

COMPUTER MAGAZINE OF THE YEAR*

JULY 1987

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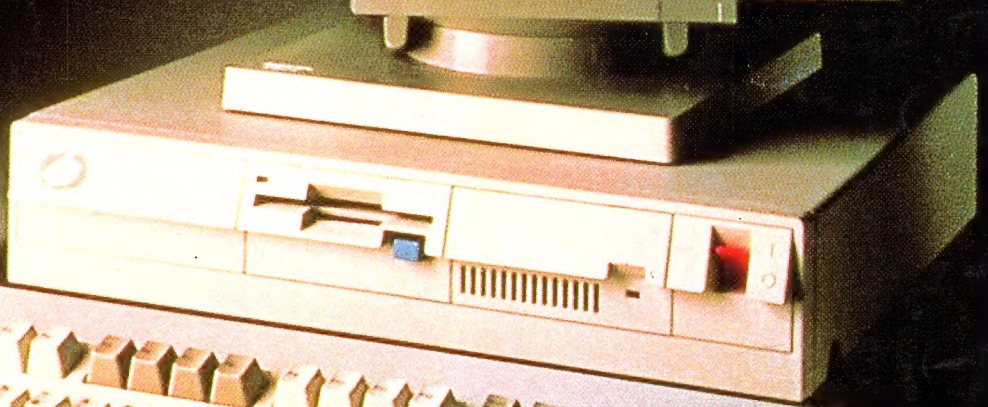
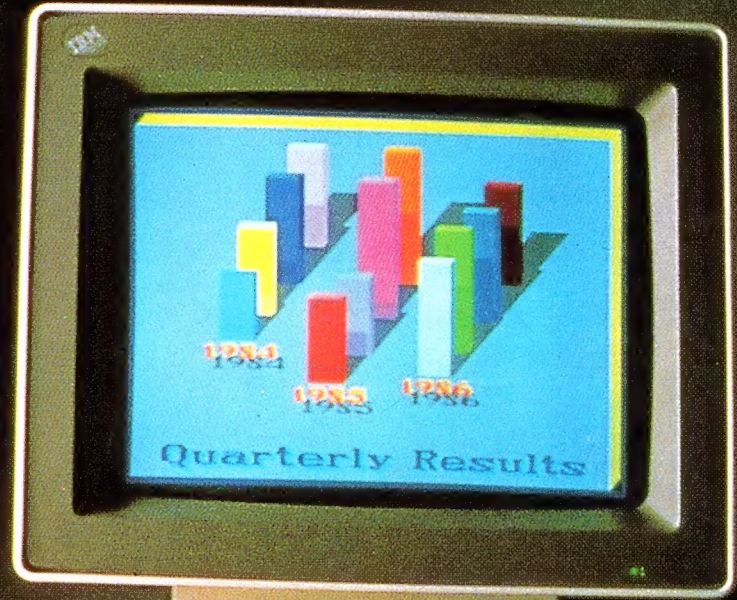
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Your computer

MAKING YOUR MICRO WORK

ANNUAL INDEX
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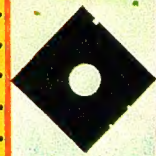
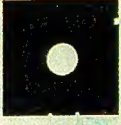
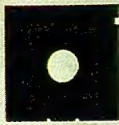
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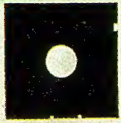
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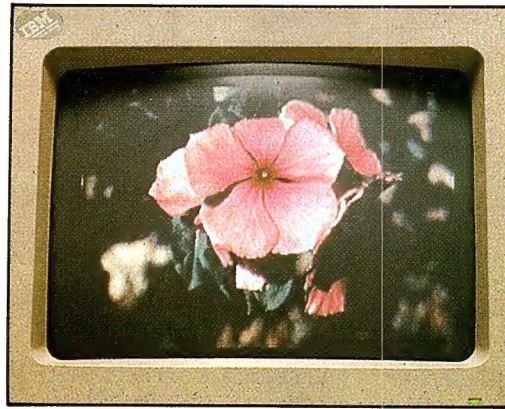
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The Dichotomy of Form and Content

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SOME TIME AGO, I casually remarked that I was heartily sick of hearing about Lotus 1-2-3; for me, the program had become an almighty bore. I have nothing against 1-2-3 or the people at Lotus: I think it's an excellent program, well designed and crafted, and I'm sure all those at Lotus are very nice people. I just wish I could shut off some of the information coming my way before I get totally overloaded.

Part of the problem is the way people become fixated on the program as an end in itself and spend hours designing self-referential macros and exploiting neat features of the program to no clear purpose. In other words, a concern with means and not with ends. There are lots of people out there who are using 1-2-3 daily to produce their forecasts, budgets and various reports, but who never feel the urge to experiment unless they need to get something done.

I feel a much greater kinship with those people than with the 'Lotus eaters'; to me, 1-2-3 is a tool, not a game. Perhaps this is because, as a programmer, I find much more challenging exercise in creating utilities in C than in bending 1-2-3 to do something unexpected.

I'm beginning to get the same feeling about the great god desktop publishing (sorry, Desktop Publishing). Now, I'm a professional communicator; I spend my time lecturing at seminars all over the world, preparing course notes, assisting people with their computer problems and, of course, writing for your computer (sorry, *Your Computer*).

On TV, I get the message that in order to secure promotion, impress the board, and so on, I have to prepare my reports using desktop publishing. There's a rash of new

products out there, all dedicated to making the printed word brighter, breezier, more attractive, and indeed, redundant, because a picture, which is worth a thousand words, can be simply included in the page.

The result, I am beginning to suspect, is that slicker, glossier, reports are being produced which are fundamentally deficient, because the author spent more time and effort making the thing look slick, than he did in getting the facts right.

We've seen this before with spreadsheets: beautifully constructed reports, correct as only computer output can be (computers never make mistakes), but which contain faulty assumptions, logical errors and other bugs which make the whole thing valueless — mainly due to an absorption on the part of the user with *spreadsheets*, when he should have been concentrating on *forecasting*. A survey of various companies' spreadsheets done by a student in Tasmania revealed bugs in the majority of them.

It's happening again with desktop publishing; a preoccupation with form over content. Certainly, attractive layout which makes effective and appropriate use of graphics actually assists in getting the facts across, but let's make sure the facts are correct before we start thinking about dressing them up.

Incidentally, in case you are wondering; no, I don't use 1-2-3, but I'm not totally prejudiced against spreadsheets. I use Framework (with care and with appropriate design guidelines), and yes, I do use desktop publishing in the form of a Mac and LaserWriter. But I'd rather get the facts right, and dully presented, than have a spectacular presentation that is wrong.

Les Bell

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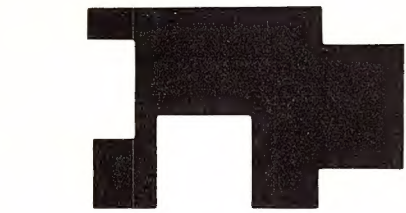
If the disk format you need to access is not included in the current menus in PC-Alien, just send us your formatted CP/M or MSDOS diskette containing more than 50% readable ASCII text and we will try to add that format to PC-Alien's comprehensive list.

With the appropriate hardware, PC-Alien will allow you to read 3.5 inch, 80 track and 8 inch formats in CP/M-80, 86 and MSDOS. Available for IBM and compatibles. **Price: \$104*.**



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TELECOM MEANS TOUGH TIMES

Be prepared for some tough times as far as higher charges for telephone calls are concerned, is the message being sounded by Telecom in the wake of the May mini-budget.

AS A RESULT of the tax on Telecom services, signalling the end of the tax exempt state that it enjoyed for years, Telecom will be slashing staff by 3 per cent, reducing its services and increasing local call fees by 3 cents.

What the new laws will mean for the high tech information industry, is that charges will start to chomp into company budgets; new rates that will directly affect bulletin boards are proposed and these will almost certainly be implemented (for more details, refer to 'The Prophet — Here Comes Telecom' in our June issue.

There is no word as to how this introduced tax will affect the future of communications development according to a Melbourne headquarters spokesman.

The new taxes are expected to nett the government \$310 million this coming financial year and \$395 million in 1988/89. □

FINALIST WINS OVERSEAS

System Builder, distributed by S B Tech, came out winner in the UK's first 4GL Grand Prix. The sophisticated applications generator was a Finalist in this year's Personal Computer of the Year Awards.

SYSTEM BUILDER came out the overall winner in a field of 11 suppliers of fourth generation languages.

The judges went through two intense 12 hour sessions of applications development. System Builder came out top in the productivity, flair and enquiry sections.

All the companies were set the same testing problem to develop and then carry out various tests on an airline reservation system. Such a system would normally take weeks to develop but organisers were seeking a productivity improvement the region of 25 to 1 on traditional programming techniques.

The Grand Prix was held at the Imperial College in London and was sponsored by Computer News and organised by 4GL consultancy, Computing Futures. □

PRIVACY IN THE COURTS

Justice Kirby, President of the NSW Court of Appeals, has warned that the breakdown in interaction between new technology and the legal system, is serious enough to be raising more concern amongst the public.

HE HIGHLIGHTED the 'tardy response' of the legal profession to the Australian Law Reform Commission's report on privacy as an example of the breakdown in understanding between the law reformers and the problems which can occur in the burgeoning technology industry.

According to Justice Kirby, the problem centered on the bureaucracy system where implementation of a report or proposal is delayed until everyone has forgotten it, or the problem which it addressed has changed and required an entirely new investigation.

Justice Kirby brought up the problem at the Royal Melbourne Institute of Technology's Centenary International Conference, where he was critical of information mismanagement in Australia, emphasising the failure of lawmakers to adequately resolve problems created by new technology.

Justice Kirby went so far as to say that what was at stake was nothing less than the survival of parliamentary government in the age of mature technology.

He believed that effective laws for the protection of privacy had not been enacted locally, probably due to the rapid growth of the information technology industry but this did not excuse the legal profession from enacting laws now.

Australia lags behind the OECD (Organisation for Economic Co-operation and Development) countries in respect of protection on personal data. 'In Europe, the misuse of personal data in the Second World War is still fresh in peoples' minds, so effective data protection acts have been passed. They generally have a heavy

emphasis on the bureaucracy and government regulation of databases storing personal information.'

The Australian Law Reform Commission has proposed a more low key and supposedly cost effective mechanism, which has not yet been implemented, still leaving loopholes for manipulation of personal information residing in personal databases.

'Current protection relies on the consciences and initiatives of information managers,' Kirby argued, 'but these same managers have at their disposal the ability to create a whole profile on an individual based on information from many sources, according to Justice Kirby. 'Data that was not specifically collected in connection with the subject may, with the speed of technology today, be retrieved from what would otherwise have been a safe burial place.'

He went on to suggest various changes to the laws —

- 1) Changes in intellectual property law (trade marks, copyright and patent laws), to move from protection of the *medium* of information to possible protection of the information itself.
- 2) The provision of effective criminal laws to deal with anti-social conduct having connection with a number of jurisdiction in trans-border data flows.
- 3) The provision of an effective regime of private international law to determine the choice of law that will apply to a transaction having connection with a number of states.
- 4) Changes in contract laws to reflect the effecting of obligations by electronic messages without written agreements.
- 5) The determination of criminal laws to deal with computer fraud and theft of information.

According to Justice Kirby, there is little co-ordination amongst the lawmakers, government and business which will, if left unchecked, cause serious problems to the future of our industry. □

NETCOMM NETS A TURBO

More speed is the constant cry from the computer industry. NetComm have taken this seriously and sponsored a Group A Nissan Skyline Turbo to back up their already racy image.

THE CAR will be driven by Murray Carter and Denis Horley in the Australian Touring Car Championships, the Adelaide Grand Prix, and major events in the Australian Endurance Championships, including the James Hardie 1000 and the Calder 500.

NetComm have also announced the rationalisation of their distribution network to allow them wider access to the growing middle and low end 'consumer' modem market.

The new retail distributor for NetComm is Imagineering who have promised to expand their dedicated technical support hotline facility to cover the NetComm range. □

SCHOOLS WAIT DEEP DOWN UNDER

New Zealand schools are waiting on a survey being carried out by their Education Department on the benefits of computers currently in their schools. The survey will lay the groundwork for any future investment by the NZ government in computers for schools.

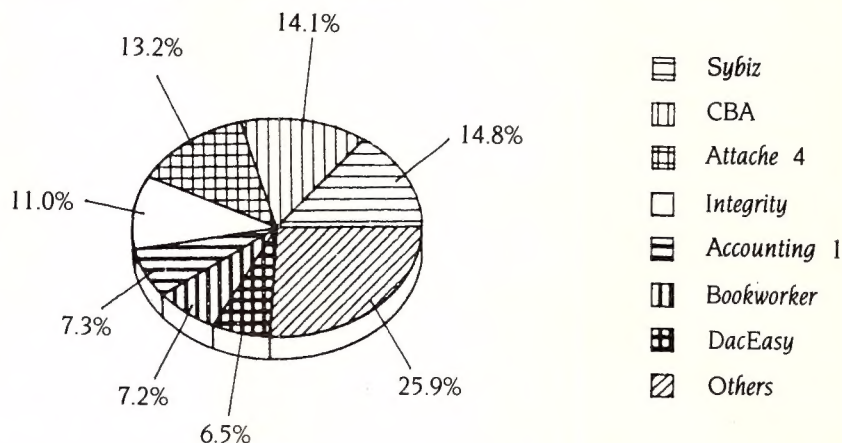
NINETEEN PAPERS, due to be released later this year, will look at and advise on a range of topics covering software and hardware applications, to the needs of special schools, rural communities and the different sexes.

Unlike Australia, the New Zealand Government has no policy on the implementation of computers in local schools and, as a result, provides no funding for the provision of computers in schools. This has not stopped nearly all of the 3000 schools in New Zealand from investing in at least one computer per school, through parent and teacher organisations and local communities.

This has raised the problem of no cohesive policy for the purchase of computers — each school buys what it could afford and what was available.

The reports on the effectiveness of computers on students will be used to develop policy for future investment in their schools. All the studies were begun early last year and all will run

The Accountancy Software Market



(Market Share, 1st Quarter, 1987)

until at least this month. Draft interim reports have already been prepared for submission this month.

Initial findings have shown that in primary schools there is an interest in wordprocessing, interactive fiction, simulation and problem solving and in secondary schools and an interest in wordprocessing, accounting, economics and geography in secondary schools. □

AUSTRALIANS NOT CONSERVATIVE

The latest survey to confirm a well-known fact was conducted by NCR — it shows that Australians do accept such technology as automatic teller machines.

THE SURVEY, conducted by the University of NSW, showed that we are not as conservative about high technology as is usually thought, and that we have been quicker to embrace the automated teller machines than any other country in the Western world.

It showed that since their introduction 10 years ago, the growth rate of the ATMs has averaged 15 to 20 per cent a year. The new technology has (of course) been accepted more readily by the younger generation which the survey puts at between 26 and 45 years old (what you are before that age we don't know), with a staggering 85 per cent of the 'young ones' avid users of the tellers. □

COMPASS CORNER

The accounting software market has shown steady growth in 1987. The introduction and success of low end packages has made the traditionally expensive accounting software market much more accessible to end-users, and has led to more consistent sales volumes.

MANY USERS who are opting for PC clones are also buying the cheaper software packages. Vendors are therefore extending their product ranges from the multi-user to the low end part of the market, and activity at the low end is expected to increase. Integrity's Accounting 1 and Sybiz's Bookworker will be facing increasing competition from the recently released Attache 4.

Accounting packages like Integrity and Sybiz, targetted at the high end of the market are selling well in NSW and Victoria. The low end packages have a broader appeal and are selling well throughout Australia. There is a lot of activity in the corporate market, and CBA sales are performing well mainly in the multi-user arena.

Over the next few months, Compass Research projects an increase in the total accounting market, largely as a result of more activity at the low-end of the market. This activity, however is not expected to impinge upon the performance of packages, at the high end of the market. □

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First Choice	215	247
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Framework II	885	1017
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Jet	100	115
Microsoft Windows	155	178
Norton Utilities	125	144
Ability	215	247
Microsoft Mouse	225	259
Genius Mouse	149	172
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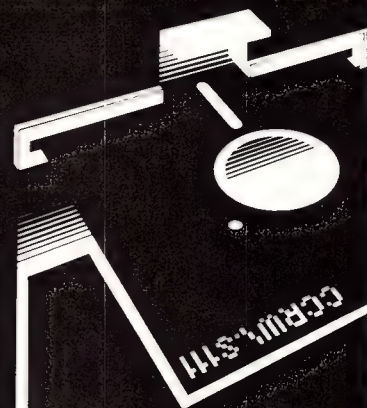
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HE'S APPLE'S

It's taken us two months just to dig ourselves out from under the pile of entrants to the Apple IIGS competition.

The winner, Alex Helbig, a student at the University of Queensland, added a bit of artistic content to his entries to win the \$4000 Apple IIGS computer.

Presentations were held at the Apple headquarters in Queensland where Helbig walked away the proud owner of the Apple IIGS, 3 1/2 inch and 5 1/4 inch disk drives and the the new keyboard and mouse. ▷

WESTPAC OFFERS HOME BANKING

Just when we are shown to accept ATMs, Westpac are offering home and office banking on personal computers through their Handyline service.

THE SERVICE allows the user to ring up and log into your account using a home computer. The catch is that you need a 'touch-tone' phone or a 'tone sender' and Prestel software run on a computer using a Videotex keyboard.

After you meet all the requirements, it's possible to gain access to your account on three levels to see what's left. The first level is a general look at the account for everyday account work and is provided free. For \$4 a month you move to the second level which offers an additional view of lending and investment information, insurance premiums, travel details and interest rates.

The top level entry is provided at \$12 a month and gets additional access into a mailbox, market rates, investment rates, bullion, foreign exchange currency, term rates and trends. Of course, the information is provided by Westpac and covers Westpac based information.

The local personal computer market is very healthy and banks are beginning to realise the market potential of offering a more comprehensive computer-based service than their competitors. But remember, you have to *need* the service frequently to make it worthwhile (and they're not as chatty as Bulletin Boards). The move by Westpac is certainly welcome, though — it makes personal computers that much more useful. □



EVENTS

The University of Wollongong is holding a course on geostatics theory and practice on July 7 to 10. Contact (042) 270 040.

The Old Institute of Technology is holding an introductory Microcomputer Principles Course from July 6 to 10 (full time). Contact (07) 223 2196.

PHoenix Computer Systems of Newcastle is holding courses this month through to August on dbase, Lotus, MS/PC-DOS, Decmate Wordprocessing, Symphony, Reflex and HAL. Contact Jenny on (049) 26 3388.

The Institute of Personnel Management Australia is holding a conference and user's fair on Human Resource Management Systems, September 9 to 11. Phone (03) 387 9955.

IREECON '87 will be held on September 14 to 18 at the Sydney Showground with the theme The Digitisation of Communications. Contact Sherie Morris (02) 327 4822.

Papers are being called for ACS '87, the official conference of the Australian Computer Society, to be held in September. The Conference theme is the MBA Experience, or Management, Banking and Artificial Intelligence. Contact Pearl Levin on (03) 573 2184

The Swiss Federation of Infomatics is seeking papers for the European conference on Computers in Education in July 1988. The deadline is October 30. Address inquiries to ECCE 1988, Professor

Bernard Levrat, Centre Universitaire d'Informatique, 12 Rue du Lac, CH-1207 Geneva, Switzerland.

The SAS User's Group of Australia has extended a call for papers for its third annual conference to be held on October 7 to 9 in Canberra. Papers describing real world applications of software in the SAS System are appropriate. Contact (02) 908 2244.

International Spectrum Australia/Pacific Conference and Exhibition, Centrepont Convention Centre, Sydney, October 26, 27, 28, specifically addressing the Pick operating system based marketplace. Further information from IDBA, 133 Alexander Street, Crows Nest, NSW 2065. Phone (02) 439 5488.

The 1987 AFR New Product Expo will be held in Sydney on July 23 to 26. Contact (02) 439 7738. In Melbourne it will be held on November 11 to 15, contact (03) 266 4424.

ACE '87: The Australian Computing Exhibition and Conference, will be held in Melbourne on September 8 to 10. Contact Karen Hucks (02) 211 5855.

A conference on Australian Computers in Education, will be held at the Adelaide Convention Centre on September 28 to 30 with the theme Tomorrow's Technology Today. Ring (08) 227 1824.

OVERSEAS EXHIBITIONS

CommuniTech and Computer '87 Malaysia: The second Malaysian International Electronic Communications, Office Technology and Business Computer Show, will be held at Kuala Lumpur from November 10 to 14. For more information contact Australian Exhibition Services on (03) 267 4500.

Siggraph '87: The 14th annual conference on Computer Graphics and Interactive Techniques, will be held from July 27 to 31. Topics included will be theories and applications in the areas of computer graphics and interactive techniques. Also discussed will be new and emerging technologies in which research is still in the early stages. For further information contact Siggraph '87 Conference Management, Smith Bucklin and Associates, Inc. Suite 600, Chicago, IL 60601 USA (312) 644 6610.

The EDP Auditors Foundation Conference: The 18th Conference is to be held in Atlanta, Georgia, US on the 10 to 15 of April, 1988. Submissions to talk on areas concerning audit, control and security are welcome and must be received no later than September 11, 1987. Write to The Program Chairman, The EDP Auditors Foundation, Box 88180, Carol Stream, IL 60188-0180 or telephone 312/653-0950. □

AMERICAN GRAFFITI

By Howard Karten

MY OLD FRIEND Sergei the Consultant dropped in the other day. He was in town on a consulting assignment, and seemed to be in remarkably good spirits. 'My company just celebrated its fifth year in business, and we seem in good shape. As you know, the stats show that a company that survives its first five years has a good chance of making it.'

How well I knew: despite his brilliance, Sergei has a record of shooting himself in the foot, business-wise, and a string of failed ventures behind him.

'Nodes, nodes, what did I do with my node list,' he muttered as he helped himself to my communications software and modem and began dialing up one of the databases that are an important part of his business. 'Gotta find out what the trends are,' he explained, beginning to relax as he scanned the latest announcements of companies offering products or services related to desktop publishing.

'What's the urgency?', I asked innocently.

'A couple of my clients have asked me to do a report about this desktop publishing business. A few years ago, when it first became a buzzword, I was sure it would be a roman candle rising quickly, with a lot of flash, disappearing as it fizzled out.'

I recalled that at the beginning of the microcomputer revolution, around six years ago, Sergei had taken a financial bath in the stockmarket. He'd sold short the stocks of a few paper manufacturers, anticipating that when prices dropped, he'd make a tidy killing. When paper manufacturer's stocks rose instead, the only killing he contemplated was that of his stock broker.

The stock market wasn't at all on his mind, he explained, in the patient manner of an adult explaining something terribly obvious to a slow child. 'As a consultant, my clients expect sage advice off the top of my head. But desktop publishing still has me

puzzled,' he noted, as he eyed my list of unpublished telephone numbers and passwords for a few 'adult-oriented' electronic bulletin boards.

'Desktop publishing gives you an almost infinite range of choices. That's good. But most people find it very hard to select when there's more than three or four alternatives. That's bad. The manufacturers are doing their best to give desktop publishing lots of sizzle. That's good. But the computer industry has a history of causing grave disappointment among users by not living up to its hype. That's bad.'

I'd begun to sympathise with Sergei: the consultant game must be hard, indeed, where you were as confused as your clients. Sergei noticed my brandy and reached for a brandy glass nearby.

But, I asked, if a desktop publishing product offered real value to its users, wouldn't the marketplace automatically make it a commercial success? And what about the fact that IBM has launched an affordable scanner that allows users to digitise their own material and enter it into their computers? Surely, I proposed, IBM would not be trying to peddle that kind of product unless it was darned sure that there was a market for it. And didn't IBM's move constitute a kind of official benediction?

'Remember the IBM portable? Remember LISA? Remember... whatever. Just because there's lots of clout behind a product doesn't guarantee success,' he explained. I couldn't decide if the tone I heard was confusion, frustration, or annoyance at my questions.

He sighed as he launched into another explanation. 'Desktop publishing threatens lots of folks. For example, suppose end-users start routinely doing their own publishing. The folks who manage graphics and printing departments in businesses now have exclusive control over those operations. Those folks are worried about losing the exclusive

control they now have. Can you blame them?'

Minutely examining my office in search of more tucker, Sergei suddenly spotted a famous cartoon in the corner. 'That's it! The answer was right in front of me all the time!'

The cartoon showed a cute denizen of a swamp declaiming a truth he'd just discovered: 'We have met the enemy, and he is us.'

The brandy was starting to give

HAPPY 6th BIRTHDAY, YC!

me some remarkable insights as well. 'Uhh... we-us-we're gonna-we're our own enemies?', I asked, not understanding at all.

'Exactly!', Sergei announced triumphantly. 'The weakest link in any system is the people. You want to know what's going to happen with desktop publishing? If users aren't careful, this time, it won't be technological change or some outside force killing an idea. It will be users killing it with overuse. Trying to do too much fancy stuff with this wonderful toy. Playing with layouts that are too hard to read. Running before they're walking.'

Remember that architect who said 'Less is more'? The key thing here is, if a desktop publisher uses too much fancy stuff, the people who are reading his output will be turned off. It'll only succeed if people obey the rule!

Now I was puzzled. 'What rule is that?', I asked innocently.

'The kiss rule, of course,' he muttered in a preoccupied way.

The Kiss rule! Of course! It was the classic admonition, applicable to engineering and so many other fields, to 'keep it simple, stupid.'

His mind now several hundred miles away as he contemplated his latest thoughts, and simultaneously eyed the laser printer and desktop publishing package I've been reviewing. 'Say, d'you mind if I try this? This would be

just the thing for that report my clients are looking for. Do you know if this printer has a high-tech type font, like this? And do you suppose we could thread the text around some pictures, like this' — he quickly sketched out a very complex-looking page — 'and maybe find a database somewhere with some neat high-tech clip art, and...' I knew when I'd heard enough. I had to discourage him 'I don't think it's capable of doing that. So far, this is all I've been able to do —

NEWS NIBS

□ IBM and Lotus have signed a joint marketing and development agreement. Under the agreement, Lotus will develop a version of 1-2-3 for the recently-announced OS/2 that incorporates graphics, which IBM will help market. Additionally, Lotus will develop a mainframe version of that product, as well as some other software for IBM mainframes.

□ IBM is also apparently preparing to phase out the XT. The company recently dropped the prices on that machine, a basic version of which can now be had for less than US\$1,000. US buyers seem to be snapping up the reduced-price machines, with dealers reporting shortages. IBM traditionally lowers prices on hardware as the hardware is reaching the end of its life cycle.

□ Apple computer has decided to spin off software development of Macintosh and Apple II software into a separate subsidiary. If all goes as planned, the new subsidiary would be responsible for most Mac software, and would become totally independent in a year or so. Response to the move was generally favourable, with most observers, customers, and software houses agreeing that if it was done correctly, the move could mean much better support for users. □



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Entries close on August 31, 1987 and judging will be done by a panel of industry experts.

-
1. How long have you been using personal or microcomputers? _____
 2. Including Ashton Tate Products, what other P.C. software do you currently use? _____
 3. Approximately how many employees are in your company? _____
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Rules & Conditions

1. Instructions on how to enter and prizes form part of these conditions of entry. 2. Entries close last mail 31 August, 1987. Winners will be notified by mail and their names published in 'Your Computer' magazine October issue, 1987. 3. This is a game of skill and chance plays no part in determining the winner. Each entry in categories A, B and C will be individually judged in accordance with the stipulated criteria and instructions. The judging will be done by a panel of industry experts selected by the promoter. The judges' decision will be final and no correspondence will be entered into. 4. The promoter is Ashton Tate Pty Ltd, Unit 2, 80 Berry Street, North Sydney, 2060. 5. Categories A and B can only be entered by owners of Framework II. Category C may only be entered by non-owners.

IBM Personal System/2

IBM has rolled over! John Hepworth found they've set new standards for software developers, peripheral suppliers and hardware manufacturers — but just how revolutionary is the roll over?

... the elephant rolls over

IBM has long been depicted as an elephant, and we all know what sleeping next to an elephant is like. Its OK until the elephant decides to roll over! IBM has just rolled over. The nimble sleepers will wake fast and survive, while the slow will ultimately be crushed.

The new series Personal System/2 computers set new standards just a bit offset from the old PC standard, and in the case of the entry level Model 30, can be seen as a window which has enlarged and moved slightly, relative to the PC's. This is particularly evident in the video capabilities. Just what effect will the new systems have on the software, peripherals, expansion board and clone makers?

Video

With the Model 30 comes a new graphics standard, and a new display adapter series. The adapter is now in the form of custom chips, surface mounted on the mother board and is called the MCGA for Multi Color Graphics Array. It offers addressability of 640 x 480 in two colors, and 320 x 200 in 256 colors. In addition, software written for the superseded MDA and CGA boards and displays is compatible with the new chips and displays. An adapter can be plugged internally into the system to extend the addressability of the Model 30 to achieve 16 colors in the 640 x 480 mode

Why do I say addressability and not resolution? Because they refer to different characteristics as seen by the user. Resolution is the sharpness of the monitor itself, addressability is the number of different points which the software can draw on the screen. All the new monitors have very good resolution. With the 0.28 mm dot pitch of the 8513 color monitor tested, a maximum of approximately 840 x 625 dots is on the screen.

The various addressability modes illuminate blocks of dots of various sizes. Even in the 320 x 200 addressability mode, images have spectacular apparent resolution due to their high edge sharpness, though combining dots into blocks gives a slight saw tooth edge to diagonals in this mode. The low addressability mode is stunning, and looks far sharper than the specs would suggest due to the very sharp edges of the images provided. It is very impressive to look at and comfortable to look at for extended periods. Output is now analogue instead of digital and can drive one mono and three color displays.

Software specially written for the new system is spectacular. On the Starter Diskette supplied with DOS 3.3, along with diagnostics and head parking routines, are the demonstration screens that have stared out at us all from every PS/2 in a dealer's window.

Old software written for the superseded MDA and CGA adapters will still run — in both cases text is similar in character

shape and size to that with MDA and Hercules. If written for the mono adapter it is in white characters on a dark background. Text written for the CGA has the same, lovely, compact, sharp outline as MDA software, but is in color.

Graphics written for the CGA can also drive the system, but here no improvement on the appearance seen on original CGA adapters and displays can be seen. If anything, the image is stretched ever so slightly vertically. The colors are usually, but not always, the same as would be seen on a CGA. One exception that I saw was when using the Peter Norton Screen Attributes program to set text to yellow — it appeared instead as a brownish red, as it also did with some Turbo Pascal graphics programs.

The Monitor

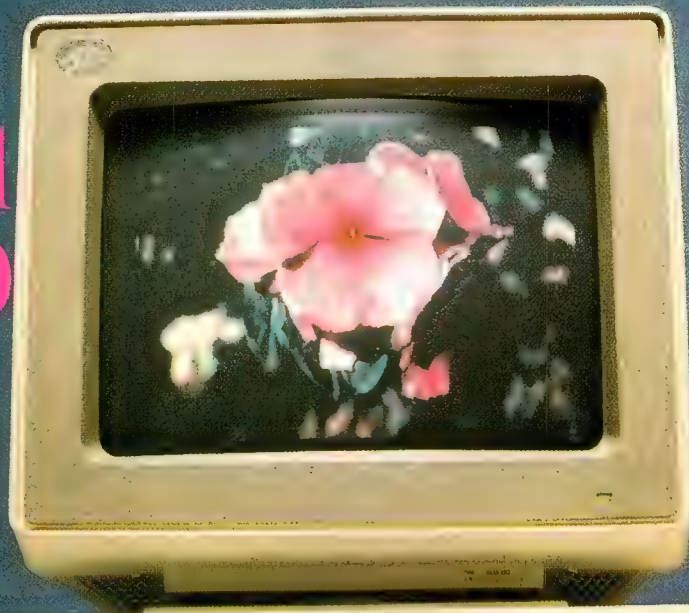
The monitor supplied with the test system was the 8513 color display. As mentioned earlier, it has a 0.28 mm dot pitch and achieves impressive sharpness in text and graphics. The color is stunning in hue and saturation, and in graphics appears as good as a high quality TV image. A swivel and tilt base is supplied as standard, and may be detached simply without any tools. A rocker for power is on the right side just behind the screen surround, and separate controls are also provided for both contrast and brightness. Two other color displays and one mono display are also available.

Benchmarks on the Personal System/2 Model 30. All times are in seconds except for Sysinfo which is a ratio of speed relative to the IBM-PC. (For comparison with AT's and clones in previous shootout use CBSieve2 divided by 10 instead of CBSieve.)

IBM 30 Table -

	PC	Mod 30	AT
cbsieve (10 iterations)	15.4	6.0	4.9
cbsieve2 (100 iterations)	147.4	55.2	48.9
bbbmark	26.4	11.4	9.1
Lotus calc	22.4	10.6	7.7
Lotus load	53.8	33.8	23.8
Lotus save	-	24.0	23.3
Sysinfo	1.0	1.9	-

Model 30



Looking Around

The new video and displays may be the biggest new features, but there is plenty more to be excited about. The PS/2 Model 30 is a very good looking unit, and sure to set the style for many competing machines as did the early PC and AT. It comes fully equipped, in just two versions. One has two 720K 90 mm floppy disks, while the other has one 720K disk and a 20 Megabyte internal hard disk. The common features include, on the mother board, one serial and one parallel port, mouse port, 640K of memory, video circuitry and a clock/calendar. Even the floppy and hard disk controllers are on the mother board.

The system unit is compact at 415 mm wide, 340 deep and 110 high. At the right side of the front panel is the power switch, or rather the handle for it — the actual switch is in the power supply is at the rear of the system unit and a rod connects the switch handle at the front to the switch mechanism at the rear. It's a neat way of putting the switch control in a convenient place without routing power cables through the system.

Also on the front are the two drives, either one floppy and one hard disk or two floppies. The opening for the floppy drive is well located and proportioned and disks can be easily inserted without looking. Disks latch in when inserted and a gener-



With the Model 30 comes a new graphics standard, and a new display adapter series. The adapter is now in the form of custom chips, surface mounted on the mother board and is called the MCGA for Multi Color Graphics Array. It offers addressability of 640 x 480 in two colors, and 320 x 200 in 256 colors.

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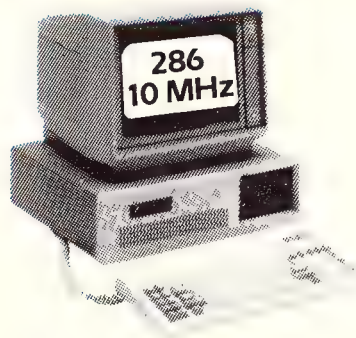
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Kaypro 386

- CPU: 16 MHz 80386.
- RAM: 2.5 MB 32 Bit wide RAM, expandable to 16 MB.
- ROM: IBM AT compatible.
- DISK STORAGE: 1.2 MB floppy, one 40 MB High Speed hard disk.
- EXPANSION: One 32 Bit, three 16 Bit and two 8 Bit.

Kaypro 286i

- CPU: 10 MHz 80286.
- RAM: 640 KB expandable to 15 MB.
- ROM: IBM AT compatible.
- DISK STORAGE: 1.2 MB floppy, one 40 MB High Speed hard disk.
- EXPANSION: Eight expansion slots.

Kaypro PC/PC30

- CPU: 8.0 MHz 8088/V20.
- RAM: 768 KB
- ROM: IBM PC/AT compatible.
- DISK STORAGE: 2 x 360 KB/1 x 360 plus 30 MB hard disk.
- EXPANSION: Nine expansion slots.

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the AT for those on the go



- CPU: 8 MHz 80286.
- RAM: 640 KB expandable internally to 2.5 MB.
- ROM: IBM AT compatible.
- DISK STORAGE: 720 KB 3.5" floppy disk drive, one 20 MB hard disk, connection for external 360 KB 5.25" floppy disk drive.
- EXPANSION: Internal expansion slot.
- INPUT/OUTPUT: Serial and parallel ports.



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ous button is provided to eject them. The heads on the floppy drives are not kept in contact with the disk until a read or write is called for, when a little click can be heard as a solenoid lowers the heads. The indicator lights are amber on hard or floppy disk drives.

Keyboard

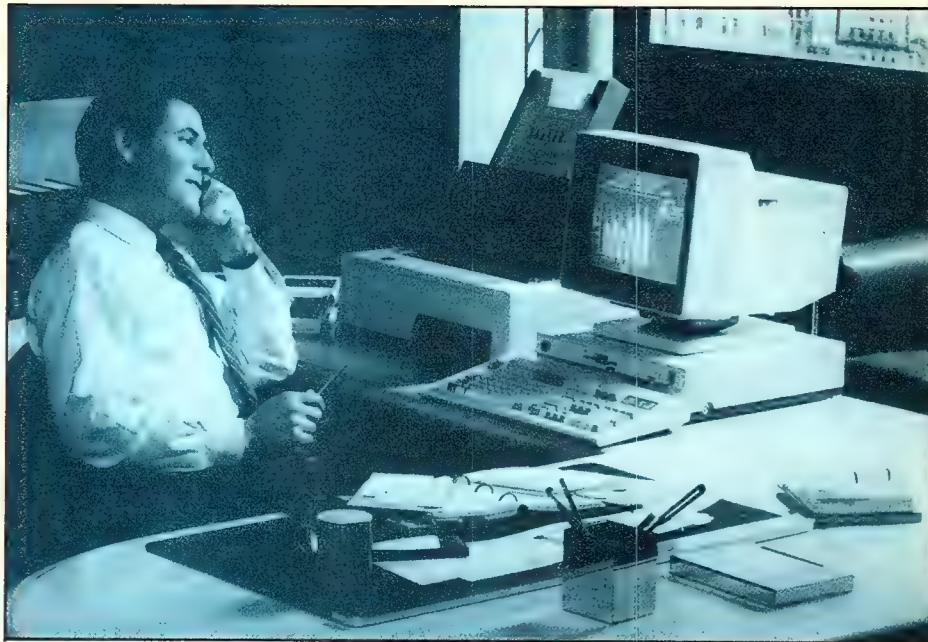
The PS/2 series comes with IBM's new Enhanced keyboard. It is simultaneously a great improvement, and a great problem! The function keys have been moved from the left side and are in a row across the top of the keyboard. Two extra functions keys have been added and there are now 12, which should make life easier for the manufacturers of emulations of mainframe terminals.

Relocating the function keys has allowed the alpha keys to be moved to the left. In addition, the keyboard is longer than the old PC keyboard, and the numeric keypad has been moved to the right. Between the alpha and numeric keypads there is now a separate cursor pad and 6 keys for insert, delete, home, end, page up and page down.

The Ctrl and Alt keys have been relocated and duplicated, the caps lock relocated and the Backslash key is now above the Enter key. Little raised lines are moulded into the home keys on the alpha and numeric keypads, making touch typing that much easier.

For use in text entry, or numeric entry to a spreadsheet, the keyboard is an improvement to the old arrangement, but some commands from the DOS command line are far more tedious, and using applications carefully written to logically use the old function key arrangement will not be as easy.

A couple of examples might show the problems. At the command line one often wants to enter a command like COPY *.*. With older PC's there was a * next to the right shift key, and it was fast and easy to enter *.* without looking. Now the * is way over on the numeric keypad, or is a combination of Shift and 8 on the alpha keypad. Three programs which carefully arranged their use of function keys to logically use the old layout were Microsoft



Word, Norton Utilities and Flight Simulator. Now that the function keys have been relocated it is necessary to look at the function keys when using either of these, or similar, programs. In Word, some operations which required a function key to be pressed in combination with Shift, Alt or Ctrl were a simple one hand job, and now require two hands.

The old keyboard was not as long as the system unit was wide. With the PS/2, the system unit is narrower but the keyboard is wider, and now protrudes each side of the system unit by around 30 mm! The keyboard cord has a straight section next to the plug long enough to almost reach around the machine to the front by itself. Then there is a generously long coiled section to allow the keyboard to be moved to almost any desired position.

Around the Back

A simple back panel has the parallel and serial ports, the power inlet socket, monitor connector and the fan opening for the power supply. Also on the back are the connectors for keyboard and mouse, both a little smaller than I would like to see. IBM provides power cables for the standard power inlet connectors, but these cables are a little too stiff, and pushing the machine back on the desk can press on a cable, which in turn may dislodge the connector. A power cable with additional flexibility would be welcome. The apertures for the rear connectors of three standard PC cards can also be seen on the back panel.

The PS/2 Model 30 is a very good looking unit, and sure to set the style for many competing machines as did the early PC and AT. It comes fully equipped, in just two versions. One has two 720K 90 mm floppy disks, while the other has one 720K disk and a 20 Megabyte internal hard disk.

Under the Hood

Opening up a Model 30 is simplicity itself. On the right hand side at the front is the lock, which also serves as the keyboard lock. After unlocking it, four screws are undone to release the cover. The screws are located two on each side just above the bottom and use a normal flat bladed screwdriver. They are also attached to the cover so that they cannot be lost and have a little spring under them to pop them away from the chassis when undone. Moving the cover about 10 mm to the rear disengages the boss around the cover screws from brackets on the chassis and allows the cover to be lifted. The cover appears to be a plastic moulding with a thin metal layer attached on the inside for protection against interference to TV or radios.

The first impression when looking inside is of the massive amount of free volume left. The power supply, rated at 70 watts output, is much the same size as in older PC's. Also inside are the tiny, 90 cm hard and floppy drives. All active components are mounted on a mother board which runs from front to rear of the system unit, and from the left side two-thirds of the way to the right side. A nice touch is a hole in the bottom of the chassis between the power supply and the drives, which would allow the system unit to be bolted to a table.

Three expansion slots are provided, and

IBM Model 30

can be used for expanded memory boards, emulation boards for connection to mainframes, internal modems and the like. The slot dimensions match those of older PC's. The cards mount horizontally and plug into a daughter board which in turn plugs into one slot on the mother board. Also on the daughter board is the battery for the clock/calendar, which is mounted in clips, not soldered into place. With all the power on the mother board, three slots are more than adequate, and most users will never install an extra board. In fact, having three slots compares rather favorably with my own PC which has only one slot free after installing options to give the functions of the Model 30.

The mother board is fitted mainly with surface mounted components and they, along with the custom arrays, mean that the board is not at all crowded. No dip switches are fitted, and the system senses which options are fitted and makes the necessary arrangements. A few components are conventionally mounted, including some in sockets. The processor is an 8086-2, running at 8 MHz. Next to it is a socket for an 8087. Connectors on the mother board allow the cables for hard and floppy drives to be plugged in, and are well located to allow a neat cable installation with minimum length of cable. Overall construction quality is very good, and only one jumper wire could be seen on the early production machine tested.

International

The PS/2 Model 30 is an international machine. The case gives the IBM address in Armonk, New York. Inside, the power supply comes from Hong Kong and the drives from Japan. The chips appear to mainly come from Japan, Taiwan and Singapore, including the new custom IBM chips which are made in Japan. The monitor is from Taiwan.

Performance

I ran the standard *Your Computer* AT benchmarks, with the exception of the dBASE benchmark, and also ran some interpreter Basic benchmarks of my own and the Peter Norton Sysinfo program. On the benchmarks the machine averaged a speed relative to an IBM PC of 2.28, with a rating under Sysinfo of 1.9. Hard disk speed was 81.9 ms for average seek time and 17.4 ms for track to track seek, rather ordinary these days. Overall, performance is midway between a 4.77 MHz PC and a 6 MHz AT.

Compatibility

I ran the usual range of test software almost without a hitch. Lotus release 1A, Flight Simulator and Jet all ran well, as did Microsoft Word, Turbo Pascal and Turbo Graphix Toolbox, SideKick, Reflex, Xtree and many others. One glitch came with a public domain program which reads directories, sorts them into alphabetical order and displays them in columns. It worked fine on the floppy drives, and locked up when reading the hard disk, which to me indicated a minor incompatibility in the hard disk or its controller. Another glitch came when a public domain graphics package locked up while loading and completely refused to run.

Naturally, I could not carry out definitive compatibility tests with all software on the market, but, before purchase, any wise user always tests any machine (not just PS/2's), in the exact configuration planned to be bought, with all software planned to be used on it.

Sound does 'sound' differently from older PC's, depending on the method used to generate the frequencies. Assembler programs sound is faster and higher pitched. Sound from high level languages like Turbo Pascal tended to sound much like it did on old PC's, despite the use of a tiny piezo speaker rather than the conventional speaker previously used.

Documentation

Documentation for the system unit is a slim booklet around 5 mm thick. While slim, it is in fact well illustrated and complete, a tribute to a design which automatically sets itself up, and does not require the user to do any setup. DOS and Basic manuals are the familiar slip-cased IBM items with a wealth of information. As versions of DOS progress the volume of information in these manuals grows, but at the same time it becomes easier to understand. An excellent effort.

Conclusion

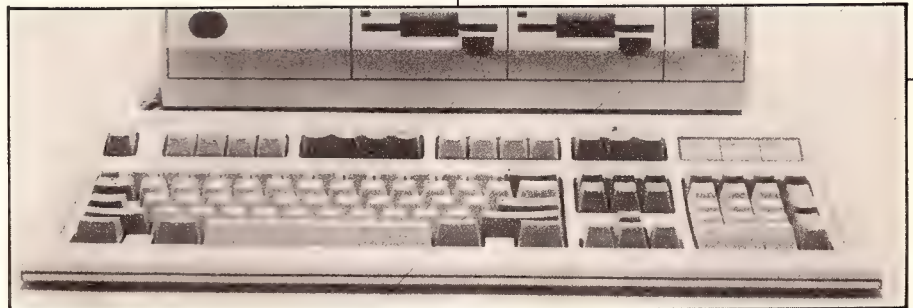
The IBM PS/2 Model 30 is the entry level machine to the new PS/2 series. The new video and displays are superb, and other manufacturers will be scrambling around, trying to clone them. No longer is it necessary to agonise between high resolution on a monochrome display adapter and monitor, or color and graphics with barely acceptable text on a Color Graphics Adapter and monitor.

The remainder appears to be an important improvement, but not a revolutionary change. The new mother board with the surface mounted compact chips allows a small machine to fit all standard functions on the mother board, and the three slots allow fitting of an ample number of expansion boards.

Value is excellent, competitive with the last official prices of PC-XT's — a PS/2 Model 30, with 2 floppy drives and a monochrome monitor is \$4100 taxed; with one floppy drive and a 20 Meg hard disk, it comes to \$5300; DOS 3.3 adds \$274 to those prices. Stacked up against the host of PC clones on the market, the judgement is still the same. While many PC clones with color and hard disk are available for around \$2000 less than a Model 30, they have inferior displays worth perhaps \$1000 dollars less and they also lack the new video standards.

IBM has rolled over. A new standard has been established for software developers, peripheral suppliers and hardware manufacturers. At the same time users of older software have not been abandoned. □

The PS/2 series comes with IBM's new Enhanced keyboard. The function keys have been moved from the left side and are in a row across the top of the keyboard and two extra functions keys have been added. Relocating the function keys has allowed the alpha keys to be moved to the left. The Ctrl and Alt keys have been relocated and duplicated, the caps lock relocated and the Backslash key is now above the Enter key.



IBM Personal System/2 Model 50 — a change of direction!

*Five and a half years on,
IBM changes direction with
a new line of PC's. Les Bell
singles one out for some
special attention . . .*

FOR SOME YEARS now, it has been increasingly obvious that the old standard IBM PC architecture was straining at the seams. This has been particularly obvious in the area of graphics, where a number of manufacturers (Hercules, Paradise, Plantronics and others) have managed to sell significant amounts of non-IBM standard graphics hardware. What this indicates is that the penalty of a lack of software support and the inconvenience of installing special graphics drivers was overcome by users' desire for higher resolution graphics.

The result has been a multiplicity of versions of software, coupled with increasingly complex installation procedures. Everyone agreed that one of the nice things about the IBM PC compared with earlier machines was its standard hardware, which made software installation a breeze, but recently this major benefit (for the novice user, particularly) has disappeared.

Virtual Device Interfaces

IBM has come up with a solution: it's time to bite the bullet and come up with the next generation of PC's which are powerful

enough to run Virtual Device Interfaces. A VDI is a piece of software which is able to perform general-purpose graphics functions on a specific display device, on behalf of all programs. So, instead of Lotus 1-2-3 having its particular set of display drivers which are patched into that program, and Framework having its set, all programs will use the same display driver, which will be patched into the operating system.

Systems Applications Hardware

This is the idea behind IBM's new System Applications Architecture (SAA), which will allow much greater portability and compatibility between PC applications and different models of PC, as well as allowing PC applications software to access data stored on IBM mainframes.

The first stage of the new architecture is revealed in the new series of IBM PC's, the Personal System/2 family. There are a number of machines in the series, ranging from the Model 30, a low-end machine which seems not to fit in the line, to the Model 80, an 80386-based machine which is intended for CAD/CAM, professional workstation and file server applications. Refer to the box *Personal System/2 Family* for more detail.)

The new machines share a common design heritage, and show a marked difference from earlier machines, both in hardware and software support. The most striking difference from the outside is the disappearance of the old-fashioned 5¼ inch

floppy disk drive. IBM has bitten the bullet and made the switch to the superior 3½ inch disk technology.

The 3½ inch disks have up to 1.44 Mbyte capacity and a 1.44 Mbyte drive can reliably write a 720 Kbyte format disk for use on a Model 30 — compare this with the difficulties in transferring data from an AT to an XT! The 3½ inch floppies are more reliable, more rugged (they can even be posted) and are more compact — in fact, better all round. In addition, IBM does not seem to have had any difficulty in convincing software companies to supply their packages in the new format. The days of the 5¼ inch floppy are now numbered — it's going to join the 8 inch floppy (which many of us still use, incidentally!).

The other big difference which is externally visible is the use of new display technology. Unlike earlier machines which used TTL monitors (the red, green, blue and intensity signals were either on or off, allowing display of 16 colours only), the new machines produce analogue video signals, and can display many more different colours. In fact, the specs suggest that the new display adapters can produce up to 256 colours simultaneously from a palette of over 256,000; on a monochrome display this allows display of up to 64 shades of grey scale. And a monochrome graphics display is properly supported — unlike the earlier Portable PC, for example, which produced a disgusting graphics display if driven with colour software.

Under the Cover

Open up the cover, and a number of new features are evident. The internals of the machine have been completely redesigned, based on aluminised plastic mouldings. Almost the first thing you notice is the lightness of the unit, because of the extensive use of plastic internally — it looks like cast aluminium, but isn't.

The main system board covers almost the entire base of the unit, with the power supply to the right. Above the centre of the unit, a chassis supports the disk drives

IBM Model 50

— up to two floppy drives at the front of the unit and the hard disk at the rear. Everything snaps together easily with no tools, and comes apart equally easily. Snap fasteners hold everything together; if any are too stiff to open under finger pressure, there's a small levering tool provided, mounted under the speaker.

There are virtually no cables or wires inside the unit; everything connects together using edge connectors and circuit boards. For example, the hard disk controller mounts vertically into the system board, projecting through the drive-mounting chassis and carries an edge connector into which the drive plugs.

Result: high reliability, the virtual impossibility of plugging things together incorrectly and cheaper assembly.

The system board uses high-density component mounting, and makes extensive use of IBM proprietary components. For example, the main memory of the Model 50 is mounted on two small vertically mounted circuit cards, each of which carries six IBM-proprietary packages.

This leads me to believe that each of these packages is a thin-film circuit carrying three 256 Kbyte memory chips, so that each board carries 512K x 9 bits of memory (the ninth bit is, of course, a parity bit for error detection).

The main board carries three IBM-proprietary circuits which will render the machine to some degree proof against cloning. I say 'to some degree' because custom chips have in the past only slowed down cloning of circuit cards: the EGA, for example, is based on IBM-proprietary chips, but that didn't stop a couple of US companies from coming up with their own, improved, chip sets. The impact of this design, will be to delay the introduction of clones until one or more US companies have reverse-engineered those chips and made them available to US and SE Asian clone-makers.



Product Details

Product:	IBM Personal System/2 Model 50
Processor:	10 MHz 80286
RAM:	1 Mbyte (expandable to 7 Mbytes)
ROM:	128 Kbytes
I/O:	1 serial, 1 parallel, 1 mouse port
Keyboard:	101-key, new IBM standard
Display:	selection of monochrome and colour displays
Graphics:	Up to 640 x 480 in 16 colours
Expansion:	3 slots available
Price:	\$7490 with 8513 colour graphics display

IBM Model 50

Everything on the system board is smaller; not just the chips, but also the expansion connectors. IBM has come up with a new expansion bus, for which (for the time being) it is the only supplier of expansion boards. The Model 50 has three free slots; while this seems few in comparison with the XT/AT, remember that the system board carries the video circuitry, serial, parallel and mouse ports and floppy controller, and that the hard disk controller is in a dedicated slot. Three expansion slots will allow for considerable expansion.

Video Graphics Array

The Video Graphics Array (VGA) represents a new standard in graphics technology — one that manufacturers of other graphics cards will find difficult to displace, since it comes as part of the machine and cannot be removed. The VGA supports existing CGA (Colour Graphics Adapter) and EGA (Enhanced Graphics Adapter) functions, as well as some new standards of its own — see the box *IBM Graphics Standards and Modes* for detailed descriptions.

We were impressed by the compatibility of the VGA video circuitry; it ran everything we threw at it with no problems.

The new power supply is smaller than that in the XT and AT, and capable of supplying only 94 watts — however, the new Model 50 uses lower power circuitry, so this should not be a problem. A nice feature for travellers is that the power supply is auto-sensing and works automatically whether plugged into 110V or 240V mains.

IBM have obviously paid attention to a lot of details in the design of this machine. It has lots of improvements over earlier machines, probably as the result of customer requests, coupled with lots of thought. For example, because of the design of the power supply switch and the front panel of the cover, removing the cover will automatically switch the machine off, a nice touch for safety reasons.

Similarly, while the machine has a security lock on the back cover, this is purely to prevent removal of the cover and theft of expansion cards (apparently quite a problem for some users). Keyboard locking is achieved through the use of a password. In fact, the machine can be set up so that it will not boot unless a password is supplied.

Performance

The Model 50 benchmarked well in our tests on the processor and memory, but did not do so well when we looked at hard disk performance. Table 1 shows the results of the benchmarks, which indicate that on average the Model 50 offers approximately five times the performance of an IBM PC/XT.

The hard disk, however, is a bit on the slow side for this class of machine, at 82.9 ms average seek time. This may not be so significant, however: this machine is

the desktop machine for business users, who tend to be spreadsheet oriented; database users should look at the Model 60, which is almost certain to offer faster drives.

Table 2 shows some other interesting information. First, the identification byte in the BIOS indicates that the machine is an IBM PC/AT, even though its hardware is quite different. This could cause some problems for programmers trying to write software which automatically adapts to its hardware environment.

Next there's the fact that our Equip-

	IBM PC	Model 50	Ratio
Sieve	124	23.5	5.27 to 1
Fib	31	10.1	3.07 to 1
Dhamp	51	11.4	4.49 to 1
Float	857	174	4.93 to 1
Sort	33	6.6	4.99 to 1
Matmult	36	7.3	4.95 to 1

Table 1. The benchmarks suggest that the Model 50 offers approximately five times the performance of an IBM XT/AT.

```
Equipment Inventory Check          Version 1.1
Copyright 1986 Les Bell and Associates Pty Ltd

Identification byte identifies machine as PC AT

Video mode:          80 x 25 color
Total main memory:   639K
Extended memory:     384K
Printers:            1
Floppies:            1
RS-232C ports:      1
Game adaptor:        off

SI-System Information, Version 3.10,
(C) 1984-86, Peter Norton

IBM/PC-AT
Built-in BIOS programs dated Monday,
December 22, 1986, Operating under DOS 3.30

5 logical disk drives, A: through E:
DOS reports 639 K-bytes of memory:
 63 K-bytes used by DOS and resident programs
576 K-bytes available for application programs
A search for active memory finds:
 640 K-bytes main memory (at hex 0000-A000)
 32 K-bytes display memory (at ex 8800-C000)

Computing performance index relative to IBM/PC: 10.3
```

Table 2. The identification byte in the BIOS indicates that the machine is an IBM PC/AT, even though its hardware is quite different. This could cause some problems for programmers trying to write software which automatically adapts to its hardware environment. Our Equipment Inventory Check program correctly identifies the presence of 384 Kbytes of extended memory, but DOS reports only 639 Kbytes of main memory, whereas an AT reports 640 Kbytes. Where has the missing kilobyte gone?

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IBM Model 50

ment Inventory Check program correctly identifies the presence of 384 Kbytes of extended memory (that is, memory mapped to be above the 1 Mbyte boundary in an AT), but that DOS reports only 639 Kbytes of main memory, whereas an AT reports 640 Kbytes. Where has the missing kilobyte gone?

We disassembled the Model 50 for photography (and to find out what was inside, of course). Upon reassembly, the machine failed to reboot, producing a couple of error numbers instead (61, 63). It was then we discovered that IBM had failed to supply the setup disk for the machine. A phone call later, we had the correct disk and were back on the air — the setup procedure is very simple (near to fool-proof), and correctly diagnosed the problem as being that the battery had been disconnected, losing the internal CMOS RAM's power, and consequently the setup information and the real time clock.

Minor gripe: if that's all the problem was, surely the system should at least limp along? Either the setup program

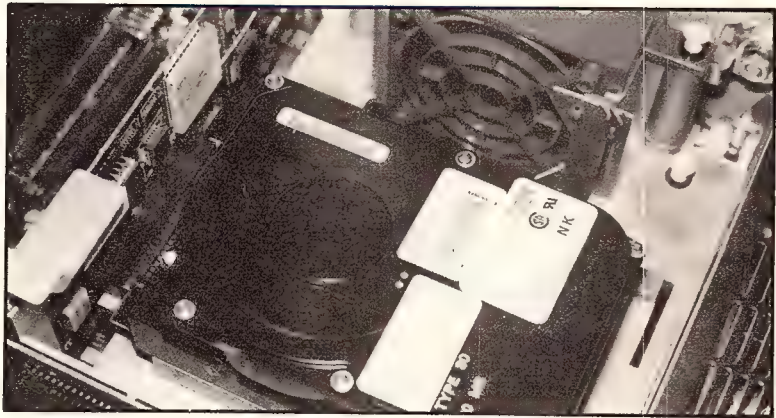


Figure 1. The Model 50's hard disk simply snaps into place.

could be permanently stored in ROM, or the setup information for the hard disk could be stored in a reserved sector, or something — it's annoying that the machine was electrically and mechanically fine, but wouldn't work for the sake of a setup disk.

Supporting Software

The Model 50 comes with a setup and diagnostics disk which automatically configures the system and allows the user to set the real time clock.

The main piece of software for the machine is IBM Personal Computer DOS 3.3. This release of DOS includes some new features, such as the APPEND command (which does for data and overlay files what

IBM Graphics Standards and Modes

CGA Modes

BIOS Mode — Description
0 — 40 x 25 text in black and white.
1 — 40 x 25 text in colour.
2 — 80 x 25 text in black and white.
3 — 80 x 25 text in colour.
4 — 320 x 200 graphics in black and white.
5 — 320 x 200 graphics in colour (sixteen colours, background, two palettes of three colours for foreground), and
6 — 640 x 200 graphics in black and white.

EGA Modes

(CGA Modes Plus:)

BIOS Mode — Description
D — 320 x 200 graphics in 16 colours.
E — 640 x 200 graphics in 16 colours.
F — 640 x 350 graphics with 3 foreground colours, and
10 — 640 x 350 graphics with up to 16 colours.

VGA Modes

(CGA and EGA Modes Plus:)

BIOS Mode — Description
? — 320 x 200 graphics in 256 colours from palette of 256,000, and
? — 640 x 480 graphics in 16 colours. □

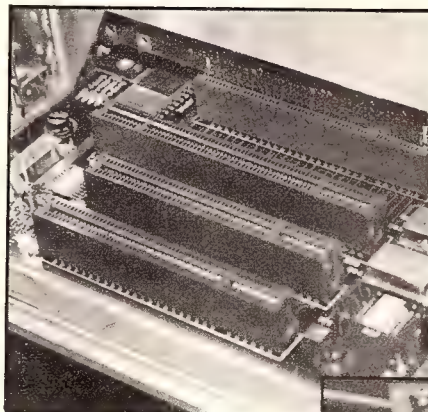


Figure 2. The new Micro Channel bus is a true 32-bit bus. Three expansion slots are provided on the Model 50.

