope
7060 PRINT: PRINT "All OK? (Y/N) ";: search$="YN": GOSUB 4500:
    IF reply%=1 THEN GOTO 7080 ELSE GOTO 7010
7080 lolim[0]=0: hilim[0]=2: lolim[1]=0: hilim[1]=2*slope: range=2*slope
7090 mindiv[0]=0.1: majdiv[0]=0.2: GOSUB 9000: mindiv[1]=mind: majdiv[1]=majd
7100 nscales%=3: currflag%=1: RETURN

9000 REM determine default subdivisions
9010 divs[0,0]=EXP(LOG(10)/4): divs[1,0]=EXP(LOG(10)/2):
    divs[2,0]=EXP(LOG(10)*3/4): divs[3,0]=10
9020 divs[0,1]=0.1: divs[1,1]=0.2: divs[2,1]=0.5: divs[3,1]=1: divs[0,2]=0.05:
    divs[1,2]=0.1: divs[2,2]=0.1: divs[3,2]=0.2
9030 found%=0: FOR n%=0 TO 3: IF range<=divs[n%,0] THEN majd=divs[n%,1]:
    mind=divs[n%,2]: found%=1: n%=3
9040 NEXT: IF found%=1 THEN RETURN
9050 FOR m%=0 TO 3: FOR n%=0 TO 2: divs[m%,n%]=divs[m%,n%]*10: NEXT: NEXT:
    GOTO 9030

9200 REM main menu
9210 PRINT cls$"PCW CONVERSION-SCALE PRINTER (C) A C Walkland 1987"
9220 PRINT: PRINT: PRINT "Press C for sterling to foreign currency conversions":
    PRINT: PRINT "   or O for other conversions ";: search$="CO"
9230 GOSUB 4500: IF reply%=1 THEN GOSUB 7000 ELSE GOSUB 9500
9240 RETURN

9500 REM data entry
9510 PRINT cls$;"ENTER CONVERSION DATA"
9515 PRINT: PRINT "Position the paper...": PRINT: PRINT: INPUT "Title? ",title$
9520 PRINT: INPUT "Left hand scale units?  ",unit$[0]
9530 INPUT "Lower limit value?       ",lolim[0]
9540 INPUT "Upper limit value?       ",hilim[0]
9550 range=hilim[0]-lolim[0]: GOSUB 9000: mindiv[0]=mind: majdiv[0]=majd
9560 PRINT: PRINT "Range: "lolim[0]"to"hilim[0];unit$[0];"; numbering
    at"majd;unit$[0]" divisions"
9565 maxmarks%=INT(60*majd/range)
9570 PRINT "How many markings per numbered division?": PRINT "(default
    ="majd/mind", max ="maxmarks%", integer value only) ";: INPUT "",a$
9575 IF a$="" THEN GOTO 9700
9580 divs%=INT(VAL(a$)): IF divs%>maxmarks% THEN PRINT CHR$(7): GOTO 9570
9590 mindiv[0]=majd/divs%
9700 PRINT: INPUT "Right hand scale units? ",unit$[1]
9710 PRINT "To convert "unit$[0]" to "unit$[1]": ": INPUT "           multiply
    by? ",slope
9715 IF slope<=0 THEN PRINT CHR$(7): GOTO 9710
9720 INPUT "                and add? ",intercept
9750 lolim[1]=lolim[0]*slope+intercept: hilim[1]=slope*hilim[0]+intercept:
    range=hilim[1]-lolim[1]: GOSUB 9000: mindiv[1]=mind: majdiv[1]=majd
9760 PRINT: PRINT "Range: "lolim[1]"to"hilim[1];unit$[1];"; numbering
    at"majd;unit$[1]" divisions"
9765 maxmarks%=INT(60*majd/range)
9770 PRINT "How many markings per numbered division?": PRINT "(default
    ="majd/mind", max ="maxmarks%", integer value only) ";: INPUT "",a$
9775 IF a$="" THEN GOTO 9900
9780 divs%=INT(VAL(a$)): IF divs%>maxmarks% THEN PRINT CHR$(7): GOTO 9770
9790 mindiv[1]=majd/divs%
9900 PRINT: INPUT "How many scales? (progressively 10-fold expanded) ",nscales%
9910 currflag%=0: PRINT: PRINT: PRINT "All OK? (Y/N) ";: search$="YN":
    GOSUB 4500: IF reply%=1 THEN RETURN ELSE GOTO 9510

10000 REM diagnostics
10005 PRINT "title$",title$: PRINT "unit$",unit$[0],unit$[1]
10010 PRINT "lolim",lolim[0],lolim[1]
10020 PRINT "hilim",hilim[0],hilim[1]
10030 PRINT "mindiv",mindiv[0],mindiv[1]
10040 PRINT "majdiv",majdiv[0],majdiv[1]
10050 PRINT "ndivs%",ndivs%[0],ndivs%[1]
10060 PRINT "start%",start%[0],start%[1]
10070 PRINT "nscales%",nscales%
10999 RETURN
```

some diagnostic information on the screen, which may help in getting the program going. It can be called by "un-REMing" the Gosub instruction at line 1030.

Using the program

Insert your Basic disc into the PCW (side 2 of the distribution discs supplied with your machine) and enter **Basic**. Now enter the program exactly as it appears in the listing, with a carriage return at the end of each line.

When you have done this, insert a new formatted disc into the drive and enter **save "chart"**. The program will be saved for you ready for subsequent use.

To use it, simply ensure that Basic is loaded and enter **run "chart"**. The program will do the rest.

Graphics on the printer are made up of patterns of 8 dots. To generate a section of the lefthand scale, we need the "vertical" backbone of the scale. and large and small tick marks to indicate the major and minor subdivision intervals.

The dot patterns for these are stored in the arrays *vert%*, *majmark%* and *minmark%* respectively (lines 85-87). In each array, index 0 refers to the left-hand scale and index 1 to the right-hand scale. A small section of the left-hand scale, with one "major" and one "minor" tick, might be assembled in dot-pattern form in the array *row%* as shown here:

row%[] index	Decimal	Binary
20	1	00000001
19	15	00001111 (small tick)
18	1	00000001
17	1	00000001
16	1	00000001
15	1	00000001
14	1	00000001
13	1	00000001
12	1	00000001
11	1	00000001
10	127	01111111 (large tick)

The pattern of 1s forms the pattern of dots on the paper. The dot patterns for the right-hand scale would be the mirror images of these, hence the different numbers in *vert%[0]* and *vert%*, and so on.

Figure IV: Graphics printing

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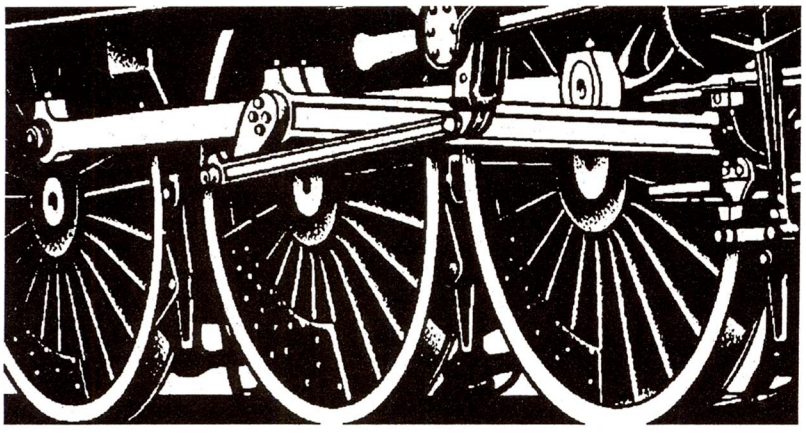

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Your personal turtle

Part 2 of a comprehensive, step-by-step series by Mike James and Kay Ewbank on the creative use of DR Logo

When you first start using Logo, its most obvious and attractive feature (or should we say creature?) is the turtle. And if you think that the turtle is just an idiosyncratic way of producing simple graphics, you're wrong. It's an integral part of the Logo philosophy.

One of the biggest problems in teaching any programming language is finding examples and exercises that aren't mathematical or abstract. Computer languages are good at handling numbers and text, and these are often not the best areas to use in introducing the subject to children.

The difficulty is that many people, children and adults alike, are turned off by any hint of maths, no matter how diluted or hidden. if you try to teach programming by an exercise on finding the roots of a quadratic equation, it doesn't matter how little real maths the exercise contains, many people will have given up trying the instant they see the title.

On the other hand there's no point in banishing maths from programming because mathematical ideas are an essential part of computing. Indeed the sort of creativity we're trying to encourage is broadly speaking a mathematical one.

But it's important to distinguish at this stage between the rote learning of mathematical facts such as multiplication tables, and the learning of concepts such as angle, length and quantity. It can be argued that teaching by rote without imparting the necessary underlying concepts is responsible for the all-too-common dislike of maths and things mathematical.

What we need is a programming environment that has some connection with the real world, which is not obviously mathematical and yet provides access to mathematical concepts.

You could try to use graphics as a way of introducing programs, but this generally involves the use of a coordinate system – quite a difficult mathematical concept. Drawing a square, say, at a particular position using commands which reference locations by X,Y coordinates only seems easy if you already know how to do it.

This is. of course, where Logo's turtle fits in. It allows you to perform very complex graphics commands without having any knowledge of a conventional X,Y coordinate system.

Turtle commands

The turtle plays the role of an object which a novice programmer, via Logo

»

Figure I: The complete set of turtle commands

bk n	Move the turtle BacKwards n steps	**rt d**	Right Turn – rotates the turtle d degrees to the right
clean	Clear the screen but leave the turtle where it is	**seth d**	Set Heading – turns the turtle to face d degrees based on 0 degrees being vertically up the screen
cs	Clear the screen and return the turtle hume	**setpos [x,y]**	Move the turtle to absolute position x,y
fd n	Move the turtle ForwarDs n steps	**setx x**	Move the turtle until its X coordinate is x
fence	Stop the turtle moving off the screen (see wrap)	**sety y**	Move the turtle until its Y coordinate is y
fs	Full Screen graphics	**ss**	Split Screen
home	Return the turtle to its original position	**st**	Show Turtle
ht	Hide the Turtle, that is: Make it invisible so that what it has drawn can be more easily seen	**tf**	Turtle Facts – returns a list giving the current state of the turtle: Position, heading, pen up/down, pen colour and turtle hidden/visible.
lt d	Left Turn – rotates the turtle d degrees to the left	**towards [x,y]**	Turn the turtle to face the point [x,y]
pd	Pen Down – the turtle leaves a trail	**wrap**	Make the screen wrap round so that moving the turtle off one edge makes it appear at the opposite edge
pe	Pen Erase – the turtle erases any trail it moves over		
pu	Pen Up – the turtle leaves no trail		

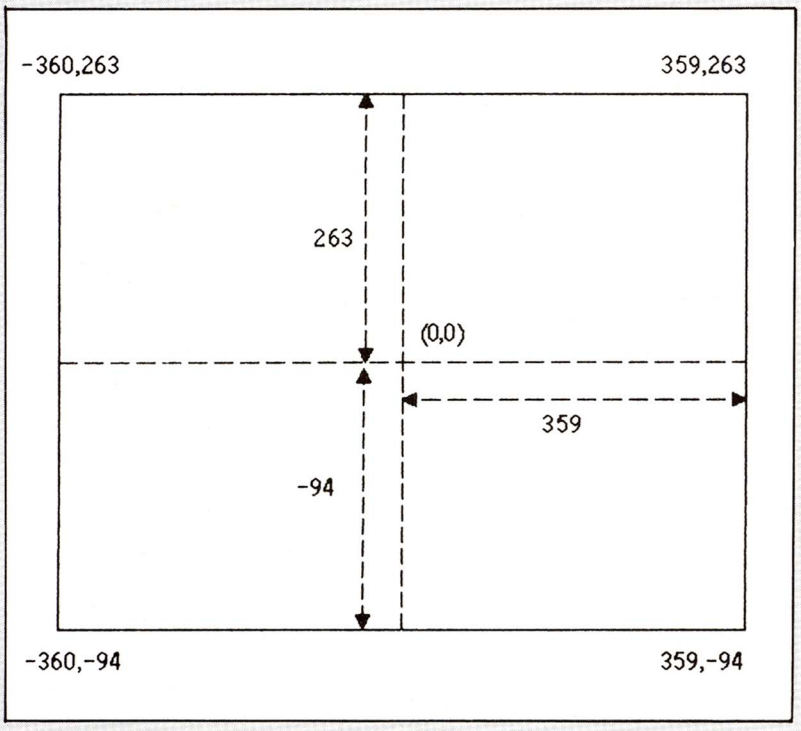

Figure II: Logo coordinates (split screen)

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commands, can concentrate on controlling. The turtle draws on the screen by leaving a trail behind it as it moves (more like a snail than a turtle).

The commands to make it move avoid using a fixed coordinate system by referencing everything to the turtle's current position and the direction in which it is pointing. Thus a command like **fd 100** (forward 100) produces different effects depending on where the turtle is and which way it is facing. In the same way, the direction that it ends up facing after a **rt 90** (right turn 90 degrees) command depends on its orientation before the command.

Such a description makes controlling the turtle sound difficult, but if you followed last month's article and actually tried the turtle, you'll have found it surprisingly easy.

There are two reasons for this. The first is that the turtle is visible at all times, so you only have to look at the screen to see its position and direction. The second is that you can imagine yourself as the turtle and work out what you would have to do to get to a new position.

Being able to see the turtle's position and current orientation means that the challenge of drawing a large figure can be achieved one line at a time. Each part of the problem consists of finding a way of moving the turtle from where it is to where you want it to be, and this is usually so simple as to be obvious. On the other hand, to draw the whole figure you have to organise the movements so as to produce it. This allows the programmer to learn the properties of movement, length, space and angle without realising it.

The use of a coordinate system based on the current position of the turtle also encourages, possibly even demands, that programmers think themselves into the turtle's world. This imagined identification with the turtle is very much a first step to higher mathematical thinking which often involves "seeing" something from another position.

The range of mathematical and programming concepts which can be learned by commanding the turtle is amazing, given that the creature is so simple. Indeed you can develop most traditional, and many novel, geometrical concepts using nothing but the turtle. If you're particularly interested in turtle geometry, see *Turtle Geometry: The Computer as a Medium for Exploring Mathematics* (1976) by H. Abelson and A. di Sessa, published by the MIT Press.

Logo Lesson 2: Advancing the turtle

The simpler turtle commands are easy to pick up, but after a while it becomes essential to learn some of the more advanced commands. By slowly introducing these advanced commands to pupils you can correspondingly expand their range of mathematical experience.

A complete set of turtle commands is shown in Figure I, and most of them are easy enough to understand from just the descriptions given. One or two others, however, are a little more tricky. In particular, the commands which introduce the use of Cartesian coordinates into the turtle's world need some comment.

DR Logo on the PCW uses a coordinate system as shown in Figure II. Normally, turtle graphics work with a screen split into a turtle area and a text area, and this is reflected in the shorter distance to the bottom edge of the screen.

You can choose to use the whole screen for graphics by using the **fs** (Full Screen) command. The lower Y value is then –265. To restore the split screen, so that you can see what you're typing, simply use the **ss** command.

The **setpos [x,y]** command will move the turtle to the point on the screen specified by [x,y], leaving a trail if the pen is down. By using the **setpos** command you can build up a range of words which mimic conventional graphics systems based on coordinates. For example, to draw a line between two points [x1,y1] and [x2,y2] you could define the new word line:

```
to line :p1 :p2
pu
setpos :p1
pd
setpos :p2
end
```

This works by first moving the turtle to point p1 without leaving a trail, and then moving it to point p2, but this time with the pen down. So, **line [0,0] [100,100]** will draw a diagonal line from the centre of the screen.

You can use **line** to build other coordinate-based commands such as **box**, **triangle** and the like, and so turn your version of Logo into a standard graphics system as found in other languages.

You might be puzzled as to the use of p1 and p2 in the definition of **line**. These are called "parameters" and they increase enormously the generality of the new words you can define.

A parameter stands in place of a quantity which will be supplied when the word is used, rather than when it is defined. For instance, if you want to introduce a new word, say **forward**, that has the same meaning as **fd d**, you have to use a parameter to enable the user of your new word to specify how

»

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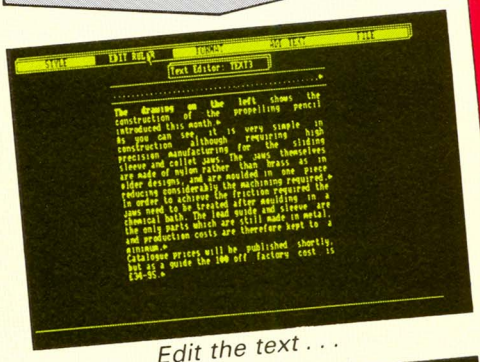

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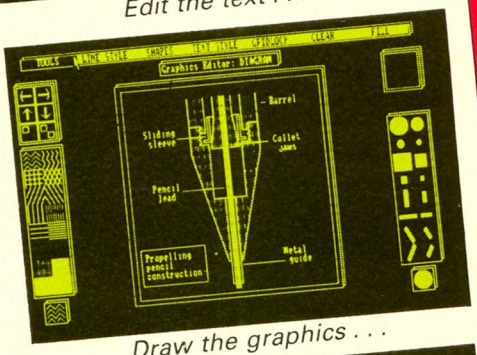
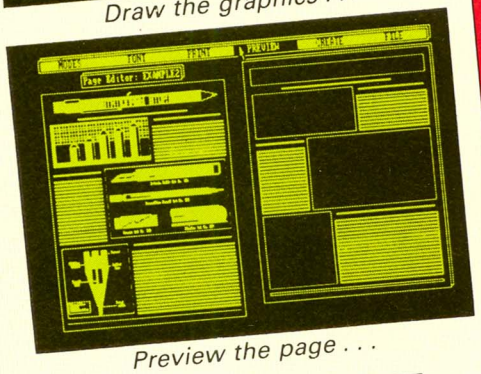


Draw the graphics . . .



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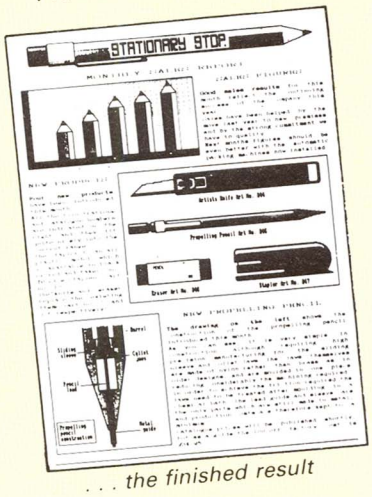

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Figure III: A Logo listing for producing a criss-crossing pattern

