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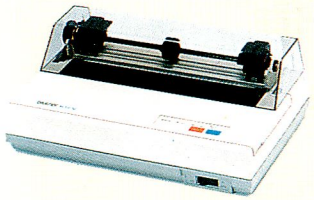
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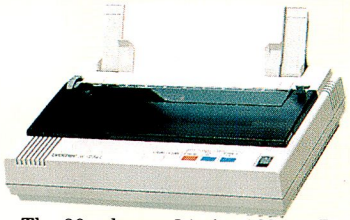
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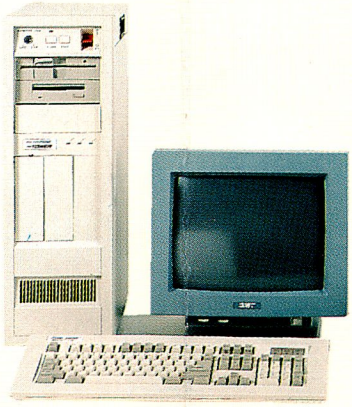
The 80 column, 24 pin, 162cps, Brother 1224L has a 54cps LQ speed. Coming standard with a 7Kb buffer, pull tractor feeder, Epson LQ500 emulation, dual interfaces and a cable thrown in!

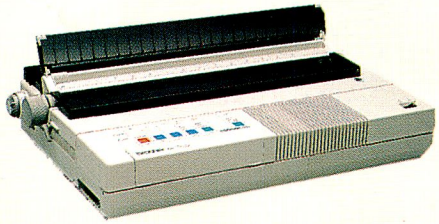
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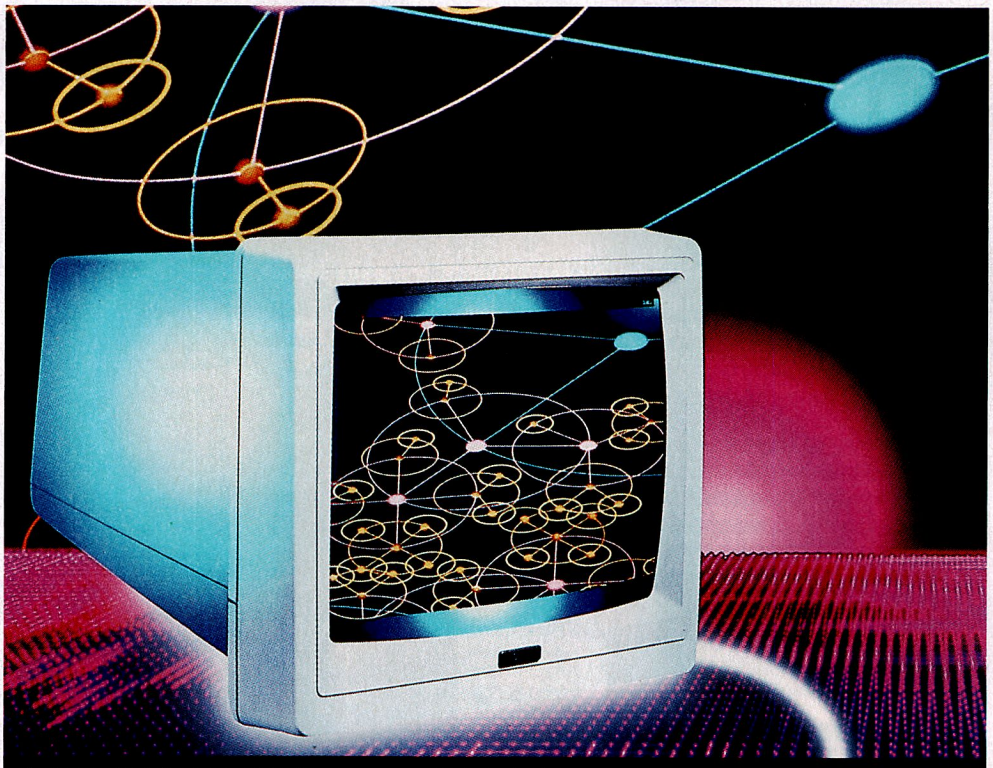
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SUNSHINE COMPUTING 50

NEXT MONTH INCLUDES

Electronic communications is the most rapidly expanding component of PC technology and holds the key to more efficient and productive use of your system. Our annual Communications feature covers the most recent developments and presents an overview of the software and hardware that's bringing it all together, including the new generation of modems and fax cards, and the latest in on-line services and communications software. For Macintosh users, we also have a review of a Mac-compatible portable and the start of a new series on powerful Macinstosh word processors. If the clack of the keyboard is music to your ears, you'll be interested in our music feature – both Yamaha and Roland have entered the world of computers on a sharp note! And – if you're looking for information and ideas, our comprehensive listing of Australian User Groups will show you where to start.

This month's cover: Concept by Sally-Anne Silveira, photography by Peter Beattie, foreground courtesy of Chantal Gallagher; background photographs by Jay Freis, Bill Varie and Chuck Place/The Image Bank.

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JAKE KENNEDY

Applications?

YOU MAY HAVE noticed the changes we are making in *YC*. Sally's striking layouts certainly give us a greater 'user-friendliness.' The major change we are making, though, is in content. Computers, the way we use them and the industry itself are maturing as a market – and, partly, that means they are becoming more of a 'consumer item.' Of course, one of the reasons for that is the growing standardisation in all its forms. While it's exactly what we need, there is a sameness in parts regardless of whose label is on the front, and this has given us a market that's driven by price.

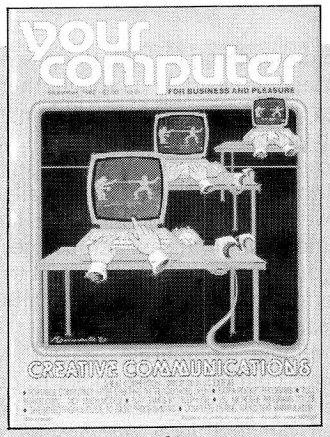
Driven by price means exactly that – 'price' is the primary criterium used when deciding which product to buy. Now that means that some will spend $15,000 when a $5000 machine would do the trick, just like some of us will buy a Porsche or a BMW to drive to work. The car analogy is a good one – I'd bet that the bulk of the Gross National Automobile Product comprises money spent by those who think: 'I've got *this* much money, what can I buy?'

That's what happened to me recently: I chose the machine I wanted on the basis of such noble traits as quality, performance, reputed reliability, proven applications, expandibilty, ergonomics and all the other virtues that reviewers extol. Once I decided I didn't have anything like $25,000 to spend (*and* I hadn't indulged myself, really), I went shopping for price and starting compromising.

Now that puts us in something of a quandary here at *Your Computer* – if the only difference between products is the price, what can we tell *you* about them? Sure, there are system boxes that won't hold the monitor without bowing dangerously and there are masterpieces of engineering. But, essentially we see ourselves more in the position of giving guidance, advising of the qualities that we feel are important to look and the pitfalls to avoid, rather than saying 'buy [Product Name].'

We might recommend Brand X as value for money, but Brands B, Q and T could well offer the same features (or more) for the same money. While we'll still bring you the 'break-through' products and reviews that can be used to form the basis of your own judgment, we will not cover every new machine on the market.

That's why you've seen so many application stories and fewer straightout product reviews in the magazine lately. For you as readers, we feel is much more value in reading and seeing the variety of applications that are developing for computers and software. And, the reviews we offer, tend more and more to be comparisons of two or three similar products, allowing you to better judge what features are available and which are useful. □



September 1982

Options like the PIP parameters make some very awkward tasks easier; it would be a pity if such versatility were to disappear – ***Les Bell, Editorial.***

ComputerLand, the worldwide chain of franchised microcomputer retail stores has opened its fifteenth store in Australia . . . The opening was celebrated with the Minister for Primary Industry, Mike Ahern, pushing a key on the Apple II keyboard – ***News, p6.***

All this serves to demonstrate that communications is not only possible on a microcomputer, it is actually quite easy and extremely useful – ***Communication – The Next Big Breakthrough, p26.***

Future Features

IN ADDITION to our application stories and other informative pieces, each month we present features designed to keep you informed about the world of personal computing –

November 1989

Graphics: With the power now available to personal computer users, computer graphics have now come of age in almost every application environment. With particular emphasis on small business applications, we'll show the exciting developments now taking place – including a special feature covering transputers and Risc-based machines.

December 1989

Integrated packages: Our survey of the latest full-featured offerings highlights the strengths and weaknesses of these flexible products. In addition, we present a detailed report on project management software and feature the latest in hand-held computers.

January 1990

Yearbook: Featuring our Annual Software Roundup of products reviewed in the previous 12 months, this issue will also be packed with buying tips, reference material, application stories – and a look at the future.

February 1990

Portables: Our survey of the newest portables and the technology behind them shows that these machines are coming of age. And – a special feature on hardware and data security.

March 1990

Printers – Part 1: Choosing a printer is a matter of balancing speed, quality and price – our survey of laser and dot matrix printers will help you match a machine with your needs.

April 1990

Printers – Part 2: If you need to print out colour graphics, and presentation quality is important, then don't miss our feature on inkjet and thermal printers (and colour lasers).

Application stories – particularly those with the same theme as our features – are always welcome. Please address editorial enquiries on our features to Mark Cheeseman, (02) 693 6143, and advertising enquiries to Mark Wilde, (02) 693 6646.

AMERICAN GRAFFITI



HOWARD KARTEN

Simple terminals and networks

YOU WOULDN'T THINK at first that there would be much of a relationship between the Second Law of Thermodynamics and the impact of micros and networks on users. In fact, not only is there such a relationship, but there is a corollary, which I am humbly calling the Fourth Law of Thermodynamics. The Fourth Law applies to the growth of PCs and networks in organisations; one of its values is that it suggests a strategy for dealing with the proliferation of micros in organisations.

A little background: the Second Law of Thermodynamics says 'entropy is always increasing.' Entropy is disorder, and it's something that all of us are constantly fighting. For example, you may have noticed that, left alone, your desk tends to become more cluttered, to-be-answered mail and to-be-filed newspaper clippings tend to pile up, and it's never easy to find your keys. Although there is a tiny minority of compulsively neat individuals who appear to be immune from this law, most normal people have been battling entropy for years.

I don't think it's stretching the definition of entropy beyond recognition to include complexity as well. If you're not convinced that entropy is always increasing, think about how you spend your time with your PC. For example, if you set aside some time each day or each week to delete garbage or work files from your directories, you're fighting entropy. If you spend time on occasion looking through your manuals for things you once knew how to do, but have now forgotten, or spend time poring through new product announcements to select new hardware or software (or to connect some new hardware), that's fighting entropy, too.

A bit more background, on a slightly different subject: you've probably heard horror stories of mainframe complexities. PC users who've never had first-hand experience with a mainframe are sometimes suckered into believing them. None of them, of course, are true.

In mainframe environments, things worked like this: if you worked for a large- or medium-sized organisation that used computers, and you wanted your DP people to do anything for you, the procedure was straightforward. You brought them offerings (stale pizza and gooey doughnuts were particularly effective) and you made your case. After some mumbling and arcane incantations, the answer usually was, 'Yes, we can do it, no problem. We'll need a bit more detail. Please tell us precisely what you want to do, how you want to deal with error conditions, and then call us in two years or so.'

Mainframe computing wasn't really complex; mainly, it was subject to delays between making a request and having the request satisfied. As a programmer, once you put in your time reading the manuals and learning the rules, you could count on the computer to behave predictably. (As we all know, that doesn't happen with PCs; the manuals are entirely too long, too complex, and too often written in an obscure dialect of Anglecised Greek.)

I was led to ponder all this, and to my discovery of the Fourth Law of Thermodynamics, by a plaintive call from my friend Felicia the Flack.

With the arrival of the first PCs, those who had formerly been supplicants had alternatives. Those early Tandy TRS-80s and Apple IIs may not have had much power or sophistication by today's standards – any colour screen, as long as it was monochrome, and 64K was a lot of memory – and they could be plenty quirky at times, but by and large, they got the job done.

Life was simpler then: you had fewer choices. None of this stuff about file servers and different partitions. Today, by contrast, many PC users who are only trying to get their jobs done have to figure out how to upgrade from CGA to VGA, how to change batch files and Config.Sys files to accommodate those things . . . what the devil is going on? This is simplicity?

Commandments

YOU DON'T NEED artificial intelligence to figure our what's happened: we've violated Commandment #0 of all of life, the KISS rule – Keep It Simple, Stupid, and you'll rarely get into trouble. The price of increased power is increased complexity. When we weren't looking, someone introduced complexity to the PC arena.

So the days of simplicity – things like stand-alone PCs and all that – are behind us now. Now, networks are wonderful tools (I just love the idea of sharing files, as long as they're someone else's!), and they do lots of great things. No one would want to do anything to cut down on the rich diversity of products available today for PCs. But look at what's happened as a result: no longer can an isolated user mutter 'what the hell, I'll show them; I'll just go out and get my own PC.' Now, the user has to call in the networking folks, to find out about connecting to the network; call in the hardware gurus, to make sure the new hardware will be compatible; call in the software gurus. . .

I was led to ponder all this, and to my discovery of the Fourth Law of Thermodynamics, by a plaintive call from my friend Felicia the Flack. 'Flack' is US slang (slightly aggressive) for someone in public relations; Felicia plies that trade for a large manufacturing organisation. Like many of her colleagues-in-ink, Felicia's attitude is that she does words, not technology. She's none too keen about technology, in fact.

Now, her organisation is very careful and fussy, and any press release it issues must be blessed by assorted presbyters and shamans representing about nine departments. Her problem was simple: her departmental computing guru, following the dictates of some distant computing bureaucracy, was trying to get her to discard her trusty, simple, un-networked machine and connect to the company network.

Her training in obfuscation had served her well; it had enabled her to escape detection as one not connected to the company's in-house network. Now the Technology Police had found her out. Not only did they want her to hook up, they also wanted her to upgrade to a colour monitor, change word processors, and a few other things. And the penalty for having evaded them thus far ('Naughty girl!') was that she'd have to do it by herself.

Felicia had come to me to ask some advice. At first, I was tempted to offer the usual platitudes about computing: 'people want to be able to do brain surgery without studying medicine,' 'in computing, power is proportional to complexity,' 'do it, it will be a good learning experience,' *ad nauseam*. To me, upgrading and trouble-shooting are fun, like doing a puzzle, but then, I enjoy this stuff and I have a technical background. But, I can appreciate that not everyone feels that way.

As I listened to her tale of woe something clicked. Felicia didn't want to muck about with all this stuff about boards and coaxes and tokens and servers. She didn't even want a PC! What she wanted was really something from the good old days: a terminal on her desk that she could pound on once in a while to get an answer to a question, or send a quick memo to someone. That's why she'd come to me: she wanted to find some digital old geezer who could wax rhapsodic about the Olden Days. That's when it came to me, in a flash: if all these support people running around thought it was such a peachy-keen idea, let them do it for her – all of it!

It was so clear: complexity *can* be dealt with. For starters, do keep things simple: simple things like a dumb terminal attached by a simple, single cable to a mainframe. Another way, probably equally good, maybe better, is to have people to do it for you! Obviously, managers and executives had long ago discovered this vital secret of life! And now I'd discovered it! What a breakthrough!

Like all good scientists, I have conducted exhaustive tests on it to make sure that it is real and not a quirk or a special case of another law, and I'm convinced that it works. So, here it is; remember, you saw it first here. The Fourth Law of Thermodynamics, which applies especially to computers, networks, and organisations: entropy can neither be created nor destroyed, but it *can* be minimised by pushing its effects onto someone else. □

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WILLIAM OLSON

World technology congress

AUSTRALIA WILL host a World Technology Congress in Canberra in 1992, Barry Jones, the Minister for Science, announced at Parliament House recently. Jones said the Technology in Government Committee had already received acceptances from Canada, the US and Britain. More than 20 countries are expected to be represented at the Congress.

While announcing the Congress, Jones made some critical statements about Australian attitudes to technology: 'Australia's level of understanding of technology was still fairly backward. We are quick to acquire technology, both hardware and software, without always fully understanding what it is all about. Both government and business, bureaucrats, lawyers, economists and administrators had great difficulty in understanding technological problems.'

'The US Rogers Commission into the Challenger space shuttle disaster was a perfect case study of this. The non-technical people thought the odds against a disaster were 300,000/1. However, the true probability was really more like 300/1 and this was very difficult for the space program administrators to understand.

According to Jones the Australian scientific and technological community was still suffering a decline in morale. This is reflected in the sharp fall of people going into physics, chemistry, maths and engineering. It is true that in computing there are large numbers entering, in fact the courses cannot keep up with the demand. However that decline in physics, maths and engineering is going to cost us very dearly.

Jones said even more depressing was the impact on science teaching. There is a good deal of evidence to show that people going into science teaching are the least qualified and least motivated of all teachers. In Victoria for example the Higher School Certificate entrance score to get into science is 40 points lower than for physical education.

Even though Australians are attracted by new technology we should not be blindly adopting technological innovation on the basis of engineering merit or the appeal of cost cutting Jones said. Technology is only a tool.

Robot tapes

SOME MAINFRAME computers now have moving parts you can see. The Department of Health and Community Services now own a new cartridge robot tape system that lives in a large storage tank filled with 5786 bar coded cartridges. Christine Mitchell, computer operations manager for the federal health and community services department says the cartridge system will eventually replace all 16,000 reels of tape.

While the cost of the automated cartridge system is more than one million dollars, Mitchell said, each holds 20 per cent more information than a reel of tape. She said that using the cartridges reduces loading time with far less chance of errors. The cartridge robot sits on a computer-driven arm inside a storage tank about the size of a small room. A miniature television camera with spotlights enables the robot to scan bar codes on the spine of a cartridge. The robot retrieves and loads a tape in under 30 seconds. With reel-to-reel manual tapes, an operator takes at least two minutes to complete a loading request.

Outside the tape cartridge tank are two TV monitors allowing technicians to see exactly what the robot is scanning inside. There is also a small glass observation window in the side of the tank. One fea-



'Australia's level of understanding of technology was still fairly backward. We are quick to acquire technology, both hardware and software, without always fully understanding what it is all about.' ***Barry Jones, Federal Minister for Science.***

ture of the system seems like feeding animals at the zoo except it is the robot that is being fed cartridges. A cartridge port in the wall of the tank for introducing new tapes into the stack. A tape is fed into the port immediately gets noticed and picked up by the robot. It comes up to the window to scan the tape, then carries the cartridge back to the shelves.

Mitchell said that by using a series of pass-through ports several robot storage units can be daisy-chained together. The robot is then be able to pass tapes along from one unit to the next if needed. Another big advantage for the system is having tape retrieval and load available 24 hours a day for seven days a week. Mitchell says staff previously employed on routine tape loading will now be able to take on more productive computer work.

Information initially being stored on the robot-loaded cartridges includes database log tapes, Medicare statistics, first home owners scheme statistics and nursing homes data. Other additions to the department's Amdahl mainframe are new triple-capacity disk units which will store 1.8 gigabytes. This acquisition puts an extra 20 gigabytes of storage on the mainframe.

Desine queries

QUESTIONS ARE still being asked about the Defence department's IBM Desine contract in parliament. The Public Accounts Committee has queried the omission of Unix-based systems from Desine. In reply Defence department officials have admitted that Australia's main allies are now using Unix although are not completely tied to the system. However, the committee is aware that both British and US defence agencies have recently made big investments in Unix.

Because Unix is an open system it allows software to be easily transferred between different types of hardware. It also reduces the chances of a system being tied in to one vendor's products. In response to further questions from the committee Defence officials say Desine will not tie them in to IBM because conversion will be easy.

In an attempt to clarify Desine, Robert Andrew from the Defence department information office released copies of two departmental memos about Desine. These memos restate the Desine position saying that the aim of Desine is to provide a 'standardised computing environment.' The memos also mention that the Defence department is committed to open systems interconnection (OSI). Another paragraph in the memo concludes that the Desine concept 'extends beyond the products selected as a result of the tender evaluation.'

In listing the benefits of Desine the memo says that they include: 'the contracted availability of a range of proven hardware and software products. This range of products has been evaluated as having the highest overall cost effectiveness available.' However IBM only announced its first Systems Application Architecture, Office Vision, earlier this year.

Other benefits claimed were – savings in training, increased Australian and New Zealand content, a simplified ordering and supply system and a ten-year maintenance contract. Despite official assurances to the accounts committee the memo admits there may be problems in changing existing defence systems over to SAA. There is no cost estimate given for this.

Subsequent specialised software tenders will be tied to IBM's Desine. Section 20 of the memo says that large scale and specialised application software packages may require separate contracts. However, preference will apply to packages which will operate on Desine equipment. Unix is not mentioned until the last paragraph of the memo. It says in part 'a Defence working group will be conducted on the need for migration of Unix-based systems to Desine or for the incorporation of Unix into the environment.' There is no timetable given for this working party.

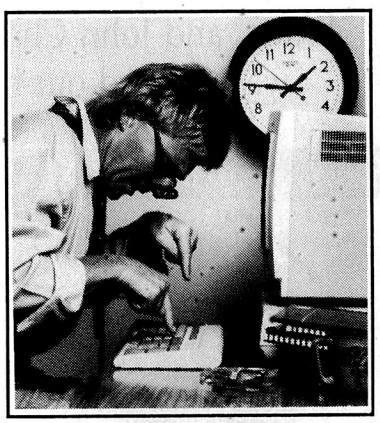
Both memos also contain a contradiction about the terms of the Desine contract. Part six of the annex to memo 59 says there is a five-year period contract with IBM. However part three of memo 60 says that the Desine/IBM contract is not a period contract because it offers exemptions.

PR lessons

THE CHIEF executive of Avis Rent-a-car in Canada once said of Public Relations consultants: 'My advice to all PR consultants is to quit today and go get a meaningful job.' Well here in Canberra one of the meaningful jobs some PR people have contracted is teaching public servants how to avoid saying anything important or interesting to journalists during interviews.

The PR advice includes this gem: 'Decide on the two or three important points you want to make, and make them – irrespective of the questions you are asked!' □

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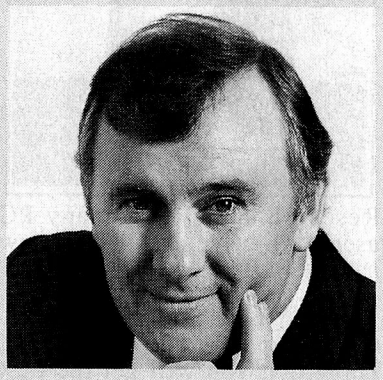
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INTRO-FACES

Each month we introduce you to the names and faces behind the Australian computer industry – and someone is paying attention: our 'mis-labelling Kim Watts' and John Chandler's photos in our July issue was pointed out by almost a hundred readers.

Pat Byrne



PAT BYRNE, managing director of Commodore Business Machines, has been building his team in preparation for hitting the business market with the power of the Amiga range. When asked about CBM's plans for the next several years, he pointed out that 'I have been in the chair only six months, to have a [long term] plan at this stage would be premature. But for the next twelve months we will concentrate on strategy and direction, implementation and infra-structure.'

That infra-structure now includes education and banking/finance software specialist Mary-Louise Parkinson and ex-Imagineering marketeer Edwin Huang. Geoff Sambell's support team has been trebled and CBM will be opening more Commcare centres. The company is also working with business package specialist, Sybiz, and other developers to focus on the strengths of the Amiga.