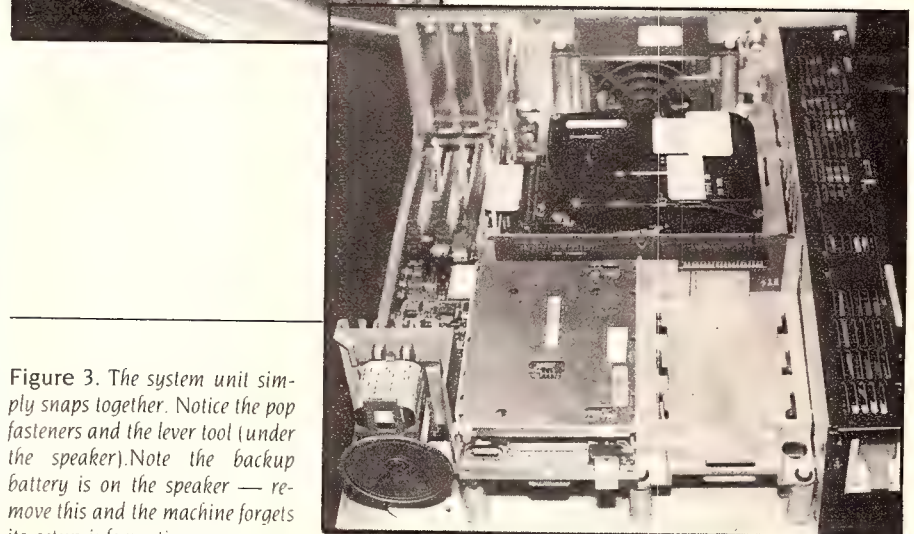


Figure 3. The system unit simply snaps together. Notice the pop fasteners and the lever tool (under the speaker). Note the backup battery is on the speaker — remove this and the machine forgets its setup information

This means that programs which modify the segment registers directly — and virtually all real mode (DOS applications) programs do — will not run in protected mode. Kiss goodbye to your favourite software . . .

Figure 4. The back panel of the Model 50 is clean and uncluttered. The connectors (from left) are for power, keyboard, mouse, serial, parallel, and video.

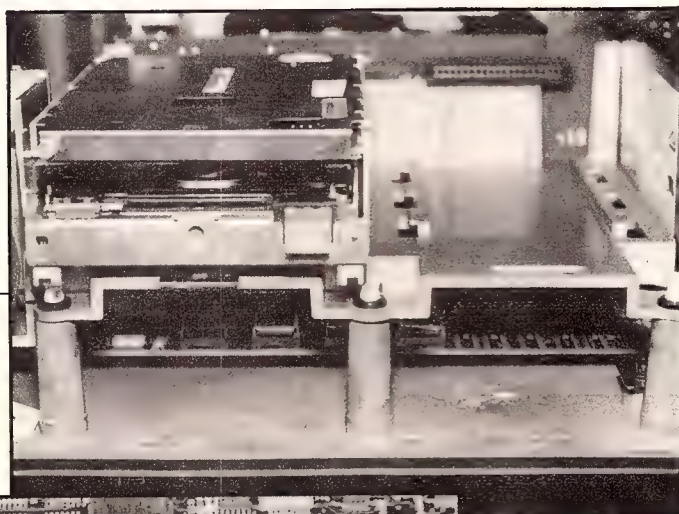
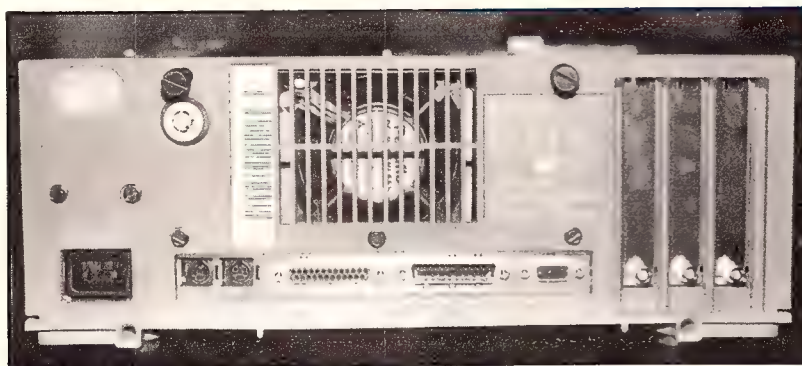


Figure 5. The Model 50 has bays provided for two 3 1/2 inch drives.

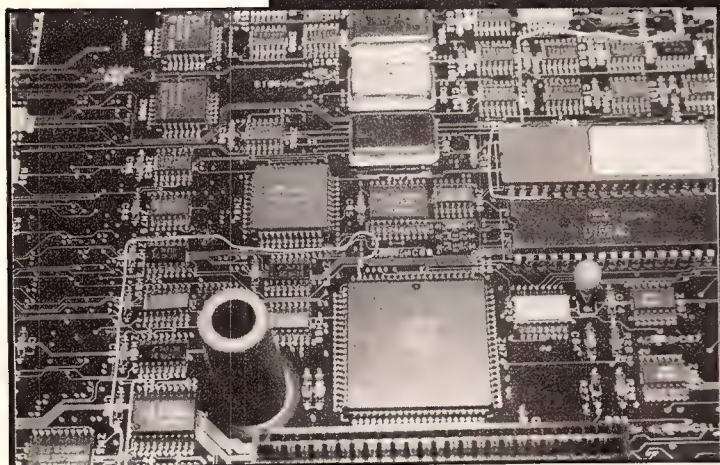


Figure 6. The Model 50's system board makes extensive use of custom chips.

PATH does for program files), the FASTOPEN command, which enables directory caching for improved performance. There's also a rationalised approach to international character set support, called code pages, which US, Australian and UK users will not have to worry about.

In addition, DOS now has the ability to partition large disk drives into multiple logical drives, thus getting around the 32 Mbyte restriction (previously, a drive could have only one DOS partition). This makes good sense; if a root directory or FAT (File Allocation Table) gets trashed, you've lost only part of your disk's contents, instead of everything.

However, owners of the 80286-based members (the Models 50, 60 and 80) of the Personal System/2 family must wait some time (until the first quarter of next year at least) to see the other new operating system, OS/2. This completely new operating system is the result of joint development between IBM and Microsoft (who will release it as MS-OS/2).

OS/2 looks like a combination of DOS and Microsoft Windows, with the addition of some real multi-tasking software smarts like pre-emptive scheduling. Indeed, Microsoft have announced that they will release a new version of Windows, called Windows 2, later this year, and this version will look like the OS/2 windows. At last! — Real Windows! Windows that overlap, like in Concurrent DOS, GEM, various UNIX windowing schemes and other operating systems that have been around for years. Why didn't Microsoft do it earlier?

In addition, OS/2 (and Windows 2) will have a new command-line interface to make it usable by old fogies like me who like to reassure themselves periodically that they can master the challenge of something more sophisticated than the Macintosh-style 'point-and-grunt' interface. Without this, how would PC owners be able to enjoy moral superiority over Macintosh owners?

OS/2 is what is called a 'protected mode' operating system. The 80286 processor operates in two different modes — 'real' mode, which is what is used by DOS and all applications programs for it, and 'protected' mode, in which the 80286's addressing scheme changes. In real mode, addresses are made up of two components: a sixteen bit segment address and a sixteen bit offset within that segment. However, in protected mode, the segment

IBM Model 50

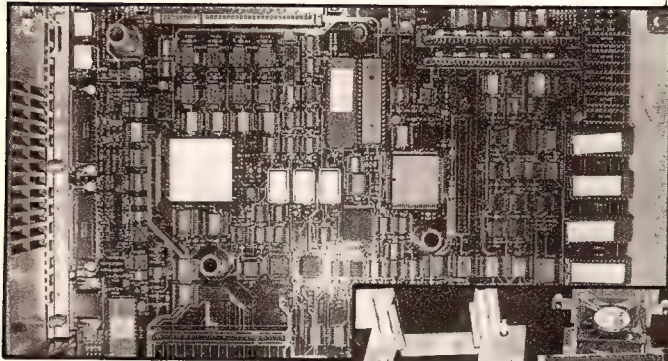
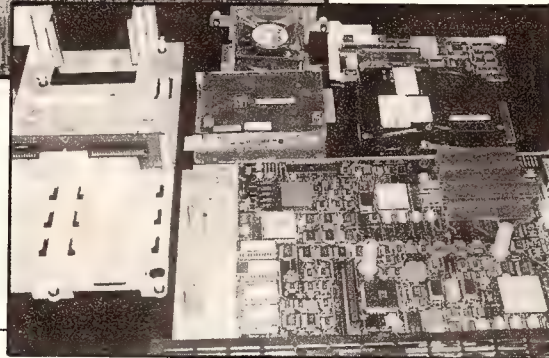


Figure 7. The densely packed system board.

Figure 8. The whole unit can be disassembled in 30 seconds without tools!



registers do not contain segment addresses but indexes into an array of segment descriptors, from which the real segment address is subsequently obtained.

This means that programs which modify the segment registers directly — and virtually all real mode (DOS applications) programs do — will not run in protected mode. Kiss goodbye to your favourite software ...

Both IBM and Microsoft claim that OS/2 will run existing DOS software. What they don't say is that the only way this can be done on the 80286 is to reserve the bottom 640 Kbytes of memory for a single DOS application, which is executed by literally restarting the processor in real mode to execute the program and then switching it back to protected mode to resume OS/2. You can only run one DOS application, and it must be in a foreground window.

The 80386 does not suffer from this limitation, due to its support for what is called 'virtual 8086 architecture'. Users who are looking for true multitasking of existing DOS software should therefore be looking towards the Model 80 and other 80386-based machines

Since the 80386 is demonstrably superior in certain essential respects, the question many software developers are doubtless asking themselves is why mess about with the 80286 and OS/2 at all? Other software developers are shipping 80386 operating systems such as Microsoft's UNIX System V.3, Concurrent DOS 386 and PC/MOS, which all have the abil-

ity to do now what OS/2 will not be doing for a year at least. Lotus recently announced that they will be supporting OS/2 — but the point is, who would ever have assumed that they wouldn't?

The 8500 Family

The Model 50 is near the bottom end of IBM's new Personal System/2 family of PC's. As I see it, the System/2 family is positioned this way:

Model 30: Small business machine; entry level, suitable for word processing, use as a terminal in large business. Perhaps slightly over-priced and likely to be discounted before long.

Model 50: Bottom-end corporate machine. Oriented towards word processing and spreadsheet usage, plus use on a network as workstation. Smallest system able to run OS/2.

Model 60: Higher-powered workstation for software development, large databases and perhaps use as a network file server (assuming faster drives).

Model 80: Top-level workstation for CAD/CAM and similar graphics workstation applications, software development, network file server, AI and expert systems. Should be a good UNIX box and better able to handle multi-tasking of existing DOS applications under OS/2.

Personal System/2 Family

8530002 — Model 30 System Unit with two 720 Kbyte disk drives. A low end system based on an 8 MHz 8086 processor, MultiColor Graphics Array (supports existing GA modes plus 320 x 200 resolution x 256 colours, 640 x 480 x 2 colours), serial, parallel and mouse ports. Expansion through standard PC bus. \$3500

8530021 — Model 30 System Unit with one 720 Kbyte disk drive and a 20 Mbyte hard disk. Expansion through standard PC bus. \$4720

8550021 — Model 50 System Unit with one 1.44 Mbyte disk drive and a 20 Mbyte hard disk. Medium-level system based on 10 MHz 80286 processor with 1 Mbyte (up to 7 MB) of memory, Video Graphics Array (supports existing CGA, EGA, MCGA video modes plus 320 x 200 x 256 colours, 640 x 480 x 16 colours) serial, parallel and mouse ports. Expansion through Micro Channel bus. \$7490

8560041 — Model 60 System Unit with one 1.44 Mbyte disk drive and a 40 Mbyte hard disk. Top level floor-standing tower enclosure, 10 MHz 80286-based system with 1 Mbyte (up to 15 MB) of memory, VGA, serial, parallel and mouse ports. Expansion through Micro Channel bus. \$11,090

8560071 — As Model 60 8560041, but with 70 Mbyte hard disk and upgraded power supply. Expansion through Micro Channel bus. \$13,140

8580041 — Model 80 System Unit with one 1.44 Mbyte disk drive and a 44 Mbyte hard disk. Tower enclosure based on 16 MHz 80386 processor with 1 Mbyte (up to 16 Mbytes) of memory, serial, parallel and mouse ports. Expansion through Micro Channel bus. \$14,600

8580071 — Model 80 System Unit with one 1.44 Mbyte disk drive and 70 Mbyte hard disk. Tower enclosure based on 16 MHz 80386 processor with 2 Mbytes (up to 16 Mbytes) of memory, serial, parallel and mouse ports. Expansion through Micro channel bus. \$17,680

8580111 — Model 80 System Unit with one 1.44 Mbyte disk drive and a 115 Mbyte hard disk. Top-of-the-line enclosure based on 20 MHz 80386 processor with 2 Mbytes (up to 16 Mbytes) of memory, serial, parallel and mouse ports. Expansion through Micro Channel bus. \$22,820

If this is the way IBM sees it, then the Model 50 meets its aims fairly well. Undoubtedly, with time, some problems will emerge with users aiming to upgrade even further, but it is impossible to forecast what users may try to do in the future. □

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A LOOK TO THE FUTURE

... on our sixth birthday
This issue of YC celebrates our sixth birthday. Since
birthdays are traditionally a time for reflection, we
thought we'd look to the future of the computer
industry. First from the crystal ball
of crystal Ball. . .

WHEN THINKING ABOUT the future of the computer industry, I usually veer between my pessimistic views and extreme optimism about the future. When feeling pessimistic, I lean to the view that the personal computer market is near saturation, that everyone who wants a personal computer has one and that nearly everyone who needs a personal computer has one. I also suspect that many people who have personal computers on their desks are not achieving nearly as much benefit as they expected — if any.

Optimistically, I see lots of new applications areas opening up, new kinds of user interface that make computer power accessible to people who previously found PC's indescribably tedious and boring. If this is the case, the future should see continued growth and lots of interesting new products to review.

A few predictions: first, IBM will continue to set the standards in the marketplace. The new PS/2 series of PC's shows, in several ways, how IBM has gone back to the drawing board: new graphics standards, new expansion bus (Micro Channel Architecture), and new disk formats. While the old PC design will be around for some time, the new machines will take over, gradually at first but then much faster.

The PS/2 series reveal some of IBM's intentions for the future. First, the new Micro Channel bus is much higher bandwidth than the old one, and this will pay off in much improved network performance.

IBM intends to blur the distinctions between mainframes and PC's, and integrate them, with PC's acting as intelligent front ends to mainframe applications, performing data entry validation, perhaps even using expert systems, context sensitive help and maybe even windowing techniques, and then using SNA LU 6.2 over a token ring network to pass 'scrubbed clean' data to the mainframe, which then does whatever mainframes do best.

One area where IBM is fumbling the ball is networks, however. For a while, there, it looked like Token Ring was it, and IBM had a clear and unambiguous view of the network future upon which customers could plan their networks. Recently, however, the company has started to emit confusing signals: support of a baseband IEEE 802.3 network (StarLAN), support for Ethernet, support for TCP/IP protocols, and the re-emergence of the original broadband PC Network. Perhaps IBM can afford to have that many irons in the fire, but its customers can't.

Other companies are providing high performance networks, too — in fact, one can now say that networks actually work. Companies such as Novell, 3Com, Ungermann Bass and others now have powerful offerings, and the next few years should see the widespread adoptions of standards, giving rise to the economic production of applications and service software (electronic mail, and so on) for the majority of networks. In other words, you'll be able to do more than share a file server and print on a remote printer.

Desktop publishing technology will continue to grow apace, with higher resolution laser printers, cheaper scanners and OCR readers, better software with the ability to handle larger documents, and faster processors in the computers and most importantly in the printers to speed the whole process.

In software, expect the major area of interest to be expert systems. There is tremendous growth in the number of small, but useful, expert systems running on PC's out there in the real world (as opposed to academia). Many of these are based on inexpensive expert system shells which are widely available and do not require particular programming skills to use.

Another area of growth for PC software companies is mainframe software. Expect mainframe versions of Lotus 1-2-3, for example, together with appropriate tools for file transfer between the mainframe and PC versions. Expect similar developments from Ashton-Tate and Microsoft.

The release of OS/2, with the IBM version's integrated communications facilities and database engine, will further spur the growth of integrated applications. However, for standalone users, OS/2 will have its pay-off, too, in the form of greater portability of software between machines and between graphics standards. In this new operating system, graphics support is embedded in the operating system, not the applications, so that software written appropriately will run on any OS/2 machine. Before you say, 'what about software that isn't?', let me tell you that software that doesn't follow the rules won't run at all.

The greater memory addressing capabilities of OS/2 will also provide benefits by allowing programmers to write larger and more sophisticated software.

At Home

In the home computer market, it's difficult to know what to expect: maybe someone will come up with a system that will control domestic devices and which is actually usable. However, I think it's fair to say that most computers in homes are really hobby computers, being used for purely the satisfaction of programming or making music, or word processing of club minutes and similar applications. The home computer, as such, just hasn't worked, and I don't really expect that to change.

In education, I expect CD-ROM disks to make quite an impact over the next five years or so. Current CD-ROM's have a capacity of 540 Mbytes, which is adequate for quite large knowledge bases. Add expert systems capability and you can see

The sustained growth and long-term future of the industry depends heavily on the provision of solutions and not, as Matt Whelan believes, the continued push of new sets of problems.

that we can make big improvements over the unsophisticated drilling and testing programs which currently characterise computer-based training.

In the distribution, sales and support aspects of the business, changes are happening continuously. The larger dealers have moved up-market, chasing corporate accounts and mastering particular areas of the business, such as PC-to-System/36 communications, and I expect this trend to continue. The strictly retail, shop-front computer store faces a difficult future, as sales of one-off computers decline; such dealers must prepare to shift into software, rather than hardware, as the basis of their business, and must prepare to offer higher levels of support. Alternatively, discount like crazy and mail-order.

Looking further into the future, what can we see? Speech recognition, coupled with natural language parsing? Widespread use of optical character recognition for scanning all documents which enter an organisation and processing them electronically from that point on? All of that, certainly, and more — but a writer would have to be very game indeed to put dates on those kinds of predictions. In general, the technology advances but slowly until someone realises the economic benefit it would produce; then suddenly, progress is rapid. In other words, if someone suddenly realised a widespread application of speech recognition and produced a prototype application, sophisticated systems would appear almost overnight.

Look at desktop publishing; until someone realised just what was possible, laser printer and software technology remained essentially primitive. Once one company showed what was possible, everyone went berserk, and we now have software packages for a variety of machines, and desktop laser printers have plummeted in price to just over \$US1,000. And the pundits didn't predict it. □

THE TROUBLE WITH jumping on the bandwagon is, if you do it too vigorously, you're likely to fall off the other side . . .

That's the first thought that comes to mind when I sit down to ponder the comings and goings in this business since we started preparing the first issue of YC in 1980.

If *Your Computer* was to throw a party for all the advertisers in its first issue who were still in business today, and all the advertisers in its latest issue who were in the business when we started, we'd still have to get help from Rent-A-Crowd to fill a moderately small function room. (Either that or we could invite the companies we expect to go out of business in the next year or three.)

Why have so many of the mighty fallen? Where did they go wrong? They devoted themselves to the technology, rather than to the customers.

The personal computer industry is locked in an upward fall

It's an industry outpaced by its own spectacular progress, and outfoxed by its own spectacular lack of progressiveness. It lives in the future, striving always for the next great leap forward without stopping long enough to leave a footprint from its last one.

It is driven almost entirely by its own needs rather than those of its customers.

Show me a software package which is mature and stable and I'll tell you all about the new, all-singing, all-dancing version which is about to replace it. Show me a piece of hardware which has the software and technical support it needs to do its job and I'll show you a model that has just been superseded

The customers are confused. Those that haven't been scared away (and there are many who have) are left wondering why the machine that was perfect for them when it was sold to them last week is now too slow, why the software that cost more than the family's annual holidays is now inefficient or incomplete. The classic example of course is IBM's effort with the new PS/2 which has left all those devoted IBM MS-DOS users scratching their heads.

Promises Promises

The industry is building itself on a base of promises, and not devoting nearly enough effort to making existing products work out there in the real world. There isn't time, because there's always something new and exciting to develop upon which a whole new series of promises can be platformed.

The 80286 processor is a classic example. It is now officially outdated, three years after it rode in on a sea of promises of new capabilities like multi-tasking, multi-user, mega-memory operation. Where are the results?

Forget it. Concocting a set of promises for the 80386 is now more important, even if it does kill any chance we had of seeing the 80286 reach its supposed potential.

And are we to believe them this time? Would anyone take seriously a car manufacturer which stood up and said 'Today we are releasing the car of the future. It is not available yet. And to perform differently to your current car, it will need a special new fuel. The fuel is not available yet. In December (we think) we will be able to tell you when it will be available.'

They would be laughed out of the marketplace. Yet the computer industry does it all the time, and gets away with it.

Meanwhile, the users are being left to arrange their own solutions.

Before the sale: Yes, this database package is exactly what you want to do the job.

After the sale: Of course, you'll have to forget about your real work for three months and learn to become a programmer, or perhaps pay our software development division \$5000 to customise it for you. . . .

One year later: Well, we can fix that for you. We have a new version — and a new machine — which will do exactly what you want.

Two years later: See above.

It's a harsh view, but one that is heavily supported by the many 'mere users' who come to us seeking help. Perhaps they have come to the wrong place yet again, for I, like many computer journalists, am often among the worst offenders.

The technology is seductive, far more so than the mundane challenge of using one of these machines to solve an everyday problem. Yet the sustained growth and long-term future of the industry depends heavily on the provision of solutions, not the continued push of new sets of problems

We've had our playtime. Now what we need is a little maturity. □

Politics has long been called the art of the possible, and so says John Hepworth, is the world of computers.

IN THE BEGINNING, after mainframes, there were three main strands in the 'serious' microcomputer industry — Apple, CPM and Tandy. Each had different capabilities, and a relatively narrow band of applications developed for them, including simple word processors, databases and spreadsheets like VisiCalc.

It takes technical innovation to make software innovation possible. The last two such innovations were the availability of 640K of memory with the otherwise rather ordinary original IBM PC, and the availability of the amazing graphics of the Mac. Suddenly, Lotus was possible, as was desktop publishing, and other applications packages could gain power which was previously the stuff of dreams.

Things move in steps with a plateau of months and years as the industry consolidates around an innovation and develops hardware and software around it. Then a major new development arrives and the whole industry must move to higher ground or be drowned.

Graphics

The Mac generated a new emphasis around graphics and images, beyond the capabilities of the humble color graphics adaptor and display on the PC. The PC had open architecture, and a host of developers created peripherals, add-in boards and software to give it abilities not imagined when originally designed. The IBM PS/2 series has created another plateau with its new display standards giving stunning color and amazing resolution. Without doubt the abilities of the PS/2 line and the Macintosh will get closer and closer together.

The other plateau is the pure grunt of high horsepower processors that can run the familiar software we all own. One machine in the US is effectively a clone running at 150 MHz, giving it a speed 72 times

faster than a 4.77 MHz PC. The 80386 also opens up the possibility of ever higher speed, with multiuser and multitasking capabilities.

Together the new graphics capabilities and processing speed offer the software developer the power for a whole genre of software yet to be imagined.

Affordable Software

The other thing which is starting to come about is the trend to affordable, non-copy protected software. In the middle ages books were not printed, but were written out by hand from a master copy. Making a copy of a major work could be the life's work for one person. As a result, books were fantastically expensive and only the very rich could afford them and had any sort of a library, albeit a rather sparse one. Then the printing press was invented and affordable books for the masses slowly evolved.

A similar scenario can be seen with software. Once all software was custom written and took many man years (ok, now there are women-years too) to write. Only the rich companies could afford their hand written, custom software. In came the micro. Very quickly a market developed for software as a retail product rather than a custom package. But many vendors kept their prices high, until now it can cost more to buy the industry leaders in databases, spreadsheets and wordprocessors than does a PC clone with colour monitor and hard disk.

How did they manage to keep selling at such outrageous prices? By putting copy protection on disks and then using high pressure marketing.

Does the development of the typical software package take more time than writing a major reference book? Yet the book will rarely be over \$100 and the software rarely under \$100, and often is closer to \$1000 or more. Ever thought of the reasons for the high price of copy protected software? The firm selling the software has to develop a copy protection scheme (or

buy it) at a cost of several dollars per disk. This impost is multiplied as the product passes from manufacturer to importer to distributor to dealer to you, inflating the cost of developing, manufacturing and marketing.

Not only does the copy protection raise the price to the home user, it does not stop the pirate as most copy protection schemes are quickly broken. It also makes life a misery for legitimate users, and makes back up of a hard disk a job for the expert. I have for a long while refused to look at, test, try, review or publicise copy protected software as my contribution to the elimination of this scourge.

But there is another way: pricing software more like books and using simple packaging, simple marketing and no copy protection. The leader was Borland. Subsequently, almost all other vendors have removed copy protection, and many have reduced their prices. The result is a very good financial result for Borland, and affordable software for us users. I'm sure they made more money from Turbo Pascal at its low price than they could have hoped for at the previously typical price for a compiler of around \$1000.

The Second Wave

The second wave of computer users is emerging, those for whom computing is a necessity and not a hobby. They need the power to run fancy user interfaces fast. They need perfect graphics so they can see the result on screen and not have to visualise it. Last but not least, they need software cheap enough so they are not scared to buy it.

Software must not be copy protected but priced so all can afford it, so that its value is self evident, and so that the cost and fuss of photocopying the manual is simply not worth the effort.

The future? Faster, cheaper hardware with infinitely improved graphics, and cheaper but more powerful non-copy-protected software to use with it all. I can hardly wait. □

The power of microprocessors have advanced way beyond our imaginative horizons as Ian Allen pointed out. It's all happened so fast that we've probably only thought up about one per cent of the possible applications. It's within those new applications that Australia will find the competitive market niches that it needs.

AUSTRALIA HAS never had a shortage of creative individuals with innovative ideas, but our track record in developing and exploiting those ideas is abysmal. Sadly, the computer industry provides few exceptions to this trend, and many times I've listened to programmers gently sobbing into their beers, as they recount the tale of how in the fifties we were right at the leading edge of computing, yet the CSIRO was encouraged to shift its resources into artificial rain making instead.

It seems that in this country, both private enterprise and government have absolutely no imagination when it comes to assessing the potential of new ideas. If you had wanted Australian backing for the development of a new product five years ago, you'd have had to sell it overseas before you could convince anybody here. That's practically what happened to Fairlight with their computer musical instrument. Thanks to Stevie Wonder, they've become a modern Australian success story.

The situation with raising finance has since become a little easier, but not by much. Although the government has made several initiatives, including the creation of management investment corporations (MICs) and a 150 per cent tax write off on r&d costs, the Australian corporate sector still seems obsessed with the faster bucks to be made by playing in the stock market.

Starting Small Then Exporting

Developing a new business, especially a high tech one like computing, is both risky and slow to produce returns. Besides, if it's any good someone overseas will do it and we'll just buy up the import licence when it's ready. No risk there. But companies like Fairlight prove that it can be done, and in my view their approach is a good model for others to follow.

Finance hurdles aside, Fairlight is marketing a niche product into a world market. Because it's a niche product, volume is relatively small and competitors can't exploit the usual advantages of mass production. In fact, if Australian manufacturing can be said to have any advantage it's in that we've always been good at low volume production. (We only look inefficient when competing against high volume manufactured imports.)

Fairlight can compete on equal terms with anybody. Their competitive edge has more to do with the quality of their firmware and software than with the cost of manufacturing their hardware. A few other local manufacturers have exploited the advantages of niche markets and low vol-

ume production, notably Labtam, AED and Microbee systems. The latter has encountered increasing competition in its educational niche and has responded by creating another one in the area of telecomputing. It's not a bad move when you think about it.

Australians are acutely communication conscious, more so than most countries with smaller distances. Telecomputing is a hot development area worldwide, and it's just possible that the Australian experience may give them an edge when exporting.

In my view, the power of microprocessors has advanced way beyond our imaginative horizons. It's all happened so fast that we've probably only thought up about one per cent of the possible applications. It's within those new applications that Australia will find the competitive market niches that it needs. Most of them are obvious once you see them.

Two examples: An Adelaide company called Vision Systems has developed a video security system whereby a computer analyses the pictures from security cameras and triggers an alarm (and recorder) if certain parts of the image change.

Space Time Research in Melbourne have developed a new database format that exploits the mass storage capabilities of CD-ROM. In fact they've put the 1981 census onto CD and developed the software to interrogate it — a world first and the methodology is applicable worldwide.

The other thing I find really encouraging is the rapid acceptance of computers by Australians. When I bought my first computer five years ago, most of my friends thought it was either a sign of unsuspected eccentricity, or that I must be 'really brainy'. I soon discovered the surest way to end a social conversation was to start talking about the computer.

Nowadays that ploy has just the opposite effect, and I find I'm constantly being asked for advice on what to look for when buying a wordprocessor. It's interesting that they ask about wordprocessors, not about computers. They want a tool for a task. Australians aren't stupid. □

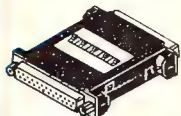
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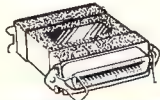
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- 2 mini jumpers
- Ideal for experimenting or temporary connections

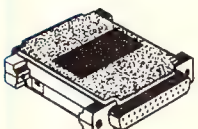
Cat. X15665 **Only \$49.95**
Only \$44.95



RS232 MINI TESTER

- All pin wired straight through
- Dual colour LED indicates activity and direction on 7 lines
- No batteries or power required

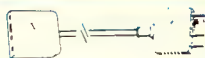
Cat. X15656 **Normally \$39.95**
Only \$29.95



RS232C NULL MODEM ADAPTOR

- Male to female connections
- Pins 2 and 3 reversed
- All 25 pins connected

Cat. X15657 Male to Male
Cat. X15658 Male to Female
Cat. X15659 Female to Female
Normally \$22.95
Only \$14.95



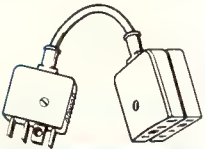
TELECOMMUNICATION EXTENSION LEADS

Cat. Y16010 5 metre **\$12.50**
Cat. Y16012 10 metre **\$14.95**



TELECOMMUNICATION PLUG/SOCKET

Plug Cat. Y16016 **\$3.95**
Socket Cat. Y16018 **\$4.95**



TELECOMMUNICATION PLUG TO 2 SOCKETS

Ideal for modern connections
Cat. Y16014 **\$12.95**



TELECOMMUNICATIONS AUSTRALIAN TO U.S. ADAPTOR CABLE

• Australian socket to U.S. plug
• Length 5 metres
Cat. Y16017 **\$7.95**



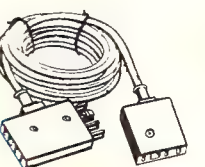
TELEPHONE ADAPTOR

• Australian plug to U.S. socket
• Length 10cm
Cat. Y16026 **\$5.95**



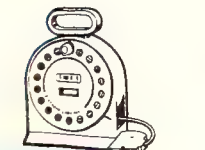
TELEPHONE CURL CORD

• U.S. plug to U.S. plug
• Replacement hand set cord
• Length 4.5 metres
Cat. Y16023 **\$6.95**



TELECOMMUNICATIONS AUSTRALIAN STYLE ADAPTOR CABLE

• Australian socket to plug/socket
• Length 10 metres
Cat. Y16015 **\$14.95**



TELEPHONE EXTENSION CABLE UNIT

Allows 15 metres of telephone extension cable to be neatly wound into a portable storage container. The reel sits on a flat base and has a handle to wind cable back on to it after use. No tangles - no mess! Ideal for the workshop, around the house, office, pool etc.
Cat. Y16013 **\$22.95**



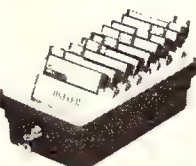
U.S. TELEPHONE EXTENSION CABLE

• U.S. plug to U.S. socket
• Length 10 metres
Cat. Y16024 **\$7.95**



U.S. TELEPHONE EXTENSION CABLE

• U.S. plug to 2 U.S. sockets
• Length 10 metres
Cat. Y16028 **\$9.95**



JUMBO 5 1/4" DISK STORAGE

If you've got lots of disks, you'll appreciate the extra capacity of this disk storage unit when it comes to locating "that" disk!

- 100 disk capacity
- Smoked plastic cover
- Lockable (2 keys supplied)
- 9 Dividers/spacers

C16020 **only \$24.95**
C16027 (Hinged Lid) **\$26.95**

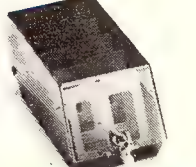


5 1/4" DISK STORAGE

Efficient and practical. Protect your disks from being damaged or lost!

- 70 disk capacity
- Smoked plastic cover
- Lockable (2 keys supplied)
- Dividers/spacers

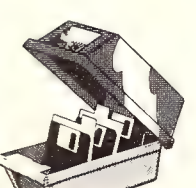
Cat. C16025 **only \$19.95**



3 1/2" DISK STORAGE UNIT

- Holds up to 40 x 3 1/2" diskettes
- Lockable (2 keys supplied)
- High impact plastic lid and base
- Anti static

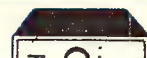
Cat. C16040 **only \$19.95**



3 1/2" DISK STORAGE UNIT

- Holds up to 40 x 3 1/2" diskettes
- Lockable (2 keys supplied)
- High impact plastic lid and base

Cat. C16035 **only \$19.95**



2 & 4 WAY RS232 DATA TRANSFER SWITCHES

If you have two or four compatible devices that need to share a third or fifth, then these inexpensive data transfer switches will save you the time and hassle of constantly changing cables and leads around

- No power required
- Speed and code transparent
- Two/Four position rotary switch on front panel
- Three/Five interface connections on rear panel
- Switch comes standard with female connector

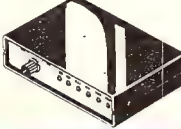
2 WAY Cat. X19120 **\$45 \$95**
4 WAY Cat. X19125 **\$45 \$119**

2 & 4 WAY CENTRONICS DATA TRANSFER SWITCHES

Save time and hassles of constantly changing cables and leads around with these inexpensive data transfer switches. These data switches support the 36 pin centronic interface used by Centronics, Printronics, Data Products, Epson, Micronics, Star, and many other printer manufacturers.

- No power required
- Speed and code transparent
- Two/Four position rotary switch on front panel
- Three/Five interface connections on rear panel
- Switch comes standard with female connector
- Bale locks are standard

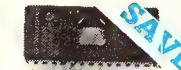
2 WAY Cat. X19130 **\$45 \$95**
4 WAY Cat. X19135 **\$45 \$119**



RS232 DATA SWITCH WITH TESTER

- No power required
- Ideal for 1 computer to 2 peripherals or 2 computers to one peripheral.
- 25 pin RS232 "D" connectors.
- Six dual coloured LED indicators showing certain flow status:

T.D. Transmit Data
R.D. Receive Data
R.T.S. Request To Send
C.T.S. Clear To Send
D.S.R. Data Set Ready
D.T.R. Data Terminal Ready
• Size 200(W) x 86(H) x 150(D)mm
Cat. X19110 **R.R.P. \$169**
Our Price \$149



SEMICONDUCTORS!

Always check our prices before you buy!

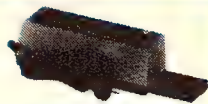
	1-9	10+	100+
2716	\$9.95	\$9.50	\$8.95
2732	\$8.95	\$8.50	\$7.95
2764	\$7.95	\$7.50	\$6.95
27128	\$6.95	\$6.50	\$6.25
27256	\$11.50	\$10.50	\$10.00
27512	\$19.50	\$18.50	\$17.50
4116	\$3.95	\$3.50	\$2.95
4164	\$2.25	\$1.95	\$1.75
41256	\$6.95	\$6.50	\$5.95
555 8pin	\$0.50	\$0.40	\$0.35
6116	\$3.95	\$3.75	\$3.50
6264	\$6.50	\$6.00	\$5.75
6802	\$5.00	\$4.00	\$3.75
6821	\$2.00	\$1.80	\$1.70
6845	\$5.00	\$4.00	\$3.75
7406	\$0.40	\$0.30	\$0.25
INS8250	\$29.95	\$27.95	

NE5534AN
SCOOP PURCHASE!!!
1-9 **\$1.95** 10+ **\$1.85** 100+ **\$1.75**

WORLD MODEM CHIP
Cat. U21614 **Normally \$49.50**
Save \$25, SPECIAL \$24.95

MEL9501
Have you blown up your Apple drive by plugging it in backwards or not turning off the power while changing boards? We have the MEL9501 chip!
SPECIAL, ONLY \$29.95

8087
Genuine Intel chips with manual and data sheets packed in boxes!
8087-3 (4 77MHz) **\$269**
8087-2 (8MHz) **\$385**
8087-1 (10MHz) **\$585**
80287-6 (6MHz) **\$475**
80287-7 (8MHz) **\$679**



UV EPROM ERASER

Erase your EPROMs quickly and safely. This unit is the cost effective solution to your problems. It will erase up to 9 x 24 pin devices in complete safety, in about 40 minutes (less for less chips).

- Features include
- Chip drawer has conductive foam pad
- Mans powered
- High UV intensity at chip surface ensures EPROMs are thoroughly erased
- Engineered to prevent UV exposure
- Dimensions 217 x 80 x 68mm

WITHOUT TIMER
Cat. X14950 **Normally \$119**
Special, \$89

WITH BUILT-IN TIMER
Cat. X14955 **\$139**
Special, \$119



"IBM" AT COMPATIBLE KEYBOARD

- 100% IBM PC, XT compatible
- Low profile keyboard design
- Proper placement of shift keys with large key tops to suit professional typists
- 3 step height/angle adjustment
- Cherry brand TS-M00001 19mm low profile switches, meet 30mm ergonomic requirement and provides high performance and maximum reliability.
- Curl lead plugs straight into PC/XT
- 3 Status displays

Just like the "Real McCoy" only at a fraction of the price!
Cat. X12020 **only \$129**



IBM XT & AT COMPATIBLE EXTENDED KEYBOARD (105 KEYS)

- 20 Dedicated function keys
- Enlarged "Return" and "Shift" key
- Positive feel keys
- Low Profile Design, DIN standard
- Separate Numeric and Cursor control keypads
- Additional Functions...
- Key-in-Lock, Audio Beep, Previous Word, Next Word, Fast Repeat, Line Feed, Pause, Clear Screen, Reset

Cat. X12022 **WAS \$299**
SPECIAL, ONLY \$199



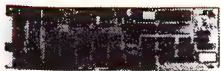
APPLE II SERIES COMPATIBLE JOYSTICK

These joysticks have adaptor connectors to suit the Apple II, IIC, IIE and II+ computers. Features include selectable "spring centring" or "free floating" Electrical trim adjustments on both axes, 360° cursor control and dual fire buttons.
Cat. C14201 **\$49.95**



JOYSTICK FOR IBM

Features Selectable "Spring centring" or "free floating" Electrical trim adjustments on both axes. 360 degree cursor control
Cat. C14205 **\$49.95**



IBM XT COMPATIBLE CARDS

NEW! NEW! NEW! NEW!

20M/BYTE HARD DISK CARD
XT compatible, simply plugs straight in to your computer!
Cat. X18002 \$1.95

Colour Graphics Card
Cat. X18002 \$129

Graphics Card (Hercules compatible)
Cat. X18003 \$145

Floppy Disk Drive Controller Card (2 Drives, 16 Bit)
Cat. X18005 \$59

Floppy Disk Drive Controller Card (4 Drives, 16 Bit)
Cat. X18006 \$85

High Resolution Mono Card
Cat. X18007 \$199

Colour Graphics & Printer Card
Cat. X18010 \$149

768kB RAM Card (without memory)
Cat. X18012 \$89

Printer Card
Cat. X18017 \$34.95

Game I/O Card
Cat. X18019 \$37.95

XT Motherboard (without memory)
Cat. X18020 \$225

Clock Card
Cat. X18024 \$57.50

RS232 Card (without cable)
Cat. X18026 \$52.50

RS232 & Clock Card
Cat. X18028 \$95

XT Turbo Motherboard (without memory)
Cat. X18030 \$275

Multi I/O & Disk Controller Card
Cat. X18040 \$169

I/O Plus Card
Cat. X18045 \$129

768K Multifunction I/O Card (includes cable but not 41256 RAM)
Cat. X18050 \$199

Hard Disk Controller Card
Cat. X18060 \$195

Enhanced Graphics Adaptor Card 256K RAM on board
Cat. X18070 \$295

64K Printer Buffer Card
Cat. X18077 \$139

(AT COMPATIBLE)

Enhanced Graphics Adaptor Card (Award Bios)
Cat. X \$495



APPLE COMPATIBLE CARDS

PRINTER CARD
Cat. X17029 \$89

DRIVE CARD
Cat. X17019 \$79

80 COLUMN CARD
Cat. X17025 \$85

SUPER SERIAL CARD
Cat. X17035 \$119

RGB CARD
Cat. X17039 \$79

PAL COLOUR CARD
Cat. X17027 \$95

Z80 C/M CARD
Cat. X17041 \$59

APPLE IIe COMPATIBLE CARDS

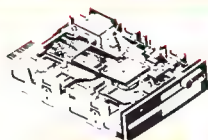
80 COLUMN/64K CARD
Cat. X \$69

64K/128K CARD
Cat. X \$69



ANTI GLARE SCREEN

Half the price of other brands!
Relieve eye strain and headaches and increase productivity with these Anti Glare Screens. Suitable for 12" monochrome and colour monitors.
Cat. X99995 \$24.95

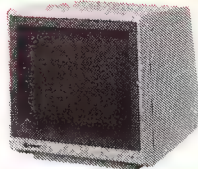


NEC DISK DRIVES

3 1/2" DISK DRIVE
● 1 M/Byte unformatted, (640K formatted),
● Double sided, double density,
● Access Time 3m/sec
Cat. \$265

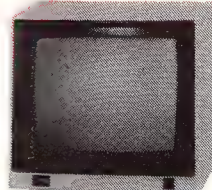
5 1/4" SLIMLINE
● Switchable 1.6 M/Byte to 1 M/Byte unformatted
1.2 M/Byte to 720K formatted
● Double sided, double density,
● AT compatible
Cat. C11906 \$295

8" SLIMLINE
● Double sided, double density,
● 1.6 M/Byte unformatted.
Cat. C11908 \$795



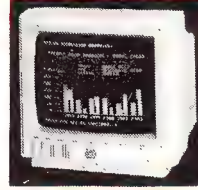
SAMSUNG TTL MONITOR

A quality 12" TTL monitor, with a high contrast, non-glare screen at a very reasonable price!
SPECIFICATIONS:
CRT: 12" diagonal 90° deflection, non-glare screen.
Active Display Area:
216(H) x 160(V)mm
Display Characters: 2,000 (80 characters x 25 lines)
Scanning Frequency:
Horizontal: 18 432 + -0.1KHz
Vertical: 50 Hz + -0.5%
Description Cat.No. 1-9 10+
Green X14517 \$189 \$179
Amber X14518 \$189 \$179



SAKATA 13" RGB COLOUR MONITOR

High quality IBM compatible monitors, great with VCR's too!
SPECIFICATIONS:
CRT: 13" 90° deflection colour
Input Signal:
Video Signal: Separate video signal
Video: Positive
Sync: Positive
Input Level: TTL Level
Scanning Frequency:
Horizontal: 15.7KHz
Vertical: 60Hz
Display Size: 245(H) x 182(V)mm
Resolution:
Horizontal: 640 dots
Vertical: 200 lines
Cat. X14530 \$695



INTRIA 14" RGB HIGH RESOLUTION COLOUR MONITOR

Compatible with IBM and compatibles, and EGA Cards.
Why pay more?
Resolution: 640 x 350 dots
Dot pitch: 31mm
Display Format: 80 x 25 characters
Cat. X14514 Normally \$1,295
Special, only \$795

INTRIA 14" RGB COLOUR MONITOR

Resolution: 640 x 200 dots
Display Format: 80 x 25 characters
Display Colours: 16
Dot pitch: 33mm
Sync Horiz. Scan Freq: 15.75 KHz
Sync Vert. Scan Freq: 50Hz
Band Width: 18MHz
Cat. X14520 \$695



RITRON 2 MONITORS

Stylish 20MHz, non-glare 12 inch monitors available in green or amber displays and featuring swivel base that tilts forward and back and swivels right to left!
Green Cat. X14506. Normally \$235
Amber Cat. X14508. Normally \$239
SPECIAL, ONLY \$199

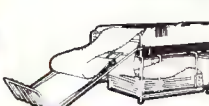
ROD IRVING ELECTRONICS FOR ONE STOP BARGAIN SHOPPING!



1 YEAR WARRANTY!

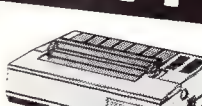
IBM COMPATIBLE DISK DRIVES

Tired of paying out more for Japanese Disk Drives? These "direct import" Hong Kong disk drives are the solution! They feature Japanese mechanical components, yet cost only a fraction of the price!
Cat.No. Description Price
C11801 500K Normally \$199
SPECIAL, ONLY \$179
C11805 1.6 M/Byte \$259



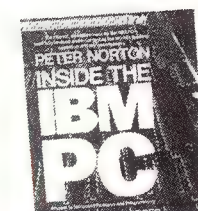
PAPER TAMER

● Restores order to the top of your desk or work area
● Made of white plastic coated steel
● Stores up to 900 continuous sheets
● Allows perfect paper feed
● Allows easy examination of print out
C21050 (10") only \$49.95
C21050 (15") only \$79.95
(Printer and paper not included)



CANON A-40 PRINTER

● Serial Impact Dot Matrix
● 140 C.P.S.
● Near Letter Quality Mode
● 1.4K Buffer
Cat. C20040 \$595



INSIDE THE IBM PC

(Revised and expanded edition)
-Peter Norton
The widely acclaimed guide to the IBM PC's inner workings. The latest edition now covers every model of the IBM micro: PC, XT and AT, and every version of DOS from 1.1 to 3.0
B20080 \$44.95



APPLE COMPATIBLE CARDS

PRINTER CARD
Cat. X17029 \$89

DRIVE CARD
Cat. X17019 \$79

80 COLUMN CARD
Cat. X17025 \$85

SUPER SERIAL CARD
Cat. X17035 \$119

RGB CARD
Cat. X17039 \$79

PAL COLOUR CARD
Cat. X17027 \$95

Z80 C/M CARD
Cat. X17041 \$59

APPLE IIe COMPATIBLE CARDS

80 COLUMN/64K CARD
Cat. X \$69

64K/128K CARD
Cat. X \$69



PRICE BREAK THROUGH!

20 M/BYTE HARD DISK DRIVE FOR IBM AND COMPATIBLES

NEC drive with DTC controller card
Cat. X20010 WAS \$995
SPECIAL, ONLY \$850
*IBM is a registered trade mark



PRINTER RIBBONS

CP80, BX80, DP80, BX100, MB100
ALL A CRAZY LOW \$9.95



PRINTER LEAD FOR IBM

● Suits IBM PC XT and compatibles
● 25 pin "D" plug (computer end)
to Centronics 36 pin plug
Cat. P19029 1.8 metres \$17.95
Cat. P19030 3 metres \$22.95



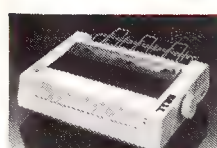
PASCAL PRIMER

-Mitchell Waite, David Fox
If you are learning programming or have dabbled in the popular language BASIC and wish to learn the capabilities of Pascal, this book is definitely written for you. Written and illustrated with a touch of humour, the informative text describes Pascal program structure, Pascal variables, Pascal procedures, and many other features. There are chapters on decision making statements, numeric functions, string functions, arrays and sets, and much more. The eight appendices present facts about the advantages and disadvantages of Pascal, components of a Pascal system, interfacing assembly language routines, and other useful information
Cat. B \$24.95



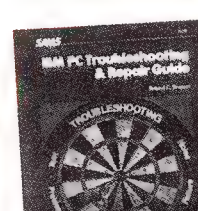
MAIL ORDER HOTLINE

008 335757 (TOLL FREE)
LOCAL: 543 7877



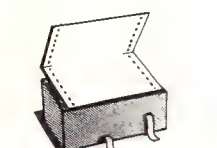
SUPER 5 EP-1201 DOT MATRIX PRINTER

● 120 C.P.S.
● Pica or Elite character set
● Print Modes: NLO, Dot Graphics, Proportional Font, Draft
● Proportional Printing
● Reliable and Compact
● Proportional Printing
● Logic Seeking
● 1K Printer Buffer
Cat. C20035 only \$595



IBM PC TROUBLESHOOTING & REPAIR GUIDE

-Robert C. Brenner
Keep your IBM PC in top operating condition with this handy reference book. Inside you will find pages of schematics, photos and block diagrams to help you identify problems. Simple instructions tell you what's wrong and how to fix it fast
● Make most repairs with few or no tools
● Quickly zero-in on a malfunctioning component
● Reduces downtime
● Pays for itself many times over in repair savings
● Easy to understand circuit diagrams
The IBM PC Trouble Shooting & Repair Guide will make even the computer novice feel comfortable with the complex world of electronic trouble shooting. This fully illustrated book is recommended for anyone who uses an IBM PC.
Cat. B \$44.95



COMPUTER PAPER

Quality paper at a low price! 2,000 sheets of 60 gsm bond paper.
Cat. C21003 11 x 9 1/2" \$39.95
Cat. C21005 15 x 11" \$67.95



SENDATA DIRECT CONNECT MODEM

● CCITT V21 300 baud full duplex
● CCITT V23 1200/75
● Bell 103 300 Full duplex
● Bell 202 1200 Half duplex
● Auto answer, auto disconnect
● LED display for Power, Tx, Rx, CD
● AC power adaptor included
● DB25 pin connector
● Telecom Approval N° C83/37/1045
Cat. X19120 \$295
(SOFTWARE FOR VIATEL ... \$95)



Rod Irving Electronics

48 A Beckett St, MELBOURNE
Phone (03) 663 6151
425 High St, NORTHCOLE
Phone (03) 489 8866
Mail Order and Correspondence:
P.O. Box 620, CLAYTON 3168
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008 335757 (TOLL FREE)
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(03) 543 7877

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\$25	\$49.99	\$4.00
\$50	\$99.99	\$5.00
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\$200	\$499.99	\$10.00
\$500 plus		\$12.50

The above postage rates are for basic postage only. Road Freight, bulky and fragile items will be charged at different rates.

All sales tax exempt orders and wholesale inquiries to:
RITRONICS WHOLESALE,
56 Renver Rd, Clayton,
(03) 543 2166 (3 lines)

Errors and omissions excepted

*Apple and IBM are registered trade names



When you're up to your neck in software revisions...

SOFTWARE REVISION MANAGEMENT SYSTEM (VERSION 3.0)

\$399

MAJOR FEATURES

Every version of a program (module) is stored within a single ASCII file in the currently defined SRMS Library. Any source that is common to different versions of the program is not duplicated and all versions of the program are totally accessible to the user.

Support for any type of source file, including **FORTRAN**, **BASIC**, **COBOL**, **PASCAL**, **C** and **ASSEMBLY LANGUAGE** is provided.

SRMS can be used in interactive OR batch environments. All modules in a **SRMS** Library are stored

WRITE PROTECTED to prevent against accidental deletion or overwriting. Each version of a module in the library is assigned a Version identification String. This string provides information as to the Release, Version and the Date/Time this version was created. This information is added automatically by **SRMS** when a module is inserted into the library and updated when new delta's are applied to the library. The user can specify any number of comments to be associated with each version to aid in the documentation process. These comments become a permanent part of the module history. History (audit) reports can be generated based on major releases, specific release/version combinations, date/time of delta's or all history records providing invaluable project management tools. Any version of a program can be restored easily and quickly, in its entirety, with a single command. **SRMS** allows you to continue to use your current editors, compilers, linkers, etc.

THE PROBLEM

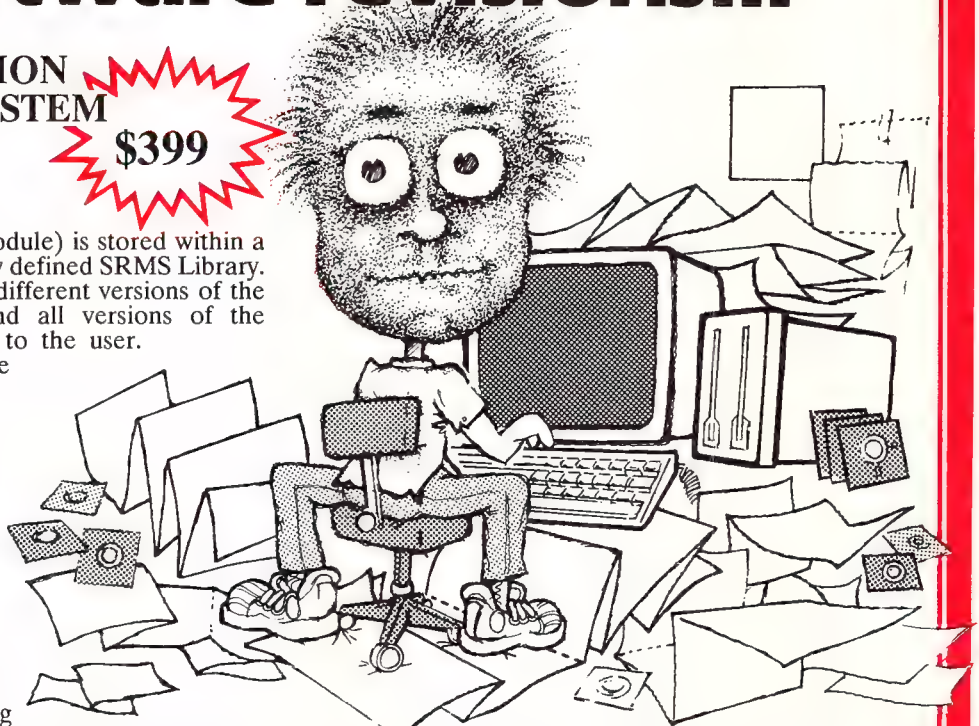
During the development cycle of a computer program, or series of programs, many changes are made to the source code. Additions, deletions, and corrections all constitute a significant investment in time on the developers part.

Traditional methods for managing these changes are cumbersome, and in fact, present their own problems. The physical storage space required to store every version of a program quickly becomes prohibitive. All changes made to a program may not be recorded and documented.

Changes made to one particular version of a program may not be carried over into other versions.

It quickly becomes difficult to keep track of what changed, when it changed, and why it changed.

Documentation describing changes made to the source code is difficult to maintain, and may not exist at all.



Several programmers working on the same project may make conflicting changes to the same program without knowing it.

These problems compound themselves if multiple versions of a system need to be supported. The manual bookkeeping methods needed to keep track of all versions of all modules belonging to Beta, Production, and Test releases of a system quickly become impractical.

The **Software Revision Management System (SRMS)** is a set of integrated utilities specifically aimed at solving these problems. All source code associated with a particular system is kept in a single DOS subdirectory. This subdirectory becomes the **SRMS** library, with each source program constituting a module in that library. Each version of the source constitutes a new version for that module in the library, with the number of versions in a particular library module corresponding to the number of revisions made to the source since its creation.

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The Future

*Marlie de Swart,
of California based Software Publishing
Corporation, gives us the view from
Silicon Valley, California . . .*

OBSERVERS SAY THAT the pace in Silicon Valley is as fast as it gets. Here at Software Publishing we realign our budgets monthly and our marketing strategies sometimes daily, products are created in 18-month cycles and new versions are sent out the door several times within that cycle.

What's driving this frenetic pace? The PC industry is uniquely computerised, almost futuristic in its employment of its own sophisticated data and communications systems. However, the rapid changes in technology and the ever-changing needs of our customers are what have made the PC market so dynamic over a short 10 year period.

After its first exponential growth, the PC market in the US experienced years of 'shakeout' and has finally matured to a highly competitive market driven by a few major US companies. Some Australian companies have created successful niches in this market, but compared to the overall US picture, they constitute a very small piece of the American pie. Americans love Aussie movies and seltzer water and those new 'outback' fashions, but less trendy corporate software purchasers tend to buy from seasoned PC companies — no less than IBM.

PC technology has evolved quickly from the original 64K standard to the new 80386 hardware and IBM Personal System/2. For many years, software development actually lead the hardware, pushing for expanded memory capabilities and increased performance. With the new IBM announcement, hardware technology has taken the lead again. Now the successful software companies will be those that quickly and effectively exploit the 80386 capabilities, OS/2 operations system and other new technologies.

In the early PC history, software products were divided strictly between the power and ease of use camps. The majority of computer work was specialised and very much production-oriented. For instance, the main computer users were secretaries, data entry clerks, accountants and researchers, small business people who couldn't afford a staff of specialised data or word processing experts yet wanted to become computerised, turned to easy to use products like PFS.

In just one or two years these computer novices became much more adept and found broader or more specialised uses for their personal computers. At the same time, middle managers in big business and other professionals began to use PCs themselves, not as workhorse computer stations to conduct the majority of their business, but as productivity and communications tools to complement their busy schedules.



Emphasis On Communications

These new users didn't need the pure power products but needed a unique new software combination that was full-featured yet intuitively-designed. The production emphasis had changed to an emphasis on communications, opening up new markets for products that supplied reports, memos, graphic presentations, electronic mail and now desktop publishing.

The second wave of PC purchases in the US therefore was due to a shift from the one-computer office (operated by the power user) to a multi-computer work group. In today's work groups, users trade budget information, data and memos more efficiently because more workers have access to PCs.

While products like Lotus 1-2-3 are still the standard, new more intuitive products like the PFS: Professional series allow users to become productive quickly and still trade data files with the power users in their work group.

For today's office, the software and hardware emphasis is on integration and connectivity. Many offices are converting to local area networks, truly the wave of the future.

For the immediate future, the standard PC system is quickly growing to 640K, or 2 Mbyte of memory, a colour monitor and graphics, and there is increasing access to laser printers. In addition, users are beginning to expect that the software they use be both powerful and intuitive to learn and use, with the new, advanced hardware systems becoming available. There will be more emphasis on the graphic look of a program not to mention the unlimited potential for speed, performance and completely new applications.

The PC has changed the office environment and virtually the entire nature of business and how it is conducted in the US. It hasn't replaced jobs, but business operations and organisation have changed. Communications technologies are the key to the office environment of the future. It is not an uncomfortable environment, with the right tools, information is immediately accessible and communications more accurate. PCs are making today's business decision more fast-paced and more competitive not just among PC and software manufacturers. □

Looking in the Right Direction

It seems that the computer industry is still set to boom for the next few years (at least), even though it has slowed down from the leaps and bounds that have been fitting the headlines for the past 10 years. To help give us a clearer view of what the future holds, we asked six very active members of the industry to give us their views . . .

THOSE WE spoke to were Lynn McDonough, Managing Director of PC Extras; Doug Ruttan, General Manager of Sourceware; Bob Mounic, Executive Director of the Australian Information Industry Association; Jonette Wilton Marketing Manager for Porchester Computers; Jodee Rich, Managing Director of Imagineering; and Peter Sandys, National Marketing Manager, Apple Computers.

Without exception, they thought that the industry must select its goals carefully in the next few years, and look at specialising in niche markets, rather than trying to take on the well-established and broadly based overseas companies. They are experienced competitors and generally armed with massive financial resources, courtesy of their huge domestic markets.

Another point that was mentioned by almost everyone was that the boom days of spreadsheets, wordprocessors and integrated packages — software that everyone with a computer must have to feel 'self-sufficient' — are over; suppliers of those products don't expect the total market to grow much faster than the sales of new PCs.

Our own domestic market is a relatively small one and it's very competitive — in fact, ours is probably the most competitive computer market in the world. As a result, Australian companies have had to grow up quickly, or sink — and only those headed in the right direction are going to survive.

Ahead of Their Time

In 1981, Jodee Rich saw that there was a real need to start a company to write software — We decided that we'd start our company when we had our first customer. That customer was Merchant Banking for which we wrote a financial package for personal computers. At the time we thought we were way ahead of the competition, as no one had been paying much attention to microcomputers.

The only hindrance is from the Australian attitude to local software, but it's getting better.

We found we were about two years ahead of the trend that the Apple range would set, and those two years were hard. Fortunately, in 1983 the IBM PC was released. We were told that someone who had been specialising in the Apple market could not get into the IBM market as that was for the big boys.

In the space of six months Apple, which was about 80 per cent of our business, dropped to 30 per cent, and IBM took the rest, now IBM has dropped to 30 per cent while the rest is taken up by Macintosh, Commodore, and IBM compatible software.

As Rich said, those first years were hard for anyone in the personal computer market. According to Lynn McDonough, *Some of the early computer dealers and the shops that opened then were a bit ahead of their time. They understood what micros could do for people and started to market their ideas very aggressively, but the market wasn't ready at that stage.*

Those entrepreneurs had the right idea, but

most of them are no longer with us — they burnt out. Then you have the more stable ones, the ones who stuck it out, like Rudie Hess who is still one of the most dominant people in the PC industry, or Linda Graham from Microsoft — she has been able to follow and direct the market.

As Doug Ruttan pointed out, you had to grip the market early and hold on. Those who survived and are the most successful today, are the ones who saw that if they got in early enough and established themselves, eventually they would be able to pull in the good products. When the market took off, all the other distributors were penny ante little companies.