```
to board :len :nm
 pu
 grid :len :nm
 lt 90
 grid :len :nm
 fd :len
 lt 90
 fd :len
 rt 180
end

to grid :len :nm
 pd
 make "wid :len / :nm / 2
 repeat :nm [u :len :wid fd :wid lt
90]
 fd :len
 bk :len
end

to u :len :wid
 fd :len
 rt 90
 fd :wid
 rt 90
 fd :len
 lt 90
end
```

far forward the turtle should move, that is:

```
to forward :x
fd :x
end
```

Following this definition you could write **forward 100**, which you can think of as replacing x by 100 in the definition. In the same way, any parameter you use in a definition has to be replaced by an actual value when you use the word. Again, you'll find that parameters are easier to understand and use than they are to describe.

In drawing patterns with the turtle you'll often find it necessary to repeat the same set of movements a given number of times. This can be achieved by writing them out as many times as required, but a better way is to use the **repeat n [*list of instructions*]** command. This will simply cause the list of Logo instructions between the square brackets to be repeated *n* times.

So, to draw a square all you have to do is repeat the instructions **fd 100 rt 90** four times. Using the **repeat** command this gives:

```
to square
repeat 4 [fd 100 rt 90]
end
```

which should be compared to the version of square given last month.

If you add a parameter to allow the size of the square to be set, and so make the new word more useful, the definition becomes:

```
to square :size
repeat 4 [fd :size rt 90]
end
```

To draw a square of size 200, all you would then have to type is **square 200**.

It is important to remember that once a new word is defined you can use it just like a pre-defined word. For example, you might like to try **repeat 4 [square 100 rt 10]** and attempt to work out why drawing the same square four times doesn't produce the same square.

You can produce lots of interesting patterns by defining a word which draws a single shape, then using it in a **repeat** command which also shifts the starting point of the turtle each time.

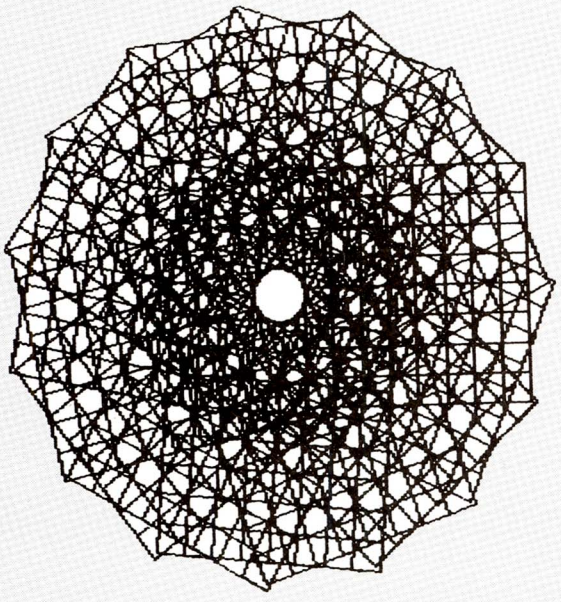
You can see an example of a turtle graphics listing for drawing a criss-cross pattern in Figure III. The command board 100 4 will draw a square board of side 100 units divided up into 8 rows and columns.

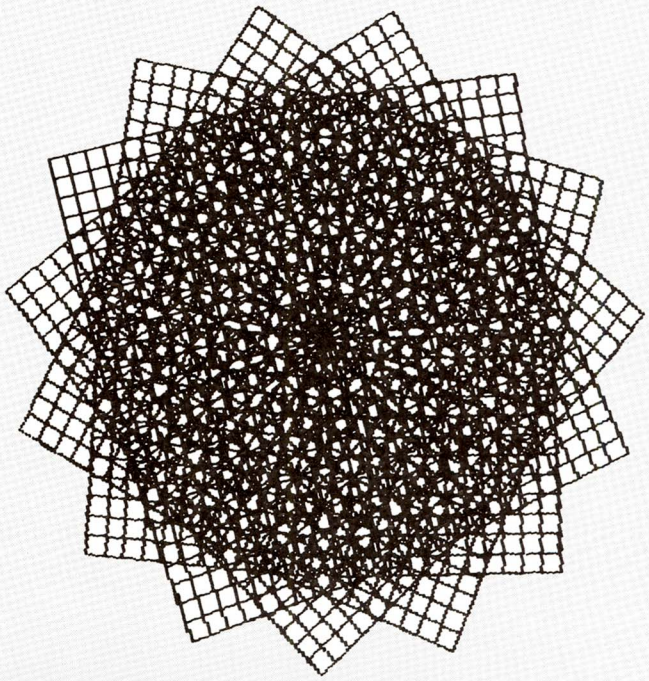
If you study this program carefully you'll find that it is based on the repeated use of a single pattern, **grid**, at two different orientations. You might like to type this program in and try using it as an element in a more complex pattern (see Figure IV).

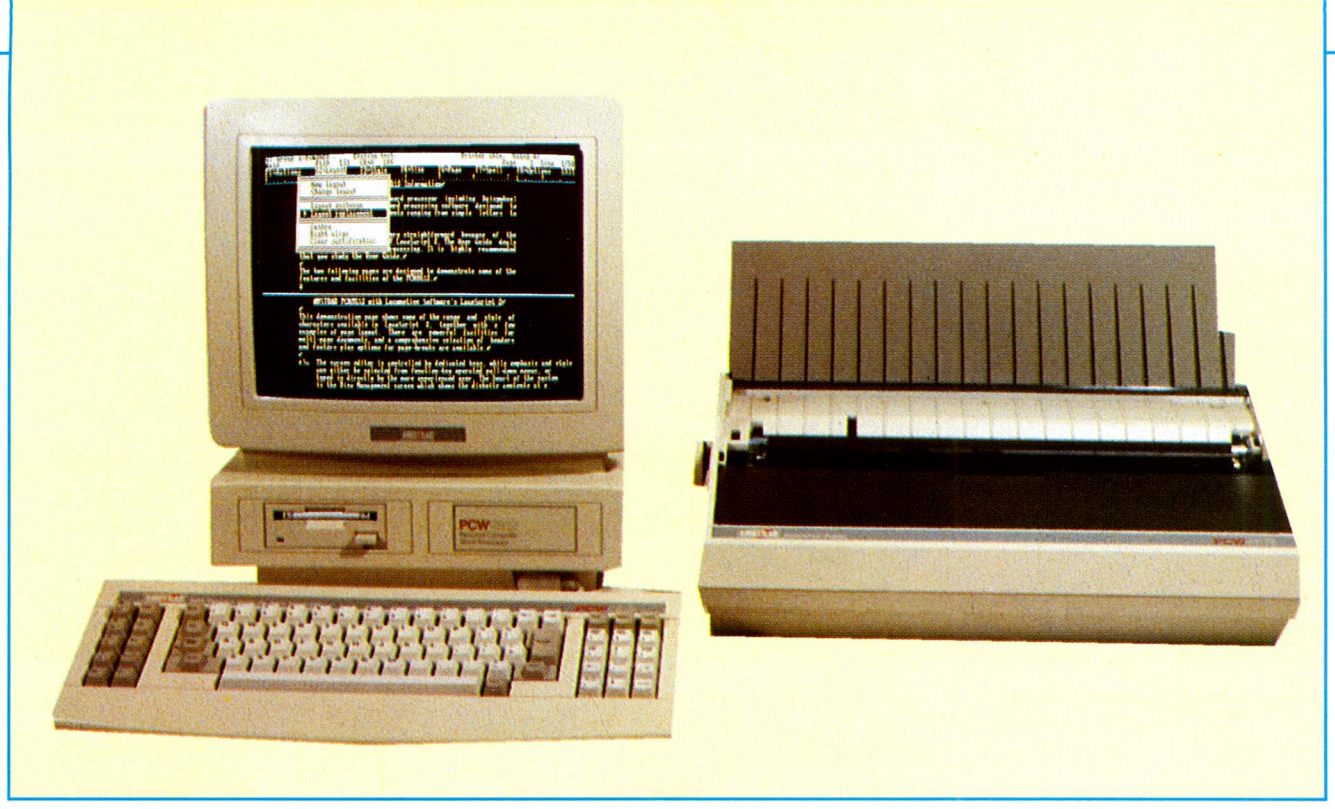
Other projects that you might like to try are:

- Using turtle graphics to draw a Xmas tree, then a forest of trees.
- Using turtle graphics to draw a simple bar chart – say four bars of height 50, 100, 80 and 160 respectively.
- Using **line** to define a new word which draws a square with its top left-hand corner at x,y.
- Shading the squares of the board in a chess-board pattern.
- Defining words which produce outline drawings of some chess pieces and combining them with the board.

Figure IV: Sample criss-cross patterns







The PCW9512: Amstrad picks another winner

In an exclusive in-depth evaluation of Amstrad's exciting new PCW, Gabriel Jacobs puts it through its first comprehensive examination

I HAVE heard Amstrad criticised on more than one occasion for bringing out new computer models offering more power for less money, but too soon for the mental well-being of some users.

It's easy to understand why certain Amstrad owners have felt aggrieved. No sooner have they paid out their money for a tried and tested model than they're hit with news of a fresh development which it would clearly have been worth waiting for.

I think that Amstrad's attitude towards such complaints is faultless – and I say that not just as the editor of one of the official magazines, but as someone who over the years has constantly hesitated over whether or not to upgrade current hardware, and many a time cursed for buying too soon.

Amstrad's attitude is that you can't delay new, cheaper and more powerful products just because people have bought your earlier models. This view not only makes commercial sense, but is the only valid way of responding to demand in just about the fastest moving industry there is. It's never the right time to buy a computer – there's always a better one just around the corner.

But the PCW has been a rather special case. The same model has now been on the market for two years – a long time in the computer arena. The very clear reason for this is that the machine has established itself as the perfect low-cost plug-in-and-go word processor, doubling as a superb business and organisational machine. It has proven that it can hold its own with the big guys; third-party add-ons are legion; and the software base almost rivals that of the PC.

It's not surprising, therefore, that the new PCW model has been designed to complement the older versions rather than break away from the standard already set. The result is not perfect (what is?), nor is it state of the art (who expected that?). But the 9512 is a beautiful, powerful piece of office equipment offering quite outstanding value for money. On the whole, it has been worth the long wait.

The system unit

As with the 8000 series PCWs (8256/8512), the monitor and system unit are all in one, but they are now styled like the PC with the engine-compartment underneath the screen. Unlike that of the PC, however, the screen looks as if it ought to tilt and swivel and doesn't. There will no doubt be some criticism

on that front if similar comments about the 8000 series at the time of its launch are anything to go by.

The disc drive is horizontally positioned in the system unit – a big improvement in design. And there's space for a second drive, though the 720k capacity of drive A (the same as drive B on an 8512, but now bootable), will prove more than adequate for many users.

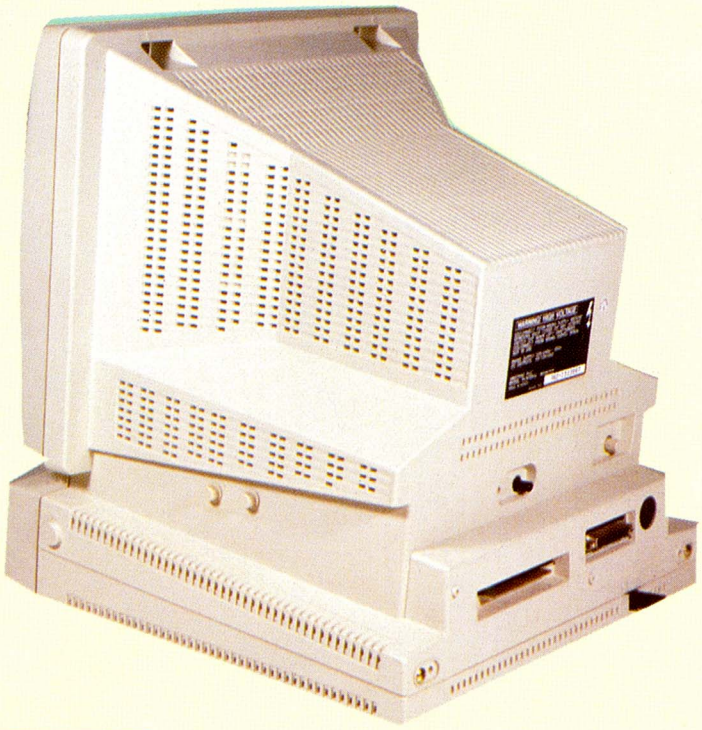
As before, the monochrome monitor displays 90 characters by 32 lines, but it's not the one we have come to know so well. The resolution is identical, but the effect of white characters on a black screen produces what must be an optical illusion of clearer definition. Perhaps it's simply that the contrast between characters and background is greater.

To my eyes, the definition is enhanced even more in reverse video (black characters on a white screen), as now seen in the LocoScript pull-down menus. It makes me wonder why Locomotive Software didn't opt for the black on white combination for text. I suppose it's all a matter of taste.

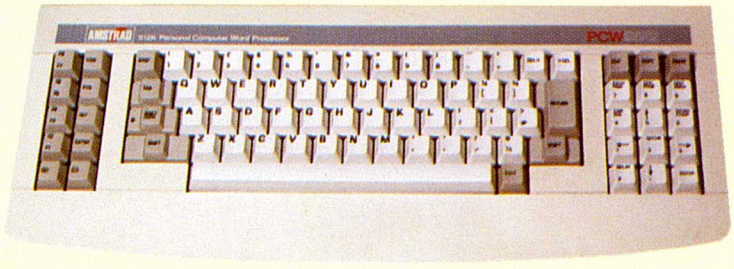
Be that as it may, the contrast can now be adjusted using one of the two knobs on the right of the monitor, the other being for brightness – again in the style of the PC.

At the back of the monitor/system unit is a knob for controlling the vertical screen hold, a single DIN socket for the printer (no more separate power and data lines), a parallel port to which an alternative printer can be attached, and the familiar 50-way edge connector on which a serial/parallel interface (such as Amstrad's CPS8256) can be fitted.

Although some people may want to add more than one printer (you can add up to three), I would imagine that the main interest of a such an interface will now lie in allowing serial rather than any additional parallel links. There's a new opportunity here for suppliers of add-ons to produce a cheap serial-only port.



The back and side of the monitor/system unit



The 9512 keyboard

Stiff lower lip

In keeping with the general design of the machine, the keyboard too is more PC-like than the previous PCW keyboard, though it plugs into the front of the system unit rather than into the side. An original feature is a lip at the front which acts as a wrist-rest. Touch typists will appreciate this especially, but even I (a two or occasionally three finger man) found it more comfortable to use than the standard keyboard shape.

The keys offer all the old LocoScript functions – Cut, Paste, Exch, Doc and so on, with most of them grouped as before, so existing LocoScript users will not need to alter too many of their habits. But the general layout is different, and the positions of some important keys have changed.

The function keys now run down the extreme left in a bank of two rows, the second of which contains Can, Ptr, Alt and Extra. The bottom two keys of this bank are the Set and Clear keys which on the 8000 series are placed on either side of the spacebar. The numeric pad, still doubling as a dedicated word-processing key group, is now clearly separated from the rest of the keyboard.

The only changes in the keytops for the Qwerty characters is that a vertical bar replaces the paragraph sign on the old keyboard, and quarter and three-quarter signs replace the curly braces. These changes have been made so that the keytops conform with the characters available on the supplied English printwheel for the daisywheel printer (see below).

One final but important keyboard change is to the keytop in the middle of the numeric pad, the one corresponding to number 2. This is now marked Spchk, and is a dedicated key for activating LocoSpell, the spelling checker which comes bundled with LocoScript on the 9512.

One criticism I have of the new layout is that the combination of Shift and Alt (used in LocoScript, for instance, to move the cursor to the beginning of the current line) is not as easy to achieve on the new keyboard as on the previous one – two fingers are required, instead of one covering both keys. But this is a minor niggle, and generally I think the new, clearer layout is a welcome move.

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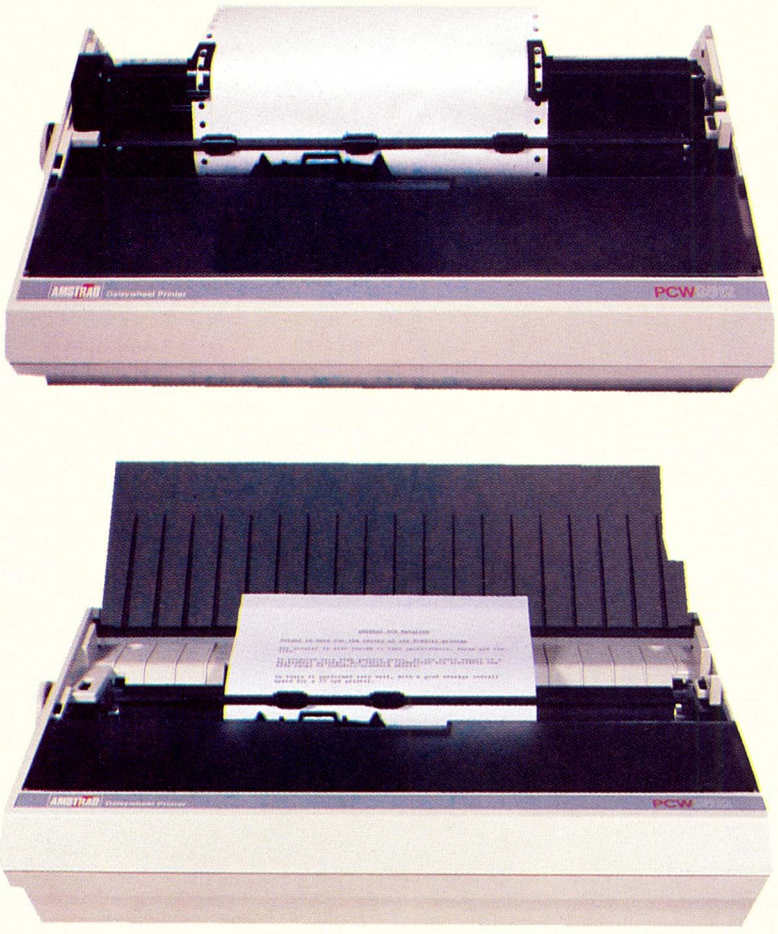
The 9512 daisywheel printer



Daisywheeling

The printer represents the most significant break-away from the 8000 series. As before, everything is controlled from the PCW itself (there are no buttons or switches) but it uses a daisywheel mechanism rather than dot matrix pins, giving the best quality print possible on anything but a laser printer, and clearly revealing Amstrad's intended market: Offices.

In one of the early press releases for the 9512, Amstrad's Group Sales and Marketing Director Malcolm Miller emphasised that while previous PCWs were acknowledged best sellers, "the print quality restricted sales into the office environment".

I bow to the superior marketing experience (and superb record of success) of Amstrad's marketing team, but frankly I'm not wholly convinced that such is the case on as wide a scale as the company obviously believes. The 8000 series dot-matrix printer produces excellent quality print, quite acceptable for most businesses; it has a draft mode, lacking on any daisywheel, for speedy output; and it offers the greatest possible flexibility.

Now, you can attach a dot matrix printer to the 9512 at fairly low cost (an Amstrad DMP will plug straight in with no bother), but a major selling point of the 8000 series was its completeness.

It gave both the man in the street and the businessman thinking of computerising his office a word processor and business machine rolled into one, requiring no add-ons. In other words, it saved him from one of his basic fears – choosing a major accessory such as a printer, and then having to mess about with Escape sequences and the like to make it do what he wanted it to do.

The 9512 printer, while offering improved quality of output, may in the long run prove too rigid for certain businesses, both for the reason I have given, and because of potential problems with special characters (which I'll talk about in a moment). Only time will tell, and I hope I'm wrong because in itself the printer is a product Amstrad can be proud of.

The platen is 15in wide, and therefore able to cope with spreadsheet printouts, wide forms and so on. It can also handle proper subscripts and superscripts (in other words the platen can roll back half a line), underline, bold and double strike.

The 10 pitch England Prestige wheel supplied will be sufficient for plain English text, but the range of available wheels is enormous. They conform to the Diablo 630 standard, and you can buy them with all manner of typestyles, and for most European languages.

Changing the wheel is about as simple as it could be – pull back a lever, take the old wheel out and drop a new one in. On some expensive daisywheel printers you have to line the wheel up and lock it in position. On the 9512 printer an automatic engage mechanism takes care of the alignment for you.

The automatic paper feed is also impressive, being more solid and therefore more accurate than that of the old dot-matrix printer. Pulling back the paper-load lever feeds a sheet of paper through securely and correctly aligned, provided that it was straight when it was rested against the paper tray. I only had to adjust only about one sheet in five to get a perfect alignment, and with practice I'll probably improve.

Given that, third-party manufacturers who have produced sheet aligners for the PCW in the past had better start thinking of a different kind of product – perhaps an automatic sheet feeder? You certainly need one in a busy office for work where continuous stationery is not appropriate.

If you do use continuous stationery, the tractor mechanism for handling it is easy to fit. You remove the smoked plastic back plate, position the tractor-

Figure I: PCW9512 specifications at a glance

Processor – Z80 running at 4MHz. Transient Program Area of about 60k.

Monitor – black and white 90 x 32. Separate brightness and contrast controls.

Keyboard – 82 keys. Four separate function keys. Numeric pad doubling as a dedicated LocoScript pad. Delete left and right. Shift lock.

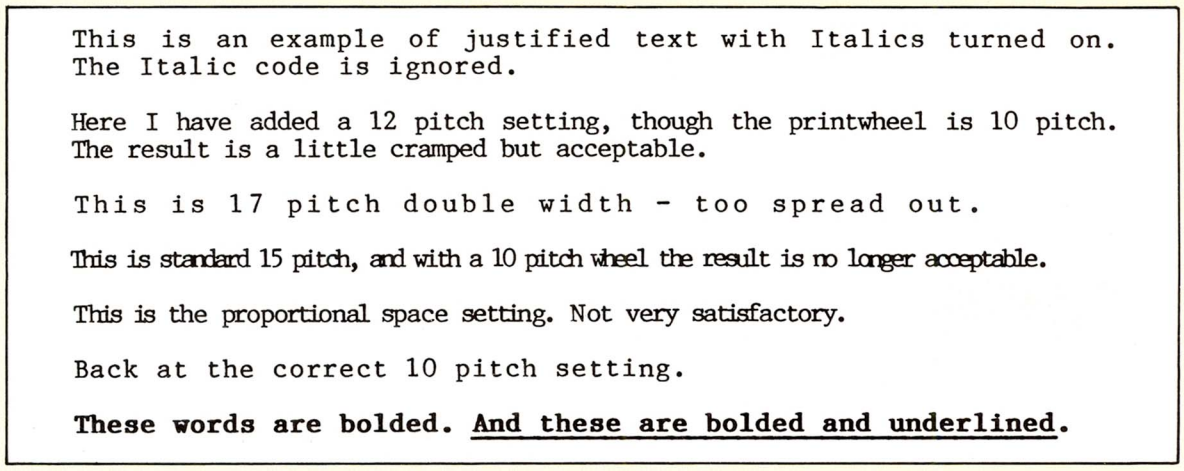
Printer – parallel (Centronics) 20 cps 630-compatible daisywheel. Tractor and (semi-automatic) friction feed.

Disc drive – one 1mb (unformatted) with a maximum 256 directory entries. Space for a second drive.

Memory – 512k, including a 368k ram disc (drive M).

Interfaces – parallel port and an edge connector to take a serial or further parallel ports.

Bundled software – LocoScript 2, LocoSpell, LocoMail, CP/M utilities, GSX graphics, Mallard Basic, DR Logo.



This is an example of justified text with Italics turned on. The Italic code is ignored.

Here I have added a 12 pitch setting, though the printwheel is 10 pitch. The result is a little cramped but acceptable.

This is 17 pitch double width - too spread out.

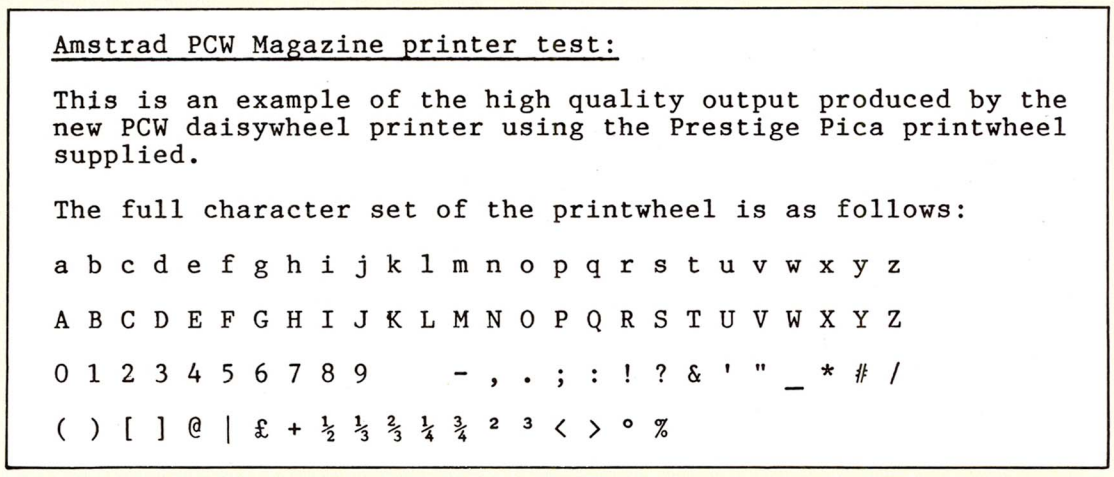
This is standard 15 pitch, and with a 10 pitch wheel the result is no longer acceptable.

This is the proportional space setting. Not very satisfactory.

Back at the correct 10 pitch setting.

These words are bolded. And these are bolded and underlined.

Figure II: Printout done with the Pica wheel supplied with the 9512



Amstrad PCW Magazine printer test:

This is an example of the high quality output produced by the new PCW daisywheel printer using the Prestige Pica printwheel supplied.

The full character set of the printwheel is as follows:

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

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

0 1 2 3 4 5 6 7 8 9 - , . ; : ! ? & ' " _ * # /

( ) [ ] @ | £ + ½ ⅓ ⅔ ¼ ¾ ² ³ < > ° %

Figure III: Samples of the 9512 daisywheel print quality and features

feed unit on the printer and push it into position. The unit is made almost entirely of plastic and it feels even flimsier than its 8000 series predecessor, which at least has a metal roller bar. But once in position it does its job perfectly, and since it takes virtually no strain it should give years of trouble-free service.

The printer is bi-directional, and has a logic-seeking head – that is, it does not "print" spaces individually but moves rapidly in either direction if part of a line is blank, and ignores blank line-ends. But despite that, it is not fast; in fact it clunks along something like the Juki printer, though not quite as noisily (There's nevertheless a market here for a third- party manufacturer to produce an acoustic printer hood.)

The official print speed is 20 characters per second (cps), but with daisywheel printers you have to be wary of such official figures. They are usually calculated by timing a continuous string of characters which follow each other sequentially on the printwheel. In everyday use, however, the wheel may have to spin up to half a turn to reach a particular spoke, which takes time and therefore reduces official figures.

I tested the 9512 printer using two benchmarks for speed – my home-grown one, and a standard test known as the Shannon text (a nonsense sentence which is supposed to simulate the frequency and distribution of characters used in normal English).

My own test consisted of 20 lines of the following sentence:

Amstrad PCW Magazine – The Choice of Professionals

This makes a total of 1,000 characters, including spaces, and it took 68 seconds to print – in other words an average of 14.7 cps. On the Shannon test, the printer recorded 13.5 cps, though this was not counting spaces (you're not supposed to). So, in all. you can expect a true speed of around 14 cps when printing standard text.

These results are more than satisfactory, and are evidence of a pretty efficient print head. I have tested other so-called 20 cps printers and had real-life results of as low as 9 cps.

One final plus point for the printer: The cable is long enough for it to be positioned comfortably on either side of the system unit.

Bundled software

The 9512 comes with a single system disc as opposed to the two discs supplied with the 8000 series. But since the disc can hold 720k of data on each side, you actually get more software with the new model than with the old ones, and there's still plenty of room to spare.

Side 1 contains LocoScript 2, LocoSpell (spelling checker), LocoMail (the LocoScript mail merge add-on for producing customised mailshots) and several very useful sample files.

There can be no doubt that the success of the PCW has been due in large measure to LocoScript, which has given the ordinary user an extraordinary powerful yet relatively easy to use word processor.

LocoScript 2 (which has been available for some time as a separate product for 8000 series users) is a big improvement on the earlier version 1, and I think it will do for the 9512 what its predecessor did for the 8256/8512, particularly taking into account the integration of LocoSpell and LocoMail.

I have one reservation about this prediction, however, and it's linked to what I was saying earlier about the rigidity of a daisywheel printer. LocoScript 2 is if anything too flexible for the machine it comes with – not in its word processing functions, where the two complement each other perfectly, but in under-using the potential of the printer.

LocoScript 2 has just about the best character set available on any word processor – a major advantage in so many applications, business or otherwise. The range of accents and non-

»

Ascii special characters is enormous, and accessing them has been made as straightforward as possible.

With the 9512 as it stands, however, all that character flexibility is wasted, since you're limited to the 100 characters available on any one wheel – only a dot matrix (or ink-jet or laser) printer can handle graphics and special characters without any physical change being made to the print mechanism. And even fitting an extra dot-matrix printer may not give you access to all the available LocoScript characters (the User Guide even contains a proviso to that effect).

On top of that, screen dumps are of course out of the question with a daisywheel printer, and it will not handle italics unless a separate italic wheel is fitted. This effectively rules out all the amazing mixed print effects which LocoScript is capable of – double width characters, mixed pitch styles and so forth. Codes for such effects are simply ignored by the 9512 printer.

I'll say no more here about LocoScript 2 and its very impressive facilities. It deserves a separate treatment, and we shall be covering it extensively in future issues of *APCW* when the machine has had a chance to penetrate the market a little.

Side 2 of the 9512 system disc contains the same software that came bundled with the 8000 series machines: Mallard Basic, CP/M with its utilities and Help system, GSX graphics, and DR Logo.

The only difference is that there are now some extra CP/M utilities. These include 8000copy.com (for copying files from an 8256 or an 8512 to a 9512, together with system files, if required), Daisy.com (which, among other things, sets the printer to work in 630-compatible mode), CPMkeys.com (which re-sets the keyboard to its defaults after using Setkeys), and Timeout.com (which enables or disables the CP/M timeout feature implemented when a peripheral such as a printer does not respond after a given period).

Mail232 is now held where it should always have been if there had been room on the earlier distribution discs – among the CP/M utilities rather than hidden from view on the LocoScript disc.

One of the things you notice as you boot up the 9512, using either LocoScript or CP/M, is that software takes a little longer to load. LocoMail and LocoSpell are automatically loaded with LocoScript, and this adds significantly to the boot-up time. But everything also takes longer because the discs hold so much more. This is, of course, a small price to pay for the convenience of such mass storage on a bootable disc.

Documentation

This time the User Guide is an all-in-one affair consisting of 626 properly bound pages covering all hardware and software aspects of the 9512. It is nicely printed and generally well written and well structured.