When asked how he saw Commodore's dealers fitting into the Scheme, Byrne replied: 'Our commitment to our dealers is to add value to the distribution channels and to eliminate cross-chanelling within our dealer base.'

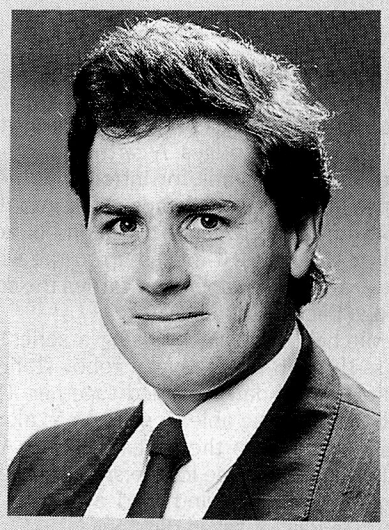
Stead Denton



STEAD DENTON left school at 15 but that didn't stop him from founding IPL-Datron in 1983 (with a $1,000,000 hand from entrepreneur Renee Rivkin) – the company has shown about 50 per cent annual growth each year since then and is now a $30 million per year company. It is the Australian representative for some of the best known computer peripheral names in the world, amongst them Oki, suppliers of 20 per cent of the world's printers.

'I set out to take the place of the manufacturer's subsidiaries in distribution. To that end, I believe a well-disciplined market structure is vital to the success of all in the market, be that the importer or the end user,' noted Stead. His approach to the market is to promote the benefits of the product, not fly the company flag. 'That is why Oki products are often purchased under a different name. At the end of the day, it's total sales that count, not the market share of a particular brand.'

Alastair McLachlan



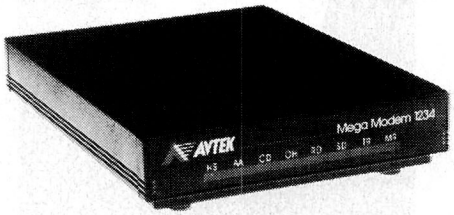
'THE AUSTRALIAN manufacturing industry has the ideas, the skills and the people, but it must improve its approach and the tools it uses if it is going to become competitive in world markets,' Amtech founder and managing director Alastair McLachlan commented recently. He sees 'contributing to the development of Australian manufacturing by using the new CAD/CAM technologies' as a real challenge.

Amtech was established in 1986 specifically to handle CAD products and was appointed sole Australian distributor of the Cadkey rang of 3D mechanical engineering and design software in July, this year. As McLachlan pointed out, though, there's more to marketing than simply having the 'the most widely used mechanical engineering CAD system in the world' to distribute. The key to the future with such products is in training and understanding user's needs and product capabilities – McLachlan has ensured that his executive team are ready to implement user training and advise with applications development by appointing qualified engineers with extensive experience in mechanical engineering to help him. McLachlan himself was part of Girlock's vehicle simulation team which won the Chevy Corvette Braking System Contract and later worked with Gerber Systems high-end CAD/CAM range.

As a personal goal, McLachlan sees smooth (and quick) sailing ahead: 'I want to move from being first on handicap to first across the line in the next State Tasar Championships.'

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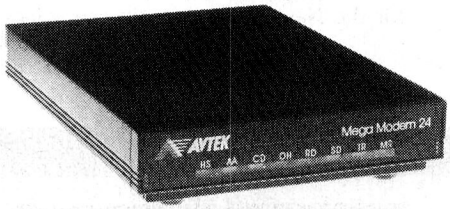
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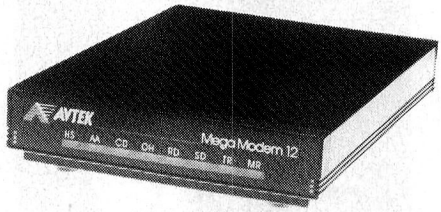
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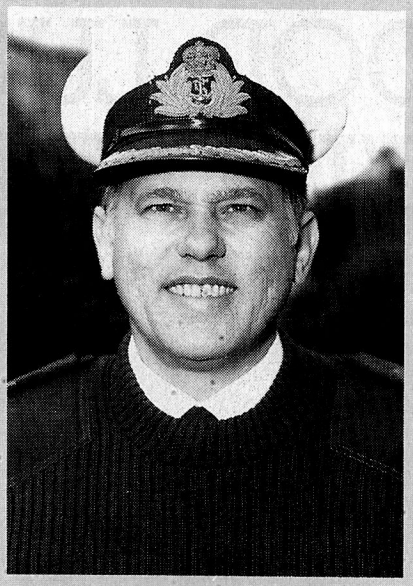
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Greg Whymark

COMMANDER GREG WHYMARK is the Project Manager of the Navy's Executive Decision Information System (EDIS). His responsibility is to oversee the development of an 'executive information system' which will be used to place critical information at the finger tips of the Navy's admirals and other senior executives. He recently commented at a Canberra seminar run by the Australian Society of Operations Research, that 'an EIS doesn't necessarily have to use computers, but with the accelerating advances in technology, the system can be automated and delivered with an executive-friendly face. This is a major requirement of the technology component of the system as it obviates the need for senior executives to undertake even the briefest of training courses.'



Whymark, who was recently granted the first Doctorate of Philosophy in Computer Science at the Australian Defence Force Academy, thought the most important factors the Navy should consider when evaluating software is the productivity of the information analysis and information management tools; compatibility with the distributed nature of the administrative systems in Defence; and the availability of suitably qualified personnel. 'This meant that a mainframe-based and managed system was unsuitable for the Navy. It also meant the selection of software that required minimum use of scarce, technically qualified manpower,' he commented.

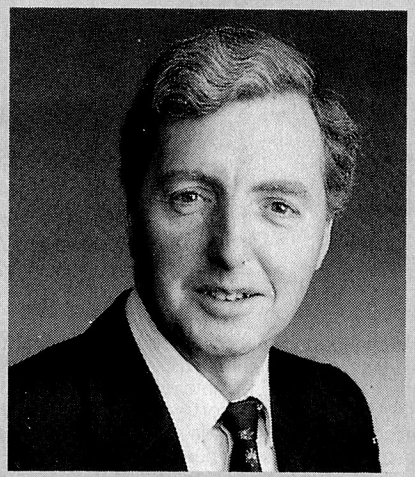
A team headed by Whymark evaluated seven possible implementations and built five prototypes to varying levels of performance and then went through a ten-month concept development and evaluation stage before spending some four months deciding on software. The team plans an initial implementation of 32 PCs and decided on EPIC software, from North Sydney company Econsult, because, according to Whymark, 'it allows the development team to concentrate on the information content. And, it allows the use of personnel who are better qualified in determining critical information needs, instead of relying on programmers and analysts for tasks in areas they are not trained for.

'Bear in mind, though,' he said, 'that the Navy's information analysts will be uniformed officers, whereas, in other organisations, they would be accountants, engineers or middle managers well-versed in the needs of the corporation they serve.'

Peter Lucas

PETER LUCAS, managing director of accounting software house Sybiz, entered the computer industry by accident. After graduating in aeronautical engineering from London University, he worked for ten years in the aeronautical industry using computers for mathematical modelling. One day he was approached by Hewlett-Packard to develop some accounting software. 'It looked dead easy compared with my scientific work,' he reminisced. 'However, it took three years to get it right, so I really learned accounting the hard way.'

Lucas joined Sybiz in 1978 when it was still a small supplier of accounting systems in Adelaide with three staff. His approach to designing accounting systems proved innovative and demand for Sybiz products grew rapidly. By 1983 the company had begun exporting and has now grown to some 50 staff.



When he was appointed managing director, Lucas' first goal were to achieve market leadership and to move the company from marginal to solid profitability – both of these were achieved in June, this year. His next challenge is to grow the company from a national to an international force: 'We have already successfully launched our products in American and Britain.'

Being a programmer at heart, Lucas defines his personal aim as 'inventing a *killer* product; an innovative software package which sells in large numbers worldwide and puts the Australian PC software industry on the map. Away from work, his wife and two energetic daughters keep him busy, while attempts at improving the dismal performance of the Sybiz indoor cricket team keep him fit: 'Thank goodness we don't write software the way we play cricket!'

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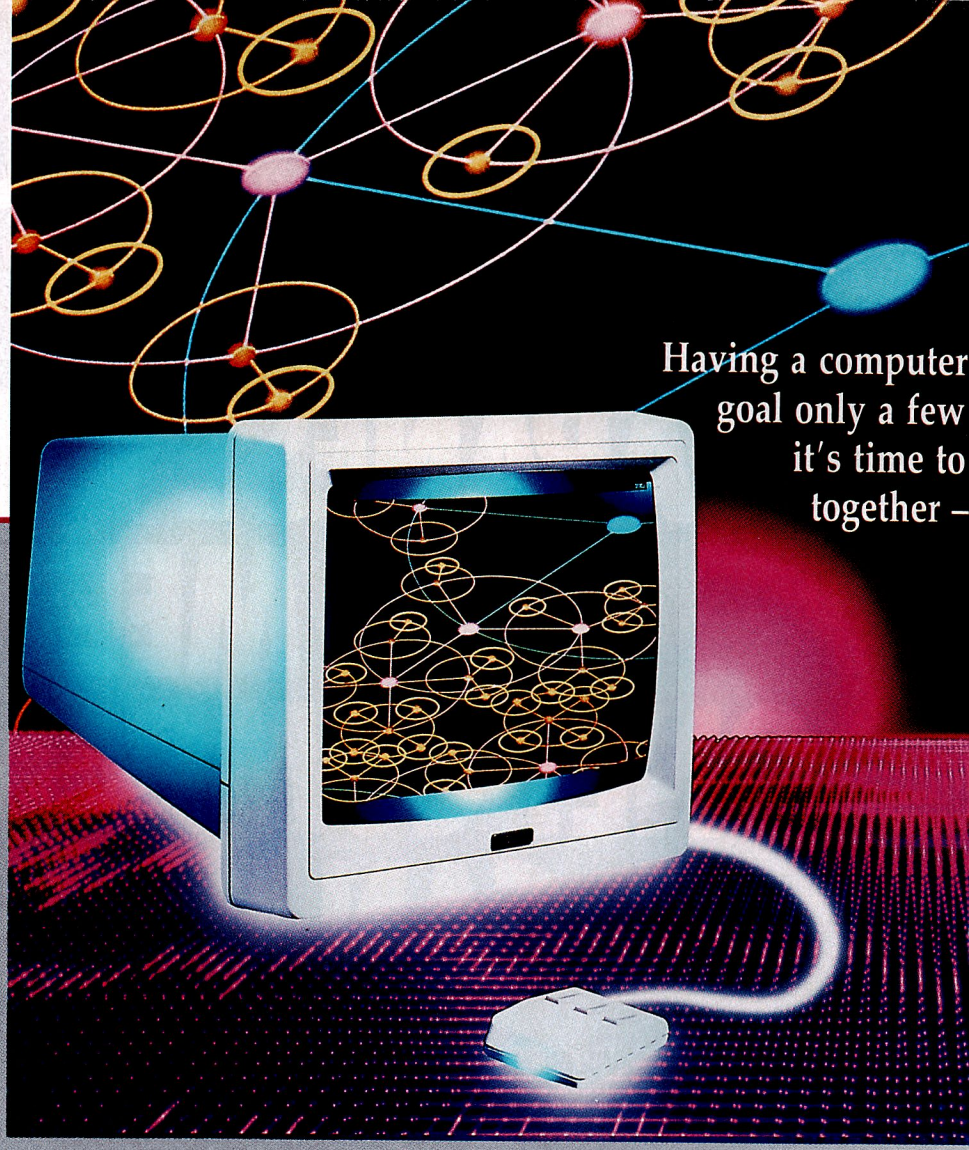
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EVERY REASON TO install a LAN (Local Area Network) can be summed up in a single word: efficiency. Efficiency in the use of expensive peripherals, efficiency in communications, and efficiency in data usage. A network reduces the amount of paper necessary for the work flow and ensures that there is only one 'latest ' copy of a spreadsheet or database in the office. In fact, it doesn't take much thought to realise that the need for a network increases geometrically with the number of PCs being used by a business and exponentially with the number of sites these PCs are located in.

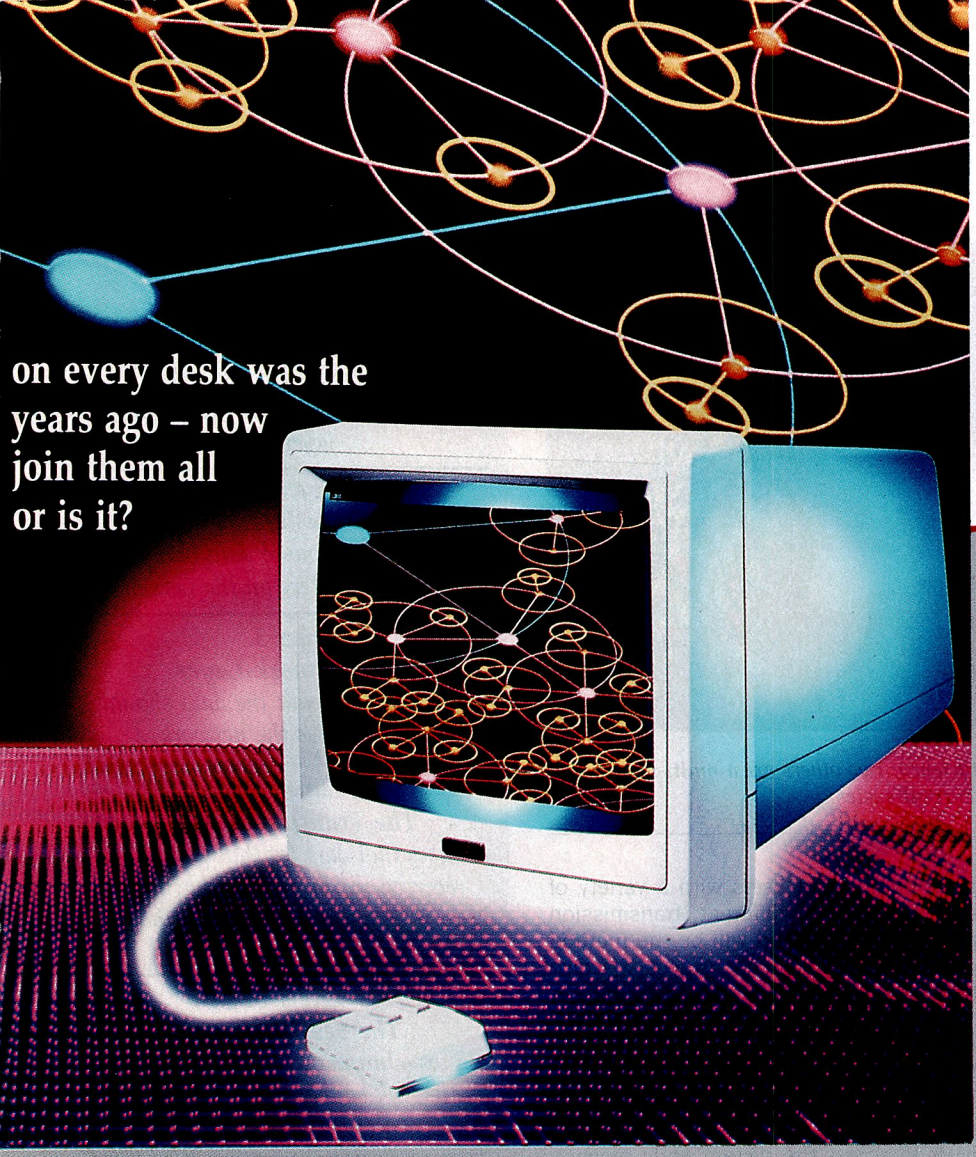
This isn't to say that a network is the *only* efficient way to manage a multi-PC office. It's a matter of considering the office's work practices and how they can be improved at a cost that makes it worthwhile – networking is only one of the options that needs to be considered; two others are leaving things as they are (this is probably the most over-looked choice) and installing a multi-user system (see the box item on choosing between such a system and a LAN).

Networks have been with us almost as long as computers, but it's only in the last few years that they've become cost-effective for small and medium-sized businesses. We've seen the price of XTs and ATs – practically a network minimum – drop to the point that these businesses could justify a machine on almost every desk in each branch. Concurrently, we've seen the price of networking software and hardware drop. And, most important for smaller offices, it no longer takes a dedicated hacker to install and manage a LAN.

But, a LAN is not simply a matter of running a wire between several PCs, a printer and the mainframe down the road. The basics for a network are a common pathway to share the data (and peripherals such as printers and modems) and a method of preventing one set of data from 'colliding' with another, plus a method of directing that data to its destination(s).

Topology

THE EARLIEST method of joining PCs together used a ring topology – computer A is connected to B, which is connected to the printer, which is connected to C, connected to A; all 'daisy-chained' together. This is often referred to as a Cambridge Ring, after the British university where it was devised. Although it is certainly a workable system, it has an inherent fault:



on every desk was the
years ago – now
join them all
or is it?

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if one node goes offline, the whole system comes to a halt (the data is only transmitted in one direction.

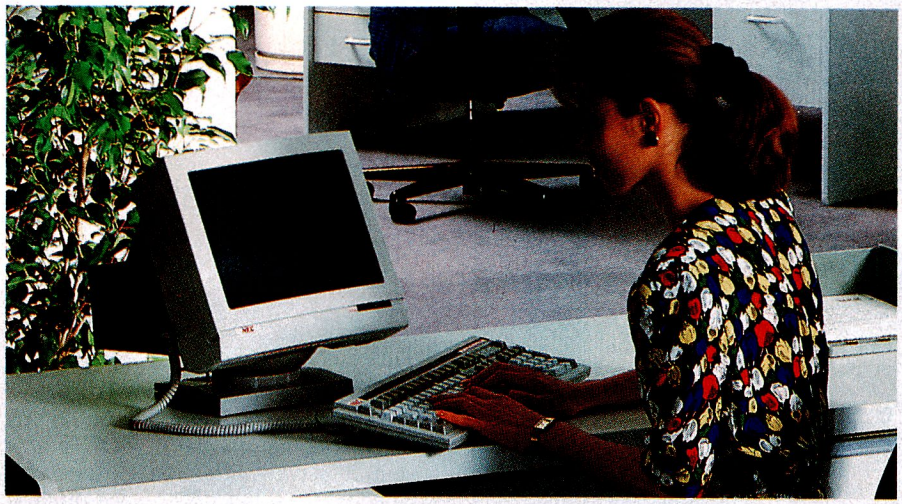
Most commercial ring networks use a parallel path around the ring which provides a detour if part of the net fails (with the added cost of electronics to provide the detour defaults). The nodes in a ring can be connected by twisted pair or coaxial cables, or by optical fibres.

The second networking method used a star topology – think of a PABX with a number of phones hanging off it (that's what the originators at AT&T did). There's a central 'server' with a number of nodes connected to it, but not to each other. If the network length is less than 600 meters, star networks are usually connected by twisted pair cables, which limits data transmission to about one Megabyte per second (Mbs). ('Twisted pair cables' are very similar to those used to connect your telephone to the exchange; in fact, in permanent installations the same cable is used.) Since they are only handling traffic between the server and one node this is usually adequate. Over longer distances, coaxial cable or optical fibre can be used.

The simplest and cheapest topology is that using a bus structure. Here a trunk cable, usually a twisted pair, has peripherals and nodes connected to it like roads branching from a highway. One of the advantages of bus topology is that a wide range of equipment can share the cable and use of peripherals quite independently – and, these devices don't necessarily have to be able to talk to each other. A drawback with this topology is that this method has the slowest data transmission rate – which may not necessarily be a disadvantage.

A high data transmission rate is quoted by some networking vendors as 'a good thing' – but, it's only a good thing if you need it. Consider the type of data that will be transferred across your network: if it's primarily small (say less than 100K) documents, then you probably won't notice whether the transfer speed.

IBM developed their own topology, the Token Ring – a star-wired ring. Here, the cabling radiates from a series of Multistation Access Units (MAUs, often referred to as 'wiring concentrators'). Up to eight terminals can be connected to a MAU, and these can then be linked to form a major network with up to about 260 PCs in it. The MAU uses relays to automatically bypass a node if the device is disconnected



Networking is only one option for increasing efficiency: two others are a multi-user system and improving work practices with the current system.

or another 'fault' is detected. The Token Ring uses a PC Adapter Card which is fitted to each PC in the network and provides the logical link and diagnostics for the system. (Refer to the boxed item for more detail on IBM's Token Ring LAN.)

Signal transmission

ASIDE FROM THE method of physical connection, LANs can use either baseband or broadband as means of signal transmission. In baseband transmission, the digital data is transmitted in the same form as it was generated and only a single user can access the system at any one time – there is only one base channel *band* available, so controls need to be implemented to to prevent data collisions from terminals trying to use the channel at the same time.

The Cambridge Ring and Ethernet use this method. Ethernet employs coaxial cable which allows nodes to be separated by up to several thousand meters. This cable also has the advantage of allowing very fast transmission speeds, overcoming the limitation of the single-user capability by time-slicing (multiplexing) the cable's use – users won't notice the wait for the cable unless the system is grossly overloaded. (Refer to the separate boxed item for more detail on Ethernet).

Broadband transmission avoids the data collision problem by modulating the signal into different frequencies using band-pass filters for separation into different channels – like TV broadcasts, the user (device) tunes into a particular channel without interference from the others. For large numbers of users with a variety of equipment with different transmission problems, broadband will be the method of choice. As you might expect, it's also the most expensive.

Protocols

THE THIRD FACTOR that defines a network is the access protocol used. Network protocols allow the members of the network to access the system while preventing them from corrupting the data of others. The two most widely-used protocols are token-passing and collision detection.

Token-passing simply passes a 'token' (usually a three-byte digital code) from one member of the net to the next. Whichever node has the token, controls the system while the others are blocked out. Token-passing is particularly suited for ring networks: the token is passed in turn to each node until one is found that has data to transmit; the token is changed to show the network is in use and then passed on with the data (and the address of the intended receiver) attached. Each node in the ring reads the token and passes it on, if it is not the intended receiver. When the addressee is reached, it detaches the 'message' and restores the token to show the network is not in use.

The collision detection system lets each node listen to the network and find a gap when the cable is not in use. There is no control as such – if two machines try to use the network at the same time, a collision is detected by both and they each stop trying to transmit for a random period and then try again. This scheme is generally referred to as Carrier Sense Multiple Access with Collision Detection (CSMA/CD) or Collision Avoidance

Layer 1.
The Physical Layer
comprises the physical connection between parts of the network. (The RS-232C standard is part of this layer.)

Layer 2.
The Data-link Layer
controls the flow of data between different computers on the network.

Layer 3.
The Network Layer
decides which path the data should follow across the network.

Layer 4.
The Transport Layer
ensures that data (within packets) is received in the right order when received and saves the data if the net is broken.

Layer 5.
The Session Layer
allows administration of the net and is the link between applications and the network itself.

Layer 6.
The Presentation Layer
controls screen features, terminal emulation and peripherals like printers and plotters.

Layer 7.
The Application Layer
is the home of the network operating system and application programs.

The seven-layered Open System Interconnection Model (OSI) sets the standards for data communications between equipment manufactured by a variety of vendors. Protocols for each layer are designed to handle a specific task – together, the seven layers enable data transfer across complex networks.

(CSMA/CA). This is the cheaper protocol to implement and is particularly suitable for bus networks, especially those with only a few PCs sharing a few peripherals.