Jonette Wilton, an associate editor of PC World before she joined Porchester, found that *When I first went into the industry I thought it was very young and naive, with a lot of shonky dealers; over the last twelve months it has grown up a lot. It had to learn business ethics and business management basics.*

Not only was the industry naive, but it was inefficient. *Up to 12 months ago people were making money despite themselves, because of the phenomenal demand; but I think now that the competition is so great, companies have really got to perform and offer quality products.*

Back in 1982, Doug Ruttan was working for Parity which had decided to take on an IBM dealership; IBM asked them to submit a business plan. Ruttan felt that they should aim for the specialist, high end market.

As Ruttan saw it, *The only distributors around at the time were Imagineering, and Arcom. The Apple was around, so they mostly had Apple products. They had also come from a games background — they were all young kids. Most of them had no real experience selling to business and the IBM machine, because of its cost, was going to be bought by the large business sector — you weren't going to buy an \$8000 PC to take home to your kid and play games.*

Effectively there was a whole range of products that the mainframe people would want. So I said I want to go for those high level products for the IBM only area. *It was like the Mercedes Benz versus the Holden dealer, whereas the Holden dealer might sell 500 units a month and the Mercedes dealer 50, the overall profit was the same.*

Initially we had to do that — we didn't have the financial clout that, say, Imagineering had; we just tried to keep out of their way. *Some people said we were like a little mouse running around under an elephant, trying to keep out of the way of the foot.*

'Are Microcomputers Just a Fad?'

The new market was a young one, and that in itself was a problem — Rich: *The hurdles*

we had at the time were that most people considered that microcomputers were toys, some journalists were still asking 'do you think microcomputers are just a fad' up to about three years ago. That attitude still lingers, and could well be the reason that Australia never capitalised on the market 10 years ago; after all, in the 1950's Australia was one of the most advanced of countries entering the computer age, as several of these we interviewed, remarked.

Bob Mounic thinks the 'naivety' could have been the result of the industry leaving behind business people who could not keep up with the technological changes. In 1978 the industry was growing very rapidly, and the big issues were general ones, like a standard for communications, and the need for readjustment by business and the government to allow the industry to grow. There was a real need to address those issues and many more.

At the beginning, the industry seemed like a young hacker's paradise, where every one spoke computer-ese and outsiders were afraid to ask what it all meant for fear of showing their ignorance.

McDonough saw that change with the appearance of IBM on the personal computer scene. The industry really didn't start to take off in Australia until IBM began marketing their PCs. I think that the Australian market benefited from being behind the US — we didn't get the problems that the Americans had with the first PCs that were sold over there.

In 1985 I spoke with Bill MacRay, the editor of PC World in the US. Before he came out here, he had the opinion that the Australians were behind — he was floored by the market knowledge Australians had, and how aware they were of the software packages that were coming out. He said the industry here was only one plane load of passengers behind the US.

When I speak to Australian business associates, I think they are more aware than the US people I have spoken with. The reason is that products, when they arrive here, are more expensive and we have to choose the best packages carefully. We have 20 per cent sales tax on hardware and software from any foreign country and, although, the packages have taken off in the US, here the market is a bit more selective and an average package wouldn't survive the scrutiny.

But, many industry 'gurus' think that we are behind and that's not really such a bad thing since it isolates us from the mistakes. However, Wilton feels this means we have no way of competing with overseas companies, since we are out of touch.

The overseas markets are much closer to the technology and it's six months later by the time it



gets here. They have been in the industry just that much longer and have the money behind them to market effectively.

Doorway to Asia

Although we are geographically and financially isolated from the US and Europe, our position is still fortuitous since we are a doorway to and from Asia with regard to new technology. As McDonough believes, we have gained from being close to places like Taiwan because those countries have had a tend-

tunities for us if we do the right thing. We must market ourselves better; but it will not only be in the hands of individual companies, it will also depend on to what extent the environment in Australia is conducive to competition. There are also other countries in the region such as New Zealand and Singapore, that want to be competitive in the Pacific Basin.

We are in an excellent position to sift through the technology and keep only the best. We are collecting both ways, according to McDonough; we are like a doorway between the US and Asia, and that gives us a bigger range to select from.

At the moment we rely very much on the Asians for components and we buy a lot from them but we need to have a flow of exports to Asia from here. Wilton: We have to look at the Asian market for a fair percentage of our components. And, because the Americans offer stiff and established competition in their own market, the Asians are looking at us as an alternative.

The bad news, according to Wilton, is that The Asians have got their, and our, market sown up for the next ten years. Taiwan and Korea can produce a quality product very quickly and cheaply — we don't have the economic structure to compete against that at the moment.

Many overseas companies entering the local market are surprised to find that it's not as big as they assume. As McDonough relates, many of the American companies look at a map of Australia and think that we are almost on par with the US market. In fact, we are probably only 2 per cent of the American market.

When I speak to American companies, they think the market here is huge — the land mass is the same size as the US, therefore the market must be big.

Robert Carr, the author of Framework, believed that the Australian market was 15 per cent of the US market and that led us into a comparison of the two. For, for example, an ad here costs us \$1000 and gets us a circulation of say 30,000; in

The government should get behind local products and set up a committee to evaluate them and decide which ones should get support — they should invest some risk capital.

ency to use Australia as a testing ground. In doing that, they make the price attractive — this is good for us, as we have affordable and current technology to work with and improve on.

Rich has taken the Asian market itself seriously — a third of his company's turnover came from it last year. Back in 1985, many US companies wouldn't support our move [into the Asian market] because of the piracy problem. We convinced them that by offering proper support, it wouldn't be a threat. Certainly Asia is the place for our marketing skills, while they are the best at manufacturing.

Mounic agrees, believing that there is significant potential as the South East Asian region develops; there will be more and more oppor-

Australian companies have had to grow up quickly, or sink — and only those headed in the right direction are going to survive.

the States, the ad would cost \$6000 and reach an audience of 300,000. This shows clearly the difference in scale between the markets and the difference you have to have in your perception of products and marketing when you go between the two.

While many companies gladly volunteer the fact they are 'wholly Australian owned,' there is usually a shocked expression when they're asked how many of their products are Australian created and produced. Most companies had no Australian software on the shelf two years ago, but since then the local content has risen — one large distributor estimates that now, 30 per cent of their sales are based on Australian products.

Rich paints a similar picture: *About 20 per cent of our turnover now is Australian products, whereas two years ago it was probably nothing. It is good to see more Australian products and there are some very good developments around the corner. We haven't found a prejudice against Australian products; we find that people judge the product on how well it does the job.*

Mounic thinks the industry is now in an excellent position to develop, especially in the niche markets: *If you look at certain sectors such as financial banking, we find that our applications and programs are as advanced as anyone's. He attributes that example, indirectly, to our sparse population and large size — it gave us an integrated, national banking system.*

And, on the software services side, we have got some very interesting companies developing local and even overseas markets for themselves — such companies as Computer Power, Computations and BBJ. Many of them are capitalising on the development of the market by overseas companies and using that as an opportunity rather than a handicap. I think more should take their lead.

But most Australian companies trying to market their products here soon come up against the 'Aussie cringe.' As McDonough put it: *The Australian market is so skeptical about Australian software; they have a tendency to buy overseas software — because it comes from overseas they think it comes from a big company which has a lot of money behind it and a lot of people worked on the package, so it must be good. That is just not necessarily so.*

You'll find that some products being sold as American as apple pie, are really local products which have been exported and re-imported simply so they'll sell better.

I hope this attitude will change. There are so many regulations, even government regulations which hamper people who are developing software. Like the sales tax, which has still not been fully defined for developers. There is just not enough incentive for them.

Government Assistance

Is government assistance the answer and if it is, what form should it take? The government with its offsets policy is trying to help, says Rich. I think it is up to the government to create a better environment though, to allow companies to perform to their potential. We have got to create a better tax environment or loose companies which move overseas.

There will be an increase in networking boards as companies reach for compatibility between their 5¼ and 3½ inch machines. Noting changes like these means we can move with the flow.

Ruttan: There is no real help or hindrance on the part of the government when we start exporting a product like The Magician. The only hindrance is from the Australian attitude to local software, but it's getting better.

Wilton believes that the government, through its policies, is forcing the industry to invest more in research and development. But that's an unco-ordinated and piecemeal approach that's more likely to result in new versions of the wheel than any technological breakthroughs. *We have had in the past, a shortage of private research and development, Mounic believes, and a lot of government r&d, but that expenditure hasn't shown itself in the form of products. I think the new r&d incentives show every sign of correcting that — the government's intention is to help and in the last three years they have been helping.*

The government is a very real part of the economy — it's our largest employer and the largest customer. McDonough thinks this cloud should be put to bat for local

products — *Although the government encourages us to buy Australian, it doesn't support this policy itself. The government, at almost every level, is the biggest offender in buying overseas products in preference to local ones.*

The government should get behind local products and set up a committee to evaluate them and decide which ones should get support — they should invest some risk capital: it will probably pay off. Basically the government should take a more active role.

Maybe we should follow the Japanese model, suggests Ruttan, who thinks that the way their government co-ordinates the industry, has many lessons for us. As he said: *The governing over there is not not socialist, just entrepreneurial.*

Room to Grow

While the real boom might be over over the computer industry, there's still plenty of room to grow. Rich feels the PC market is still growing, at around 20 per cent per year. *As PCs come down in price, more people will be attracted to them and the software that can be run on them. The hardware has reached the stage where some users don't really need to update, but they can update the software for their changing needs. Although at the high end, the specialist level, they are still updating their hardware and I think this trend will continue.*

The market has changed so that there are less opportunities, for example, to sell memory boards with the introduction of the new IBM range. However, there will be an increase in networking boards as companies reach for compatibility between their 5¼ and 3½ inch machines. Noting changes like these means we can move with the flow.

Most of the industry feels it is consolidating after years of headline profits and crashes. As Mounic put it, *the individual parts of it are re-examining their strategies. An industry that has grown as fast as this one has to take time for readjustment.*

I expect to see some very interesting developments in both software and hardware — however hardware development is hindered because we don't have a very strong electronics industry to begin with. If you look at our manufacturing industry as a whole, our exports of manufactured goods are very low compared to most OECD countries.

As far as McDonough sees it, *the industry, certainly the distributors, have stabilised over the last two or three years. It's still a growth industry. And that's good — the more hardware out there, the more software people are going to buy, but I think they are going to be much more discerning about that software.*

Software has to become more friendly. Why

The Right Direction

The future is with software which will make better use of the hardware we already have.

All the major, broad-based areas of software have been covered. The winners are going to be the 'specific' software, for instance, desktop publishing which is a limited market, but it's still a big one; or specialised software for the legal or engineering markets — that's where the growth is going to be. The future is with software which will make better use of the hardware we already have.

We have to continue to look at the niche markets — we can do very well there as such companies as FBN and Typequick have shown. I still get people coming up to me with a new wordprocessing package they've developed — we don't need another word processor; we need a product that starts with a wordprocessor and then does something new.

Sandys is optimistic about the future as long as we can continue to be innovative. I think the market has been stabilising for the last two years. And now is the time to look to the future and find an innovative approach. We cannot compete against high volume, low-cost Asian parts or machines, but we have the expertise here to come up with ideas.

make people climb up a wall and over a barbed wire fence to operate their computer? In fact, an operating system, written by Australians, is set to be released and it's unbelievably easy to use — I don't even think the Macintosh is as user friendly. This approach is essential if we are going to win new users, especially those who are scared of computers — it should open up a whole new market.

Optimism is still the keynote, but everyone agrees that the halcyon days of 120 per cent annual growth are over. Ruttan believes the industry is still bounding, but in smaller leaps, because there are no more dBases, or 1-2-3s coming on the market.



It's a Crime

The industry still isn't very well-policed and offers ample opportunity for shady dealers to make their killing. By far the worst offenders are the software pirates — there are hardware pirates too, but it's a lot easier, quicker and cheaper to copy software, and pirates are looking for the easy way to the big bucks. But, they are a danger to everyone in the industry — users, suppliers and developers alike.

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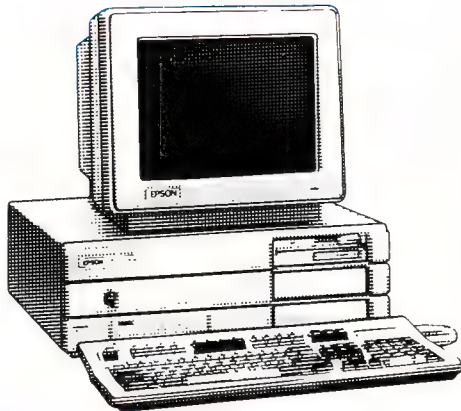
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The Right Direction

*Up to 12 months ago
people were making
money despite themselves,
because of the phenomenal
demand.*

Developers are put in the position of not being able to recover their investment because 24 hours after they've released a product that's taken years to ready for the market, it's being copied in Singapore and sold at half price. And that hardly encourages investment in new ideas and products.

Distributors are unable to offer technical support — how can they afford to when their phones and technicians are tied up with the problems of software that they've never sold and all that legal software they've paid for is still sitting in the warehouse; and though the name, and even the packaging may be the same as the original, pirate software (and hardware) often has its own peculiarities. And the users? Well, you try getting your money back or technical support from some company whose head office is on the eleventh floor of a factory block in the backwaters of Hong Kong — just try.

Keeping piracy under control is especially important in Australia for two reasons. First, because of the damage it will do to our own burgeoning developers. And second, if piracy is unchecked, we will see fewer and fewer of the new products released overseas, released here.

McDonough summed up the attitude of the industry: *Distributors put money behind their products through advertising, marketing, support and training, but 'grey marketeering' is still rife — the pirates use the advertising and support to push the copies they get. They might call it free trade but I don't think it is fair practice to sell something to the public which is not supported. They are cashing in on the work done by others and that hurts everybody.*

Recently, a user wrote to one of our resellers saying that he had bought (from some one else), a software package the reseller was advertising, but it didn't have a registration number. We checked it out and found the manual didn't have any copyright in it, but the program was a perfect replica of a product we were selling. The copy was so good that it was almost indistinguishable from the original.

We took legal action against three or four companies in Australia selling it because, in that instance, we were able to identify them. We usually find out about the pirating from users who ring up

with a problem with the software.

An idea that one of our programmers has come up with is an amnesty, where we will swap the pirated copies of the the package for the real ones for a minimal price. We think that many people are not aware of the fact that they have pirated versions; in fact, even some stores are not aware they have it on their shelves.

I don't think the government has taken the problem seriously enough, although they haven't turn a blind eye. They don't understand the situation and because they don't understand it, nothing is done.

They might call it free trade, but I don't think it's fair practice to sell something to the public which is not supported. They are cashing in on marketing done by other people and that hurts everybody.

Where Are The Skills?

One of the keys to the continuing success of the computer industry is people — skilled, experienced, knowledgeable 'computer people.' But many of those in that category move overseas as soon as they're able, and it's usually the best who go first. That leaves a diminished pool here for the industry to draw on; the smaller that pool, the higher the price they can command for their services, which makes developing new products and servicing the established ones, that much more difficult and expensive.

The problem has dogged the industry from the beginning, and it needs to be addressed, everyone agreed. Inhouse training by individual companies is effective, but that is only a small part of the answer. As Mounic points out, *the companies that are involved in training their staff can only offer company specific training. What we need is a 'community investment' in education and the place to start with that is the educational bodies themselves. This can be achieved by a shift in resources rather than more resources.*

We need to develop computer skills, technical

and consulting skills are a valuable export in themselves. And then we'll need telecommunications skills, because many of the new products are going to be online. And networking skills, and skill at speciality applications, and graphics, and education products . . .

The best place to start is in the schools — Computers in schools not only start readying the younger generation for using the technology they'll face later in life, but it prepares them for manipulating it. Of course the 'technological gap' will still be with us for a while; McDonough: *the young generation that comes from the schools and universities these days, have been brought up with computers and they're second nature, whereas the more sedate companies still have not accepted computers. It's happening, but it's happening slowly.*

Sandys maintains that the only future for an innovative society is to, *make sure that we educate the younger generation to accept and be skilled in using computers, so we can be part of future developments and contribute to new ideas.*

The Future

The future lies with the capabilities we start developing today; and those abilities will best be developed by using those resources we already have. As McDonough expressed it, *we have to capitalise on our intelligence to make up for our size.*

Mounic makes the point that, *the industry is very young, it's vibrant and it's still finding its way. It's very much like a strong, growing teenager, still developing, and who knows what the adult will be like?*

After her years in computer journalism and now on the business side of the industry, Wilton feels that buyers and marketers are both maturing — *The average buyer has become wiser about what he has to buy, and more knowledgeable about the industry and its offerings. He is looking more for a quality item with real value; twelve months ago he just wanted the cheapest price, but today he wants value.*

Past successes have generally been based on keeping up with the technology that is already there and recognising its importance. And timeliness is a large part of any successful undertaking; as Ruttan expressed it, *choosing the right software at the right time is very important; choosing a software package to develop or sell is like choosing a pop band to get behind — you have to be where the action is in the first place, grab them when they are young and still developing, and hope that they have a hit record.*

The Future — it's there, and it seems we're heading for a successful one; all it needs is application(s)! □

YOUR COMPUTER'S ANNUAL READER SURVEY

FIRST

Help make *Your Computer*, your magazine — We are currently planning our Features for the next twelve months and we would like to know what you want to see in the magazine, and more about what type of 'computer person' you are. Please fill in the questionnaire and return it to the address below (it won't even cost you a stamp). In our October issue we'll publish the results of the survey and tell about the Features we've got planned (what is the 'average' YC reader like?).

1) What are the features you look for in a computer magazine? (Please number your responses in order of preference, starting with 1.)

- Applications stories
- Software for Home use
- Hardware for Home use
- Business Software
- Business Hardware
- Comparative Reviews
- User Reports
- New Product Releases
- Tips from Other Users
- Programming Hints
- Business News
- Computer News
- Overseas News
- Other — _____

2) What type of software would you like to know more about? (Please number your responses in order of preference, starting with 1.)

- Accountancy
- Communications
- Databases
- Desktop Publishing
- General Business
- Graphics
- Music
- Networking
- Programming Languages
- Spreadsheets
- Wordprocessors
- Other — _____

3) Choosing from the list in Question 2, what two types of software do you most often use at home?

- 1) _____
- 2) _____

4) Again choosing from the list in Question 2, what two types of software do you most often use at work?

- 1) _____
- 2) _____

5) What are you primarily interested in reading about computers for (please tick one) —

- Home use
- Business use
- Both

6) Please tick the type of programming are you most interested in?

- Basic
- C
- Turbo-Pascal
- dBase
- DOS
- Assembly Language
- Other — _____

7) If you own a personal computer, what type is it?

- Apple IIc/e
- BBC
- Commodore C64/128
- IBM PC-AT/Compatible
- IBM PC/XT/Compatible
- Macintosh
- Microbee
- Other — _____

8) What peripherals do you have attached to your computer?

- B/W Monitor
- Colour Monitor
- Printer
- Modem
- External Floppy Drive
- External Hard Disk
- Other — _____

9) What type of hardware would you like to know more about?

- 1) _____
- 2) _____
- 3) _____

10) How long ago did you buy your current computer?

- Less than 12 months
- 12 to 24 months
- More than 24 months

11) If you use a computer at work, what type is it?

- Mainframe
- Minicomputer
- Standalone PC
- Networked PC
- Other — _____

12) What field do you work in?

- Education
- Manufacturing
- Government
- Banking/Financial
- Law/Medicine/Accountancy
- Retail
- Consulting
- Communications
- Other — _____

13) How would you describe your role at work?

- Self-Employed
- Corporate
- Operations
- Marketing
- Administration
- Engineer
- Technician
- Education
- Other — _____

14) What computer magazines do you subscribe to or buy regularly?

- 1) _____
- 2) _____
- 3) _____

15) Of the articles published recently in *Your Computer*, which did you like the most?

- 1) _____
- 2) _____
- 3) _____

16) Of the articles published recently in *Your Computer*, which did you like the least?

- 1) _____
- 2) _____
- 3) _____

THANK YOU for taking the time to answer our questions. If you have any other comments to make about the type of articles and features you'd like to see in *Your Computer*, please include them on a separate sheet of paper.

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Publishers Choice

Walking *the* Hardware *minefield*

Six months ago there was no real desktop publishing on the IBM PC. Now it could take six months to wade through all the possible combinations. Last month Matt Whelan sorted out the software, now he has the answer to the hassle and heartache of hardware selection.

LAST ISSUE WE told you which software to use for desktop publishing on the IBM (PageMaker for type quality and design flexibility, Ventura for long documents, reports, manuals or books) — this issue we cover the hardware choice. Matt Whelan has some definite leanings in this area, but you need a friendly bank manager...

Prepare Yourself

I'm going to say this real fast, so it doesn't hurt. And you'll have to read it just as fast, or you might die of fright. Ready? Here goes: my ideal PC-based desktop publishing setup would cost upwards of \$50,000. Okay, that's it — don't look back. A large number just flashed before our eyes, but we'll now ignore it and go on to look at more practical, affordable solutions.

But not cheap solutions. There is no such thing if you want to do the job properly. I'm assuming you want a certain level of quality or you would have stuck with a word processor and a dot-matrix printer

If you want serious desktop publishing you need:

- 1) A very fast 80286-based (at least) computer,
- 2) An even faster hard disk — faster than is standard on the best AT/clones — or (and?) a several-megabyte RAM disk,
- 3) A high-resolution display — at around double the resolution of the IBM 'Enhanced' Graphics Adaptor,
- 4) A scanner/optical character reader, and
- 5) A high-quality laser printer, preferably one which uses the PostScript page description language.

If you follow this approach and buy a good system, it will hit \$20,000 before you even blink. If you follow it to its logical conclusion and buy the best of everything, \$30,000 won't be enough. But you'll have one hell of a publisher's desktop.

Yes, you can do it cheaper — cutting corners on every item mentioned except the printer will produce much the same finished art result. But life will be harder. So let us describe the ideal approach, and leave it to you to decide where to apply the sharpened pencil.

Start With The Engine

Unless you're 'trying out' desktop publishing on an existing machine, my strongest recommendation is to get hold of the fastest 'engine' you can afford.

Because the IBM has no built-in support for graphics, the processor has to do all the work of redrawing the screen — and doing that for a complex layout on the standard PC can take longer than forever.

Running Ventura Publisher on a standard PC is almost feasible (as long as you turn the picture display off), but it's a long way from being fun. Using PageMaker, running under the CPU-gobbling Windows shell, is painful. A 6 MHz 80286, the original IBM AT standard, is only just fast enough to make these programs useful and productive.



You really want a 10 MHz AT-clone, or something faster — the Compaq 386 is the nicest desktop publishing machine we've used, scoffing at Windows' attempts to strangle it and cruising instantly through PageMaker's sometimes-hesitant menu responses.

If you can't stretch to the Compaq, then you should select from the top machines from our AT performance tests table, like the Earth Computer Systems 286, the ITT Xtra XL, the Video Technology AT, the Osborne AT or the latest President AT.

Even Dick Smith's 10 MHz Multitech 900 didn't make it to the top group of that list because of its standard AT-speed hard disk — I'm using one fitted with a high-speed voice-coil drive to lay out this story, and the improvement is dramatic.

80386 The New Standard?

In the near future machines using the Intel 80386 will be considered the standard input machines for desktop publishing. While many programmers have performed

a remarkably good job of making their desktop programs run on standard personal computers, the truth is that such machines are woefully lacking in power. Even the 80286 machines will shortly start to run out of steam when enhancements to the desktop publishing packages start to flood in.



The power needed to manipulate images and the memory needed to construct a good wysiwyg program are far beyond both the theoretical and practical limits of the standard 8086 and even the 80286.

In the ideal desktop publishing package three essential programs — word processing, graphics and the page make-up itself — would run concurrently with a fourth, a spreadsheet.

Of course, this is totally impossible with the arbitrary 640K limit on existing machines. Indeed, with most of the desktop publishing programs at the moment, it's essential to strip out any memory resident programs before you load them — otherwise the program simply will not run.

We have often been asked why anyone would need an 80 Mbyte hard disk and 4 Mbytes of RAM. High resolution screens and intricate graphics in desktop publishing supply the answer.

Note carefully: we are talking here about the full glory of black and white. We shudder to think how much memory will be needed when colour desktop publish-

ing becomes a reality sometime in the next 12 months — then the term gigabyte will move out of the research laboratory and into the office.

Starting soon we will see the introduction of graphics chips for the IBM like those in the Macintosh, which can carry some of the load.

The two chips which will do this are Intel's 82786 graphics co-processor and the Texas Instruments 32-bit TMS 34010 chip. Current favourite is the TI34010 because it is very versatile and programmable.

However, even their assistance for fast, high-resolution screen display won't alleviate the demand for more processing power — we need to access the extra memory, and at speed, to run our ideal multi-program setup.

Don't Use Square Wheels

Getting hold of a hotrod processor and bogging it down with the 'square wheels' of a slow hard disk is a shameful waste. All these programs spend a lot of time reading from or writing to the disk, and your average cheap-clone AT drive just isn't up to the job.

All of the machines mentioned as our top speedsters above had Miniscribe (or similar) drives with access times of 26 to 28 milliseconds.

It was disk access speed as much as processor speed which put them at the top of the table. Witness the Multitech example: fitted with a standard drive, it was an also-ran (among the super-quickies at least); fitted with the fast drive it is a front runner.

Watch out when you go to buy any of these machines, for the fast drives are often not standard equipment. If the sup-

plier doesn't provide a high-speed drive option (most, like those listed above, will) then buy a floppy-only model and add the hard disk yourself.

We've had nothing but good experiences with Miniscribe's 6800 series drives, but there are others (some even faster, getting down to 18 milliseconds) around. Look for names like Fujitsu, Micropolis, Priam, NEC and others — and check the specification sheets.

All of these people make exceptionally fast drives, but they also make ordinary ones. It is not only the name that counts, but what's in the packet as well.

Incidentally, hard cards — hard disks which fit into the PC's expansion slots — are convenient, especially for frequent travellers, but they are usually very slow.

RAM disks (add-on memory which is made to look like a disk drive) can do wonders for the speed of your disk-bound desktop publishing. You'll need plenty of 'above-board' style memory as well as a RAM disk. Four or eight megabytes wouldn't go astray, although you can manage with two.

I favour the AST RAMPAGE boards, because they are configurable for the several types of add-on memory standard defined for the PC, but there are several others which will do the job.

The Eyes Have It

Okay, you can run Ventura and Pagemaker on the standard Colour Graphics Adapter — but it looks awful (everything looks awful on the CGA!), and gives you an inaccurate view of your document, and it's plain hard on the eyes ▶



I would strongly recommend the Enhanced Graphics Adapter (EGA) as a minimum standard. Its 640 by 350 resolution is adequate, if not ideal, for desktop publishing. It is attractive with PageMaker, where the use of colour to distinguish the various components of the screen works well, but it's less impressive with Ventura.

Ventura's lack of intermediate view sizes, scrolling and zooming means that proofing your laid-out document is tedious — in a short time you start dreaming of the higher-resolution displays. PageMaker's instant zooming and scrolling, plus the provision of 50 and 75 per cent views, make the EGA (and, if you must, even the CGA) acceptable.

There are many excellent copies of the EGA around, but you can still count on spending between \$600 and \$1000 for one, plus another \$800-plus for the colour monitor.

A cheaper, and very effective, solution is to use the Hercules graphics card. Because it runs with a mono monitor, it will cost you a lot less overall.

Towards A Sharper Image

However, nothing improves intensive desktop publishing (where you have a lot of work to get through, fast) so much as a high quality monitor which can display an A4 page at a time with enough resolution so that all the type is easily readable.

Such monitors are few and far between, cost an awful lot of money, and in many cases are far from satisfactory in other areas.

The high-resolution act is not really together yet, but there are a few workable attempts. And if you are dedicating the machine to desktop publishing they can be your biggest possible advance in and take priority over almost any other feature.

Remember, we are not talking about the spurious fidelity of EGA or even IBM's new VGA standard, which (in DTP at least) have all the clarity and appeal of finger painting. We are talking about resolution which allows desktop publishing to at least approach truth in its motto of 'what you see is what you get.'

Getting hold of a hotrod processor and bogging it down with the 'square wheels' of a slow hard disk is a shameful waste. All these programs spend a lot of time reading from or writing to the disk, and your average cheap-clone AT drive just isn't up to the job.

To get high resolution, you need a stack of memory because the images are bit mapped and each dot takes up a finite amount of memory. The more dots, the more memory required. And you need a higher bandwidth signal to move the information from memory to the monitor.

Monitors work like a television with a raster display which sequentially scans horizontal lines several times a second. The number of times each dot on the screen is updated is called the refresh rate. Higher refresh rates mean less screen flicker.

Four of these new high definition screens are currently available in Australia for the PC: the Viking I, the Wyse WY-700, the Conovision 2800 and the MDS Genius.

I've used each of them for varying amounts of time, and for the moment, I am only prepared to recommend one. Happily, it's the cheapest — the Wyse, which retails at around \$2800 for the card and monitor.

The Wyse is smaller than the others, with its 15 inch tube appearing relatively standard, yet with a resolution of 1280 by 800 using a 69.4 Hz refresh rate, it provides a resolution sharp enough so that you can read 8 point type when a full A4 page is displayed.

It works well with Ventura and PageMaker, even when displaying double-page spreads — the ideal way to work on your layouts. Interestingly, the Wyse monitor is half the price of the Viking and Conovision units, yet it is definitely superior for desktop publishing (although we can make no judgements about other programs).

If there is any one accessory that will improve desktop publishing for you, the Wyse monitor is it.

I dislike the MDS Genius simply because it is a single-page display, the shape of an A4 page — so when you want to work on double-page spreads it shrinks the work area unacceptably. If your work involves laying out single pages, it's worth a look. ▶



Figure 1. The Compaq 386 provides the power (at a price), to run desktop publishing packages fast enough to keep you from dying from boredom. The Conovision 2800 monitor, sitting on top, is a real puzzle — it's both brilliant and unbeatable and yet often painful

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Thai Airways International 747

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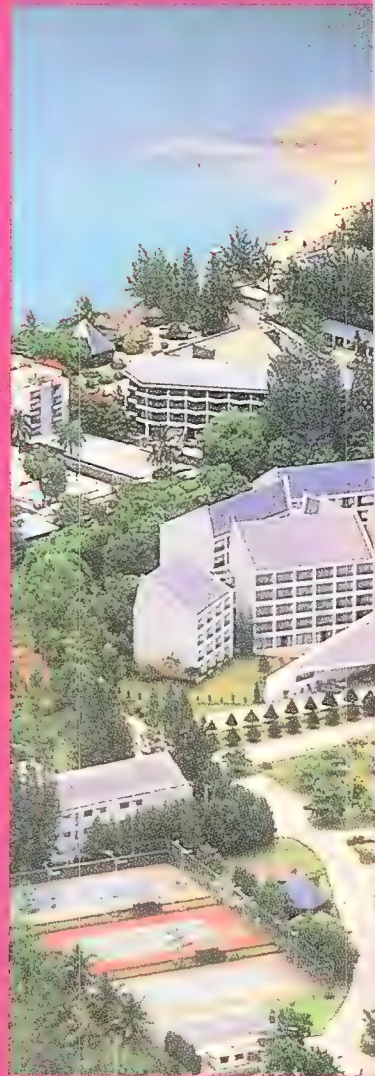
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The Floating Markets



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The Viking and the Conovision are a real puzzle for me. Often they are brilliant, unbeatable; and often they are painful. At the price they need to offer a little more resolution before they'll get my vote.

The Viking I is a 19 inch screen with 1280 by 960 resolution. The Conovision is a similar size but offers 1440 by 720 resolution (we're still waiting to see the 2880 by 1024 version which, I hear, is brilliant — but, I suspect, it is still unfinished even though it has been shown publicly).

Both these units have problems — not dramatic ones, but niggling faults you don't want to know about when you're spending \$6000.

The Viking's DTP screen drivers leave you with a jumpy mouse — it fails to react for a moment, then 'leaps' across the page — and has decidedly inadequate screen fonts in certain views. When it switches back to normal DOS work, without the help of its Windows or GEM drivers, it uses standard type sizes and fills only a small portion in the centre of the display.

This tiny island of type in a sea of screen blackness looks strange — and is definitely off-putting — yet it may be a better solution than Conovision's. When this unit isn't protected by its high-resolution drivers, it defaults to Hercules graphics mode, but fills the screen with what is effectively a 100 percent enlargement of a normal Hercules display. It would be great for teaching young children to read, but the giant type you're faced with in WordStar, for example, is just plain hard on the eyes. Much of this effect comes from the fact you lose *apparent* resolution by doubling the Hercules image — the dots making up each letter get spread further apart, so it starts to look like CGA-style 'grainy' type.

Once into 'DTP mode' I liked the Conovision a lot better than the Viking, although the comparison is perhaps somewhat unfair, as I used one almost exclusively with Ventura, the other with PageMaker, so differences in the GEM and Windows environments may have had an effect.



Figure 2. The Hewlett-Packard Scanlet is a good example of how far scanners have come in the past two years. For desktop publishing the scanner is best for optical character recognition — you do not, however, get a publishable result yet from scanning photographs.

The Wyse certainly seems to be the best compromise, and at the price has to be the best value for money. Yet even it is not perfect. There is a certain lack of thought in its Windows and Gem drivers in that the non-varying components (such as menu bars, tool boxes and so on) are retained at the original 'relative size'.

That is, something 10 pixels wide on a 300 by 200 screen stays 10 pixels wide on the Wyse, so it appears to be much smaller. Menu bar selections that fill the width of the screen on an EGA are scrunched up in the left corner on the Wyse, and it promotes the feeling that everything is tiny.

At least the Conovision provides its own 'system' fonts in its drivers, so menu bars, file lists and so on are equivalent in physical size to those on lesser screens, and thus show at a much higher resolution.

You Scan Do It

Little more than six months ago I thought the image scanners being introduced to desktop publishing were a complete waste of time. Now I consider them one of the

great revolutions of microcomputing, one of the must-have accessories for any system. I do not recommend scanners for their image scanning. It is their OCR (Optical Character Recognition) capabilities which make them invaluable. You can take typewritten manuscripts, feed them into these devices, and very quickly end up with an (editable) ASCII text file on your disk ready for dropping into your DTP layout (or even use the scanner to archive office correspondence).

What we are seeing here is the transfer of what was \$100,000 technology just a year or two ago into an invaluable, affordable (\$3000 to \$7000) desktop accessory.

A year ago one or two of the higher-priced scanners could perform OCR — on one or two typefaces. Now most units read at least 10 or 20 typefaces, some go as high as 30 or 40. Units like the Datacopy can be 'taught' new typefaces, and dot-matrix or proportional-type printing (a no-no for scanners just a few months ago), are quickly falling before the onslaught of this revolutionary technology.

Good scanners we have used (we haven't tried them all) include the HP Scanlet (beautiful, if unfinished, Windows

Publisher's Choice



Figure 3. When buying a printer, go for one with PostScript (the best DTP language at the moment), such as Apple's LaserWriter Plus, which is probably the best choice as it gets the first support in terms of machine specific drivers.

software with conversion to several formats); the Canon (tedious in the image editing area, good OCR, and great value for money); the DEST PC Scan Plus (a leader in OCR technology, now with image scanning added); and, of course, the Advanced Vision Research (AVR) flatbed scanner/memory buffer combination.

Image scanning is a different story. Diagrams and line-art work well, but no matter how much the manufacturers talk about dithering and grey-scales, you cannot (repat *not*) get a publishable result from a photograph.

Having said that, what we mean by publishable is something we could put into a national magazine like YC and expect our readers not to notice. Yes, scanned half-tones (photographs) could be used in Trade-A-Coat style classified ad publications, internal newsletters or even hardware catalogues.

But you cannot get real half-tones from a laser printer, only a 'sort-of' simulation. And it is silly to fall into the trap of trying to do everything on the PC anyway — use low-resolution scans to show the printer positioning and sizing, and attach the originals to the page for him to insert in the traditional manner.

Full-resolution (300 dots per inch) image scans are just too hard to handle.

Remember, a 300 dpi image of an A4 page adds up to more than a megabyte of disk file — that slows your layout efforts dramatically, and increases printing time

More than six months ago I thought the image scanners being introduced to desktop publishing were a complete waste of time. Now I consider them one of the great revolutions of microcomputing, one of the must-have accessories for any system.

to unacceptable levels, especially on PostScript printers.

If you have to do a lot of scanning, then make sure you get something designed to

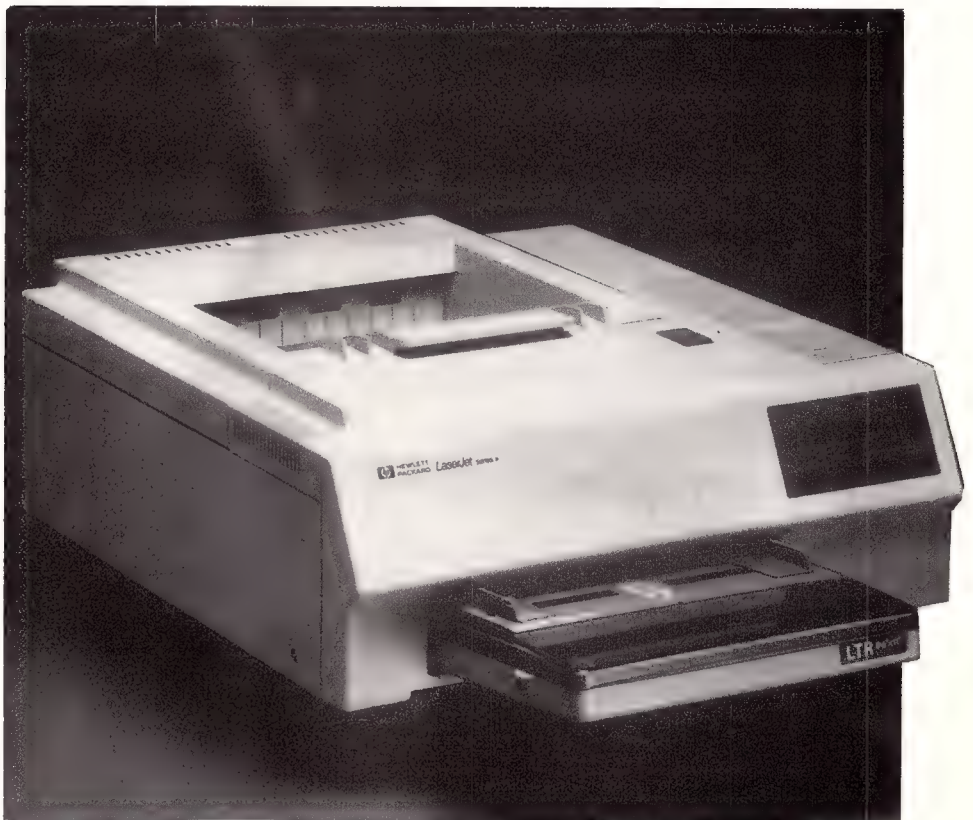


Figure 4. The Hewlett-Packard LaserJet Series II is neater, smaller and lighter than earlier Canon engine printers, and produces real blacks instead of dark greys. But, it is limited until HP come out with their DDL language (similar to PostScript) or release PostScript controller boards.

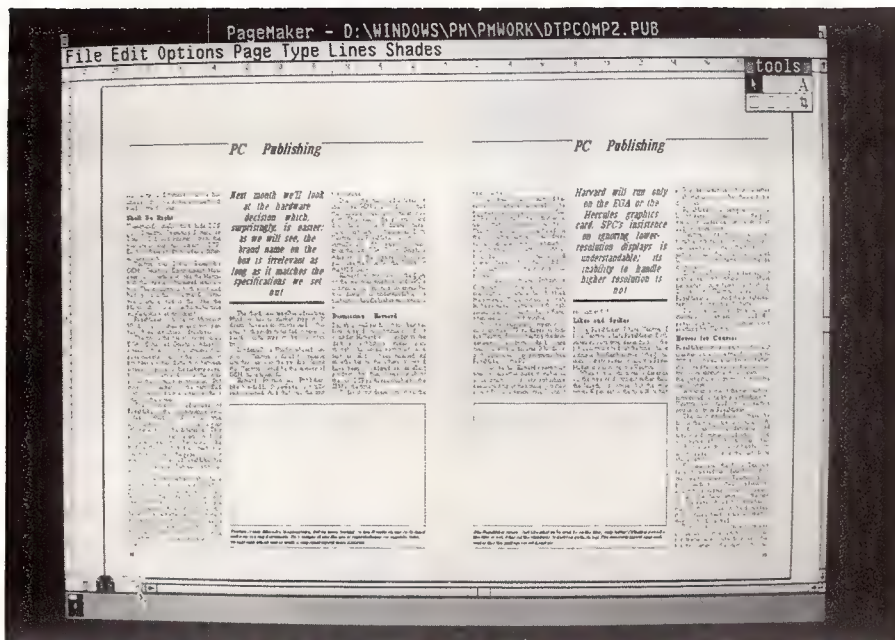


Figure 5. The Conovision 19 inch screen offers 1440 x 720 resolution, and as you can see it provides for double page spreads for desktop publishing. It provides its own 'system' fonts in its drivers, so menu bars, file lists and so on are equivalent in physical size to those on lesser screens which means they show at a higher resolution.

get around these problems: specifically, President's AVR Megabuffer system as described last issue. It handles this area better than anything we've ever seen, anywhere, interfaces directly with Ventura, doubles as a facsimile machine, and more.

Last And Foremost

Take all the shortcuts you like, but if you go cheap on the printer everything else is wasted. You must buy at least a Laserjet Plus, and even that is not yet up to what I consider true desktop publishing.

Far better is the decision to buy a PostScript printer, whether it be the Apple LaserWriter Plus (perhaps the best choice because it's the market leader and thus gets the first support in terms of machine-specific drivers), the TI Omnilasers (we'd love to tell you whether they work or not, but TI keeps selling them faster than it can get hold of them and we're still waiting to see one), or the Dataproducts LZR 2665 (a 28-page-a-minute A3 printer, it's \$30,000 — but we crave one! Its output is superb).

The freedom and versatility PostScript provides far outweighs its lack of printing speed. Far. Unless your documents are straightforward with little variation in type

styles and sizes, it's the only way to get true quality DTP output (as opposed to restricted-design, quality pretty-printing).

There are good reasons to have a Laserjet; the Series II is neater, smaller and lighter, and produces real blacks instead of the dark greys of the earlier Canon engine: because there are so many Laserjets out there it is the first quality printer supported by PC software developers; and it possibly just 'fits in' with your existing office Laserjet collection.

However, if you're buying it for 'real' desktop publishing, then you will be accepting a severe compromise until HP releases its DDL (a page description language similar to PostScript) and/or PostScript controller boards later in the year. These will slot into the PC itself and work with the existing printer to give 'dual-drive' capability (use it as a standard Laserjet Plus for your conventional software, or via the page description language for desktop publishing).

In the meantime, I must recommend PostScript unless a careful analysis of your requirements suggests you can 'get away with' something less. Be warned: everyone I've seen who believed something less would do started asking for the extra features of PostScript within weeks of getting started on their DTP projects.

As in all PC applications, there is a 'horses for courses' consideration; but even more so than usual, desktop publishing is one of those seductive applications which tempts you to go further and further than you ever thought you would. □

Suggested Combinations

Cheap And Nasty:

System: A PC clone, bubblegum software, and a dot-matrix printer.

Price: \$ 1,500 to 2,500

Uses: Fete flyers, junior school, Bridge Club, and Scout/Guide group newsletters.

Basic:

System: Turbo XT clone, PageMaker or Ventura, Laserjet Plus.

Price: Around \$12,000, depending on your shopping skills.

Uses: Corporate newsletters, reports and presentations. Newsletters that were previously produced by word processor and daisy wheel or laser.

Advanced:

System: 10 MHz AT clone, fast hard disk, scanner, Wyse WY-700, Apple LaserWriter Plus, PageMaker and Ventura.

Price: \$22,000 to \$28,000

Uses: Just about anything short of top-quality magazines.

Whelan's Wish

System: Compaq 386 (120 Mbyte drive version), about 10 Mbytes of memory, Apple Macintosh (to generate graphics with leading-edge programs like Cricket Draw and Adobe Illustrator, for transfer to the Compaq), scanner, PageMaker and Ventura, Dataproducts LZR 2665 (for proofing and short-run printing), Linotron 100 PostScript typesetter (or the 300 if the bank manager can be conned).

Price: If you have to ask . . . (try \$150,000)

Uses: Printing diskette labels, party invitations, Whelan household stationery, and, perhaps, typesetting Vogue or anything else you care to name. □

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NEC P6 PRINTER
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NEC P7 PRINTER
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PRINTERS — PART 3

— Daisy wheels and plotters

TO HELP YOU understand printers and the sales talk you'll hear when shopping, we've looked at a variety of printers — dot matrix, ink jet, and thermals in our May issue, lasers in June, and now daisy wheels and plotters. We've chosen particular machines simply to demonstrate the range of features that's available in different price categories, and the suitability of the different types of machines for different types of work. We haven't done your shopping for you, but we've tried to make it easier.

Daisy Wheel Printers

Daisy wheels are dead, long live the lasers, could very well be the catchcry of the printer industry at the moment, although daisy wheel printers are still holding on after being the leaders of the printer industry for close to ten years. Lasers and dot matrix printers are making inroads to the daisy market because of their letter quality print, but daisies are surviving by offering much less expensive letter quality printing than the lasers can and better quality than dot matrix machines.

The key factor which is keeping the daisy wheel alive is the simplicity of the mechanism — a daisy wheel printer has less parts to go wrong and is assembled with a minimum of cost.

The marks against the daisy wheel are that it is slow compared to the competition, too noisy (in most cases), and that colour printing is limited and graphics generally is not supported. These printers are really only useful for text, and because there is usually only one type face on a wheel at a time, there is no chance to mix fonts and sizes.

Dot matrix printers in general are getting nearer the letter quality of the daisy wheels; with the introduction of 32-pin head printers, the quality has become almost indistinguishable. This could well be the death knell for daisies.

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Survey figures gathered by Compass Research on last year's market performances, showed that the daisy wheel printer market had shrunk from 8 per cent of the total printer market in January 1986, to 1.7 per cent in January 1987.

The top five performers in the daisy wheel market last year were the NEC 3500 (35 per cent share), Brother HR20 (15 per cent), NEC Elf and NEC 8800 (11 per cent each), and Brother HR35 (9 per cent). The other 20 per cent was taken by a wide variety of machines from a number of manufacturers.

The operation of the daisy wheel printer centres around a hammer in the head of the printer which strikes a revolving wheel that has the characters on it. This wheel is comprised of a series of spokes, like those on a bike wheel, with a character at the end of each spoke.

How does the printer know which spoke to hit? It's easy: you tell it!

There is a wide selection of daisy wheels from a number of manufacturers that provide a range of fonts and styles. Each of these wheels has the characters in a different configuration — when you get a new wheel, the printer needs to be programmed (usually with the control panel), so it knows where to spin the wheel to find a certain character. Each wheel is locked onto the printer in a certain way — if the wheel's were placed on randomly, you'd

never know which key would produce which character.

The wheels take a lot of pounding but are built to take it — Brother's daisy wheels, for example, have an expected life of 10 million characters. Even when they break, it's no calamity as the wheels retail for \$10 to \$40 and are easy to replace.

The Brother HR20

Because daisy wheel printer manufacturers are fighting to retain their market share, they are building in almost every conceivable feature. Brother Industries, of sewing machine and typewriter fame, have been amongst the most innovative — do you want a dot matrix printer for fast report printing and a letter quality printer for correspondence? The Twinriter 6 combines both in one printer.

Brother's HR20 is their 'entry level' (read 'least expensive') machine. It's rated at 20 cps (characters per second) — in our test runs it actually produced 10 cps — while matrix printers give 50 cps in NLQ (Near Letter Quality) mode or around 150 cps in draft. Daisies are not meant to be fast; their strength is typewriter quality — true letter quality — printing.

The HR20 features an optional keyboard which plugs into the parallel port at the back of the printer. The keyboard has a parallel port junction box on the connection cable, so the port can still be used for connection to a computer. Although the keyboard is marketed only with the HR20,

Printers

it's compatible with the others in Brother's range.

According to Brother, it's an attempt not to lose the typewriter brigade which has yet to invest in a PC — they'll already have the printer when they're ready to make the move.

Daisy wheel printers are simple machines — a fact that's reflected in their light weight (the HR20 is only 8 kg), and the ease with which they can be set up (remove the bright yellow transportation clamps and tabs, plug it in, and, once the machines configured for your computer, you're ready to start printing).

Brother encase the daisy wheels themselves in a plastic cartridge. Not only does this protect the wheels, but it keeps your hands clean when handling them.

To insert the cartridge, a lever on the right hand side of the printer head is pulled forward to spring the head back. The cartridge even has a finger grip — keep this to the right when inserting and the cartridge slides into place. Most other daisy printers use a locating pin on the wheel that fits into a slot on the printer head mechanism to give consistent set up; the HR20 locates the pin and does a bit of a song and dance to position the wheel automatically.

Replacing the ribbon is a breeze because of the simplicity of the printing mechanism. The ribbon cassette just snaps in and out of its holder.

Under the lid, just behind the control panel, are three switches. The first of these selects striking strength, from low for air-mail stationery, to medium for printing on bond paper with up to three carbons, to hard for up to four copies plus the original.

The next switch toggles between the serial and parallel ports. This might have been better turned into a button on the control panel as you have to open the lid to switch over from serial computer printing to parallel keyboard printing. If both are parallel and you've used the junction box, selection is simply a matter of turning off the keyboard and letting the computer send.

The sensor, the third switch, stops the printer if the lid's lifted so nothing will fall into the printer while it's working.

When the printer is turned on, the head goes through a dance routine — it zips to the left, whirrs, jumps around, clackers a bit, and finishes at a programmable tab placement

Paper insertion is even easier than with



Brother Industries have taken the innovative approach to holding the market for daisy wheel printers — their HR20 model has an optional keyboard which turns the printer into an electronic typewriter. Another model, the Twinriter 6, combines a dot matrix and daisy wheel printer in a single machine.

Answering 'yes' to 'print out of setups?' in program mode on Facit's D2000 gives a list of the 19 options.

a typewriter — start it feeding and push the TOF (top of form) button. TOF is set with dip switches and control codes from the computer. To make it even simpler, the paper bail is automatically pulled back and the paper is positioned for printing.

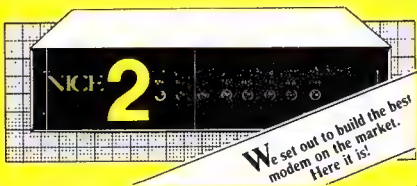
The HR20 comes with a single sheet feeder which has markings for A3, A4 and A5 paper. The HR20 takes paper up to 36 cm wide and prints 117 characters per line in 10 pitch. An optional tractor feeder

is available for continuous work.

There is a colour selection for the HR20 — a two-colour ribbon can be used to highlight words in much the same way that it's done with a typewriter.

The printer is provided with an 8 Kbyte internal memory which is enough to store 'the equivalent of three office letters,' and

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The control panel has the standard set up modes for printing. On the left are two LEDs with the power light on the top and an alarm light underneath. The alarm light warns when the printer is jammed, or when the ribbon reaches the end, and also when the continual feeder is out of paper.

The orange online button stands out next to the LF (line feed) button, the TOF button and a pitch selection button. The LF button doubles as a self test when it is pushed down and the printer turned on. Available pitches are 10, 12 and 15 characters per inch (cpi), and proportional spacing (each character is given space according to its width)

Another useful feature that Brother have included in their range of printers is their own 'copy mode.' This allows printing multiple copies of a document held in the buffer — push the copy button and the printer starts recording, push a second button a number of times and that number of copies will be printed.

The HR20 is about \$1000 (taxed); the keyboard is \$599; wheels, \$38; multistrike ribbons, \$12; correctable ribbons, \$10; fabric ribbons, \$11; and two-colour ribbons, \$10.

The Facit D2000

The D2000 may not be the most elegant printer in the daisy wheel market, but it's a quiet and compact machine. It measures 47 cm wide, 15 high and 31 deep and weighs about 10 kg.

The whole top pivots back to reveal a spacious compartment packed with sound proofing — very effectively, as we found later.

Ribbon installation is easy — the cartridge just slips into place. The rated life of the Facit ribbons is 2 million characters for fabric ribbons, 360,000 for multistrike, and single strike, 115-150,000. Take these figures as a guide when you're trying to decide what type of ribbon to buy for your printer (regardless of the brand), as the prices for ribbons can vary as much as the rated life figures just quoted (not true, in Facit's case, however).

During installation we found (by trying it) that the printer would operate without either the ribbon or the daisy wheel — it hit merrily away with a nary a warning light or error message.

Installing the daisy wheel is straightforward — an up arrow shows which part of the wheel should be at the top, insertion guides align it, and a hook holds it in place. (If the wheel is not positioned properly, it can be broken as the characters fly against the guide arms in the head area.)

When the printer comes online, the head does a modest jump to the left and back to the right. If the cover is opened for any reason, the head section moves to centre so you can have access to the ribbon cartridge and the daisy wheel.

Inserting paper is made easy by the automatic form feed which is operated through the paper bail lever on the right of the printer. Normal position is with the lever at the top; if you pull the lever to the middle and push it like a button, the paper is fed through until the bail can hold it and the printer head moves to the top left of the page; pulling the lever down, releases the paper to be finely adjusted.

Two LEDs on the control panel indicate when the power is on and if an error in operation has occurred. When the printer is bumped or moved while online, the error light comes on and the printer stops. (The job is restarted by pushing the online button twice.)

There are two groups of four buttons each on the control panel — The first group comprises the online button, line feed, form feed and pitch selection. Line feed is continuous if the is button held down for more than one second. The pitch choice is between 10, 12, 15, and proportional spacing.

The second group of buttons is a program and self test section. Pressing the 'program' button instigates a sequence which prints out 'print out of set-ups?' — the 'yes' and 'no' buttons are used to reply. Pressing 'yes,' prints out a list of 19 options (in yes/no question form) ranging from hammer force to paper length to the type of daisy wheel.

Pushing the 'yes' button instead of the program button starts the standard self-test.

You can get out of the 'change set-ups' routine or the self-test anytime by pressing the 'end' button. During the self test, the machine ran out of paper and continued to print on the platten — there didn't appear to be any device to stop it. ▽

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Printers

A catalog of daisy wheels is provided with the printer; it lists a variety of international sets, each available in a range of pitches, point sizes and fonts.

During the D2000's self test we were treated to a peculiar hollow sound. We never pinned down exactly what caused the noise — it may have been a function of the concrete used to fill the platten (that's right — concrete). Whatever it was, the noise attracted a lot of comment.

During printing, certain characters varied in alignment; the underline character, for example, printed irregularly on the medium hammer force setting. On the low setting, however, all characters came out clearly.

The D2000 hammered out a very respectable 17 cps and produced a clean letter quality result — perhaps not as dark and crisp as more expensive printers, but the speed and price more than compensate for that.

The manual provided with the D2000 devoted itself primarily to explaining the control panel and providing technical hints on the ASCII commands which could be sent through to the printer.

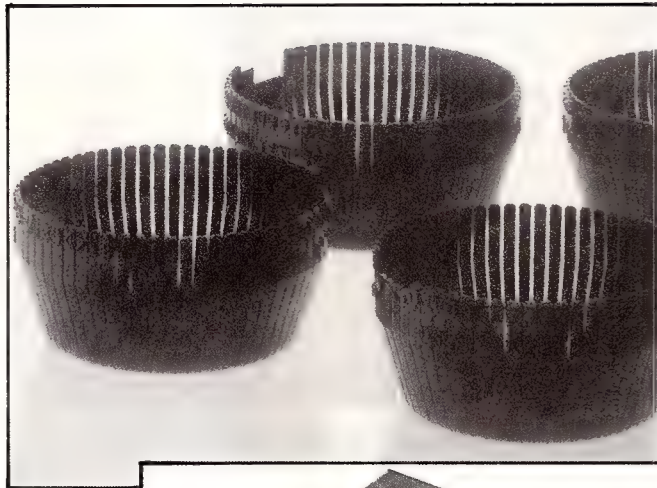
Unfortunately, Facit have taken an uncommon approach to wiring the female serial port. The 19th and 20th pins on most printers are used to tell the computer if it is busy or ready for more data; the D2000 is wired so that busy and ready are both handled by the 19th pin. This most likely means the cable will need to be re-wired, although it may be possible to accomplish the job via the computer.

In all fairness to Facit, there are still a wide range of 'standard' connections for peripherals, many of which are not interchangeable. Be warned — before buying, try the printer with your computer, *especially* if you own one of the less well-known brands.

The Facit D2000 retails around \$1250 (untaxed); wheels are \$40; single strike ribbon, \$10; multi strike, \$12; and fabric \$15.

The NEC Spinwriter 8800

NEC's 8800 is a top line daisy wheel printer. It's rated at 55 cps and gave 42 cps in a fairly easy test — this certainly beats many of the NLQ speeds of matrix printers. The Spinwriter accepts paper up to 40 cm wide.



The NEC Spinwriter series of printers uses a 'thimble' rather than a flat daisy wheel — the thimble carries up to a third more characters.

The Qume Sprint II is a true letter quality printer that works at an impressive 30 characters per second.



Weighing in at almost 18 kg, this is a heavy daisy wheel printer, but, as we found, it needs the weight to keep it from moving across the desk when it's working. And leave plenty of room for it — it's 57 cm wide, 41 deep, and 17 high.

NEC has taken their own approach to the daisy wheel printer technique. Whereas other printers have a flat wheel, or disk, NEC developed a wheel which looks like a thimble — imagine a spinning thimble with the hammer in the center. The advantage is that the thimble can hold up to 30 per cent more characters than the traditional wheel (enough to include two, albeit rather limited, fonts on the one wheel) and it's claimed to be longer lasting.

The disadvantage is that installation of the thimble is a little more involved — A

locking lever is moved to the right and pivots the hammer mechanism to the left. The thimble has a hole in the centre which fits over a vertical pin; a second hole at the bottom of the cup fits over a corresponding hook. Any misalignment or improper seating, and the printer gives unintelligible scraps of letters.

NEC's ribbon cartridge can be flipped over so that both sides can be used; in theory it should last twice as long as the usual once-only typewriter style ribbons.

The 8800 comes online with 'the daisy wheel shuffle,' and a blast from the fan, strong enough to dry your hands on. The fan is noisy enough on its own, but at least it can barely be heard above the 60 db that's produced during printing.

Setting the printer up for your computer is a matter of setting the dip switches on a cartridge (about the same size as a VHS video cassette) to configure it for the com-

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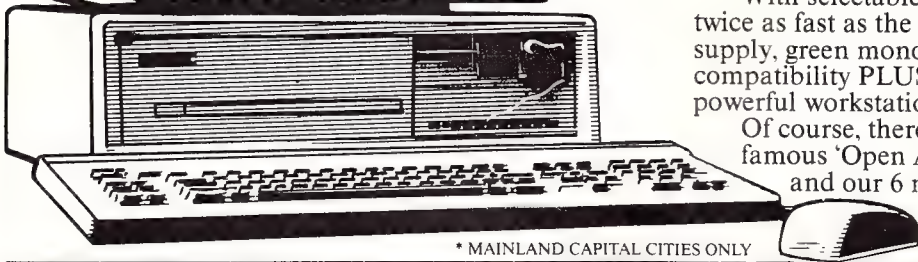
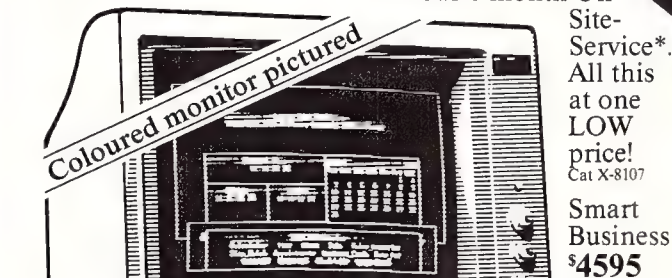
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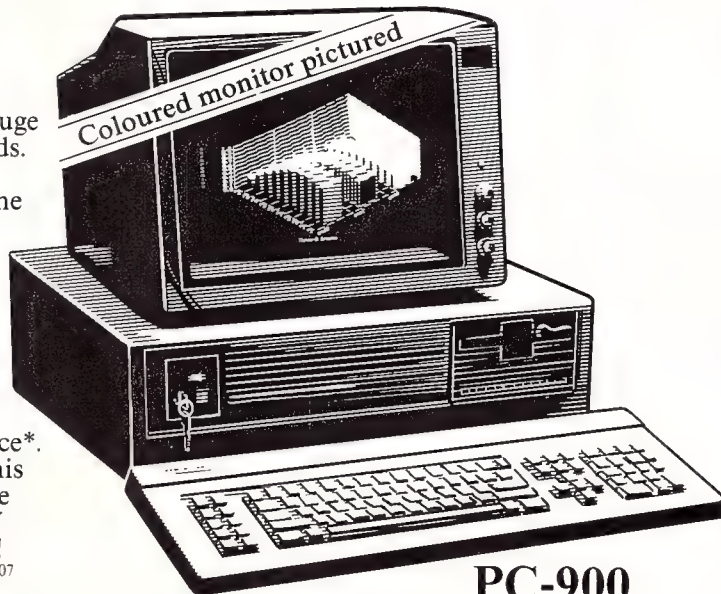
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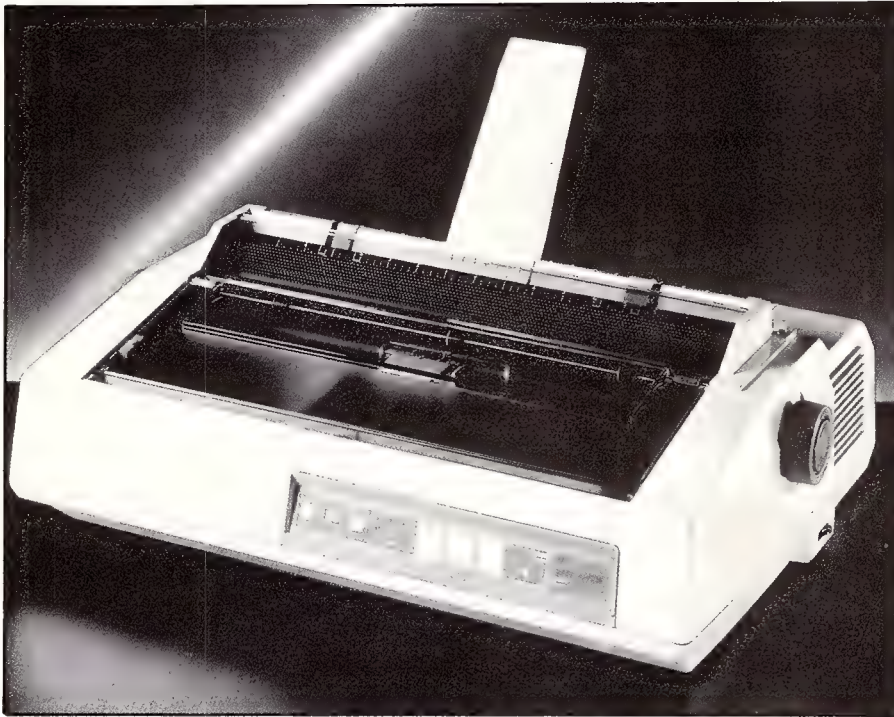
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Printers



The NEC Spinwriter series of printers uses a 'thimble' rather than a flat daisy wheel — the thimble carries up to a third more characters.

puter and slipping it into its slot. There are four different cartridges available: serial with NEC's own command set, serial with Diablo commands, Centronics with NEC commands, and Centronics with IBM commands.