330 densely packed pages are devoted to word processing. Apart from the instructions for using the spelling and mailmerging facilities, the LocoScript documentation is more or less the same as that of LocoScript 2 which, as Katherine Cranford pointed out in the last issue of *APCW*, is excellent.

Mallard Basic, on the other hand, is given rather scant coverage – just a general introduction to the language, instructions for running programs and brief descriptions of the commands, presented in groups with very few examples of their use. If you want to use Mallard Basic seriously, you'll have to buy Locomotive Software's comprehensive manual (which, incidentally, is vastly superior to the one supplied with the early PCWs).

The GSX graphics documentation is only a slight improvement on that supplied with the 8000 series, and the DR Logo instructions are more or less a re-print of the earlier version.

I suppose that, as with all previous Amstrad products, finding errors in the documentation will become a popular hobby, and I can start the ball rolling with the fact that the key combination for a % sign is given as Extra+5, instead of Shift+5.

Overall conclusions

There's no doubt about which family of computers the 9512 belongs to – anyone upgrading from an 8000 series machine will feel perfectly at home with it. But, like me, they will also appreciate the extra goodies.

They will also own a prettier and generally better designed machine, and that's not an unimportant consideration. Malcolm Miller's remark about the chances of the 9512 penetrating office environments will certainly hold good for those who want their offices to present a professional appearance.

Yet is not obvious to me that the 9512 will have the same kind of impact as the 8000 series had, with its virtual monopoly of the small to medium word processing market. The 9512 is a mature product, the result of a system which has evolved, but its market will now overlap considerably with that of the 8000 series.

Of course, it's dangerous for a reviewer to make pronouncements about the future of any new product, because the real trial begins when ordinary users get their hands on it. I can't claim that I've exhausted its every aspect, but I have tried as hard as I can to simulate the kind of rigorous use to which it will be put in many applications, and I have been increasingly impressed with its performance.

If it stands up to the kind of hammering dealt out to 8000 series machines (very few of which have not withstood the worst that users have thrown at them), it will establish itself as an industry standard. And being unique to Amstrad, rather than a clone of somebody else's idea, it can only bring the company the prestige for genuine innovation which it deserves but which is often denied it by jealous rivals.

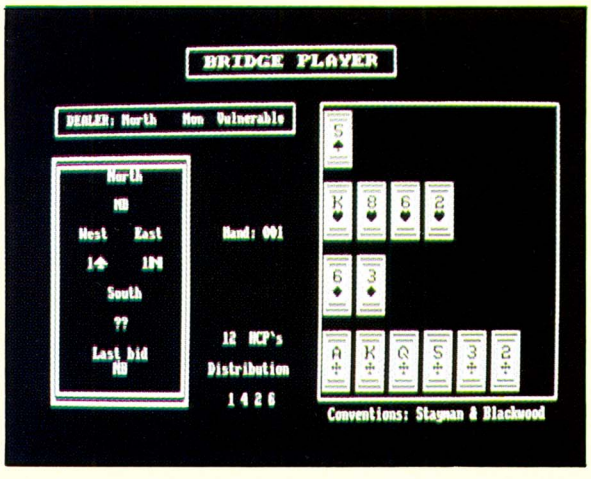


Figure IV: A CP/M program written for the 8000 series running on the 9512 (in this case CP Software's Bridge Player)

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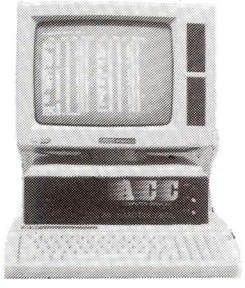

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Exploring computer-aided drafting

In the first of a two-part article about Cad concepts, Martin Woolley (in user-friendly mode) explains the fundamentals and uses the PCW Draughtsman program to illustrate a simple application

ONE of the tricks that techno-boffins often use to blind Jo Public with computer power, as well as show off their own expertise, is to display the more seductive images generated by computer aided design (Cad) in glorious Technicolor, in three dimensions, and with full animation.

The effects can be stunning. But the inference is often that practical Cad can only be produced on the latest and most expensive generation of black boxes by a new-style renaissance mutant, a humanoid amalgam of designer, draughtsman, engineer and information technologist.

This leaves the PCW owner with the distinct feeling that there's no possible connection between his or her machine and any kind of useful design activity. But that is far from the truth. Once such superficial preconceptions are ditched, there's no reason why the PCW can't be used to produce some very practical Cad work.

In order to demystify Cad, it will help to clarify just what the term means. Unfortunately, like a number of new buzz phrases, it has suffered from a rapid increase in the number of possible interpretations. So it's worth sorting this out straight away, and noting the three major directions that Cad can take:

● *Computer graphics.* These are the kind of spectacular animated sequences used to introduce television programmes and to promote futuristic realism in science fiction films.

The term also includes using computers to help us "visualise" objects or images, rather than having to rely on models, renderings or other highly finished artwork.

Computer graphics can also include some aspects of desktop publishing, since features like page layout and typography still have to be "designed".

● *Engineering design on computers.* This concerns the design and development of technological components and systems for production.

It can include Cam (computer aided manufacture) and, even more recently, Cim (computer integrated manufacture). In these applications the process of design and production is coordinated within a single computer-controlled system.

● *Computer aided drafting.* This covers the production and processing of technical drawings on computer – and will be the main focus of these two articles. It's used by a wide range of

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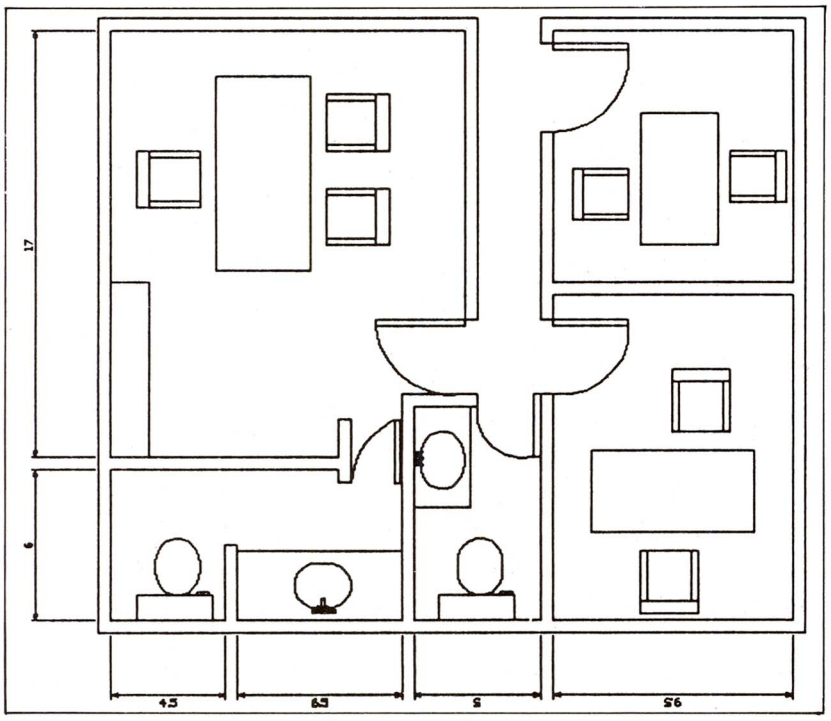


Figure 1: Technical draining lends itself easily to computer modelling

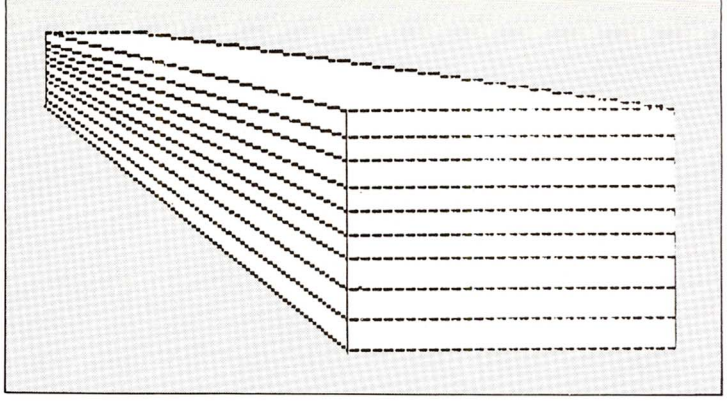
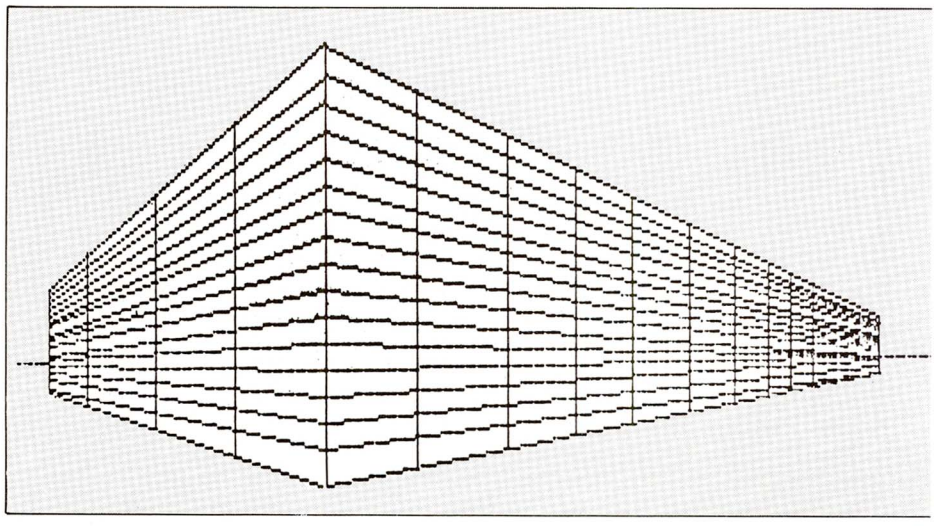


Figure II: One point perspective has only a simple vanishing point

Figure III: Two point perspective presents a more realistic view with two vanishing points



different professional user groups, from boat builders to mouse-trap designers.

With such divergent definitions, those involved in the field frequently end up talking at cross-purposes. Thankfully, the view is a little clearer when it comes to looking at the hardware and software available.

Since most Cad systems are designed to meet a set of defined objectives it's possible to pigeon-hole the majority of software packages according to one of these three types of application.

Hey Tosh

However, the process of design has always thrived on innovation, and it's important that the Cad enthusiast doesn't assume that a system designed for one category can't be modified or reapplied to another.

For example, recent TV ads for Toshiba products used Cad engineering drawings essentially as graphic animation components – with lively results.

This is all well and good, but where does the PCW fit in? Naturally, even the most committed user wouldn't claim that the machine can compete with the design clout of professional systems. But on closer inspection there are hidden areas in which the PCW can make an important contribution and, in the true sense of Cad, function as a design *aid*.

One of the most useful applications is in the grey area between computer aided drafting and computer graphics. There are a number of packages now available for the PCW, such as Grafpad/Powercad and Draughtsman which, strictly-speaking, are technical drawing aids.

If these are considered imaginatively, they can be put to wider uses, including technical development and the production of finished drawings. In themselves they can't be expected to play the part of a surrogate designer, but they can certainly provide a vital studio aid if exploited creatively.

I have chosen Draughtsman for the purposes of illustration. It is the one I would recommend, mostly because it can do conventional computer-aided drafting, but also because it includes the ability to provide infill and perspective construction, which can give a more creative and realistic approach to drawing presentation.

Suitable tasks

Along with misconceptions about what Cad is, there are a number of prejudices concerning who is supposed to benefit from it. The real answer is that anyone involved with reorganising our visual world, on whatever level, can employ Cad techniques to advantage.

The DIY enthusiast is just as likely as the spacecraft designer to gain from systems which electronically model aspects of the real world with greater flexibility and speed than traditional pen and paper – from cartoons to cartography, interiors to integrated circuits. Like most things in the world of computers, it's a question of linking an appropriate task to suitable software.

While Cad applications are legion, I shall concentrate on the way that the PCW can be employed as a sort of mini drawing office, since this is the kind of activity which most closely matches the machine's strengths and limitations. To do this it's useful to explain some basic traditional drawing terminology, starting with the fundamental drawing systems.

Any drawing is just a means of recording and communicating some aspect of the real or imaginary world. The more precise the visual information that's required, the greater the need for a systematic approach which both the designer and the client understand.

If a design has to be built to a precise specification, this need is paramount. Hence the emergence of technical drawing as a method of systematically describing materials, shapes and dimensions. Like many "systems", technical drawing lends itself to computer modelling.

One of the first conventions we use is to define the way in which a particular drawing system actually records the world. In practice, there are three methods in common use, all of which can also be successfully employed on the PCW:

● *Perspective drawing*. This is perhaps the most important way of communicating three-dimensional information to the layman. You can use it to simulate aspects of the real (3D) world in only two dimensions, like the fact that objects appear to get smaller as they move away.

Some software packages, such as Draughtsman, contain a special

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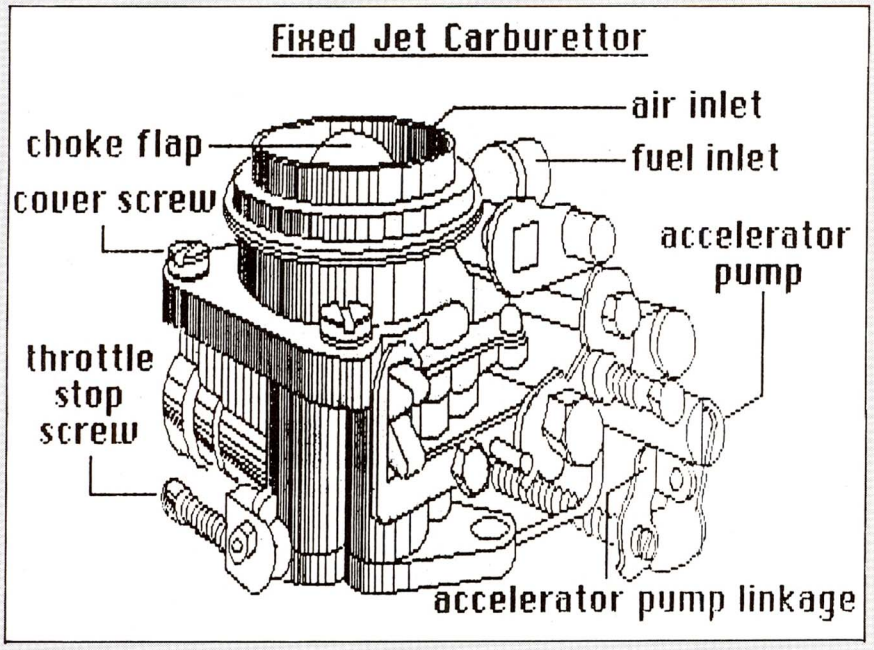

Figure IV: Detailed perspective drawings communicate directly to the layman

provision for constructing two different types of perspective. In a one-point perspective there's only a single "vanishing point" (this is the imaginary eye-level position at which imaginary outlines extending from the sides of an object converge). In a one-point perspective, then, objects are viewed only from a regular face-on position.

In a two point perspective, there are two eye-level vanishing points, so allowing objects to be viewed obliquely. In Figure V there's more about one and two-point perspective.

● *Orthographic projection – Elevations, Sections and Plans.* This is probably the most precise method of communicating how a 3D object is constructed – as long as the viewer is familiar with the drawing convention.

Basically, objects are defined as planes which are viewed from fixed and defined positions. No concession is given to perspective. For example, a house might be viewed directly from above to provide a flat plan, and directly from the front and side to provide two additional flat elevations.

The main advantage of this approach is that each view of the drawing has a defined relationship with all the others.

Information can be projected from one to another (hence the term projections) without always requiring fresh measurement.

Ortho-graphic projections can be executed on virtually all drafting software, conventionally with the different plans, elevations and sections grouped within a single drawing.

Alternatively, since some Cad software can work in layers rather like tracing over drawings, it's possible to place the different views on top of one another to synchronise dimensions.

● *Metric Projection*. This is a kind of compromise between perspective and orthographic projection. The length, breadth and height of drawings can be measured accurately, but they still convey an impression of 3D form. They're set up from orthographic projections and can be drawn at different scales.

Such projections are currently fashionable with architects and designers because they combine visual accuracy with a style that's easily understood by the uninitiated client. Most suitable for this kind of treatment are Cad systems capable of angular measurement, parallel line drawing or with a special metric projection facility.

In spite of their technical sounding names and definitions, these systems are only as complicated as the objects they describe. Thus there's no reason why they shouldn't be used on the PCW – provided that the drawing data is not over-complex. For example, you can produce perspective drawing using Draughtsman with surprisingly few key commands.

In the adjoining panel I've provided a brief description of how you would use the Draughtsman package to produce some simple perspective drawings. Certainly, if you work through the points I make, they should give an insight into how Cad can sometimes be simpler to operate than even the average computer game.

The technique I've described can be used to produce simple drawings of houses, interiors, or small objects. If more complex and detailed drawings are required it can always be used to set up the general layout of the perspective, printed, and then enlarged to provide a skeletal structure for general detail to be traced in.

In this way it can even be used to create a library of different perspective models which can be selected and worked on as new applications arise.

The example I've provided also clearly demonstrates just how the low-cost PCW can play a gimmick-free Cad role. In the second half of this article, I'll explain the advantages of computer-aided drafting in terms of the processing of drawing components. I will also work through a related example using Draughtsman.

Computer aided drafting in perspective, using Draughtsman

Draughtsman is obtainable from E.G. Computer Graphics, Orange House, Orange Street, Uppingham, Leics. LE15 9SQ. Tel: 0572 821291. It costs £29.95

Using Draughtsman, you start the process of constructing a two-point perspective by pressing the command key 7 (labelled H'ZON on the function key strip). This replaces the cursor with a single horizontal line (the eye-level line) which extends from one side of the screen to the other.

You can move this line up and down the screen, using the cursor control keys, to position it for a suitable view of the object on the final drawing. You can change the cursor speed by pressing the number 2 key in the centre of the cursor pad.

If the object you want to draw is to be looked down on – a carpet on the floor for example – the eye-level line should be towards the top of the screen. But if it's to be looked up to – a tall building, say – it should be towards the bottom.

When you've decided on the position you want to use, you need to register it by pressing the Enter key. The vanishing point menu then appears which allows you to select the left and right vanishing points.

Initially, Draughtsman locates these points on the eye-level line at the extreme left and right sides of the screen. These points can now be shifted left or right by changing the signs of their values using the number 2 key (imagine a horizontal screen axis with zero at the left hand side of the screen).

Then you vary the numeric value of the two vanishing points (for example, +200 and +600), by first pressing the number 2 key and then entering an appropriate value. Finally, these new positions have to be registered by pressing the Enter key.

Exiting the menu and pressing key 8, you will see the full screen cross-hairs cursor along with a single horizontal line with ends which relate to the left and right vanishing points. If you look carefully at this line, you'll also see a small "blip" at about the horizontal centre of the screen.

This line can then be "rubber banded" to form a flexible vee shape as an outline perspective, with the blip at its apex. Press the Shift and cursor control keys together and you'll be able to move the band anywhere on the screen.

As key 8 will now remove or redraw this perspective line, and the line is not printable or savable, you can treat it like a perspective template. You can now use the standard Draughtsman drawing facilities to draw your object within (or even over) the template.

Constructing a one-point perspective is even easier. After setting the eye-level line as before, you mark the position of the single vanishing point by pressing key 9 (shown as SPP on the function key strip).

This blanks the screen but, by pressing the cursor keys, a moveable line appears that stretches from its resident position at the bottom left of the screen. Once you've decided on the appropriate position of the end of this line, it can be fixed by pressing Enter.

Next, the perspective drawing cursor is switched on by pressing shifted 9. Another moveable line appears, this time with its origin at the vanishing point you have set. This can be rotated either clockwise or anti-clockwise by pressing Shift and either the cursor left or right keys. As usual, the cursor speed can be adjusted using the number 2 key.

This perspective cursor can be turned on and off using key 9, and you're now ready to draw your object using Draughtsman's drawing facilities.

In short, quite complex perspectives can be built up by first establishing the vanishing point (you only need to do this once per drawing), then moving the perspective cursor to the required position, and drawing over the cursor to produce the final line with required start and end points.

Figures II to IV will give you an idea of some perspective creations.

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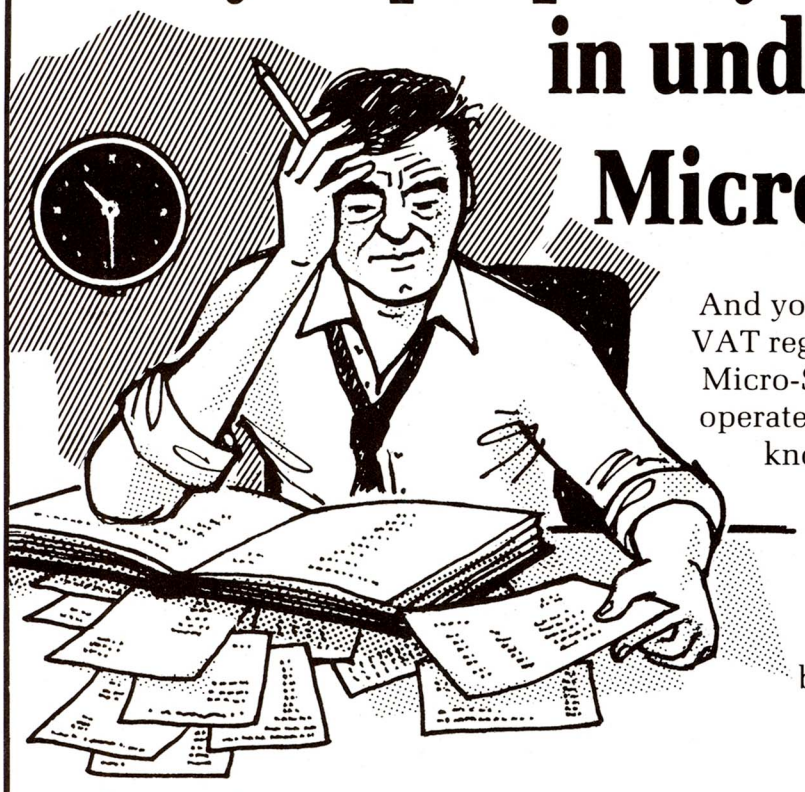

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Getting to grips with CP/M Plus utilities

The second part of a short series by our technical expert Jack Lumb on handling CP/M. Here, he takes a look at some transient commands for fine-tuning your PCW's performance

LAST month, in the first article in this series, I outlined the principles of the PCW's CP/M operating system and looked at basic built-in commands.

As promised then, this time I'm going to concentrate on giving full descriptions of some of the CP/M Plus transient utilities – the special routines supplied by Amstrad which enhance the base-level CP/M.

Let's get straight down to them.

Submit.com

Syntax:

SUBMIT filespec {argument} {argument} .....

Operation:

Submit executes a list of CP/M commands in exactly the same way as if they had been typed in at the CP/M command prompt (the "right chevron" or "greater than" symbol – >). The commands are stored in an Ascii text file which must have a filetype of .SUB (I'll refer to these files as Sub files).

The Sub file can contain any valid CP/M Plus command or program input line. Also dummy parameters can be used. The command line cannot exceed 135 characters.

Additional notes:

Normally commands are entered at the keyboard, but there may be occasions when a sequence of commands has to be entered regularly, which can become a laborious task. This is when "batch processing" comes into its own. Putting the commands into a Sub file enables the whole batch to be executed by typing just one command.

Aficionados can create Sub files using Pip.com or Ed.com, but in fact the easiest way to go about creating them is to use Rped as supplied with the PCW.

Simple batch files just consist of CP/M commands, for instance:

SETDEF A:,M: [TEMPORARY=M:]
BASIC

but it is also possible to accept program lines from a Sub file.

This is done by putting a "left chevron" ("less than" – <) symbol at the start of a line as in the example below. The rest of the line will be accepted by the previously specified program as if it had been typed in at the keyboard. A left chevron on a line by itself terminates program input mode and any other entries required by the program will have to be typed in.

The following is a small Sub file which will load Basic.com and then execute the commands **LOAD"TEST** and **LIST**, though this technique is not restricted just to Basic.