OSI

IN THE EARLY '70s, the Paris-based International Standards Organisation (ISO) set a standard model for data communications between terminals and computers, and computers and computers – the seven-layered Open System Interconnection (OSI) model. Since most of the jargon associated with networking is derived from the OSI model, it's worth looking at in some detail.

At the bottom of the OSI model is the ***physical layer*** which comprises the wiring and cables, including twisted pair cables, coaxial cables and fibre-optic strands. The RS-232C standard, which defines which pin in the standard PC serial port does what and what the voltage levels on each pin mean, is part of this layer.

The second layer in the model is the ***data-link layer*** which controls the flow of data between different computers on the network. The access method of a LAN is defined by a part of this layer called Medium Access Control (MAC). It both controls the network and corrects faults – for example, MAC packages the data and sends it out over the network, and then checks that the packets have been received at the other end. These packets (blocks of data) consist of the sender's and receiver's address, error checking information and the message itself.

The Logic Link Controller (LLC) is a second part of the data-link layer; it's common to the three IEEE (Institute of Electrical and Electronic Engineers) standards that describe the cabling, electrical and physical topology and access scheme protocols for the bottom two OSI layers: 802.3 for CSMA/CD Ethernet, 802.4 for Token bus and 802.5 for IBM's Token ring; late last year IEEE standards committee 802.8 announced that a standard would be set for the use of fibre-optics on a network – refer to the separate box item.

IEEE 802.3, derived from the original Collision Sense Multiple Access (CSMA) scheme, leaves room for a variety of wiring options. So, we see 'the same but different' products with their own internal standards from 3Com (Ethernet), Xerox (Xerox's own Network Service, XNS; Novell's NetWare was developed from XNS and 3Com use it in their 3+Share software) and AT&T (StarLan).

Ethernet

ETHERNET was developed by Robert Metcalfe while at Xerox; he then went on to found 3Com, a company that now specialises in highly standardised Ethernet systems. Since then – with a lot of help from Xerox, DEC and Intel – Ethernet has almost become an industry standard for networking.

The reasons for this are simple: the system is moderately fast, quite reliable and very flexible. Plus, it can be used with a wide range of media, although it was specifically designed for coaxial cables.

Ethernet uses a Carrier Sense, Multiple Access/Collision Detection (CSMA/CD) control protocol – a first-come, first-served scheme that works well up to about 80 per cent of the theoretical capacity of the network. At that point, so many computers are trying to access the system at the same time that the whole thing bogs down while trying to decide who owns the communications path.

With the CSMA/CD protocol, a node that has a message to send, first 'listens' for any activity on the LAN; if there is none, it begins transmitting. If the LAN is busy, the node will wait while constantly listening for a break in the activity. When the break comes, the node begins to transmit – this is when most collisions occur.

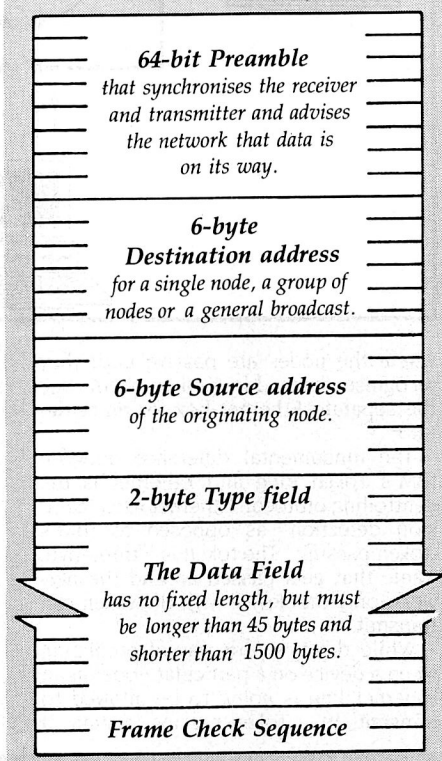
A collision results in overlapping pulses that are detected by the Ethernet controller in each node which monitors all communication on the line – and transmission is stopped. The competing nodes immediately issue an abort pattern over the LANs informing all nodes on the network that a collision has occurred and that the last stream of data was garbled. The receiving station (or stations) then dump the data received and the whole network goes into a holding pattern.

Each node then waits a random length of time before it begins to retransmit. The first node to begin retransmission has a high chance of finding the network free; once it starts sending, the whole wait cycle starts over.

The information in an Ethernet network is sent and received in packets, each of which is called a 'frame' (the makeup of a single frame is shown in the diagram).

Xerox has always seen Ethernet as an office automation network, primarily to link powerful workstations. The problem with Ethernet in a manufacturing environment is that it can be subject to interference as it passes electrical and electronic machines. It can be too slow for some assembly line processes and its contention-type protocol means that timing delays are uncontrollable and unpredictable – an Ethernet might not be able to react quick enough to a problem on the assembly line to prevent damage to the equipment.

On the plus side, Ethernet is already well-established as a workable LAN standard, accepted around the world. Also, it's cheap and easy to install and implement; and it offers a data transfer rate fast enough to satisfy most users.



***An Ethernet frame** – the use of frames (packets of data) having a limited length gives each node a chance to transmit in the gap between frames. The ability to use quite long frames means that the system doesn't lose too much time in overheads such a addressing and checking; it also means there is less chance of a collision. The **Type field** identifies the protocol used by the frame and the **Frame Check Sequence** ensures the data sent is the same as that received.*

IBM's Token Ring

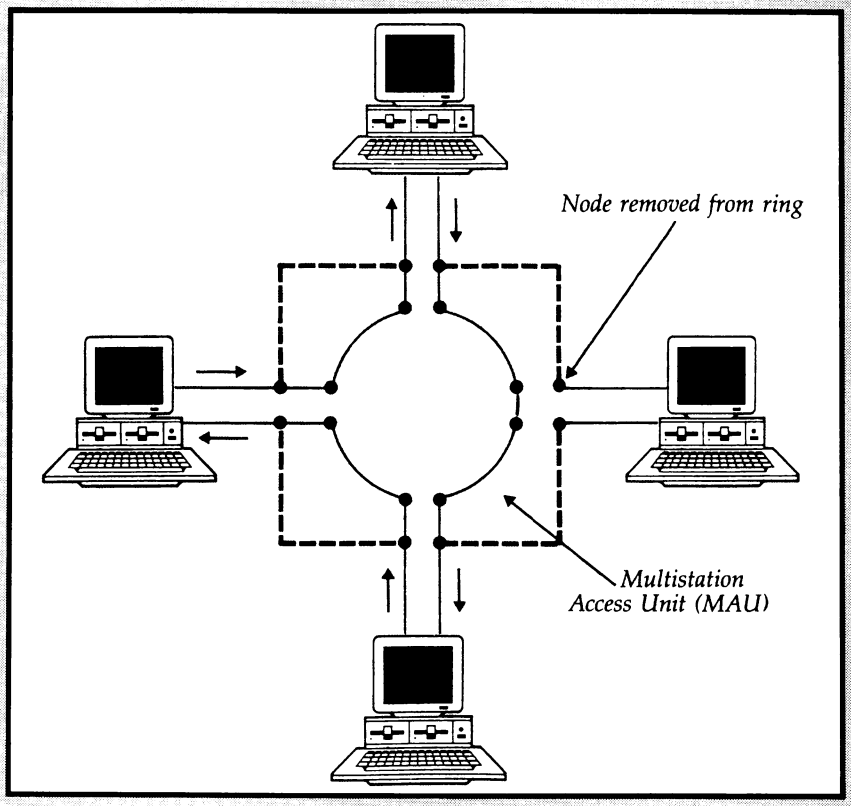
IN LATE 1985, IBM released its major LANs system, a hybrid of the star and ring topologies. Since then, the Token Ring LAN has become one of the two main contenders in the networking stakes – the other is Ethernet. IBM's star-wired ring topology has most of the advantages of both the ring and star architectures: it doesn't need a central controller like a star network and it doesn't suffer from the 'one-out, all-out' problem of simple ring wiring.

Even though the cabling radiates out from a series of central 'concentrators', the Token Ring is essentially a circle. The network passes information around the circle with each computer in the system reading the frames of information and either acting on them or passing them on to its neighbour. The cables in each node in the network radiate from the Multistation Access Unit (MAU). The specifications allow for normal twisted-pair telephone cable, but recommend special shielded twisted-pairs.

The MAU reacts to the presence or absence of a special test signal: if the signal is absent, the network isolates that node and drops it out of the network. This can occur for a variety of reasons: there may be a fault in the device, say, or it may be powered down for maintenance.

If a break occurs in the ring, the next node downstream reacts after not receiving the token by sending out a 'beacon' signal with the address of the upstream neighbour. The faulty device is then disconnected from the ring and the ring automatically reconfigures.

Each PC in a Token Ring requires a PC Adapter Card to provide the logical link control functions and diagnostics. The card can transmit and receive data at four Mbs (compared to Ethernet's ten), limited to a large degree by the fact that each node needs to read, reconstruct and retransmit every frame of data as it travels around the ring. Every node plays an active role with every piece of data in the system, unlike Ethernet systems where the nodes are passive until they recognise data addressed to them (see the separate Ethernet box for more detail).



The fundamental difference between IBM's Token Ring and Ethernet is the controlling protocol: Ethernet uses 'collision detection' as opposed to IBM's 'token passing.' The token is a three-byte frame that gets passed around the network; only the device with the token can transmit.

While there is now way of predicting when a device on a particular node on an Ethernet line is going to be allowed to transmit, in a token-passing system, a strict order of access can be enforced. And, priorities can be allocated so that particular nodes have double, triple or quadruple the chance of transmitting than others.

It could well be that this aspect of IBM's Token Ring will be the edge it needs to eventually win the networking stakes. For example, it is difficult to transmit digitised speech on an Ethernet system because there is no way of ensuring that the next few syllables are going to arrive in time to keep the flow of speech continuous – and the integration of voice and data is becoming increasingly important to LANs.

Control is maintained through a variety of protocols which set the signal level to be used by the system, define how data is to be handled, match speed in disparate ports and determine the proper sequence of data packets in a message. Common protocols in use are HDLC (High-level Data Link Control), ADCCP (Advanced Data Communications Control Procedures), and bisychronous (or BYSYNC, an IBM synchronous protocol). On PC-based networks, circuitry on adapter (or 'interface') cards performs the functions of the data-link layer.

The third layer, the ***network layer***, decides which physical path the packages of data should follow using software switches in the network itself – these switches are set according to predetermined priorities, the volume of traffic and other network conditions. In smaller networks this layer has little importance because there will generally only be one pathway between nodes. The network layer is particularly important in Wide Area Networks (WANs) – where one or more single-site LANs are joined into a single multi-site network – because there may be a number of switching nodes along the route.

The ***transport layer***, the fourth in the model, is a 'local' version of the network layer; this layer's tasks are handled by the

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Multi-user systems

ONE OF THE FIRST thoughts that comes into any manager's head when considering how to use the office's conglomeration of standalone PCs better, is cost. And cost is the single largest advantage that a multi-user operating system offers over a LAN. For example, a '386 running a multi-user operating system with dumb terminals hanging off it, will cost from two-thirds to three-quarters as much as a PC-based LAN with the same number of users. But – if you already have half a dozen PCs in the office, there might not be much difference in the hardware investment.

Support and maintenance on a multi-user system is less than on a networked one, since there is only one machine and a collection of dumb terminals in the system – and it isn't just the number of machines that adds to the cost of supporting a LAN: for a start, the cabling is much more finicky than that used with a multi-user system and it's probable that the hardware will have been supplied by a number of vendors, rather than just one or two, which further complicates support and maintenance.

While hardware for a LAN may be more expensive, those dollars buy flexibility and added security: if the computer in a multi-user system goes down, so does the system – many LAN operating systems will let any of the workstations functions as a server. This highlights a major advantage of LANs – distributed processing: on a multi-user system, especially one working close to capacity, 'power' applications can markedly slow down other applications, often to the point of frustration. A PC-based multi-user system can only have users added to the limit of the hardware (which is effectively about 25 users on an efficiently run Unix system), while there are LANs that can support an 'unlimited' number of users. Of course, a perfectly workable solution for expanding an overworked multi-user system is to add a second system and network the two.

The applications that will be run on the system are another determining factor when making the choice: if PCs are already being used in the office and the applications running on them are doing all you want, then it can be pointless and expensive to throw out the experience and skill already gained with these applications – also a lot of wasteful re-keying of data may be needed to make the changeover. So, it's necessary to find out whether multi-user or network versions exist of the database, word processor or spreadsheet you are using – and their costs (be prepared to discover some anomalies in pricing).

Ultimately, the choice comes down to which system would best suit the work load and work practices you expect to see in your office in three to five years time.

networking software and can be thought of as the quality control centre of the net. For example, it ensures that data (within packets) is in the right order when received and saves the data if the net is broken (or decides on an alternative route, if it exists). This is the layer that allows different computer systems to talk to each other: the protocol provides for the establishment of communications, the transfer of data and the release of the communications channel after.

While there are a variety of transport layer protocols, probably the most well known is the Transmission Control Protocol, developed by the US Department of Defence and marketed as TCP/IP (the IP stands for Internet Program). A number of vendors, including Banyan, Novell and 3Com offer a variety of TCP options. In the interest of 'connectivity' these same vendors also usually offer an emulation of IBM's NetBios (see below). There are a number of other protocols at this level but they are generally vendor-specific – particular care must be taken with these products to ensure that the chosen networking software matches the hardware to be used on the net.

The fifth layer, the ***session layer***, is quite important to PC-based networks – essentially, it allows administration of the net and is also the link between applications and the network itself. Examples are IBM's NetBios (Network Basic Input/Output System) which was developed to link a network operating system with specific hardware and APPC (Advanced Program to Program Communications – another IBM development), which establishes the conditions necessary for application programs to communicate with each other across the net – the PC version is APPC/PC.

Sixth is the ***presentation layer*** which controls features on the screen (graphics, reverse video and the like) and terminal emulation (so your PC-compatible thinks it's a VT-100, for example). The software also controls peripherals like printers, plotters and mass storage devices; it also may be used for encryption.

To users, the most visible layer is the seventh – the ***application layer***. It's the home of the network operating system and application programs. The software at this level handles file sharing, electronic mail, and print spooling as well as auditing functions and database management. Each software developer pretty well sets its own 'standards' for its own range of products in this layer.

Net to net

UNFORTUNATELY, IT'S not possible to add to a network *ad infinitum*. A Token Ring is limited to 255 stations per ring since every node needs to handle each frame of data and Ethernet has problems as more and more stations scream for access to the net. Generally this isn't a problem since, on average, there are less than ten devices hooked into a network.

In fact, smaller networks offer a number of advantages over larger ones. For example, the smaller the network, the easier it is to maintain security; inter-net transfers are quicker; and a malfunction in one network can't interfere with operations in another. Most businesses function essentially as a collection of work groups: accounting, personnel, inventory control, marketing, whatever – these are also logical groupings for small networks. Most of a business' data exchange will take place within these groups, but to realise the efficiencies that office-wide computerisation offers, they need to be connected together at some stage. This is made possible by one of three devices: a bridge, router or gateway.

Bridges connect independent networks, but keep local traffic local and forward only that data intended for a receiver on another network, using a 'filtering' process. In its simplest form, a bridge needs to be told which packets of data to filter since it doesn't know which addresses are local and which are not; smarter bridges – sometimes referred to as 'learning bridges' – are able to work out the location of the addressee for themselves. Bridges function on the second OSI layer, the data-link layer – since they are below the transport layer which sets the communications protocols, they are said to be 'protocol transparent'; so, whether the protocol is XNS, StarLan, TCP/IP, or the like, the bridge will bridge quite happily. They are also used to connect networks

INTO networking!

THE FIRST MULTI-STATION Canon INTO network installed in Australia was set up in April at Sydney advertising agency Lawrence Harop Vartan. Although many of the agency's departments operated standalone PCs, the principals had not seriously considered networking. Joy Sherbon, one of three partners, explained:

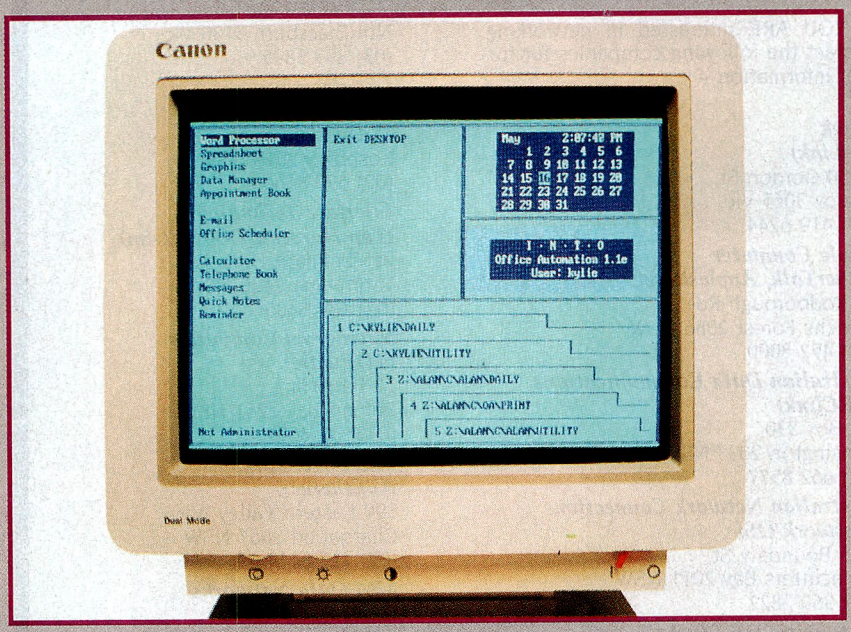
'Even though we knew networking was a must to streamline our business, we knew so little about it that it went in the too-hard basket. It seemed too complex – the jargon, the training, the expense of an MIS manager. Would an MIS manager's salary tend to cancel out productivity gains, for example? Were we too small for economical networking?'

'Most of us had little or no computer experience, and those who did, hadn't thought beyond the personal PC. And yet we basically trained ourselves from day one.'

After three months the INTO 13-node network was servicing reception, secretarial, creative, production, traffic, accounts and account service departments; and the agency decided to install another node in its affiliated arts studio, Scribbles, enabling it to use the graphics package and also to be on network to track and pursue work in progress. And – one reasonably computer-literate agency man now the role of network manager.

E-Mail, the electric mail feature, proved particularly useful from the start in a place where people are in and out all the time and where tight communication is essential. 'It's a great saving because it eliminates bits of paper and keeps a permanent record of messages until they have been dealt with,' Sherbon pointed out. 'If someone is out and you need to tell them or ask them something, you dispense with the waiting and frustration simply by mailing them. The Appointments Book and To Do list are a boon – a job not done one day is automatically transferred to the next.'

At LHV the network is a mix of Canon PC '286 and '386 nodes, with a range of hard disks from 20 to 40 megabytes. Key features of the package include – no central file server, built-in document security; each node can stand alone or work with the network; and words, data and images can be combined in a single document.



The main menu gives access to word processing, database management, electronic mail, reminders, appointments book, calculator, spreadsheet, graphics, messages, office scheduling, phone book and quick notes. Each program is interactive: information from the spreadsheet or database can be easily transferred into a word processed document.

If three people are working on one task, they can combine three different sections to make one master document. Or, using a feature called hot-linking, if one person corrects part of the document, the revised version is automatically corrected for everybody.

To date, INTO has saved the agency the cost of one secretary, says Sherbon. 'With the word processor, we can write documents straight into INTO, and then transfer to a secretary for tidying up. This saves time on original typing. And for reach beyond the agency, we have clients on database. The time savings in producing ads are enormous.

'We are also putting in budget summaries, so that expenditure can be updated as it occurs or is committed. Budget status is always known at the touch of a key. The reach extends to new business as well. We have a database of prospective new clients which can be updated at will and streamlined to the agency's development plans.'

And this is still only small potatoes. Using desktop publishing and a colour laser copier, the agency can produce layouts superior in quality to manual illustrations. And down the modem to clients they one day soon will go. In the none-too-distant future, the agency foresees ads that can be composed, typeset, artwork compiled and separations made at far lower costs than at present. In the US these can even be transferred to publications by disk or modem, depending on makeup of the ad.

The agency's experience thus far has thrown up some useful do's and don'ts, said Sherbon, which can in future save others certain installation frustrations – do, she advises, appoint one person as controller, relayer of instructions, and main contact point during installation; encourage people to think ahead and overbuy. The agency has extended the network twice and is about to do it again. And – although it's easy to teach yourself, it is advisable to have lessons first to avoid hiccups and confusion.

employing different media: fibre optics and co-axial cables, for example. The most efficient way to put performance back into a large, strangling Ethernet network is to subdivide into small networks using bridges.

Routers are used in networks where there is more than one path for the data to follow as it moves from one address to another. They are designed to send packets of data along the most efficient path and to optimise the load on the various paths.

Interested?

IF YOU ARE interested in networking, contact the following companies for further information –

Actek
(D-Link)
6/250 Gordon St,
Fitzroy 3065 Vic.
(03) 419 6244

Apple Computer
(EtherTalk, Appleshare)
16 Rodborough Rd,
Frenchs Forest 2086 NSW
(02) 452 8000

Australian Data Communications
(ARClink)
PO Box 330,
Kensington 2033 NSW
(02) 662 8577

Australian Network Connections
(Network OS)
3/15 Boundary St,
Rushcutters Bay 2011 NSW
(02) 360 2822

Datamatic DP Pty Ltd
(Pronet-10)
16 Suakin St,
Pymble 2073 NSW
(02) 488 8066

Digital Solutions
(LANtastic)
95 Landsborough Ave,
Scarborough 4020 Qld.
(07) 203 4880

Hewlett-Packard
(StarLAN)
31 Joseph St,
Nth Blackburn 3130 Vic.
(03) 895 3895

Imagineering
(3Com)
77 Dunning Ave,
Rosebery 2018 NSW
(02) 697 8666

Interface Technology
(Top Harvest, POWERrim)
265 Pennant Hills Rd,
Thornleigh 2120 NSW
(02) 484 8400

Microgram Computers
(TOPware)
17 Barry St,
Bateau Bay 2261 NSW
(043) 32 8651

Micro Networks
(G/Ethernet)
390 Eastern Valley Way,
Chatswood 2067 NSW
(02) 417 8444

MM Data Networks
(Isolan)
4 Bridge St,
Pymble 2073 NSW
(02) 488 8799

Remington
(Acer Ethernet)
15 Iron Rd,
Lane Cove 2066 NSW
(02) 418 6011

Unisys
(Ethernet, Omninet)
30 Alfred St,
Milsons Pt 2061 NSW
(02) 963 6000

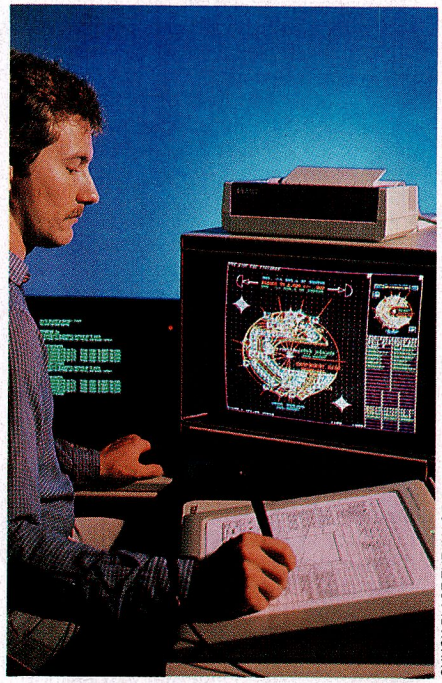
Since they need an actual address to work with, they function on the network layer. In large, divided networks using a number of bridges, there can be multiple paths to a destination; this often results in data looping endlessly and being duplicated, with the result of decreased performance (at least). While the smartest bridges can detect loops and open them up, the surest (and most economical) solution is to use routers.