The control panel features touch-sensitive buttons that add their own noise to the printing environment — they give a loud, high-pitched beep every time you make a change.

The line selector is programmable from 1 to 99 lines, to allow form feeding whatever length of paper is being used — the printer defaults to 66 lines, which is A4 size, when it's turned off. The LED display for the line selector also shows cryptic error and warning messages — 'AP' for example, means the cut sheet feeder or guide is waiting for paper (as we discovered on consulting the manual).

Available pitches on the 8800 are 10, 12, and 15 cpi and proportional spacing. But, to make it easy, NEC have built in an auto sensor that sets the proper pitch for the thimble being used regardless of what the printer is set to.

If the form feed button is held down while the printer is turned on, a self test prints out the classic 'The quick brown fox...' continuously. On our machine, the self test didn't when the serial cartridge was installed, but ran quite happily with the parallel cartridge.

There is a pause/online select button which halts printing in the middle of a file without affecting any of the other operations. It's also used to restart printing if the cover is opened or the ribbon or paper run out.

The NEC Spinwriter 8800 retails around \$2900 (taxed); thimbles are \$18; black fabric, multistrike and red-and-black fabric ribbons all sell for about \$13 each.

The Qume Sprint II Plus

Qume have been in the daisy wheel market from the beginning and they've well-developed Sprint II series shows it.

These are big printers: they measure 61 cm wide, 17 high, and 37 deep. A look inside revealed why the Qume weighs some 17 kg - the chassis is made of metal plates and there are large motors to drive the printing wheel, and the platten, and to

move the head across the page. The weight helps make the Qume a sturdy printer which isn't going to jump around during long runs, but you wouldn't want to move it too often.

The outside is a moulded plastic case with vent holes situated on the sides to cool those big motors. Rather than a lid, Qume have provided a sliding top panel which can be removed completely for working on the printer.

When the daisy wheel motor is pivoted back, the small, plastic Qume daisy wheel slips over a hook on the print head. The motor locks back into place, and holds the wheel in position. It's one of easiest daisy wheel installations we've seen.

Near the control panel on the right front of the printer are two sets of four dip switches. These are the printer control switches which are used to set pitch, page length, lines per inch and to turn the auto line feed on and off.

These are supplementary to the dip switches on the back of the printer which are used to set up communication with the computer — the exact setting of the switches is determined by the interface module for a particular printer. The catalog lists both serial and parallel modules for IBM printers and a serial module for the Apple IIe. ▷

Daisy Wheels

ONE MAJOR servicing company we spoke to — they service a wide range of printers and have been in the servicing industry for more than a decade — believed that of all the types of printers on the market, the daisy wheels have proven themselves the most reliable because of their simplicity. And, if your needs are simple, they provide an easy, mechanical way of changing fonts.

Apart from the wheels, the only problem usually encountered with the daisy printers is malfunctioning of the touch sensitive pads which lose their responsiveness through constant use.

Everyone says daisy wheels are noisy, but decide for yourself if that's a problem. But, be warned — a machine that seems to purr when it's sitting on a cushioned pad in a carpeted showroom can become an irritating clatterer when it's brought home and put on a wooden desk in a small room. Try it out — where you'll want to use it, if you think noise will be a problem (that applies to any printer). □

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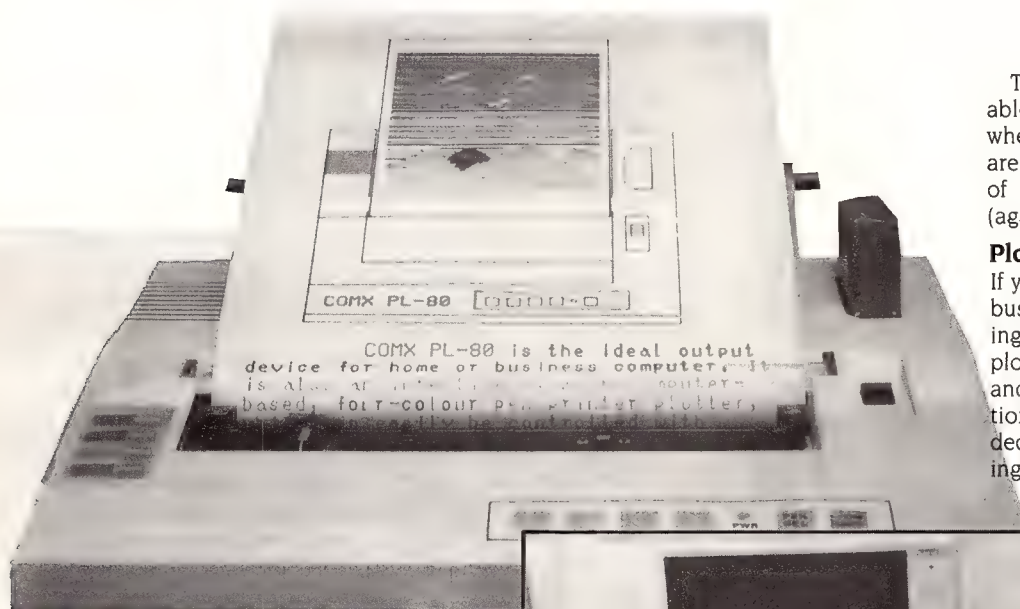
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The Comx PL-80 is a basic plotter than can double as a printer.

There is a high pitched beep that irritates when the printer is started up, when the form feed button is pressed, and when something has gone wrong.

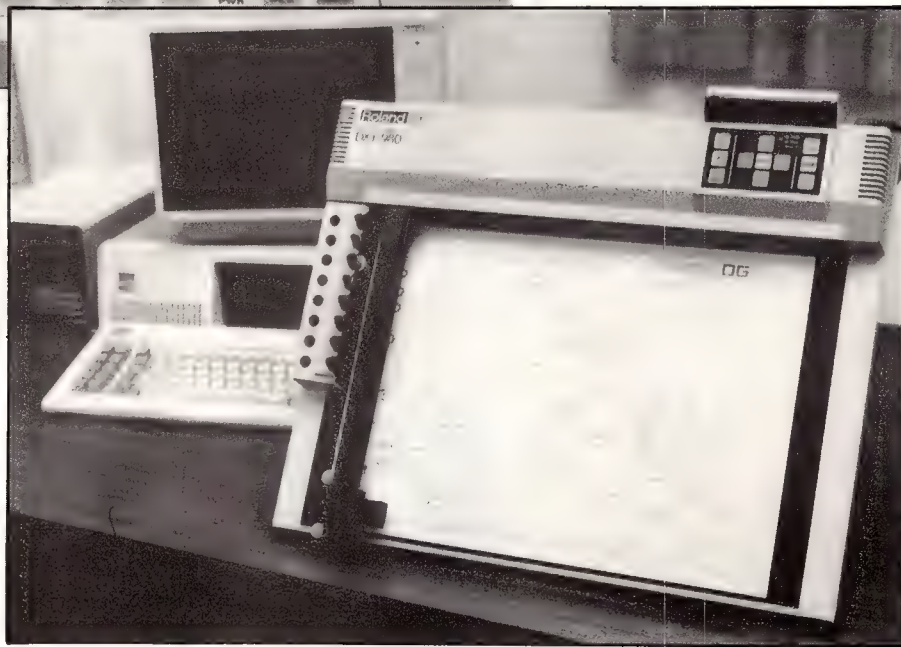
When the Sprint II Plus starts printing, the noise is quiet acceptable as a result of the extensive use of sound proofing inside the printer, and the all-enclosing casing. However, this doesn't stop the printer from giving the desk a little shake.

With only two buttons, pause (online) and form feed, this must be one of the most straight forward control panels on any printer. A yellow light to the left of the panel lights up for emergencies while the green light is constant for online and flashing for paused. Pressing the touch sensitive form feed button, after turning the printer on, activates the self test. Pushing the pause button gives a run out of the printer's set up mode and runs tests on the RAM and ROM.

The Qume Sprint 11/90, which is available through STC, is about \$4300 (taxed); wheels are \$16 to \$70; multi strike ribbons are \$16 each (but they only come in boxes of six) and nylon ribbons are \$19 each (again, only in boxes of six).

Plotters

If your needs lie with professional quality business graphics or any form of draughting, you probably have good use for a plotter. The design of plotters is simple and straightforward, but with a few exceptions they are dedicated machines — dedicated to complex, high-quality drawing.



Roland's DXY-980 is suitable for dedicated draughting applications.

Print tests done on the Sprint II/90 (rated at 90 cps), gave a true speed of 30 cps. But, as Qume say in the manual, 'the material printed and the sequence of carriage and paper motions determine the speed of any printer.'

The manual is actually a comprehensive companion to the printer — one of the best we've seen. The appendix on the printer's command set, for example, gives basic explanations and lessons in programming the printer in graphics or customising a type face — the novice need only have the vaguest idea of what a Basic program is, and they're ready to start. If you're interested in how printers think and work, the manual is definitely worth a read.

Plotters use conventional pens to put their mark on paper — conventional in the sense that the pens are ink-filled cartridges, but in top end machines, these are precision 'tools.'

There are two different types of plotters — drum and flatbed. Drum plotters move the paper around a typewriter-like roller; the paper is securely held and can be moved both forward and backward. The pens move left to right, parallel to the axis

Printers

of the roller. These are the most common type at the home-user's end of the market. There are drum plotters, however, that can meet the most exacting requirements of sophisticated engineering applications.

When shopping for a plotter there are three specifications that, generally, will determine its suitability for the job you have in mind. First is resolution, or accuracy of the plot, also referred to as 'the smallest addressable step' — this is a measure, essentially, of the closest that two lines can be drawn together. Resolution can vary from 0.2 mm at the bottom end of the market to 0.025 mm for professional draughting quality machines.

Second is repeatability, which is a measure of how close the plotter can come to drawing the same line twice. This can vary between plotters from from 0.2 mm to 0.1 mm. (To keep these two measurements in perspective, though, bear in mind that the pen tips themselves are usually about 0.5 mm wide.)

Third is plotting speed, measured in millimetres per second (mm/s). For plotting simple bar graphs and the like, speeds at the bottom end of the market, down to 5 mm/s, are all that's needed. But, complicated engineering drawings would take hours to do at that speed — plotters suitable for this type of work move the pens along at 40 to 50 mm/s.

With plotters, just as with any piece of equipment, after sales service and parts availability should always be taken into consideration. Sooner or later, the pens on a plotter are going to wear out or otherwise need replacement, so satisfy yourself that you'll still be able to buy them in several years. No plotter's a bargain if it can't be used because the specially designed pens that fit into the custom-engineered holder can't be replaced.

The Comx PL-80

This is a light-weight wonder! When we pulled the unit out of its box, we found it measured only 32 cm wide, 23 deep, and 6 high — and weighed just over a kilo (without the power adaptor, mind you).

The plotter is encased in a light-weight, moulded plastic body with a clear plastic lid completely covering the print area and pens.

There are four pens in green, red, blue, and black; both the pens and the printing head are custom-designed. The pens are only 25 mm long and fit snugly into individual compartments in the holder on the printer head.

The PL-80 is a simple drum plotter with a typewriter-style paper feed. At the back of the plotter are two holes for detachable arms which hold a roll of paper. This allows continuous drawing vertically (or change the axis, and it's horizontal).

The control panel has touch sensitive buttons to scroll the paper up, down, left and right. The pen selection button drops the pen onto the page so that manual changes to the design can be made using the scrolling buttons.

During such manual operation, the pens are changed by opening the lid and turning the head of the plotter to the right until the appropriate pen lines up with the holder.

Probably the most interesting feature of the PL-80 is that it can double as a normal printer. Unfortunately, the modules for the various character sets weren't available at the time of review. We also understand that user-defined graphics can be programmed directly using the modules.

While the Comx is good value, there are some useful features which are missing. For example, it has no serial port, and it's limited to four colours at any one time, and it's not particularly fast — it's rated at 10 cm/s (it gave an average of about 4 in our trial runs). For reference, a relatively fast plotter in this market can clock about 23 cm/s — of course this speed drops as the plotting becomes more intricate. The PL-80 has a minimum step of 0.2 mm which is quite suitable for the simple type of graphics that the Comx is designed for.

When the plotter was in full swing it was fairly quiet and the control buttons were very responsive. The directional control buttons can be used together to move the pen diagonally. But — a problem with the buttons was that the print head moved too quickly to allow for detailed manual work.

This might be a slow plotter, but it's a good one. The lines were consistent in thickness and inking. Faster plotters, notably the low-end ones, often produce broken lines because the pens can't keep the ink flowing fast enough.

When the paper is in position, two clamps on either side of the platen grip it. This allows the plotter to respond quickly when the platen juggles up and down to draw the vertical lines (the head moves horizontally like a normal typewriter). ▷

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The only problem with the method used to grip the paper is that it leaves little teeth marks down the sides of the paper.

The Comx PL-80 retails for \$449 (un-taxed). Pens using water-based inks are \$18 for a set of four; oil pens (for transparencies) are \$24 a set; paper rolls, \$10; and the font ROM pack, \$39.

The Roland DG DXY-980

This is a mid-range flatbed plotter. It looks like a professional draughtsman's board and acts like one, as well.

Roland, which specialises in plotters, has paid attention to detail and given many features which draughtsmen and users of AutoCad and similar packages would appreciate.

The plotter draws at about 25 cm/s, with a resolution as fine as 0.05 mm per step. When plotters are drawing fine lines at high speed, there is a tendency for the pens to bounce. Roland have minimised by designing the head so that the pens touch the paper lightly at all times.

Another problem experienced with fast drawing is that the pens can catch on the paper if it's not perfectly flat. To combat the problem, Roland developed an electrostatic surface on the board to attract the paper. While you can still lift the paper off easily to reposition it, the surface can hold the paper even when the board is tilted at 60 degrees from the horizontal. The board takes up to A3 size paper.

The X and Y co-ordinates of the pen are given on an LED display to the top right of the plotter, in units of 0.1 mm.

The control panel has an X and Y display across the top, and to the left is the co-ordinate's display reset. This can be set at any point on the plotter with the new origin being the 0 value.

A set of 'scaling point keys' are located on the boxed control panel. These keys are used to send the plotter pen to a designated location. The default settings are for the pen to go to the bottom left corner of the paper with the key labelled P1 and to the top right with P2. Underneath these is the enter key which is used to change these set points manually — this is handy for scaling drawings to fit into a particular area, or simply changing their size.

The centre of the second control panel consists of north/south and east/west positioning keys, which are used in combination to give diagonals. There is also a fast key that speeds the movement of the pen to the desired location.

A good design feature is the pen up/pen down key to the right of the panel. The pen up key locks the pen into the up position and is indicated with an LED light to the left of the panel. The DXY-980 has a mechanism which lifts the pen off the page after several seconds if it's not drawing to prevent the ink from blotting.

A pause key underneath the pen up key, is designed to temporarily halt printing, while pressing the key again resumes printing. This is useful for checking the drawing while it's still being plotted.

A home key at the bottom right of the control panel sends the arm back to deposit the pen in the clip in its holder and returns to the standby position to the left of the page.

The pen holding system accommodates eight pens. As different colours or line thicknesses are specified, the pen carrier on the plotting arm moves to the holder, replaces the current pen, and picks up the new one.

The power port, power switch, parallel connector, dip switches, serial connector and external input and output connectors are arranged across the top of the plotter. Dip switch setting is covered very well in the manual. The DXY-980 is suitable for use with both IBM and Apple computers.

Roland have provided a comprehensive manual which explains graphically the various parts of the plotter as well as providing hints on how to set up with certain types of computers, understanding the co-ordinate plotting jargon, using certain commands to achieve special effects, a full look at the Roland DG Graphic Language and a selection of short programs in Basic to produce graphics effects on the plotter.

The Roland DXY-980 Plotter is \$2950 (taxed); fibre pens, \$17 to \$34; oil based, \$40; and ceramic, \$28.

Good Shopping!

We hope that our review of printers and plotter has made it easier for you to find the machine to suit your needs. Remember, before you go shopping, decide exactly what you want the machine to do — if you have your needs clearly in mind, you're not going to end up paying for gee-whizz features that you have no practical use for (except to show them off). □

Plotter Pens

Plotting can be done using traditional draughting pen points, pressurised ball point cartridges, ballwriters and fibre tip pens.

Choosing the right pen depends on the result required. When you consider the technical aspects of the drawing keep in mind, the desired plotting media (high or low quality paper, or film, for example), the speed, acceleration, drying time and pen force of the plotter.

As plotters are very colour orientated, you should consider the colour intensity and the smudge proof quality of the ink.

Draughting utensils such as fibre pens, ball point pens and refillable, pressurised ball point cartridges are generally expendable. More expensive, refillable precision made pens will give superior results and last longer, but they need to be handled with care and kept clean. Decide which suits your needs; you may want several sets of pens to be used for different types of drawing.

The plotter pen is actually an adaptation of the draughting pen. Plotters use special inks developed to accommodate the speed the pens move across the paper.

The speed requirement led to the development of 'wet ink plotting'. A wet ink pen usually consists of three parts: the body which is produced to the holder on the plotting arm; an ink cartridge or ink reservoir; and a cap to protect the point and prevent the ink drying while the pen's not in use.

Plotter pens, especially on precision machines, are stabilised to reduce vibration during the plot. This helps prevent shakey lines caused by the arm's movement across the paper. There is often a compression spring in the head which reduces the shock the pen undergoes every time it contacts the paper; the spring also holds the pen against the paper to aid ink flow.

Wet ink plotter pens are generally available in stainless steel, tungsten, and jewel tipped points, all of which work best on particular surfaces. The stainless steel head works best on paper, the tungsten on matt film, while jewel tips work on both paper and film. There are other types around — ensure that the one you buy is suitable for your needs. Some pens are better at filling in areas than they are at line drawing, for example.

When buying plotter pens also ensure that the ink used is appropriate for your machine. The most universal of inks are carbon based; these are suitable for most work. But there is a wide range of inks available, each one particularly suited for certain applications. □

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- U1. DIRECTORY CONTROL.** Returns you to a previous directory whose name it saves.
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- U7. DIRECTORY PATHS.** Lets programmes write to other directories.
- U8. KEYBOARD DEFINER.** Redefines keyboard to suit own needs.
- U9. SPACE.** Shows the amount of free space on disk in thermometer style.
- U10. SUPERIOR DIRECTORY.** Shows disk directory with file attributes which are active. Also sorts by name, date, size, extension. Accurate for hard disk.
- U11. BACKED UP.** Indicates which hard disk files have not been backed-up.
- U12. NEW FILES.** Lists files that you created today.
- U13. SPEEDKEY.** Increase speed of cursor.

FILE PRINTING/EDITING

- U101. PRINTER SWAP.** Swaps line printer assignments for easier printing.
- U102. WORDSTAR CONVERTER.** Superior converter of wordstar to ASCII and reverse from document file.
- U103. DISK COVER DIRECTORY.** Prints directory in size suitable for pasting on disk jacket.
- U104. COMMAND EDITOR.** Very good editor of operating system commands.
- U105. BANNER.** Prints wide banners on your printer.
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- U108. NOT PRINT.** Redirects computer output to the screen.
- U109. DARKEN.** Overstrikes a text file to obtain darker print.
- U110. MERGE.** Merge sorted files into one sorted file.
- U111. TEXT FORMATTER.** Processes text files for printing with special features imbedded in output – bold, italics, etc.
- U112. SEARCH/REPLACE.** Search for and replace characters.
- U113. CUT & PASTE.** Allows movement of parts of documents between files.
- U113. NOTEPAD.** Ready at hand notepad. Memory resident.

U114. TEXT INDEX. Indexing for text files. Mark words for listing.

- U115. WORDSTAR INDEX.** Indexing system for Wordstar.
- U116. UNDERLINE STRIPPER.** Strip underline from Wordstar files.
- U117. KEYBOARD DEFINER.** Keyboard redefiner for Wordstar.
- U118. WORDSTAR COLOUR.** Adds colour to Wordstar.
- U119. WORDSTAR NUMBERS.** Add and remove numbers to paragraphs in Wordstar files.
- U120. WORDSTAR CHARACTERS.** Character look-up programme.
- U121. EXECUTABLE PATCHES.** Standalone Wordstar patches.
- U122. WORDSTAR GREEK.** Obtain Greek characters in Wordstar documents.
- U123. PROGRAMME EDITOR.** Editor for programmers, with multiple windows.
- U124. TEXT EDITOR.** Editor with major commands, without frills.
- U125. LAST LINES.** Types the last specified number of lines in a file.
- U126. FAST LISTING.** Fast listing of files by extension.
- U127. SQUEEZE LIST.** Lists squeezed library files.
- U128. COUNT.** Counts characters, words, lines, pages in a textfile.
- U129. PRINTER PATCHES.** Extensive collection of printer patches for wordstar.

FILE LOCATING

- U201. SMALL FILE FINDER.** Locates files in subdirectories. Small tightly coded.
- U203. FILE SEARCH.** Memory-resident. Locates files in subdirectories.
- U204. CHARACTER SEARCH.** Searches disk for character or string.
- U205. FILE FINDER.** Locates and lists files, allows deletion of unwanted files. Act from within programme.
- U206. NEW GREP.** Matches file patterns. Has 'C' source.

FILE READING/DISPLAY

- U301. TEXT READER.** Excellent text display utility with many features. Scrolls, reads one page at time, goes to end, beginning, etc.
- U302. READ SQUEEZE.** Read squeezed files without physically unsqueezing.

U303. READ BACKUPS. Read backup disks of your hard disk. Needs Basic.

- U304. TREE DIRECTORY.** Displays a tree directory of files, including sub-directories.
- U305. TRACK READER.** Reads sectors and tracks in hex and ASCII.
- U306. BROWSE.** Examine files with 4 way scrolling.
- U307. DUMP.** Gives an ASCII/HEX display of any file.
- U308. DIRECTORY READER.** Read a directory from or to a certain point.
- U309. KEYBOARD BUFFER.** Keyboard buffer of 160 characters.
- U310. SYSTEM SHELL.** Operating system shell that interfaces with Crosstalk, 1-2-3, and Multimate.

EQUIPMENT HANDLING

- U401. DRIVE CLEANER.** Runs the drive for head cleaning disk.
- U402. CORELOOK.** Gives memory content in HEX and ASCII.
- U403. SCREEN SAVE.** Blanks screen if not used for several minutes. Saves screen wear.
- U404. DISKPARK.** Positions the hard disk head key for safety when travelling or moving computer.
- U405. COLOUR CONVERTER.** Displays colours as shades of grey.

FILE MOVING

- U501. SWEEP.** Famous file-handler. Reads, mass copies, deletes, etc.
- U502. REDIRECTS** output to a disk file.
- U503. NIMBLE DISK.** Helps you move more easily around a hard disk.
- U504. SECTOR RETURN.** Recovers deleted first sectors.
- U505. SELECTIVE COPYING.** Copy programme using menu system.
- U506. SELECTIVE DELETION.** Programme delete using menu system.
- U507. ENHANCED COPYING.** Copy several unrelated programmes with the same command.
- U508. NEW MOVE.** Rename and move programme to another directory without copying.
- U509. TOTAL ERASURE.** Totally erases disk, including format.
- U510. NEW DISKCOPY.** Good diskcopy with extra features. Copies whole disk. Sidesteps and signals faulty sectors.

FILE ORGANISATION AND CHECKING.

- U601. ARCHIVER.** Superior file compressor and library creator.
- U602. FILE CORRUPTION.** Fast checker for detecting corrupted files.
- U603. DISK SQUEEZE/UNSQUEEZE.** Squeezes and unsqueezes all files on a disk.
- U604. PROTECT/UNPROTECT.** Avoids accidental erasure of important files..
- U605. SECRET FILES.** Make, go to, or remove a secret directory.
- U606. SQUEEZE/UNSQUEEZE.** Compresses files to save space. Also uncompresses.
- U607. LIBRARY CREATOR.** Combines files into libraries. Adds to, deletes, extracts files.

U608. LIBRARY DISPLAY. Displays the directory of a library. Related to above programme.

- U609. NEW NAME.** Changes volume name of a disk.
- U610. FILE COMPARISON.** Intelligent file comparison programme which detects differences between files.

SPECIAL FEATURES

- U701. CALENDAR.** Display of any month or year.
- U702. NEW DATE.** Changes date of file entry in disk directory.
- U703. BYTE CONVERTER.** Converts all bytes to 2 byte (7 bit) for serial transfer.
- U704. COMPILING AID.** Simplifies, automates compiling and linking.
- U705. ALARM.** Sets time for alarm to sound.
- U706. NEW TIME.** Sets system time and clock.
- U707. DOS HELP.** Assistance with dos commands displayed on screen.
- U708. GET TIME.** Simplifies getting time and date.
- U709. CLOCK.** Shows time on screen while you work.
- U710. CALCULATOR.** Memory-resident for convenient access.

FILE ALTERATION/RECOVERY/REPAIR

- U801. FILE RECOVERY.** Retrieves a programme you have just erased.
- U802. DEBUG TIPS.** Tips on using debugging programme effectively.
- U803. DISK PATCHER.** Reads and patches disk contents. Altering files, repairing corruptions, allowing unerase and creating files from memory.
- U804. LOCK/UNLOCK.** Protects files from unauthorised access with simple encrypting technique.

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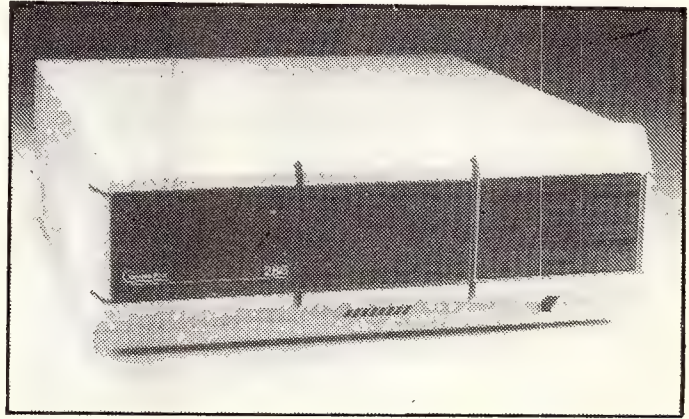
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EXPERT SYSTEMS

A lot of what passes for 'artificial intelligence' in this brave new world of ours is baloney, according to Tim Hartnell. Under all the smartness of many supposedly intelligent programs is a twisty, turny maze of cleverly-programmed string and array manipulation.

STRING AND ARRAY manipulation is fine, as far as it goes. But in nearly all cases it doesn't go far enough to produce actions and reactions which we could really class as 'intelligent' — the ability to cope with the totally unexpected, for example. If you stick to a narrowly-defined universe, some pretty fine examples of apparently intelligent behavior can be found. But out in the real world, the string and array trickery stands out naked, like the emperor.

But (and this is an important 'but'), the fact that an AI universe may be small and constrained does *not* devalue what can be achieved within that limited domain. Expert systems have proved their worth in many fields over the past 15 years or so, almost precisely because they have been constructed to work in tiny little universes.

So, what is an expert system? Like everything which runs about town proclaiming 'I'm living proof of the reality of AI,' an expert system is just a computer program. But it's a computer program of a special kind. An expert system program contains 'bottled expertise', painstakingly gathered from real live human experts; this expertise is held in such a way that non-experts can make use of it.

Expert systems have proved that they can do a lot. For example, the system called MYCIN can diagnose infectious diseases, DENDRAL can deduce molecular structures from mass spectrograms, and the aptly-named PROSPECTOR can look

for oil and precious metals. The program THE AUTO MECHANIC, given in this article (and downloadable from our bulletin board) will even help you start your car in the morning.

How does it do it? Most expert system programs consist of two parts, although these parts may not be obviously separated within the program. The two parts are the stored information (the 'bottled expertise') and the reasoning apparatus, which asks the user questions, and from the information which it gets in reply, makes decisions, reaches conclusions, and gives advice.

The bottled expertise, or the knowledge base as it is more properly called, can either be encoded directly into the main body of the program as in AUTO MECHANIC, or held in some way separate from the reasoning bits of the program. Directly coded expertise is a bit of a hassle, from the expert system developer's point of view. The information locked into the program is virtually impossible to modify or delete.

By contrast, a program which cleanly separates the thinking from the raw expertise is of much more use. The program can

— Expert? System?

learn, simply by adding more information to the knowledge base: it can grow, by discarding old, less relevant expertise, and perhaps most excitingly, it can become an expert on a whole new field, very simply.

Whereas our AUTO MECHANIC will never do anything else in its life except help you start your car, the program MYCIN, which we've already mentioned is able to diagnose infectious diseases, has been taught to do a number of other things. The knowledge about infectious diseases was taken away, leaving the reasoning apparatus as a program called EMYCIN (for 'Empty Mycin'), and new databases of knowledge were plugged into it. As well as becoming an expert on other areas of medicine (such as pulmonary diseases), one researcher use an old car repair manual to teach it to become a trouble-shootin' mechanic for a particular model American car. And of course, that's where I got the idea to write AUTO MECHANIC.

There are several ways an expert system can think. One way is by use of 'decision trees'. In this method, the program follows a hard path down a series of questions, letting the answer to each one determine which specific channel of enquiry the program should pursue next. This sort of program likes YES/NO answers, and is not so good at situations which produce answers from the user such as USUALLY, SOMETIMES, or PERHAPS. Our program follows a decision tree approach.

MYCIN and PROSPECTOR use an approach called 'semantic nets', in which answers to questions 'cluster around' conclusions, so a number of 'usually' and

'pretty often' answers can be, in effect, added up, to reach a conclusion. Whereas an expert system which has been climbing a decision tree can give a clear, unambiguous answer ('The patient has a toothache'), those caught up in semantic nets are more likely to give answers like 'There is a 70% chance that it will rain tomorrow.'

Rule-Based Systems

A rule-based expert system can be created fairly easily. Such a system, perhaps the simplest kind of expert system you can write, can nevertheless be effective and useful, as well as giving an insight into how other, more complex rule-based systems such as MYCIN have been created.

The AUTO MECHANIC is one such simple rule-based system, which is designed to help hopeless non-mechanics (such as myself) focus on possible causes of problems they are having with their cars. Because this program is based on real information painlessly extracted from human experts on this field, you may well find it can be of genuine use.

However, the main reason for including it in this article is to show how a rule-based system can be developed, in which rules are encoded in a specific order, and the answer to one question dictates which question the system will ask next.

The simplest rule for an expert system to use has two parts. They are a left hand side (LHS) which is typically an IF statement (IF THE COMPUTER IS ON FIRE...) and a right hand side (RHS) which is usually a THEN clause (SQUIRT IT WITH THE

EXTINGUISHER). A low-level rule-based expert system could be little more than a series of LHS-RHS pairs which are presented in a specific order.

A primitive program of this type would allow the user to enter the answer to a question (IS THE COMPUTER [1] ON FIRE, [2] SITTING THERE SERENELY, OR [3] MELTING INTO AN UGLY BLOB?) and then search through its collection of rules for a match between the answer given and the LHS of a rule. At this point, it could either output the relevant RHS, or use the RHS to direct the program to further, more specific questions.

The order in which the collection of rules is stored is important, as is the way in which the LHS matchings are handled. If there are several LHS conditions which must be met before a RHS is invoked, the system must know such things as how many matches are required, or how close an answer must be to constitute a match, before it continues.

In some expert systems, it will make sense for a RHS to be triggered the moment a match is found. In others, where a single answer from the user may match several LHS's, these could be arranged in an hierarchical order, with the higher level ones invoked before the lower level ones were even investigated.

In AUTO MECHANIC, the rules are in a strict order, and there is a single clear path to the next rule, with the questions which are asked being based on the answers given to previous questions.

It starts with a menu of possibilities:

SO YOU'RE HAVING CAR PROBLEMS,
LET'S SEE IF WE CAN PIN DOWN
THE TROUBLE...

ENTER A LETTER WHICH DESCRIBES PROBLEM:

A - ENGINE WON'T TURN OVER
B - ENGINE TURNS, BUT WON'T START
C - STARTS, THEN STALLS RIGHT AWAY
D - CAR RUNS, BUT STALLS A LOT
E - CAR RUNS, BUT IDLES ROUGHLY

Let's say our problem is the second one: ENGINE TURNS, BUT WON'T START. Once we've told it this, it leads us a number of checkpoints, and emergency repair suggestions —

CHECK WIRES AT POINTS FOR DAMPNESS.
IS THERE A CHANCE AREAS ARE DAMP?
(Y - YES, N - NO)?
> OK Y <
SPRAY WITH MOISTURE REMOVAL SPRAY

IS THERE DUST VISIBLE ON THE INSULATING
PART OF THE COIL, OR ON THE
DISTRIBUTOR CAP?
(Y - YES, N - NO)?
> OK Y <
WIPE COIL SECTION AS WELL AS INSIDE
AND OUTSIDE OF CAP

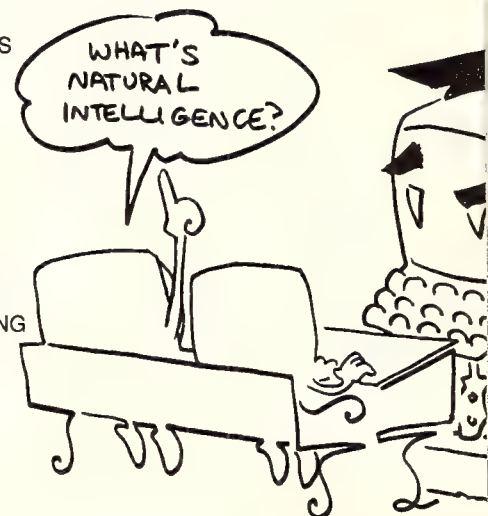
... and so on.

The order in which the expert system gives the suggestions, and which suggestions it makes, depends upon the answers you give.

If you ever have trouble starting your car, and you'd like your computer to save you from having to call an emergency repair service, enter the program listing (or, if you're a member, download it from the YC Bulletin Board), and you'll have an AUTO MECHANIC at your beck and call. Next month, we'll look more closely at 'real life' expert systems, and see how well MYCIN and its mates perform. □

```
10 REM THE AUTO MECHANIC
20 REM (c) Tim Hartnell
30 REM Interface Publications, 1987
40 CLS
50 PRINT "SO YOU'RE HAVING CAR
PROBLEMS."
60 PRINT "LET'S SEE IF WE CAN PIN DOWN
THE TROUBLE..."
70 PRINT
80 PRINT "ENTER A LETTER WHICH
DESCRIBES PROBLEM:"
90 PRINT
100 PRINT " A - ENGINE WON'T TURN OVER"
110 PRINT " B - ENGINE TURNS, BUT WON'T
START"
120 PRINT " C - STARTS, THEN STALLS
STRAIGHT AWAY"
130 PRINT " D - CAR RUNS, BUT STALLS A
LOT"
```

```
140 PRINT " E - CAR RUNS, BUT IDLES
ROUGHLY"
150 IF INKEY$ <> "" THEN 150
160 A$=INKEY$
170 IF A$ < "A" OR A$ > "E" THEN 160
180 GOSUB 1580
190 ON ASC(A$)-64 GOTO
220,600,1220,1250,1370
200 END
210 REM *****
220 REM WON'T TURN OVER
230 PRINT "WE'LL START BY CHECKING
THE BATTERY."
240 PRINT "TURN ON THE LIGHTS."
250 PRINT TAB(6);"ARE THEY DIM?"
260 GOSUB 1540
```

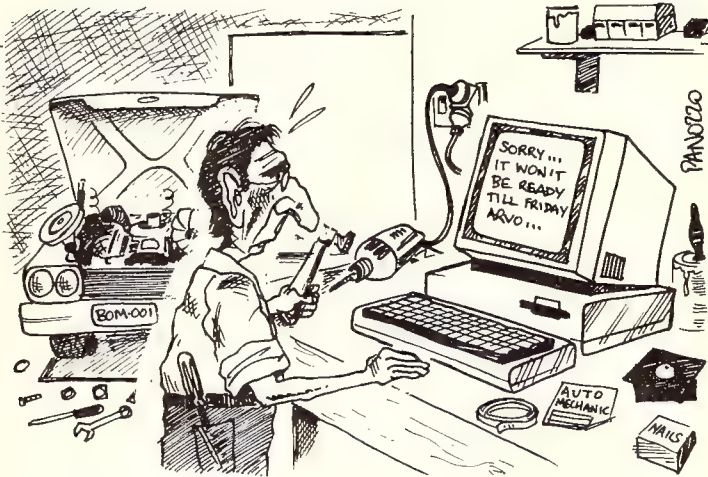


Artificial Intelligence

```
270 IF A$="N" THEN 370:REM BATTERY OK
280 PRINT "ARE BATTERY CABLES LOOSE
    OR CORRODED?"
290 GOSUB 1540
300 IF A$="Y" THEN PRINT "TIGHTEN AND
    CLEAN"
310 GOSUB 1600
320 PRINT "IS FAN BELT LOOSE?"
330 GOSUB 1540
340 IF A$="Y" THEN PRINT TAB(8);"TIGHTEN
    THE FAN BELT"
350 GOSUB 1600
360 PRINT "JUMPER LEADS OR A PUSH
    SHOULD BE ENOUGH TO START THE
    CAR":END
370 PRINT "IS THERE LOOSENESS OR
    CORROSION AT THE"
380 PRINT "STARTER END OF THE BATTERY
    CABLE"
390 GOSUB 1540
400 IF A$="Y" THEN PRINT "TIGHTEN AND
    CLEAN THE CONNECTIONS"
410 GOSUB 1600
420 PRINT "PUT A PIECE OF METAL
    ACROSS THE"
430 PRINT "SOLENOID TERMINALS. DOES
    STARTER WORK?"
440 GOSUB 1540
450 IF A$="Y" THEN PRINT "THE IGNITION
    SWITCH IS PROBABLY FAULTY"
460 GOSUB 1600
470 IF A$="Y" THEN PRINT TAB(4);"IT
    SHOULD BE REPLACED":END
480 PRINT "DOES STARTER CLICK?"
490 GOSUB 1540
500 IF A$="Y" THEN PRINT "THE STARTER
    MAY BE JAMMED":GOTO 540
510 PRINT "AS NOTHING HAPPENED, THE
    SOLENOID IS"
520 PRINT "PROBABLY FAULTY. A PUSH
    MAY START"
530 PRINT TAB(12);"YOUR CAR.":END
540 REM STARTER JAMMED
550 PRINT "TURN THE IGNITION OFF, AND
    PUT THE CAR"
560 PRINT "IN A HIGH GEAR. PUSH CAR FOR
    A FOOT OR"
570 PRINT "SO TO POP STARTER
    LOOSE.":END
580 RETURN
590 REM *****
600 REM TURN OVER, WON'T START
610 PRINT "CHECK WIRES AT POINTS FOR
    DAMPNES."
620 PRINT "IS THERE A CHANCE AREAS
    ARE DAMP?"
630 GOSUB 1540
640 IF A$="Y" THEN PRINT "SPRAY WITH
    MOISTURE REMOVAL SPRAY":
    GOSUB 1600
650 PRINT "IS THERE DUST VISIBLE ON THE
    INSULATING"
660 PRINT TAB(6);"PART OF THE COIL, OR
    ON THE"
670 PRINT TAB(11);"DISTRIBUTOR CAP?"
680 GOSUB 1540
690 IF A$="Y" THEN PRINT "WIPE COIL
    SECTION AS WELL AS INSIDE"
700 IF A$="Y" THEN PRINT TAB(6);"AND
    OUTSIDE OF CAP.":GOSUB 1600
710 PRINT "ENSURE ALL WIRES ARE TIGHT
    AND DRY BEFORE CONTINUING"
720 GOSUB 1600
730 PRINT "IF CAR STILL DOES NOT START,
    IT IS TIME TO CHECK THE SPARK
    PLUGS:"
740 GOSUB 1600
750 PRINT "DOES SPARK FROM THE END
    OF THE PLUG WIRE JUMP 3/8 INCH
    OR MORE?"
760 GOSUB 1540
770 IF A$="Y" THEN PRINT "THE PLUGS ARE
    FAULTY":GOSUB 1600
780 IF A$="N" THEN 850
790 PRINT "ARE PLUGS GREASY?"
800 GOSUB 1540
810 IF A$="Y" THEN PRINT "AN EMERGENCY
    REPAIR CANNOT BE MADE"
820 IF A$="Y" THEN PRINT "WHILE PLUGS
    ARE IN THAT STATE.":
    GOSUB 1600:GOTO 790
830 IF A$="N" THEN PRINT "IF THIS IS AN
    EMERGENCY, TRY CLOSING"
840 IF A$="N" THEN PRINT "THE GAP TO
    ABOUT HALF NORMAL":
    GOSUB 1600:GOTO 930
850 PRINT "IS THERE ANY SPARK AT ALL?"
860 GOSUB 1540
870 IF A$="Y" THEN 790
880 GOSUB 890:END
890 PRINT "CHECK ROTOR, COIL AND
    DISTRIBUTOR CAP"
900 PRINT "FOR CRACKS. IF THERE AREN'T
    ANY THERE,"
910 PRINT "IT LOOKS AS IF THE POINTS OR
    CONDENSER IS YOUR PROBLEM"
920 PRINT "A REPAIR MAY WELL BE
    NEEDED":RETURN
930 PRINT "DO YOU HAVE FUEL IN THE
    TANK?"
940 GOSUB 1540
950 IF A$="N" THEN PRINT "FILL TANK AND
    TRY AGAIN":GOSUB 1600
960 PRINT "ARE ALL FUEL AND VACUUM
    LINES SECURE?"
970 GOSUB 1540
980 IF A$="N" THEN PRINT "ATTEND TO
    THESE AND TRY AGAIN":
    GOSUB 1600
990 PRINT " REMOVE THE AIR CLEANER
    FROM THE"
1000 PRINT TAB(13);"CARBURETOR":
    GOSUB 1600
1010 PRINT "DOES IT LOOK DRY?"
```



Artificial Intelligence



```

1020 GOSUB 1540
1030 IF A$="N" THEN 1100
1040 PRINT "TURN THE ENGINE OVER A
      FEW TIMES WITH"
1050 PRINT "YOUR HAND SEALING THE AIR
      INTAKE":GOSUB 1600
1060 PRINT "IS YOUR HAND WET WITH
      FUEL?"
1070 GOSUB 1540
1080 IF A$="N" THEN PRINT "UNSCREW
      FUEL CAP IN CASE AIR VENT IS
      PLUGGED"
1090 IF A$="N" THEN PRINT "THE FUEL
      PUMP MAY NOT BE
      WORKING":GOSUB 920:END
1100 PRINT "HAVE YOU BEEN CRANKING
      THE STARTER A"
1110 PRINT "LOT IN THE PAST FEW
      MINUTES?"
1120 GOSUB 1540
1130 IF A$="N" THEN 1170
1140 PRINT "WAIT FOR A MINUTE OR SO,
      THEN HOLD THE "
1150 PRINT "ACCELERATOR STEADILY ON
      THE FLOOR WITHOUT"
1160 PRINT "PUMPING IT. THIS SHOULD
      GET YOU GOING":END
1170 PRINT "THE ENGINE MAY WELL BE
      FLOODED AT THIS"
1180 PRINT "POINT AND THE FLOAT VALVE
      STUCK OPEN.":GOSUB 1600
1190 PRINT "TAP THE SIDE OF THE
      CARBURETOR"
1200 PRINT "THEN TRY THE STARTING
      PROCESS AGAIN":END
1210 REM *****
1220 REM STARTS, THEN STALLS
1230 PRINT "THIS SUGGESTS A FAULTY
      BALLAST RESISTOR WHICH
      SHOULD BE REPLACED":END
1240 REM *****
1250 REM RUNS, STALLS A LOT
1260 PRINT "THE PROBLEM IS EITHER
      CAUSED BY:"

```

```

1270 PRINT TAB(7);"SHORTING (OR LOOSE)
      WIRES;"
1280 PRINT TAB(7);"A WEAK SPARK; OR"
1290 PRINT TAB(7);"A FAULT IN THE FUEL
      SYSTEM"
1300 PRINT "CHECK FIRST FOR LOOSE OR
      SHORTING WIRES":GOSUB 1600
1310 PRINT "IF THEY ARE NOT OK, REPAIR.
      IF THEY ARE,IT COULD BE THE
      SPARK PLUGS"
1320 GOSUB 890
1330 PRINT "THERE IS A FINAL CHECK WE
      CAN TRY ON"
1340 PRINT "YOUR SPARK PLUGS":GOSUB
      1600
1350 GOTO 1380
1360 REM *****
1370 REM RUNS, ROUGH IDLE
1380 PRINT "IT COULD WELL BE THAT ONE
      OR MORE OF"
1390 PRINT "YOUR SPARK PLUGS ARE
      FAULTY.":GOSUB 1600
1400 PRINT "DISCONNECT THEM ONE AT A
      TIME. THE ONES"
1410 PRINT "WHICH DO NOT CAUSE THE
      ENGINE IDLE TO"
1420 PRINT "DROP ARE FAULTY. CHECK
      THESE THEN"
1430 PRINT "RETURN TO THE
      SYSTEM.":GOSUB 1600
1440 PRINT "DID TEST SHOW ANY PLUGS
      WERE FAULTY?"
1450 GOSUB 1540
1460 IF A$="Y" THEN PRINT "REPLACE ALL
      PLUGS IF YOU CAN, OR JUST"
1470 IF A$="Y" THEN PRINT "THE ONES
      WHICH TESTED FAULTY":
      GOSUB 1600
1480 PRINT "THE MOST COMMON CAUSE
      OF A BAD IDLE,"
1490 PRINT "ASSUMING THAT THE PLUGS
      ARE OK, IS THAT"
1500 PRINT "YOUR FUEL MIXTURE IS SET
      TOO RICH"
1510 PRINT "SO YOU SHOULD ADJUST
      THIS":END
1520 PRINT "ADJUST THE IDLE
      SPEED-SCREW ON THE
      THROTTLE LINKAGE"
1530 REM *****
1540 PRINT TAB(16);"(Y - YES, N - NO)?"
1550 IF INKEY$<>" " THEN 1550
1560 A$=INKEY$
1570 IF A$<>"Y" AND A$<>"N" THEN 1560
1580 PRINT TAB(22);"> OK ";A$;" <"
1590 BEEP:REM ADD 'BEEP' OR
      SIMILAR SOUND IN THIS LINE
1600 FOR T=1 TO 1000:NEXT T
1610 PRINT
1620 RETURN

```

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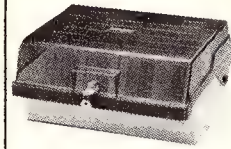
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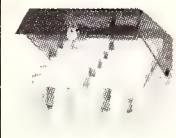
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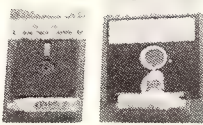


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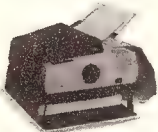
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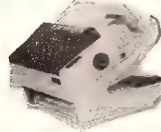
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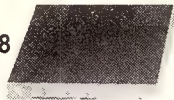


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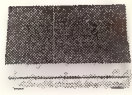
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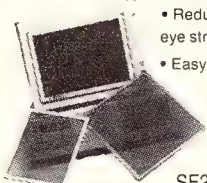
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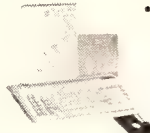
For 84 key keyboard

DC2 **\$20**

For 100 key keyboard

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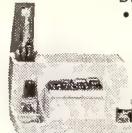
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FormTool — to create, edit, manage, and print your own forms

Computers are supposed to speed up simple tasks, eliminate the mundane, and make complicated tasks simple. In most cases this is true, except when a form is required. Suddenly using a computer is akin to water torture and using a manual typewriter would often be faster. John Hepworth offers a solution . . .

FORMTOOL IS DESIGNED for just one purpose: creating forms. I hear a few cynics saying that only bureaucrats need forms, but think again of the needs of the smallest company, community group or association. Everyone needs a membership form, an order form, an invoice, receipt or other form.

Now tell me, how with your wordprocessor can you create a box with two parallel lines around it? What are the characters which will form the corners of the box, and the vertical and horizontal rules? With some word processors or spread sheets just drawing a simple rectangular box is tedious and slow. Often it's impossible to use those graphics characters needed to draw a box.

In contrast, FormTool's dedicated design makes creation of a form a snack.

FormTool comes on two disks, the program disk and a utility disk, neither of which are copy protected. The program can be run from either a floppy or hard disk system. From the DOS prompt, typing FORMTOOL loads the program, giving an initial menu with one option being entry to the forms editor. Now a number of different standard form sizes are selectable by a keystroke or a custom form size can be specified.

The Forms Editor

On entering the Forms Editor a considerable amount of information is available (see Figure 2). A window is surrounded by an outline, and above it is shown the name of the active file, a line showing the column number in the form, another row showing the tab positions, and numbers

down the left side showing the row number within the form. The size of the form and the character and line pitch will also be shown.

When drawing a form move the cursor down and across to a selected position. Pressing F5 draws a line from the cursor position to the right side of the form, or

F-Keys (Drawing) F1:All F-Keys Menu F2:All Editor Commands F3:Double/Single Lines F4:Grid/Line Generator F5:Draw Vertical Line F6:Erase Vertical Line F7:Draw Horiz. Line F8:Erase Horiz. Line F9:Erase All Text F10:Manual Line Drawing	Alt+Keys (Text) F1:[A] Attributes/Fonts F2:[C] Alignment Counter F3:[E] Erase Form/Block F4:[H] Help / Help Menu F5:[J] Justify or Center F6:[L] Large Letters F7:[V] Vertical Typing F8:[W] Word Wrap Mode F9:[X] Fill Block/Symbols F10:[Z] Reformat Text	Ctrl+F-Keys (File/Print) F1:Save Current Form F2:Quit Form/Organizer F3:Get Another Form F4:Start a New Form F5:Switch Current Form F6:Toggle Between Forms F7:Print Current Form F8:Lst Active Forms F9:Rename Current Form F10:Load ASCII File
Shift+F-Keys (Blocking) F1:Mark Row Block F2:Mark Character Block F3:Open Block (Insert) F4:Close Block (Delete) F5:Copy Block (Insert) F6:Copy Block (Replace) F7:Move Block (Insert) F8:Move Block (Replace) F9:Drag Block (Replace) F10:Unblock (Unmark)	Ctrl+Keys (Other) F1:[Backsp] Delete Row F2:[Enter] Insert Row F3:[D] Quick DOS Shell F4:[W] Word Erase/Replace F5:[Q] Exit to Organizer	Alt+F-Keys (Screen/Form) F1:Change Options F2:Change Paper Size F3:Change Char./Inch F4:Change Lines/Inch F5:Change Tab Settings F6:Special Forms Tabs F7:Foreign Char. Sets F8:Key-Pad Char. Sets F9:Size current Window F10:Toggle Stack Forms
Alt+Keys (Merge) F1:[F] Easy Fill-Out Form F2:[M] Master Form Merge		

[F2] Editing Menu

Figure 1. FormTool's comprehensive Master Menu — a condensed version of all those available.

```

Current Form: Z:BOOKS      FormTool 2.0      Replace Row: 1 Col: 1 ← Status Line
      1          2          3          4          5          ← Tab Stops
1234567890123456789012345678901234567890123456 ← Rule Line
--BOOKS      Size: 8 1/2x11 - 10 CPI / 6 LPI
*
 1
 2
 3
 4
 5
 6
 7
 8
 9
10
11
12
13
14
15
16
17
18
19
*
[ALT][H]:Help  [F1]:Menu of F-Keys  [F2]:Master Menu  [Esc]:Exit ← Prompt Line
  
```

Figure 2. The Forms Editor. The asterisk in the lower left corner (below the row numbers) appears when any changes are made to the form; it disappears when the form is saved to disk.

YOUR SOLUTION IS BRILLIANT, WATSON, BUT WHERE ON EARTH DID YOU GET THE INFORMATION?

ELEMENTARY, HOLMES, I USED FORMTOOL. THE REST WAS EASY.



until it meets a vertical line. Press F7 and a line is drawn from the cursor to the bottom of the form, or until it meets a horizontal line. Pressing F6 or F8 erases along a horizontal or vertical line.

The process can be repeated until a form is generated, but two other methods are available to assist in the task. Pressing F10 initiates the cursor draw mode — the starting point for a line can be selected, and the cursor then moved horizontally and vertically leaving a line behind it.

Creating Grids

Alternatively, a grid can be created: Position the cursor at the top left of the proposed grid. Press F4, and answer the prompts to specify the number of columns and their width (in characters), the number of rows in the grid and how many characters high each row is.

Thus far, the boxes so swiftly created are outlined in single lines. Want some of the lines to be double? Put the cursor over a line, press F3 and the line is toggled to double lines; press F3 again and it's toggled back to single.

Entering Text

Text can be entered in either insert or overwrite mode (toggled with the Ins key), and wordwrap can be on or off. In overwrite mode, the boxes can be overwritten with text. In insert mode with wordwrap off, encountering a box outline when typing causes the cursor to stop (signalled by a beep). If wordwrap is on, the text wraps within the box.

Menus

A spreadsheet type menu system is accessed by pressing F1, and a number of menus are then available at the top of the

screen with most of the screen still displaying the newly created form. Pressing F2 replaces the screen image with a condensed version of all the available menus (Figure 1).

Selecting a command is simply a matter of moving the cursor to it and pressing Enter. Alternatively a command can be made by pressing one of the Shift-, Alt- or Ctrl-key combinations shown at the top of each condensed menu. In addition, pressing the Alt key in combination with various letter keys, accesses various character and text formatting commands.

FormTool can be used to create a standard form which can be used over and over again — fill in a copy and print it out or merge it with a dBase or Lotus file.

FormTool carries the expected range of block moves, deletes and copies. And, it is possible to move a rectangular area by selecting it and dragging it around the screen. As the area being dragged passes over other text or box outlines they disappear, and reappear after the dragged area moves on.

Saving and Merging

FormTool can be used to create a standard form which can be used over and over again — fill in a copy and print it out or merge it with a dBase or Lotus file. The facility to merge the form with data from another program means that those end of

month invoices can be calculated and printed in almost one action.

Design Limits

FormTool is fast and efficient within its limits. As I said at the beginning, it has just one purpose: creating forms. Unfortunately, it's designed around character based displays and not graphics. While this allows all types of video boards and monitors to use the program, it precludes seeing onscreen the effect changing type size has. While a range of printers is supported, including several lasers, the design assumption is clearly that a dot matrix printer with a limited range of character attributes will be used. Only eight character variations are available, in various combinations. These are bold, underline, italic, subscript, superscript, expanded, compressed and medium.

Documentation

Documentation is brief. At the opening page the authors state their belief that 'most people don't enjoy curling up with a manual,' and supply a brief 72 page booklet in the form of a tutorial. There is no index or reference material (other than the Keystroke Reference Card). On a utility disk supplied with FormTool are a large number of standard forms which, in fact, contain important reference material.

Value

It's hard to assess the value of FormTool — you'll have to do that for yourself. Just calculate the value of the time the program could save you or your business over, say, a year. If it's much more than \$300, you've got a bargain.

I found FormTool to be fast and simple to use. The manual was just a little too brief, and occasionally was at variance to the current version of the program. FormTool should be on the short list of any organisation which uses forms. □

Product Details

Product:	FormTool Version 2.0
From:	BLOC Development Corp Florida, USA
Review Copy from:	Perfect Interface Australia, PO Box 946, Crows Nest 2065 NSW (02) 957 6686
Price:	\$295 taxed

The Microbee Premium vs The Amstrad PCW8512

AT WEIGH-IN, both contestants came in at a very good price. The Amstrad at \$1499 (taxed) for a 512 Kbyte memory, dual disk drive system, including a monochrome monitor, printer and LocoScript, is significantly lighter than the Microbee. This price could prove a devastating advantage. Tonight Microbee and Amstrad are out to prove that their word-processors are able and willing to do honest professional work. If they fail, then who cares what the price?

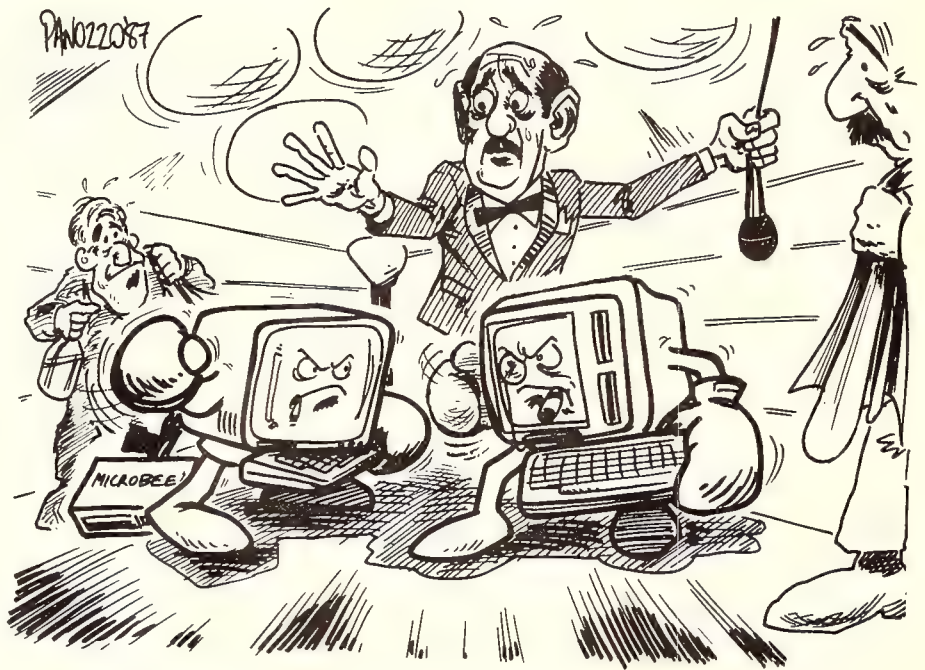
Microbee professional pack came in at \$2,499 for a dual disk system (\$1,846 with one drive) with high resolution monitor and printer, and with Simply Write. This is a good bit more than the Amstrad, but the 'bee is significantly cheaper to run because it uses much cheaper disks. You can currently get 5¼ inch disks for as low as \$1.50 and 3½ inch disks for around \$5 each. Microbee gives you a choice of either. The smaller disks hold twice as much data and are tougher, but I have used the others for years and find them fine. You should calculate on using at least 40 disks a year if you do much writing as you should keep two copies of all your files. (I use around 100 disks a year.) The Amstrad's disks cost nearly \$10 each.

To win this contest Microbee must demonstrate that it can give better value for money despite its smaller memory and higher initial price.

In the Dressing Room

In the dressing room I had a sneak preview of the contestants and felt their muscles before they shrugged into their dressing gowns. I have to report that the Amstrad has four arms of crazily differing strengths!