```
BASIC
<LOAD"TEST
<LIST <
<
```

This is fine, but of course it means that the Sub file can only ever load the file Test.bas. However, as well as accepting CP/M commands and program input lines, Sub files can also accept arguments from the command line. There can be up to nine, designated $1 to $9, where the first argument in the command line will replace the $1, the second $2, and so on (the filespec will replace $0).

These arguments can be used with CP/M commands and program input lines alike. For example, if the file Test.sub contains the following commands:

```
BASIC
<LOAD"$1
<LIST
<
```

then the command **SUBMIT TEST DEMO** will execute the equivalent of:

```
BASIC
<LOAD"DEMO
<LIST
<
```

The first argument in the command line (DEMO) will substitute the $1 in the Sub file. This is a much more flexible arrangement because this particular Sub file can load and list any Basic program.

There is a special version of a Sub file called Profile.sub. If this file and the transient utility Submit.com are on your CP/M boot disc, then every time you boot CP/M the commands in Profile.sub are executed automatically. This is a good way to personalise your system, with the parameters you prefer to work with being initialised every time you boot up.

One thing to remember: Whenever you "submit" a file, the default disc must be write-enabled (the tab must cover the hole) and it must have a little spare space. This is because Submit.com creates a small temporary file called SYSIN59.$$$. If you have used the **SETDEF** command (which I'm about to move on to) to make the PCW's ram disc (drive M) the temporary drive, then this of course will not be important.

Setdef.com

Syntax:

SETDEF {drivespec} {[options]}

Operation:

Setdef sets the order in which the disc drives are searched when loading programs or executing Sub files. It also optionally sets the filetype search order, Program Name Display mode

»

«

and Console Page mode.

Normally when executing transient programs under CP/M, the CCP (Command Control Processor) tries to find the requested file only on the current default drive, or on the drive specified in the filespec. If it can't be found, an error is signalled. Setdef actually allows up to four drives to be searched, though Amstrad's implementation of CP/M Plus only allows for three drives anyway.

Also, when a file with a filetype of .COM is searched for (I'll call such files Com files), Setdef can normally first search for and execute Sub files instead.

Setdef without a drivespec or options specified displays the current settings.

Options:

drivespec, {drivespec} ... tells the system to search the drives specified, in the order specified, to find a file. The drive specification (*drivespec*) is either a legal drive letter (A, B or M) followed by a colon, or an asterisk (*) which signifies the current default drive.

TEMPORARY=d sets the disc drive *d* to be the drive used when creating temporary files. The option can be shortened to *T=d.*

ORDER=(typ1,typ2) tells the system to search for a file of filetype *typ1* to execute. If no file of type *typ1* is found, the program will search for a file of type *typ2.* Only Com and Sub are legal types for this option. It can be shortened to *O=(typ1,typ2).* CP/M defaults to searching for Com files first. *DISPLAY* sets the system to Program Name Display mode. The drive, name, type (and user number if not the default) are displayed on the screen as programs are loaded, or as Sub files are executed. It can be shortened to *D.*

NO DISPLAY turns off the Program Name Display mode. This is the CP/M default. It can be shortened to *N D* (note the space between the N and the D).

PAGE sets Console Page mode. Utility programs are halted after displaying one screenful of information, and a key must be pressed to continue. This is the default mode in CP/M Plus. It can be shortened to *P.*

NO PAGE turns off Console Page mode. It can be shortened to *N P* (note the space between the N and the P).

Examples:

SETDEF

This displays current Setdef parameters.

SETDEF *,m: [TEMPORARY=M:, ORDER=(COM,SUB)]

This sets the disc drive search order to be first the default drive then drive M. It then sets M to be the drive used for the creation of temporary files, and sets the system to search for Com files first then Sub files.

SETDEF [DISPLAY, NO PAGE]

This turns on the System Display mode and turns off System Page mode.

Additional notes:

Setting the drive search path can be very useful, but bear in mind that if you set a path and mistype the name of a command as you enter it, the system will search every drive in the path before giving up. Note also that if there is no disc in the drive searched, an error message will be displayed.

Paper.com

Syntax:

PAPER parameter {parameter ... }

Operation:

Paper is used to simplify initialising the printer to the size of stationery being used. This is done by sending a suitable series of Escape sequences to the printer. The utility works only on the standard PCW matrix printer or an Epson FX-80 compatible printer attached to a Centronics interface.

Parameters:

FORM LENGTH n, where n is a number in the range 6-99 which sets the length of the form (page) to be n lines. It can be shortened to *F n.* If line pitch and gap length are not specified at the same time as the Form Length, they are set to six lines per inch and zero gap length respectively.

GAP LENGTH n where *n* is a number in the range 0-99 which sets the gap length (the area that is not printed between sheets) to be *n* lines. It can be shortened to *G n.* If line pitch is not specified at the same time it is set to six lines per inch.

LINE PITCH n where *n* is either 6 or 8. It sets the line spacing to six lines or eight to the inch (six lines to the inch is the usual line pitch). It can be shortened to *L n.*

SINGLE SHEET sets the printer to Single Sheet mode – after a page is printed the system waits for paper to be inserted before continuing with subsequent pages. If "paper out defeat" is not specified at the same time, then it is set to On. It can be shortened to *S.*

CONTINUOUS STATIONERY sets the printer to Continuous Stationery mode – the system does not halt after each page is printed. If "paper out defeat" is not specified at the same time, then it is set to Off. It can be shortened to *C.*

PAPER OUT DEFEAT ON. This parameter can be shortened to *P ON.*

PAPER OUT DEFEAT OFF. This parameter can be shortened to *P OFF.*

As well as these individual settings for the parameters three other options are allowed which give predefined settings:

n: A number by itself in the range 1-17 sets the form length to *n* inches and sets the rest of the parameters to:

Six lines per inch
Gap length of zero
Continuous stationery
Paper-out defeat Off

A4: This is a predefined layout giving:

Six lines of text per inch
Form length of 70 lines
Gap length of 3 lines
Single Sheet paper mode
Paper out defeat On

A5 This is another predefined layout giving:

Six lines of text per inch
Form length of 50 lines
Gap length of 3 lines
Single Sheet paper mode
Paper out defeat On

Examples:

PAPER 12

This sets the form length to 12 inches, and additionally: Six lines per inch, Gap length zero, Continuous stationery, Paper out defeat Off.

PAPER F24 L8 S G0 P OFF

This sets a form length of 24 lines at a line pitch of eight to the inch (that is, a form length of three inches), Single Sheet mode, a Gap length of zero, and Paper out defeat Off.

PAPER A4

This sets a form length of 70 lines, six lines per inch, a Gap length of three lines, Single Sheet mode and Paper out defeat On.

Next time, I'll continue with a description of some other transient commands, and offer as many tips on using them as I can. In the meantime, experiment with what I've already covered – you can only get the best out of CP/M by actually trying things out, and you can't do any serious damage if you work with copies of discs rather than originals, and data which you don't mind losing.

Who do you think you are?

The first part of Stephen Wells' series on starting your own business with the help of a PCW

THERE'S an odd attitude toward self-employment in this country. You get the feeling from many politicians and some segments of the press that people only go into business for themselves if they lose their job.

This appears to go hand in hand with a prejudice in some quarters against service industries and part-time jobs. Perhaps it's because the last few generations have got used to working for a pay cheque with a big company.

But in the days before assembly lines and mass distribution, chain stores and multinationals, practically everybody worked in a small business. Even soldiers worked for a kind of militia and paid for their own uniforms.

I have always felt that even if you're employed by someone else, you're still really working for yourself. You may have a certain loyalty to a company, but basically your future depends on your own efforts. And if you think there's more security working for someone else then you've never had the experience of being declared redundant.

It is a fact that there never seems to be a right time in your life to start a business. When you're young and have loads of energy, and have many years left in which to recover from your mistakes, you may not have sufficient experience to pull it off and next to no starting capital.

In your peak-earning mid-years, you probably feel too obligated to maintain the security of your family and don't want to let go of the golden cord with which your company holds you.

When you retire, you probably don't have the necessary energy or ambition.

Yet many successful businesses have been started by people in their twenties, forties and sixties. What was the key to their success?

Well, an important factor was that they were lucky. Don't knock it. When they asked Napoleon what sort of men he looked for when appointing generals, he said: "Lucky ones."

Of course, we feel lucky when things are going right. So it's important to take on a new business when things are going right for you and not as an escape from an unhappy situation.

Have a plan

Equally important is to have a plan for what you're going to do. It's not that it will all turn out the way you think it will: It's that planning concentrates the mind.

You should have a personal goal and a goal for the business. Your personal goal might be to make a lot of money, or gain new standing in the community, or become important to your friends, neighbours and customers. All is vanity, 'tis true.

Your business goal may be to grow the juiciest strawberries in the county, or make the sweetest sounding flutes, or sell the finest range of leather goods, or run the best local graphic arts centre.

There is risk. That's why business owners can be so well rewarded. But they can also lose their shirts, their home, their car, their pride, and their self-respect.

The risk is that the marketplace rejects your product or service. If your idea is not needed by the consumers in your community, or your timing is wrong, you're doomed.

Have a good idea

To succeed in your own business you must have something the competition isn't offering the consumer. Today's new business can't be run of the mill: There's simply too much competition for the consumer pound. It's a buyer's market and the buyer calls the shots. If you can't offer what the consumer wants, when he wants it, for how much he wants to pay for it – and still make a profit – you had better forget the whole thing.

To find out if you're ready for the marketplace and if the marketplace is ready for you, you could go into business and see what happens. But a safer way is to go through the steps laid out in this series, starting right now with some self-questioning.

You should ask yourself a series of searching questions about the type of person you are, why you want to start a new business, how much you already know about business and marketing, and so on. Twenty examples of the kinds of questions you should be thinking about are shown in what I have called a Personal Inventory (Figure I).

Unfortunately, there's no simple way of interpreting the results of this kind of self assessment. But the process itself should encourage you to think more about where your strengths lie, and suggest where you may need extra help.

You are what you know

The more education you have the better, and one advantage we have over "the good old days" is that we live in the information society.

Some colleges offer specialist short courses of one or two days' duration about starting your own business. Some of these courses are run by local Enterprise Agencies.

A number of colleges run longer programmes lasting up to 15 weeks. These are often sponsored by the Manpower Services Commission's Training Services Division. Their courses, called either New Enterprise Programmes or Small Business Courses, are run at some 25 business schools in universities and polytechnics throughout the country.

Such courses often consist of three to four weeks of classroom work covering all the main aspects of running a small business. This is complemented by up to 10 further weeks with business

»

PERSONALITY

- Do you enjoy a challenge and thrive on competition?
- Are you the kind of person who is willing to make decisions and see things through?
- Are you sufficiently outgoing to be able to talk to clients and understand their requirements?

WORK HABITS

- Do you like to be organised and work to a plan?
- Are you willing to work *very* hard for the things you want?
- Are you reasonably confident with figures?

RELATIONSHIPS

- Have you taken sufficient advice from other professionals, like your solicitor and bank manager?
- Can you get others to go along with your ideas?
- Are you certain that your suppliers will be able to provide you with the range of services you need?

MANAGEMENT

- Are you able to accept responsibility?
- Do you have any experience in selecting, training and supervising employees?
- Are you able to train someone as a deputy to cover for you during absences?

MARKETING

- Do you know your market sufficiently?
- Do you know the mechanics and important elements of advertising?

FINANCES

- Do you have sufficient capital to get started?
- Do you know enough about the kind of loans and schemes that are available?
- Are you able to interpret the significance of a Balance Sheet and Income Statement?

COMPETITION

- Do you know what your potential customers want?
- Do you know enough about your competitors, their strengths and weaknesses?
- Have you studied where the best location is for your business?

Figure I: A personal inventory

«

school staff working with the entrepreneurs on the mechanics of starting up their own business.

There are other longer courses on a part-time or linked weekend basis. These often cover a specific topic such as book- keeping or marketing.

Information on these courses can be obtained from the M.S.C. Training Services Division, 180 High Holborn, London WC1V 7AT.

The British Institute of Management runs a major information advisory service on management education throughout the country. This includes information on starting up or running a small business.

Write to: BIM, Management House, Parker Street, London WC2B 5PT.

Mature students may be eligible for a place on a full-time (perhaps residential) course for periods of a year or more.

Details of bursaries and courses to which they are applicable can be obtained from the Department of Education and Science, Honeypot Lane, Stanmore, Middlesex HA7 1AZ; or the Welsh Office, Education Department,

```
PFS
A1        = "PFS
C2        = "Personal Financial Statement
A4        = "        I OWN
E4        = "        I OWE
A6        = "Cash
B6,G6,B21,G21  = "#
E6        = "Current household bills
A7        = "Current Account
E7        = "Installment contracts
A8        = "Securities
E8        = "Car          #
A9        = "Property
E9        = "Appliances #
A10       = "Furniture
E10       = "Personal
A11       = "Car
E11       = "     loan  #
A12       = "Cash value of
E12       = "Other       #
A13       = "  life insurance
A14       = "Savings Bonds
A15       = "Deposit accounts
E15       = "Other loans
A16       = "Computer equipment
E16       = "Insurance premiums
A17       = "Other assets
E17       = "Taxes
A18       = "Receivables
E18       = "Other debts
A21       = "     TOTAL
C21       = SUM(C6:C18)
E21       = "     TOTAL
H21       = SUM(H6:H18)
E24       = "I OWN      #
F24       = C21
E25       = "I OWE      #
F25       = H21
F26       = "_________
E28       = "I'M WORTH #
F28       = F24-F25
```

Figure II

Figure II: Spreadsheet listing for the Net Worth statement

Figure III: Printout of the listing in Figure II

```
                    Personal Financial Statement

          I OWN                              I OWE

Cash                  £_________   Current household bills  £_________
Current Account        _________   Installment contracts
Securities             _________   Car          £_________
Property               _________   Appliances   £_________
Furniture              _________   Personal
Car                    _________        loan    £_________
Cash value of                      Other        £_________
  life insurance       _________                             _________
Savings Bonds          _________
Deposit accounts       _________   Other loans               _________
Computer equipment     _________   Insurance premiums        _________
Other assets           _________   Taxes                     _________
Receivables            _________   Other debts               _________


       TOTAL          £_________          TOTAL             £_________


                                   I OWN       £_____________
                                   I OWE       £_____________
                                                _____________