Gateways are used to connect LANs and mainframes. They are often described as translators: an incoming packet of data is disassembled and then 'translated' into packets that can be read by the destination system. Because of the complexity of their task, most gateways are dedicated PCs and often use all seven layers of the OSI model.

Network software

THE MOST CRITICAL decision to be made in setting up a network is the choice of an Operating System (OS) for the LAN. The decision is critical, because once implemented, it can be expensive and time-consuming to change – imagine the bother of having to set a single PC up with a new operating system, then multiply that by the number of stations on the network and add in network installation, configuration and customisation bother – it's better to make the right decision the first time.

The decision should not only be based on what the network will be asked to do as soon as it is set up, but what it is likely to be asked to do in several years. Considerations such as whether or not an electronic mail system is necessary might seem ludicrous with only four users in a single office, but five years down the track, with twenty users on three sites, the question is not nearly so silly – and having to change the LAN OS to implement a mail system can make it more expensive than using Australia Post. Another example: remote access – the ability of a user 'remote' from the LAN to access it and (most of) its features over a modem mightn't seem important today, but work practices are changing – for example, more and more companies have come to realise that keeping sales executives on the road and out of the office maximises sales; and the most efficient way for those on the road to work, is with a portable PC. If that portable can't access the network . . . what a waste.



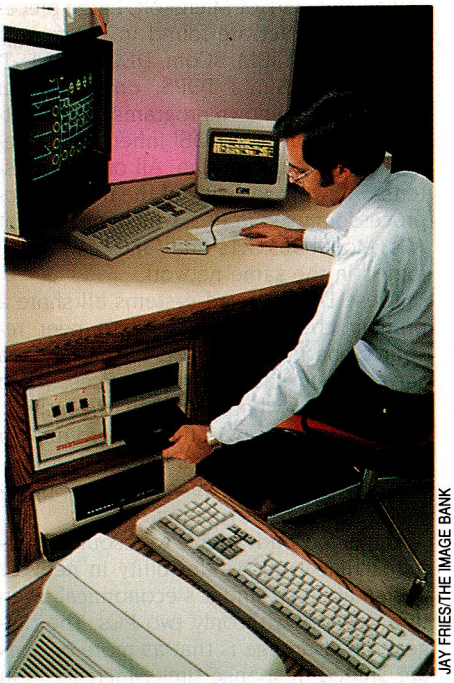
CHUCK PLACE/THE IMAGE BANK

The most critical decision to be made in setting up a network is the choice of operating system – once implemented, it can be very time-consuming to change it.

Another: allowing only certain staff members access to certain files might not seem a very important consideration today – but, like back-ups that are never done until it's too late, most users only think of data security when it's too late.

This isn't the time for a full discussion on networks and security – but security is one consideration that must be borne in mind from the first day of planning. Not just the three-level password type of se-

curity or maintaining data integrity, but physical security of the system and the data entrusted to it. This starts with ensuring the network cables are securely attached and out of the way of an errant foot, and might include the 'bolting down' of machines in high-traffic areas. It certainly includes physical security of your data – imagine the worst: your office's entire PC network has been stolen (or lost in a fire, whatever). Replacing the machines, the network and software is easily done with a bit of cash – but what about the records, database files and spreadsheets that have taken years to build up?



JAY FRIES/THE IMAGE BANK

Much of the efficiency found in a networked office arises from the ability to share expensive peripherals without interrupting the work of others on the net.

As you can see, the decision on which operating system isn't merely one of price. Another factor to take into consideration is the support that the system needs – widely used systems are the easiest to find trained staff for. Still another factor is the amount of RAM the OS will need (it may be necessary to upgrade machines so they can be used on the net) – typically, the OS will use between 30 and 90K of RAM on each machine functioning as a workstation and anything from 90 to 640K on the server. If you are running OS/2, these numbers can blow out to several

Workstations

WORKSTATIONS FOR use in PC networks can be classified into three distinct groups, according to the type of disk storage they have. Diskless workstations, as their name implies, have no local disk storage at all. This results in a physically compact system, which is often housed within the keyboard enclosure.

Such machines are usually based around an 8088 processor, with 640K RAM, serial and parallel ports, and Hercules-compatible monochrome video. A special BIOS allows the workstation to be booted from a drive on the file server, rather than the non-existent local floppy or hard drive. The only required connections are to an external video monitor, and of course the network cable itself. The serial and parallel ports allow a local printer to be connected, and also a mouse or modem, if desired.

The use of diskless workstations also offers the potential for quite good system security, as the system administrator has absolute control over the only floppy drives on the system – those on the file server. This prevents users from removing copies of delicate data or software from drives on the network, and also prevents the installation of unnecessary (and possibly virus-ridden) software by users of the system.

Of course, for diskless workstations to work at all, a dedicated file server is required, from which the workstations are initially booted, and which also provides centralised mass storage and print spooling facilities for the entire network. For this reason, both the CPU clock speed and the speed of the hard disk in the file server need to be as high as possible, so that the demands of handling file I/O operations for several users at once do not cause too noticeable a delay for each user. Of course, if the file server goes down for any reason, the entire network dies with it.

A network composed wholly of diskless workstations is the closest that a network comes to the more traditional multi-user system, with all disk storage centralised at the file server. However, unlike a multi-user system which has a single CPU for all users, a network gives each user his or her own processor and memory, so that software can be run without having to share CPU speed or memory.

Ordinary floppy-based machines can also be used as network workstations One disadvantage of this set-up is that a DOS boot disk is needed to boot the each system up, as the workstations have usually been designed as stand alone systems with little thought for networking. With such a set-up, it can be easy for users to copy data from the file server onto floppies, and also to run software not on the file server's hard disk. This may be an advantage or a disadvantage, depending upon individual circumstances and security requirements.

One obvious advantage of such a set-up is the availability of card slots in each node, which are usually absent in diskless workstations. The presence of these still allow a degree of flexibility in adding extra peripherals to individual nodes, such as fax cards, internal modems or whatever.

Of course, there is nothing stopping you using a hard disk equipped computer as a node on a network. This is often desirable if there is sensitive data which you don't want to keep on the file-server's hard disk, and thus be visible to the system administrator and possibly others (perhaps due to a minor lapse in security). Another reason that a hard disk may be advantageous in a workstation is if that particular computer is to be used for a particularly disk-intensive activity, such as CAD or desktop publishing, yet still needs access to file or print-sharing facilities, such as those offered by a network. Operation of such a disk-intensive application would tend to be greatly slowed down by the network.

If a network is going to consist entirely of hard disk based machines, then a central file-server may not be necessary, and can be dispensed with altogether with certain network software. Such a situation could arise, for example, if the users on the network work largely independently, and only need to share a printer or transfer files occasionally.

Individual users can then determine for themselves which printers and areas of their hard disk (if any) are accessible to other users on the network. Because a dedicated file-server is not required in such circumstances, the failure of one machine does not usually disrupt the rest of the network, although the resources on the crashed computer are of course no longer accessible. It is still possible at any time to use each computer as an independent entity, without the benefits of the network, so that if a single user wants to work, say, during a weekend, it is not necessary to boot any computers other than the one which needs to be used.

The final choice of which type of workstations are to be used depends upon the priorities for security and versatility within the network, and each particular network situation is likely to have slightly different requirements than the next.



A network can be defined in terms of its topology, the access protocol it uses, its method of signal transmission and whether it's DOS or multi-user system-based. More important in the planning stage, though, is defining network needs in terms of the office's work practices.

megabytes of RAM for the server. RAM is one of the costs of flexibility in a system: those OSs that use the least RAM, are those that allow a single machine to only act as a workstation or only as a server, while those that use more, generally allow a machine to be used as either, or even both. Don't forget that drivers for adapter cards and network function menus also use RAM.

Network operating systems can be divided into two very general categories: those derived from MS-DOS and those that originally were designed for minicomputer systems. As you might expect, most DOS-derived networking systems are largely the work of Microsoft. Large pieces of their MS-Net are found in networking software from IBM, 3Com, DEC and AT&T. 10NET and Sun's TOPS, on the other hand, have their own programs to add networking features to DOS' inherent 'single-user, single task' design. All of these systems will work with any of the Intel microprocessors used in PCs, which means that ATs, Model 30s, XTs and '386s can all be joined in the same network.

These DOS-derived systems all share a primary characteristic: peer to peer resource sharing – each PC in the net is a server which shares its 'resources' (hard disk, printer, whatever) with the others. And this sharing is in the background – a PC can access another's hard disk, for example with no interference to any applications that may be running.

The biggest advantage to resource sharing is that it allows flexibility in network design and use, and it's economical, even in a network with only two PCs. The biggest disadvantage is that as more devices are shared, response times increase – in itself, this can stifle the growth of the network. Another disadvantage to each PC's having an equal share in each resource, is that it can complicate administration and management.

The two most well-known OSs based on minicomputer operating systems like Unix are Banyan's Vines and Novell's NetWare. Because minis were designed as multi-user, multitasking systems, these features needn't be 'patched' on or added through modules although the need to emulate DOS and associated elements like NetBios is still there. Standard features usually include electronic mail, support for remote workstations, network bridging and print spooling. If these aren't included in the basic package, they are most-often available as inexpensive add-ons from the original vendor.

Typically these systems offer faster per-

formance than DOS-based ones because software in the server itself handles simultaneous requests for data, and runs multiple applications. Another difference between the two is that these Unix-based systems don't generally offer direct resource sharing between PCs – all printing and network data must be via the server, which is usually dedicated to these tasks.

Network features

AS WE SAW above, a network can be defined in terms of its topology, the access protocol it uses and its method of signal transmission; and it can have its roots in either DOS or Unix. All of these offer their own advantages (and disadvantages) when choosing a network. But even more important to users and managers are the particular features of each networking system. If you're considering a network, the following should bear heavily on your choice –

Network administration will be the secret of a transparent, trouble-free network. What tools does the network operating system offer to manage the network? Is there a reporting system for network statistics? Are diagnostic utilities for configuring the server included? Is there a reporting method for bad packets and network errors? Is there a facility for assigning users priority access to resources?

Security features should offer multi-level privileges for access to disk drives, directories and files – for example, there should be the facility to allow (or not allow) specific users to read, create, modify or erase files. This is usually done through a system of passwords – which is also generally used for the most basic network security: authorising access to the system.

Fault tolerant systems duplicate a critical disk drive or application on a second drive or server – if the first fails, the second carriers on. There are also schemes that log critical transactions to a tape drive; in the event of system failure, the log can be used to reconstruct the data.

Dedicated servers will offer faster performance, but whether or not one is necessary depends entirely on how the LAN is used. And, in a small network, the cost of a dedicated sever can be a significant part of the total cost of the system. Server-based applications can be a more efficient method of handling disk intensive tasks (like indexing a database), than leaving it to each workstation where the application is being run.

RAM usage was discussed above – note that a number of systems offer blocks of memory on optional cards to cover the required workstation RAM.

Disk caching can improve network and application performance by storing frequently requested data in RAM.

Print spooling means that PCs in the network won't be waiting for the printer – the job is saved and queued in a spool (buffer). There should be the ability to change the order of spooled jobs and to 'kill' them.

Electronic mail systems should store and forward messages to a single user, a mailing list or to all users. They should also be able to advise a user that there is mail waiting to be read or that a message has not been received.

Take your time deciding whether or not a network is the solution for your particular problem. If you decide it is, then take your time choosing a system – check the offerings from a number of vendors with different networking systems, talk to someone who has had experience with the network you are considering (not just the vendor) and others who have 'networked' – it's a decision the office will need to work with for quite some time, so careful planning, right from the beginning is imperative. □

Fibre-optics in networks

USING FIBRE-OPTIC cabling in networks offers three advantages over conventional twisted-pair or coaxial cable: speed, security and resistance to a harsh environment.

While ten Mbs on an Ethernet, or even four on a Token Ring, is fast enough for data transfers that the time taken wouldn't be noticed by most users. But – increasingly there are applications where these transfers rates are too slow. Fibre-optic cabling allows transfers on the order of 100Mbs – a fact that is being put to good use in graphics and animation.

However, security is the primary reason that we have seen the recent developments in the use of fibre-optics in networks. Governments and the military have always insisted on the highest levels of security in computer networks and fibre-optics offers it. A fibre-optics cable doesn't radiate any form of electro-magnetic energy so 'tapping' into such a cable requires a physical connection – and, it's almost impossible to tap an optic cable with out an easily detectable interruption to communications.

And, fibre-optic cabling is resistant (and largely impervious) to electro-magnetic radiation, so it can be used on, say, a factory floor, in hazardous (potentially explosive) areas or outside with greater confidence (and generally much less shielding than would be needed with more conventional cabling). Another advantage is that the large bandwidth available with fibre-optics means that the same cable can carry voice, data and video at the same time – this will become more and more important as PCs and personal communications become more integrated.

With these advantages, why isn't everyone using fibre optics? The reason is two-fold: cost and a lack standards.

Fibre-optics have traditionally been much more expensive to install. Until recently, it cost much more to connect two sites with fibre than it was with copper; now they are about the same, although for very short runs copper cable still has a slight advantage. However, the optical-electrical interface cards/adapters needed with fibre are still more expensive – but the gap is narrowing fast.

The second reason certainly contributed to the first – until there was a standard to follow, few vendors were willing to commit themselves to the technology – this led to isolated and independent development which results in (comparatively) expensive solutions. The good news is that late last year the IEEE Fibre Optic Technical Advisory Group, 802.8, confirmed its support for the Fibre Optic Inter-Repeater Link (FOIRL) it had approved as a working standard in 1987.

This working standard specified a point-to-point Ethernet that could be used to link coaxial segments of a network together, it did nothing in the direction of total fibre-optic networking. This was because the Group was presented with two quite different approaches: both proposed a star topology for the 'standard' fibre-optic net, but differed in how the incoming signal was to be split for sending to the receiving station. The 'passive' approach favoured having the incoming signal split in a passive 'light splitter,' while the 'active' approach favoured splitting the signal with electronics. While there are still problems with collision detection when the passive approach is used, the Group expects to ratify the new standard incorporating both approaches by mid-1990.



MAKING CONTACTS

Here is an Australian package, designed to increase the productivity of anyone managing a complex 'contacts' list. Ewart Stronach's been in touch. . .

A FEW MONTHS AGO I reviewed a database program written to utilise a locally produced product called a dealer – it connected to a PC and automatically dialed a number displayed from the database of business contacts. At the time I thought that it was overkill to use a PC for something as trivial as dialing a telephone. But the new software suite – Contact Plus – which now backs the product turns it into a powerful productivity tool with the ability to track and manage the most complex customer lists.

The software consists of two main modules, the database and a word processor, each with its own 'bells and whistles.' Let's look at them in turn. The database is people orientated. After automatic installation on your hard disk from the four 5¼s or two 3½ inch disks provided, it displays a sign on screen which offers a cheery welcome. This screen can be edited to display your own reminder messages automatically at the beginning and end of each session.A single keystroke sends you straight to the main database. The current time and date are displayed (and constantly updated) with the main selection menu. The options are pretty standard database choices of Search, Maintenance, Editor, Utilities and Quit.

As the options are displayed, its use is described on the bottom line; for example, with Maintenance selected you are offered the opportunity to 'Update and Transport Data Base'; the Editor option calls the word processor. A Utilities selection allows you to configure the system and no prizes for guessing what happens if you select Quit.

To make any database active you must feed it data, although Contacts Plus has already been fed with a complete list of Australian Post Codes. I used a club mailing list to try the beast out and jumped straight into the maintenance section to build my first file.

By selecting Maintenance I was rewarded with a further pull down menu of Add, Fast Add, Undelete, Import, Re-Index and Change. My first task was simply to add names. The Add Record screen offers a normal Name, Title, Position, Division, Company name and so on. A feature of data entry at this point is the Auto Case switch which automatically enters capital letters in appropriate places such as names and addresses.

Pleasant surprise

THE NEXT pleasant surprise is the automatic display of possible postcodes after the suburb entry. In the case of Ashfield, I was offered the choice of 2131 for Ashfield NSW and 6054 for Ashfield WA. A single keystroke transports the code into the appropriate field and the cursor moves onto the next entry. Then more goodies: having first entered the postal address, the next fields are for street address and, as is most common, the two are the same, the information is automatically entered for you at each keystroke, requiring editing only if it differs.

The next entries called for are the Contact Dates and when selected offer a Date Calculator for your convenience. You are offered a form of shorthand date input with plus and minus signs, followed by a letter, D for day, W for week, M for month, Y for year and T for today. Thus, to enter a next contact call for two weeks hence you need only to type +2W and the date will be calculated and entered for you. The final fields are for Category and Classification. These are almost free-form and can be searched in a variety of ways which I shall discuss later.

On then to the most tedious job – feeding the brute data, made much more simple by the automatic functions listed above. There is a Fast Add function which speeds the process up even further by not writing to the disk after each entry, but has the drawback of risking loss of data if disrupted during use. My first application of a simple club list required no contact dates, but has both address types, postal and street, both phone numbers, and I used the club name for the category entry. The classification area allowed me to enter up to 44 characters and on this occasion I entered specific interests of the members. In very short order (considering my typing abilities) I had about 100 entries filed and was ready to try out the database.

First the Search function. By placing the highlight over the search selection on the menu and pressing return, I was shown a further pull down menu offering Person, Company, Number, Date or Reports. I selected Person and was prompted for the first name. I entered a blank and was prompted for a Surname. On entering a name a very rapid search took place and a full-width pull-down screen descended

from the top and displayed a single line entry which matched my search criteria. The phone number was displayed under the heading Phone (B) and was blank. Pressing F5 key changed the display to Phone (H) and the home phone number was displayed. At this stage, if the dealer or a modem were connected, simply pressing enter would dial the displayed number! Escape moves you back through the menus.

Reports offers the ability to search for a particular string of characters in any of the available fields. The choices are to search All Fields, Note Pad (more of which later), Selectable Field, Last Search, Duplicates or Print. Choosing Selectable offered me a list of the fields and highlighting the entry for postcodes, I was then offered the search criteria selection of = (equal to), <= (less than or equal to), < (less than), <> (greater than), <>= (greater than or equal to), or <> (not equal to). This allowed me to list any range of postcodes and would have particular application in the real world where a company representative needed to select all clients from the database in a certain area.

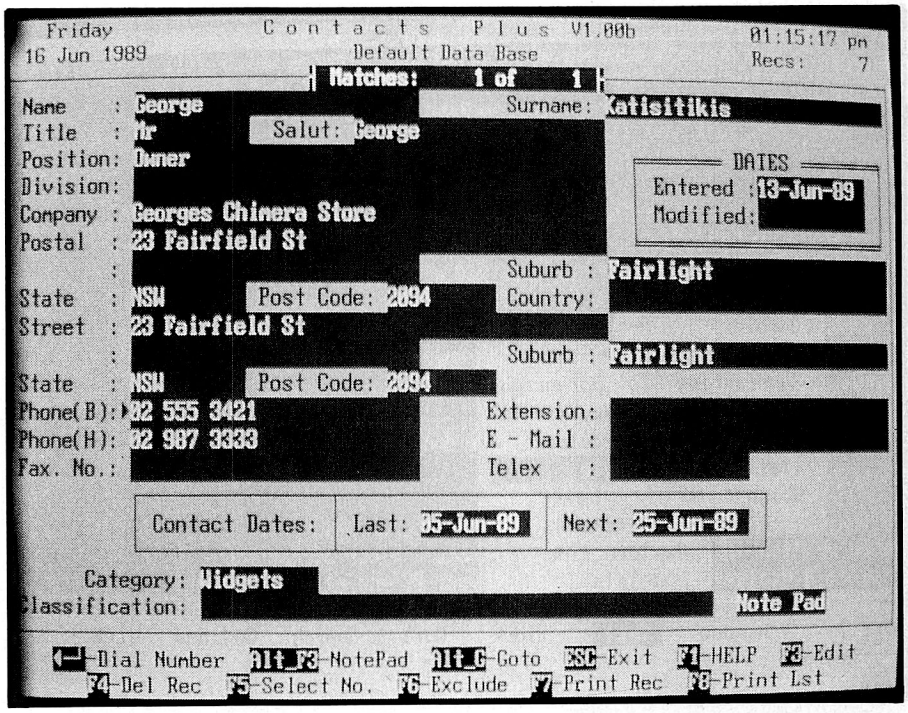
The search may be further narrowed down by the use of logical operands which allow you to search for numbers equal to or greater than, say, 2000 and numbers equal to or less than 2040, thus listing only the postcodes in that sequence. This logical request can be carried across fields, with the ability to search for very narrow criteria such as any entry within defined postcode areas who need to be contacted within a certain time structure or who, say, have the title of general manager.

It was at this point I discovered that the selection could be made with a mouse, but unfortunately I still had to go back to the keyboard for an Enter command. This shortcoming deserves addressing as the whole thing could be mouse-driven to advantage.

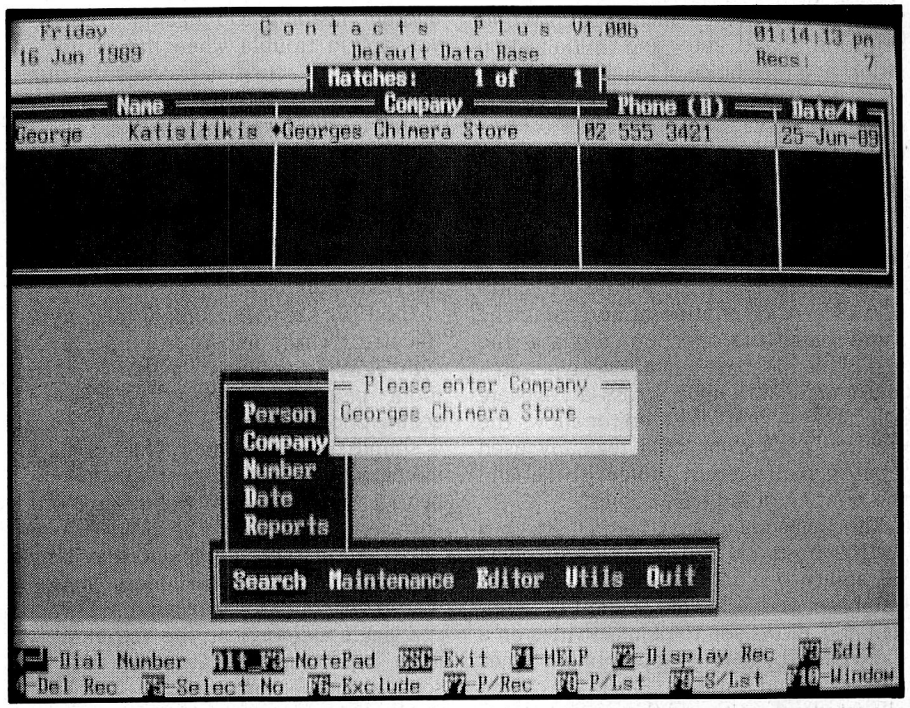
What else does it do?