It's internal brain power or operational space (in CP/M) is 61K. Its internal RAM disk, the M:drive, is 368K. The disk drives are extraordinarily ill-matched. Drive A: is just 171K — and only one-sided! You have to turn over the disk to read the other side. Drive B: however has 702K available! This comes to a grand total of 1,302K available at any one time.



*Roll up! Roll up! For the Australian 1987
Fly-weight Championship!*

In the right-hand corner, the recent winner of the Swedish educational championship — that popular home-grown Australian the Premium Microbee armed with Simply Write, a new-fangled wordprocessing star-wars weapon. In the left-hand corner, fresh from sweeping successes overseas, comes the British challenger — the Amstrad PCW8512, muscle-flexing with LocoScript, the word-processing weapon with which they are challenging the world.

It seems plain silly having two differently configured disks for the one machine. The only reason I can see why they should not put a double sided 702K disk drive in both drives is to allow the use of programs on disks made for the cheaper

Amstrad 464 machine. I tried it out. If I first load the PCW256 system disk, I can then swap disks in A: and boot a 464 disk. But I did not find this much use. I could run *none* of the seven or eight Basic programs I tried to load from the 464 disk

Microbee vs Amstrad

with the Basic provided with the PCW256.

But the Microbee is not to be outdone. It has *five* arms! It's internal arms are 62K operational space and 62K assigned as a permanent RAM disk (M:drive). It then has either 776K per disk drive if you opt for 3½ inch disks or 386K per drive with the cheaper 5¼ inch disks. It appears to only have two external double-sided drives, but the A: drive can be used as an L: drive — you could run a program disk in A:, a data disk in B: and a back-up disk in L:. The machine will prompt you to swap disks when needed. This comes to a maximum of 2,452K accessible at one time — or 1,676K without using L:. (And incidentally, its Basic does run programs written for their cheaper ROM-based machines.)

The Microbee scores on disk capacity — but the Amstrad gets double points for its RAM disk size. A penalty is awarded against the Amstrad for having a single-sided A: drive and for not using industry standard cheaper disks.

What about speed? In real life, program speed depends on how machines use their memories and on how fast they access their disks. This is more important than clock speed. Both machines load faster than the standard IBM, both use their RAM-drives automatically to speed up the running of their programs. The Amstrad automatically parks a small part of its wordprocessing program (the templates and phrases) in M:, both machines automatically save recently used data in any part of M: you aren't using and thus speed up their programs — Microbee says by 50 per cent or more.

The Microbee program and disk drives appear to be somewhat quicker, you could easily have it load its wordprocessing program into M: and run it even faster. I tried this out and it worked *fast*. (The Amstrad might be able to do this but I am not sure.) Both machines are faster than the standard IBM. They won't let you sit there and fret.

Also, both keep their cool with no need for fans — for me this is a very important consideration. Who needs an incessant hum (or roar)?

The Microbee has a definite edge in its M: drive programming. Resetting the Amstrad destroys all data in M: (as it does on IBM's) — not so with the Microbee. You can reset to your heart's content and not disturb a hair on the head of programs stored there.

It is nearly time for the battle. Before leaving the dressing room, have a sneak

Disk management											
Drive A:				Drive B:				Drive M:			
127k used 46k free 26 files				14k used 692k free 2 files				4k used 362k free 2 files			
ADVERT	1k	group 4	0k	group 1	10k	group 4	0k	LETTERS	2k	group 4	0k
SAMPLES	12k	group 5	0k	group 2	0k	group 5	0k	SAMPLES	0k	group 5	0k
COMT	1k	group 6	0k	group 3	4k	group 6	0k	COMT	2k	group 6	0k
TEMPLATE	17k	group 7	0k	group 4	0k	group 7	0k	TEMPLATE	0k	group 7	0k
A:LETTERS 7 files				A:SAMPLES 5 files				A:COMT 1 files			
0 liabo files				0 liabo files				0 liabo files			
ADVERT	.EG	1k		DOCUMENT	.EG	4k		TEMPLATE	.STD	1k	
READ	.ME	3k		LAYOUT	.EG	1k		LETSPACE	.HDP	2k	
TEMPLATE	.STD	1k		BOOK	.EG	3k		LETTER	.HDP	1k	
4 hidden	86k			TEXT	.EG	3k		LETTER	.PLP	1k	
								MANUSCR.		2k	
								WORD		2k	
								PAGENUM	.CEN	1k	
								PAGENUM	.PR	1k	
								PAGENUM	.R	1k	
								PHRASES	.LEY	1k	
								PHRASES	.NUL	1k	
								TEMPLATE	.LAB	2k	

Figure 1. The formidable looking initial screen in LocoScript on the Amstrad PCW8512.

look at their keyboards. The Amstrad's is bigger with a numerical keypad, four function keys, ALT and Extra, Stop, Exit and Cancel, Return and Enter, Cut, Paste, Copy and Printer. It is a good keyboard for a newcomer to computing although it felt a bit too soft for my taste. Experienced computer users (especially WordStar users) would be bewildered by the lack of a Control key and by the splitting of the normal functions of Return. It will end paragraphs as on other machines — but it will not operate commands. For that you must type Enter.

The Microbee has only a few keys more than the standard typewriter. It only has Control, Escape, Break, Reset and Line Feed keys added — nine keys less than the Amstrad. It's cursor keys are in a line low down, not as convenient as the Amstrad's diamond centred in the numerical keypad.

As a touch typist, I found the Control plus Number system on the Microbee easier to use than the Shift plus Function key system on the Amstrad. The right hand shift key is also too far to the right for easy striking. But I loved the Cut, Paste, Copy and Find keys.

The Amstrad scores on these dedicated function keys and a better layout for its cursor keys. The Microbee scores on having a firmer touch.

Our two contestants are now leaving for the ring. Other comments on their basic equipment will have to wait till later.

Ringside

They are in their corners now. The Amstrad is up and ready to go quicker than the Microbee — just plug its monitor into the power supply, and its keyboard and printer into the monitor. Very neat! It clearly scores here — especially for those who often move their machines.

The Microbee plugs the disk drives and the monitor separately into its power supplies, then connects the keyboard both to the front and back of the disk drives and to the monitor. The crowd grows restless — but it is only on the initial set-up that there will be this delay. Once all is connected the Microbee actually loads its system and programs a few seconds faster than the Amstrad.

Power on!

Power is turned on. (The Amstrad scores here in having its power switch at the front rather than the back.) Both load fast.

The Microbee is provided with two start off programs, the Shell and the Easy menu, both easy to use. The Shell is a directory of all files on any one drive. You can toggle from A: to B: to M: to L:. There are icons along the foot of the screen to allow single key choices of the most commonly used programs — pick the program you want with the cursor or use the icons. Icon 7 brings up a new Shell with copying, displaying, renaming and deleting. Icon 6 brings up disk formatting and other sub-screens that allow you to configure your system with ease to use different colours, to set disks to start on any program on booting, to position the screen and more. Icon 6 is telecommunications, Icon 3 is Viatel; 2 is a database. Of course, you can set your own icons. Wordprocessing is just

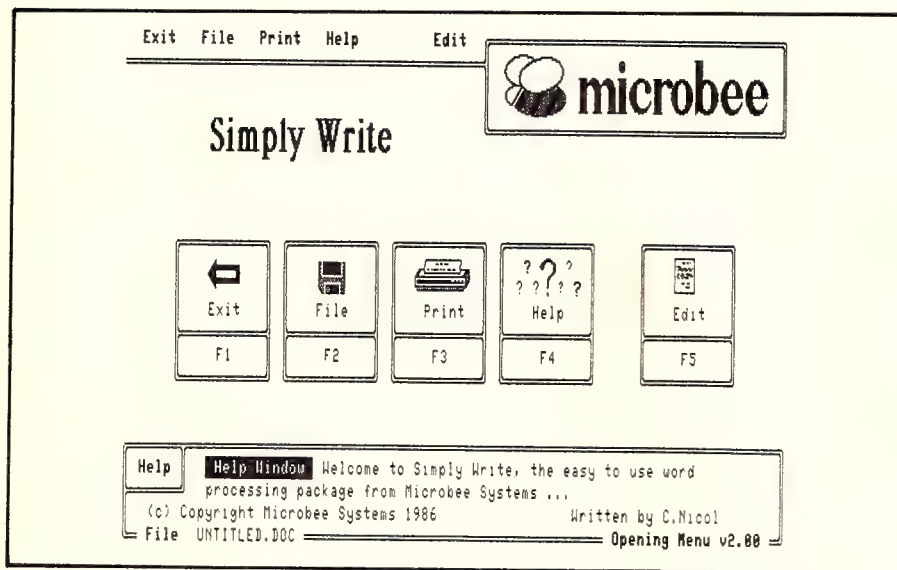


Figure 2. The friendly opening screen for Microbee's Simple Write.

one of the initial choices in the Shell.

The Easy menu is a simplified menu that allows the icon choices but does not show the directory.

Both machines have Basic and common CP/M utilities — including a safe way of formatting disks. The Amstrad has Logo supplied, unlike the Microbee, but otherwise the Microbee comes with more (and better) utilities.

Point to Microbee

With the Amstrad, you pick the LocoScript side of a disk and insert it in the drive with that side on the left. The initial screen in LocoScript is the very full and, at first sight, complex DISK MANAGER. This allows you to copy, rename, erase, inspect a summary of a file and print-out by using the function keys. Formatting and copying more than one file at a time is done through a separate program called DISKIT. This is unfortunately hidden away on the other side of the disk and not now accessible — a point to Microbee.

The Disk Manager screen reveals that the Amstrad has a remarkable 32 lines of text per screen, up to ninety characters across. The lettering is clear, green, steady and easy to read, but I found it can be a bit of a strain reading so small a print for a

long time. But it is very useful to have 50 per cent more text on the screen than with Wordstar or Simple Write.

Score for Amstrad!

This extra space allows the Amstrad Disk Manager to list, not just the files on A:, but also those on the other drives. It scores a bonus point here. In the upper part of the screen the files on each drive are listed under four group headings per drive. Each group can have a specified 'template' to allow pre-set formats for different kinds of documents. For example, you can put all your letters in one group, memos in another and report writing in another. Microbee's Simple Write can set a layout for each document — but not one for a group of files. This then is a major point scorer for LocoScript.

The lower part of the Amstrad screen lists the files under group headings. It scrolls unusually from left to right, from drive to drive, while the top half of the screen stays put.

An excellent feature is a listing of the number of files per group DELETED! All deleted files are said to be in 'Limbo' (the place for unbaptised souls in some Christian traditions). Only when there is no room elsewhere on the disk will they be destroyed (sent to Hell perhaps?) — and then only one by one. This is a great safeguard. Another point to Amstrad.

The Rename function allows you to resurrect files from Limbo. Their names reappear in the directory and they are as good as new. The Rename facility also allows you to hide or reveal Hidden Files. These are normally the program files which you interfere with at your peril.

The Copy or Move functions operate only on a file at a time and require quite a lot of cursor movement to effect. You have to place the cursor first on the file, then call up the command, then scroll the screen sideways until you find the group and the drive on which you wish to place a copy.

Extraordinarily, there is no way of stopping the program short of resetting and thus wiping the Memory drive. This would make it hard if you wanted to exit to use another program to mass back-up files or even run a spelling program on a file in the fast M: drive.

All these commands come with either drop down menus (the latest fashion) or with re-written command and information lines along the top of the screen.

Who said 8-bit computers were dead?

In the Microbee Corner

But the Microbee has drop down menus too — let's look at what's happening in its corner. We left it as it was starting up SIMPLY WRITE, its new wordprocessor. This is not the only word processor with the Microbee — but more about this later.

Well, Simple Write came up fast with its own initial screen — with a large bumblebee in full colour if you have a colour monitor — and with its own set of function keys.

Its characters are much larger than those on the Amstrad. When editing, it shows up to 21 lines of text on the screen against 27 in Amstrad's LocoScript. They are clear, well drawn and a pleasure to read. No eye strain likely here — but there's less text on the screen. You make your choice.

Simple Write's Initial Screen looks much simpler than the Amstrad's Disk Manager. It allows five choices — Exit, Files, Print, Help or Edit. A drop down menu appears when you make your choice giving more choices — as with the Amstrad. But here a box at the bottom of the screen offers a fuller explanation of the choices.

There is no listing of documents until you pick the Load File option on the Files drop down menu. A drop down directory then appears that lets you select the file you want. This is a very neat way of doing

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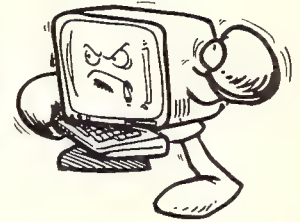
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A younger brother of one of the contenders, the Amstrad PCW8256, carrying almost \$400 less (\$1149) with 256K RAM, could have been a lethal foe for the Microbee, but it has only one disk drive of limited capacity (171K), most of which would be needed by LocoScript. It uses its 112K RAM disk M:drive for its files, necessitating frequent disk swapping to save copies from sudden death at the hands of power cuts and even resets. This is not recommended for anyone who has to do much writing. □

things. It cannot group files together as does Amstrad — but it's easier to use. Before we go through all the options on Simply Write's initial drop down menus, let's get into the real action — into editing a file with Simply Write. This is accessed with F5 from the start off menu.

Now the action really starts to get interesting. Again there are drop down menus that can be accessed with 'Control' plus One, Two, Three, Four, Five, Six, Seven and Eight. These are as easy to use as the drop down menus in the thousand dollar program Framework II. Once you have called up one menu, you can move from one to the other with the left and right cursor keys. (A point here to the Microbee. On the Amstrad you have to Cancel a menu before you can look at another.)

Simply Write supplements the drop down menu with handy extra little windows. These appear in the midst of your screen as needed, allowing the entry of information such as the text for headers. LocoScript uses a whole screen or drop down menus. A point to Simply Write for presentation.

Let's go straight to the Style drop down menu. This lists the choice of Bold, Underline and Italic. Select the one you want with a Return. Carry on editing — and you have italics, underlining or bold before your eyes *on the screen*. You can even choose all three and have bold, underlined italics on the screen.

This is a wonderful facility only available with expensive 16-bit programs on an IBM such as Word or Framework. In fact, the combination of onscreen italics and colour demands the combination of Word and an IBM running an Extended Memory Board to give it 1000K of RAM.

This feature alone makes Simply Write quite sensational. Who said 8-bit computers were dead?

But there is, wait for it, still more. Try calling up the Font menu. This gives a list of ten fonts. Select Running and — you now type on the screen in a flowing script! Go back to the Font menu. Pick French — you now have all the letters with accents. You can even pick a font that lets you write an electronic circuit to screen or to set borders around your document. Up to 6 fonts can be used per document.

It's a shame that only ten fonts can be accessible at a time. When I looked at the

Master disk I found that there were more provided. Pick out your top ten and put them on your M: or B: drive, or save all the others to another disk and delete them from your program disk. You can tell the program to look to any drive for its Fonts. ▶

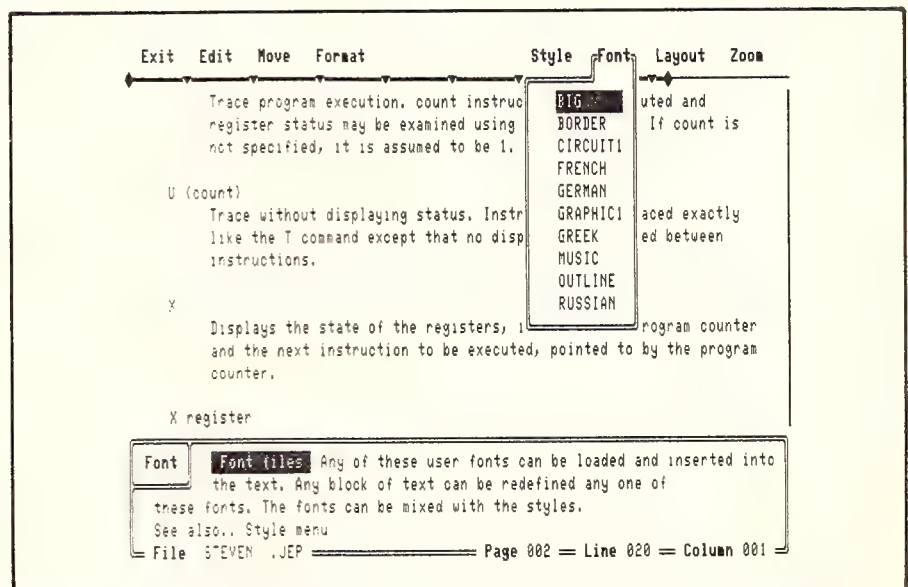


Figure 3. Simply Write's Font menu offers a choice of 10 fonts — and the text appears onscreen in the chosen font (and Style — bold, italic, underlined Greek is yours, onscreen!) No Latvian, you say? — read the text.

Microbee vs Amstrad

The Microbee has a definite edge in its M: drive programming. You can reset to your heart's content and not disturb a hair on the head of programs stored there.

One font available is Greek — this alone makes this program invaluable to many Australians.

But, you say, all these redefined keyboards must be very confusing. They are — go back to the initial menu (Control 1) and set FONTHelp on. Go back to your document again (Control 5). The bottom half of the screen is now a graphic representation of the keyboard and, as you change fonts, the keyboard changes. Brilliant!

But, no Latvian script, I hear you say. Just leave Simply Write, enter a program called FONT.COM on your master disk and up comes a font editing program complete with its own set of drop down menus. This allows you to flick between four different fonts on four differently coloured overlaid screens. Here you can edit any font to your heart's desire.

Simply Write prints the loaded fonts in graphics mode, but the normal text, italics and bold are in the clearer 'normal' mode

Amstrad's Breathing Hard!

After all that font work, the Amstrad's has been left for dead. It can only underline onscreen. LocoScript inserts printing codes by writing them 'longhand' into parenthesis in the text. You can toggle these on to make them visible. However the codes are so lengthy that this often makes the screen quite untidy and hard to read.

If you don't toggle them on, the only way to tell what script variation is being used is to put the cursor over the text and see what is reported on the top line of the screen. However the ALT and Extra keys extend your keyboard. ALT gives you a set of fractions in eighths (all neatly drawn in one character onscreen) and the most used Greek letters; Extra gives French and

Now it's Simply Write's turn — it tries the Zoom menu. A representation of the current page appears in a box on the right side of the screen. A dot marks the position of every character. It even shows the position of Footers and Headers. This is marvellous for looking at overall layout. Once again LocoScript is knocked reeling. It has nothing like this. Spanish accents and punctuation marks onscreen.

Simply Write Staggers

Let's drop into editing in LocoScript and try out it's Style menu. This prints out (but doesn't show onscreen) half height characters, italics and pitch changes. You select with the plus and minus keys each side of the space bar. Select Pitch and the drop down menu is extended with a wider range of pitches from 10 characters per inch to 17. (If you pick 17 you will be able to type about 40 more characters to a line. This extends the line off the right hand side of the screen. It looks untidy — but it's fine when printed out.) LocoScript also has proportional spacing. Simply Write staggers a bit here. Changing pitch is something Simply Write simply cannot do.

A Hard Right from Amstrad

The Amstrad comes back with LocoScript's drop down Layout menu. This allows editing the basic layout for the current document (it automatically reformats), or editing to create a new layout. There can be up to 99 different ruler lines that include decimal tabs, centering tabs, right or left justifying tabs in one document — and each one can be summoned by number. This makes table work exceptionally easy. Simply Write's a bit dizzy — it only has normal tabs.

The Format menu in Simply Write allows margins and tabs to be edited. A handy thin red line dissects your screen to help position the margin or tab. You can change the format and choose only to reformat part of the text.

LocoScript lashes out with the Line Layout menu. This is easily parried by Simply Write. While LocoScript allows centering or right justifying it can only do one line at a time. Simply Write allows continued onscreen right justifying or centering until the instruction is cancelled.

Worse than this, LocoScript does not centre the line onscreen when asked. It merely inserts on the line the printer instruction (Centre). Right justify a line — it stays on the left of the screen but with the instruction added (Rjust). Points lost, LocoScript! It does allow setting soft or hard spaces, soft or hard hyphens; it changes line spacing too — points regained.

Holding Even

Simply Write counters with its own Layout menu which allows setting of lines per page, paper width, page offset, top and bottom margin, header and footer margin. These are saved within a document and can be used with different sizes of paper. LocoScript counters with its Page Size menu which sets page length, head and footer positions, top and bottom margins. For the moment they are holding even.

They both decide to go for headers and footers (these are single lines appearing on all pages at the top and bottom). The Edit menu in Simply Write brings up very neat centre screen menus on which you can set these on the left, in the centre and on the right of the page. ▶

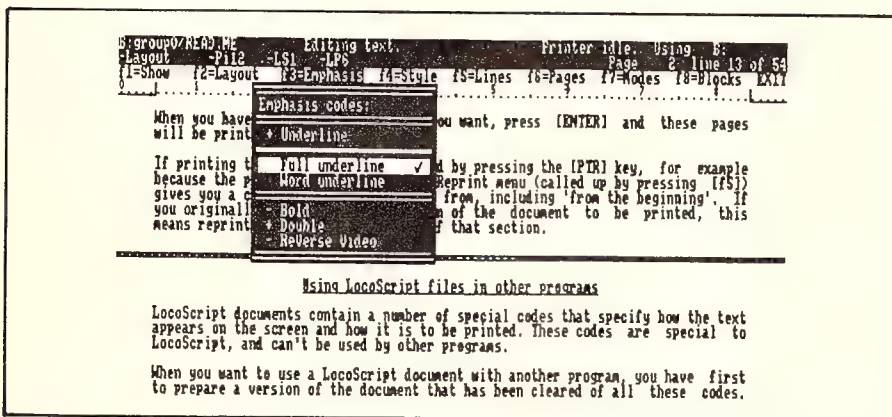


Figure 4. LocoScript's 27 line editing screen showing the Emphasis codes

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LocoScript doesn't help you set the line as nicely — but it allows for different footers and headers on odd and even pages and even the exclusion of both or either on the first and last pages. Once more LocoScript has greater power in its more detailed professional facilities.

Simply Write now goes in with the heavy block moving stuff. It's Edit menu drops down — pressing return now puts you into Block mode. Move your cursor left or right or down — text lights up in reverse video. Drop down the Edit menu again and press Return to end Block definition mode. You can now Cut the block out and Paste it elsewhere, or simply Copy it. If you have selected a new Font — you can reformat the block to the new font. You can turn it entirely from lower case to upper or vice versa.

Well, LocoScript can't change cases like this — but otherwise it can do much more. You can save up to ten blocks and recall them by number. You use the 'Cut', 'Paste' and 'Copy' keys on the keyboard.

You can save up to 26 short blocks by giving them a letter of the alphabet as their name for a word or phrase 'library.' However the total number of characters available is only 550 — so, since a single phrase can be up to 255 characters long, great care must be taken not to use them all up unnecessarily.

LocoScript allows you to insert anyone of these blocks or phrases as many times as you wish with Paste and then the block's number or letter. Simply Write has nothing like this. LocoScript also allows you to write a block to disk as a separate file. Or, you can read another file in from disk.

Here is Simply Write's greatest failing — it has no facility to insert another file into a document from disk. I would find this a serious handicap in my more serious writing work. (In WordStar, for example, I constantly read in other files to consult or merge them.)

Still a Few Punches Left

There are still a few punches remaining in the fight. LocoScript uses its 'Find' and 'Exchange' keys to great effect. Find is used within Block mode to mark out a block with great speed. You can tell it to

replace a word with another in a whole document, a page or a paragraph. (Simply Write doesn't know these tricks — points to the Amstrad.)

A quick nasty jab from Simply Write — it flicks out a drop down menu and with a swift Return turns up an instant word count and tally of the memory remaining. This is an excellent feature — especially for students and journalists who both have to write to a word count.

LocoScript, in a quick sidestep, showed the unusual facility for creating an 'Identity Text' for any document. This is done through a drop down menu that offers three lines of 30 characters each in which to describe the document. This 'Identity' can then be called up from the Disk Manager screen whenever you wish to 'Inspect' a file to see what it contains. This is quite useful, but sometimes I would like to be able to read a whole document as well without disturbing the file I'm editing.

Both packages score points on being able to toggle to and from their initial disk management screens without disturbing the file being edited.

A Nasty Jab

But LocoScript gets in a nasty jab with its Page Breaks sub menu. It can prevent widows, orphans or even broken paragraphs at the foot or head of any page. (Widows and orphans are single lines of a paragraph isolated by page or column breaks.) Few if any of the professional programs have the power to outlaw broken paragraphs.

Final Blows . . .

Finally, any word processor worth a pinch of salt must print out well.

The Amstrad has an excellent screen dump accessed with the Extra Print key combination — the printer is entirely controlled from the keyboard. Single sheet or

continuous paper feed is permitted.

Simply Write allows you to request a multiple printout, a graphics dump, a blank title page, a draft copy without fonts or character styles, single sheet or continuous.

You can install a high class printer on either machine, but you would need to buy a parallel or serial interface for that on the Amstrad. The Microbee comes with both parallel and serial ports and ports for both a monochrome and a colour screen. The Amstrad does not run colour.

Both contestants take care to prevent document loss when you finish editing. They save the document before exiting by default. Both give you the choice of abandoning the document.

Both can write out a file in pure ASCII form to allow for easy transfer of data to other computers running other programs

Scoring

The two battlers are almost exhausted (*me too*). Both programs and both machines performed well . . . and the bell rings.

Simply Write's graphic abilities are astounding and very easy to use. Newcomers to the wordprocessing world should take to it with ease. However, it lacks the finer points of professional wordprocessing programs, notably the ability to read and write blocks as files to disk and to merge documents.

LocoScript on the Amstrad is a thoughtful and quite complex package that has much of the power of 'professional' wordprocessors. It is certainly cheaper than buying a Microbee with Simply Write. It would be better than Simply Write for research work, for tables, for major writing tasks that don't require fonts or italics and for office work that requires templates.

However the Amstrad's offering isn't as easy to use as the Microbee's. I found an apparent lack of consistency in controls —

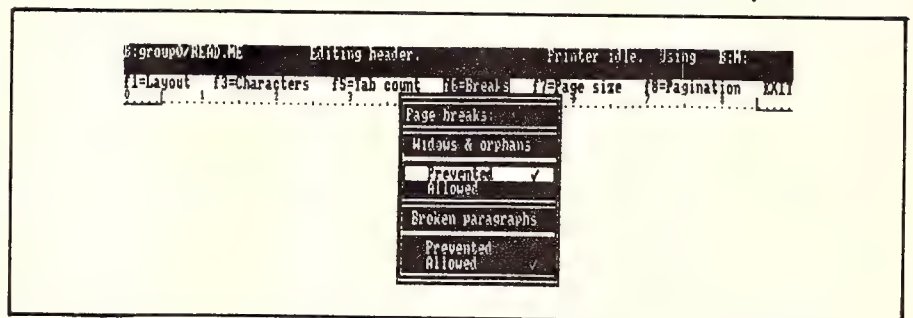
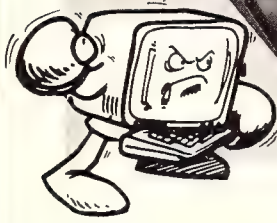
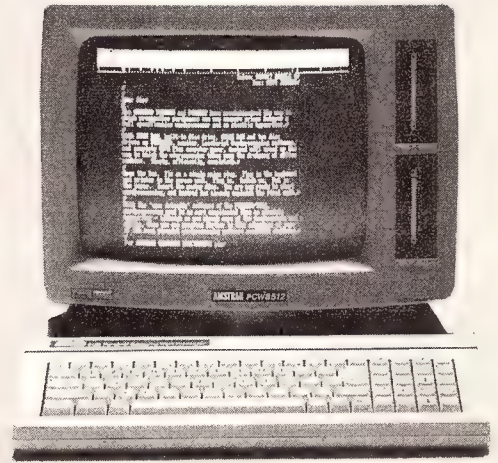
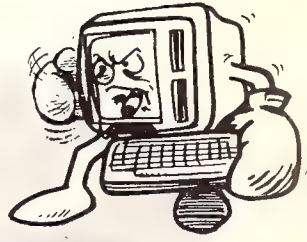


Figure 5. LocoScript's Page Break sub menu prevents widows, orphans or even broken paragraphs — a feature not found on many 'professional' programs

Microbee vs Amstrad



sometimes menu options are selected with the Plus-key, sometimes Enter, sometimes you need both. I got lost and frustrated more than once — especially when trying to activate the printer for a screen dump or in trying to remember where I saw a particular drop down sub menu. Of course, this becomes easier with use.

The Shell System with its utilities on the Microbee is much easier to use and faster for disk management and for changing between programs.

Both programs could do with an Undo key for accidental deletions.

If you want to use the computer for more than wordprocessing, you'd do well to examine the ranges of programs supplied with each of these two and what's available for them. The Microbee comes with more and this *could* help justify the higher price, but both have a good range of extras available from the suppliers. Look at the cost of accessories such as modems, and the availability of future reasonably priced up-upgrades. Microbee may well have the edge here as it is an Australian made machine with upgrades avail-

able for reasonable prices.

Try out both keyboards to see which *you* feel most comfortable with, and test both screens to see if you want more text or more graphics, and to see which your eyes

are most comfortable with. Both machines are excellent value.

The winner of the 1987 Fly Weight Championship of Australia is — add up the points for the winner in *your* ring. □

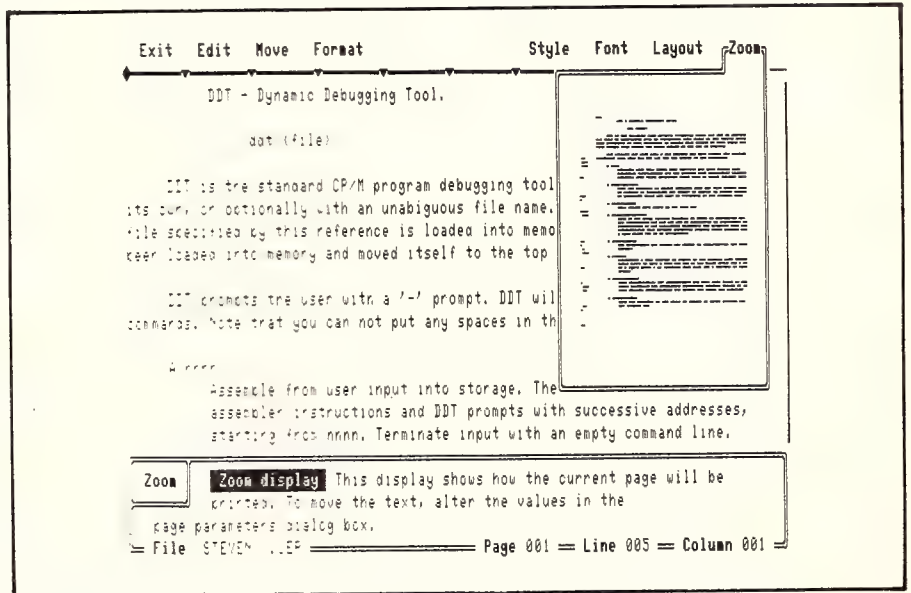


Figure 6. Simply Writes Zoom menu shows a representation of the full page, including any headers and footers.

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\$9.50

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\$7.50

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IC PROJECTS FOR BEGINNERS BP0097
F. G. Rayer
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112 pages

ELECTRONIC PROJECTS USING SOLAR CELLS BP0082
O. Bishop
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128 pages

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DIRECT Help



IF EVER A CHILD, diagnosed as dyslectic, could be described as 'lucky', then that child is Peter Pollard. At the age of eight he had failed to master basic reading skills and had been described by psychologists as 'having severe word scrambling problem-dyslexia'. This means that when viewing the written word, the sufferer does not see what is on the paper, but some scrambled form of the word. The brain fails to 'see' the word in the right order and might 'see' the word 'aixelsyd' where 'dyslectic' was written. This results in almost complete lack of comprehension during reading with subsequent falling behind in all other educational skills.

Peter's father, Dr John Pollard, had the knowledge and equipment to try a bold experiment, using computers instead of the repetitious one to one teaching methods used in the past.

I first saw the resultant program, Direct Helper, in action on a friend's System 80, way back when 16 Kbytes was considered a good-sized home micro. The program was first developed in 1978/9 and bases its success on the fact that the computer may easily be programmed to keep pace with even the slowest reader, and it never loses patience. It can control a cassette recorder to give audible responses to the students input and thus reinforce the lesson



Victims of dyslexia are unfortunately slow to be diagnosed and often put down as just plain lazy. Traditionally, the 'cure' has been tedious, frustrating repitious excercises — but now, as Ewart Stronach found, help is here . . .

Where to Start

The problem with the dyslectic child is where to start. Victims are unfortunately slow to be diagnosed and often overlooked as lazy. Teachers today are fortunately far more skilled in recognising the early warning signs of dyslexia and most schools now boast a micro. More importantly, the cost of micros has fallen to the stage that it is not an insurmountable hurdle for the majority of families to dedicate a computer to helping the dyslectic child. While the degree of reading skill retardation varies with each child, this example will show the problem — a child was asked to copy down the following sentence:

Down the cold, dark stairs crept the man in the black coat. Closer he came, closer and closer. Asleep in their blankets, Dan and Pete were unaware of their danger

The passage was perceived by the dyslectic child as:

Now the could, back stars keep the man in the dalk coat. Colser he came, colser and colser sheeping the dantes and deer wore nuraw for the bang.

Imagine the frustration at both levels. First, the child who must see himself or herself falling behind the class, and the frustration of the teacher who must devote substantially more time to this student at the expense of the rest of the class. Research has shown that reading skills can be taught and repetitive showing of the word combined with slow pronunciation is effective. The words should be broken up into parts or syllables and recognition of syllables can be carried over into other words. Repetitive, tedious work — just the thing for a micro.

Pollard's program, Direct (Dyslectic, Imaginative Reading Encouragement using Computer Technology), addresses the problem with a skill obviously born of first hand knowledge.

The first section of the program is called SAY. Simple words are built up on the screen with large block graphic letters, letter by letter, or syllable. The computer is attached to a cassette recorder, and when a key is pressed, the cassette speaks the word.

An element of serious fun is incorporated by the addition of Robots, who cross the screen and form a queue on the other side with the aim of reducing the time taken to recognise the word by keeping the queue as small as possible. A rocket ship appears, crossing the screen from left to right, to keep the student aware of the need to read in the right direction. Both the rockets and the robots speed can be adjusted and the robots may be deleted if they prove to be a distraction. The time taken is displayed and at the end of a group of words, the average recognition time and score is shown.

Choice of the words is based in the first instance on well documented frequency lists of words needed for basic skills. There are 44 sounds of English, embedded in the list which is drawn from the Campbell Word List, which will be familiar to all reading teachers. Other words come from the Dolch Word list. As skills build with the use of the SAY program, the student moves on to the STORY section of the suite.

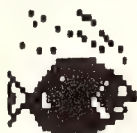
STORY uses words which the student has mastered, and builds a linked story, presented on screen at a controllable rate with an animal figure which moves along the story line at an appropriate speed. At the end of each session, the student's reading speed is calculated and displayed. There are a number of 'stories' supplied on the disk but the inference is that the

Direct Help

teacher or parent evolve their own stories. Running the STORY section demands the assistance of a supervisor to correct the student and control the speed of progress.

The SPELL segment follows naturally from the other two programs. It is not sufficient that the student learn to recognise words, but he or she must also be able to spell correctly.

Self esteem plays a large role in the progress of these special students, and the confidence which comes from being able to write, as well as read, for the first time in their lives, will surely encourage further study.



SPELL teaches in three different ways. On a key-stroke, the cassette speaks and spells a word and the student types it into the computer. In the second mode, the word is spoken only, and the student must type it in, and in the final mode, a story is displayed and when a pause occurs on the screen, the cassette speaks the word and the student enters it.

HIDE AND SPELL displays four words on the screen, one of which is incorrectly spelled. The student is encouraged by visual rewards, to identify and correct it.

The results tabulated from the program offer great hope to those afflicted with the problem. Quite apart from the obvious improvement in reading skills, attitude changes became apparent with tested children. One child 11 years old who was able to use the program for a period of seven months, improved his reading skills from his previous ability of that of a 7 year 11 month old reader to a 9 year old reader and his comprehension level from 7 years, 10 months to 10 years, 8 months.

In other words, his comprehension levels had progressed 2 years, 10 months in a period of seven months. This marked progress brought about a new awareness of his ability and a keenness to extend his new found skills.

The program is not easy to master, despite very clear documentation. Perhaps my skill is more towards hardware and my total lack of teaching experience slows me down, but ideally, a teacher with computing skills would be the best combination. I am sure that any competent teacher could master the package and familiarity would

Dataflow Computer Services presents...



DIRECT Helper



1. Say 2. Story



3. Prep 4. Spell



5. Hide & Spell



Figure 1. Direct Helper's opening menu. While the program is aimed at young people with reading problems, there is a module that could be modified to suit any age.

speed up the application. The documents are written with non-computer users in mind and logical steps are clearly defined.

The IBM Version

The IBM version tested requires a PC with at least 128 Kbytes, colour monitor, at least one disk drive, (two preferred), DOS and a cassette recorder. The program will operate without a cassette but I feel it would be somewhat emasculated. Most clones do not boast a cassette port, and in fact many genuine IBMs don't either, but it should pose no major problem to build a device which will read the RS323 and switch the cassette on/off on demand.

The drawback of the cassette based computers, (TRS80, Commodore basic units and so on), is the loading time of the programs. They are long compiled Basic

programs and given the unreliability of cassette based programs, could prove a bother. On the other hand, if economics don't allow the expenditure of over \$2000 for an IBM or workalike with colour, the program is no less effective on smaller machines.



What the program most demands is a patient, caring tutor. Direct will *not* solve the problems alone. It requires careful supervision, preferably from someone with educational knowledge and a fair amount of time on a regular basis. Ideally, the system should be used in a school. The necessary supervision can be minimised once the pupil has mastered loading and operating the program, but regular checking and up-grading of the word lists is essential. This should not discourage anyone from applying the course at home. You will strike problems, but none that could

Product Details

Product:	Direct Helper
From:	Dataflow Computer Services 124 Barcom Ave, Rushcutters Bay 2011 NSW (02) 331 6153
Price:	Apple II/Ile/Ilc \$329 Commodore 64 Disk \$195 IBM PC/AT/XT/IX \$330 (Microbee and BBC are in preparation)

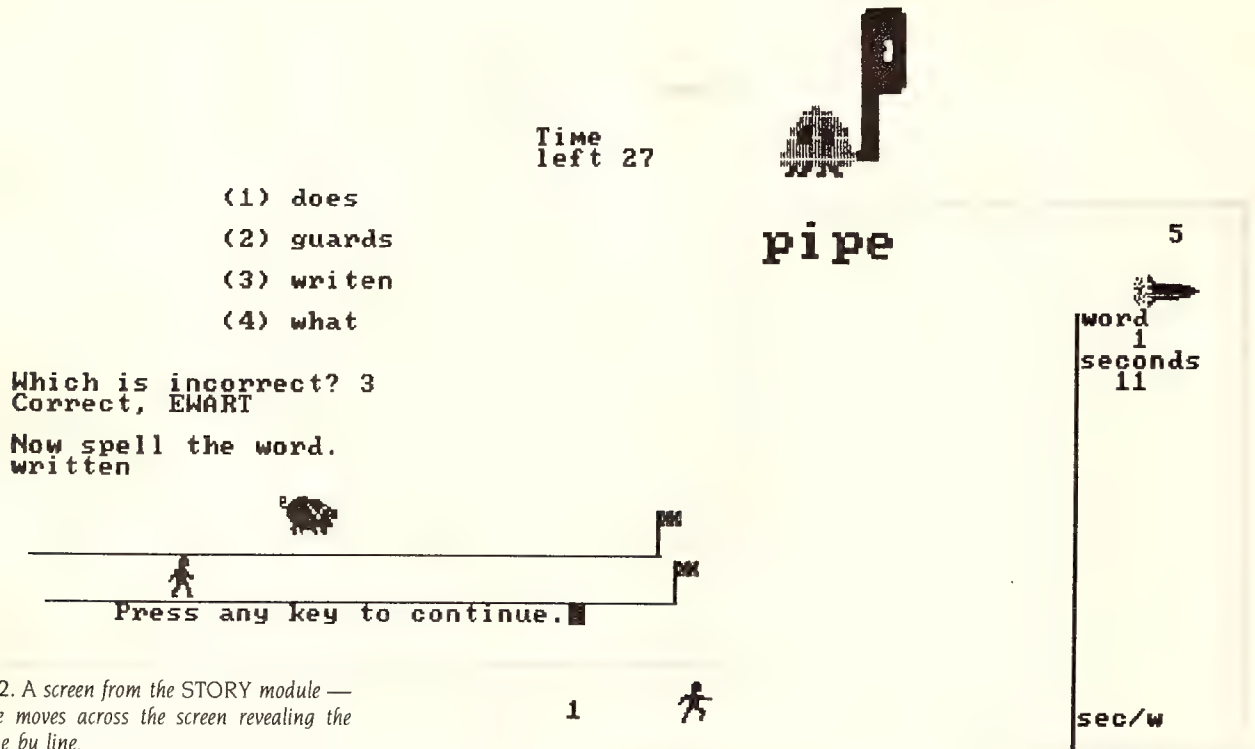


Figure 2. A screen from the STORY module — the horse moves across the screen revealing the story, line by line.

not be sorted out by discussion with your child's teachers.

If you have a child who needs the assistance this program offers, I suggest you show this article to the school. As I said, most schools now have some sort of computer and with the BBC and Microbee version in sight, nearly all the general computer formats found in schools will be ca-

Figure 3. The HIDE & SPELL program displays the time left and illustrates it with a runner moving across the screen, from left to right.

Many years ago a man, his wife and their two sons went far away from home. Here they found food and rest. They could buy what they knew was good to eat and they ate well. Before long the sons were married to local girls. One of these was a pretty girl Ruth. They lived together happily under the one roof where they could help each other to wash their clothes clean and white,



tered for. There are still, unfortunately, some teachers who resist the impact of computers in their field. The program should be welcomed by all teachers as it addresses the most basic of problems encountered.

For Any Age

Whilst the program is clearly aimed at young people with reading skill problems, a module supplied with the program to add words as needed could very easily be



Figure 4. A screen from the SAY module — Direct Helper incorporates fun into learning by the addition of Robots who cross the screen and continue to cue up until the word is recognised. The Rocket Ship crosses the screen from left to right as a reminder to read from left to right.

used to modify the whole thing to suit any age. Direct is already being used in Pen-tridge Gaol with excellent results.


The percentage of illiterates in gaol is appalling, around 10 per cent, and the correlation between illiterates and criminal tendencies is too obvious to be overlooked. Statistically, one in ten children in our schools have some form of reading problem. This program is too late to keep those already in gaol out, but properly applied to the problem area now could well keep many 'on the level'. □

Interested in Education?

NEXT MONTH Your Computer starts a two part look at computer-based education at home and in school — what to look for in educational software, programs for teaching English and maths, self-educational packages, and more...

We've also included a look at a hand-held calculator with the mathematical power of a mainframe — it makes differential equations child's play! □

Digicard Printer Buffer



and bonus serial to parallel converter!

*If you and your computer
have got better things to
do than wait for your
printer to finish its job,
then Ewart Stronach may
have the answer . . .*

WHAT'S A printer buffer? Who needs one? Will it enhance my life style and make the world a better place?

Well, a print buffer is a hardware device about the size of a paperback novel but much more functional. It's located on your desk between the computer and the printer, in most cases, by the simple expedient of plugging the printer cable into the buffer and the buffer cable into the printer with no further set-up required.

Who needs one? Anyone who uses a printer for non-trivial matters, particularly when you would like to go on computing or entering text while your printer chatters

away in the background without holding up the foreground task.

Will it enhance your lifestyle? If you consider time saved as time gained and use that time in some worthwhile pursuit such as testing sun tan lotions, then yes, it will enhance your life style.

But seriously, folks, the Digicard represents the simplest style of hardware buffer and the simpler the better in this type of device. It is practically invisible to the computer in normal use and any data which would normally go to the printer just goes to the buffer, which holds it until the printer catches up.

With the ability to soak up 256 Kbytes, it can hold 262,144 text characters and make your computer think they are already

printed and allow you to resume normal operation a lot faster. You can send data of any type including complex graphics to the buffer without the printer even being turned on (provided you haven't powered down the buffer), and print the data out at any time that suits you.

The unit looks as simple to operate as it is. It has two LED's on the front panel and two switches. The green LED is a power indicator and the red one indicates that there is something in the memory awaiting printing. The first switch allows you to clear the buffer and the second is for selection of parallel or serial printer.

The back of the unit has two cables emerging from the bowels of the beast and two DB25 female sockets. The cables

Product Details

Product:	Digicard Printer Buffer
From:	Maclagan Wright & Associates 123 McEwan Road, West Heidelberg 3081 Vic. (03) 458 1211
Price:	\$269 64 Kbyte \$325 256K (prices untaxed)

are for parallel (or Centronics) connection and the shorter cable (about 15 cms) plugs straight into a standard printer; the longer cable goes to the printer port on the computer. For standard use this is all that is required. Simply continue as before but marvel at how soon you get your computer back or how much earlier you can go home.

The serial connectors operate in the same manner. Simply plug your computer into the 'serial in' DB25, using the supplied extension cable if required, and plug the printer into the 'serial out' socket. No further set-up is required as Digicard automatically senses the use of serial or parallel connections.

Digicard works with any computer and has particular applications where a number of users share a single printer. Instructions are supplied for configuring a Digicard Classroom Network to operate with Digicard and almost any network file server would operate much faster with the unit.

Digicard works with any computer and has particular applications where a number of users share a single printer.

A Serial or Parallel Converter

A bonus application is the ability to use the unit as a serial to parallel converter. Many bottom line computers lack a serial or RS 232 port and the Digicard will allow you to read your Centronics or printer port as a serial. This allows you to drive different styles of printers and other devices normally driven by RS 232 ports such as a modem or mouse without the additional cost of an RS 232 board

There are smarter (and dearer) print buffers on the market with additional features such as the ability to retain the data

and print multiple copies — but before you rush out and buy any sort of buffer, check the software buffers available (only if your computer has enough memory, of course). Such buffers are normally described as 'Spoolers' and often are enough for minor applications.

Digicard worked at the first plug-in without trouble. It even works with a number of complex graphics printing programs I have which warn against using hardware buffers. The only time Digicard let me down was in a dBase application when for some reason it failed to recognise a control code which was designed to set my printer into compressed character mode.

All in all, a worthwhile addition to any unit which devotes much of its time to hanging about waiting for a printer to become available. Like so many of the units I get to test, it will be returned to Digicard with regret, as my need for it runs a poor second to the need to re-paint my Daughter's car. Perhaps I should fit a buffer to that! □

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PolyBoost

Keith Mackay has found another useful utility for all you database wallahs and others manipulating large volumes of data — a memory-resident accelerator.

POLYBOOST is a memory-resident accelerator utility which, according to the documentation, will speed up applications software and utilities by as much as ten times. Unlike other such programs — Lightning, for example — it consists of three separate modules which speed disk access, screen display and keyboard input, any or all of which may be used as required. It is recommended for computers with at least 384K of RAM installed, although, as the manual claims, Polyboost 'is very memory efficient' — being a perverse individual, I ran it on a 256K system to begin with and it operated satisfactorily, although RAM constraints prevented full use of its power.

Polyboost supports up to four floppy and three hard drives, recognises most monitors and, according to the manual, no display adaptors have been found incompatible with the program. The IBM PC and AT keyboards are recognised, as well as the new IBM keyboard with separate cursor keys. Polyboost supports expanded memory cards compatible with Lotus/Intel/Microsoft Expanded Memory Specification (LIM EMS) standards. The program is compatible, according to the manual, with all popular applications software and RAM-resident programs — certainly I experienced no difficulty using Polyboost with Lotus or with any of my clutch of word processors, and ProKey, SideKick and SuperKey ran with it uncomplainingly. Polyboost is distributed on one disk, not copy-protected, and is accompanied by an informative and well written manual.

There are six utilities designed to speed disk drives: hard or floppy drive with conventional memory, with expanded memory boards and with AT machines fitted with extended memory. These utilities

function by creating disk caches or memory buffers into which frequently accessed disk data is loaded — when the data is required by the software, it is read from RAM rather than from disk.

If any changes are made to data, those changes are immediately copied into the RAM buffer and written to disk in order to preclude the possibility of loss by mishap. The disk cache may be anywhere from 5K to 500K in length using conventional memory, or up to 4 Megabytes using an expanded memory board. Using a disk boost with a word processor which loads text into RAM in small blocks — WordStar operates this way, for example — is tantamount to having text in a RAM disk with a greatly diminished risk of loosing data. Moving from top to bottom of a 44K WordStar file, an operation which normally takes rather more than fifteen seconds, takes just five seconds using PolyBoost once the text has been loaded into the cache.

The screen boost, which occupies 4K of RAM, allows software to write directly to screen, as most faster word processing programs do, instead of going through the slower DOS and BIOS display routines. No difference, therefore, will be noted in any of the more powerful word processors. If an ANSI driver is used, the screen boost can only be set at its slowest level and will default to that level whatever setting has been chosen. Even at that slowest level, however, the improvement in performance is remarkable in DOS operations: a directory or CHKDSK comes onto the screen

very rapidly and a document is TYPed at a brisk rate of knots.

The higher speeds are yet more impressive, information being slammed onto the screen at break-neck speed with no perceptible scrolling. The highest speed, 6, disables the Control-S command to pause scrolling. This setting is provided, according to the manual, for word processors which can benefit from the enhanced speed. None of the word processors with which I experimented would so benefit; and for most purposes, the lowest setting is quite adequate.

The key boost occupies 3K and offers a number of options: adjusting key repeat rate and preventing cursor run-ahead; increasing the size of the type-ahead buffer from the standard 16 bytes to 128 bytes, thus allowing commands to be queued; creating a command line editor which permits any of the last 15 DOS commands to be reissued; and generating an audible keyboard click — many people, myself included, find a keyboard click improves typing accuracy. With SuperKey running also, Polyboost's type ahead buffer can produce two characters every time a key is pressed, as it did on my own computer.

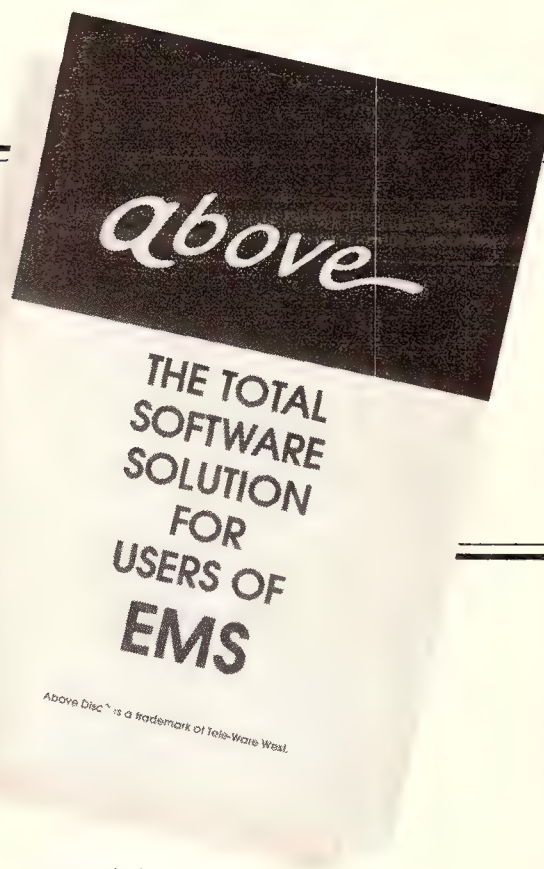
PolyBoost is a useful and impressive utility, probably of most interest to database wallahs and others manipulating large volumes of data, and I shall certainly continue using it until the distributor takes it back. My one reservation is that the price seems rather high, but this is one of the penalties associated with computer use in Australia. □

Product Details

Product:	PolyBoost
From:	Polytron Corporation, Beaverton, Oregon, USA
Distributor:	International Computing Technologies Level 49, 19-29 Martin Place, Sydney 2000 NSW (02) 398 9333
Price:	\$215 (\$512.40 with Above Disc, a software memory expander)

Above Disc

Feeling the 640K pinch when using a spreadsheet or database? Keith Mackay has found a software memory expander that can turn your disk into RAM.



ABOVE DISC is a software memory expander. It is supplied on one floppy disk and is not copy protected. The manual is not the most informative piece of literature I have ever read, and I understand the distributors are considering supplementing it with their own documentation.

Above Disc runs under DOS 2.0 or higher and requires a minimum of 128K of RAM and one double-sided disk drive. The program operates on the virtual memory principle, deceiving the system into thinking there is more RAM available than has been installed. It accomplishes this by sectioning off an area of disk as RAM or by

treating extended memory as expanded memory, and will simulate up to 8 megabytes of RAM for data storage.

Although a hard disk is obviously preferable, Above Disc will also recognise a RAM disk. It will operate with any software adhering to the Lotus/Intel/Microsoft Expanded Memory Specification (LIM EMS). Software adhering to this standard in-

cludes Lotus 1-2-3 Release 2, Symphony Release 1.1, Reflex, Lightning, Microsoft Windows, DESQview releases later than 1.21, Truevision Image Processing Software and Javelin.

Installing Above Disc is a simple matter. The program itself will create a config.sys file on the boot volume if Above Disc has not already been installed, and the user need only nominate the drive for the swap file which holds the virtual memory, and specify the amount of RAM to be allocated. The configuration may be modified simply by rewriting the config.sys file.

Above Disc, as I suggested, is ideally used with a hard disk and will undoubtedly be of interest to heavy spreadsheet and database users who have been feeling the 640K pinch — temporarily sacrificing two fifths of one's hard disk space seems a good trade-off for the increased memory. □

Product Details

Product:	Above Disc Version 1.02
From:	Tele-ware West Seal Beach, California
Distributor:	International Computing Technologies, Level 49, 19-29 Martin Place, Sydney 2001 NSW (02) 398 9333
Price:	\$358.80 (\$512.40 with PolyBoost, an accelerator utility)



WHAT A DIGI-VIEW

— Get the picture?

If you and your Amiga want to get into the picture business, this is probably the best way to go. The pictures were produced quickly and well, and were very easily manipulated.

Now you can really get the picture on what the Digi-View can do on the new Amiga computers. The shot of Ayres Rock shows the cursor to the bottom right.

IT'S THE NON-ARTIST'S dream. Just stick something in view of the camera, play with the keys on your Amiga for a few seconds, and a full colour picture of the object appears on the screen. (To learn more about graphics packages for the Amiga, see Gregg Faulkner's article on Desktop Video on the Amiga, YC June 1987, page 32.)

This picture can be manipulated with such programs as Deluxe Paint, and then incorporated into other programs, or can be printed out.

The dream is made possible by the product Digi-View, which is a combination of hardware and software for the Amiga. With Digi-View, a monochrome camera and a bit of patience, the least artistic amongst us can create marvels.

The colour picture is captured in the 320 x 200 mode on the Amiga, by taking the 'snapshots' of the object, through coloured filters (red, green, and blue). The colour filters, which come with the product, are mounted in front of the camera lense, and an exposure of around 10 seconds per filter is needed, so obviously you can only produce digitised pictures of objects which are not moving. The program then combines the three images into a full colour, or higher resolution grey scale monochrome image.

The colour images can be in the Amiga's hold-and-modify mode, which allows up to 4096 colours on the screen at once.

Alternatively, the software can be used to produce standard 32 colour pictures, to incorporate them into other programs. If this mode is chosen, the Digi-View software automatically selects the most appropriate palette for the image you've produced.

Why Bother With Black and White

If these marvels are possible in colour, why bother with black and white? The black and white images is much sharper than the colour one (640 x 400, as opposed to 320 x 200), and from a short dis-

tance, the picture looks like a clear photograph.

My watch and keys looked good enough to steal, when digitising in this mode. An exposure of 20 seconds is needed for one of this high resolution colour images.

If you and your Amiga want to get into the picture business, this is probably the best way to go. The pictures were produced quickly and well, and were very easily manipulated.

The program is not particularly cheap, but if you can make good use of the Digi-View's output, it will be money well spent. Of course, you'll also need a black and white camera, which will cost you around \$600.

Happy snapping on your computer for once. □

Product Details

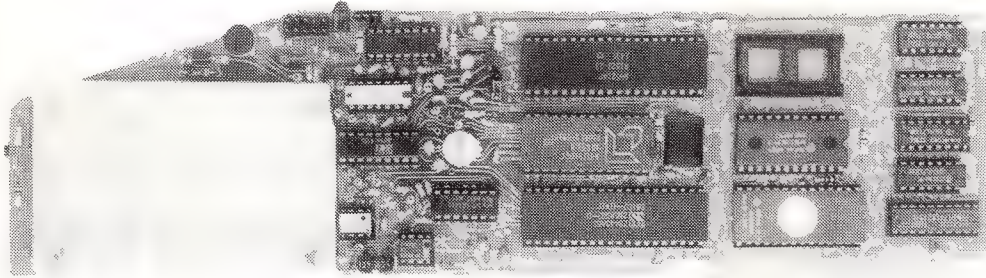
Product:
Review Copy from:

Digi-View
ACME Software,
PO BOX 3,
Brighton North,
Victoria, 3186.
(03) 596 6732
\$495 for digitizer,
filter wheel, and software

Price:

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Sending/receiving files is very simple:—

- Press "ESC" to display menu.
- Select "(S) END A FILE" option
- Answer the prompt "FILENAME?:"

The modem will search the disk for the file, make all the decisions (e.g. binary, basic, textfile, DOS 3.3 or ProDos) and transmit it in the correct format. <CR> transmits the file in memory. Similarly to receive a file select "(R) RECEIVE A FILE" option.

* AUTO ANSWER — AUTO DIAL. Senses true dial tone, ring tone, busy tone and acts intelligently, returning status messages. Characters can be included in the phone number to set baudrate, pause, "await dialtone" and multiple redial on busy. On answer, it selects the incoming baudrate by precision frequency measurement. This is much more reliable than the normal autosearch using carrier detect which is often confused by voice and phone tones. A reliable autosearch is a must for bulletin board operation.

* 300 Baud full duplex or 1200/75 and 75/1200 with fast automatic line turnaround. An upgrade kit to add V22 (1200/1200 baud) and V22 Bis (2400/2400 baud) will be available later.

* Main menu option "(V)IDEOTEXT" shows the VIATEL menu. It becomes a full graphics VIATEL terminal, automatically dialling and transmitting the user ID stored in the battery backed ram. When online, a keypress will immediately save pictures to memory. These can be reviewed later and selectively saved to disk or printed (requires a graphics printer card). Pictures can be loaded from disk and printed out. The modem can act as a videotext host and can be programmed to act on frame information. e.g. — use the clock to ring "MONEYWATCH" hurly and dial you at the office if your shares move outside a given range.

* TELESOFTWARE DOWNLOAD facility to purchase programs over VIATEL from suppliers such as MICROTUX 666 and TANGO.

* A full wordprocessor in EPROM for pre-composition of text before transmission. It can also be used to edit or print received files as well as for general wordprocessing.

* Onboard battery backed calendar clock can time and initiate calls or keep an activity log. ProDos uses it to time and date disk files and it is accessible from Basic.

* 2Kx8 battery powered CMOS RAM stores default parameters, phone numbers, ID, password, logon strings, search codes and setup parameters (e.g. baud rate, parity, printer ON) for each number, allowing single keystroke call establishment to specific areas of complex databases. Main menu option "(T)ELELIST" displays the list of 23 names and one is selected.

* Incorporates XON/XOFF and CHRISTENSEN error correcting protocol. Textfiles are not so fussy but error correction is a must when transferring program files. A debug function can display normally invisible control characters sent by the host.

* Can output directly to printer even when online at 1200 Baud — a fast printer is not required as the printer is spooled out of the receive buffer. A "FILTER" function is available to remove screen control characters from textfiles (these can drive a printer crazy). Special scroll routines print to 80 column screen and printer at 1200 Baud without any lost characters.

* Unique "PHANTOM MODEM MODE" function allows the modem to be permanently connected with the normal phone. When answering, if it doesn't immediately detect a calling modem it generates ringing tone back to the calling party and sounds the APPLE bell, giving you 60 seconds to answer the phone.

* If you have previously purchased this modem and have not yet received an updated EPROM VERSION V2.18 and a manual, contact AUTOMATIC ICE CO. — there is no charge for these

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Disks Without DOS For The Apple II

Having DOS on every disk makes it easy to boot up, but it wastes three tracks — Greg Walpole shows how to make them useable by re-formatting and saying good-bye to HELLO.

DOS 3.3 REMAINS the best operating system for the Apple II with Disk II drives. One of the features appreciated by the novice is that every disk contains the disk operating system (DOS) — to boot, just insert any disk and turn it on. However, for the more experienced user, the use of three tracks for DOS on every disk consumes space unnecessarily. An additional track is wasted since most Disk II drives are capable of reading and writing 36 tracks, but only 35 are used!

Operating systems for most micros are able to produce disks which do not contain DOS. 'Formatting' is the name usually given to this process; a program to format disks under AppleDOS 3.3 is given in Listing 1.