                                   I'M WORTH   £_____________
```

Figure III

Ty Glas Road, Llanishen, Cardiff CF4 5PL.

For younger people, the trades courses run by the forces are often the best form of training available. I remember when I was in the RAF I used to think that the Education Corps should be running the country's schools.

For older people there are many excellent correspondence courses which can be taken in your own time at your own pace.

Your finances

While it is true that many new businesses fail because they are undercapitalised, it is not true that you need a great deal of capital to get started. In fact starting too big at the beginning can be a mistake, and the bigger the business, the bigger the mistake. Far better to let the business develop gradually, shaped by the market. The soundest businesses grew that way.

But first you must take stock of where you are financially at the moment – that way, you know what you're working with. So let's make a Net Worth statement for you, just as though you were a business right now.

The speediest way to do this is to use a spreadsheet program, like SuperCalc, on your PCW. If you use the listing in Figure II for a template, it will print out as in Figure III.

When you fill it in, use quick sale values. In other words, if you give a value for your house, or car, or computer, or power tools, enter the price you could realistically get for them today.

Actually, whether you ever go into business for yourself or not, it's a good idea to prepare a Net Worth statement like this once a year, just to keep track of your financial progress.

There's one other step to take this month and that's to prepare a cost of living budget for you and your family.

Again, the whole thing can be most easily laid out, rearranged where necessary, and calculated, if you use a spreadsheet on your PCW. The listing in Figure IV offers a template, and Figure V shows how it should look.

When you fill it in, don't deduct anything for contributions to expenses by other family members. We're not concerned here with income but outgoings for an average month. It doesn't cover purchase of any major new items, but it must include an appropriate allowance for bills paid by the quarter, semi- annually or annually.

●*Next month I'll get down to the all-important aspect of researching your idea for a new business, and helping you find a niche in the marketplace which will respond to your product or service.*

Figure IV: Spreadsheet listing for a cost of living budget

Figure V: Printout of the listing in Figure IV

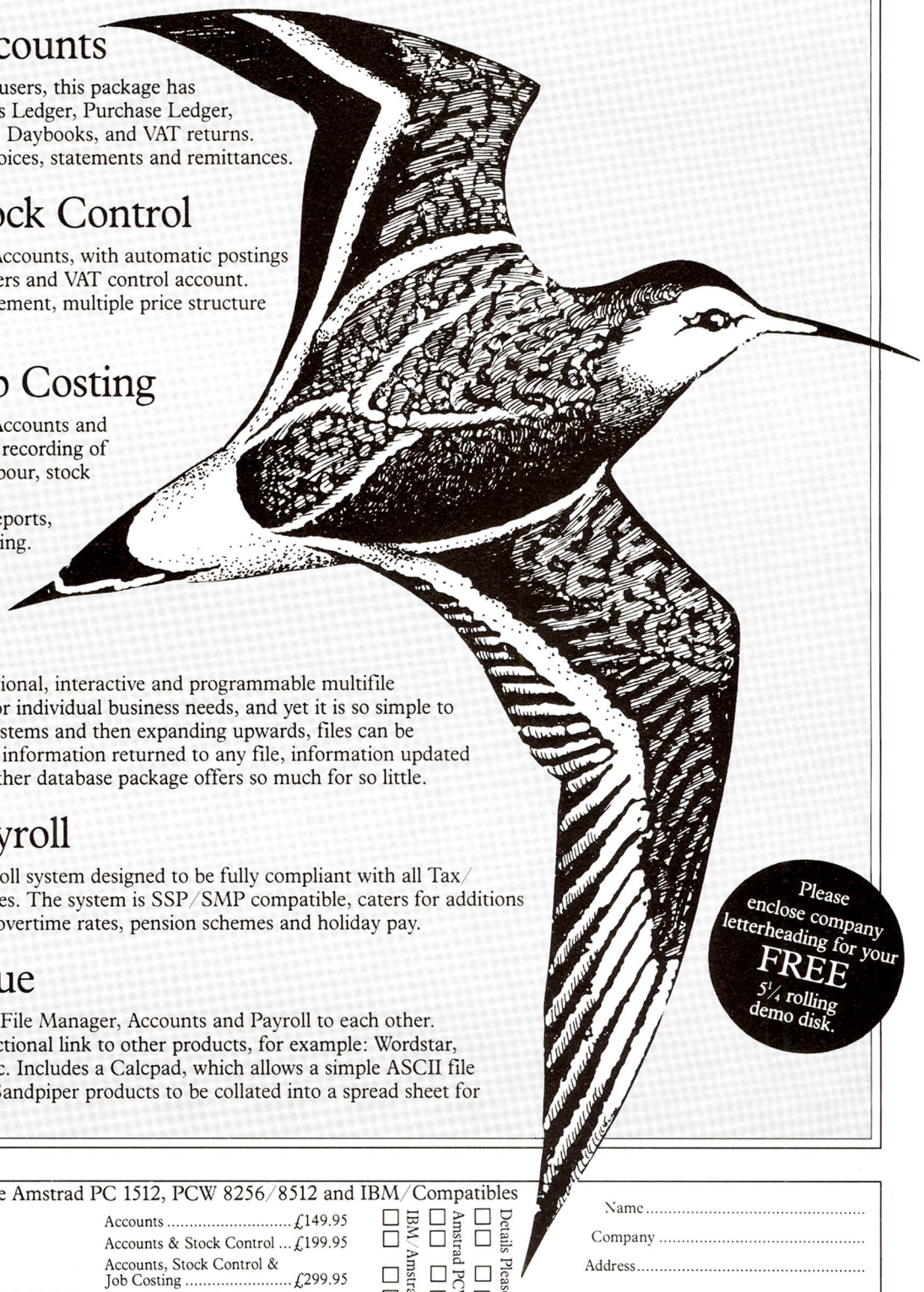
```
BDGT
A1        = "BDGT
C2        = "Family Cost-Of-Living Budget
C3        = "      One Calendar Month
A5,A39    = "REGULAR MONTHLY PAYMENTS
E5,A40    = "HOUSEHOLD OPERATING EXPENSE
A7        = "House payments or rent
B7,F7,B18,F18,B22,F22,F25,F30,B35,F35,B45 = "#
E7        = "Telephone
A8        = "Car payments
E8        = "Gas and electricity
A9        = "Appliance/TV payments
E9        = "Water and sewage
A10       = "Home improvement
E10       = "Other household expense,
A11       = "  loan payments
E11       = " repairs and maintenance
A12       = "Personal loan payments
A13       = "Health plan payments
A14       = "Insurance premiums
A18,E18,E25,A35,E35,A45   = "      TOTAL
C18       = SUM(C7:C15)
G18       = SUM(G7:G15)
A20,A41   = "FAMILY EXPENSE
E20,A42   = "FOOD EXPENSE
A22       = "Clothing, laundry
E22       = "Food  - at home
A23       = "Medicines
E23       = "Food  - away from home
A24       = "Dentist
A25       = "Education
G25       = SUM(G22:G24)
A26       = "Dues
A27       = "Gifts and contributions
A28       = "Travel
E28,A43   = "TAX EXPENSE
A29       = "Newspapers, magazines,
A30       = "    books
E30       = "Income taxes
A31       = "Car upkeep, petrol/oil
E31       = "Other taxes
A32       = "Spending money and
A33       = "   allowances
C35       = SUM(C22:C33)
E35       = "      TOTAL
G35       = SUM(G30:G33)
A37       = "BUDGET SUMMARY
C39 = C18      C40 = G18
C41 = C35      C42 = G25
C43 = G35      C45 = SUM(C39:C43)
```

Figure IV

```
                    Family Cost-Of-Living Budget
                         One Calendar Month

REGULAR MONTHLY PAYMENTS                HOUSEHOLD OPERATING EXPENSE

House payments or rent      £_____      Telephone                  £_____
Car payments                _____       Gas and electricity        _____
Appliance/TV payments       _____       Water and sewage           _____
Home improvement                        Other household expense,
  loan payments             _____        repairs and maintenance   _____
Personal loan payments      _____
Health plan payments        _____
Insurance premiums          _____
Miscellaneous payments      _____

     TOTAL                  £_____           TOTAL                 £_____

FAMILY EXPENSE                          FOOD EXPENSE

Clothing, laundry           £_____      Food  - at home            £_____
Medicines                   _____       Food  - away from home
Dentist                     _____
Education                   _____            TOTAL                £_____
Dues                        _____
Gifts and contributions     _____
Travel                      _____       TAX EXPENSE
Newspapers, magazines,
   books                    _____       Income taxes               £_____
Car upkeep, petrol/oil      _____       Other taxes                _____
Spending money and
   allowances               _____

     TOTAL                  £_____           TOTAL                 £_____

BUDGET SUMMARY

REGULAR MONTHLY PAYMENTS    _____
HOUSEHOLD OPERATING EXPENSE _____
FAMILY EXPENSE              _____
FOOD EXPENSE                _____
TAX EXPENSE                 _____