SO, NOW WE have a very versatile database with the ability to automatically dial a selected number. What else does it do? Incidentally, I might add that up until this point I had not needed to refer to the excellent documentation provided, as every menu was clear and precise. I moved the highlight bar across to Utilities and was offered the following choices: Config, View Log, Labels, Postcode, Schedule, Reminder and Do Calc.

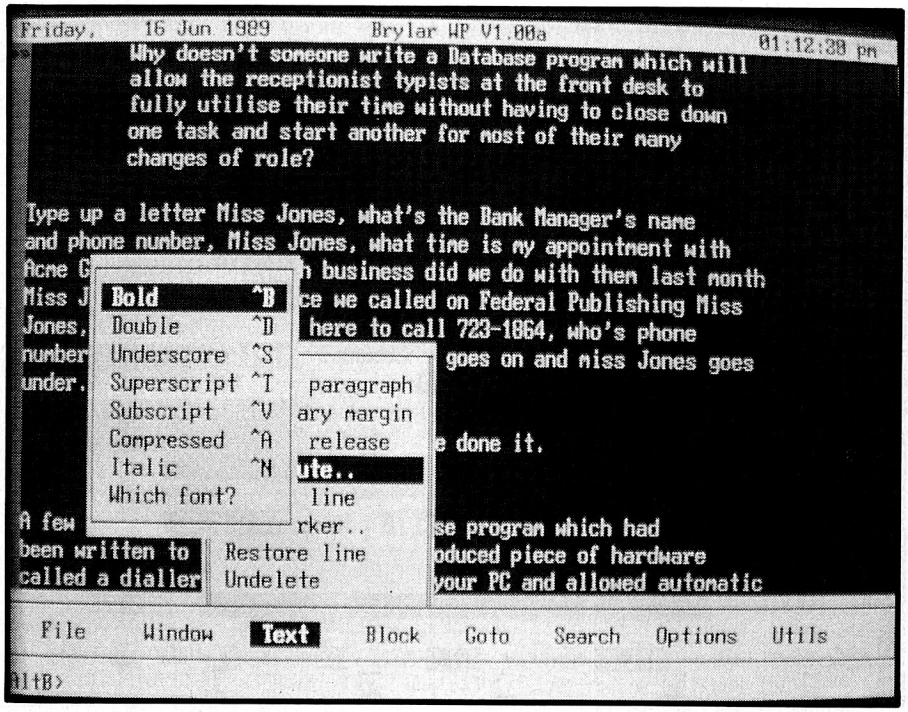
The Config option allows setting-up di-



Data entry has been streamlined in Contacts Plus – for example, after the suburb is entered, a list of relevant postcodes is displayed and the appropriate one is entered into the database by placing the highlight bar over it and pressing Enter; Contact Dates are also calculated automatically.



The database can be searched on a variety of criteria – when a match is found a single line entry is displayed; the full record can also be viewed by pressing F2.



The word processor will be familiar to users of Borland's Sprint or WordStar – a spelling checker can be added with Turbo Lightening, giving enough features to suit most sales offices.

rectory paths, describes the set-up for your dealer or modem including COM port selection, baud rate and initialisation string, and the choice of logging all outgoing calls. The printer can be described, error beeps switched and screen colours chosen. The View Log displays a list of every outward phone call with time, date, name and phone number of the person called. This may be printed or deleted and the logging function turned on or off.

The Labels option allows the configuration of a label printing utility, using the same search and selection criteria as the rest of the database. Label size, type pitch and number of labels across a page are selectable. A simple text editor allows the creation and saving of a regularly used label such as a return address sticker and the printing of multiple copies.

The Postcode option merely searches for the postcode you require and offers the ability to update the existing postcode database. The Schedule section is excellent and allows you to plan activities on a daily basis by setting appointment times and estimated duration. Each task can be allocated a priority and the current status of the task allocated under the descriptions of To Do, Started, Forwarded, Done or Canceled. (In my case, there should be another heading: Do Again.) You know you are in trouble when the estimated time for your activities exceeds the number of hours in the day. Updating of this scheduler displays the percentage of your daily target achieved and gives due warning of a pending conflict of time and appointments. A full on-screen calendar is available as a pop-up to assist in forward planning and a pop-up calculator is always on line.

The Utility function simply calls up the calculator which displays a simple layout with normal abilities including square roots, percentages, gross margins and selling prices. The gross margin calculator is simple to use – in the calculator mode, merely press G and an overlay screen appears prompting for entry of the cost price and description. There are four displays for a required percentage and the margin and calculated reselling prices are displayed side by side for comparison. There is a single memory and the output shows as a tape-style display which can be scrolled through or printed.

Altogether a pretty impressive piece of software with a very real application in any business dealing with people, customers, mailing lists and so on. But that's not all – Behind all this runs very good word processor. It's not Wordstar 5, but it's designed specifically for a normal office application with emphasis on repetitive letter writing with access to all the search criteria available from the main program. Selecting Editor from the main menu offers you the choice of Word Processing, Letters or Sheet Files.

Word processor

FIRST, THE word processor. The layout is similar to Borland's word processor, Sprint, and much of the structure would be familiar to users of that software. The screen opens with a directory displayed and a pull-down menu of normal file functions. The bottom line menu bar offers File, Windows, Text, Block, Goto, Search, Options and Utilities. A keystroke on the Newfile highlight prompts for a filename and path which when entered clears the screen with the cursor at the top left corner. A menu bar appears along the bottom with the Function keys described for quick commands. Now is not the time for a complete review of a word processor, suffice it to say that it is excellent. Fully functional and with complete spelling checking available using the optional package of Turbo Lightning (also available from Brylar), this word processor would handle the requirements of most offices.

Until this point I had not needed to refer to the excellent documentation provided, as every menu was clear and precise.

The features that make this part of the package shine are its integration with the database for easy production of single or form letters, picking up the required information automatically from your customer lists. The heading Letters from the editing menu options also invokes the full word processor, but heads up your potential letter for you with blanks for the name, position, postal address and salutation already entered. Data bounded by << >> are requests to the software to collect that information from the selected entries in the database. Once the main form is loaded, pressing Alt-M at any point during

your typing will display all the possible fields in the database and enter the appropriate call to the data. Thus your original letter might read 'Dear << Firstname>>, with the <<Firstname>> automatically entered on the screen and then sourced from the database at printing time.

An additional feature is the ability to design and store Sheet Files. These are line drawn forms which could be a delivery sheet or invoice type layout and may be appended to a letter to produce a document followed by a tear off order form. Printing is automatically designated a background task and will continue happily while you prepare new documents.

I've covered the main functions of the software, but each time I use it I find more little features tucked away. The program would be up and running in an office environment within a day of its installation. There are massive amounts of on-line help available with clear directions offered on the screen or function in use. The manual is almost superfluous. As your needs and confidence grow, other features may be explored. Up to six files can be loaded into the word processor and each file accessed and displayed with a zoom function. Text can be easily transferred between files at the touch of a key.

Print commands can be entered in a text file using 'dot' Commands. This means that any new line starting with a dot (.) is treated as a command and not printed. For instance, a file starting with the command .PG would turn on the page numbering and .PA would force a new page, displaying the page break information on the screen. Cursor movement can be controlled with WordStar type keystrokes rather than the arrows with Ctrl-Y deleting a line and Ctrl-B formatting a paragraph and so on.

Little features such as the ability to store up to 50 often used and complex search criteria for instant replay make the program a joy to use. Imagine having to type in a search request such as 'Every record whose postcode is greater than and equal to 2000 and less than 3000 and position is equal to Managing Director and Category is equal to Export or Classification is equal to Exporter.' This would not be an unusual use for a program as powerful as Contacts Plus and can be recalled with a keystroke. Automatic searching for duplicated data is available to check that an imported database does not overlap anything already in use, causing more than one form letter to be sent to the same person.

I consider Contacts Plus to be an excellent example of the ability of local software writers to compete with the best in the world, and when it's marketed at a reasonable price, it deserves to succeed both locally and in the export market. □

Product Details

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DEALER INQUIRIES WELCOME

BACK TO THE FUTURE

Celebrating its 50th anniversary this year, Hewlett-Packard becomes one the industries rare Golden Oldies. We asked Lauraine Sayers to tell us more of this company that's not too old to learn. . .

AT A TIME WHEN leading research organisations have reported that the annual growth of personal computer sales has slowed down to just 15 per cent, one company has consistently doubled that part of its business for the past four years. In fact, PC products could account for up to 50 per cent of that same company's financial results this year. That's not bad going for an organisation whose own staff, just five years ago, irreverently referred to their personal computer division as the 'Kiddy Calc' division.

The company is Hewlett-Packard Australia Pty Ltd. In an industry where a mere three years can see a 50 per cent turnover in players, HP celebrates its 50th anniversary worldwide this year. Like most 50-year-olds, the company freely admits it could write a book on the mistakes it has made, but in the simple act of aging, it has also achieved an enviable position of experience.

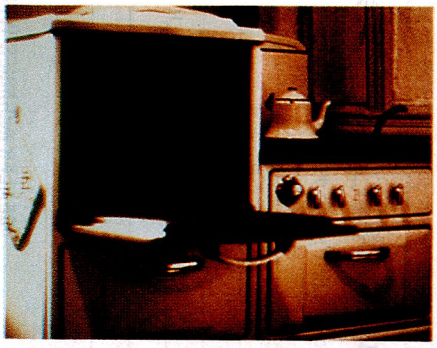
Enter the PC

ROBERT MILES, PC marketing manager, claims HP was the first company in the world to release a personal computer – ten years ago, the company brought out its first desktop computer, the Series 80. Not surprisingly, since HP was traditionally a test-and-measure instrument company, the computer was aimed at the engineering market. At the time, the Series 80 proved to be very popular. It was priced from $5000, had an optional 16 or 32K of RAM, 160K of ROM and the entire operating system was built into plug-in modules. (Incidentally, HP's proprietary Basic instrument language used then, is still one of the most sophisticated around today.)

The same performance can now be obtained in a HP handheld 'computer' priced from around $170. '

HP got into PCs for two reasons,' said Miles. 'It was a natural extension from the calculation business, and the instrumentation the company was manufacturing at the time became so sophisticated, it required computers to control it.'

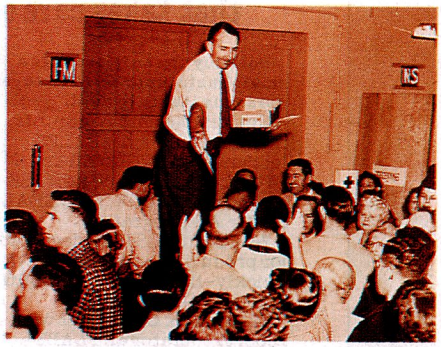
Shortly after the introduction of the Series 80, an HP engineer designed a low-cost unit for the home market in the US, but the company did not have the distribution network set up to handle it – so the engineer, named Steve Wozniac, sold his HP calculator and his HP colleague Steve Jobs sold his VW, and together they raised the working capital to form a new company called Apple Computer.



***The meatloaf never tasted the same** – after Dave Packard used his wife's oven to bake the paint onto the first production run of Hewlett-Packard audio oscillator panels.*



***The first HP computer** – went into operation in 1966: the HP2116A was designed as a controller for HP test and measurement equipment.*



***Sharing the profits** – is an HP tradition that dates from the 1940s when Bill Hewlett, Dave Packard (pictured) and other managers personally handed out the cheques.*



***Softball, basketball and horseshoes** – are an HP tradition dating back almost to the company's founding.*

Enter IBM

THE NEXT MAJOR impact on the industry was IBM's announcement that it had entered the market. 'While HP was aimed squarely at the engineers, IBM targeted the commercial market,' Miles noted. 'HP's first foray into the commercial market was when it took one of its terminals, and added a PC, to produce the world's first intelligent terminal.'

It was unfortunate that the terminal ran CP/M, however, it later shamelessly migrated to MS-DOS after that became the more acceptable standard. 'To differentiate the product, and in an effort to specifically address the corporate customer, who at the time was still predominantly scared of computers, HP introduced the Touchscreen.' This was 1983, and the first non-keyboard interface to a PC fell flat on its face, although it has since gained wider acceptance in today's more imaginative market.

These terminals now have 90 per cent fewer parts and take 95 per cent less time to build.

HP was full of such ideas: most of them fell short of, or overshot, their window of opportunity. One other such example was the 3½ inch diskette, which HP first released with its CP/M machine in a joint venture with Sony. Once again the company had to wait patiently in the sidelines until IBM legitimised the idea with the release of its PS/2.

It was the same with the first true full-function (battery operated) portable which was released in 1984 and *Your Computer's* PC of the Year award. It is only now, five years later, that portability is finding its niche markets in the insurance, sales and auditing areas.

The valuable lesson learned was that not only did a product have to be software compatible with the current industry standards, it also had to be hardware compatible. Further to that realisation, came the disheartening awareness that compatibility is a moving target.

Miles said, 'During this time, HP's peripheral innovations continued with the release of its inkjet and laser technolo-



***Ahead of the time** – is almost an HP trademark: the HP-01 calculator watch, invented in 1977, is a classic example; other HP products that had to wait for the market (and acceptance) to catch up were the first PC (1979), the first intelligent terminal (1982), 3½ inch diskettes (1982), the first non-keyboard interface (1983), and the first battery-operated portable (1984).*

Evolution . . . not revolution

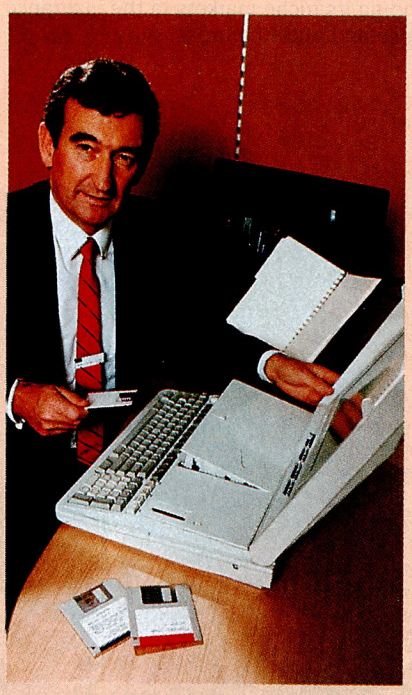
WHILE THERE HAVE been milestones in the past five years of PC development, trends have been in the form of a continuing evolution, rather than a series of major revolutions, according to Malcolm Kerr, managing director of Hewlett-Packard Australia Pty Ltd.

'The past five years have marked a hard-won legitimising of the PC in the computer marketplace,' he said. '1984 was still a time where the PC side of our business was known internally as the 'Kiddy Calc Group,' a soft product area much removed from the minicomputer, test and measurements, medical and analytical equipment mainstays of our company. Emerging from these humble beginnings, to form over 40 per cent of our company's computer business this year, is a startling indication of the extend of the revolution the PC has made on computer vendors and users in a short space of time.

'Our early involvement in general purpose PCs five years ago taught HP the lesson that the philosophy of building a better mousetrap does not automatically apply. HP released the first intelligent terminal/PC in the world, introduced 3½ inch diskettes, the first non- keyboard PC interface (the Touchscreen), and the world's first full-function laptop computer, and the critics raved.

'The reason that HP has largely been forgotten for these achievements, and that they are only just starting to take off elsewhere in the industry, brought home to our company that there is more to marketing than better engineering and new innovations. We kept missing the window of opportunity, trying to create new industry standards simply on the belief we have built a better product. We realised that compatibility is a moving target and we had to be a driving force in the setting of industry standards to achieve the market share our quality products deserved.

'We began with a long-term strategy of focus factory technology – pouring massive investments into manufacturing automation, total quality control, building smarter with fewer parts and streamlined production. While this strategy has taken years to come off, we are now in a stronger position than our competitors who are like a dog chasing its tail, searching for ever- decreasing sources of cheap, third world labour to keep prices down.



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'In the present, the word we must get across is that HP no longer means high price. While engineers still get a gleam in their eyes when they take the back off our PCs, the marketplace is just starting to realise that we are less expensive than all of our major competitors including IBM, Compaq or NEC. For example, our new 386-based RS/25C PC is $3000 cheaper than the closest Compaq machine. Now all we have to do is tell the market. 'The message seems to be getting through. HP's PC products are now in the top five in the Australian market. Our PC business has tripled in Australia in twelve months. HP has the largest PC product range in the industry, and complies with industry standards more closely than any other vendor, including IBM. Its PC products will be approaching 50 per cent of Australian business by 1990. 'The next five years will see new products delivered according to the needs and demands of the marketplace. The success of the Laserjet, DeskJet and PaintJet printers, our Vectra PC range, ScanJet scanner and drafting plotters, have finally made us a market-driven, rather than product-driven company. In terms of hardware developments, the capabilities of the PC processor chip in five years, will be comparable to the high-end minicomputer of today. As well as dramatic improvements in magnetic and optical storage at the PC itself, we will also see advance software environments that allow the PC user to access a corporate wide, and even world-wide computing resource.

'This will be in a seamless way by simply requesting the information, the software itself will make the necessary interfaces and connections to obtain that information and display it in the form desired.

'The increasing grey area between the performance of high-end PCs and the minicomputer will force the industry to re-evaluate the roles of each. This will be the challenge facing vendors, and with our strength in both areas, a major window of opportunity for HP.'

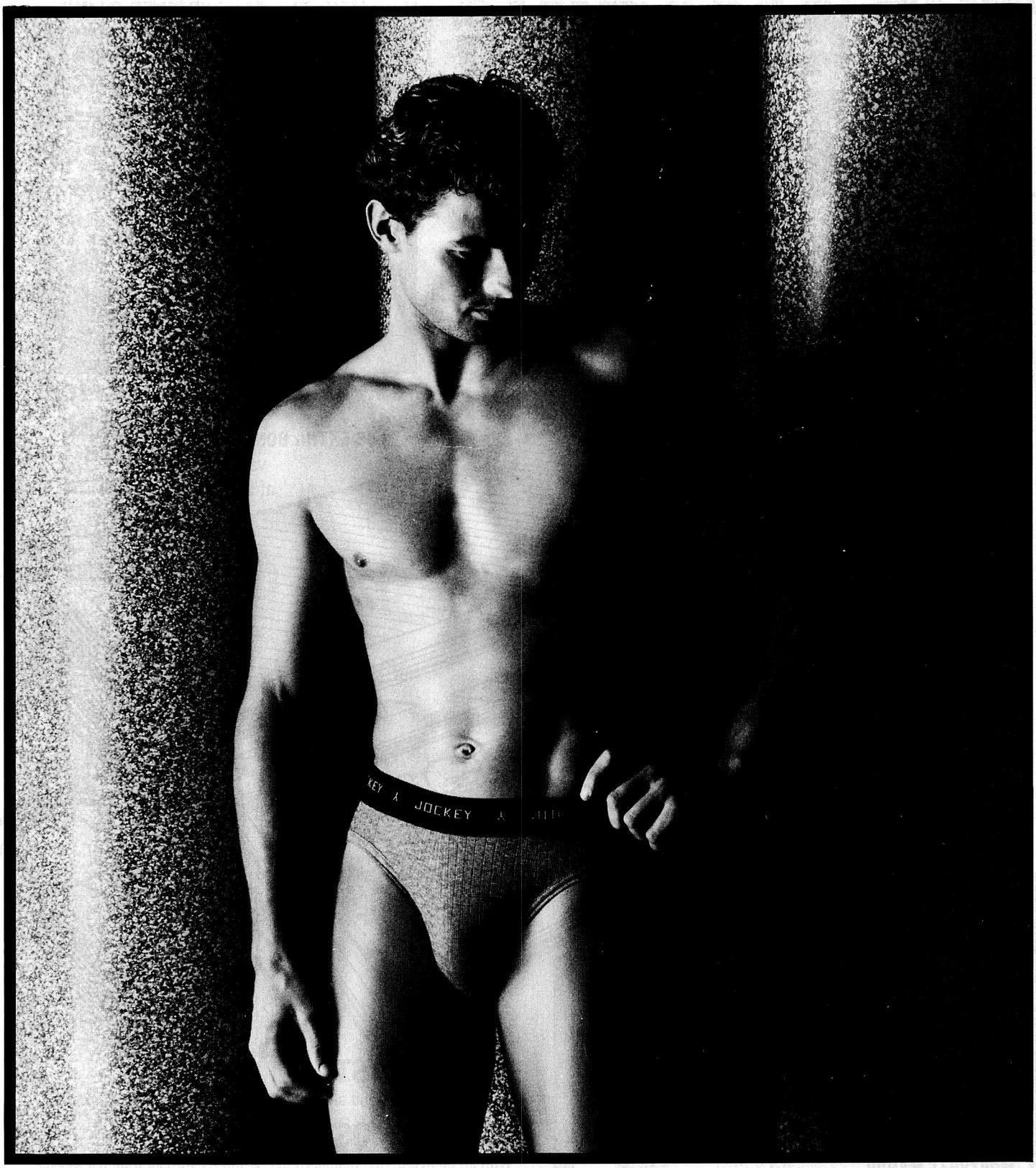
gies, pen plotters and the more recent grit wheel, which is a new method for moving paper in plotters.

'At the time, HP's approach was to produce a product using leading-edge technology, then try to find someone to sell it to. However, during the last five years, the company has begun the cumbersome turn around to becoming a market-driven company. Rather than producing a product for technology's sake, we go out to the market and ask it for its requirements.

'HP's new DeskJet is a prime example of this. The DeskJet is a third generation inkjet printer which gives laser quality for less than $2000 – it's HP's solution for the person who wants laser quality for a dot-matrix price.'