Once you've typed the program in and run it, you'll have a disk formatted without DOS in about the same time it takes to INITIALISE a disk. Brun FID and check the number of free sectors — you'll find there are 528 (or 544 if you've formatted 36 tracks). That's 32 more than the 496 sectors available on a disk with DOS. But wait a minute — something here doesn't add up: there are 35 tracks on an Apple disk and each track contains 16 sectors; 16 times 35 is 560. While we've gained 32 sectors, there are still 32 sectors missing.

When you type a command such as RUN COPYA, DOS quickly finds the program on the disk, loads and runs it. In order to load COPYA, DOS must be able to find where on the disk the program is located. Just as an index is used to show where information can be found in a book, a list (catalog) of where each program begins on the disk is used in a similar way by DOS. The catalog is located on track 17

(decimal). So, one track for the catalog accounts for 16 of the missing sectors.

What about the other 16? Well, they aren't being used for anything at all; in fact, they could be made available for storage. All that is required is to change two POKES in the program. However, as we will see, it simply isn't worth it.

In the catalog, each file has an entry which describes it. The description includes the first track of the file; first sector of the file; file type (A, B, I or T); whether the file is locked or unlocked; file name and file length in sectors. Each description is 35 (decimal) bytes long. It can be represented diagrammatically as shown in Figure 1.

Byte 0 of a file entry is the track of the beginning of the file. If the beginning of the file is located on track 0, byte 0 will actually be a zero value. Unfortunately, DOS also uses a zero in this byte to mark an entry which has never been used. If DOS is looking through the catalog and finds an

entry with a zero in byte 0, it assumes that the entry and all following entries in the catalog have never been used. The entry in question and all following entries are no longer accessible by any DOS command. This includes the CATALOGUE instruction, LOAD, RUN and so on.

Bad luck if that disk also contains the only copy of your latest programming masterpiece. For this reason, the format program presented here does not make track 0 available for storage. That accounts for the other sixteen sectors.

While I have used the term 'beginning of the file' for simplicity's sake, 'first track/sector list' is actually the correct term. If you are interested in finding out more about this topic, see *The DOS Manual*, appendix C, particularly pages 126 to 134.

The Volume Table Of Contents

Track 17, sector 0 (of the catalog track) contains the Volume Table Of Contents

Byte 0	Byte 1	Byte 2	Bytes 3 to 32	Bytes 33 & 34
Track where file begins	Sector where file begins	File type and lock/unlock status	FILE NAME	FILE LENGTH

Figure 1. The catalog describes each file on the disk using the format shown here.

(VTOC). The VTOC covers a large amount of information about the disk including the volume number and the number of sectors per track. More importantly for our purposes, it contains a list of all sectors on the disk. Each sector will be marked as free or used — for example, all sectors on tracks 0, 1 and 2 will normally be marked as used (by DOS). Similarly, all sectors on track 17 (for the catalog) will be marked as used. When a file is saved onto disk, the sectors it occupies are marked as used in the VTOC. Once a sector is marked as used, it cannot be allocated to another file. If the file is DELETED, the sector is marked as free once again.

Initialisation And DOS

When a disk is INITIALISED using the standard DOS command, the disk is first divided into tracks and sectors. A copy of AppleDOS is placed on tracks 0, 1 and 2. The AppleSoft program which happens to be in memory at the time is saved on the disk as the HELLO program and its name entered into the catalog. Space taken up by the HELLO program, the catalog and DOS are marked as used in the VTOC so they cannot be overwritten. Of course, if the HELLO program is subsequently DELETED, the space it occupies on the disk becomes available once more.

What The Program Does

The Format Program in Listing 1 begins by INITIALISING the disk using the standard DOS command. At this stage, the disk being formatted contains DOS and the AppleSoft program in memory has been saved to the disk as the HELLO program. The catalog track has been updated to show this — in other words, you have a normal initialised disk.

Next comes the part that makes those extra sectors available — By using the DOS read/write routines directly, it is possible to write information anywhere on the disk. This includes the VTOC and catalog. By changing the VTOC, tracks 1 and 2 (normally containing DOS) can be marked as free and so are available for storage. By changing the VTOC and catalog sectors, the space taken by the HELLO program can also be made available for storage. This is done in the program by storing an image of the modified VTOC and catalog in RAM and then writing them to disk over the VTOC and catalog produced during INITIALISATION.

An important point to remember here is that marking the sectors occupied by DOS

```

1  REM DISKS WITHOUT DOS.LISTING1
2  REM COPYRIGHT GREG WALPOLE
100 REM MAIN *****
110 TEXT : HOME
120 GOSUB 1500: REM PRINT HEADING
130 GOSUB 22000: REM INITIALISE RWTS
140 GOSUB 2000: REM INITIALISE BUFFERS ETC
150 GOSUB 1000: REM MENU
160 :: GOSUB 10000: REM ERASE STATUS LINE
170 :: IF CHOICE$ = "F" THEN GOSUB 3000: REM FORMAT
180 :: IF CHOICE$ = "D" THEN GOSUB 4000: REM TOGGLE DRIVE
190 :: IF CHOICE$ = "T" THEN GOSUB 6000: REM TOGGLE # TRACKS
200 :: IF CHOICE$ = "C" THEN GOSUB 5000: REM CATALOG
210 IF CHOICE$ < > "E" THEN GOTO 150
220 GOSUB 23000: REM RESTORE HIMEM;ONERR THEN
230 IF PEEK (48894) < > PEEK (770) THEN GOSUB 6000: REM RESTORE # TRA
    CKS
240 GOSUB 10000: REM ERASE STATUS LINE
250 END
1000  REM MENU *****
1010 HTAB 1: VTAB 1
1020 :: GOSUB 1500: REM HEADING
1030 :: GOSUB 1600: REM MENU CHOICES
1040 :: PRINT : PRINT
1050 :: HTAB 11: PRINT "YOUR CHOICE: ";
1060 :: GOSUB 10200: PRINT : REM GET SINGLE CHAR
1080 RETURN
1500 REM HEADING *****
1510 INVERSE
1520 :: HTAB 17: PRINT "FORMAT"
1530 NORMAL
1540 PRINT
1550 PRINT "THIS UTILITY WILL FORMAT A DISK WITHOUT"
1560 PRINT "DOS, FREEING 32 SECTORS FOR STORAGE."
1570 RETURN
1600 REM MENU CHOICES *****
1610 PRINT : PRINT
1620 PRINT TAB( 10)"(F)ORMAT DISK IN DRIVE "; PEEK (47082)
1630 PRINT : PRINT TAB( 10)"(D)RIVE TOGGLE ("; PEEK (47082);")"
1640 PRINT : PRINT TAB( 10)"(T)RACK TOGGLE ("; PEEK (48894);")"
1650 PRINT : PRINT TAB( 10)"(C)ATALOG"
1660 PRINT : PRINT TAB( 10)"(E)ND"
1670 RETURN
2000 REM INTIALISE BUFFERS & DRIVE #S *****
2010 GOSUB 21000: REM CHECK DRIVE #S
2100 FOR I = 20500 TO 20755: REM POKE TRACK 0 SECTOR 0 IMAGE INTO MEMORY
    @ 20500
2110 :: POKE I,234: REM NOP
2120 NEXT I
2200 FOR I = 21000 TO 21255: REM POKE NEW IMAGE OF 1ST CATALOG SECTOR @ 2
    1000
2210 :: POKE I,0
2220 NEXT I
2230 POKE 21001,17: POKE 21002,14
2240 POKE 770, PEEK (48894): REM SAVE # TRACKS
2290 RETURN
3000 REM FORMAT *****
3010 GOSUB 10000: REM ERASE STATUS LINE
3020 GOSUB 10100: PRINT "FORMATTING"
3030 ONERR GOTO 10400
3040 :: PRINT CHR$( 4);"INITIALISE"
3050 ONERR GOTO 24000: REM STANDARD ONERR
3060 GOSUB 3500: REM WRITE PATCHED SECTOR IMAGES
3070 GOSUB 10000: REM ERASE STATUS LINE
3080 IF PEEK (6) THEN GOSUB 10100: PRINT "DISK ERROR": GOTO 3100: REM E
    RROR DURING DIRECT DISK ACCESS
3090 GOSUB 10100: PRINT "FORMAT COMPLETE"
3100 RETURN
3500 REM WRITE PATCHED SECTORS *****
3510 REM TRACK 0 SECTOR 0
3520 REM      17      15 (CATALOG)
3530 REM      17      0 (VTOC)
3540 OP = WRITE:TRACK = 0:SECTOR = 0:ADDRESS = 20500: GOSUB 20000: REM WRIT
    E TRACK ZERO SEC 0 IMAGE
3550 IF PEEK (6) THEN GOTO 3600: REM EXIT IF ERROR DURING DIRECT DISK A
    CCESS
3560 OP = WRITE:TRACK = 17:SECTOR = 15:ADDRESS = 21000: GOSUB 20000: REM WR
    ITE PATCHED CATALOG IMAGE
3570 IF PEEK (6) THEN GOTO 3600: REM EXIT IF ERROR
3580 IF NOT VFLAG THEN GOSUB 3700: IF PEEK (6) THEN GOTO 3600: REM IF
    NOT VTOC FLAG THEN READ & PATCH VTOC IMAGE IN BUFFER @ ADDRESS 21500
3590 OP = WRITE:TRACK = 17:SECTOR = 0:ADDRESS = 21500: GOSUB 20000: REM WR
    ITE PATCHED VTOC IMAGE
3600 RETURN

```

Listing 1. AppleDOS 3.3 disk formatting program

AppleDOS

```
3700 REM READ VTOC IMAGE & PATCH @ 21500 *****
3710 OP = REED:TRACK = 17:SECTOR = 0:ADDRESS = 21500: GOSUB 20000: REM REA
D VTOC IMAGE
3720 IF PEEK (6) THEN GOTO 3850: REM EXIT ON RWTS ERROR
3730 POKE 21500,196: REM NOT USED BY DOS ACCORDING TO "THE DOS MANUAL". H
OWEVER, SET TO #C4 TO AVOID PROBLEMS WITH SOME "FIX FILE SIZES" PROGR
AMS
3740 POKE 21548,17: REM LAST TRACK WHERE SECTORS WERE ALLOCATED
3750 REM PATCH BIT IMAGES OF TRACKS 1 TO 34, SKIPPING TRACK 17
3760 FOR I = 21560 TO 21620 STEP 4
3770 :: POKE I,255
3780 :: POKE I + 1,255
3790 NEXT I
3800 FOR I = 21628 TO 21692 STEP 4
3810 :: POKE I,255
3820 :: POKE I + 1,255
3830 NEXT I
3840 VFLAG = 1: REM SET VTOC FLAG SO THIS ROUTINE IS NOT CALLED AGAIN
3850 RETURN
4000 REM TOGGLE DRIVE *****
4010 GOSUB 21000: REM CHECK DRIVE #
4020 POKE 47082, ABS ( PEEK (47082) - 3): REM TOGGLE DRIVE USED BY RWTS
4030 POKE 43624, PEEK (47082): REM COPY RWTS CURRENT DRIVE TO LAST USED D
RIVE
4040 GOSUB 21000: REM CHECK DRIVE #
4050 RETURN
5000 REM CATALOG *****
5010 TEXT : HOME
5020 ONERR GOTO 10400
5030 :: PRINT CHR$ (4);"CATALOG"
5040 ONERR GOTO 24000: REM STANDARD ONERR
5050 PRINT
5060 GOSUB 10300: REM PRESS <RETURN>
5070 TEXT : HOME
5080 RETURN
6000 REM TOGGLE # TRACKS *****
6010 POKE 48894,35 + ( PEEK (48894) = 35): REM TOGGLE 35/136
6020 POKE 44725, PEEK (48894) * 4
6030 POKE 46063, PEEK (48894)
6040 VFLAG = 0: REM RESET VTOC FLAG SO A NEW VTOC WILL BE READ DURING THE
NEXT FORMAT
6090 RETURN
10000 REM ERASE STATUS LINE *****
10010 HTAB 1: VTAB 21: PRINT "
10090 RETURN
10100 REM POSITION CURSOR IN STATUS LINE *****
10110 HTAB 11: VTAB 21
10120 RETURN
10200 REM INPUT SINGLE CHARACTER *****
10210 CHOICE$ = " ": PRINT " "; CHR$ (8);
10220 GET G$
10230 :: IF G$ = CHR$ (13) THEN RETURN
10240 :: IF G$ = CHR$ (8) THEN G$ = " "
10250 :: IF G$ < " " THEN 10220
10260 :: IF G$ > = CHR$ (ASC ("A") + 32) AND G$ < = CHR$ (ASC ("Z")
+ 32) THEN G$ = CHR$ (ASC (G$) - 32): REM CONVERT LC->UC
10270 :: PRINT G$: CHR$ (8);
10280 :: CHOICE$ = G$
10290 GOTO 10220
10300 REM PRESS <RETURN> *****
10310 PRINT "PRESS <RETURN> TO CONTINUE: ";
10320 GET G$: IF G$ < > CHR$ (13) THEN GOTO 10320
10330 PRINT
10340 RETURN
10400 REM ONERR DURING FORMAT OR CATALOG *****
10410 CALL - 3288: REM FIX STACK
10420 CALL 54915: REM CLEAR STACK
10430 IF PEEK (222) < 1 OR PEEK (222) > 15 THEN GOTO 10570
10440 REM IF DISK ERROR
10450 :: ONERR GOTO 24000: REM STANDARD ONERR
10460 :: IF CHOICE$ < > "C" THEN GOTO 10540
10470 :: REM IF CHOICE$=CATALOG
10480 :::::: PRINT "CAN'T FIND CATALOG."
10490 :::::: PRINT
10500 :::::: GOSUB 10300: REM PRESS <RETURN>
10510 :::::: TEXT : HOME
10520 :: GOTO 150: REM RESTART
10530 :: REM IF CHOICE$<>CATALOG
10540 :::::: GOSUB 10000: REM ERASE
10550 :::::: GOSUB 10100: PRINT "DISK ERROR"
10560 :: GOTO 150: REM RESTART
10570 GOTO 24000: REM BASIC ERROR
10580 STOP
20000 REM READ/WRITE SECTOR *****
```

as free does not remove DOS from the disk. If the format process ended here, it would still be possible to boot from the disk. During the boot process, the tracks containing DOS (tracks 0, 1 and 2) are accessed directly. The catalog and VTOC are not used and so no changes we have made could make any difference — at least not in the beginning. As the disk filled up, tracks 1 and 2 (usually occupied by DOS) would finally be used. When this occurred, a boot with this disk would begin normally because track 0 is not available and will always contain the first sixteen sectors of DOS. Loading of the new data on tracks 1 and 2 would have totally unpredictable, possibly catastrophic results. To avoid this danger, the program writes the value 234 (6502 NOP) to every byte of track 0, sector 0. This causes the disk to spin harmlessly if a boot is attempted.

How It Does It

Extensive use of REMs and using meaningful variable names such as TRACK and DRIVE, make the program relatively easy to understand. The following presents more detailed information for those interested in understanding the program in depth or making modifications of their own.

Controlling Routine

Once initialisation is complete (courtesy of GOSUBs in lines 120 to 140), the program loops through lines 150 to 210, with all actual work being achieved by calls to subroutines.

Lines 150 to 250 —

150: calls a subroutine at line 1000 which handles user selections via a menu.

160 to 200: checks if CHOICES contains a valid selection, on return from the menu subroutine. If so, the required function will be carried out via a GOSUB to the appropriate subroutine.

210: unless the user has selected the (E)ND option, the program loops back to line 150.

220 to 250: restore HIMEM: and number of tracks to be INITIALISED and turn ONERR off.

Initialising Buffers, Drive Numbers and Number Of Tracks —

Initialisation of the read or write track and sector routine begins at line 22000. This was discussed in the first part of this series (YC, May '87). Initialisation steps specific to this program —



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AppleDOS

```
20010 REM CALLING ROUTINE MUST SUPPLY VALUES FOR: TRACK; SECTOR; ADDRESS;
      OP.
20020 REM DRIVE NUMBER MUST BE SET AT 47082
20030 REM RETURNS "1" AT ADDRESS 6 IF DISK ERROR ENCOUNTERED
20040 GOSUB 21000: REM CHECK DRIVE NUMBER
20050 POKE 47083,0: REM ANY VOLUME NUMBER
20060 POKE 47084,TRACK: POKE 47085,SECTOR: REM TRACK & SECTOR
20070 HB = INT (ADDRESS / 256):LB = ADDRESS - HB * 256: REM FIND LOW & HI
      GH BYTES OF SECTOR IMAGE ADDRESS
20080 POKE 47088,LB: POKE 47089,HB: REM POKE LOW & HIGH BYTES OF SECTOR I
      MAGE
20090 POKE 47091,0: REM ENTIRE SECTOR
20100 POKE 47092,OP: REM SET READ/WRITE FLAG
20110 CALL 20000: REM READ OR WRITE SECTOR
20120 RETURN : REM END READ/WRITE SECTOR
21000 REM CHECK DRIVE NUMBERS *****
21010 REM @ 43624 & 47082
21020 IF PEEK (43624) < > PEEK (47082) OR PEEK (47082) < 1 OR PEEK (
      47082) > 2 THEN CALL 54915: PRINT : PRINT : PRINT "DRIVE NUMBER ERRO
      R"; CHR$ (7): GOSUB 23000: STOP : REM IF DRIVE NUMBER POINTERS INVALI
      D CLEAR STACK:ERROR MESSAGE
21030 RETURN : REM END CHECK DRIVE NUMBER
22000 REM INITIALIZE *****
22010 POKE 768, PEEK (115): POKE 769, PEEK (116): HIMEM: 19999: REM SAVE
      OLD HIMEM VALUES, SET HIMEM
22020 ONERR GOTO 24000
22030 POKE 47082, PEEK (43624): REM SET DRIVE IN IOB TO VALUE IN LAST USE
      D DRIVE VECTOR
22040 GOSUB 21000: REM CHECK VALID DRIVE NUMBERS
22050 REED = 1:WRITE = 2: REM READ/WRITE VALUES
22060 REM POKE RWTS ROUTINE INTO MEMORY
22070 POKE 20000,169: POKE 20001,0: POKE 20002,133: POKE 20003,6: REM STO
      RE 0 IN ADDRESS 6
22080 POKE 20004,32: POKE 20005,227: POKE 20006,3: REM JSR #03E3
22090 POKE 20007,32: POKE 20008,217: POKE 20009,3: REM JSR #03D9
22100 POKE 20010,144: POKE 20011,4: REM BRANCH IF CARRY FLAG CLEAR
22110 POKE 20012,169: POKE 20013,1: POKE 20014,133: POKE 20015,6: REM IF
      CARRY FLAG SET, STORE 1 IN ADDRESS 6
22120 POKE 20016,169: POKE 20017,0: POKE 20018,133: POKE 20019,72: REM ZE
      RO ADDRESS $48
22130 POKE 20020,173: POKE 20021,15: POKE 20022,157: REM LDA $9D0F
22140 POKE 20023,96: REM RTS
22150 RETURN : REM END INITIALIZE
23000 REM RESTORE HIMEM *****
23010 POKE 115, PEEK (768): POKE 116, PEEK (769): REM SET HIMEM TO ORIGIN
      AL VALUES
23020 POKE 216,0: REM DISABLE ONERR
23030 RETURN : REM END RESTORE MEM
24000 REM ERROR HANDLING *****
24010 PRINT : PRINT : PRINT "ERROR NUMBER "; PEEK (222);" IN LINE "; PEEK
      (218) + PEEK (219) * 256; CHR$ (7)
24020 CALL - 3288: REM FIX STACK
24030 GOSUB 23000: REM FIX HIMEM;DISABLE ONERP
24040 END
```

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2100: POKES an image to be written to track zero, sector 0 into a buffer beginning at RAM address 20500 (decimal).
2200 to 2230: POKES the image to be writ-

ten to track 17, sector 15 (first catalog sector) into a buffer beginning at address 21000.

2240: the number of tracks which will be INITIALISED is copied from one of the locations where it is stored by DOS into address 770 (decimal). This value can be retrieved so that DOS can be restored to its initial state when the initial value for HIMEM: is stored, as discussed in the May issue.

Lines 3000 to 3600
(Formatting) —

The actual format operation consists of the following steps: a) print the FORMATTING message; b) INIT the disk using the standard DOS command; c) write patched

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AppleDOS

sectors to track 0, sector 0; track 17, sector 15 (catalog sector 1); and track 17, sector 0 (VTOC); *d*) print FORMAT COMPLETE

This is handled by lines 3000 to 3100. Writing of patched sectors is controlled by a GOSUB to 3500. It can be seen that this routine consists mainly of a series of calls to the read or write track and sector routine beginning at line 20000. These calls can be best understood by reference to the first part of this series.

Lines 3700 to 3840

(Patching The VTOC) —

3700 TO 3840: The VTOC contains a considerable amount of information. As a result, the most efficient way to produce the patched VTOC image in the buffer at 21500 is to read it from the freshly formatted disk and patch the few necessary bytes. Once the VTOC image has been patched, there is no need to do it again (unless the number of tracks to be formatted is changed). For this reason, after the VTOC is patched, the variable VFLAG is set in line 3840 so that the check in line 3580 will not allow this routine to be called again. Error handling is covered below.

Lines 6000 to 6090

(How Many Tracks To Format?) —

DOS stores the number of tracks on a disk for various aspects of the INITIALISATION process in three addresses: 44725 (number of tracks times 4); 46063 and 48894 (decimal). Line 6010 PEEKs at the last of these and replaces a 35 with a 36 or vice versa. The new value is then copied into addresses 44725 (times 4) and 46063.

Lines 10000 to 10120

(Keeping The User Informed) —

At various times while using the program, messages such as FORMATTING, will be printed below the menu. Erasing of old messages and positioning of new ones is handled by these lines.

Lines 10200 to 10290

(Accepting Input) —

The only user input to the program is single characters entered from the menu. Rather than using the Basic INPUT statement, the routine in these is more appropriate. Type a character; if it's not the one you wanted, type another and it will overwrite the previous character. The back arrow can also be used if you prefer.

Error Handling

For the purposes of this discussion, errors can be regarded as being due to three causes —

1) Basic errors: these shouldn't occur, but,

if one does, error handling is via line 24000. This was discussed in the first part of this series.

2) A DOS error while INITIALISING (line 3040) or CATALOGING (line 5030) a disk: Possible causes for this include a drive door open or attempting to CATALOG an unINITIALISED disk. If an error occurs during either of these operations, it will be handled by a routine at line 10400. If a disk error has occurred (PEEK(222) between 1 and 15 inclusive) an error message will be displayed and the program restarted at line 150. A non-DOS error (in other words, a Basic error) will be dealt with via the standard error handler at line 24000.

3) An error during a call to RWTS via the subroutine at line 20000: This will not generate an error which can be detected by Basic. After each read or write, a PEEK (6) will return a 1 if an error has occurred, 0 otherwise. See lines 3080, 3550, 3570, 3580 and 3720.

Variables Used

ADDRESS: Address of sector buffer.

CHOICES\$: Stores user's choice of menu options.

HB: High byte of sector image address.

LB: Low byte of sector image address.

I: General purpose counter in FOR/NEXT loops.

REED: Always equals 1. Value to be POKED into DOS RAM location 47092 to cause a READ operation.

VFLAG: Flag to indicate if patched VTOC image is present in memory.

OP Set to value of variable REED or WRITE to cause READ or WRITE operation.

WRITE: Always equals 2. Value to be POKED into DOS RAM location 47092 to cause a write operation.

Important RAM Locations

115: Low byte of current HIMEM.

116: High byte of the current HIMEM setting.

43624: Current drive number — 1 or 2.

47083: Volume number of disk to be accessed.

47084: Track to be read or written.

47085: Sector to be read or written.

47088: Low byte of address of data to be written to disk.

47089: High byte of address of data to be written to disk.

47091: Number of bytes to be written to sector.

47092: Contains a 1 if the next DOS opera-

tion is to be a read or a 2 for a write operation.

44725, 46063 and 48894: Number of tracks used for various purposes by DOS while INITIALISING a disk.

Notes On Entering The Program:

Notice that the variables REED and SECTOR have rather unusual spellings. This is to avoid syntax errors due to use of reserved words in variable names.

Colons are used extensively for indentation of loops and to emphasize control structures, for example, in the main loop in lines 150 to 210 and when the ONERR pointer is changed while CATALOGING the disk in lines 5020 to 5040.

REMS, apart from those ending with **** are not the target of any GOTOs or GOSUBs and can be omitted safely.

How To Use The Program

When you RUN the program, there will be a brief pause while the various routines and sector images are POKED into memory. A menu will appear, offering the following options:

(F)ORMAT DISK IN DRIVE *n* — Enter F to format the disk in the drive represented by *n*. When you first run the program, *n* will be the number of the drive which contained the disk with the format program. For example, if the format program is in drive 2, the top menu item will initially read (F)ORMAT DISK IN DRIVE 2.

(D)RIVE TOGGLE *n* — Enter D to toggle 1 to 2, or vice versa.

(T)RACK TOGGLE *n* — Choosing this option will toggle between formatting 35 or 36 tracks. Normally, *n* will have an initial value of 35. Rumour has it that some very old drives will not handle the 36th track — Experiment!

(C)ATALOG — Just so you can check that you are not about to format the wrong disk!

(E)ND — This option does just what it says: enter E and the program will end. You will be left in the AppleSoft command mode.

In Conclusion

I am sure that you will find this program as useful as I have done. Or for that matter, as useful as owners of other systems find programs which provide a similar function.

A parting question Line 410 reads —

410 PRINT CHR\$(4); "INITIALISE" Can you explain why it works?

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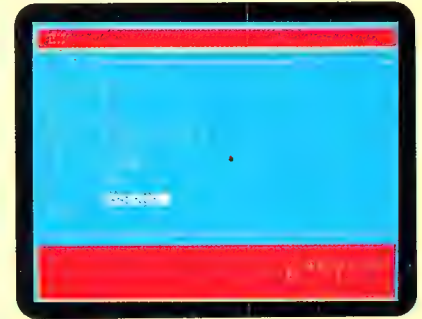
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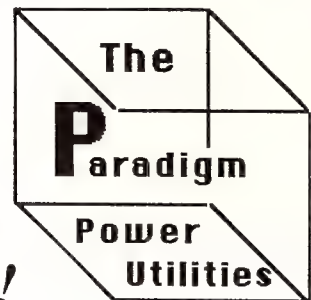
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Ridding WordStar of Non-Contiguous Files

By his own admission, Farquhar Cameron is not a giving person, but here he offers a solution to the wastefulness of non-contiguous files (for a price).

NON-CONTIGUOUS files are those which are scattered broadcast around a disk wherever there is room free. Under WordStar (and lesser word processors also) on a disk which is becoming full, a frequently edited file will tend to be split into non-contiguous blocks as it is repeatedly saved (and you do save your work frequently, don't you? ^KS, hmmm?) Thus, the beginning of a file may be on an early section of the disk and other parts of it may be some considerable distance away, whacked in both higgeldy and piggeldy wherever the File Allocation Table can find room for them — I have in my time seen as many as thirteen non-contiguous blocks in a 40K file. Honest.

There is nothing at all wrong with this except that it slows things down: as you move through the text, the disk drive read head has to move also, casting anxiously around the disk for the next part of the file, and there can be lengthy and irritating pauses when you scroll a text which has been split up in this way or when you carry out a search or search-and-replace. And

the devil, as we know, finds work for idle hands to do.

It is an easy matter to find out how messy your disk is: the DOS CHKDSK.COM utility will fill you in. Type CHKDSK B:.* and all will be revealed.

(Horrible, isn't it?)

The solution is to write a batch file which will rearrange the disk and to execute it whenever things are getting sluggish, or whenever time is hanging heavy on your hands; and although it has not been my wont in these occasional columns to offer anything of any concrete use — I am not by nature a giving person — I am here going to break with tradition and suggest how such a file may be created. I shall be exacting a return for this thoughtfulness.

Assuming all your text files are on drive B: where they belong in the proper ordering of things, this astonishing batch file will copy all the files on B: to a scratch disk in drive A:; everything on B: will be erased, and all the files will be copied back from A: to B:. Seldom used files — those which have already had the bejasus edited out of them — will be placed at the start of the disk, while those which are still being honed to perfection will be shunted to the end. As an added refinement, the batch file itself is tucked away in a subdirectory on drive B: in order to prevent its accidental passage into the void when more drastic housekeeping tasks are performed.

Step one, therefore, is to create a subdirectory on B:

```
MD B:\BAT.
```

and copy CHKDSK.COM onto it:

```
COPY A:CHKDSK.COM B:\BAT
```

Step two is to write the batch file — The

And the devil, as we know, finds work for idle hands to do.

most convenient approach is to use the SideKick notepad or failing that, the DOS copy command:

```
COPY CON: B:\BAT\TEXTBAB.BAT
```

— just wallop the text straight onto the screen with ^Z <CR> at the end. If the batch file is written under WordStar, it will have to be entered from the non-document mode. N. However, since WordStar has not yet heard about subdirectories, it will have to be created as B:TEXTBAB.BAT and then copied into the subdirectory from DOS:

```
COPY B:TEXTBAB.BAT B:\BAT
```

The version on the root directory can then be erased. The first line of the batch file reads:

```
VERIFY ON
```

which will force all copying to be checked. The next line reads:

```
COPY B:\*.* A:
```

(The backslash indicates that the files are being copied from the root directory.)

The next step is to wipe everything off disk B: except the batch file itself. You could write ERASE B:.* for a global zap, but this would involve you in confirming the command and you're in the kitchen building a nice dry Martini. So each group of files must be specified individually. Let's say the text disk has a number of SideKick files, all with the extension .SK; the text files themselves, the draft of your

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Non-Contiguous Files

If you have a beep utility — there's one on the Norton Utilities which is quite audible from my own kitchen even above the rattle of the cocktail shaker — you can pop it into the subdirectory, and the next line will summon you back from the turps.

doctoral thesis or your next bestseller, all with the extension .TXT; a back-up file for every text file, all with the extension .BAK and a number of temporary files — good lines you want to get in somewhere — all with the extension .TEM. Kill 'em all, every man-jack.

```
ERASE B:\*.SK
ERASE B:\*.TEM
ERASE B:\*.TXT
ERASE B:\*.BAK
```

Finally, all the files are copied from A: back to B:, and since the only space now assigned on B: is that holding the batch file itself, the files will appear on B: in the order in which they are copied. The Side-Kick files, perhaps, are not edited as frequently as anything else — there might be a phone dialler, a train timetable, a list of people prepared to lend you money in emergencies and other things which don't require frequent update. It therefore makes sense to place them at the beginning of the disk:

```
COPY A:*.SK B:\
```

The good lines can go anywhere since they're going to be erased eventually:

```
COPY A:*.TEM B:\
```

The text files themselves should be copied in such a way that the most frequently used is the last copied. Let's say your embryonic bestseller has four chapters: 1.TXT, 2.TXT, 3.TXT and 4.TXT, and you're not yet happy with the brutal massacre scene in Chapter Two. Not enough

viscera, you feel. The next lines therefore read:

```
COPY A:1.* B:\
COPY A:3.* B:\
COPY A:4.* B:\
COPY A:2.* B:\
```

If you have a beep utility — there's one on the Norton Utilities which is quite audible from my own kitchen even above the rattle of the cocktail shaker — you can pop it into the subdirectory, and the next line will summon you back from the turps:

```
BEEP
```

The next line:

```
CHKDSK B:\*.*
```

will prove that it's all been worthwhile — you should see the gladsome tidings 'All specified file(s) are contiguous'; and you may now pause to consider the grammatical structure of the English language.

The final line:

```
CD B:\
```

puts you back in the root directory.

To execute the batch file, stick the scratch disk in drive A:, make sure you haven't written a codicil to your will or anything else of any importance on it, move into drive B: and enter the subdirectory:

```
CD\BAT
```

then type TEXTBAB, and repair at once to the kitchen.

And here is the return, the quid pro quo: while leafing idly through an American computer journal the other day, I came upon an advertisement for a memory-resident program called 'Tornado Notes', which lets you write little memos to yourself. Now, I never write memos to myself or anyone else, but I am greatly enamoured of memory-resident programs — a man cannot have too many of them, in my view. When not executing the above batch file, I love nothing better than to get all my pop-ups going at once and plaster the screen with as many pretty displays as possible. 'Tornado Notes', if the advertisement is to be believed, will allow as many as five hundred pretty displays, one atop the other — the mere thought of it maketh mine heart for to sing for very joy within mine breast. If anyone knows where this wondrous thing can be had in Australia, please get in touch with the YC office on (02) 693-6666.

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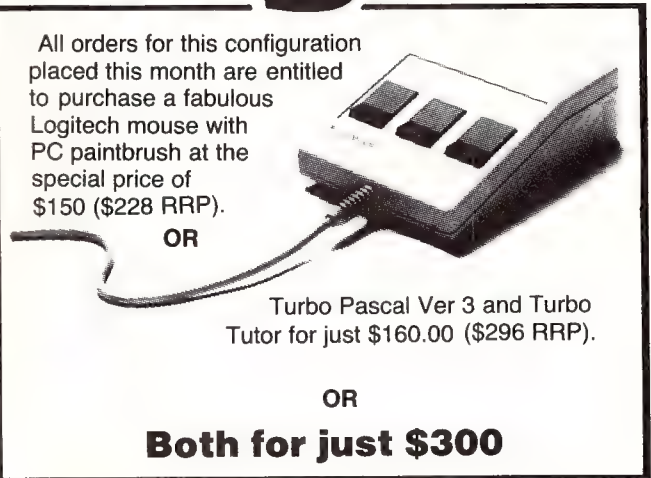
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One-Dimensional

Evolving Graphics



The Rule and the Sum

Stringies live in a simple universe. There are just two laws which control their lives — the Rule and the Sum. Understanding these laws will enhance the interest of the Stringies when they're in action.

The basic element of Stringyness is a series of nine numbers, using the digits 0 to 9, in which no digit is repeated. This series of numbers is called the Sum. Here are some sample Sums:

3 4 5 6 2 9 0 8 1

8 2 1 5 3 6 9 4 7

1 2 7 3 4 9 6 0 8

As you can see, the numbers are in a random order, and no digit appears more than once in the sequence.

The second law of Stringyness is called the Rule. The rule is another series of nine numbers, in which the first number is always 0, and the other eight are any combination of 0, 1, 2 and 3. Here are some sample Rules:

0 3 1 3 1 0 0 3 3

0 0 2 2 0 1 3 3 2

0 0 0 3 3 0 0 1 2

Now, the Rule and the Sum relate to each other quite simply, to create an evolving Stringy. A stringy starts life as a series of nine digits, which can be any combination of 0, 1, 2 and 3. A Stringy could start life as this:

1 2 3 3 2 0 2 1 3

When this is printed out, at the centre of the top line of your screen, a specified character is substituted for each number. My program uses a space for 0, a full stop for 1, a dash for 2 and an asterisk for 3, but you can select any characters you like. (The IBM specific versions of the program uses colours, instead of characters, and this produces a superb result.)

So, the first generation is printed out in the centre of the screen as:

. - * * - . . *

Now the Rule and the Sum come into play. But before we can use them, we have

The rule is	0 0 0 3 3 0 0 1 2
The sum is	0 3 8 1 7 4 5 6 9

USING A COMPUTER program to replicate a living organism is a fascinating project, and here you'll learn one way it can be done. Running the cellular automata program produces some very interesting patterns on the screen, so I thought I'd include some other pattern-making programs in the article as well, to give you 'value for money.'

Whereas the classic program Life, written by John Conway, imitates organisms living in two dimensions on a grid, our cellular automata live in one dimension, on a line. Although Life is very interesting to watch, only one generation at a time can be shown because it is two-dimensional, just like your computer screen.

This is not the case with our little cellular beasts, which I've decided to call 'Stringy Thingies' (which is a lot simpler to say than 'one-dimensional cellular automata', especially after a medicinal lager or six).

When you run the first program ('Stringy Thingies'), you'll see the first generation printed across the top of your screen. The second generation is printed directly below that, and so on, until the whole screen is filled. As the organism continues to develop, new generations are printed on the bottom line of the screen, and the older ones will scroll off the top. It is very interesting to watch as generation succeeds generation. Some of the effects are superb, and continually evolve. Other Stringies settle down to cycle between two or more patterns, while still others either freeze up and simply clone themselves from generation to generation, or just curl up and die.

I learned about Stringies from an article called 'Abstract Mathematical Art', by Ken Perry in *Byte*. Ken points out that these automata were first described by one of the true pioneers of computers and computing theory, John von Neumann, in his paper 'Theory of Self-Reproducing Automata.' If you want to really study the subject, you can immerse yourself in *Essays of Cellular Automata* (edited by Arthur W Burks, and published by the University of Illinois Press, 1971). Anyway, for now, let's get back to the simpler Hartnell version of Stringy Thingies.

One-dimensional cellular automata — These creatures sound a little distressing, like the mould that grows on the bathroom wall. But they thrive, as Tim Hartnell shows, on a computer screen, rather than in some steamy bathhouse.

Cellular Automata

```

10 REM Stringy Thingies
20 REM (c) Tim Hartnell, 1987
30 WID=40:REM No of characters across
40 DIM A(WID),B(WID),R(9),S(9),T(9)
50 CLS
60 PRINT "The rule is";
70 FOR J=1 TO 9
80 R(J)=INT(RND(1)*4)
90 IF J=1 THEN R(J)=0
100 PRINT R(J);:NEXT J
110 PRINT
120 PRINT " The sum is";
130 FOR J=1 TO 9
140 S(J)=INT(RND(1)*10)
150 IF T(S(J))=1 THEN 140
160 T(S(J))=1
170 Q=J+WID/2-4:B(Q)=INT(RND(1)*4):A(Q)=
B(Q)
180 PRINT S(J);:NEXT J
190 PRINT:PRINT
200 INPUT "Press <RETURN> to begin";B$
210 CLS
220 FOR K=0 TO WID/10-1
230 FOR J=1 TO 9
240 M=J+K*10
250 W=A(M)
260 FOR Z=1 TO 9
270 IF W=S(Z) THEN W=R(Z)
280 NEXT Z
290 A(M)=W
300 IF M=1 THEN PRINT " ";:GOTO 370
310 IF W<0 OR W>3 THEN W=L
320 IF W=0 THEN PRINT " ";
330 IF W=1 THEN PRINT ".";
340 IF W=2 THEN PRINT "-";
350 IF W=3 THEN PRINT "***";
360 L=W
370 NEXT J
380 NEXT K
390 FOR M=2 TO WID-1
400 B(M)=A(M-1)+A(M)+A(M+1)
410 IF B(M)>9 THEN B(M)=B(M)-10:GOTO 410

420 NEXT M
430 PRINT
440 FOR J=1 TO WID:A(J)=B(J):NEXT J
450 GOTO 220

```

Listing 1A

Listing 1. *Stringy Thingies* — The first generation is printed across the top of your screen. The second is printed directly below that, and so on, until the whole screen is filled. As the organism continues to develop, new generations are printed on the bottom line of the screen, and the older ones will scroll off the top. Listing 1A is the general program; Listing 1B is for an IBM; Listing 1C is the IBM colour version. Note the sample run.

```

10 REM Stringy Thingies - IBM Specific
20 REM (c) Tim Hartnell, 1987
30 DEFINT A-Z:RANDOMIZE VAL(RIGHT$(TIME$,
2))
40 WID=80:KEY OFF:WIDTH 80
50 CLS
60 DIM A(80),B(80),R(9),S(9),T(9)
70 PRINT "The rule is";
80 FOR J=1 TO 9
90 R(J)=INT(RND(1)*4)
100 IF J=1 THEN R(J)=0
110 PRINT R(J);:NEXT J
120 PRINT
130 PRINT " The sum is";
140 FOR J=1 TO 9
150 S(J)=INT(RND(1)*10)
160 IF T(S(J))=1 THEN 150
170 T(S(J))=1
180 Q=J+WID/2-4:B(Q)=INT(RND(1)*4):A(Q)=
B(Q)
190 PRINT S(J);:NEXT J
200 PRINT:PRINT
210 INPUT "Press <RETURN> to begin";B$
220 CLS
230 WHILE NOT FINISHED
240 FOR K=0 TO WID/10-1
250 FOR J=1 TO 9
260 M=J+K*10
270 W=A(M)
280 FOR Z=1 TO 9
290 IF W=S(Z) THEN W=R(Z)
300 NEXT Z
310 A(M)=W
320 IF M=1 THEN PRINT " ";:GOTO 400
330 IF W<0 OR W>3 THEN W=L
340 IF W=0 THEN PRINT " ";
350 IF W=1 THEN PRINT ".";
360 IF W=2 THEN PRINT "-";
370 IF W=3 THEN PRINT "***";
380 IF INKEY$<>" " THEN RUN
390 L=W
400 NEXT J
410 NEXT K
420 FOR M=2 TO WID-1
430 B(M)=A(M-1)+A(M)+A(M+1)
440 IF B(M)>9 THEN B(M)=B(M)-10:GOTO 440
450 NEXT M
460 PRINT
470 FOR J=1 TO WID:A(J)=B(J):NEXT J
480 WEND

```

Listing 1B

to add together each number which is the Stringy with its neighbouring numbers to the right and the left. The first number in our String is 1. The 'new' Stringy cell will be to the left of the first element of our original Stringy. We take the 1 and write it down. Now, we have to work out the sec-

ond cell, which is directly below the 1. This 1 has no neighbour to the left, but there is a 2 to its right. These added together equal 3. So, the second number of Stringy Mk II is 3. The next number is a 2, and there is a 1 to its left and a 3 to its right, so the second number of String Mk II is 6 (2

plus 1 plus 3).

If we continue to do this, you get this result:

Original Stringy:

1 2 3 3 2 0 2 1 3

Mk II:

1 3 6 8 8 5 4 3 6 4 3



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Cellular Automata

```

10 REM Stringy Thingies - IBM Specific Colour version
20 REM (c) Tim Hartnell, 1987
30 DEFINT A-Z:RANDOMIZE VAL(RIGHT$(TIME$,2))
40 DIM A(80),B(80),R(9),S(9),T(9)
50 WID=80:S$=CHR$(219):KEY OFF:WIDTH 80
60 BLUE=9:GREEN=10:CYAN=11:RED=12
70 MAGENTA=13:YELLOW=14:WHITE=15:BLACK=0
80 COLOR YELLOW,BLACK,BLACK
90 K=RND*4:CLS
100 IF K=0 THEN E=YELLOW:F=GREEN:G=BLUE:H=RED
110 IF K=1 THEN E=BLACK:F=MAGENTA:G=WHITE:H=BLUE
120 IF K=2 THEN E=CYAN:F=RED:G=BLACK:H=WHITE
130 IF K=3 THEN E=RED:F=BLUE:G=BLACK:H=WHITE
140 PRINT "The rule is";
150 FOR J=1 TO 9
160 R(J)=INT(RND(1)*4)
170 IF J=1 THEN R(J)=0
180 T(J)=0
190 PRINT R(J);:NEXT J
200 PRINT
210 PRINT " The sum is";
220 FOR J=1 TO 9 .
230 S(J)=INT(RND(1)*10)
240 IF T(S(J))=1 THEN 230
250 T(S(J))=1
260 Q=J+WID/2-4:B(Q)=INT(RND(1)*4):A(Q)=B(Q)
270 PRINT S(J);:NEXT J
280 PRINT:PRINT
290 INPUT "Press <RETURN> to begin";B$
300 IF B$<>" " THEN END:REM Any key to end
310 CLS
320 WHILE NOT FINISHED
330 FOR K=0 TO WID/10-1
340 FOR J=1 TO 9
350 M=J+K*10
360 W=A(M)
370 FOR Z=1 TO 9
380 IF W=S(Z) THEN W=R(Z)
390 NEXT Z
400 A(M)=W
410 IF M=1 THEN PRINT " ";:GOTO 500
420 IF W<0 OR W>3 THEN W=L
430 IF W=0 THEN T=E
440 IF W=1 THEN T=F
450 IF W=2 THEN T=G
460 IF W=3 THEN T=H
470 COLOR T:PRINT S$;
480 IF INKEY$<>" " THEN 80
490 L=W
500 NEXT J
510 NEXT K
520 FOR M=2 TO WID-1
530 B(M)=A(M-1)+A(M)+A(M+1)
540 IF B(M)>9 THEN B(M)=B(M)-10:GOTO 540
550 NEXT M
560 PRINT
570 FOR J=1 TO WID:A(J)=B(J):NEXT J
580 WEND

```

Listing 1C

Now, let us imagine that our Sum and Rule are as follows:

```

Sum: 0 3 8 1 7 4 5 6 9
Rule: 0 2 3 3 3 1 2 2 2

```

We compare our Mk II Stringy with the Sum, and if a digit in Mk II equals a number in the Sum, it is substituted with the digit which lies directly below that in the

Rule. The first digit in Mk II is a 1. We look along the Sum till we find a 1, and look below that to the Rule. The Rule says that a Sum of 1 becomes a 3. The second digit in Mk II is 3. We look along the Sum to find the 3, and look below the 3 to find 2 in the Rule. This means the second digit of Mk II becomes a 2. ▶

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Mr. J. C. Ryan, President
Flossmoor Soup Company
Flossmoor, Illinois 60422

August 1, 1987

Dear Mr. Ryan:

In an effort to help you stay competitive, we are publishing 5-year sales projections for two soup categories: canned and dry. Please keep these projections handy as they will aid you in your product planning over the coming years. Of special interest to you are the dry soup projections.

	CANNED	DRY
1987	\$6,700,000	\$1,100,000
1988	\$7,300,000	\$2,100,000
1989	\$8,400,000	\$2,600,000
1990	\$9,500,000	\$4,800,000
1991	\$9,900,000	\$7,300,000

As you can see, industry experts project that the gap between dry and canned soups will begin to close by 1990. They also believe mergers will follow.

Needle Price Hike

Bad news this month comes from TNG (The Noodle Group). By year's end, they project the price of noodles to double - up to eighteen cents a barrel. How will this price hike affect you? A two-cent per can increase on all noodle soups you sell.

Recommended Reading: "Cap or Bow?"
This in-depth study discusses the habits of the American soup eater. Call and I'll send you a copy.

Sincerely,

Albert Wolfe

Mr. R. Wolfe
Director, Canned Soup Council



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What if...

Desktop Publishing Chronicle

Advanced Vision Research, Inc. San Jose, California

May 7, 1987

What's Missing From Most Desktop Publishing Systems

When selecting a Desktop Publishing system, consider the most frequent type of documents to be produced and seek product characteristics that satisfy your most common requirements. Don't simply purchase the "popular" product that may only fit a small percentage of the need.

Frequently, popular products have features that are designed for an experienced, extremely proficient user who no longer needs a word processor. Most of the needs for Desktop publishing center around simple documents, improving document appearance, and bringing the work "in-house."

Questions to ask are: The amount of graphics versus text per normal

document; the number of pages in the average job; and how important is fast turnaround?

A complete Desktop Publishing system will include a laser printer and scanner in addition to the computer and the software. Do they work together? Are they an integrated system? Is it hard to learn how to use it? Consider the following in your selection:

Speed: Don't wait 2 and a half to 30 minutes for a page to print on a laser printer. Scanning a page should not require that the image be stored on disk before you edit.

Immediate Preview: When the boss or client want a proof, you shouldn't

be spending more time setting up the job than doing the job itself. What if changes have to be made?

Real WYSIWYG: If the screen image and the laser image are different pixel densities, you never really see what you will get until it is printed out. Is that too late?

Graphics editing: Is a must if you are to improve the quality of the documents you produce. Charts, graphs, pictures, logos, and line art add quality. Scaling, cropping, moving, drawing, darken, lighten, reverse, flip, mirror, and copy are all useful image processing features.

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Total System Solution - AVR's MegaPAGE system is an integrated subsystem for scanning, editing, printing, and communications. The system includes:

MegaPAGE Scanner: 300 dpi flatbed desktop image scanner with 32 levels of gray scale and scan modes for photo, line art, and halftones.

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MegaBuffer: Multi-function interface card for the AVR image scanner and the most popular laser printer.

MegaFax: Performs PC to FAX, FAX to PC, and PC to PC image communication transfers.

OCR: MegaRead, AVR's proprietary optical character recognition software.

MegaFreeze: Memory resident screen "snap-shot" software to capture, CAD, spreadsheet, and graphic images.

GEM Support: Interface software to bridge Digital Research, Inc. Graphic Environment Manager (GEM) family software and Xerox's Ventura Publisher with AVR's MegaScan software.

The missing pieces now fit together with AVR.

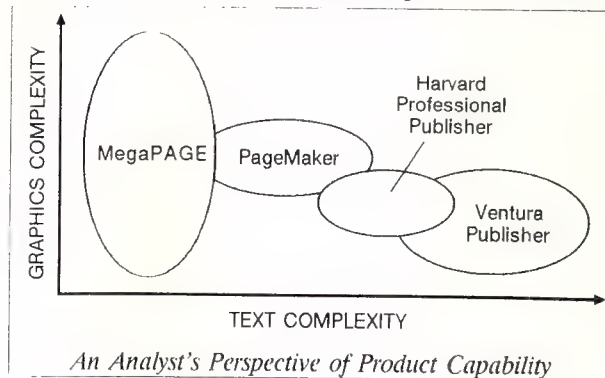
Speed: Scan a page and start editing in only 9 seconds. Any page prints in only 10 seconds.

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This page was created using the MegaPAGE system.

Cellular Automata

Here's what's happening —

Original Stringy:

1 2 3 3 2 0 2 1 3

Mk II:

1 3 6 8 8 5 4 3 6 4 3

After Rule applied:

3 2 2 3 3 2 1 2 2 1 2

Now the final number, 3 2 2 3 3 2 1 2 2 1 2, is the second generation of the Stringy. You can see that it is two cells longer than the original. The Stringy grows lengthwise, until it is as wide as your screen, and evolves according to the Sum and the Rule. Fortunately, the computer does all of the hard work I've described. All you have to do is watch it.

Let's see what we've got. Here are the first two generations, as they would be printed out in characters (using a space for 0, a full stop for 1, a dash for 2 and an asterisk for 3):

```
  . - * * - - . *
* - - * * - - - -
```

Although this appears to be a pretty random set of symbols at this point in the evolution of our Stringies, you'll find that once this process has been carried out 20 or more times, a fascinating pattern will often appear. In many cases, a pattern emerges in as few as five generations.

If you have an IBM PC or a clone, you can try the other two versions of the program. The second one, as you can see, needs a colour board in order to work.

Lissajous Figures

There are many other programs to produce evolving and interesting graphics on the screen. Jules Antoin Lissajous, a French physicist who lived from 1822 to 1880, made a study of the movement of particles under the action of periodic motion, acting at right angles to each other (I got that out of my encyclopedia; it sure sounds impressive). He discovered that bodies moving in this way trace intricate patterns as they dance around each other.

The plotted points in Listing 2 (Lissajous Figures) trace out the path of the sum of these periodic motions. Whereas the Stringy Thingies program should run with little modification on any computer as it is, you may have to do a bit more work to get Lissajous into action. Unless you have an IBM PC, leave out line 50 (SCREEN 1) or substitute your own computer's command — if it has one — to put the com-

puter into high resolution graphics. Where I've used PSET in line 150 to plot a point, your own computer may demand PLOT, SET or something else.

The scaling of the plotted points in Listing 2 is also important. The numbers in line 150 (50 as a multiplier, and 160 and 60 to be added) determine how much of the screen the image occupies (the 50* does this) and the other numbers (160 and 60) determine where on the screen the image appears. Fiddle with these to get the most effective result. You may need to change them quite dramatically. On the VZ 300, for example, the line

should read:

```
SET ((20*SIN(A*Y)+60),
      (20*COS(A*Z)+30))
```

As mentioned earlier, the image the program creates is the sum of the two periodic motions. If the two frequencies are the same, the program will draw a circle. If they are different, the number of points where the curve touches either the vertical or horizontal edge is the ratio of the two frequencies.

Here are some values to try, for very effective results, with Listing 2A, the non-random version of the program:

```
10 REM Lissajous Figures
20 REM (c) Tim Hartnell, 1987
30 PIE=3.141592
40 REM Next line is IBM PC specific
50 SCREEN 1
60 CLS
70 INPUT "Steps";S
80 REM Enter 0 to end
90 IF S=0 THEN END
100 INPUT "Y Frequency";Y
110 INPUT "X Frequency";X
120 CLS
130 FOR A=0 TO 2*PIE STEP PIE/S
140 REM Use PLOT, SET or whatever
      your system demands to plot
      particular points on screen
150 PSET ((50*SIN(A*Y)+160),(50*COS(A*X)
+60))
160 NEXT A
170 FOR T=1 TO 1000:NEXT T
180 GOTO 60
```

Listing 2A

```
10 REM Random Lissajous Figures
20 REM (c) Tim Hartnell, 1987
30 PIE=3.141592
40 REM Next line is IBM PC specific
50 SCREEN 1
60 CLS
70 S=400
100 X=INT(RND(1)*20)+1
110 Y=INT(RND(1)*20)+1
120 CLS
130 FOR A=0 TO 2*PIE STEP PIE/S
140 REM Use PLOT, SET or whatever
      your system demands to plot
      particular points on screen
150 PSET ((50*SIN(A*Y)+160),(50*COS(A*X)
+60))
160 NEXT A
170 FOR T=1 TO 1000:NEXT T
180 INPUT Z$
190 IF Z$="" THEN 60
```

Listing 2B

Listing 2. Lissajous Figures are the path of particles moving with periodic motion, at right angles to each other. In Listing 2A, you have to enter numbers for the X and Y frequencies, while in Listing 2B, the program chooses these values at random.

Cellular Automata

STEP	X	Y
50	1	1
60	2	1
60	3	4
60	5	2
80	1	2.5
600	1	26.5
300	7	4
175	9	4
500	1	6
500	4	12
200	8	1
250	3	8
500	2	8
500	1	20

Bunbury Lace

The program in Listing 3 is pretty simple, but it produces very effective results. (I used to live in Bunbury, south of Perth, so I thought I'd name the program after the place.)

Bunbury Lace prints asterisks at random in the top left hand corner of the screen, then 'echoes' these in a balanced way in the other quadrants, to produce very effective designs. If you don't have an IBM PC, change the command LOCATE in lines 80 through to 110 with PRINT AT, PRINT @ or your computer's equivalent.

Although the program contains very few lines, it creates constantly evolving patterns, and will well reward the few minutes it will take you to enter it.

3D Printer Plotter

Listing 4 allows you to print out three-dimensional plots of formulae. There are four sample formulae in the subroutine from line 220. Once you've run the program as it is, and seen the result of including each formula, substitute some of your own. You may need to scale the output to some extent, to get the best results on your printer. The numbers which you should try changing, if the results look rather strange, are those in lines 240 through to 270 (try, for example, changing the 200 in line 240 to 100, or to 400, to get the most effective result on your screen).

You'll find all of these programs will produce interesting, evolving graphic patterns and I'd like to see variations you develop yourself. Note that if you don't want to go to the trouble of typing in the programs, you can download them from the *Your Computer Bulletin Board* on (02) 669-1385. Alternatively, if you have an IBM PC, or a clone, I can provide you with the programs on disk (some of them tailored specifically for the PC, and compiled so they are much more satisfying to watch —

```

10 REM Bunbury Lace
20 CLS
30 WID=78:REM No of characters across
   less two
40 LE=22:REM No of lines down less two
50 X=INT(RND(1)*LE)+1
60 Y=INT(RND(1)*WID)+1
70 S$=" ":IF RND(1)>.45 THEN S$="*"
80 LOCATE X,Y:PRINT S$
90 LOCATE (1+LE-X),Y:PRINT S$
100 LOCATE (1+LE-X),(1+WID-Y):PRINT S$
110 LOCATE X,(1+WID-Y):PRINT S$
120 GOTO 50

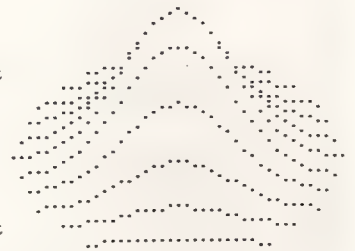
```

Listing 3. Bunbury Lace prints asterisks at random in the top left hand corner of the screen, then echoes these in the other quadrants. If you don't have an IBM PC, change the command LOCATE in lines 80 through to 110 with PRINT AT, PRINT @ or your computer's equivalent.

```

10 REM 3D PRINTER PLOTTER
20 REM (C) Tim Hartnell, 1987
30 FOR DE=1 TO 4:GOSUB 220
40 FOR CP=-BI TO BI STEP BY
50 AL=0
60 SU=VA*INT(SQR(900-CP*CP)/VA)
70 FOR TI=SU TO -SU STEP -VA
80 ST=INT(VA*VA+FNA(SQR(CP*CP+TI*TI))-CH
  *TI)
90 IF ST<=AL THEN 140
100 AL=ST
110 REM Line 130 is to print on printer
120 REM Use LPRINT or PRINT #8
   or whatever
130 LPRINT TAB(ST);"";
140 NEXT TI
150 REM Next line also is to print
   on printer
160 REM LPRINT
170 NEXT CP
180 NEXT DE
190 END
200 REM -----
210 REM Next line also is to print
   on printer
220 LPRINT:LPRINT
230 VA=5:BY=1.5:BI=6*VA:CH=.7
240 IF DE=1 THEN DEF FNA(Q)=BI*EXP(-Q*Q/
200)
250 IF DE=2 THEN DEF FNA(Q)=BI*EXP(-COS(
Q/16))-BI
260 IF DE=3 THEN DEF FNA(Q)=BI-BI*SIN(Q/
18)
270 IF DE=4 THEN DEF FNA(Q)=SQR(BI*BI+BY
/100-Q*Q)
280 PRINT "OK, here we go with demo"DE:P
RINT
290 RETURN

```



Listing 4. 3D Printer Plotter prints three-dimensional plots of formulae. Try scaling the output to get the best results on your printer — try changing lines 240 through to 270 (for example, change the 200 in line 240 to 100, or to 400). Note the sample run

along with a selection of other graphics programs to fill up the rest of the space) for just a used fiver, cheque, or Visa or

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Is the Printer Attached?

Let the computer find out for itself!

When you turn your computer on and there's a modem or printer attached, you shouldn't have to tell it that those peripherals are there, right? That's what John Summerfield thought and here's the answer . . .

WHILE THE routine given here provides a particular solution to a particular problem, it's really intended to spark the idea of applying the same approach to other problems. I find it intensely annoying for a computer to expect its user to provide information it can obtain for itself. For example, I don't like having to tell the computer (in effect) there's no modem attached.

If I want to start the day using communications, what better way than just turning on my modem before the computer? If the computer can determine that the

modem is turned on when it boots, I shouldn't need to tell it a second time by starting my communications program, particularly if I always start the same one in the same way.

Now, my particular problem is with my printer. I usually use my Toshiba T3100 without a printer attached, but then, quite often I do have a printer. On those occasions when I don't use a printer, I have another computer attached to the serial port, and use it as a sort of 'glass printer.'

When I don't use a real printer, I redirect the printer output to the COM1: device. Rather than type the command each time, I wrote a little program to determine whether the printer is available, and set a return code I can test with ERRORLEVEL in my AUTOEXEC.BAT file.

If you would like to do the same on an IBM PC (or compatible), create a text file with the lines below. Use EDLIN, WordStar in non-document mode, or an equiva-

lent. Don't start a line with spaces. If you want, you can enter the DEBUG command with no operands, and type these commands straight in. It requires more care than doing it the way I suggest, but it will work fine.

If you don't have an IBM compatible PC, you may be able to adapt it to your machine. On the APC III, for example, you shouldn't need to do much more than change the ROM BIOS interrupt number, and perhaps test some different status bits.

```
nprstat.bin
a100
MOV     AH,02
MOV     DX,0000
INT     17
MOV     AL,00
AND     AH,3F
XOR     AH,30
JNZ     0113
INC     AL
MOV     AH,4C
INT     21

rcx
17
w
q
```

Please note that the blank line before 'rcx' is necessary. It doesn't matter whether you use upper or lower case in entering these commands: the parts in uppercase are the program itself. The other lines contain supplementary commands to control DEBUG.

The first line gives the name of the file to be created. Then there is a command to accept assembly language statements and to assemble them from location 100. The three lines ending 'INT 17' set up a ROM BIOS call to obtain the printer status, which is returned in register AH.

The next instruction sets AL to 0, the return code we'll use to indicate the printer is available and ready.

The four lines ending 'JNZ 0113' isolate and test the status bits that tell us whether the printer is ready. If it is, a branch, or jump, is made to location 113. Otherwise, register AL is incremented. Location 113 contains the instruction 'MOV AH,4C.'

The last two lines of the program invoke the DOS TERMINATE function. Register AL has already been set to the appropriate return code.

The blank line tells DEBUG to stop as-

If you've got any ideas on how to use the approach I've outlined here (and you've implemented them!) send them in — we'll share them in a future article (any ideas published will be worth a free subscription).

sembling. Then we have the command 'rcx.' This tells DEBUG that we want to change the contents of register CX. The line after contains the new value.