     TOTAL                  £_____
```

Figure V

The Sandpiper Business Collection



Sandpiper Accounts

Designed for inexperienced users, this package has a large file capacity for Sales Ledger, Purchase Ledger, Nominal Ledger, Cashbook, Daybooks, and VAT returns. It produces personalised invoices, statements and remittances.

Sandpiper Stock Control

Integrated with Sandpiper Accounts, with automatic postings to Sales and Purchase Ledgers and VAT control account. Includes FIFO stock management, multiple price structure and many other features.

Sandpiper Job Costing

Integrated with Sandpiper Accounts and Stock Control, provides full recording of all costs to jobs including labour, stock and consumables.
Includes work in progress reports, four labour rates and invoicing.

Sandpiper File Manager

A comprehensive, fully relational, interactive and programmable multifile package designed to cater for individual business needs, and yet it is so simple to use. Starting from simple systems and then expanding upwards, files can be selected, calculations made, information returned to any file, information updated and reports produced. No other database package offers so much for so little.

Sandpiper Payroll

A simplified integrated payroll system designed to be fully compliant with all Tax/National Insurance guidelines. The system is SSP/SMP compatible, caters for additions and deductions, bonus and overtime rates, pension schemes and holiday pay.

Sandpiper Glue

Designed to link Sandpiper File Manager, Accounts and Payroll to each other. Glue also provides a bi-directional link to other products, for example: Wordstar, Locoscript, Lotus, dBase etc. Includes a Calcpad, which allows a simple ASCII file from any source including Sandpiper products to be collated into a spread sheet for further processing.

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File Manager	£ 99.95	☐	☐	☐
Payroll	£ 79.95	☐	☐	☐
Accounts & Payroll	£199.95	☐	☐	☐
Glue	£ 99.95	☐	☐	☐

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Midnight confusion

Steve Gold puts the record straight on BT's Midnight Line service, and looks at Mercury's new challenge in the area of data communications

THE article in the August issue of APCW *entitled* Software free for all *carried an inadvertent error. Due to misinformation supplied on more than one occasion by some local British Telecom sales offices, we were led to believe that BT's Midnight Line allowed all telephone calls free of charge between midnight and 6 am.*

Since then BT has informed us that a Midnight Line only allows free calls to UK inland destinations – international calls are not free. APCW*'s comms expert, Steve Gold, explains the repercussions ...*

APCW recently received a call from Keith Edwards, Product Manager of British Telecom's special services in London. One of his responsibilities is the administration of the BT Midnight Line.

In our first (August) issue of *APCW*, I covered the subject of accessing the giant US online services for the latest shareware and public domain software. Part of that article referred to BT Midnight Lines which, we were led to believe by no less than three BT sales offices, allowed free calls between the hours of midnight and 6 am.

"Not so", explained Keith. "Midnight Lines allow free *inland* calls between the nominated hours and, contrary to popular belief, we don't disconnect the meter for six hours a day. In fact, we install special equipment in the exchange that allows calls to most inland destinations free of charge, but meters international calls as usual".

Keith's explanation is not mirrored by some local BT sales offices. When contacted by both myself and *APCW*'s Editor, Gabriel Jacobs, our respective local BT offices came back first with the comment that the service had been withdrawn, and then that it was available and, yes, the meter was turned off between midnight and 6 am so international calls were free between those times.

As I said in August, compared to the cost of a pay-as-you-go transatlantic call, the £190 installation cost and £153.50 per quarter flat rate for all calls made in the wee small hours compares very favourably. Unfortunately, BT's central office has now burst the bubble.

To be fair to BT, neither I nor the Editor of *APCW* got to the stage of actually ordering a Midnight Line. Had we done so, the small print of the latest Midnight Line contract would have noted that inland calls only were free. It's worth pointing out, however, that even this small print could be considered slightly ambiguous: It talks of Midnight Line being applicable to calls made "to a telephone on the BT telephone system".

Nevertheless, our story prompted a lot of interest. Keith Edwards reports that some of BT's major customers became understandably excited at the prospect of reducing their international call costs, only to be disillusioned by BT's central office.

Keith Edwards told *APCW* that since the August article appeared, a directive has been sent out to all BT sales offices informing them of a possible public misunderstanding about Midnight Lines. Hopefully, intending Midnight Line renters will now have the correct terms and conditions spelled out to them before they make a decision based on the BT sales staff's verbal information.

Since we went to press ...

Despite this sad blow to one of the ways of downloading the latest public domain and shareware software from the US online systems, the online market has changed considerably since *APCW*'s August issue.

For one thing, British Telecom no longer has the comms market wholly to itself. Mercury Communications is coming up in the fast lane, ready to cream off the lucrative international voice and data calls from BT.

Currently, the Mercury 2300 domestic telephone service is available to most major areas in the UK. And the company has just announced that it has broken BT's monopoly agreements with several of the European telecommunications authorities, and expects to offer substantial discounts over BT rates on Mercury calls to at least five EEC countries. It has also announced 10 per cent discounts on calls to Australia, with further cuts on other international routes – including those to America – just around the corner.

BT of course argue that Mercury is skimming the cream on its trunk and international markets, leaving it with only the milk. But free market economics are the life-blood of the West, and not even the largest company can hold back the law of supply and demand.

Mercury 5100

Mercury 5100 – the Mercury equivalent of BT's IPSS (International Packet Switch Stream) – continues to gain a foothold in the data communi-

»

cations market. At the time of writing, the joint ICL/Mercury national network is about to be launched in the UK. This facility will allow non-Londoners to enjoy the substantially discounted datacall rates offered by Mercury 5100.

BT's IPSS is charging £4.50 an hour for datacalls to the US. Add to that a £3.75 surcharge for each kilosegment of data (a segment is 64 bytes), and IPSS datacalls to the US work out at between 15p and 18p a minute.

Mercury charges a little extra for the time element of datacalls to the US – £5.10 per hour – but its data charges work out at £2.80 per kilosegment of data carried. At today's 1200 baud modem speeds, the bulk (over 60 per cent) of the call costs relate to the data transmitted. Overall, a call cost saving of between 15 and 30 per cent can be achieved by using the Mercury 5100 data services in preference to IPSS.

Interestingly, PSS's response to the Mercury data network challenge has been to maintain its call tariffs to the US and most other countries. And ironically, it's the connection and rental charges that have risen.

Previously, it cost £25 for connection to the IPSS network, and £6.25 per quarter for the use of a single PSS exchange. As from earlier this summer, these charges have risen to £40 for connection, and £10 per quarter for the use of a single PSS exchange.

Mercury's data network standing charges remain unchanged at £15 for connection and £3.50 per month (£10.50 per quarter equivalent) for network registration. Once the national network becomes operational – hopefully by the time you read this – the £3.50 per month standing charge will cover registration for all Mercury data network exchanges in the UK.

The Mercury challenge

Clearly then, Mercury is aiming aggressively to undercut BT's tariffs for both voice and data communications. And for the newcomer to comms in general, it seems to me the choice is clear – choose Mercury for both voice and data communications and it's a fair bet that, if your phone costs are greater than £75 a quarter, and/or you intend to use a public data network either in the UK or abroad, then Mercury can offer a cheaper alternative to BT.

The ironic thing about Mercury is that, for the time being at least, non-London *APCW* readers who do opt for Mercury will unknowingly be using BT lines, since Mercury lease a major proportion of their international, and some of their national, circuits from BT. Call savings accrue from the economies of scale that apply when Mercury use these BT circuits to switch its customer's calls around the UK and abroad.

All is not doom and gloom for BT however. Despite such communications price aggression, Mercury does not anticipate clawing more than 1.5 per cent of BT's market share of communications by the end of the decade. But there again, 1.5 per cent of the multi-billion pound communications industry is big money.

It is to be hoped that the sales staff on both sides of the Mercury/BT fence understand the market and can handle the increasingly complex services that the public will begin to demand in the future.

Reading about the PCW in business

Jane Brown reviews two books from the Glentop stable, both designed to help you choose PCW software

GLENTOP's output of books about Amstrad computers and their uses is unequalled. Several titles concerned with the PC1512 appeared on the very day the machine was launched, and since then we have been inundated with Glentop offerings for all Amstrad machines.

The same authors are used over and over again, and they seem to be able to churn the stuff out at the drop of a hat. But the quality varies, not only between authors but also between the works of the same author. And Glentop (or perhaps the authors) also seem to be making a habit of choosing inappropriate and sometimes misleading titles.

Such is not quite the case with P.K. McBride's *Choosing and Using CP/M Business Software on Amstrad Computers*, since that is exactly what most of the book is about.

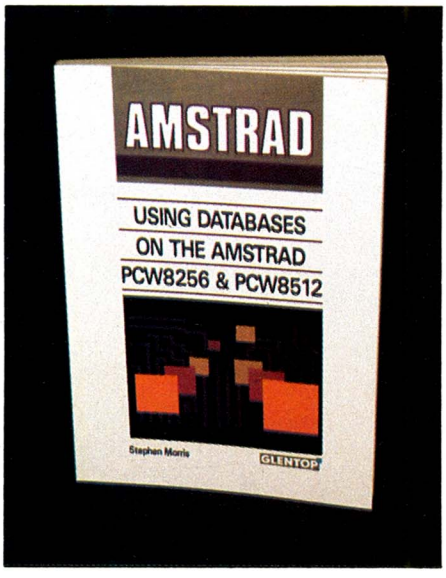
But "Amstrad computers" covers the PC range, and in his first chapter McBride takes pains to include it. Having opened with a mention of the complete Amstrad range, he continues (still in the first paragraph):

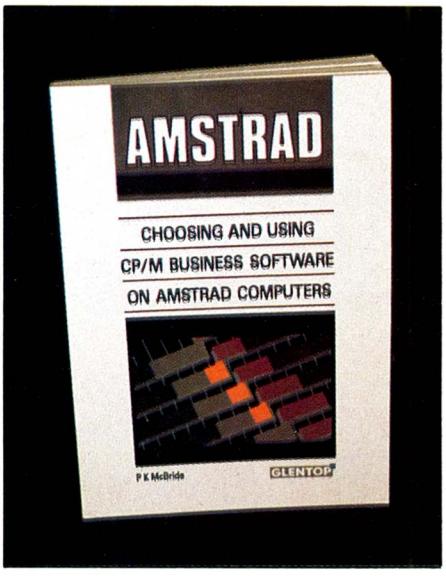
"With very few exceptions, the programs and packages that are reviewed in this book are available in formats to suit all of these machines, either as CP/M versions on 3-inch disks, or as IBM PC-compatible versions on 5.25-inch disks."

When people flick through books, they often read the first paragraph carefully, and many PC owners may be tempted to buy this work in the belief that what it contains applies for the most part to their machine.

This is simply not the case. Many of the programs and packages reviewed are *not* available in PC format, and the descriptions and evaluations of nearly all of them are limited to their specific implementation on the PCW.

Furthermore, the emphasis throughout the book is firmly on CP/M, and there is even a complete chapter on CP/M commands. The only concession to the PC in the body of the book is the (very) occasional reference to 5.25in discs – the bulk of it is all but useless to PC owners.





Choosing and Using CP/M Business Software on Amstrad Computers by P.K McBride

Using Databases on the Amstrad PCW8256 and PCW8512 by Stephen Morris

But after those opening remarks McBride has clearly felt obliged to pay lip service to them. Throughout, he refers to "Amstrads" when he means PCWs.

I find this very annoying. I wish authors (and publishing companies) would not try to pull the wool over the eyes of unsuspecting new Amstrad users in their desperate attempt to cash in on the mass sales of Amstrad machines.

It therefore hurts me to say that for the PCW owner this book is definitely worth considering. The range of PCW software is now enormous and, while magazines perform a service in their reviews of new products, there's nothing quite like having thumbnail descriptions and assessments under one roof when it really comes down to making a choice.

McBride covers the main business areas – databases, spreadsheets, payroll programs, accounting, word processing, graphics packages and training programs. There's little on things such as desktop publishing, computer aided design or memory-resident front-ends, but most businesses will, at least initially, be interested in bread and butter rather than champagne and caviar, and McBride gives them just what they need.

After some bland and wearily platitude-ridden opening chapters on topics such as installing a computer

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Both £8.95

system and using an Amstrad in your business (it beats me why these sections should have been given Amstrad-specific headings), McBride gets down to useful comparisons of the available software. He names names, and on the whole makes informed judgements, not only in terms of features but also of value for money.

But there are some bizarre curiosities even in the PCW-specific material. Take the step-by-step guide to reading an Ascii file into LocoScript. All perfectly accurate, but with a strange acknowledgement to Camsoft for the details of the method described – which is exactly the same as the standard method except that drive M is used for increased speed (hardly a startling breakthrough).

In many ways, such an oddity is typical of the book, which is a mixture of excellent advice, and scraps of disconnected, out-of-place, and often old-hat snippets of information taken from a variety of sources.

Databases only

Stephen Morris is a Glentop regular, and his *Using Databases on the Amstrad PCW8256 and PCW8512* is (in practice) aimed at the same market as McBride's offering: PCW owners who need to choose a piece of software, in this case just a database.

Both books are 192 pages long, so it's obvious that Morris has been able to go into much more detail about each package in the space available to him. He gives us not so much thumbnail sketches as full portraits, many of them longer than you would normally find in a magazine.

There are the obligatory opening chapters on information and its storage, the concepts behind computerised databases, data collection and accuracy, and initial preparations. Little or nothing new here, but it's all done quite competently.

The six packages described in detail are: Matchbox, Cardbox, AtLast, Retrieve, Cambase and Condor 1. Each is treated in depth, and two full chapters and an appendix are devoted to Condor, given its complexity.

The short conclusions drawn at the end of each section make the most interesting reading, since the other material is largely descriptive – in fact each section is little more than a digest of the relevant manual.

But I have no objection to that. On the contrary, this book allows the potential customer to read a shortened version of the instructions, which is an excellent way of assessing a package.

As with McBride's book – it seems to be a Glentop hallmark – there are some oddities. Let me just cite one: The blurb on the back cover announces a description inside of the general principles behind the Data Protection Act.

This in fact consists of a three very short paragraphs saying that the Act exists, and that there are few exceptions to what it covers. It does not say what the exceptions are, nor does it tell you, except in the most general terms, anything about what the Act is all about. I suppose that it does describe some general principles, but why bother flagging it so conspicuously?

That's a niggle, and other complaints I might make would be too. Generally speaking, the book forms a useful introduction to the idea of storing information on the PCW, and indirectly offers those considering a database a fairly painless way of making up their minds.

There are more than six database packages available for the PCW (what happened to dBase II?), but knowing about six common ones is a good enough start.

PCW SURGERY

Jack Lumb takes on your technical problems, and comes up with the right answers. Write to PCW Surgery, APCW, 169 Kings Road, Brentwood, Essex CM14 4EF

Laptop file transfer

I AM contemplating buying a Tandy 102 laptop portable computer. My intention is to use it for word processing while travelling, and then to load the files into my PCW8256 for editing and printing.

In addition to the RS232 interface for the 8256 and the interconnection cable, do I need any extra hardware? Also, are there any specific operating procedures or software required to carry out this process. – **C. Waghorn, HMS Neptune, Helensburgh, Dumbartonshire**

APCW: Portable data entry devices such as the Tandy, the Microwriter and the Z88 are becoming very popular. I, for one, would rather write where and when I choose rather than being confined to my den, so as an experiment, I typed most of this column relaxing (well ...) in my back garden using a Tandy 100. The text was then transferred using just such a link as you describe.

You will have to use CP/M to transfer the text file, but there is no problem because CP/M text files can be read by LocoScript.

First, the connection. You will need a lead to join the Tandy and the PCW together, using a cable with a male plug on one end and a female on the other. Pins 2 and 3 should be crossed (so pin 2 of one should go to 3 of the other, and vice-versa) and pin 7 should be connected together on each plug. If you're not happy creating your own, you'll probably be able to buy a suitable lead from your nearest real computer shop.

Secondly, at the PCW end boot CP/M and enter the following command:

Setsio 4800, 8 data, parity none, 1 stop, xon on, handshake on

Then you will need a disc to copy the file to. Make sure that a copy of the CP/M utility Pip.com is also on the disc, and enter:

Pip *filename*=Aux:

CP/M now sits in a loop and waits for your document.

At the Tandy end: Using the cursor keys select Telecom, then press f3. STAT appears on the screen. Type 88N1E and press Enter; now press f4 and f3, and you'll be asked to enter the "File to upload", and then width.

If you just press Enter for the width there will only be carriage returns at the end of paragraphs – which is what you want for LocoScript. If you enter a number (n) at this point, then a carriage return will be inserted every n characters.

The word UP is highlighted while the data is being transferred. When it returns to normal, hold down the Control key and press Z. This is the CP/M "end of file" marker and it tells the PCW to close the file which has just been transmitted.

Press f8 to quit the terminal mode. Answer "Y" to the question "Disconnect?", then press f8 to return to the Tandy main menu.

Finally, at the PCW end again: Boot LocoScript, change the disc (press f1 if you are using LocoScript 1; f7 for LocoScript 2), and then create a document in the usual way.

Select the Options menu (f7 LocoScript 1; f1 LocoScript 2), and the Insert Text option. Highlight the name of the transferred file with the cursor and press the Enter key twice. The transferred text will be sucked into the document.

Now you can get on with your final editing process.

Editing command lines

I HAVE been using an IBM PC at work for several years and I know the machine and its operating system pretty well. I recently bought myself a PCW for word processing at home, but couldn't resist the temptation to experiment with CP/M and I am now doing all kinds of things with the PCW, in fact I'm using it as I would a PC and finding that it's not all that much less satisfactory.

I have noticed, however, that PCdos seems to offer greater flexibility at the system prompt. In fact, CP/M Plus seems to offer no flexibility at all. In PCdos there are various ways of editing what you have typed in, including a very useful feature obtained by pressing f3 which brings back the last command. I find myself using it all the time.

The writers of CP/M have included so many powerful features, and I wonder why command editing could not have been put in as well. It cannot have been that difficult to implement. – **George Gilby, Glasgow**

APCW: It's surprising how many people don't realise when they buy a PCW for word processing that they're actually getting a fully-fledged micro with a very powerful operating system. CP/M Plus has a great deal to offer, and lots of hidden surprises – hence my series on it in APCW.

Something which will no doubt come as a surprise to you is that you can not only edit command lines in CP/M, but that the editing procedures are at least as good and in some ways better than those available in PCdos or

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MSdos on the Amstrad PC.

The instructions for editing command lines are to be found in Book 1 of the User Guide (Page 28 of the CP/M section). There you'll find ways of moving the cursor around, deleting to the end of the line and so on, and – note – ways of bringing back the last command entered (pressing Copy or Paste, and Alt+W achieves the same effect though it's not mentioned).

What's more, editing command lines on the PCW can actually be easier than under PCdos or MSdos, since you can move the cursor along the line and change characters at will – try moving the cursor around on both machines and see the difference.

Passwords

I WONDER if you could assist me with a problem that I have with the PCW8256 concerning the password protection system. As you know, it is possible to place passwords on files to prevent them from being read, written to, or deleted. However, I am unable to use the programs once I have placed a password on them. I would be extremely grateful if you could help me solve this problem.

Also, can you send me a map of the PCW8256's memory (a list of all of the addresses in memory, including routines, such as Setdma, Home, and Boot)?

Finally, can you tell me if there are any books or programs available which will teach me machine code on the PCW8256? I already know 6502 machine code, although I understand that there are several differences between the two. – **I.D. Fleming, Head of Computing, Frampton Products Ltd, March, Cambridge**

APCW: The idea of the password is to prevent unauthorised use. Once you have put a password on a file you must use it every time you use the file. For example if you have SET Basic.com to have a password of "demo", you must quote the password every time you run Basic – otherwise you'll get a "password error" message.

The way to quote the password is to follow the filename with a semicolon and the password, for instance:

BASIC;DEMO .....

Memory maps, Bdos and Bios entry points are all specified in the Operator's and Programmer's Guide for the Amstrad CPC6128 and PCW8256 *(Heinemann Newtech, ISBN 0 434 90320 5).*

There are many books which try to teach Z80 machine code, (the Z80 is the chip at the heart of the PCW). I don't really feel that I can recommend a particular tutorial book. My usual method of finding a suitable volume is to go to the largest local bookshop with a computer section and flick through a selection of likely titles. I then discard those whose tone is patronising and those that I just can't understand. This usually leaves at least one that is suitable.

The Z80 is quite a bit different from the 6502, although as you have some machine code knowledge you should not find transferring from one set of commands to the other too difficult. The standard work on using the chip is Programming the Z80 *by Rodney Zaks, published by Sybex.*

PCW MAILBOX

Your views, thoughts and opinions aired in our readers' corner. Write to PCW Mailbox, 169 Kings Road, Brentwood, Essex CM14 4EF

Speed of sorts

I HAVE just purchased a copy of *Amstrad PCW Magazine* and was interested to see that a review of our Indexer II was featured in it. I think it would be fair to say that it was not a good review, and just for the record I would like to raise a couple of points.

Factually it was accurate on sorting time and so on, although it is pointed out in the manual that frequent sorting is advisable. (100 unsorted entries take approximately one minute on the PCW8256.) I think a comparison of like times with like would have been fairer. For instance 70 character sorting on 1500 entries with a proprietary program such as dBase III. Also contrast the view of ram disc usage with that in your Masterfile 8000 review.

Our main complaint is however paragraph 3. The sorting routines used are very efficient considering the task undertaken and I think the comments made are totally uncalled for. Why presume whether garbage collection is or is not being carried out? Have a look! A few simple calculations would reveal that sorting on just the first few characters enables only the TPA to be used thus greatly increasing the speed.

We are not used to dealing in the consumer field, but as professionals we do observe the usual rules when appraising a product.

We will continue, however. Perhaps we will give away a free fan with each disc: It seems to help with computers. – **J. Torselli, Basingstoke, Hants.**

APCW: It is our opinion that Katherine Cranford's review of the Indexer II program was fair. Even the manual warns users to expect a long wait while the program sorts itself out. And we assure you that APCW *also observes the normal reviewing rules expected of a professional magazine: Legality, honesty and decency.*

Katherine Cranford's comments are as follows: *A reviewer's job as I see it is to represent the consumer, who can't try out every product on the market but wants an informed opinion in order to make a choice.*

With that in mind, let me come to the points you make:

● *Who in his senses would produce a dBase index sort on 70 characters? How many indexes have you seen in which two entries are identical for the first 69 characters but differ in the 70th? Computer programs are by their very nature trade-offs. Would it not have been better to decrease the number of sorted characters and thus increase the sort speed?*

● *I have not used Masterfile 8000 which, according to Sheila Napier's review, also holds data in the volatile ram drive. All I can say is that if it holds it for seven hours with no indication whether or not the program is still beavering away, then it deserves adverse criticism. (I'm assured that such is not the case.)*

● *I can find no reference in the Indexer II documentation to increasing the sort speed. I therefore assume that your comment about restricting sorts to the Transient Program Area is a theoretical one.*

In that case, I would say that it's not much comfort to the average consumer to know that if the TPA were bigger the sort would be faster. My criticism of the snail-like pace of Indexer II was made from the standpoint of what I take to be that average consumer. Given the limitations of the PCW, he or she requires a compromise between the two extremes of the fastest possible speed and absolute accuracy.

Your final comment, which I take as a reference to Alan Sugar's decision to put a totally useless fan in the hard disc Amstrad PC models simply to satisfy consumer demand, seems to me a poor analogy. Compromises of the kind I mean are not totally useless.

I might add that I mentioned in my review that Indexer II sorts on all characters, not just the first few as some programs do. I also took care to point out that unsorted indexes can be saved to disc for later sorting. I restricted what I still consider my legitimate hammer blow only to the thought of waiting hours and hours with no indication of whether or not the program has hung.

● *I did not* presume *that the problem of sort speed lay in garbage collection. I said that I strongly suspected that part of it did. I'm still not convinced that I was wholly wrong.*

»

Blunders

WE really do try hard to get things right, but sometimes little demons creep into our editorial copy and hide away and only show themselves when the magazine goes on the news-stands.

In last month's *APCW*, a couple of them managed to slip through our demon nets into Rex Last's listing on Pages 24 and 25. Apart from the leading zeros on line numbers which should not have been there, the last three lines of the listing suffered an attack – the leading numbers of those lines were missing.

Anyone who knows Basic will have worked out immediately what the line numbers should have been (and the fact that we received very few letters of complaint testifies to the knowledge of our readership). But some people may have been confused, so here are the last three lines again:

```
10000 REM **** blank
11000 REM **** blank
11999 RETURN
```

PCW MAILBOX

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Making the early upgrade link

AFTER reading Vol 1 No 1 of *APCW* I rushed out and bought eight 41256 (150 ns) DRAMS and followed Mike James' step-by-step guide to increasing the size of your 8256 ram disc.

All went well and with the chips in place I looked for the DIP switch. Oh no! I have an old PCW8256. No DIP switch, but hard wire. What do I do? I seek advice and find in some instructions that in order to complete my upgrade I need to "solder link between centre position and A and cut link between centre and B".

That loses me. So I ask a PCW expert to do the job. A simple task has cost me more than I thought because not all the facts were given. – **Gary Hardwicke, Barry, South Glamorgan.**

APCW: *We have received several letters similar in content to that of Mr Hardwicke.*

Frankly, we have been surprised that so many people have these early PCW models without DIP switches. And they have to be very early not to have them. The editor remembers upgrading his own 8256 ram at the end of 1985 with a proprietary kit, the instructions for which stated even at that time that "early PCW8256 models are not fitted with DIP switches".

It's true: We should have mentioned the possibility of having to do a little soldering job, but we thought that those models requiring it would be few and far between. We were obviously wrong, and here are the extra instructions, together with some hints about soldering.

Read all these instructions before making a start.

First make sure that the PCW is disconnected from the mains before opening it up.

Use Mike James' article to locate the spot where the DIP switches should be on the main circuit board. On early models, instead of the DIP switches you will see some soldered wire joints marked as in Figure I. The shape of the links may not be identical to those in the diagram, but the points should be clearly marked.

The idea is to disconnect the link which exists between the centre solder pad and point B, and replace it with a link between the centre pad and point A. This link is Link 1, as shown in Figure I (it may be marked LK1). Link 2 (LK2 – points C and D) will not be touched in this operation.

There may be some varnish on points A and B, so scrape them lightly *with a small screwdriver until the metal is bare so that a good contact can be made.*

Unsolder the wire connecting the centre solder pad to point B. To do this, apply the tip of a hot soldering iron to point B, and when the solder becomes molten gently lift the wire away with the small screwdriver, a wooden toothpick or something similar. Don't use a pencil for this job because you may leave traces of graphite which can conduct electricity.

Next, cut the wire link (preferably with a clipper, but you can use scissors) close to the centre pad, or (better) unsolder it away from the pad as you did with point B.

Take a new piece of wire of about the same gauge (thickness) as the one you have removed. Cut it to length – slightly more than the distance between the centre pad and point A so that you have enough to work with. Solder it to the centre pad and to point A.

The original piece of wire will almost certainly not be long enough to reach point A, but if it is then you can obviously dispense with unsoldering it from the centre pad.

Make sure that no part of the new wire is touching any other points or that any bits of wire remain on the board (they can cause a short).

That's all there is to it, but you may never before have done any soldering. There's really nothing to be afraid of, though you should have a fairly steady hand (and of course an electric soldering iron and some solder containing flux – most electrical solder does).

If you don't think you're up to it, get someone else to do it. A computer shop shouldn't charge very much for the work – it can be done in a matter of minutes.

If, on the other hand, you're happy about doing it yourself, and you're not an expert solderer, then note the following points:

- *Do not touch the tip of the soldering iron to see if it is hot enough. If it is you'll get a nasty little burn.*
- *If you have never soldered at all before, practice with some bits of wire before doing the job for real, using an old piece of wood as a base.*
- *Just before making the joint, "wet" the tip of the soldering iron with a little solder. You may see some smoke – this is the flux in the solder burning off and is quite normal (but don't breathe it in, and avoid getting it in your eyes).*
- *To solder a joint, lightly press the tip of the hot soldering iron on it for a couple of seconds. Next, touch the joint with the solder at the point where the tip of the soldering iron meets it. As the joint heats up the solder will flow over it. Put the end of the new wire on to the joint and remove the soldering iron. Keep the wire still until the solder solidifies of its own accord (do not blow on the joint). The wire should now be held firmly by the solidified solder.*
- *Use a low-power soldering iron (about 25 watts or less), otherwise you risk overheating the circuit board.*
- *The joints must be made hot enough for the solder to be effective. A joint which has been soldered at too low a temperature will have a rough, dull appearance and may not work properly.*
- *The same dull effect can be produced*

»

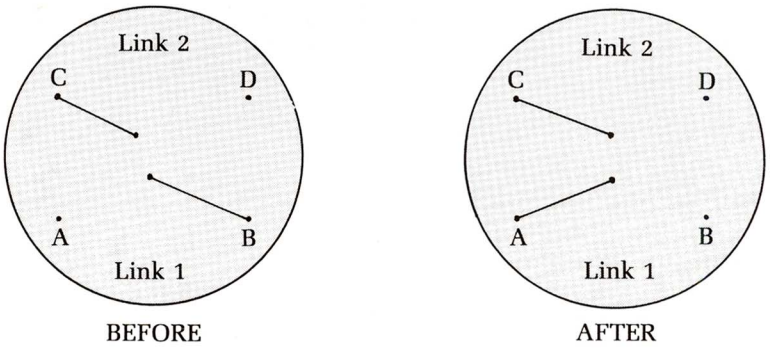

Figure I: Diagrammatic representation of the joints to be cut and soldered on early models of the 8256

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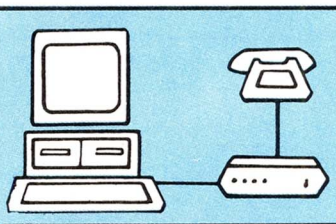

Typical comms packages	
A	*Dataphone: Modem + RS232 interface + Kiwichat software (£149.85)*
B	*Sage: Chit Chat modem + RS232 interface + Chit Chat software (£225)*
C	*PMS: WS4000 modem with RS232 interface Dialup software (£226.04)*
D	*Pace: Nightingale modem + RS232 interface + Chit Chat software (£231.75)*
E	*Miracle: WS4000 modem + RS232 interface + Chit Chat software (£259.90)*

All you need – apart from your PCW – is a modem, which plugs into your telephone wall socket, an RS232 interface and suitable communications software.

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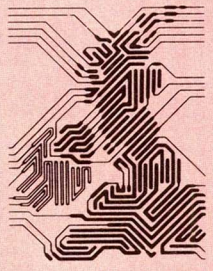

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PCW MAILBOX

if the joint is moved while the solder is cooling, so when you remove the soldering iron after making the joint, as mentioned above keep the wire still until the solder has solidified. This takes only a few seconds.

- *It's best to hold the wire in place with a small pair of pliers while the solder is solidifying, but keep the pliers well back on the wire away from the joint, otherwise the heat will be conducted away too quickly.*
- *Keep the tip of the soldering iron clean at all times by wiping it regularly across a damp sponge.*
- *Work in very good light. A desk lamp focused on the area to be soldered is best.*

All this may sound complex, but it's surprisingly easy once you have had a little practice. And it's very satisfying!

A turn for the better

I HAVE just devoured the first issue of *APCW* and quite tasty it was. I shall certainly be seeking a second helping.

I was especially interested in the review of Database Software's The Desktop Publisher, as I had already bought the program. Your reviewer tells us that it does not have the ability to rotate images. I was a trifle disappointed when I too discovered this.

It struck me, however, that there is a limited Rotate facility available in Graphic mode when using the Text tool. I reasoned that if the image to be rotated could be pasted into a font using the Edit Font option, then it could be treated as a group of letters. It should then be possible to write that group of letters right, left, up or down as if they were normal text. It worked! Here's how to do it:

Select Edit Font and choose any font. When it appears, select the File option and save it under another name. *This is important, otherwise you will lose a font.*

Now that you have created a new font, select the Tools option, and select Paste on the Tools menu. Position the pointer at the top left-hand corner of one of the letters on the main screen. It is best not to use the space character at the top left of the screen as this is also used by the Delete key.

Choose the image you want to rotate, and write down the letters covered by the box which appears on the screen (otherwise you'll surely forget what they are). Paste the image. Choose the File option then Save and Exit. You now have a copy of the image which can be rotated through 90, 180 or 270 degrees.

To produce the image, select Edit Graphics and choose a blank graphics file. Select Tools. Move the pointer to Text on the menu. Next, select Text Style, move the pointer Read Font, load the new font, position the cursor on the body of the screen, type the letters which you wrote down earlier, and the image appears on the screen. You must type the letters in the order they appeared in the original font (top left to bottom right) or they will be jumbled.

To rotate the image, choose the Down, Left or Up option on the Text Style menu for 90, 180 or 270 degrees rotation. When using Down or Up, it is better to double the size of the box along the X axis, otherwise the image will be a bit squashed.

The examples I have sent to you (Figure II – *Ed*) demonstrate some results. The box at the back of the bird's head shows the size of the character chosen using the Text option on the Tools menu. The letters show the keys which represent the various parts of the image, and the order in which they must be pressed.

Five characters need the Extra key: Tilde (Extra + minus sign), split bar (Extra + full stop), double quotes (Extra+8), up-arrow (Extra + semi-colon) and backslash (Extra + the "at" symbol). – **Iain Stephen, Manchester**

Voltage USA

I HAVE recently completed a two year post-graduate course in the UK and am shortly to return to my home in the United States. During my time here I discovered the simple joys of the PCW and have ended up processing most of my course work on it. Indeed I have become so attached to my electronic companion that I am considering shipping it back with me for future use. However, I wonder how practical this is. Will the PCW adapt to the different US mains voltage, and if not is there a gadget available to convert it? – **Margaret Alison, Reading.**

APCW: No problem. You can buy a step-up transformer at any radio shop, and that's all you need.

Signs of quality

I READ with some suspicion the review on Tas-Sign by Martin Woolley in your September issue. It seems totally naive for the author to go along with the software producer in suggesting that the quality of a DMP printout is acceptable for signwriting. The very thin quality of the actual illustrations used in the article are a testimony to the low quality of the final printout. I hope future reviews of graphic-type packages will be less rose-tinted. – **David Reed, Bristol.**

APCW: Martin Woolley replies: *On re-reading my own article I note that there are several references to the limitations of the DMP printer for this purpose. However, I also pointed out that the available variable strike and density will optimise the final print quality and produce an acceptable sign.*

I would add that if you're desperate for improved quality, Tas-Sign printouts can be used as the basis for simple tracings with a fine technical pen.

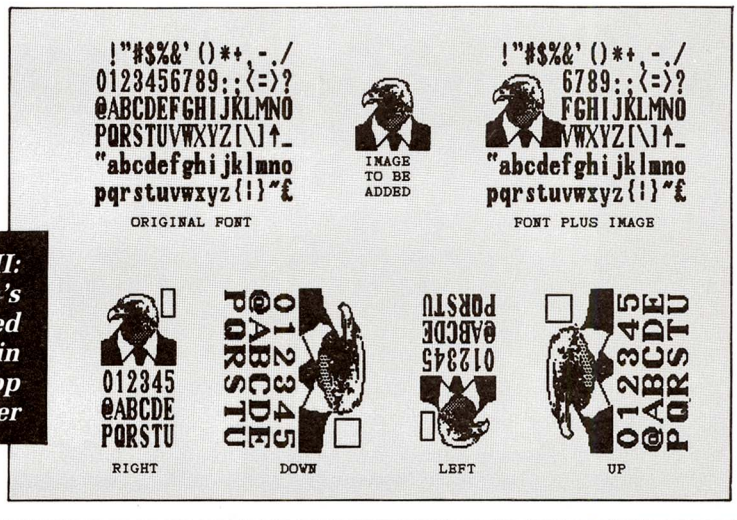

Figure II: Iain Stephen's rotated graphics in The Desktop Publisher

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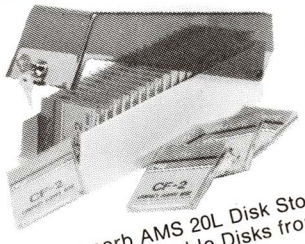

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Master SCAN

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MasterScan has great potential for professional users, but it's also a fun tool for all the family. Experiment by scanning a whole range of pictures and use them to produce posters, personalised notepaper, invitations and greeting cards.

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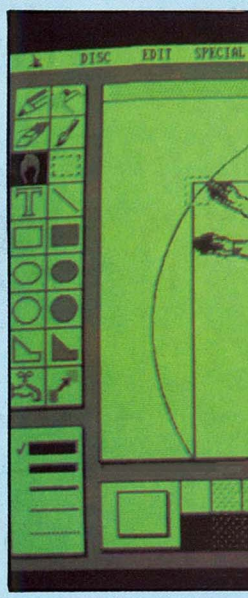

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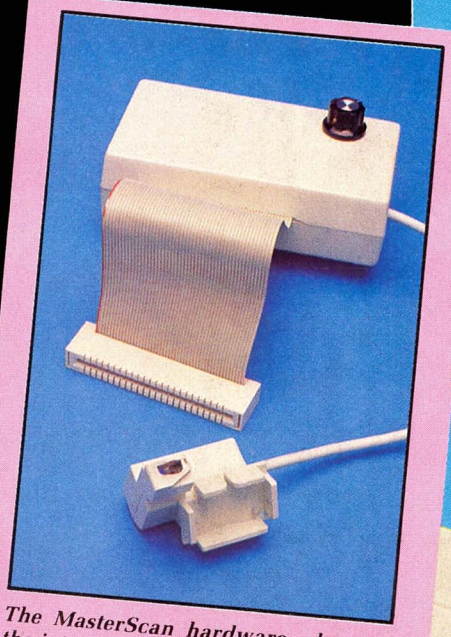
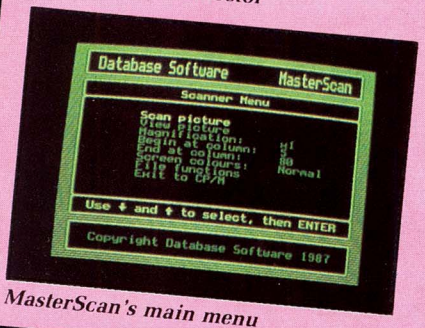
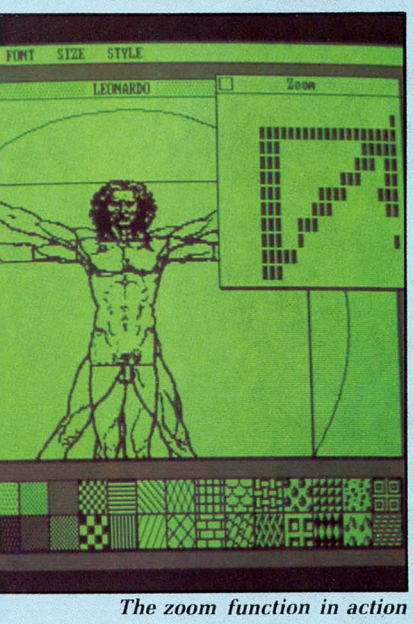


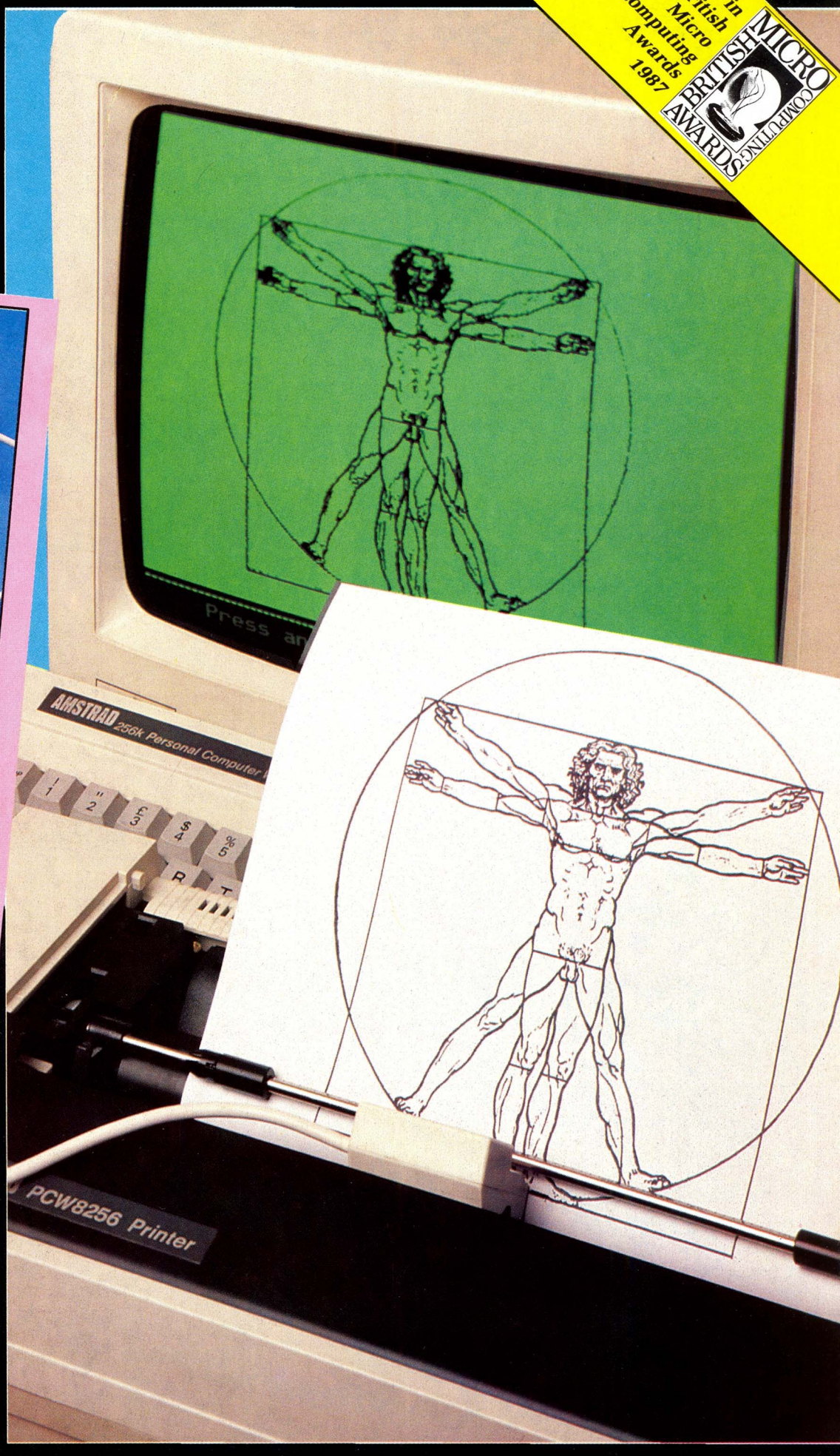
The MasterScan hardware, showing the interface box with contrast control and through connector



MasterScan's main menu



The zoom function in action



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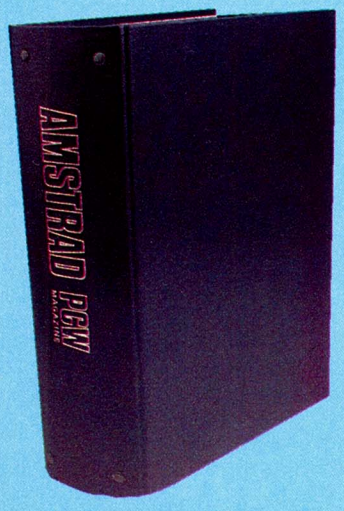

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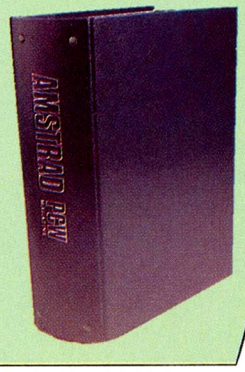

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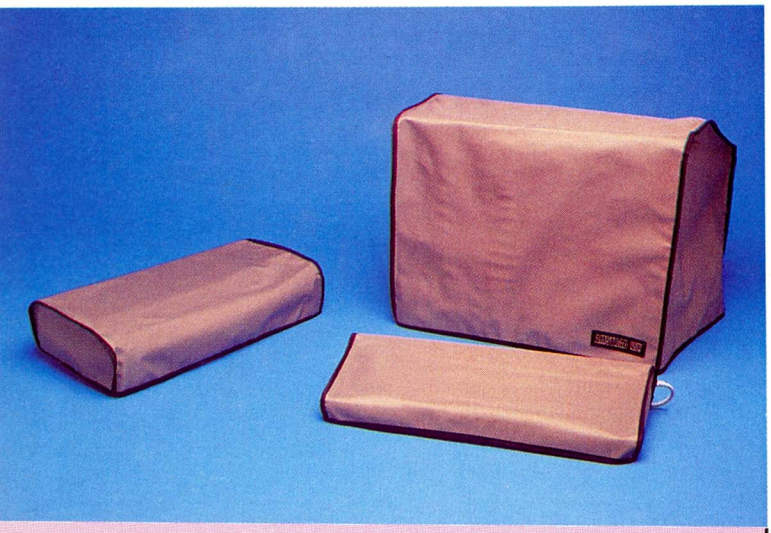

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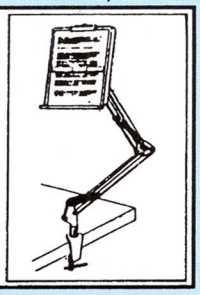

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