Re-focus

WITH THESE FOUR hard-earned lessons under its belt, HP has set about realigning its focus. The HP Vectra PC family has been expanded up to 40 models; it was a



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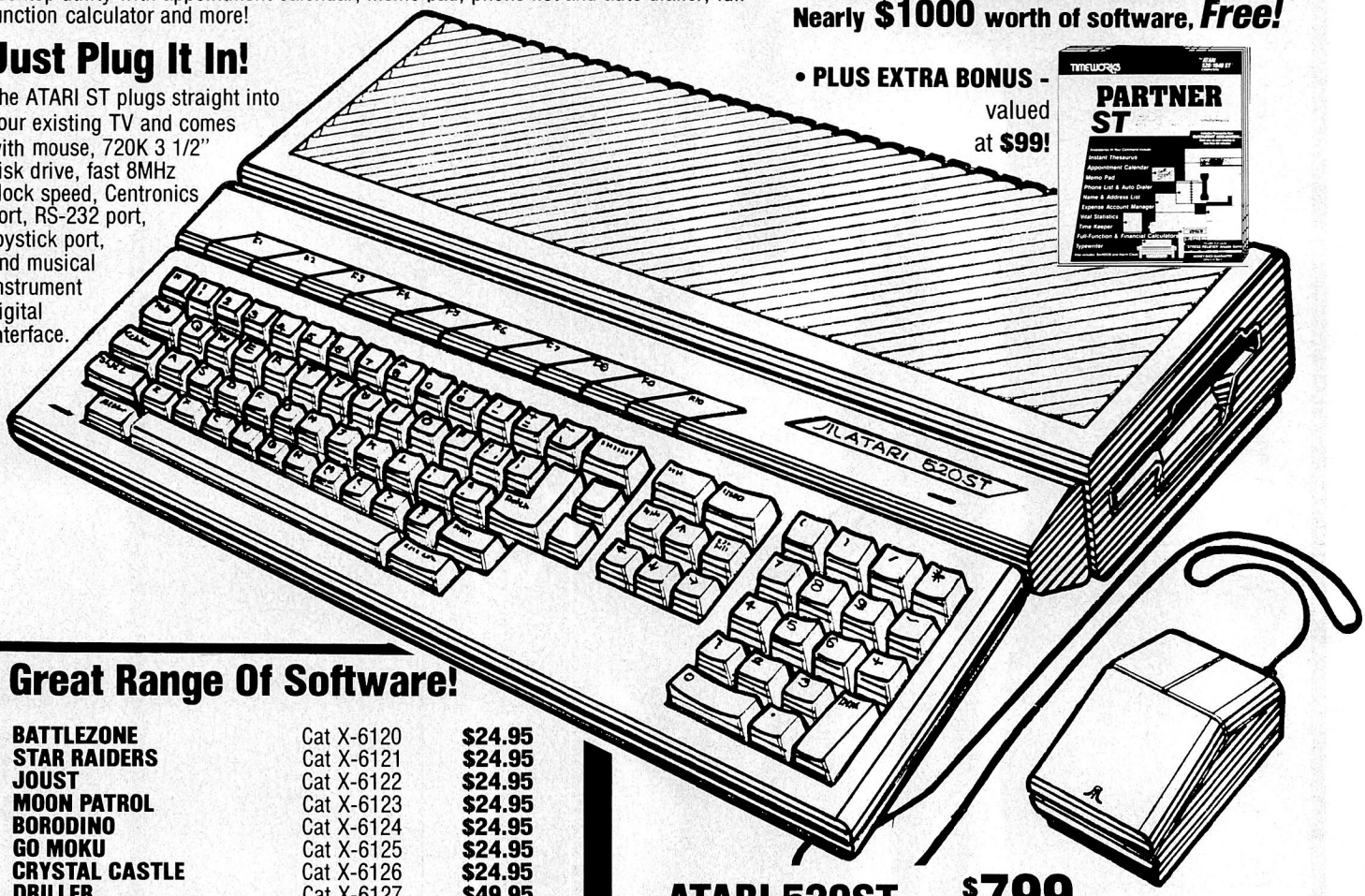


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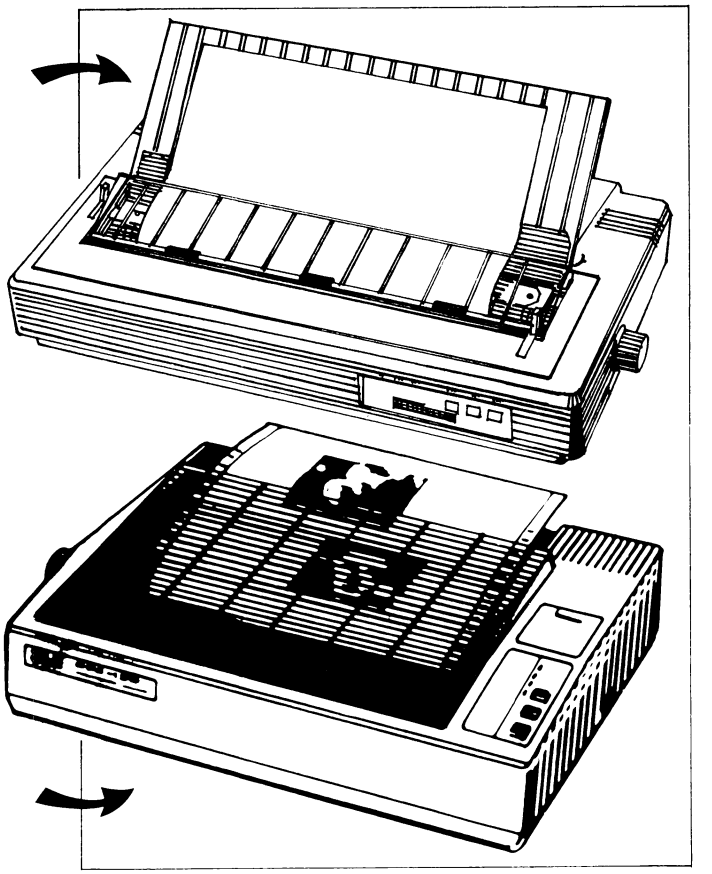
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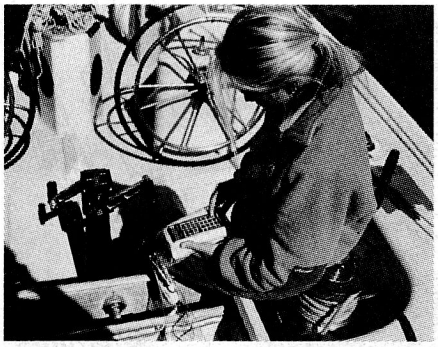
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single product family in the past. HP has also taken an education role in the desktop publishing market and is postioning itself to lead the way in PC CAD.

'In the past HP stood for high price, and we are working hard to change that perception also,' Miles said. 'We have put a lot of investment into achieving manufacturing efficiencies, which is paying off today by allowing us to produce the cheapest terminal products available on the market.'



***Ten years ago,** Hewlett-Packard introduced tens of thousands of users to programming with the release of the HP-41C, the first calculator that could display alphabetic characters as well as numeric. Special modules could be used to expand its memory, program it and to link it to peripherals, computers, and test and measuring instruments. Even greater flexibility was gained by assigning user-developed functions to single keys. An HP-41 has seen action in the last three America's Cups: first with Denis Connor where it was used to compute the distance between Freedom and the rest of the field – a 41-CX is shown here aboard Stars and Stripes performing pre-race calculations.*



***Hewlett-Packard incorporated** – in 1947; ten years later Dave Packard (left) and Bill Hewlett (centre) went public – note the results of the first day's trading, top centre.*

Five years ago HP released its first terminal costing $6000. One million terminals later, it is producing terminals costing just $600. These terminals now have 90 per cent fewer parts and take 95 per cent less time to build.

The other side of the business involves becoming active in helping to set the standards with alliances like HAM (HP, Aldus and Microsoft). Today those joint developments extend to include such agreements as the one between Microsoft, the Santa Cruz Operation and HP for the development of PC Unix; and 3Com, Microsoft and HP for the development local area network products.

Once again HP has demonstrated that you are never too old to learn – five years ago its products were based around a closed architecture.

Another lesson involved changing distribution methods, which in itself has achieved significant 20 per cent reduction in PC prices alone in the past 12 months. Two years ago, HP made the fundamental decision to change its distribution ratio from 60 per cent dealers and 40 per cent direct sales, to 95 per cent dealers and just 5 per cent direct sales.

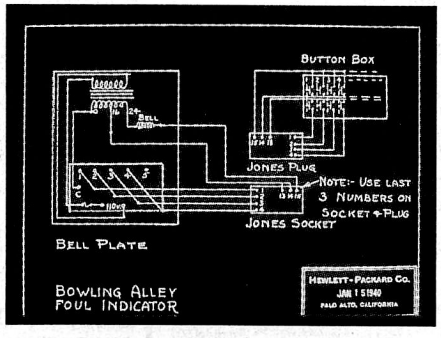
'We have not quite reached that ratio yet,' Miles said, 'but we are working on it. A direct sales force has a high overhead because of its support staff required.'

'During the past 18 months, the combination of all these things has enabled HP to drop its PC prices by 30 per cent overall, its laser printers by 35 per cent and its plotters by 40 per cent. The future will see a continued push towards releasing 32-bit '486 EISA products which are being pushed as an alternative standard to IBM's 16-bit micro-channel bus.

'The future of printing is obviously in laser and ink jet technology. HP will roll its PC family, or bring it to the next level of technology, every six to eight months. It also aims to introduce a major peripheral product every six to eight weeks. High growth markets will be in the area of PC Cad, PC Unix and networking, in addition to RISC architecture PCs.'

But not just yet,' he added. 'Although we have already designed them, the market is not quite ready.'

Miles concluded that it was frustrating being hemmed into 1960s technology by IBM, but indicated that the company would soon begin its own journey – back to the future. □

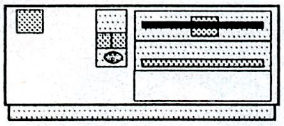


***A 10-pin bowling alley foul indicator** – was one of a variety of one-time products that HP developed in its early days. Others included a lettuce thinner, a harmonica tuner and a weight-reduction machine.*

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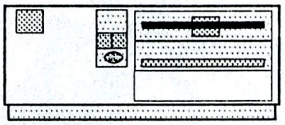
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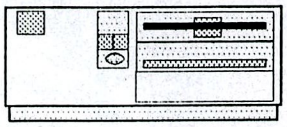


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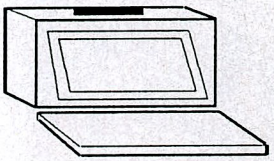


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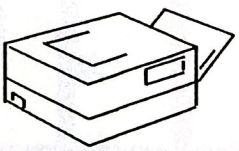
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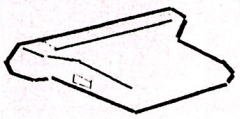
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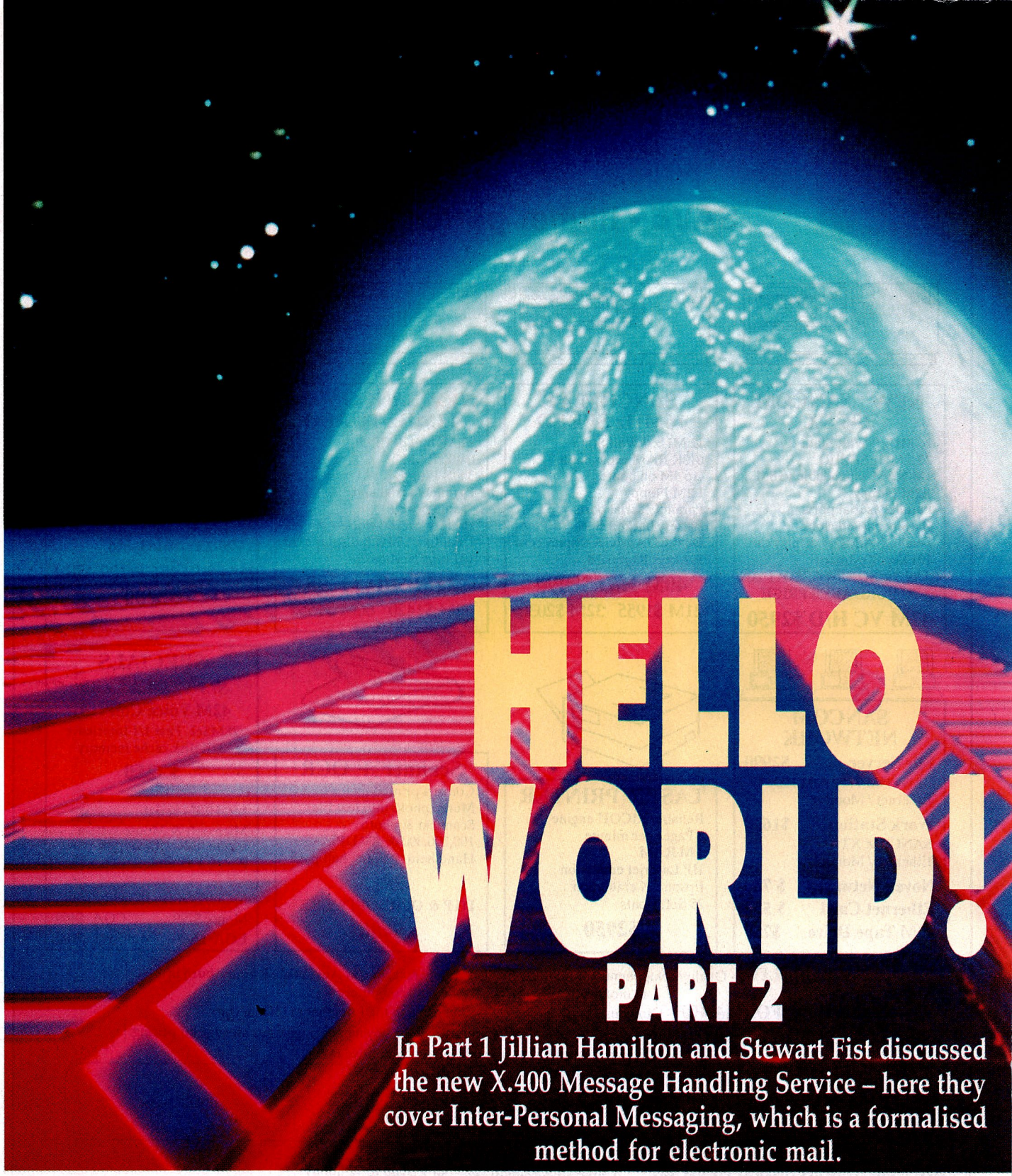
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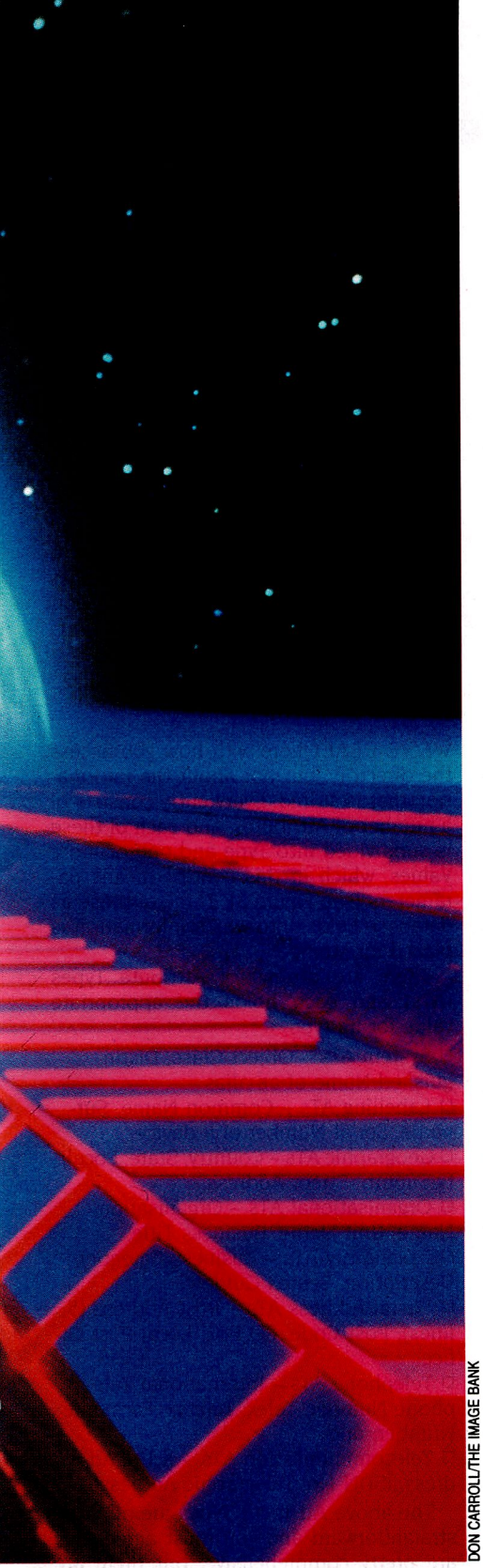
PART 2

In Part 1 Jillian Hamilton and Stewart Fist discussed the new X.400 Message Handling Service – here they cover Inter-Personal Messaging, which is a formalised method for electronic mail.

THERE ARE MANY features in Inter-Personal Messaging (IPM) in the X.400 protocols that you've seen before, and some new ones that extend its use quite dramatically. For instance, you can issue a request for Delivery Notification, and that advice will be returned to you automatically when the message has been delivered into the recipient's mailbox. If, for any reason, it doesn't get delivered, you'll get a Non-Delivery Notification.

We've had delivery notification on e-mail systems before, but usually not outside the boundaries of the one service ('domain' in the jargon). This facility is now formalised internationally, so even if I send a message to someone in Alaska, a Delivery Notification memo will be returned along with information as to the time and date of delivery. If the message was broadcast through a distribution list, I can get notification from each recipient.

If you aren't sure about an address, you



DON CARROLL/THE IMAGE BANK

can also send a Probe which is a message envelope without contents but with Delivery Notification. The Probe is intended as an interim measure while the X.500 Directory system is still in the formulation stages; and it takes into account the fact that many pre-X.400 e-mail systems are slowly being adapted to the new standards. Old addressing systems are not going to change overnight.

The third important new function in IPM is that you can establish (with your e-mail supplier) an order that incoming messages should be automatically redirected to a business associate while you are on holidays or otherwise absent from your normal place of work. This last function relies on the provision of a directory system, and this is what the X.500 protocols have been established to do.

We aren't talking here about electronic telephone books with just names and numbers, but about a very complex and comprehensive, internationally accessible record of information about each individual. Your local directory will be held (following the guides laid down in the X.500 protocols) in your local MHS computer – which could be your company mainframe, or OTC's Dialcom, or Telecom's Keylink computers.

Part of the information held on you is for system use only, part is viewable by the public: part can be modified by you, part can only be established or modified by the MHS provider. Although you can access records internationally, the International Directory system doesn't actually constitute one gigantic distributed database; rather it is an internet of centralised databases. Each is autonomous, but while they will all conform to the minimum standards set by the CCITT, some will have many more functions than others.

Directories are to be held in the 'domain' of the service provider. The word 'domain' is used here to mean 'area of influence' – and in practice it applies to the management of the system – who to pay; who does the billing? You'll be charged for using the directory system, but fortunately you can limit your search to only your local domain. Since the directory system will have full-text search facilities, and since a lot of business information is stored in company or professional records, you can perform 'yellow page' operations, such as ask for 'All Dentistsz in Chatswood open Saturday morning.' How you frame this request will depend on the special communications program you'll need on your computer. I suspect that HyperCard for the Macintosh will be a real winner here.

The design of an electronic international directory service isn't easy, and the extent of the X.500 protocols is quite surprising, considering the problems they face. Security is the obvious one – we don't want hackers being able to modify company records, or redirect electronic mail. But at the same time directories are subject to constant change as entries come and go. The connectivity details of entries also change, and the characteristics of 'objects' (in other words their location) also changes. An electronic directory is a highly dynamic database – and that's, in fact, its main advantage over print and paper.

The aim of X.500 is to isolate the user from these frequent changes, and to make it easy for them to use the system. You don't have to access the directory, carefully note down the full pathname, then key it in yourself. The directory will eventually be an integral part of the message handling service, so all this meticulous typing will be done for you – once you select the name. The total range of functions that may still be include in the X.500 International Directories hasn't yet been finalised, but there's already enough to surprise you. Let's start with the easy ones.

Range of functions

THE MESSAGE Handling System can support Distribution Lists. These are created and stored within the system as 'objects.' You create your message and send it to one of these List 'objects,' and the Directory then takes over and broadcasts your message to everyone on that list. What's more, you can nest lists inside lists, so your can create a chain reaction with ever-widening circles of transmission.

This idea has a lot going for it – mainly, in the way it will save money. For instance, my company may have ten dealers in various states across the USA and I need to fax them each an urgent message. I can either fax each of them direct at high cost, or I can fax only one international message to a Los Angeles-held distribution list, and have this automatically broadcast my fax messages to the various state offices. Obviously this is a much cheaper way to use the system.

You had better get used to this idea of 'objects' as used in X.500 jargon, because you're going to find the term coming up constantly from now on. An 'object' can be a person, an organisation, a computer, a fax machine, a laser printer, a distribu-

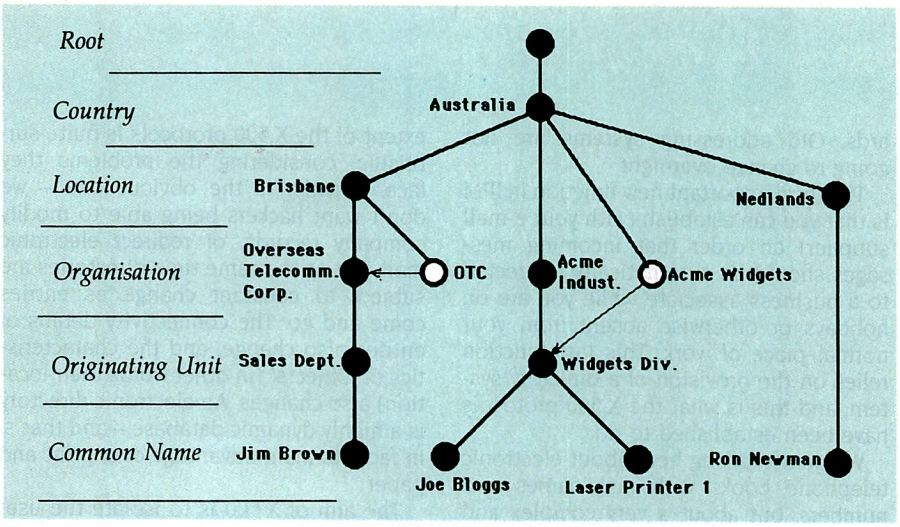


Figure 1. *The CCITT's basic tree-structured design of the Directory System gives a basic understanding of the naming process – there are a number of levels in the Directory Information Tree (DIT), and each of the lower nodes on this tree is an 'object.' Each object has a totally unambiguous name, called a 'distinguished name' which in computer terminology would be called a pathname – its own name plus the names of the objects that precede it, back to the Root. For instance, Jim Brown could be addressed from anywhere in the world through the distinguished name 'Australia/Dialcom/Brisbane/OTC/Sales Branch/Jim Brown.'*

tion list – virtually anything to which (or whom) you may want to address a message. In practice, an object is anything for which there is a directory record.

A standard business record in the directory will typically contain the organisation's name, address, telephone number, telex, teletex, fax, e-mail addresses and less obvious information like a description of the business type, hours it is open, products carried, services provided, and so on. You can see immediately that it is really a combination of the white and the yellow pages, with extra information for electronic searching.

The CCITT have put out its basic tree-structured design of the Directory System which gives you only a basic understanding of the naming process – see Figure 1.

Now abbreviations like 'OTC' give us problem, as does 'Acme Widgets,' which is the trading name for Acme Industries, Widgets Manufacturing Division. The CCITT have solved these problems by making provision for 'aliases' which are pseudo-objects in that they don't have directory information attached to them, but merely redirect the enquiry to its correct entry.

Notice also that there are often two or more paths to the same final object. In the Jim Brown example above, the Brisbane location could have been omitted and the message sent to the OTC head-office computer in Sydney, where presumably their internal mail system would have enough knowledge to re-direct it to the Sales Branch in Brisbane.

As long as there's only one Ron Newman in Nedlands, you can also access him direct from anywhere by just adding country and location names. If he doesn't have a computer, fax or telex, you can reach him via his local post office, and you'll be able to find this address in the directory.

In the X.500 jargon, 'Jim Brown,' 'Joe Bloggs,' 'Laser Printer 1' and 'Ron Newman' are all called 'Relative Distinguished Names' (RDNs). The CCITT certainly knows how to make its protocol publications difficult to read by overloading them with jargon! I said that the final structure of the directory hasn't yet been finalised, and so Figure 1 is an over-simplification. Figure 2 is the structure currently being considered and it has many very interesting additional features.

For instance, note that access to a residential person passes through the locality section in a loop-back. So I can use the location function more than once in a pathname. Ron Newman's full X.500 address might then be 'Australia-/WA/Nedlands/Ron Newman' if there are two or more Nedlands in Australia.