After that, the 'w' command tells DEBUG to write the new program (we have already given it a name), and the 'q' command tells DEBUG we've finished.

Assuming you create a file called TEMP containing the statements above, you can assemble them with the command DEBUG <TEMP. (If you aren't in the habit of using DEBUG, you'll find it on your master MS-DOS disk in a file called DEBUG.COM. It will read all the commands and process them as outlined above, creating a file called PRNSTAT.BIN.

Rename it to PRSTAT.COM, copy it onto your program directory, and it's ready for use. These two lines from my AUTOEXEC.BAT file show how I use it —

```
prstat
if ERRORLEVEL 1 mode lpt1:=com1
```

As outlined above, PRNSTAT checks whether the printer is ready (unfortunately I can't see any way to tell whether the printer is not attached or just not ready), and sets the return code to 0 if it's ready to use, 1 if it's not.

If ERRORLEVEL is greater than or equal to 1, the MODE command is issued, to direct all printer output to COM1. You, of course, can elect to do something else at this point.

Adventurous readers could use the same basic idea to test other conditions — Is anything attached to the COM1 port? What kind of graphics card is installed? Is today the date the backups should be done? Is a particular disk in drive A?

If you've got any ideas on how to use the approach I've outlined here (and you've implemented them!) send them in — we'll share them in a future article (any ideas published will be worth a free subscription). □

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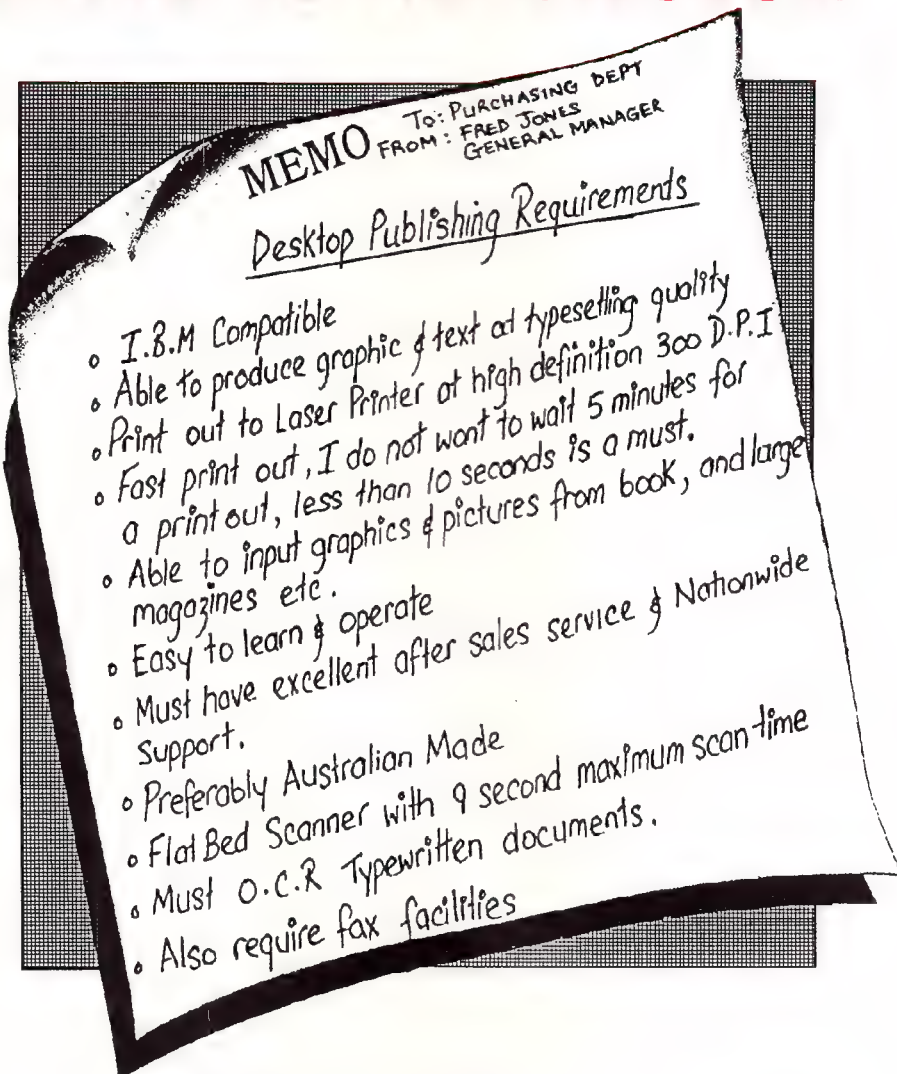
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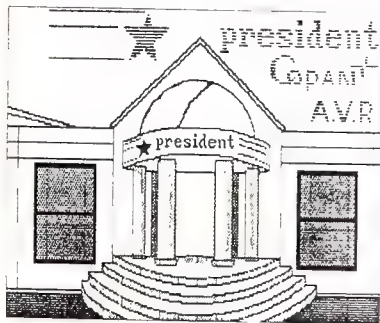
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President News of MegaPAGE

President Computers Pty. Limited an eighteen year old leading Australian owned Computer Company with manufacturing facilities on the Gold Coast Queensland, have boldly released a total system solution for Desktop Publishing.

As Desktop Publishing requires so many hardware segments to make up a complete publishing system such as A.T.Computer, Hi-Resolution Monitor, Laser Printer, Image Scanner, Voice Coil Hard Disk, Tape Backup, Graphics Software and Publishing Software. It is most desirable, if not essential, for the customer to be able to source the complete system from one Computer House, a Company that offers total support, both hardware and software.

President Computers is offering total support on site for the complete system as well as a formal "hands on" training facility available in all major cities.

HARDWARE

President's hardware consists of a Publisher 286 Computer which is a custom A.T. built in Australia at Labrador, which incorporates a 80286 processor with 6-8-10 Mhz selectable speeds, a choice of 44 or 71 Megabyte voice coil hard disk with fast access speeds, 60 Megabyte of tape backup and a special 101 keyboard incorporates the new tactile positive keys. The standard CGA colour monitor is supplied or a choice of EGA or powerful Wyse-700 which displays 1260 x 800 lines. A specially modified Canon A1 Laser Printer comes with the system giving a full 300 D.P.I. resolution at 8 copies per minute. The AVR-300 Flatbed Scanner which has the ability to scan any A4 document in an amazing 9 seconds at 300 D.P.I. the results are astoundingly high quality scans from sheets, photographs, oversized documents, books even some 3 dimensional objects. With scanning, a flat bed scanner is essential to give all the flexibility and choice you will most certainly require

The software President offers is the A.V.R. MegaSCAN page composition software, this software is fully interfaced with the A.V.R. scanner, MegaSCAN is a most powerful graphics orientated package, and is simple to use. MegaSCAN can manipulate scans of text introduced from your standard word processors or scanner, to compose pages with combinations of graphics and text fonts in amazingly short periods of time. In many applications MegaSCAN will be all the software you require. MegaSCAN has many advanced operations including drawing attributes, boxes, circles, eclipses, freehand as well as operation options such as outlines, reverse image, darken, lighten, halftone black, move, cope, scale. MegaSCAN also has functions to photo enhance photographs, paint box which allows selection of 128 different patterns, smooth which will clean up rough scanned images and rotate. The ability to store files from most ASCII type word processors, then select from the vast range of type fonts and flow your text into preset areas of your page form embedded commands (like batch files) with features like centre, left justification, right justification etc, gives MegaSCAN the power to handle most layout requirements.

Mega Freeze

Allows you to capture complete screen images from your monitor and store and use at will, particularly useful for creation of training manuals etc.

MegaDisk

Allows you to access the 1.3 Megabyte MegaBUFFER Ram Card for normal software applications as Ram Disk.

MegaGem

Transfers megabuffer files into Gem files and allows scanning into Ventura or Gem.

MegaWriter

Is a word processor which creates a window on your page layout so you can input your text with word processing features and flow the finished text file directly into your page composition without leaving MegaPAGE.

MegaFax

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MegaRead

is an O.C.R. Optical Recognition option which allows typewritten documents to be scanned into the system converted to ASCII text files and manipulated edited and reprinted in a new format.

Training

President has opened three full time training centres in Sydney, Melbourne and Brisbane to give XEROX Ventura publishing software "hands on" operator training programmes.

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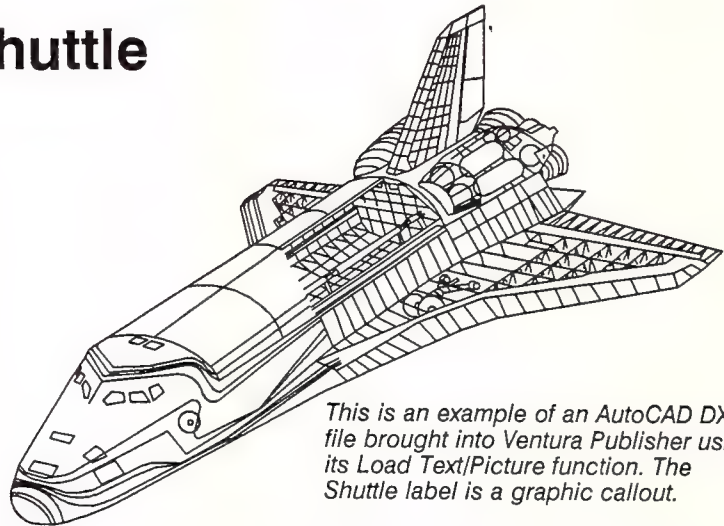
MegaScan - GEM/Ventura Publisher Support

The MegaScan Accessories link GEM applications and Ventura Publisher to AVR's powerful image/text editing program: MegaScan.

The accessories consist of three individual programs: a GEM desktop accessory for scanner control and image format translation; a printer driver for 300 dpi output from GEM applications; and a second printer driver for 300 dpi output from Ventura Publisher.

The accessory software allows the AVR-300 scanner to scan images into the 1.3 megabyte pixel buffer (MegaBuffer) from within any GEM application or Ventura Publisher. In addition they can also transfer pixel images between the MegaBuffer and GEM image files.

Shuttle



This is an example of an AutoCAD DXF file brought into Ventura Publisher using its Load Text/Picture function. The Shuttle label is a graphic callout.

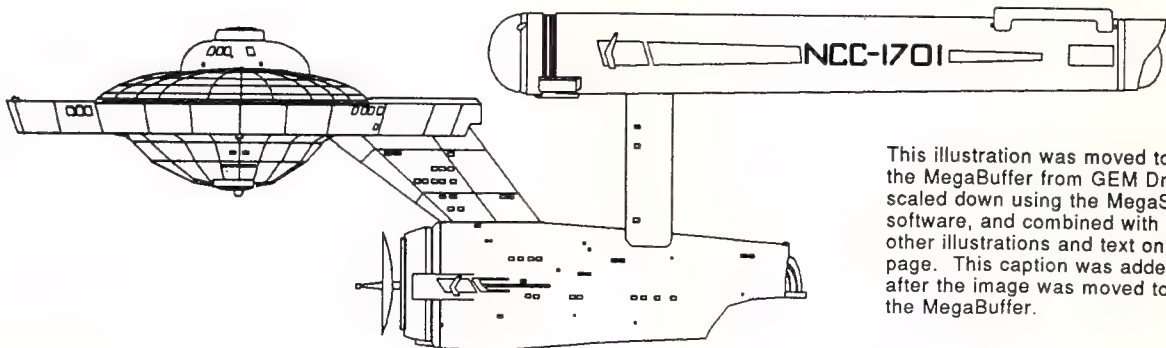
This illustration with text was moved to the MegaBuffer from Ventura Publisher to create this data sheet.

Features

- * Operates the AVR-300 scanner from within GEM applications or Ventura Publisher.
- * Prints from GEM applications and Ventura Publisher at 300 dots per inch on the AVR Laser Printer.
- * Reads GEM images into the MegaBuffer where they can be edited and incorporated into larger documents.
- * Transfers GEM application and Ventura Publisher formatted output into the MegaBuffer where they can be edited with the MegaScan software.
- * Converts scanned or other images in the MegaBuffer into GEM image format.



This image was scanned using the GEM desktop accessory from within Ventura Publisher.



This illustration was moved to the MegaBuffer from GEM Draw, scaled down using the MegaScan software, and combined with the other illustrations and text on this page. This caption was added after the image was moved to the MegaBuffer.

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This page was created using MegaScan and the MegaScan Accessories.

Compacting Data on a Home Computer

Is your 8-bit computer always running out of RAM? Merv Beamish has an idea that will add up to 50 per cent more space to the memory (but he's wondering about the machine language routine) . . .

IF YOU COMPACT your data before storing it, that precious little memory available in the average 8-bit home computer can 'be pushed' up. And that's the equivalent of adding memory to the RAM. The AND and OR operatives are the key. A single memory location (that's a single BYTE), can store a value from 0 to 255. Now, a BYTE is made up of eight binary digits, BITS, and the digits can be either 0 or 1. Thus the lowest decimal value, 0, equals 00000000 in binary code and the highest, 255, is 11111111.

If you 'restrict' the values used to the first 16 (0 through 15), a single BYTE's capacity for storage can be expanded by 50 per cent. This is done by breaking the BYTE into two NYBBLES of four BITS each. Table 1 shows that only 4 BITS are needed to represent the 16 values.

VALUES	BITS REQUIRED
0 - 255	8
0 - 127	7
0 - 63	6
0 - 31	5
0 - 15	4
0 - 7	3
0 - 3	2
0 - 1	1

Table 1. Bit/Value Requirements — If you're dealing in values from 0 to 15, a single BYTE's capacity for storage can be expanded by 50 per cent. It's just a matter of breaking each BYTE into two NYBBLES of four BITS each. As the table shows, only 4 BITS are needed to represent up to 16 values (0 to 15).

For example, take the values of decimal 5 (0101 binary) and decimal 11 (1011 binary). Let's store 5 in the UPPER NYBBLE and 11 in the LOWER NYBBLE.

The actual BYTE value will then be 91 —

```
UPPER NYBBLE decimal 5 0101
LOWER NYBBLE decimal 11 1011
-----
BYTE value decimal 91 01011011
```

To separate the two NYBBLES from the BYTE value, the AND operative is used —

```
BYTE value decimal 91 01011011
AND with decimal 15 00001111
-----
Result decimal 11 00001011
```

The AND operative compares the corresponding BITS in each value and prints 1 only where both are 1. At all other times it prints 0 —

```
BYTE value decimal 91 01011011
AND with decimal 240 11110000
-----
Result decimal 80 01010000
```

Not exactly a 5 is it? However, we have to take into account that the UPPER NYBBLE is spaced 4 bits to the left. Table 1 showed that 4 bits can represent 16 values, so —

```
80/16 = decimal 5 00000101
```

Separating the NYBBLES is fine, but how did they get there in the first place? The UPPER and LOWER NYBBLES are combined by using the OR operative. When corresponding BITS of each value are compared, a 0 is printed when both BITS are 0, and a 1 in all other cases —

```
BYTE value decimal 0 00000000
OR with decimal 11 00001011
-----
Resulting BYT value 11 00001011
```

```
New BYTE value dec. 11 00001011
OR with dec. 5*16 = 80 01010000
-----
Resulting BYTE value 91 01011011
```

Values within a BYTE can be changed using both operatives: first for clearing the required NYBBLE by using AND, then OR

the new value. We will change the UPPER NYBBLE value to 9 —

```
BYTE value decimal 91 01011011
AND with decimal 15 00001111
-----
Resulting BYTE value 11 00001011
```

```
BYTE value decimal 11 00001011
OR with dec. 9*16 = 144 01110000
-----
Resulting BYTE value 123 01111011
```

As we already knew that the LOWER NYBBLE was 11, we could have gone straight to the OR routine — but we don't always know the LOWER NYBBLE's stored value.

Now, it doesn't take too much imagination to realise that the same methods can be applied to individual bits. Also that a number of BYTES can be combined for larger and more complex tables than those used above — an illustration of this is given in Table 2.

BYTE	BITS	DETAILS
1	8 - 3	Event numbers 1 to 60
	2 - 1	Position:
		0 = unplaced
		1 = first place
		2 = second place
		3 = third place
2	8 - 6	Lane number 1 to 8
	5 - 4	Style:
		0 = freestyle
		1 = backstroke
		2 = butterfly
		3 = breaststroke
	3 - 1	Club:
		0 = Eastwood-Epping A.S.C.
		1 = Killarney Hts. A.S.C.
		2 = Castle Hill Dolphins
		3 = Ryde A.S.C.
		4 = North Sydney A.S.C.
		5 = Ku-ring-gai A.S.C.
		6 & 7 unused

Table 2. Using the method described in the text, a number of BYTES can be combined to give large and complex BYTE Storage Tables such as this one.

Text

One of the largest wasters of memory is the text file. Excluding control characters, an alphabet containing all upper and lower case characters, numbers, commonly used mathematical symbols and punctuation, requires only 96 characters. This means that only 7 of the 8 bits of a BYTE are required, which leaves the 8th free.

Now, in many cases a program only needs a selection of 64 characters. Only 6 BITS are then required to represent them all. A 25 per cent saving in space can be achieved by saving characters in groups of 6 BITS as opposed to BYTES of 8 BITS.

Table 3 gives a selection of 64 characters that might be used and a decimal value allocated to each. By way of explanation, there's also a worked-through example.

Determining when to multiply or divide the results can be a little confusing, so if you find the following hard to follow, work it through with a pencil and paper. First, determine where the result of an AND sits in the group of 6 BITS. For instance, in the example, character 'r' is decimal 18 (010010 in 6 BITS). It was made up of 1 (01) from BYTE value 173 and (0010) from BYTE value 33. The (01) is space 4 to the left in our group of 6 BITS and as such has to be multiplied by 16. However, (0010) is not spaced to the left in our group of 6, but is spaced 4 to the left in our BYTE of 8 bits, so it needs to be divided by 16.

Dictionary

One of the problems involved with compacting data is speed. The poor old computer is near having a hernia doing all these mathematics. If you are programming in Basic, processing 'speed' can become quite obvious, so the best idea is to write an assembly language routines to handle it for your particular computer (more about that later).

Something can be done to help speed up the progress by using 'frequency of use' tables, though. By constructing such a table, the value (representing a character or word), that is most used in a program becomes quicker to locate than one that is seldom used.

A program may require a only a small vocabulary of words for error messages, instructions and help statements. Let's assume Table 4 is such a vocabulary — it shows the word or character, its frequency of use, and the binary code allocated to the word.

Table 3a. The 64 Character Alphabet.

1st column = character and		2nd column = allocated decimal value					
spc	0	p	16	6	32	K	48
a	1	q	17	7	33	L	49
b	2	r	18	8	34	M	50
c	3	s	19	9	35	N	51
d	4	t	20	.	36	O	52
e	5	u	21	,	37	P	53
f	6	v	22	A	38	Q	54
v	7	w	23	B	39	R	55
h	8	x	24	C	40	S	56
i	9	y	25	D	41	T	57
j	10	z	26	E	42	U	58
k	11	0	27	F	43	V	59
l	12	1	28	G	44	W	60
m	13	3	29	H	45	X	61
n	14	4	30	I	46	Y	62
o	15	5	31	J	47	Z	63

Table 3b. A step by step calculation for using UPPER and LOWER NYBBLES for separate values.

Characters "Free"	F	r	e	e
Decimal values (see Table 3a)	43	18	5	5
6 BIT Binary	1010110010000101000101			
Stored BYTE values	173	33	69	
Four step loop -				
BYTE value 173	10101101			
AND with 252	11111100			
Result	172	10101100	Value 172/4 = 43 = F	
BYTE value 173	10101101			
AND with 3	00000011			
Result	1	00000001	store A 1*16 = 16	
BYTE value 33	00100001			
AND with 240	11110000			
Result	32	00100000	store B 32/16 = 2	
			Value (A+B) 16 + 2 = 18 = r	
BYTE value 33	00100001			
AND with 15	00001111			
Result	1	00000001	store A 1*4 = 4	
BYTE value 69	01000101			
AND with 192	11000000			
			01000000	store B 64/64 = 1
			Value (A+B) 4 + 1 = 5 = e	
BYTE value 69	01000101			
AND with 63	00111111			
Result	5	00000101	Value 5 = e	

Table 3. In many cases, a program only needs a selection of 64 characters, rather than the 96 generally used in text files. That means only 6 BITS are required to represent all 64 (and that's a saving of 25 per cent). Figure 3a shows the 64 character alphabet and Figure 3b is a step by step calculation for using UPPER and LOWER NYBBLES for separate values.

Table 4. A program may require a only a small vocabulary (like the one given here) for error messages, instructions and help statements. The allocation of the binary code for a word or character is determined by its frequency of use — for example, * was used 91 times, so it's allocated a 3 BIT number, while AT is used only three times and is given an 8 BIT number.

1st column = word or character		2nd column = frequency of use		3rd column = allocated BINARY number	
PRESS	36	0001	SELECT	8	110110
RETURN	20	01110	EXIT	50	0110
STAGE	8	10111	HELP	27	1010
AT	3	01111110	-	4	1101110
CONTROL	14	10010	.	34	1100
FUNCTION	8	101110	SCREEN	3	01111111
KEY	34	1111	ON	39	0010
FOR	6	100111	WITH	10	001110
WAIT	9	001111	CABBAGE	1	11011110
/	5	0111110	,	7	11011111
WRITER	14	10110	OUTPUT	12	011110
IF	35	0000	PRINTER	18	00110
CHECK	34	1110	?	26	1000
=	15	11010	THE	2	11011110
:	1	100110	*	91	010

Compacting Data

The allocation of the binary code is based on frequency of use (spaces are automatically generated). The most used character is * (91 times), so it's given the shortest possible binary code which is 3 BITS long. Words with frequency ratings of 26 to 36 have 4 BIT codes, 15 to 20 codes of 5 BITS and so on. What the actual code is, has no significance — it is the number of BITS that counts.

Table 4 can be drawn as a tree — reading the allocated binary codes in the table from left to right, the path to a particular word turns left at a 0 in the binary code, and right at a 1, and that gives us the tree in Figure 1.

Each word or character has an identifying decimal value stored in a memory location. Messages are stored as a continuous binary code. A base memory location (address) is allocated, then the program commences checking the binary code from left to right. When a 0 is found, a 1 is added to the address which is then checked for a valid value. When a 1 is encountered and the contents of the current memory location is less than 32, then the contents is added to the address and the new address checked for a valid value. (A value is valid if the address contents is between 32 and 62.) When a valid value is located, it is fed into the program and the address is reset to the base address.

As you can see this method has a considerable amount of flexibility. There are no set rules on memory location, setting

of binary codes or even the size of the vocabulary base. Using Table 4, the example in Table 5 gives a rough demonstration of how the system works.

Now here's the bite — this can all be programmed in Basic for demonstration purposes. But, for speed we need machine

language routines.

So, there's the idea for compacting data on that memory starved 8-bit, so let's see the results. We'll publish as many machine specific routines as space allows (and put all of the good ones up on the Bulletin Board). □

Table 5. The method for compacting data, as described in the text, has a considerable amount of flexibility. There are no set rules on memory location, setting of binary codes or even the size of the vocabulary base. Assuming the vocabulary in Table 4, the example here is a rough demonstration of how the system works.

Sentence	PRESS RETURN KEY :*	
Binary code (from Table 4)	000101110111100110010 00	
BYTE value	23 124 200	
8 Step Routine		
BASE ADDRESS	000000	
BYTE value 23	00010111	
AND with 128	10000000	

	00000000 + 1 to address	000001
BYTE value 23	00010111	
AND with 64	00100000	

	00000000 + 1 to address	000002
BYTE value 23	00010111	
AND with 32	00010000	

	00000000 + 1 to address	000003
BYTE value 23	00010111	
AND with 16	00010000	

	00010000	000003
		contents 32 = PRESS
Reset to BASE		000000
BYTE value 23	00010111	
AND with 8	00001000	

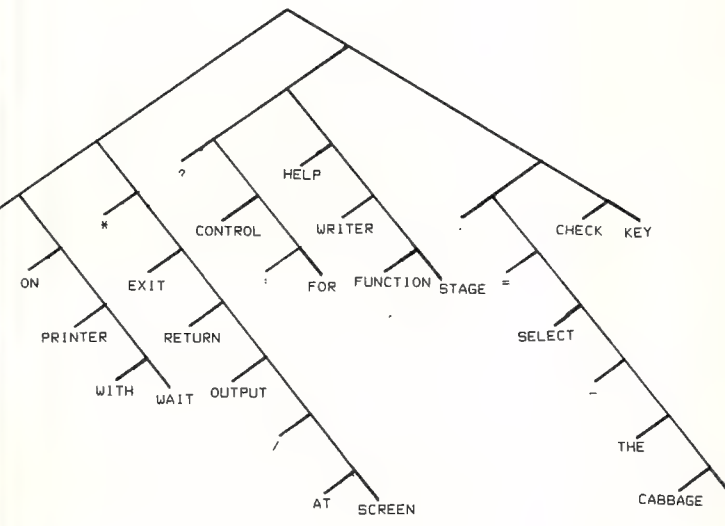
	00000000 + 1 to address	000001
BYTE value 23	00010111	
AND with 4	00000100	

	00000100	000001
		contents 4 add
		000005
BYTE value 23	00010111	
AND with 2	00000010	

	00000010	000005
		contents 1 add
		000006
BYTE value 23	00010111	
AND with 1	00000001	

	00000001	000006
		contents 16 add
		000022
-----new loop-----		
BYTE value 124	01111100	
AND with 128	10000000	

	00000000	000022
		contents 33 = RETURN
***** And so it goes on.		



NEW PRODUCTS

Software

Custom-Made Cash Flow

Custom-Made Software

Phone: (02) 399 8566

Price: \$99 (taxed)

Lewis Cash Flow is a financial manager which generates a cash flow projection. The package is designed for either personal or business use. The software helps decide the time to purchase big-ticket items like a new car or when to invest in home renovations or business capital expenditure. You can decide when to transfer money between different accounts, and re-schedule payments for loans. MS-DOS, Macintosh and C/PM-80 versions are available

COMPACT

Enter Accounting Software

Compact Software Australia

Phone: (02) 371 9333

Price: \$450 (taxed)

Compact has released a low-end accounting package based on their Professional accounting suite. The package includes Customer and Supplier accounting with Sales Invoicing and a full Private Ledger with flexible profit and loss and balance sheet reporting. It also includes an interface module that can access all the data in the Enter package and can transfer it to most word-processor and spreadsheet packages. The system is menu driven, with password protection on three levels. It includes on-screen enquiry and print facilities, alpha search by customer and supplier, aged debtors with phone number shown, a cheque writing facility, modifiable profit and loss and balance sheet reports, modifiable invoice formats, built-in product file for invoices (optional), and customer and product profit ability reports by profit markup percentage. All modules are fully integrated.

TA Technical Imports Australia Pty. Ltd.
INC. IN NSW

PSpice Circuit Simulation Software

Technical Imports Australia

Phone: (02) 922 6833

Price: \$2000

PSpice is the IBM PC version of the widely-used mainframe (DEC VAX) Spice package which is a software breadboard for the design of analog circuits. It allows the user to input a circuit description from a text file or from a schematic CAD package and have PSpice perform the analysis. The results may be viewed interactively and output to printers and plotters. The Probe option lets you check results with high resolution graphical output. Information about any part of the circuit may be analysed interactively without re-running the simulation. The 'Parts' option helps you extract device model parameters from the manufacturers' data sheet specifications and check that the device characterisation has been done correctly. It runs on a 512K PC with co-processor and can simulate circuits up to 640K with up to 120 transistors. The package can be used to analyse voltages and currents in the circuit, time response, frequency response, and noise behaviour over a range of frequencies — all of which can be run over any temperature range. PSpice includes a library of common discrete devices such as bipolar transistors, diodes, power MOSFETS, op amps and voltage comparators.



SOURCEWARE

Tapestry LAN package

Sourceware

Phone: (02) 411 5711

Price: Not supplied

Tapestry, from Torus Systems, is designed to integrate 8 to 10 network stations (PCs, XT or ATs) in small to large businesses. It uses icon-based menus to represent common office features such as in and out trays (is there a too hard basket?), file drawers and cabinets, and telephones. The +interface isolates users from DOS so no knowledge of DOS commands is necessary. Tapestry supports IBM Netbios-compatible LAN hardware, including IBM Token-Ring network, 3Com

Etherlink, Ungermann Bass, Net/one and AST Resource Sharing Network. It's claimed that an unlimited number of hard disk drives, modems and printers can be networked, eliminating the need for dedicated machines since all servers can run as back-

ground tasks. Automatic print spooling and electronic mail and a central library for shared programs are also featured. IBM PC workstations require a minimum of 320K RAM and the server stations require a minimum of 384K RAM plus a 10 Mbyte hard disk.

New Machines



GRiDLite Laptop Computer

Vicom Australia

Phone: (03) 690 9399

Price: \$3604

Vicom have gone miniature with their lightweight (3.8 kg) laptop, designed for field use. The laptop comes with 640K RAM which is expandable to 1 Mbyte; there is also the option of an additional 1 Mbyte of ROM from snap in cartridges. The GRiDLite features a 25 cm supertwisted LCD screen, and 71 keys with 12 function keys; a 1200/300 band internal modem is available. The machine can run on either mains power or an internal, rechargeable NiCad battery pack weighing only 340 grams, which supplies 3 to 4 hours of use.

Mica LAN System

Mica Computers

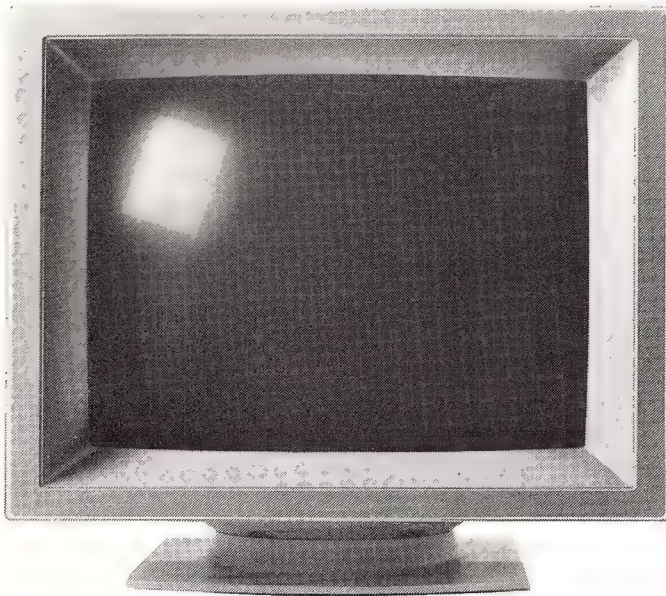
Phone: (02) 929 4988

Price: Not supplied

The system called MicaLan II consists of workstations, communications gateways and file servers all based on Mica's new Constat family of PC/AT-compatible computers. A key feature is

the ability to communicate with multiple host computers — workstation users can have simultaneous sessions with different hosts. Two workstations have been designed for operation on MicaLAN II. These are the floor-mounted Prostat workstation with a 40 Mbyte hard disk and the ability to take additional hard disks and a streaming tape backup and the Genstat with a 20 Mbyte hard disk. Both feature an 8 MHz 80286 processor, 640K of RAM, and a 1.2 Mbyte floppy disk drive. The system is available with two 8 MHz 80286-based file servers. The 40 Mbyte Filestat-1 (with 2.6 Mbyte of RAM) can be optioned to 70 Mbyte; it's bundled with Novell's Advanced Network 286 networking operating system. Filestat-2, also with Network, comes with 109 Mbytes. Each have eight I/O expansion slots and three printer ports (2 serial and 1 parallel). Network can support up to 32 separate file servers on a single LAN or an inter-network of several LANs. Each workstation can be simultaneously logged onto up to eight file servers

NEW PRODUCTS



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NEC484/87 USPNeedham

tion panel provides a direct link from PC to overhead projection with out any intervening software or the need to transfer the information to transparencies. Any information that can be shown on a PC/AT/XT or Apple II screen can be projected. The QA25 panel plugs into the computer's monitor port, and light from the projector shines through the LCD display for projection onto the overhead screen. The picture may be viewed in standard mode (black on White) or inverted, depending on preferences.

Tandy ELECTRONICS

Tandy 3000 HD Computer

Tandy Electronics
Phone: (02) 675 1222
Price: \$8999

Tandy have introduced an IBM PC/AT styled machine using an 8 MHz 80286 processor. it's avail-

able with MS-DOS 3.1 and Basic. The standard configuration incorporates a 512K memory expandable to 12 Mbytes under Xenix using the 10 builtin expansion slots (7 AT compatible slots, 2 XT slots and 1 XT compatible half-slot for the serial/parallel adapter). A real time clock with battery backup, sound and power-up diagnostics are included. The 3000HD comes with a builtin 20 Mbyte hard disk and reads 1.2 Mbytes and 360K floppies. The keyboard has 84 sculptured keys with 10 programmable function keys and a numeric keypad. Disk storage is expandable to two floppy disk drives and one hard disk or one floppy and two hard disk drives with a total capacity of 40 Mbytes. The price includes a high resolution monochrome monitor and a colour video adaptor for use with Tandy's VMI or CMI monitors. The multi-user machine was designed to run up to six display terminals using Xenix 5.0. ▽



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"If ever there was a small software accounting system that could be described as ideal for the very small business, Lewis Cross-Cheque would fit the bill." Dan Lawrence, reviewer for Your Computer, August 1986.

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Peripherals and Extensions

Blitzer Modem

Mike Boorne Electronics

Phone: (02) 46 3014

Price: \$449

The Blitzer BBM-12-E modem (the latest offering from Hong Kong based, expatriate David Hartley), is an asynchronous 1200/300 full duplex unit complete with Telecom approval. It

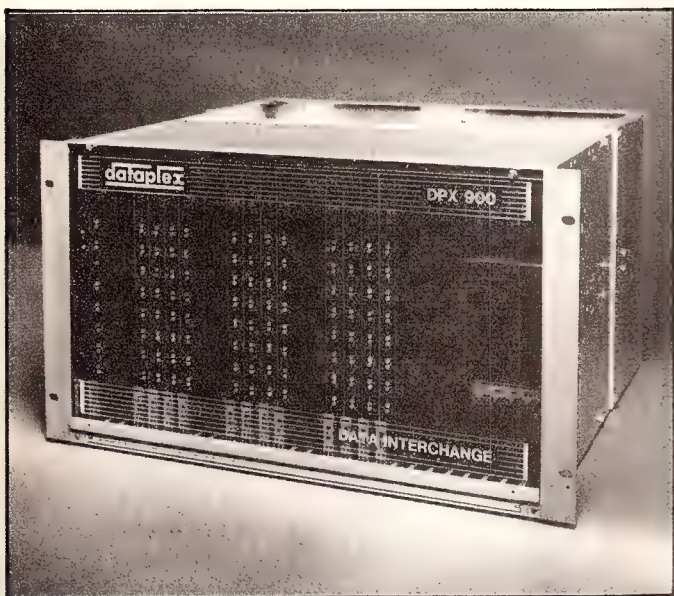
Vocofax

Teli

Phone: 46 752 639 62

Price: Not supplied

Teli, part of Sweden's national telephone company, are preparing to release a 6.5 kg combination telephone, fax and copier at Telecom 87 in Geneva. Called the Vocofax, the unit has an RS232C interface which enables it to be used as printer or a modem. There are also facilities for storing 120 phone numbers, automatic redial for engaged numbers, and a printed out call-me message.



△ **dataplex**

DPX-900 PABX

Dataplex

Phone: (03) 735 3333

Price: Not supplied

Dataplex, in conjunction with Monash University, have released the DPX-900 Data Interchange, designed specifically for small to medium-sized, asynchronous networks. The system, which uses the telephone network, can support from 8 to 248 ports each operating at 19,200 bits per second. By interconnecting DPX-900's and the new DPX-230 'streamline' multiplexers, local data distribution networks can be set up.

supports V21 and V22 as well as 103 and 212A standards. Other features include auto answer auto ranging, call monitoring and a loopback for remote diagnostics. The full Hayes command set, including all 17 'S' registers is supported. Hartley's company, BIT, expects to announce 1200/75 and 2400 bps units shortly. The Blitzer was designed in Australia and manufactured in Hong Kong.

SONY

CD-ROMs for IBM's

Sony

Phone: (02) 887 6666

Price: Not supplied

Sony have released their new 240V CDU-5002 and CDU-100 read-only storage disks which are completely compatible with IBM

PC's and clones. The CDU-5002 is a specifically designed, inbuilt unit which is the same size as conventional 5¼ inch floppy disk drive housings so it will fit into computer facia panels without the need for modifications. The CDU-100 is equipped with two 40-pin Sony bus connectors which can be used to daisy chain up to four drives. Each CD-ROM holds the equivalent of 1500 single-sided floppy disks.

FUJITSU

Fujitsu Drives

Fujitsu Australia

Phone: (02) 959 6555

Price: Not supplied

Fujitsu has announced the release of the M222XD series 3½ inch and the M2344K Winchester disk drives. The 3½ inch range has three capacities: 25, 38, and 51 Mbyte unformatted. A voice coil motor allows the drive to access data in 40 milliseconds and data transfer is carried out at 625 Kbyte per second. MFM coding is used to record data on 834 tracks/inch; recording density is 14,845 bits/inch. A front mounting panel to fit PCs is available. The 8 inch disk drive has 690 Mbytes of storage; the average access time is

16 milliseconds; the data transfer rate is 2.5 Mbytes per second; power draw is an efficient 160W. The 8 inch unit has a rotary actuator which automatically parks the drive when the power is turned off.



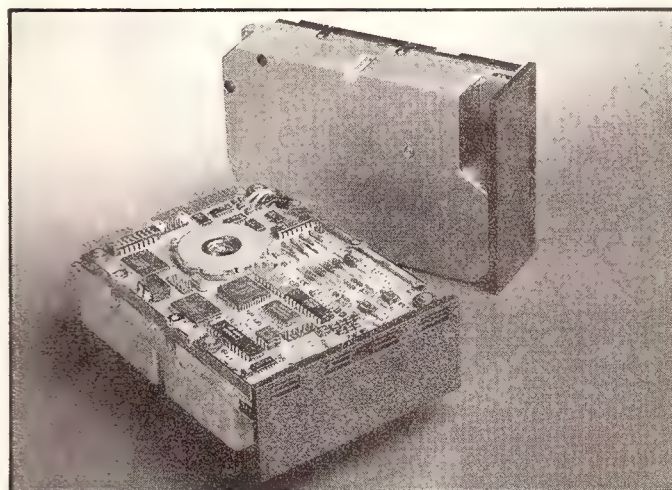
Jet 386 Accelerator Board

Porchester Computers

Phone: (03) 537 2722

Price: \$2995 (untaxed)

American-based Orchid, well-known for their 286 accelerator boards, have released the industry's first 16 MHz 80386 accelerator board, designed for IBM PC/ATs. The plug-in board is claimed to run at three times the speed of an AT, and twice as fast as a DEC VAX II/750 mini. It's fully compatible with software written for the 80286 and 80386 micro processors for IBM AT and compatibles and has looked to the future in being compatible for any future software for the 80386. The board has a 32-bit bus width and a 64K cache. The Jet 386 can be used in ATs that run at 6 MHz or more. The accelerator card is compatible with add-on boards such as networks, disk controllers, high resolution colour graphics and software accounting packages.



NEW PRODUCTS

Labscope Colour Graphics Terminal Labtam

Phone: (03) 587 1444
Price: Not supplied

Labtam have released the Labscope 19 inch monitor for their range of 32-bit System V Unix workstations for CAD/CAM and engineering applications. With a resolution of 1024 x 800, it provides 23 graphics drawing commands, eight double buffered colour planes (256 from a palette of 24 million or 4096 colours) and three extra planes for text, background and colour. An additional eight colour planes acts as a buffer for smoother screen updates.

etched display, tilt and swivel base, and an optional height-adjustable mechanical arm. (Shame there's not one fitted with hands to do some typing.)

5 1/4 inch SCSI Drive

Quasar Data Systems
Phone: (02) 624 8488
Price: Not supplied

This range of hard disk drives are available in 170, 280 and 380 Mbyte capacities (unformatted). They use a rotary voice coil actuator with a 28 millisecond average access time and feature a automatic head parking when not in use. They feature an embedded SCSI interface enhancement which conforms to the

system and applications overview, initialising the networked PC, fault handling, and the use of ACI's Application Manager. The Manager's course covers LAN administration techniques, hardware orientation, use of virtual drives and devices, installing network communications, network administration, applications and special back-up management.

Desktop Publishing Courses

Bird Cameron Computer Training
Phone: (03) 67 9212
Price: Not supplied

Following the success of desktop publishing (more than 12,000 desktop publishing packages were sold last year), there has developed a growing need for training to utilise the benefits of desktop publishing. According to Bird Cameron, most users only require 10 hours' training to become proficient enough to create presentation reports, overhead foils or slides, and letter heads. The courses are provided for both IBM and Macintosh systems.

Textline Information Service

Dewe Rogerson Australia
Phone: (02) 261 2144
Price: Not supplied

Textline is a computer-based information retrieval service run by well-known, London-based Finsbury Data Services. It provides detailed abstracts on company activities, industry trends, and economic and political developments drawn from newspapers, business journals, press releases, news tapes, and broker surveys from all over the world. Country Briefs is a new feature covering business, economic and travel information on 207 countries, and includes in-

formation on sales leads and tenders, an airline and hotel guide, and schedules of conferences and exhibitions. Connection is via a 300/1200 baud modem and an IBM PC or compatible computer. Charges are based on standard OTC phone rates plus an account fee.

Furniture

Compact Printer Stands

Data Decor
Phone: (03) 699 2877
Price: Not supplied

Putting your printer on wheels is very handy if you want to move it around the office. Data Decor have designed a mobile printer stand with paper-in and -out shelves. The basic model is open, and made of a light metal frame, the deluxe model has a built in cupboard in the front to store paper and has an adjustable shelf.

Miscellaneous

Do-It-Yourself Multiple Line Sharer

Electronics Today magazine
Price: \$149 (kit form)

A kit-form line sharer has been developed for those able to wield a soldering iron, and understand resistors. The design is featured in the July issue of Electronics Today International. Most line sharers only allow selection of one of three ports into one port or the reverse. This one lets one computer run three peripherals or three computers to share one printer. In order to achieve maximum versatility, builtin break-out facilities are available for independent configurations of each port. Kits are obtainable from major kit suppliers. □



Comodem for Commodore 64/128

Computermate
Phone: (02) 457 8118
Price: Not supplied

The Comodem is designed especially to access services such as Viatel and Elderlink at 1200/75, and includes a 300 baud full duplex data transfer facility for computer to computer communication. It plugs directly into the Commodore user port through a 5 meter cable. The modem comes with software for Videotex access and a phone plug to fit directly into the phone socket.

△

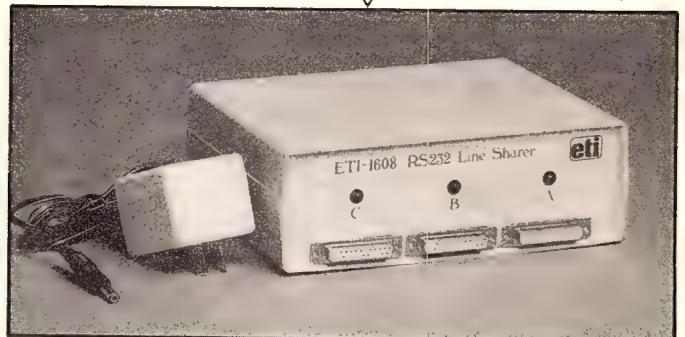
common command set (CCS 4B), allowing the transfer of 1.5 Mbytes per second. Other features include multiple block transfer, selectable sector size, transparent sector level defect handling and 48-bit ECC.

Services

LAN Training Courses

ACI Computer Services
Phone: (03) 541 5600
Price: Not supplied

ACI are offering An Introduction to Local Area Networks and a Network Manager's Course. The LANs course is primarily for those who are operating the network on a day to day basis and is designed to teach the end user skills and techniques for operating software in a network environment. The course is for those using IBM PC machines on a PC network. The introductory course covers such things as a review of essential DOS commands, understanding the LAN concept, a



Wyse 530 IBM PC monitor

Microprocessor Applications
Phone: (03) 894 1500
Price: Not supplied

MPA have released the WY-530 IBM PC compatible monochrome monitor. The 14 inch screen features high-contrast dark glass, an

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This book describes the world of digital electronics: The functions circuits, basic system building blocks, how integrated circuits provide these, the fundamentals of microprocessor concepts, applications of 8-bit and 16-bit microprocessors, and design from ideal to hardware. Line drawings, flow charts.

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Explains concepts such as electricity, semiconductor theory, how electronic circuits make decisions and how integrated circuits are made. A glossary is included.

UNDERSTANDING SECURITY ELECTRONICS

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Getting the Most from Utilities on the IBM

ANY NEW user soon finds that they need to know more about their computer, especially as they begin to depend on it. In fact, as the applications that the computer is being used for grow arithmetically, the need for knowledge probably grows exponentially. This book, sub-titled 'Perfecting the System Environment,' is a good starting point for finding that knowledge.

The author's general theme is how to get more from the computer by using utility programs. But, in building his discussion of utilities, he starts with an excellent, basic tutorial on MS/PC-DOS (he specifically deals with DOS Version 2.1, but that's not a real limitation, since the differences between versions are noted as necessary).

What makes this book a particularly good learning tool is that the explanations of how DOS works are illustrated by showing

how familiar programs like WordStar, in its various forms, and 1-2-3 use DOS.

Copy protection is one of the many general topics covered in this opening section. The author puts it into perspective, and then discusses how to make (legal) copies. Other topics covered include the whys and uses of batch files, CONFIG.SYS and device drives.

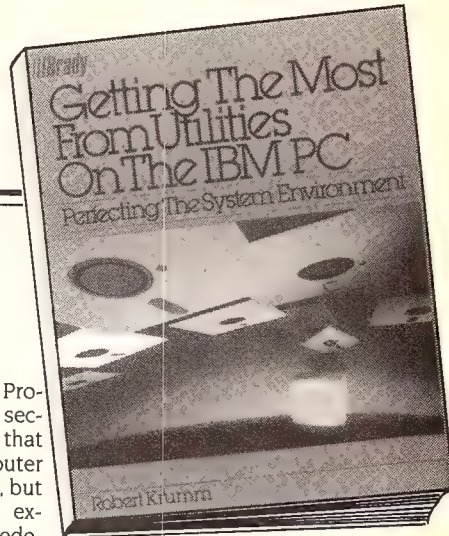
The second part of the book covers system utilities that expand the functions of DOS. The first of these discussed is the Norton Utilities collection — the author makes the point that the Norton Utilities (and most others) are a powerful tool, but the only way to make full use of that tool is to understand how it relates to the operating system. He puts this into practice while discussing topics that range from 'What Erasing a File Really Means' through to 'Recovering

Robert Krumm,
Prentice-Hall,
\$39.95, 509pp

Damaged Files.'

'Keyboard Enhancing Programs' comprises the third section. Starting with the idea that the link between the computer and the keyboard is not fixed, but programmable, the author explains how the keys can be redefined and how this can personalise (and simplify!) a variety of computer tasks.

Using ProKey, SuperKey, Recall and SmartKey as examples, the basic functions of key enhancements are discussed using DOS commands and functions. This section concludes with a comparison of the functions available with the four programs; it's done in such a general way



that the reader should be able to judge how worthwhile any other keyboard enhancer is, taken in the context of how it's intended to be used.

The last section covers 'Background Utilities.' Starting with a discussion of Ramdisks and Spoolers and how they led to the concept of programs that operate in the 'background,' the author carries through to DOS 3.0's VDISK.SYS device driver, a built-in ramdisk.

Using SideKick as an example, he discusses the usefulness of this type of utility in general and how it operates within the DOS environment. Spotlight, Deskset and Turbo Lightning are also covered. The author then compares these programs and discusses their basic design so the reader can generalize from the specifics used as examples.

The final chapter of the book describes print utilities that allow the use of a variety of fonts and modes with dot-matrix printers in conjunction programs that don't support them, 1-2-3 and dBase, for instance.

Getting the Most From Utilities on the IBM PC helps do just that — If you've been using any type of application, not just those used as examples, this text offers valuable lessons, not just in DOS, but in learning how to learn more about the computer.

□ Next Month we will be looking at Dr Dobb's Toolbook of 68000 Programming. The editors of Dr Dobb's Journal, have gathered all the best of their articles, updated them, and added new material to create a virtual encyclopedia for using Motorola's 68000 chip. Look out for this and other book reviews in coming issues of *Your Computer*. □

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JULY NEWS

Hello again,

Thank you for making June our biggest month ever. We sold around half a million disks in Autumn and our next order is for one million disks! Specials this month include reduced prices on bulk SSDD disks and plain label disks as well as very low prices on the EPSON GX80 and LX86 printers. These printers are our top-sellers with excellent reliability and near-letter-quality.

Our disks are machine-made, lifetime warranty from Wabash. Major customers buying up to 10,000 at a time include Telecom, CSIRO, Dept Agriculture, UNSW, Deloittes etc. Our disks are very cheap but they're also the best quality presently available in Australia and we have deliberately pursued the policy of buying top-quality in very large volume to do this. You can buy Taiwanese and South Korean disks for similar prices in Australia but the quality isn't as assured, and as for Australian made disks forget them. You're paying treble the price for lesser quality.

The Auto-Ice Apple modem is selling very well with excellent reports and very few negative comments. At \$299 it's an absolute steal. It's selling well to VIATEL users, particularly users involved with MoneyWatch and Elders FarmLink, as it is just a plug-in-and-go modem for Viatel users.

Maestro's GPA Supermodem is selling very well with a noticeable trend to sales to the corporate market. This modem has been a great success as it is around half the price of comparable, up-market modems such as the NetComm range.

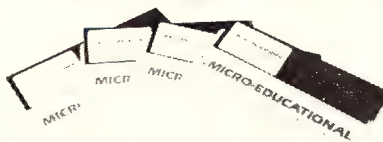
The latest modem from Maestro is the **Maestro Flyer**, a standalone, no-frills V22 modem for \$199. This is a manual dial, manual operate, standalone modem which gives you 1200 Bd full-duplex. It is designed as a cheap second modem for existing modem owners who want to increase their speed to 1200 full-duplex but don't want to junk their current modem and don't want to spend a fortune upgrading. Available now \$179 ex, \$199 inc. Orders being accepted now.

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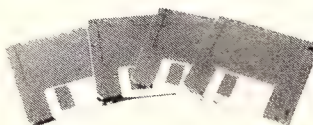
Regards
George Parry
DIRECTOR



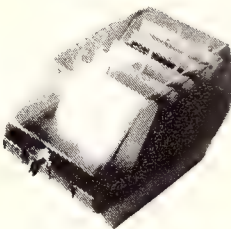
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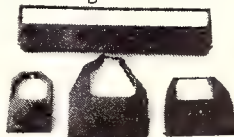
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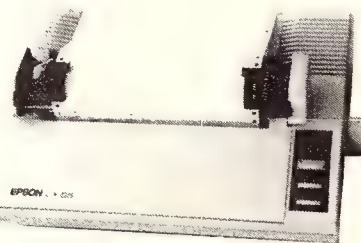
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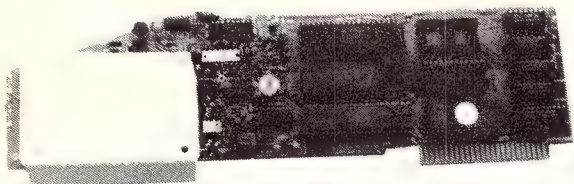


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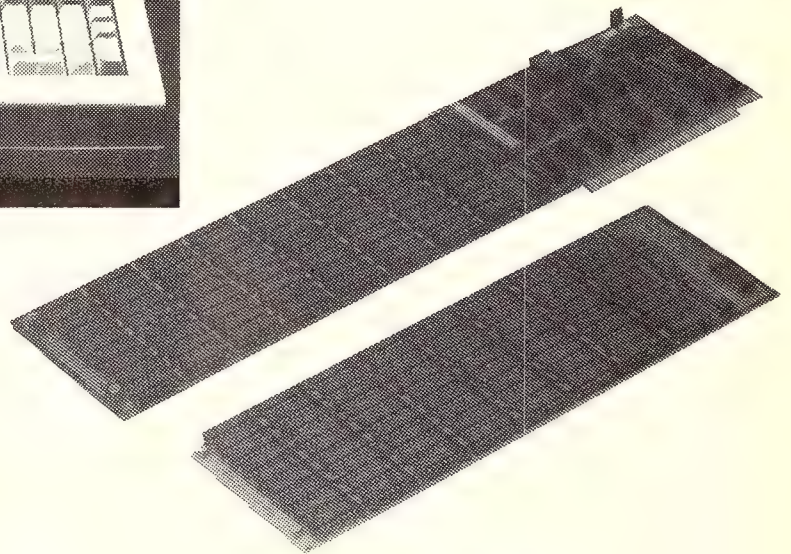
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The specifications for PC-File + are amazing. Created databases can have up to 65,533 records, and each record can have up to 70 fields. The screens can be 'painted' using a built in editor and can contain not only the field names and data but literal strings, such as placing a company name at the top of a screen.

ONE OF THE great programs to come out of the Public Domain area has been PC-File. It is a high performance, feature laden electronic card file, usable for almost any purpose which does not require creation of a custom database in one of the speciality database languages like DataFlex or dBase.

Calling PC-File Public Domain is not totally accurate as it falls into that grey area of user supported software. Individuals are allowed, nay encouraged, to make copies and give them to their friends, acquaintances and workmates. If productive use is made of the database or it is used for business purposes the author, Jim But-ton, asks for a registration fee of US\$69.95.

Enough of the economics, back to the program. Long term readers will know that in the January 1986 issue of YC I reviewed PC-File III Version 3. Since then a couple of revisions have been made, and extra features added by the score. PC-File has grown to be called PC-File +. It is still one of the best databases around.

New Features

The specifications are amazing. Created databases can have up to 65,533 records,

and each record can have up to 70 fields. The screens can be 'painted' using a built in editor and can contain not only the field names and data but literal strings, such as placing a company name at the top of a screen. Reports can be 'painted' on screen and can have information which appears only on the first page, headers and footers on each page, and complete control of totals and subtotals. It is so good that I create my invoices with it — address, items for which payment is awaited, and totals.

Other added features include a plethora of built-in help screens available at the press of a key, a teach mode where the help screens are automatically displayed when user input is required, and a learn mode for smartkeys.

The learn mode for smartkeys, in PC-File, allows strings of commands to be attached to the numeric keys across the top of the alpha keyboard when they are pressed at the same time as the Alt key.

You can go through the process of a desired action and determine which keystrokes are required in a smart key macro and then manually enter them. Alternatively press Alt-y, run PC-File through the desired process, and press Alt-y again when no more keystrokes are to be recorded. The user is then asked to nominate which Alt plus numeric key combination is to hold the string. To replay the process, just press Alt and that same numeric key again.

While previous versions of PC-File also had smartkeys, the new ability to memorize keystrokes is fantastic.

Amongst the other improvements is that PC-File + is now in one .EXE file written in C, rather than in several .EXE files written in Basic which then chain to each other. As a result it can be in a directory, be run via a path, and can use files in sub-directories.

Field Types

Fields may be numeric, character or calculations, and the difference is selected by placing a # at the end of numeric field names. Calculations may be carried out on numeric fields, either to another field or fields in the same record, or to totals and subtotals.

In previous versions of PC-File, fields could only be arranged in two columns. In this latest version fields can be placed

anywhere on the screen and the sequence in which they are accessed is selected by the user.

String searches on fields can be carried out for exact match of the leading letters of the field with the search string, searching for the search string anywhere in the desired field, and a soundex search where the field 'sounds like' the desired string.

Running PC-File

Running PC-File + is simplicity itself. From DOS type PCF to load it. An initial screen comes up asking the user to specify the drive on which the data files are to be found. The user is then asked which sub directory contains the data files. If PC-File + was started from a sub directory, the display defaults to that directory.

A list appears of the data files found in the selected directory, with a number beside each. Pressing the number key or moving the cursor down to the data file name and pressing F10 in either case loads the database.

This is followed by a menu whereas in previous versions of PC-File you were asked for function keys to be pressed to select items. PC-File + allows either pressing of a function key or pressing of the leading letter of the desired option to select it. Press A to add a record, F to find a record, G for global alterations or deletes, L to create form letters, R for reports, S to sort the database index, U for utilities and M for the menu of smart keys. Q quits to DOS and it is also possible from this menu to select the teach mode to automatically display all help screens.

Adding and Finding

Adding a record is fairly self explanatory. Finding a record, however, brings up another menu. S allows a search for specific data in the record, B goes to the first record, E goes to the end of the database, N moves to the next record, P to the previous. A specific record in the file can be selected by pressing R (for relative record number) and then entering its numerical location in the file. The leading fields of 20 records can be browsed by pressing PgUp for the last 20, or PgDn for the next 20 records. After the selected record is displayed, pressing an M allows modification of the selected record.

Returning to the first menu showed up the Sort option. PC-File + uses a data file

IBM Underground

PC-File + is also on the YC Bulletin Board in two files — PCFIUTIL.ARC and PCFI PROG.ARC.

and a separate index file. When a sort is carried out only the index file is sorted — the data file remains in its previous sequence. Sort can be on multiple keys, and can sort on strings of selected lengths in selected positions in the field. Imagine being able to sort on the 4th to 8th characters in a field — quite possible with PC-File +.

After sorting, searches for strings in the primary sort field are blindingly fast. PC-File + uses a binary search for the primary field, going first to half way down a file and determining if the string is in the first or last half, and then successively halving the number of fields in the search until the right field is found. Around 16 comparisons should find the desired field in the PC-File + database.

Utilities

Utilities allow a great range of other functions. Fields can have a range of acceptable characters specified, and some infor-

mation including dates in a number of formats can be specified to be automatically entered into new records. Databases can be cloned, creating a new database with more or fewer fields and with fields of the same or different lengths.

Data can also be imported and exported from a number of file formats. dBase II and III, DIF, Fixed Length Random Files, Lotus .PRN, MailMerge, PC-Calc, Peach-Text, SYLK, User Defined Delimiter, Visicalc and Word Perfect. Enough there to get data into or out of almost any other program.

Documentation is rather sparse, only a couple of brief readme files on disk including one which is a quick reference guide. Most people used to public domain software will find it adequate. The full manual is supplied when registering with the author. It is an A5 paperback of around 240 pages, and is a very complete guide to running PC-File +, and creating your own databases.

PC-File + is available on two disks. You can get an evaluation copy, which is a full working system with brief documentation on disk, from most user groups for \$20 plus postage. Try your local group, or the Sydney PC User Group at Box 5010 GPO Sydney. Only user groups can charge a copying fee, and commercial software libraries are prohibited from selling copies.

PC-File + is also on the YC Bulletin Board in two files — PCFIUTIL.ARC and

PCFI PROG.ARC. They are large files and will take some time to download.

Registration

Registration, which gives you the latest version on disk plus that 240 page printed and bound manual, is US\$69.95 plus US\$10 postage to Australia, from ButtonWare Inc, PO Box 5786, Bellevue WA, 98006, USA. They have to be the fastest people I have ever found to respond to letters and registrations, and seem to have the interests of users at heart with generous update offers for people who have registered earlier versions. □

Power, features and update

PC-File started as a powerful database with a range of features. It has always been possible to define a database within five minutes, and start entering data immediately. With each revision more features have been added, and users of older versions always 'trade up' when a new version is available.

The latest version adds more fields and more flexibility in their placement, is faster in all functions by 2 to 10 times, and has fantastically improved the report capabilities. If you have no databases, and even if you have one of those high price, high power database languages, I'm sure that you need the latest version of PC-File +. □

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AS IF, AFTER the release of the Amiga 2000, anybody still needs convincing that the Amiga is a solid business machine, this month I'm featuring some brilliant new business software and hardware for the Amiga. To start with, here's a brand new Database Management System from England.

Acquisition

Acquisition is a full featured professional DBMS which the Amiga has desperately needed in order to be accepted in business environments. This one was worth waiting for.

It can handle all forms of data including numeric, alphanumeric, date, time, and logical. The field formats can be standard, customised, clipboard, or IFF image. Yes this data base can handle a complete image as a single field, if that's what you want.

Maximum field size is 10 Mbytes so you need never worry about over running the limit. The maximum number of records to a file is 100 million, and maximum file size is 1 Gigabyte. Obviously telephone numbers like these are meaningless in terms of everyday use. What it means in practice is that you will never be restricted in what you want to do by limitations of the DBMS. The limiting factor is your machine, the memory size and disk capacity.

As with most of the newer software for the Amiga, Acquisition has been written to take advantage of the Intuition environment. Pull down menus and mouse pointer selection modes are used throughout the product making it straightforward to learn. An indication of the planning which went into the design of the package is that you can amend and enlarge a database at any time without losing any of the data which it contains.

Acquisition incorporates a mapped filing system organised around paths, which allows both relational and hierarchical filing structures, or a combination of both. With full sets of logical and relational operators available, as well as the arithmetical operators +, -, *, /, =, %, (), all conceivable search types are catered for. Key fields and indices are unnecessary as Acquisition updates all the links between files automatically.