Notice also that they've made provision for a Group of Names (in other words, a distribution list) which can be contacted through a Location or an Organisation. So – I can have a list which is, say, all Newspaper Editors in San Francisco (Location) or all Sales Managers in Acme Enterprises (Organisational). Further down on the chart you will see that you can address either an Organisational Person, or an Organisational Role. Even if you don't know Joe Bloggs' name, you can still send a message to him via his role as 'Widget Division/Marketing Manager,' and if you send a Probe, you can get back the information that Joe Bloggs is the name.

How is it stored?

WE'VE DEALT here with how you access the directory, but not about the information that is stored. Every entry consists of a number of Attributes, and each of these is subdivided into Type and one or more Values, which in this context means parameters (see Figure 3). Think of these as database fields, into which information is placed for storage.

There are dozens of Attribute Types (ATs) and each holds the appropriate value for its type:

- System ATs – Object Class, Distinguished Name of an alias
- Labelling ATs – Common Name, Surname, Serial Number of a device;
- Geographic ATs – Country, State, Locality/Suburb, Street Address;
- Organisational ATs – Organisation Name, Unit Name, Business Title;
- Explanatory ATs – Business Category, Description, Search Guide;
- Postal Address ATs – Post Address (5 lines), Post Code, PO Box, Local Post Office;
- Telephone ATs – International Telephone Number, Telex, Teletex, Facsimile Number; and
- Telecommunication ATs – X.121 Address, ISDN No, Telegraphic Addresses

The above Attribute Types are all fairly straightforward and you must agree they are pretty comprehensive, but there are some that require more explanation –

Preference ATs – these set the preferred method of delivery of messages. You've got a choice of e-mail, postal delivery, telex, teletex, G3 fax, G4 fax, ASCII terminal, videotex or telephone. I understand there's a couple more to come which deal with radio paging, and so on. You can establish a sequence of these in your attri-

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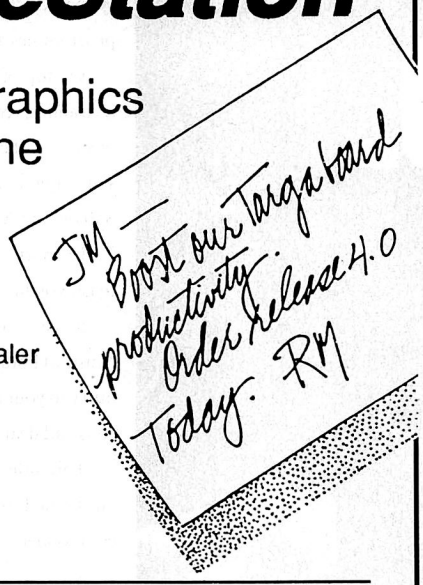
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ISDN in-depth

THE PRESENT state of the telecommunications industry has been described as a revolution, and it has many fronts and disguises. The three major fronts are technology, standards and regulation, and the disguises are voice versus data, analog versus digital and telephony versus data processing. Much of what is happening today has left industry professionals and management confused about the myriad of vendor options, directions and solutions. So when trends become standards almost overnight, how can one plan for the future?

Well, on the horizon is a bright light called Integrated Services Digital Networking (ISDN). What then is ISDN? Technologically, it is somewhat similar to the development of instant photography. Mechanical business information is transmitted from point to point directly without being transformed by black boxes (in other words modems). ISDN is not a market, nor is it an opportunity, a service, a technology or a dream. It is a realistic blueprint for an orderly transition from the analog telephone network to a ubiquitous, digital telecommunications network that allows the coexistence of information (in other words voice and data).

During the last two years, interest has accelerated because operating standards have reached a workable stage. In short, ISDN is ready to be bought to the marketplace, at least, in its initial form. By digitising traditional information transfer methods such as voice, highly efficient and accurate transmission facilities can be employed. This includes the ability to use the same cabling for voice and data. Professionals can talk about business projects while sharing the same updatable spreadsheet and faxing a contract over one set of telephone wires.

One of the major factors enabling this efficiency is the error checking capabilities inherent in digital signal transmission. Another major factor is the ability to 'packetise' information together with routing information, permitting point-to-point delivery over previously under-utilised wires. Gone will be the days of waiting weeks or months for a data line only to discover that it needs to be relocated shortly after being installed. Gone also will be the days of having dedicated lines for voice or data go idle while experiencing a bottleneck elsewhere. Capacity will be electronically switchable by the end-users' organisation.

ISDN is a concept that has been waiting for years for the right environment to develop and grow. Two key technological developments make the time ripe now. Very large scale Integrated (VLSI) circuits are now readily available at falling prices to facilitate digitising signals. Fibre optics are providing more high-speed error free circuits. But fancy technology is of little use unless it can be connected together from point to point with ease. This requires international standards.

Physical implementation

RELATIVELY QUIETLY (in the trade press) the Consultative Committee International Telegraph and Telephone (CCITT) has been developing ISDN standards for years. Connecting to ISDN becomes a regulatory issue defined by CCITT'S reference points. The key issue is where physical implementation occurs. Does it occur on the customer's premises or at the telephone company's central office? Regulations aimed at supporting fair trade become involved in providing interconnecting options (in other words business alternatives versus Telecom).

Some analysts suggest that ISDN will pay for itself in office moves alone. ISDN telephone headsets will have their own 'built-in' address. Moving a telephone headset will move the telephone number associated with it. Other features that can be supported by ISDN includes automatic number identification. For example, when customers call, the computer automatically retrieves their transaction history, while the company's service representatives are establishing voice communications.

Imagine addressing your customers by name when they call, and having their records before you without the time consuming efforts needed to verbally identify them. Getting from here to there involves a multi-step migration path. The largest portion of the migration path will be carried by the telephone companies, the remainder, by the end-user. Internally, strategic decisions can be made now. If you are building new facilities or remodeling old ones, consider universal wiring that supports CCITT's ISDN recommendations. Purchases of any telecommunications equipment should be made with regards to CCITT's standards.

Approximately 50 field trials are in progress today throughout the US. A common complaint about ISDN is that it's too little, too late, to become a workable alternative to Local Area Network (LAN) technology. ISDN will probably cost users about 1.5 times as much as the plain old telephone service. Although with economies of scale, the price ratio could quickly drop to about 1.2. But, while ISDN will cost less than double, services could triple (ISDN contains three channels).

An intelligent network requires intelligent people to keep it up and running. Over the next decade, there will be a steady rise in the demand for experienced telecommunications professionals that cannot be met by the projected available supply. Many analysts have predicted that a majority of ISDN-based services will not be available until the late 1990s. Asking big businesses to wait nearly ten years may be asking too much.

Clearly ISDN is a long-term project with plenty of remaining problems. Nevertheless, the pieces are starting to fit together and the outline of the ISDN puzzle is finally beginning to appear. What then, should business people do, or leave undone, concerning ISDN? Above all, they should not ignore it. Evaluate it carefully, and don't expect too much. Get ISDN answers from experts now, mainly from the technical staff of the carriers who will provide ISDN if there is a ghost of a chance that it can become viable.

Track the life-cycle costs/benefits of your company's existing communications solutions in order to capture an accurate history against which to measure ISDN costs/benefits. Weigh capital investments against the real prospects and the schedule for ISDN as they unfold, while still fulfilling obligations concerning the organisation's communications. Now is the time to dream of just how ISDN and this evolving network power might help forge a powerful strategic information weapon system for your organisation. One thing is certain: your competitors will be doing so, regardless of what they say publicly about ISDN.

butes list, each with the appropriate parameters, and the system will default sequentially down the line if, say, your fax is out of order.

Relational ATs – these give information about your own entry in relationship to other entries. For instance, it will advise if you are a member of a group with a distribution list, if you are the owner or administrator of an organisation, and what company role you occupy. If you are on holidays the 'redirect to so-and-so' information will be stored here too.

Security ATs – these are very important because they extend the value of the mes-

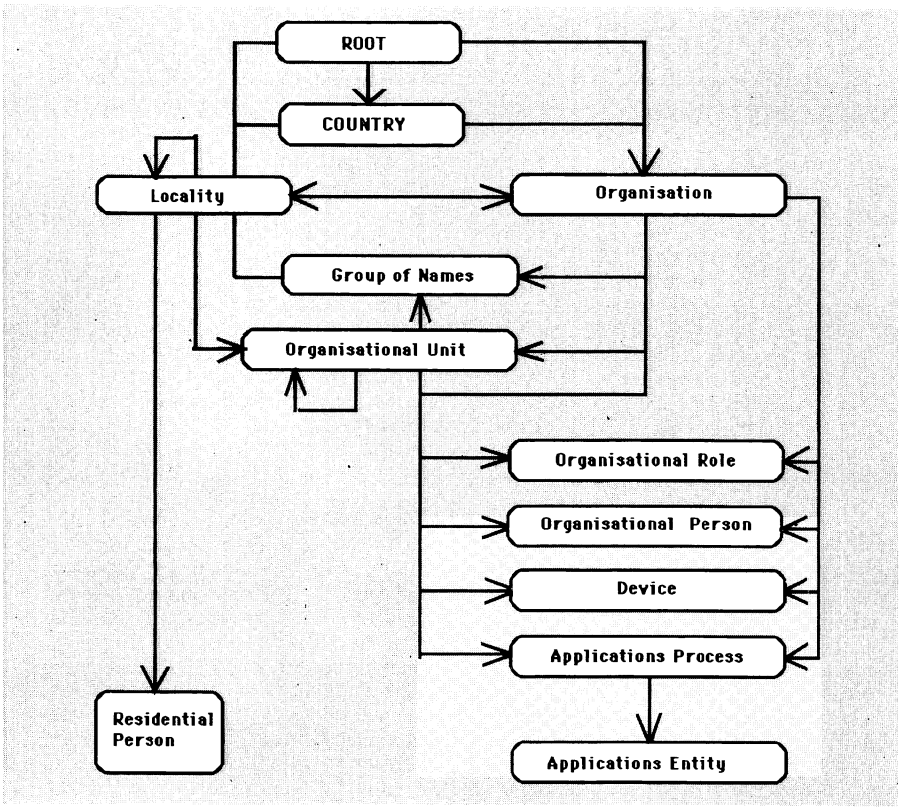


Figure 2. The final structure currently being considered by the CCITT for the Directory System. (Courtesy of James White/Malcolm Cardriss & Assoc.)

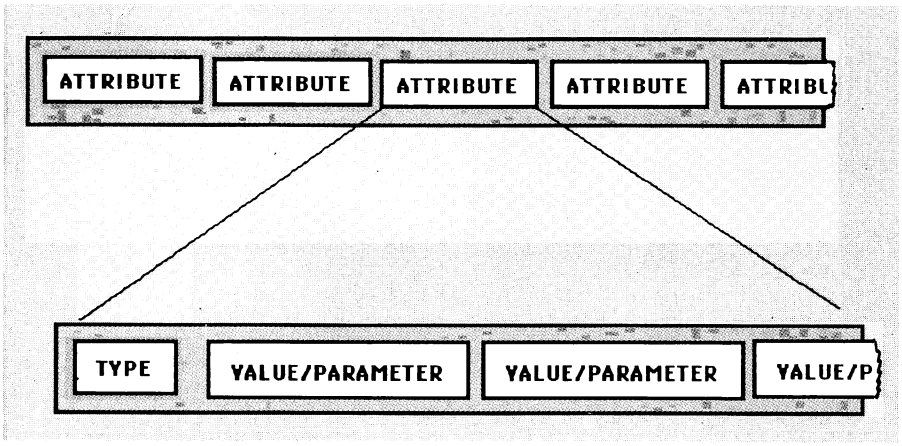


Figure 3. Every Directory entry consists of a number of Attributes, and each of these is subdivided into Type and one or more Values, which in this context means parameters – think of these as database fields, into which information is placed for storage.

sage system into EFTPOS and EDI areas. Some of this information is accessible from outside the system, others are tightly locked up by the computer itself, and some are encrypted before being stored. Information held in these attributes include the User Password and the Public and Private Key, together with 'certificates' and 'authority-revocation lists,' and a few other very esoteric bits and pieces. The Directory is central to the security of all message handling, and the system provides two levels of 'authentication.' Simple authentication requires you to provide only a Name and a Password as credentials, while strong authentication involves public-key encryption techniques, which involve the production of 'certificates' which are, themselves, highly secure messages. We'll talk about 'digital signatures,' the security system in detail, and its application to EDI and EFT in Part three.

User Agents

JUST AS THE MHS involves User Agents (UA) passing messages to MTAs, which then pass them on across the world until finally they are stored in a Message Store (MS) computer, so the X.500 protocols set-up the way in which the Directory User Agent (DUA) passes requests to the local Directory System Agent (DSA). If the DSA can't resolve the query locally, it consults what amounts to a 'knowledge base,' and then passes the query to another DSA for resolution.

This may sound relatively straightforward, but in fact it involved the CCITT committee and work-groups in designing a 'knowledge model' which establishes the minimum information any particular DSA needs to know about other linked DSAs, so that it can relay the query in the right direction. This has been a very complex problem, and this knowledge model is now a mandatory part of the standard, so every DSA should be capable of resolving any query or passing it on to a DSA that can.

When you examine the work that has been done on this directory system, you can only have praise for the CCITT and those people who have worked on the committees. At one end of the scale we will shortly have a simple telephone directory service that won't need interminable waits on the 013 number. On the other, we should have direct access to the corporate directories of most of large companies, and therefore be able to message the appropriate person direct – or phone their direct extension number and address them by name, without going through the switchboard operator.

When you consider that the above refers only to the draft standard, and that room has been left for many other features to be implemented in future years, you can see that the X.500-based directory system will eventually become a very important part of future telecommunications services. □

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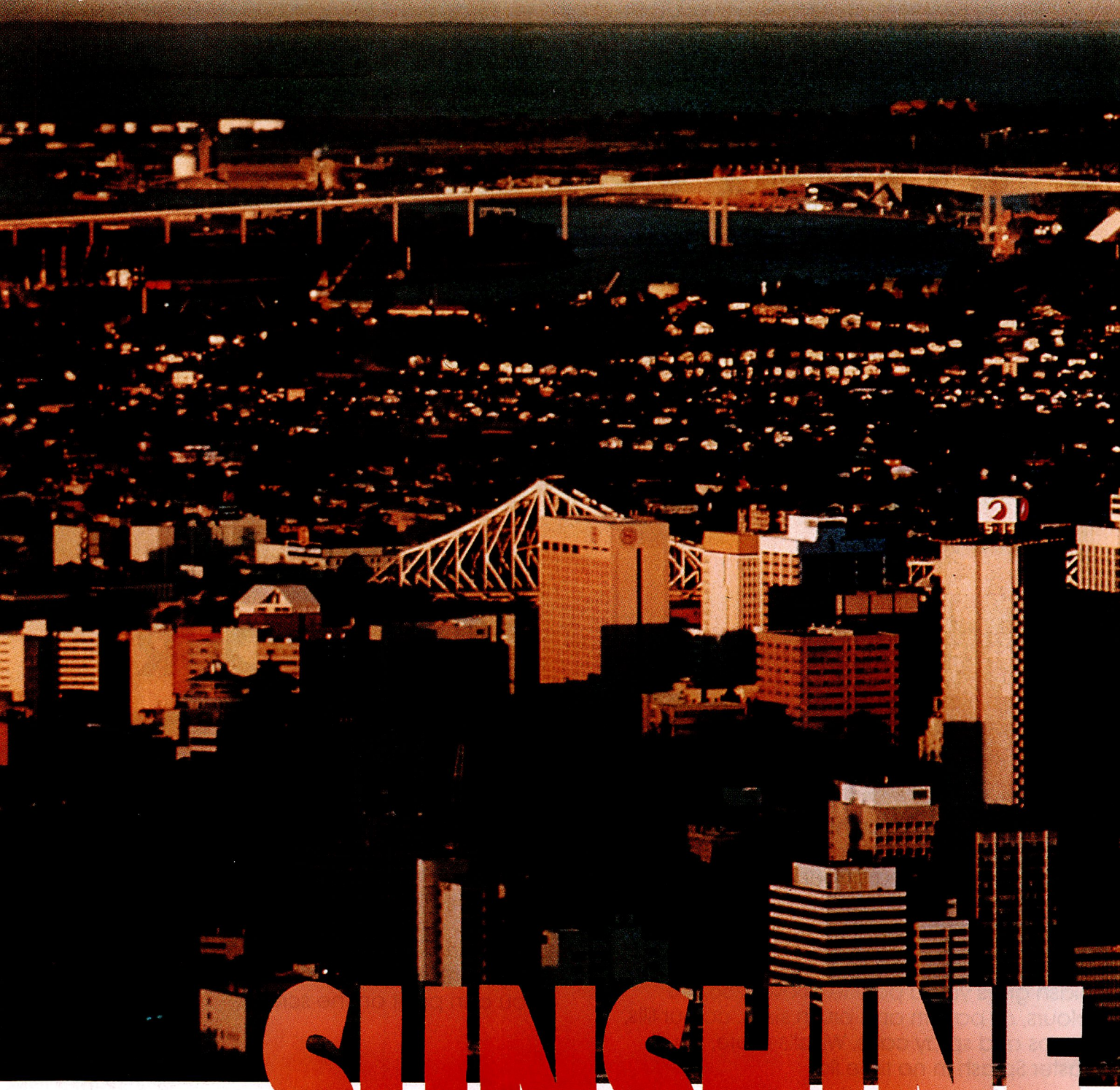
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Pactronics



SUNSHINE COMPUTING



The Queensland computer industry is currently experiencing a re-surgence after the shake-out of several years ago – the remaining players appear to have mastered the elusive combination of capitalisation and management skills that form the secret of business longevity. Bill Hartzia reports . . .

THE STATE OF Queensland, like the microcomputer industry, has achieved spectacular success with sand. The snow-white variety of silicon that lies in piles on Queensland's scalloped beaches soaks up stunning amounts of tourist dollars. But almost equally stunning is the growth in Queenslanders' appetite for silicon in its purer semiconductor form.

Brisbane's annual computer show, with its increasing contingent of home-grown products, offers compelling evidence that Queensland's personal computer industry has entered a new phase of consolidation and maturity. For much of the past 10 years, it has been characterised by a bewildering constellation of short-lived distributors, clone-makers and suppliers.

It is only within the past 18 months that some appear to have mastered the elusive

LOTTOCHECK - *6 from 45, & NEW 6 from 44 (NSW) Version*

No man-made machine is a perfect random number generator. The one used to draw winning lotto numbers is no exception. Lottocheck is a program designed to find the biases. We make no outrageous claims for it. Our estimation is that it can be used to find numbers that have won 5 to 10 times more prizes than the statistical average. If you play LOTTO, you should wisely choose your numbers using Lottocheck. A brief overview follows:

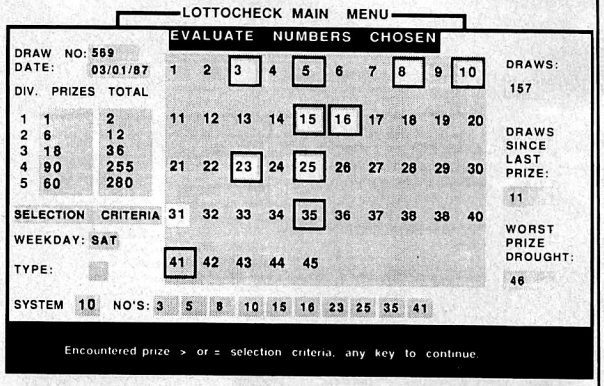


Fig. 1 - Screen snapshot of the PRIZES option in progress.

FIGURE 1 is a screen **snapshot** of the *Prizes* option in progress. The user has chosen to test a System 10 over the history of draws stored in the database. (Lottocheck comes with an up-to-date database of all past draws). These chosen numbers are 3, 5, 8, 10, 15, 16, 23, 25, 35, 41 which have a square around them on the screen-coupon. Progress has been halted at draw 569 due to some prizes been won. The numbers with white backgrounds are the 6 winning nos. for draw 569. The 2 numbers with slightly darker backgrounds, are the 2 supplementary numbers. The tables to the left indicate prizes won. This System 10 has won a 1st division, six 2nd divisions, etc. for draw 569. The 2nd table is a running total of prizes won up to that date. This System has done the improbable of having won **two 1st divisions** so far. Eleven draws had previously passed since the last prize. The worst such prize drought was for 46 draws. The analysis will continue when the user presses any key.

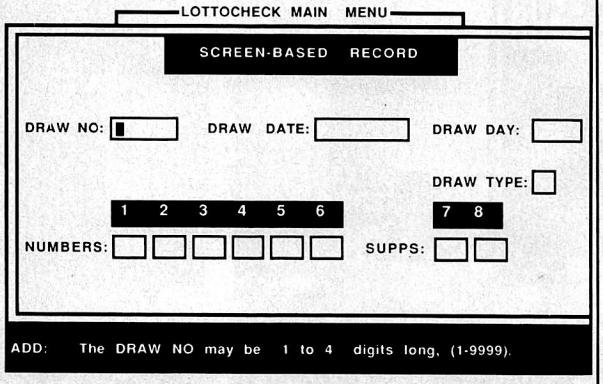


Fig. 2 - An input screen-form, used to update the database.

FIGURE 2 is the screen-form via which the user ADDs new data. Like all input-screens used in Lottocheck, the entry is made as easy as possible. When you move the cursor from one box to another, the prompt message at the bottom of the screen, changes to tell you what is required. If you are still unsure, pressing the F1 key summons a pop-up HELP message. If you are still uncertain, the **26 page Manual** is very clear and helpful. When you enter numbers, the program will not let you enter a number greater than 45 (or 44 for NSW). Nor can you accidently enter the same number twice. Other database functions not shown here are MODIFY, DELETE, LOOK, BROWSE, data EXPORT.

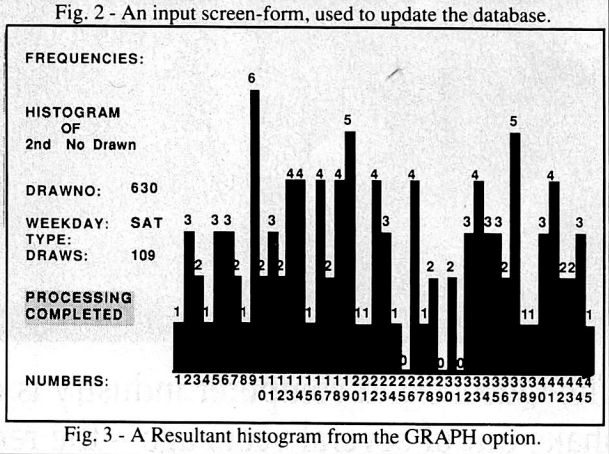


Fig. 3 - A Resultant histogram from the GRAPH option.

FIGURE 3 is a resultant histogram using the *Graph* option. In this instance the user has chosen sub-options to look at just the 2nd ball out of the barrel. And just Saturday draws using the **DAY restriction**. You can choose such a graph on any drawn position, or effectively ask it to: *'count it if it was any winning ball - I am not interested in the order it was drawn'*. As well as being able to place DAY restictions, you can have any of the Lottocheck analysis options start from any draw in the database, rather than the beginning.

Other features not shown here include a QUICK PICK option and a sophisticated EVALUATE option that uses rankings to test theories.

NEW! NSW GoLOTTO 6 from 44. This version handles: the new 44 number game (introduced on the 24/04/89); *Second Chance* Draws (ie. no supplementary); and tests up to System 18's (up from System 15's). It also includes past 6 from 40 GoLotto database, back to 1979.