Three design editors permit you to set up your filing structure, the way your files look on screen, and design of reports and standardised documents. The Acquisition database language, ACOM, is a dBase III compatible command structure with over 250 different functions. ACOM commands can be translated into several languages such as C, Basic and Pascal for compilation or attachment to other programs.

In summary, Acquisition is a state-of-the-art DBMS which would be a great asset to a business using the Amiga for its data processing. At \$595 it is not expensive by business software standards, but probably out of reach of most home enthusiasts, a pity as it has heaps of uses in the home. Manufactured in the old country by Taurus and distributed by Commodore.

A couple of months ago I made mention of the Polaroid Palette system which is used to produce very high quality 35mm slides or instant prints of computer displays. Until recently the Palette was only available as an attachment for the dreaded IBM clunkers. Now a Western Australian company called Bruining Headlam (let's hear it for the sandgropers!) is distributing an interface to run the Palette from the Amiga.

This device is no toy, being able to produce very high resolution images, including color separation masters for color printing. At \$850 ex tax it ain't cheap but the results are astounding. For any business which is serious about producing computer generated images this little box of tricks beats the hell out of photographing a monitor screen with a hand held box Brownie.

The package is called Imprint and contains a hardware/software combo to interface your Amiga to a Polaroid Palette system. If you don't already have the Palette, the whole box and dice is available from Bruining Headlam, PO Box 31, West Leederville, WA, (09) 381 2988.

AmigaDOS Help

Several Amiga owners have asked me for help with various functions and commands in AmigaDOS (sometimes known as CLI). As I have mentioned before, I think it a cruel joke that Commodore doesn't include any DOS manual with the Amiga package. I can only repeat that the AmigaDOS Manual, at around \$40 from your friendly local Amiga dealer, is *absolutely vital* if you want to make effective use of your Amiga.

lutely vital if you want to make effective use of your Amiga.

One of the most frequent needs a user has is to find out the contents of a particular disk. AmigaDOS provides two commands which can perform this function. The LIST command will produce a list of all directories and files on a disk, including their creation dates and protection status. The DIR(ectory) command will provide a list of all directories and files on a disk, displayed in a hierarchical format.

Before either of these commands can be used we must understand a little of the way DOS commands are stored and used in the Amiga. The Workbench disk contains a directory (or drawer) called 'C' in which are stored a whole lot of small programs. Each of these programs performs a task which corresponds to one of the DOS commands, and the program is named for the command. Thus the program called LIST performs the job of looking at a disk, gathering the names of the files and directories on the disk, sorting and arranging them, and presents them to the output device (which is usually the monitor screen).

When we are using CLI and we type a command after the I> prompt, the operating system looks in the C directory of the Workbench disk for the command file corresponding to the command we entered. If we have changed disks since we booted the machine it will ask us to replace the boot disk in any drive, to allow it to find the command file.

Let's assume that we have switched on the machine, loaded the Kickstartdisk (for the Model 1000), and loaded the Workbench disk. We have selected CLI and we now have a window with only the I> prompt inside. If we now type LIST and press <ENTER>, the machine will produce, on the screen, a list of files and directories which are contained on the current disk. The LIST command also shows, at the bottom of the listing, a line something like: 27 Files 4 Directories 826 blocks used.

BEWARE of this space report. The LIST command does not count space used by the directories in the number of blocks

used. While you're at it try the following commands as well: DIR and DIR OPT A

If you have a printer connected, and you would like to produce a hardcopy of your LISTS or DIRs, simply type the command as: LIST > PRT: or DIR > PRT: or DIR > PRT: OPT A. The > PRT: tells the computer to send the output to the printer instead of to the screen. This also works with several other DOS commands like ECHO for example.

For those of you who have not already done so, jump into gear and send off \$150 for your Club Amiga membership immediately. For your \$150 you receive 12 months subscription to Amiga World — the magazine for Amiga Owners (after *Your Computer* of course!) which is worth \$65, a copy of Textcraft or Graphicraft — excellent beginner level software worth about \$80, four issues of an Amiga newsletter (worth nothing much but nice to have), the promise of sundry 'Special Offers' (who knows what they're worth?), and sundry trinkets which we'll come back to later.

So why is it a good deal? Well, for your \$150 you get about \$150 worth of goodies immediately. The extra value is in the lap of the Gods. If Commodore do the right thing by us there will be opportunities to obtain great buys on new products, lots of useful utilities and other tidbits provided, and a user group type atmosphere created. On the other hand, if Commodore do the dirty on us, at least we'll have got our \$150 worth to start with.

Getting back to the 'trinkets' provided with the package. When you receive your Club Amiga package from Commodore, you will find your copy of Textcraft or Graphicraft, a hype note from the management and a grey imitation leather wallet. Inside the wallet is a Club Amiga keytag (very tasteful), a Club Amiga membership card (very tacky), and three demonstration disks (very good idea).

Distributing disks of demo software to users is good marketing if it's done right. Unfortunately Commodore really screwed up on this one. Pagesetter is really hot stuff, a good, polished desktop publishing package, but you'd never tell from this horrible demo. Anyone who has ever used a DTP package knows that the product always looks lousy on screen and doesn't shine until it's printed. So what use is a desktop publishing demo which won't print! OK, I accept that the thing had to be crippled before being distributed as

demo, but why disable its most vital function? Better to disable the create functions and at least allow a demo to be printed. No points out of several million, Mr Commodore.

The second demo disk is Superbase, a you beaut Database Management System. Absolutely useless without some instructions. Better not let people see it at all than let them become frustrated with the product by trying to find their way without directions. If you want to provide a demo then provide a demo. Put a bit of effort into producing a real demo disk with, perhaps, an animated sequence demonstrating how the product works. At least provide a modicum of description of the product.

Piece of Resistance

(That's French for 'piece of resistance'.) I've used Deluxe Video and Deluxe Paint and I like the products, which is just as well. If I didn't know better I would think that the demo disk of Deluxe Video Construction Set was provided by one of its competitors to make DVCS look bad.

Under Kickstart/Workbench 1.1, the wretched thing just keeps falling over — not a friendly 'sorry guys, got a problem' type falling over — more of a KERASS-SHHHHH! A spokesman for Commodore admitted that there was 'a problem' with it. It was 'problems' like that which sank the Titanic and blew away the Challenger.

For the benefit of the slower reader who may not have picked up on the prevailing ambience, I'm really not impressed with the rubbish Commodore foisted upon us here. The people who join Club Amiga are the most enthusiastic of Commodore's customers and deserve a darn sight better deal than they got with this package. I think it's up to Commodore to make amends by providing some useful membership goodies like a set of assorted utilities or similar. Without some such gesture the future of Club Amiga could well be Club Mud

On to other matters. The Amiga 500 and Amiga 2000 models are starting to appear around the traps. The '500' allows an easy step upward for the legions of C64 owners out there who have desperately wanted an Amiga but couldn't find the readies. At \$995 the '500' has to be one of the best buys since broken bikkies were 3d a bag.

The '500' is a smartly presented and easily portable package which may well become the long awaited 'standard' for educational use. Amiga Basic, which is provided with the machine, is a powerful language with full graphics and sound support. It doesn't require line numbering, using instead a 'module labeling' procedure which is a big step toward structured programming techniques. The ability to run all the same software as its 'big brothers' is a big selling point with the '500'.

The Amiga 2000 should be the lever which has been needed to open the door to business acceptance of the Amiga. I know the management of my organisation remained unimpressed despite my glowing descriptions of the Amiga's graphics and sound capabilities, until I uttered those magic words 'IBM compatible'. Now they're all over it like flies on a peanut butter sandwich.

The man from Commodore was telling me about the way he's set up a '2000' with 3 Mbytes of RAM, two 20 Mbyte hard disks, a 68010 card, and so on. I'm sure he just wanted to hear me salivate over the phone, but he reckons it has to be the hottest machine since Cousin Ferdie put a can of nitro in Auntie May's Morrie Minor. Anyway he says it runs spreadsheets so fast that the answers appear before you finish entering the data. Now personally I think that's a load of IBM but I'm prepared to accept that the beast sure sounds pretty.

The hard disks will solve a few of my problems waiting for data to load in the middle of animation routines. The 3 1/2 inch drives are not bad, but a hard disk or, even better, a whopping big RAM disk would make the world of difference.

Enough from me for now. Keep those cards and letters coming in. We're thinking of setting up a 'Dear Guru' section for readers letters, let us know what you think. Cheers. □

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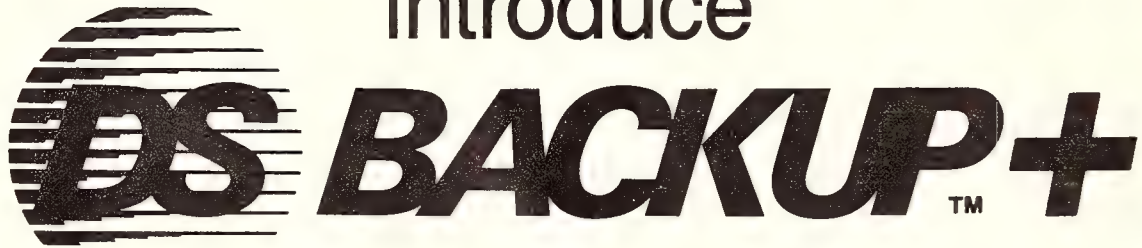
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Turbo C

SERENDIPITY SURELY is the name of this game. Not luck, not chance, just things happening fortuitously at the right time. As I sat down to write this, in came from the US a mention of release of the newest language from Borland. It's not Turbo Modula 2, and not Turbo Basic, which was announced at Comdex and should be in Australia soon.

Would you believe — it's Turbo-C! Initial information is rather sketchy, but the overall effect is very exciting. I can't wait until I get my hands on a copy! First

and foremost is the inclusion of the usual Borland style interactive editor. Errors detected during compiling cause a jump back to the editor with the cursor positioned at the offending line in the source code.

A few other tantalising drops of information include support for the tiny, small, compact, medium, large and huge memory models, provision of a Make facility and compatibility with the ANSI C standard. It comes with its own linker, and is also compatible with the PC-DOS linker. Compatibility with .OBJ files and libraries

created by different compilers and assemblers will have to be tested, but this seems to be the way that Borland is heading. 8087 and 80287 support is included.

Performance is interesting. Borland claims compile and link times several times faster than for competitive products. Execution time of an unspecified benchmark is claimed to be two to three times faster than for competing industry standard C compilers.

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duty and sales tax, you can expect the price in Australia to be somewhere near \$200.

The price, performance, interactive editor and fast compiling of Turbo Pascal turned Pascal from being an academic curiosity into an essential part of every micro user's toolkit. Turbo C could well do the same, and more, for C.

Turbo Basic

About the time you read this, Turbo Basic should be available in Australia. Released with much fanfare at Comdex Fall in 1986, initial shipping to the US market was scheduled for March 1987. Price is the same as for Turbo C.

Again, the familiar Borland development environment is included, with the interactive editor and flagging of the exact location in the source code of errors found during compilation. Compiler directives allow development of programs using all available memory, and 64K can be used for strings while arrays can use all memory with any array being up to 64K.

DOS services and BIOS interrupts can be called directly from the source code without having to resort to an assembler. 8087 and 80287 mathematics co-processors are supported, and emulated in software if not present at run time.

Full compatibility with Basic and QuickBasic source code is claimed, though as always individual programmers must confirm this personally when changing compilers.

Compile and link speed appears a little faster than for QuickBasic, resulting in an .EXE file a few per cent larger than the one generated by QuickBasic. Execution speed is pretty even, with Turbo Basic being a few percent faster than QuickBasic on most tests and a little slower on a few. The benchmark results are on tests created by Borland and supplied on disk by them, independent benchmarking will follow when a production copy of Turbo Basic is to hand.

Microsoft Word 3.1

Microsoft Word 3.0 was a major step forward for the users of IBM-PC's and compatibles. It allowed amazing control of the output to almost any sort of printer, including most lasers, and did so in a way that maximised the authors productivity I made the transition to Word over six

months ago, and the release of Word 3.1 was long awaited and highly welcome — see YC's May issue for a complete review.

New features include an online thesaurus. Placing the cursor on a word, and Word looks up a range of words with similar meaning, presenting a list on screen. Pressing the enter key then replaces the word in the document with that selected from the thesaurus.

Word 3.1 now comes on no less than eight disks! Why so many? Tutorials fill two disks, while over two and a half disks are taken up with printer drivers for almost any printer released. All fonts on the Apple LaserWriter Plus are now supported (Word 3.0 only supported the four type faces of the plain LaserWriter), plus virtually all laser, dot matrix and daisy wheel printers that I could think of

More display adapters are supported, and finally the display on Hercules boards of 90 columns by 40 rows works properly. Speed improvements are noticeable in many functions, particularly in spell checking where the offering of alternative spellings appears to be much faster.

Upgrade kits are available, and include a new manual, new keyboard templates including one for enhanced keyboards with 12 function keys, and a 54 page booklet of information on the new features, functions and newly supported printers. Contact Microsoft at 452-5088 (008-22-6850 outside Sydney) regarding updates. Cost is \$50 to upgrade from version 3.0, free if your copy of 3.0 was purchased after February 1, 1987

One More Book

Back in the March issue, I mentioned some books that I have found to be of value. Since writing that column I obtained a copy of a new book from Ray Duncan, author of the 16-Bit Software Toolbox column in *Dr Dobb's Journal*. As a trained paediatrician who turned to micros to make his living around a decade ago, Ray is a master of the art of examining complex problems and discussing them in a relaxed and informal manner. A style many would love to emulate.

Now he has taken his skill and written a new book, titled *Advanced MS-DOS*, published by Microsoft Press. Around 200 of the 480 pages are a clear and concise reference to the DOS and BIOS interrupts, while the remainder discusses a range of topics of interest to assembler programmers working with MS-DOS.

The topics include the genealogy of MS-DOS, programming for the MS-DOS environment, programming character devices, file and record manipulation, directories, subdirectories and volume labels, MS-DOS disk internals, memory allocation, the EXEC function, interrupt handlers, installable device drivers and filters.

Extensive examples in assembler are included and a companion disk is available. Price is around \$35.95 for this interesting to read and invaluable reference.

The DOS Environment

The DOS environment is rather poorly documented in IBM's manuals, and this has led to many users sharing their experiences in a range of publications around the world.

One of the problems is the size of the environment. The default size of the DOS environment is 127 bytes, but as strings are added by use of the SET command it expands to allow them to fit. Unfortunately, it only works if the SET command is issued from the keyboard and no co-resident programs have been loaded. It can't be done from your AUTOEXEC.BAT file because the batch file is loaded immediately above the environment and prevents its expansion.

Jim Vallino, in the magazine *PC Tech Journal*, November 1986, gives details of a patch to COMMAND.COM in DOS 2.x and 3.0 which enlarges the master environment area up to a maximum of 32K. He also mentions the use of SHELL within the CONFIG.SYS file with DOS 3.1 and 3.2 to achieve the same result.

Other mentions in the literature over the last year include a Pascal procedure to read the master environment and from it obtain information of use to a program, which can be the path or other data. This is to be found in the *American PC Magazine* for June 10, 1986.

Unfortunately neither *PC-Tech Journal* nor the *American PC Magazine* have been sold in Australia for the last two years, but the technical libraries of many large companies should have copies. □

Getting an ARM Full

IT'S THREE TIMES faster than a Compaq 386, has more graphics power than an Amiga and sound that makes an Apple IIGS sound hoarse. At present it's called the Acorn Risc Machine (ARM, if you can bear to add another acronym to your vocabulary) and it's the first of the next generation of Acorn computers.

Still, speed and flashiness isn't everything; compatibility with other systems is at least desirable and I'll explain how it manages this after looking into the history of the machine.

The development of Acorn's Model B series finished in 1983 when the Master 128 prototypes were handed to their engineering and sales people, to be eventually released late in 1985. The continuing success of the Master series has posed a few problems for Acorn (why kill off a product that has rescued them from a near-fatal attack of financial starvation?), but by keeping the price of the ARM high when it is first released it seems the Master series will remain attractive to most potential buyers. Still, the raw power of the ARM should have quite a few folk reaching for their credit cards.

Risc stands for Reduced Instruction Set Computer. The idea of reducing the number of instructions available on a microprocessor chip is to allow for more efficient processing in terms of overall performance.

The Simple Chip

If you look at a simple chip such as the 6502, you'll find it hasn't a lot of instructions available, but it is versatile and very efficient. (The success of Econet is probably more dependent on the 6502's ability to handle mountains of interrupts than any other single factor.)

Chip designers began adding bells and whistles to their later designs to make programming at the system level more flexible and less laborious, but overall system speed went out the back door. (Remember the early Macs?) It was clear that adding complexity wasn't the way to increase operating efficiency.

When design engineers analysed the tasks a typical microprocessor chip was asked to do, it seemed that 80 per cent of the available instructions were used less than 10 per cent of the time. Just having

It's three times faster than a Compaq 386, has more graphics power than an Amiga and sound that makes an Apple IIGS sound hoarse.

these available, however, was costing a huge amount of time while the chip sorted itself out and it several solutions were tried. Faster chips were one answer, another was the Risc approach. By reducing the number of available instructions to a bare minimum the processor could be wired for a high level of efficiency.

Most of the time these single, simple instructions are enough to do the most common tasks such as storing, incrementing and testing data. When it's necessary to do the occasional more complex job there's nothing for it but to write more code. However, much of a nuisance this might be for systems programmers, it means the chip spends nearly all its time romping through life at a terrifying speed.

In 1984 Acorn's research engineers designed their own 32-bit Risc chip. Each of its 44 instructions contain a condition field; if this field is not true the instruction is skipped, effectively removing the need for sequences of branching instructions. It also contains twenty-five, 32-bit registers, some of which overlap and therefore help speed up internal data transfers.

To everyone's surprise the very first prototype worked perfectly. Within a few months they had designed three other BLSI chips to complete an integrated system. One chip handled memory management (up to 4 Mbyte RAM with up to 643 Mbyte of virtual memory capability), the second contained a video and sound processor while the third looked after all I/O interfaces except disk control. The resulting set of four 84 pin packages sitting amongst 4 Mbyte of RAM is indeed a sight to quicken the pulse.

Although the Risc processor only uses an 8 MHz clock, it averages around four million floating-point instructions per second. This sort of speed is achieved by giving the memory controller full respon-

sibility for memory access, including the ability to read and write memory by the page, effectively halving read/write time. There are also dedicated video, keyboard and sound buffers on the chip.

The I/O controller copes with all peripherals and interrupts. (The production version should also be able to act as a disk controller.) The video/audio chip does all the processing associated with image and sound generation without having to call on any of the main processor's time. Video images can be generated using 1, 2, 4 or 8 bits per pixel. Thus, as resolution increases the number of colours available decreases. At 320 x 240 pixels resolution any 256 of 4096 colours can be displayed, while the monochrome display of 1280 x 980 should keep CAD users and desktop publishers happy indeed.

The audio system allows up to eight stereo channels of quality speech or music synthesis. Stereo image positioning is provided and a 72 db dynamic range is available. The designers seem to have used more cunning than power in this design: by using 8-bit log representation of sound levels they have achieved the same range as 13-bit linear conversion, saving both processing time and memory.

The overall result is a machine which isn't just fast internally, but one which actually does things quickly. According to Acorn's tests it runs high level benchmarks at twice the speed of a VAX 11/780; it runs Basic benchmarks at ten times the speed of an IBM AT; and machine code at a speed equivalent to a 68020 clocked at 16.67 MHz. For what it's worth, it performs the PCW Basic benchmarks at an average of 0.55 seconds, compared with 1.5 seconds for the Compaq 386.

I had a very busy afternoon using the development system which Acorn have released to a number of software developers in UK. The machine, about the size of an Amiga, was fitted with a full 4 Mbyte of RAM, a hard disk and a 3 1/2 inch floppy.

There was plenty of room to spare inside, probably for I/O expansion (in the form of a Eurocard adaptor) which will appear in the production version, though this will only be fitted with 512K of RAM to keep the initial cost down. The keyboard will be IBM standard and the operating system, based on the existing thoroughly proven one in use on the Master series, will be able to cope with foreign languages (including Arabic) without modification. The mouse is standard. It is built into the system hardware at a very low

level so that any language can use it with a minimum of fuss.

So far Acorn have produced six high level languages (Lisp, Prolog, Logo, Fortran, C and BBC Basic) and a Basic compiler is on the way. (By the way, BBC users should be delighted to know that the long-overdue C implementation is due to be released any week now.)

BBC Basic 5, an extension of the already excellent BBC Basic, includes Mouse functions, 'Dowhile', 'Case', 'Otherwise' and a few other surprises. It runs with amazing speed. On the Master demo disk there is a picture of a castle that takes three or four seconds to draw. The Risc machine, running exactly the same interpreted Basic code, does it in less than a tenth of a second.

With a 500K system ROM available, there is no shortage of help messages and trimmings of all kinds, yet the system is

The resulting set of four 84-pin packages sitting amongst 4 Mbyte of RAM is indeed a sight to quicken the pulse.

almost identical to that on the Compact as far as the user is concerned.

Surprises Galore

Still, there are surprises and pleasures galore for the experienced user. MODE 16, for example, switches the screen to monochrome 132 columns. Used with View, this makes the presentation of complex documents or spreadsheets a breeze and is more than handy if you need a VT100 terminal in a hurry.

Acorn's chances of making good with this machine depend a lot on its acceptance by users who need lots of speed, memory and versatility. From my outline it should be obvious that it has a lot of the first two: when it comes to versatility the machine is something else again. Why? Because the Risc chip can be reprogrammed to emulate any other microprocessor!

Thus, by entering *6502 I was able to load a new instruction set from disk that altered the machine so that it effectively functioned as a standard Beeb. (A similar set of instructions could alter it to 'be' an 8088, 68000 or whatever.) The cost is a reduction of throughput by a factor of 20, but it still runs faster than a standard Master! Just what this means in terms of versatility is something that doesn't take a genius to see.

The machine is due for release in the UK around September, but no local release date or price has been announced. For me, it can't come soon enough. □

dLETTER

The Newsletter for dBase II and III Users, Volume 2 Issue 11

dCoder

Tips For The Weary dBase Traveller (or) EmBELLISHing Your Programs

By Les Bell

Whenever dBase comes across an ampersand (&) replaces it with a variable name that follows the usual rules of the language. This is a useful addition to the language, but it can be a nuisance if you are using a variable that contains an ampersand. There are several ways to avoid this problem...

dLouse!

dBase III Bug Reports

SET EXACT ON AND INOPERABLE INDEXES (A, 1)

SET EXACT ON will render the SET INDEXES INOPERABLE when the length of the key expression is not a multiple of four. SEEX and FPKD will return the first value of the key expression. Any attempt to access an individual record will return "Record is not found" unless the record is not found. Commands that return the message "Record is not found" will return the record number.

dBase User Groups

Brisbane The Brisbane User Group meets on the second Wednesday of each month at 5:30 pm, on the 6th Floor, 230 Queen Street (the offices of De Queen Street and Seely). There is a \$25 annual subscription.

Dear Dele

Conducted by Geoff May For the Sydney dBASE Users Group

This month's problem has to do with the use of the INDEX ON RECCATE TO RECCATE command. The system will use records the name of an individual and the date the entry was made. The user wants to be able to work out whether there should be a record or not. In the flow of the program it is possible to use the INDEX ON RECCATE TO RECCATE command. Talk to your PD Librarian.

dLetter – the 8-page monthly newsletter for serious users of dBase II and III.

Available *free*, every month, with subscriber's copies of *Your Computer*.

The Iceman Cometh!

Automatic Ice is an odd name for a modem manufacturer — especially one living in the steel and shipbuilding centre of New South Wales, Newcastle.

The name comes from the fact that the owner/founder/resident designer, Dennis O'Keefe, is a Newcastle engineer who moved into the modem business after designing car-wash and automatic ice dispensers. At one time he ran a very successful venture making a coin-counter-cum-switch unit which is used throughout the world in Coke dispensing machines.

Dennis is one of those hacker/designers who's casual attitudes to life, and minor eccentricities, drive hard-nosed business associates up the wall. But he is thoughtful and inventive, and with his Apple modem he has produced something exceptional — even if it is not entirely finished, and possibly never will be.

His friend George Parry, who runs the Newcastle mail-order house Micro-Educational, maintains that Dennis's main problem is the chronic disease of 'creeping features'. He can't leave well enough alone, and when a new idea strikes him, he has to add it to the modem, so the design is always in a state of flux.

From a buyer's point of view the Auto Ice Modem has been a frustration. For a long time most owners of the modem have only been able to use it successfully to access Viatel, but now the new updated Eprom for ASCII access is available (my new Eprom is version 2.62, and there is already a version 2.64), and to top it all I've managed to get hold of a badly photocopied manual (version 1.2 — prominently marketed 'Temporary Notes').

So at long last the modem is truly a 'package' and is up and running. And it is a hacker's dream: the creeping features have been worth the wait.

The model I now have in my Apple IIe is a shorter version suitable for the new Apple GS (the old card wouldn't fit the new machines). The card plugs into slot #2 which saves you having to buy a separate Super Serial card — which has both advantages and disadvantages since most users you will need the card anyway.

The Super Serial card also has all software permanently resident onboard and it provides Viatel access and a battery-pow-

ered clock, so at a total price of \$299 this is possibly the best value for money on the Apple market.

O'Keefe has now changed the old 64K modem EPROM to one of 128K to accommodate his new features, and if you already have the old version he will update it for you at no cost. There have been a number of changes in the last year and now the new GS modem will also display and print Viatel screens in full colour.

At the basic level the Auto Ice modem is simplicity itself to operate. The communications software is already in place and the modem can be left plugged into a double telephone point at all times (unlike many of the other cheapo Apple modems) without putting noise on the line.

To activate it you just type 'IN#2' and then hit the Esc key to jump immediately into the main command menu. This menu provides for single key-stroke first-character commands for most functions: K = keyboard dial, S = Send a file, H = hang-up, V = Viatel and so on.

This simple menu system is not suitable for programmers who wish to issue modem commands from within their program, so behind this menu is a layer of command characters initiated by the Control A key. For instance Ctrl-A D (plus the phone number) will automate the dialing function. Most users won't need to use these Ctrl-A commands, so they are usually invisible behind the main menu.

The number to be dialed can be entered in direct mode from the keyboard using the menu 'Keyboard dial' selection, or it can be stored in a battery-backed CMOS RAM onboard and accessible through a second menu level called 'Telelist'. The Telelist will also store and automate log-on procedures, passwords and IDs (I haven't yet managed to get it to handle the Minerva electronic mail '=' initiator).

Set-up values like data rates, stop bits numbers, and the selection of XON/XOFF and Christensen error checking protocols are all held in the CMOS RAM as defaults, but you can override these for individual cases on the Telelist or for direct dialing.

If you place an 'I' anywhere in the phone number, the modem will override the bit-rate default setting and reset itself to 300 baud. Similarly an 'L' will reset the transmission to the low-speed videotex rate of

75 baud, and an 'H' to the high-speed 1200 baud.

You can also add an 'M3' command to the phone number which will cause the modem to redial up to three times (or whatever number you choose up to 9) if the called number is busy, while an ':' makes it wait up to 8 seconds for a second dial tone (important if you are dialing through a Pabx). One or more commas placed in the dial-number sequence creates any number of 2 second pauses in the dialing.

The inclusion of a 'V' instructs the modem to dial but not look for carrier tone, so you can use the program simply as a dialer for voice calls, and there's an 'X' which extends the carrier search time if you are experiencing trouble with premature hangup.

In the answer mode, the modem will select the incoming baud rate and set itself accordingly. O'Keefe says that it does this by 'precision frequency measurement' rather than the normal way of using only carrier detect signals and apparently this is essential if you are going to use the modem for bulletin boards or other unattended operations. I'll take his word for it.

The Phantom Modem Mode

The 'Phantom Modem Mode' is also an interesting addition for those who want to leave the modem connected to a line in a semi-permanent wait condition. When the modem detects an incoming phone call it listens for a carrier tone, and if one is not detected, it switches the phone back to normal voice conditions. It returns a bell-ringing tone to the caller, and sounds the Apple 'bell' for you. You've got one minute to answer.

Probably the most outstanding feature of the Auto Ice modem is that the commands are simple and logical. O'Keefe has used the Esc key consistently to drop you back through menu selections (as does AppleWorks) and the single character menu selections are reasonably easy to remember.

It is obviously quite hard for writers of communications programs to strike the balance between making a program easy to use while providing comprehensive commands for sophisticated users. So far, this is the most balanced communications program that I've seen — and the fact that it all resides on a chip and is instantly available at one keystroke, is a definite bonus.

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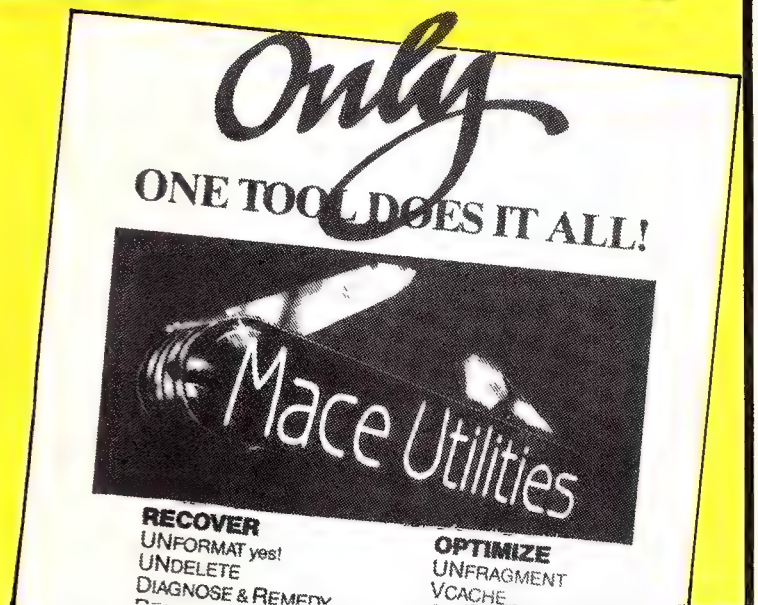
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Your Apple

you can jump back to the menu with a single Esc command, and if you need to record a file, it again takes only one key-stroke.

The card establishes its own memory-capture buffer of 36,352 bytes in the computer's normal RAM space, and it displays the amount of remaining free space at the bottom of the main menu page. The modem also beeps a warning at you when the memory is nearly full.

If you are outputting to a printer, even when using the Viatel baud rate of 1200 bps, the receive buffer will act as a spooler. There is also a filter function which can be activated to remove screen-control characters from text files.

Bulletin boards often transmit nulls (\$00) as non-displayed time-fill characters, and these are often disastrous to DOS 3.3 files which see the \$00 as an 'end of file' character. At other times you need these special characters to retain the format of a file. So you have the option of stripping them from the data stream.

Menu selections 'S' to send a file, or 'R' to receive a file, both clear the memory space of previous data and add the file to be sent, or as it is received. If you are sending a file, the modem will search the disk and make all decisions necessary to transmit it in its correct format. It can handle binary, Basic, textfiles, DOS 3.3 and ProDOS automatically — which alone make it one of the most flexible communications programs around.

O'Keefe has also added a simple word-processor in the Eprom and this is activated by the 'N' Notepad/memory command. It allows you to edit, erase, print, load and save memory. You can use this as a general wordprocessor if you want — but it is pretty primitive.

The modem also contains an onboard battery-backed clock which will keep time even when the computer is turned off.

This clock is read by ProDOS as if it were the standard Thunderclock and it is powered by the same two batteries that run the Cmos RAM. This feature is well

worthwhile since it saves the purchase of a special clock card and gives you one extra expansion slot at the same time.

All in all, O'Keefe has come up with a first-class piece of equipment here — although it still hasn't quite been finished or polished. And knowing Dennis, it probably never will be.

Even so, it is well worth the price at the present moment, and you can be sure that it will only get better in the future. Automatic Ice has an excellent reputation for supporting purchasers with free or (base-cost) upgrades as the product improves.

I have reservations about the value of on-board modem cards, as distinct from standalone units, and I would also prefer on occasions to be able to use a memory resident or disk-based communications program instead of the one in the Eprom — but this is almost nit-picking when you look at what you get for the price. □

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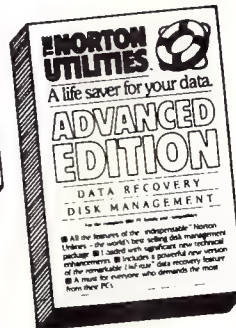
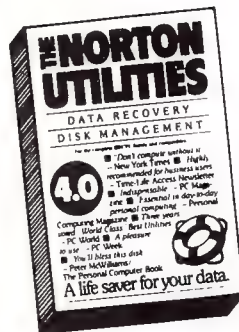
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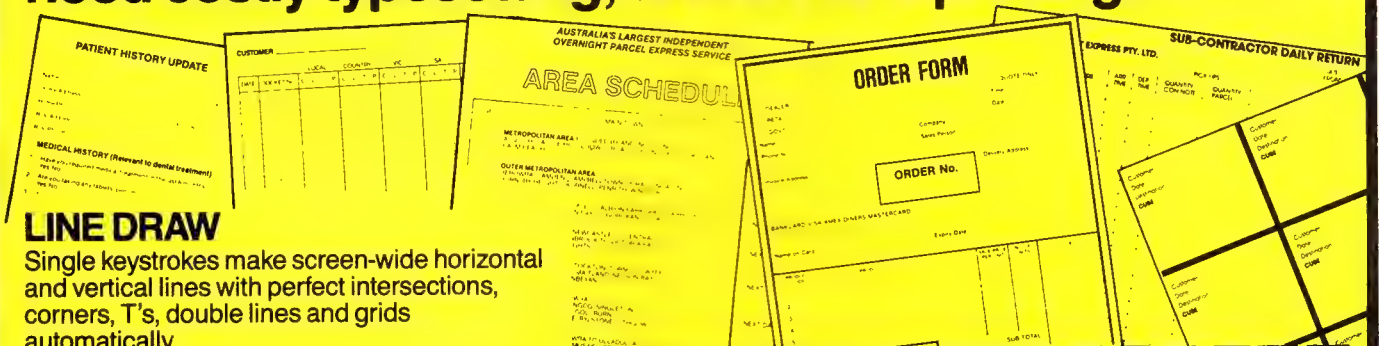
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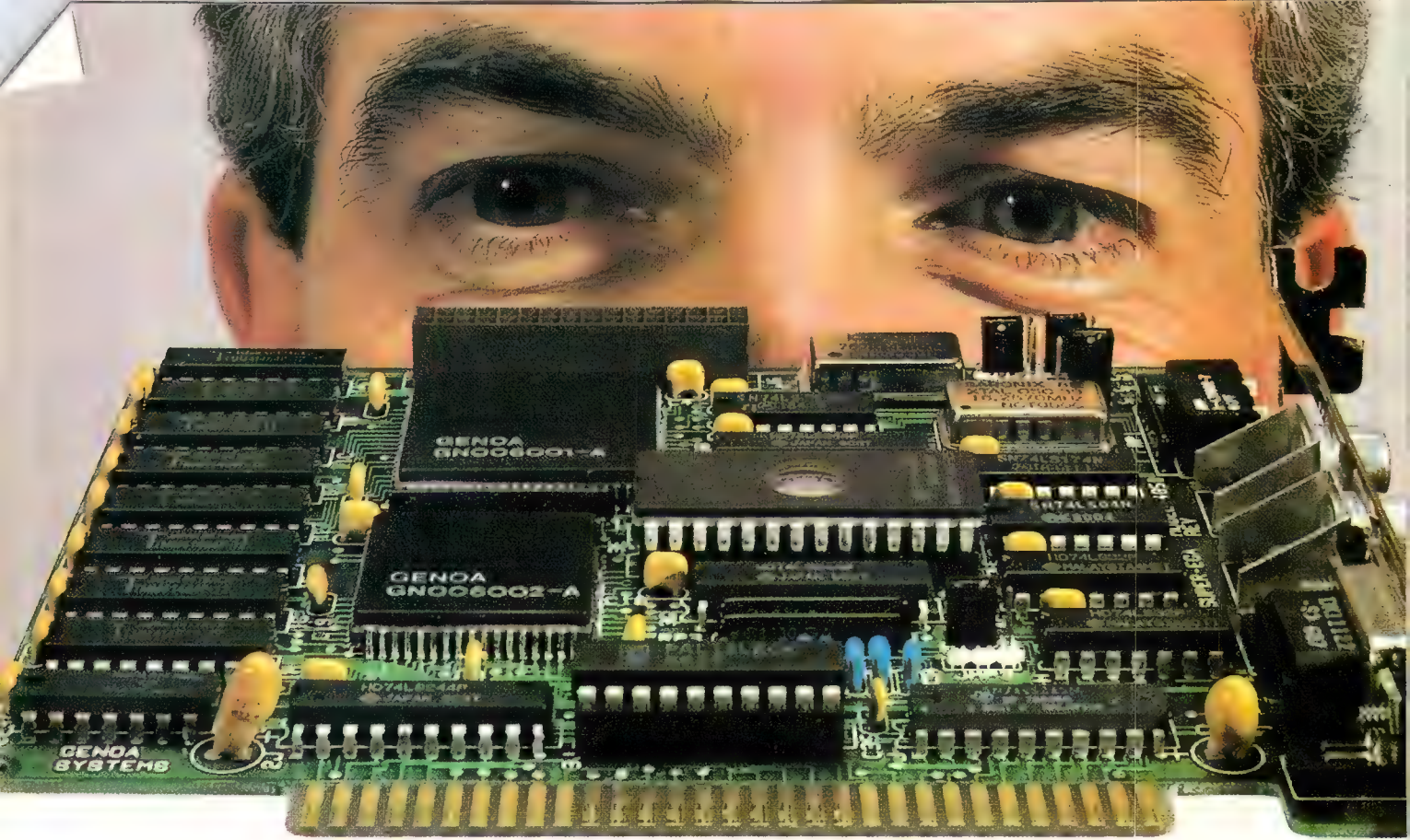
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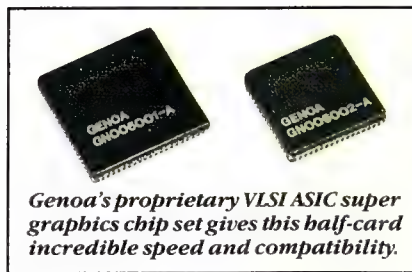
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I had thought that problems with driving RS232 printers were to do with the actual connections, errors in the wiring of the cables or maybe some confusion with the output voltages. I've since discovered that part of the problem is inside the 64 itself; it's ROM defines incorrect timings for the higher baud rates.

Printers

UNTIL I BECAME interested in telecomputing, I'd always made a point of steering well clear of the 64's RS232 port. It seemed to pop up so often as a source of problems for people, especially when trying to successfully connect printers through it.

When I purchased a printer I took the easy way out and went for a model that used the CBM serial bus — admittedly I had a limited choice, but at least I knew it would work first time.

The market soon recognised the lack of choice in the CBM printer range, and it wasn't long before Xetec and Carco put out a range of interfaces which would drive just about any type of printer. If you're in the market for a printer, I highly recommend that you look at these. They offer various features like Hi-res screen dumps, definable character sets, NLO, and printer buffers (up to 8 Kbytes in some models). But aside from the above, they offer one other big plus — printer compatibility.

With only one exception, the CBM serial bus printers will work with only C64/128/Vic computers. It's a non-standard arrangement so if you have one of these and in the future decide to upgrade to an IBM or Amiga, you'll also need a new printer. Not so if you had used an interface card and bought a standard printer in the first place. In that case, all you would need to do would be to get a new cable for the printer (and sell the interface along with the old computer).

The one exception I mentioned is Commodore's MX-1200 printer which supports both standard and CBM serial bus connections. I've not had the opportunity to review it, but it sounds like it's worth checking out. If it suits your purpose and budget it may be another safe way to go.

Solving the RS232 Problem

I had thought that problems with driving RS232 printers were to do with the actual connections, errors in the wiring of the cables or maybe some confusion with the

output voltages. I've since discovered that part of the problem is inside the 64 itself; it's ROM defines incorrect timings for the higher baud rates.

I first encountered this problem when modifying a terminal program to work at 1200 baud. It worked fine at 300 baud; and the theory said it was just a matter of opening the RS232 at 1200. To do that, according to the Programmers Reference Guide, all I needed was a statement that said —

```
OPEN 2,2,2, Chr$(8)+Chr$(0)
```

Well, the book was wrong. All I got was garbage on my screen. But what to do about it? For a while I was completely stumped, but I knew there must be a way. How else were people able to use Viatel at 1200/75 on a 64? But that is little consolation when the only information available to you is wrong, and asking Commodore was a waste of time. 'What problem' they said. Then one day I came across a letter in the Canadian *Transactor* magazine (Vol 6, Issue 4). It spoke of the same problem and of getting around it by fiddling with the settings of the user defined baud rate.

What happens when you open the RS232 channel is that the 64 checks the

first two characters in the Open statement, and if they are non-zero it consults a look up table to obtain the correct bit timings for that baud rate. These are then poked into locations \$0299/9A and \$0295/96 and are referred to by the Kernal when sending and receiving characters.

If, on the other hand the first two characters in the open statement are zero, then the system assumes a non standard baud rate and takes it's cycle timings from the third and fourth characters in the Open statement.

Both the PRG and Sheldon Leemon's *Mapping the 64* are incorrect when they say that the non-standard baud rate feature is not implemented. It is, so all that remained to be done was to find the correct values to use. The formula for these timings is given as the system clock frequency divided by the baud rate divided by two minus 100 stored in low byte, high byte format. Unfortunately, for 1200 baud this formula gives exactly the same results that were in the look-up table, which I already knew didn't work.

Eventually, I adopted the empirical approach (trial and error). I tried a whole range of values on either side of the incorrect formula. As I got closer I got less and less garbage, until finally I hit upon the numbers that seemed to work.

```
OPEN 2,2,2,Chr$(0)+Chr$(0)+  
Chr$(44)+Chr$(1)
```

will open the RS232 at 1200 baud with an 8 bit word, one stop bit and no parity.

I've since tested this on various modems, done lots of perfect error free file transfers and had no problems at all. It's a solution which will only apply to countries using PAL (Phase Alternate Line), because the system clock frequencies are different with NTSC (National Television Signal Committee used in the US). I wonder whether it may also solve some of those printer problems; 1200 is a common speed for RS232 printers.

The C64 appears to have a similar timing problem with 2400 baud. I haven't had reason to seek a solution to that one, but I suspect the same approach of using non-standard baud rates and fiddling with the numbers will yield a solution. ▶

The C64 appears to have a timing problem with 2400 baud. I haven't had reason to seek a solution to that one, but I suspect the same approach of using non-standard baud rates and fiddling with the numbers will yield a solution.

Incidentally, I've since found out that Stephen Punter (the Punter in Punter Transfer protocols) approached the 1200 baud problem in a different way.

Instead of Opening the RS232 channel at a user defined speed, he Opened it as a standard, and used a 'wedge' on the CHROUT routine. CHROUT is the ML Kernal call for outputting a character. If the character was destined for the RS232, he bypassed the normal Kernal, and went to his own routine which handled the output, using his own timings.

1200/75

A by-product of all this has to do with explaining how 1200/75 baud is implemented on the 64. As you know, the 64 has only one RS232 port and is not designed to handle asynchronous baud rates. In other words it is designed to send at the same speed that it receives.

So how can it receive at 1200 and then send back at 75? The answer lies in the

way the 64 handles its bit timings. Once you've opened the RS232 channel, the computer doesn't care what rate you picked. All it uses are the timing numbers placed in those four locations I mentioned earlier. So to get asynchronous rates to happen, all you need to do is change those numbers to suit your needs. You'll need to use ML to do it quickly enough, but if you adopt the receive speed as the default, you only need switch the numbers when you are actually transmitting a character. As soon as it is sent, you switch back to the receive speed.

The only problem that I've found with this is that 75 baud is very slow, and if you type quickly you will be sending the next character before the last one has echoed back. When it does, your computer is in the 'send' speed baud rate, so it doesn't 'hear' the echo. The character has still gotten through, it's just that you didn't get the confirmation. The solution — type slowly! □

Do You Sometimes Feel Like Joe ...

*Keyboard hangs-up
... why?*

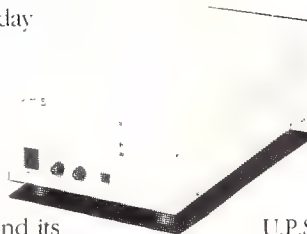


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EMONA

COMPUTERS & PERIPHERALS

THERE'S NOT A lot of changes this month, although keying in all the addresses for the first lot of System Operators to get their free *Your Computer* Subscription was a task in itself. As a result of some lobbying done by Bill Bolton, electronic registrations will also be eligible for a free subscription. (See YC May for details if you're a Sysop and missed it).

NABA-Prophet (02) 628-7030, has been set up to accept an on-line registration using a question and answer system to fill out the application. All Sysops please note, you can mail me the registration via any Fido system to my FidoNet address: 712/606.

Hopefully by the time you read this all FidoNet systems will also be receiving

the AED-Prophet listing each month.

Please use these lists, they are the most up-to-date available. We work hard at maintaining them, so — commercial publishers please contact me for permission to use the lists, as they are copyright (I did this mainly to protect the integrity of the listings). □

AED-Prophet Australian PAMS Listing
Changes with Release: 8705

NEW SOUTH WALES

PAMS List INFO: *** AMENDED ***

System: Club Amiga
Sysop: Ross Kellaway
Phone: (02) 521-6338
Baud: V21.V22
Access: Mem.VA

PAMS List INFO: *** AMENDED ***

System: CSACE BBS
Sysop: Larry O'Keefe
Phone: (02) 529-8249
Baud: V21
Access: Mem.VA

PAMS List INFO: *** Status Changed ***

System Status: ** OFFLINE **
System: Dungeons and Modems C-64
BBS

PAMS List INFO: *** NEW System ***

System: Dymock's Computer Bookline
Sysop: Bob Green
Phone: (02) 232-3061
Baud: V21.V22.V23
Access: Reg.VA
Hours: Weekdays: 1000 - 0830
Weekends: 24 Hours
Computer: IBM XT
DOS: PC-DOS
BBSSoftware: Fido

PAMS List INFO: *** AMENDED ***

System: NSW ACE BBS
Sysop: Larry O'Keefe
Phone: (02) 529-2059
Baud: V21
Access: Mem.VA

PAMS List INFO: *** NEW System ***

System: Shore BBS
Phone: (02) 959-3936
Baud: V21
Access: Reg.VA

PAMS List INFO: *** AMENDED ***

System: Software Tools
Sysop: Bill Bolton
FIDOnet: [711/403]
Phone: (02) 449-2618
Baud: V22.V22bis
Access: Reg.VA
Computer: Sharp 7501 AT
DOS: PC-DOS
BBSSoftware: Opus
Info: Trailblazer 9600 baud
online

PAMS List INFO: *** Status Changed ***

System Status: ** OFFLINE **
System: Turbo Land

VICTORIA

PAMS List INFO: *** AMENDED ***

System: The Magic Pudding BBS
Sysop: Rupert Russell
Phone: (03) 428-2178
Baud: V21.V22.V23
Access: Public

PAMS List INFO: *** AMENDED ***

System: The National
Sysop: John Blackett-Smith
FIDOnet: [630/301]
Phone: (03) 25-6904
Access: Public

SOUTH AUSTRALIA

PAMS List INFO: *** AMENDED ***

System: Adelaide Micro User Group
Sysop: Richard Newcombe
Phone: (08) 271-2043
Baud: V21
Access: Reg.LVA

PAMS List INFO: *** AMENDED ***

System: Multiple System BBS
Sysop: Danny Vozzo
Phone: (08) 255-5116
Baud: V21
Access: Reg.LVA

PAMS List INFO: *** AMENDED ***

System: The Electronic Oracle IBBS
Sysop: Don Crag & Grayham Smith
Phone: (08) 260-6222
Baud: V21.V22.V22bis.V23
Access: Mem.LVA
Computer: President PC
DOS: MS-DOS
BBSSoftware: IBBS
Info: Multiuser

PAMS List INFO: *** NEW System ***

System: The IDN Board
Sysop: Dave Winfield
Phone: (08) 352-2252
Baud: V21.V22
Access: Reg.VA
Hours: Weekdays: 1730 - 0900
Weekends: 24 Hours

PAMS List INFO: *** NEW System ***

System: Trivia BBS
Sysop: Daron Ryan
Phone: (08) 377-0049
Baud: V21
Hours: Weekdays: 1800 - 0800
Sat 1400 - Mon 0800

QUEENSLAND

PAMS List INFO: *** AMENDED ***

System: AMPAK PBBS/RCPM
Sysop: Brian Wendt
Phone: (07) 263-7070
Baud: V21.V22.V22bis.V23.B103.
Access: Mem.Public 8212
Computer: AMPRO
DOS: CP/M80
BBSSoftware: PBBS
Info: 147.600 Mhz B4AC (Radio)
1200 bps Amateur Packet
Radio

PAMS List INFO: *** NEW System ***

System: Ozforum
Sysop: Greg Noonan & Dirk
Vanbruggen
Phone: (07) 209-4294
Baud: V21
Access: Reg
Hours: Weekdays: 1700 - 0700
Weekends: 24 Hours

AUSTRALIAN CAPITAL TERRITORY

PAMS List INFO: *** NEW System ***

System: ACT Pharmacy Opus BBS
Sysop: Michael Pye
FIDOnet: [626/223]
Phone: (062) 92-3875

PAMS List INFO: *** AMENDED ***

System: Amiga BBS
Sysop: Mike Hurst-Meyers
Phone: (062) 59-1137
Baud: V21.V22.V23
Access: Mem.LVA

PAMS List INFO: *** Status Changed ***

System Status: ONLINE
System: The Gateway AIBBS
Sysop: James Collins
Phone: (062) 88-0024
Baud: V21.V22.V23
Access: Public

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Christensen Protocols in the May and June 1983 issues) can arrange direct transfer to our computers through our Bulletin Board system, which is on-line 24 hours a day, seven days a week. Contact our office by phone for details on transferring material in this way.

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Listings: Unless it is absolutely impossible, we want listings produced on the computer. This reduces the risk of error — if the computer typed it, the computer probably accepted it. Print listings with a dark — preferably new — ribbon on white paper, and try to format the output to a narrow (40 characters) width. If they can't be produced on a printer, borrow a good typewriter — hand-written material is likely to sit around the office for a year before someone can find time to type it all out for you! Please provide an account of what the program does, how it works and so on. Any comments on the program should refer to the address, line number or label rather than to a page number. Any comments on modifying the program to work on other machines will be appreciated. Try to include a printout of at least part of a sample run if possible.

Style: All items should be typed (or printed) and double-spaced on plain white paper. We will only accept original copies — no photostats. Include your name, address, telephone number and the date on the first page of your manuscript (all manuscript pages should have your surname and page number in the top right-hand corner). Be clear and concise, and keep jargon and adjectives to a minimum. □

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■ ONE OF THE TASKS which robots will eventually take over is shearing sheep. It has been difficult teaching a robot to deal with a living creature and the sheep have had to be strapped to stop their receiving significant injuries. Naturally, Australia leads the world in research on the subject and at the moment it is possible to have 90 per cent of the wool removed in about 15 minutes. The parts not shorn are the hard ones — the head, crutch and so on.

By the end of next year the Australian Wool Corporation may have a machine able to remove 100 per cent of the wool in about five minutes which is up to twice as long as it would take a conventional shearer (human-interface-type).

The program has a model of the expected shape of a sheep and makes variations to suit individual animals. The robot has a cutting unit similar to a shearer's handpiece mounted on a hydraulic arm (known as a hydraulic ram, of course). Sensors determine the location of the skin and control the cutter.

The Wool Corp says a 'level of functional feasibility equivalent to that of manual shearing has not been reached.' This translates to 'the unit is not very user-friendly as far as the sheep is concerned and it doesn't do a good enough job.' Of course, some shearers aren't all that sheep-friendly either.

My days of wielding a handpiece were limited by my lack of a user-friendly vocabulary as well as poor functional feasibility. Anesthesia (for the sheep) is considered a possibility to reduce the sheep's discomfort but it would add to the expense and to complications with stoned sheep roaming the paddocks. (I'm not sure whether Animal Liberation is writing the manual to ensure an improvement in sheep welfare.)

Plus, what happens to the 'corrupted' sheep. Is there a robot butcher waiting in the wings? Alternatively, there could be a utility similar to Mace or Restore. Hmm, dubious. There is no indication of any interest from major hairdressing chains in an extension of the idea yet, but who knows what Bruce's Salon will look like in the year 2000?

■ A frequent question these days is: 'Have you got a computer which will tell me which computer to buy?'



I'M NOT REALLY SURE WHAT THE THING'S SUPPOSED TO DO, BUT, BY JOVE, IT JOLLY WELL LOOKS GREAT - DON'T YOU THINK?

This could be an ideal job for an artificial intelligence program. Such a program could run through a series of questions, 'think' for a bit, ask a few more, spit out the answer and appear quite impartial.

Some good computer store could set this up and use it well. Then again, some smart operators could use it to sell almost anything else to the gullible — the modern version of the snake oil salesman. It could fit in well with people's expectations — many people buying a computer think they need the one with the greatest list of features. Usually what they need is the computer which will do their work with the least hassle.

That's usually a seat of the pants decision, based on all the possible computers meeting the basic criteria. But people think they need the raciest, snazziest and most fashionable model.

■ Computers are appearing in cars to aid people with various disabilities as well as those who just want a computer. As their power increases will we have an improvement in road safety or efficiency? My

guess, based on the ability of the average car owner with the simple technology in a car alarm, is that we are in for a carnage greater than in Mad Max.

I don't know what it is about alarms, but it seems that anyone who has one must set it off as they get into their car. Perhaps these are the people with watches that beep in theatres too.

Bootstrap

You've no doubt seen some of those unusual clocks which have ball bearings running round in them to indicate the time. Perhaps you've also seen the ones which circulate water a drop at a time to pass the seconds. I thought they a relatively recent invention, but excavations in China counter that. Apparently during the Hung Dynasty, about 5,000 years ago, they had a computational device which ran on a similar system using clay pots as registers and general memory.

The machine covered many hectares — it had the equivalent of about 4K of RAM and was extremely slow because water doesn't travel as fast as electricity and the distances were much greater than in today's miniature chips.

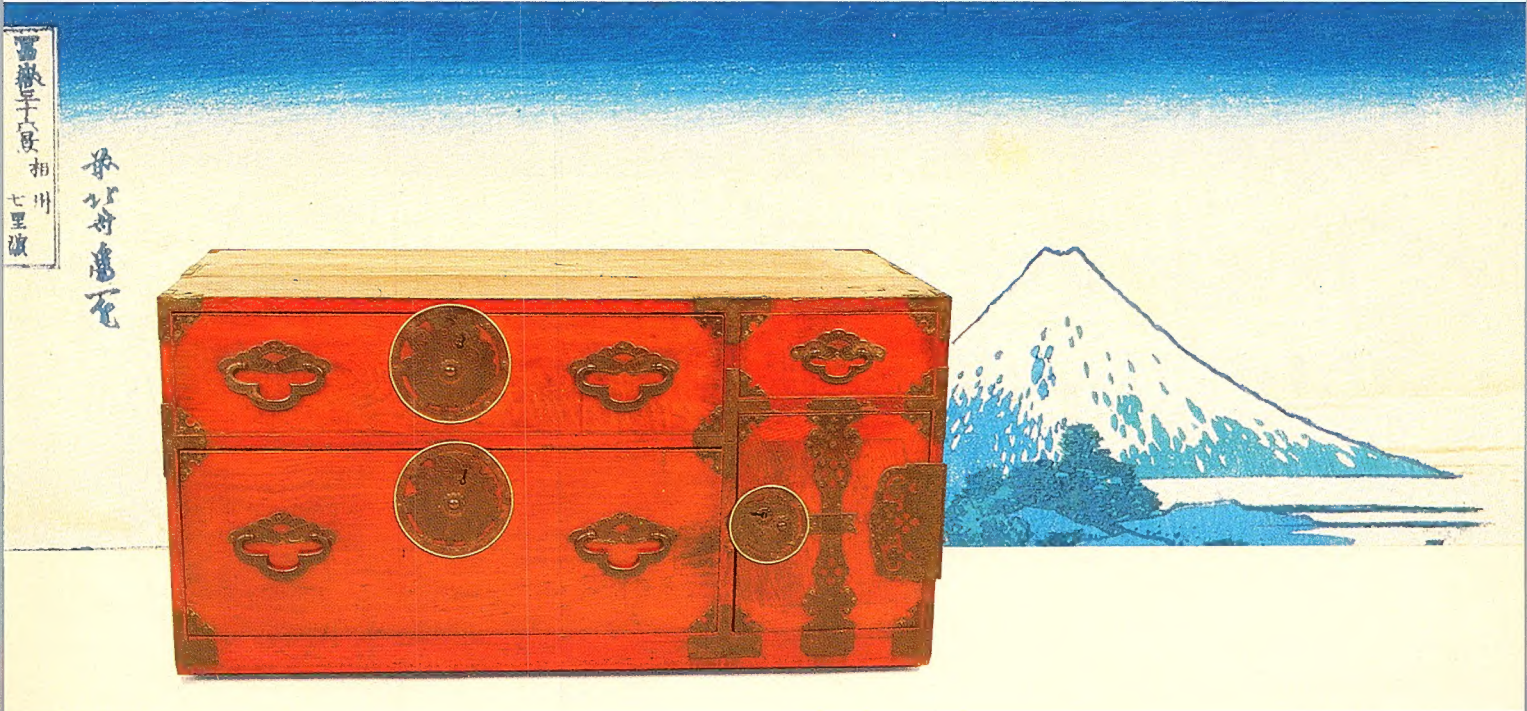
As well as being used for astronomical calculations it was used to run a very primitive word processor — about equivalent to WordStar version minus 1.0 or Word Imperfect and definitely no mouse capability. The archaeologists are not clear on all the details yet, but as soon as they are, someone is bound to reconstruct a working model — just the thing to do with a Tasmanian rainforest/dam.

Michael Burlace is an independent computer consultant operating from the Sydney Information Technology Centre (Itec). He may be contacted by writing to PO Box 57, Broadway 2007 or by phoning (02) 281 2111. □

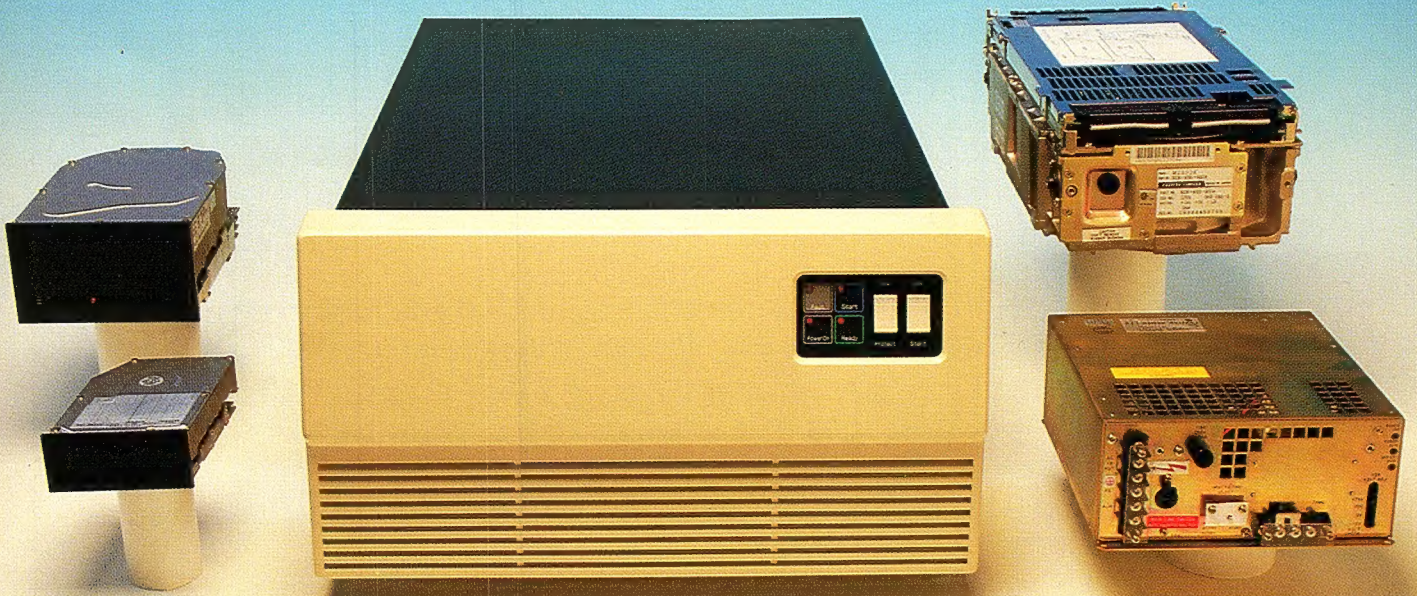


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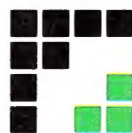
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