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'Congratulations on your program. Lottocheck has enabled me to cross-reference my theories and has proven to be a valuable asset.'
K. R., Morphett Vale, SA.

(Note: LOTTOCHECK is for IBM PC XT, AT and compatibles.)

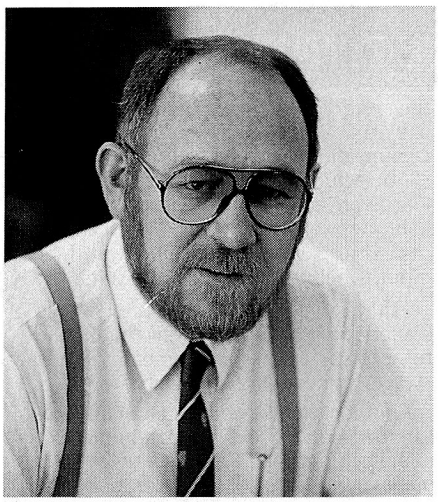
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The largest business challenge in Australia is called the Federal Government. I spend 15 to 20 per cent of my time dealing with changing Government regulations. I did a degree in accountancy and got high distinctions in tax . . . I was hot bottle on it. That was only five or six years ago but now I am hopeless on it because the regulations keep changing so much – ***Peter Eliot, Qunix.***

combination of capitalisation and management skills that form the secret of business longevity. Chief among them would be Computer Corporation of Australia (CCA) which sells about $15 million worth of its Cleveland range nationally – CCA is also one of the primary suppliers for PCs in Canberra's billion dollar monument to itself. CCA now has solid financial backing from both the Queensland business establishment and Mitsui Computers.

Just behind it in terms of turnover is the dean of Queensland's clone suppliers, Custom Computer Services, overseen by ex-Tandy techie Alan Garnham. (President Computers, attracted north by land and building incentives, is assembling computers in Queensland, but can't be called native to the State.)

A third homebred clonemaker to have made a national impact is Uni-X, largely on the back of its kit computers.

The trio's success doesn't mean clonemaking has become a low-risk proposition in Queensland. The recent demise of Photon, who had some success in the local education market, is proof of that.

It does show the State's highly-volatile clone market is crystallising into a more stable form. The same process can be detected among dealerships and distribu-



Queensland's climate was once thought to guarantee the State's success as a software powerhouse – micro programmers were expected to flock north and establish a new electronic cottage industry while enjoying the leisurely lifestyle.

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KEN BAKER, AN Indooroopilly-based computer consultant, noted during his work that over 50 per cent of the software his clients had purchased was not used. As Baker pointed out 'many businesses don't know what it is they really need in their software (and their hardware too for that matter) until they actually start trying to use it. More often than not, I find clients with a whole computer full of software that has cost thousands of dollars to acquire, but is never used. The reason is that they bought it thinking they needed it or that it was what they thought they needed, only to find it was too hard to learn, or simply didn't do what they thought it would.'

Baker now often suggests that clients try Shareware products if they are unsure of their needs. Shareware is not to be confused with free, Public Domain software – Shareware authors ask that, if you like their product and are going to use, it, then you pay for it.

While his primary business is based on the widely-known Attache Accounting software, he has found that many firms don't need additional commercial products to solve their computing problems. In his own office, Baker uses Shareware product File Express to maintain a database of leads, contacts, clients and suppliers. New leads from Attache go straight on to the database and after they have been contacted, FE is used to produce a customised standard letter, confirming the discussions. 'At only $95 per registration for FE, we have installed it on many of our client's computers. They like it for the same reasons we do: it's easy to learn, yet sophisticated enough for some very serious work,' Baker said.

As an example, he cited a public accounting firm in a northern Brisbane suburb which inquired about a system to record and analyse transactions from their client's bank statements with the least amount of data entry possible. Baker's firm showed them that using File Express to manage a database which had the client's name code and year of income in its title, and only two fields (cost code and amount), reduced their work to the absolute least possible number of keystrokes.

Baker: 'We developed the system in one afternoon, including the documentation. The following afternoon we installed the system and trained their staff how to use it – we called it the Accountant's Dream, and have been selling it since for $350 including the registration fee for File Express. Our client was rapt in the solution we gave them. They had expected to pay over $1000 and wait three months before they saw any results.

'They rang us up a week after we installed the system just to say thanks and to express their amazement at the system's speed and simplicity.'

Another client, one of Australia's oldest specialist oil and lubrication product manufacturers, had a list built up by their managing director of every car made before 1941 and a complete lubrication guide for each one of them. Baker developed a database system using FE to manage the lubrication guide one evening in their offices. The cost to the client was under $300.

Other FE applications developed by Baker and his team include an automatic billing system for regular monthly charges (used by one client to charge for photocopy service), and a system to send personal letters to selected clients from Attache's Accounts Receivable module.

As well as File Express, Baker's company has developed applications from other Shareware products – Express Calc was used as the basis of a standard series of budgeting and cashflow models, for example, and Ezy-Forms is being used in a variety of manifestations, including the generation of price lists.

Baker's firm, Computer Accountants, is probably a pioneer in its use of Shareware products in such a diversity of commercial applications. 'We use Shareware because it is in line with the guiding principle of our practice – to supply our clients with simple, affordable solutions.'

As a source of Shareware, Baker uses Manaccom, which also distributes public domain software from its suburban Brisbane office. Ian Mackay, Manaccom's managing director, has recently negotiated distribution rights for many Shareware products that were no longer being supplied by their authors to Australian users. Local users have developed a reputation as non-payers in the Shareware world – these products, including the well-known Buttonware range, are now available again.

tors where pivotal companies are Byte Technologies (Apple reseller), Computer-Land Solutions (business micro solutions) plus Qsoft and the revitalised Arcom Pacific (software distribution).

A rising star in the Unix applications area is specialist distributor Qunix, founded by an entrepreneurial doctor who

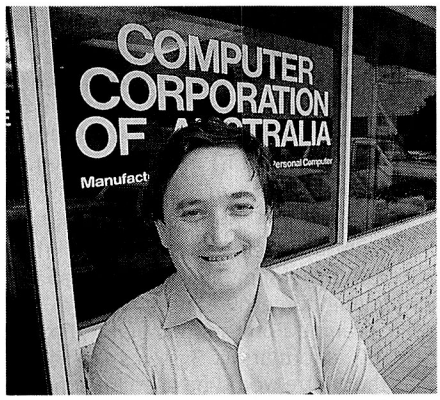
finds computers more satisfying than medicine. Adding critical mass around the edges are several peripheral makers and suppliers whose names have become recognised at the national and international level.

Most notable is Anvil Designs with its range of terminal communications cards for Unix systems. Another is Eracom, the Gold Coast-based data security specialist whose PC Encryptor board has become a hot item in European banking circles. Also included in this group might be Western Computers with its Hauppauge 386 motherboards and modem-maker Mosaic.

Code- versus cane-cutting

WHEN THE made-in-Queensland focus is flipped to software rather than hardware, a different picture emerges. Queensland's climate was once thought to guarantee the State's success as a software powerhouse. Its leisurely lifestyle was supposed to appeal to creative micro programmers who would flock north and establish a new electronic cottage industry.

All they would need, so the scenario ran, would be a modem link to their publishers to transfer their latest software achievements. The reality is that Queensland's software success stories have occurred primarily on larger systems. An example is Mincom, a Brisbane-based firm that can claim with some authority to be the world's largest mining software company and whose packages can cost up to $1 million each.



The biggest challenge we've faced from day one has been money – just getting ourselves up to critical mass as far as capitilisation goes. The other one is staff communications and that showed itself when we passed 20 employees (we now have about 80.) It is one of those things, like having a baby – it's hard to explain if it hasn't happened to you. People don't do what you expect they were going to and when you ask why, you discover it is because you never told them the way you wanted it done in the first place – ***Ian Bennetts, CCA Systems.***

On the personal computer level, code-cutting has not threatened to overtake cane-cutting as an income earner in Queensland. Illustrating the point is the saga of Queensland schoolteacher Ian Phillips, one of Australia's pioneer micro software writers, who created the legendary Zardax word processor for the Apple II in 1980.

The program was so impressive that Apple users paid several million dollars for copies of it. But when Phillips tried to repeat the feat on the Macintosh a few years later, he rapidly realised that market was already well served and abandoned the attempt. Phillips is now back teaching school and says he doesn't pine for the days when a kitchen table programmer could take on the world and win.

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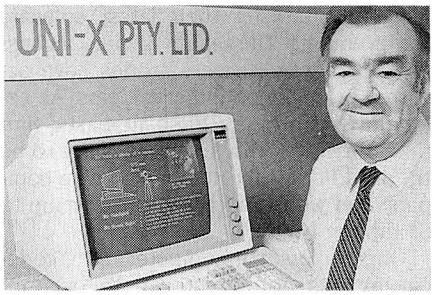
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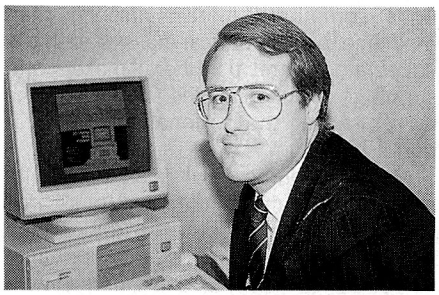


Finding credit to bring components in was my most difficult challenge while setting up the business. I had to invest two years of my life building up relationships in Taiwan before I was able to solve the problem by getting a $1.3 million line of credit from Taiwan's Export Import Bank – ***Ron Thomas, Uni-X.***

A recent exception to Queensland's generally lacklustre performance with micro software might be Virus Buster, a well-engineered virus protection package written by Brisbane professional programmer Roger Thompson. One of the few pieces of Australian software picked up by Imagineering, Virus Buster is written in Turbo Pascal for the DOS environment. If the virus threat continues to escalate, user enthusiasm for the $100 program ($149 for an advanced edition) may become infectious.

Another bright development – NEC's Information Systems divison opened their Software Development Centre in Brisbane, employing some 60 staff, in June of this year. Graeme Poulton, managing director of NEC Information Systems, indicated that the centre would be used for software development encompassing integrated communication of image, voice, text and data, particularly for Unix-based systems.

And – well-known Melbourne importer and distributor, Rod Irving Electronics, has recently committed themselves to Queensland's computing future by appointing local-company, VRC, as a Brisbane-based supplier. VRC – originally Visible Record Computers – started as a supplier of ledger card based accounting systems and has kept pace with developments since the days of CP/M. The company will also be offering repair and service facilities at its Lutwyche site.



There is no way one person can keep up their level of product knowledge anymore. In the early days at ComputerLand I knew everything about Apple. Then came IBM, Apple Mac, networking and Xenix and I literally got to the stage where I could not absorb any more knowledge – ***Paul Rees, CCA Systems.***

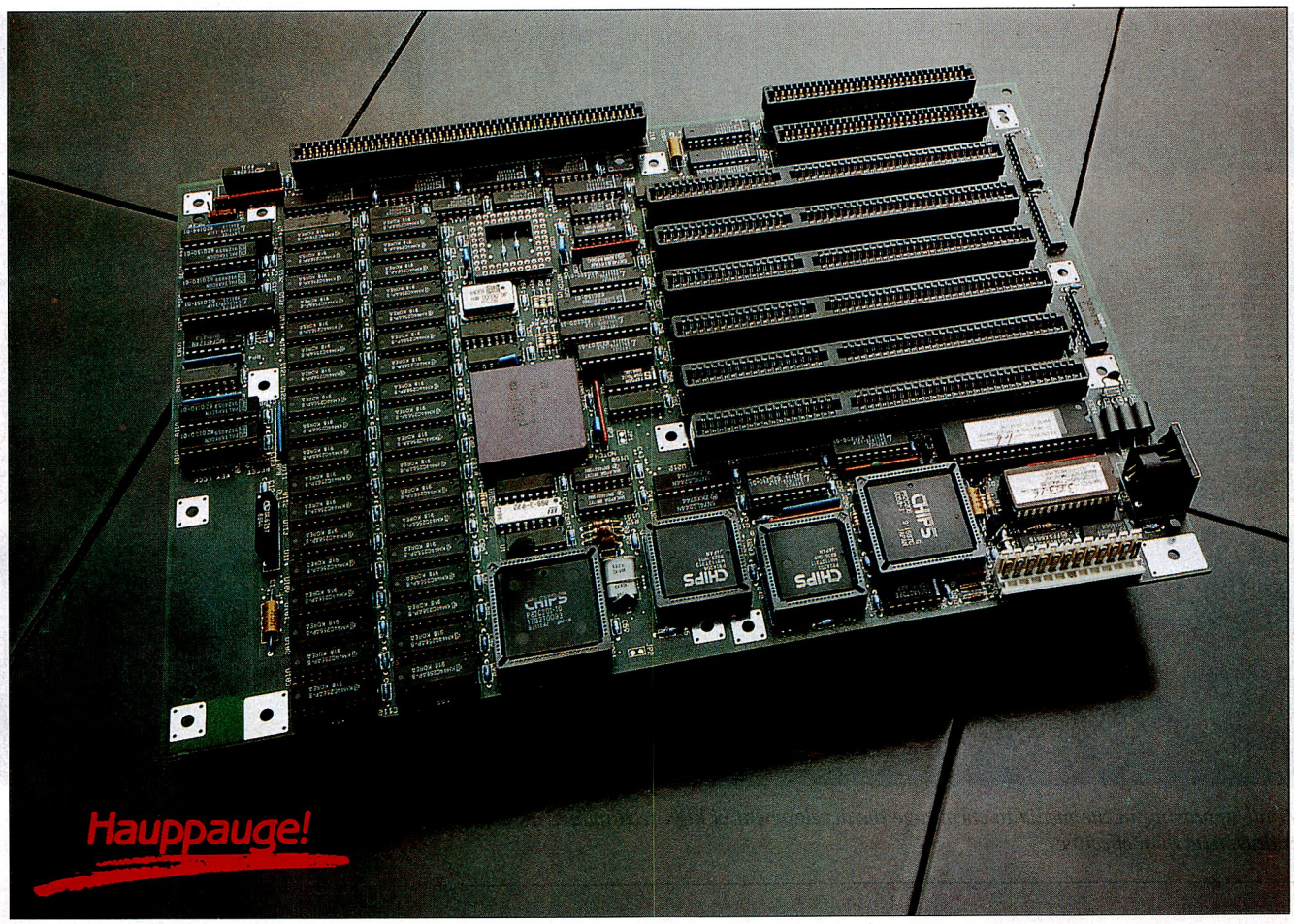
Governmental enthusiasm

AS FAR AS NURTURING Queensland's micro industry is concerned, the State

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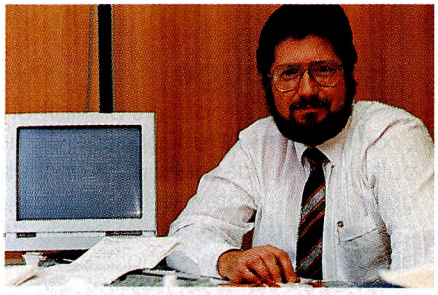
While appearing in the media to encourage the development of high-tech industries in the Sunshine State, the government has been more enthusiastic than effective.

Government has been more enthusiastic than effective. It is in the position of wanting to do the right thing if only it could figure out what that was. Before ascending to the Premier's position, Mike Ahern was Queensland's Technology Minister and there is no doubting his desire to encourage the industry. What is doubtful is the effectiveness of that government encouragement.

For example, the Government helped Sperry (now Unisys) establish a personal computer plant in Brisbane that never became profitable although it sold perhaps 3000 Sperry PCs into the school system. Paul Rees, the first Computerland franchise holder and Apple dealer in Queensland, remembers many Sperry micros arrived at schools with their Ram chips and disk drives still not installed.

In retrospect, 'if the Government ever made one big mistake, it was with those PCs,' said Rees, now Queensland manager for Compaq. 'You had school teachers who didn't know a thing about micros having to install the chips and drives. The next thing they did was get on the phone to dealers and ask us to come and sell them some software.'

One of Sperry's competitors for the school market was the Cleveland micro from CCA, founded by Ian Bennetts in 1985, the year before Sperry's plant went in. In little more than a year, CCA went from Bennetts' garage to 50-person operation sprawling over several thousand square metres in the Brisbane industrial estate of Hendra.



Coming to grips with the international market and trying to address it with a valid strategy from Brisbane's relatively low technological base is our greatest challenge. On a personal level, the challenge is to balance my family and community commitments with the demands of the business. This year I promised myself that I wouldn't work weekends . . . . I haven't managed to keep it but I don't work Saturdays ***–Bob Waldie, Anvil Designs.***

Along the way Bennetts and self-taught software wizard Grahame Istead, now CCA's R and D director, put together the first Australian-made clone Bios. The Cleveland first attracted attention because of its price, but CCA gradually shifted its sights upmarket with its Sprint and Vortex ranges of '286 and '386 machines.

Now Bennetts has signalled he feels the time is ripe for CCA to return to its origins with a blitz on the 8088 section of the market. 'We are going to hit the bottom end so hard it will bounce,' he commented. Between now and Christmas CCA plans to build 5000 units aimed at what Bennetts called 'the cash and carry weekend shopper. They can have any configuration they want as long as it is mono/colour with a

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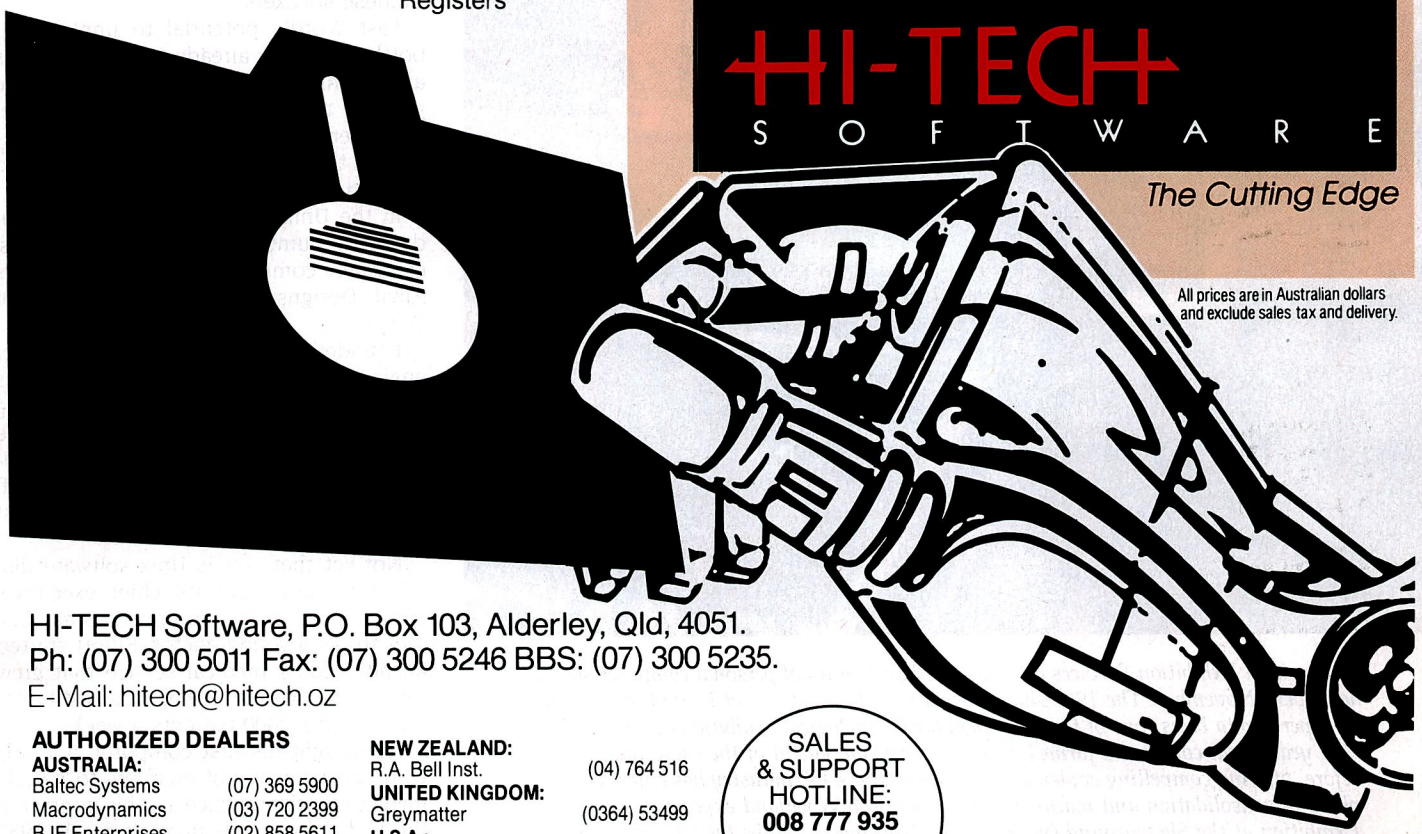
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Queensland Exhibition Services organise Brisbane's annual personal computer show, held every November. The 1988 show drew a record attendance of 15,000, making it, on a per capita basis, one of the most popular technological exhibitions in Australia. Last year, local companies formed a more visible component of the show than ever before, offering compelling evidence that Queensland's PC industry has entered a new phase of consolidation and maturity. Organiser Rob Woodland expects this year's Exhibition at the Showground (9, 10 and 11 November) will be the biggest in the its seven-year history – already over 120 exhibitors have booked more than 200 stands.

dual scan monitor and has a 20-megabyte drive.

'I got out of that end of the market because RAM prices went up so much the profit margin disappeared. But it is where we got our start and I want to go home and do it again ... it's fun.' Fun aside, Bennetts believes the throughput of his plant will make the overall exercise a profitable one even though the margins on each unit will be small.

Over at Uni-X, a different set of circumstances are also leading to changes. Co-founders Ron Thomas, an RAAF officer turned businessman, and ex-Siemens engineer Helmut Stohr, have a reputation for coming up with slightly offbeat ideas that turn out to be money-spinners. Their decision to sell IBM compatibles in kit form falls in that category.

Chinese input

NOW THE TWO have made a bet-the-company move by devoting much of their time to developing a micro-based Chinese language input system called Fast Word. To date, the 50,000 characters in their language have been a bottleneck in the spread of computer technology among Chinese speakers.

Fast Word's potential to unplug that bottleneck has already earned Thomas and Stohr considerable coverage in the general media. Based on some clever character formation and retrieval concepts, the keyboard system has also sparked interest in Taiwan.

In the Unix area, Queensland has produced a number of interesting players, especially communications board makers Anvil Designs and software distributor Qunix.

Founded by three ex-Hartley Computer engineers, Anvil has a range of boards (Stallion, Brumby, Onboard) for unloading Unix terminal I/O that has impressed the market. One-third of Anvil's $5 million annual sales are made in the US and its staff has exploded from nine to 31 in the past year.

Not yet that size is Unix software distributor Qunix, but its chief executive, Peter Elliott, is well equipped to manage growth. As a young doctor, Elliott started an after-hours medical service that grew into a practice employing nearly 40 doctors treating 2000 patients a week.

He bought his first computer, a Tandy with two kilobytes of memory, to handle invoices for the practice and his interest in the technology grew from there. By 1987 his reputation for expertise in Unix sys-

tems was secure and he decided to drop medicine completely and launch Qunix

Said Elliott: 'We have three things going for us: we know distribution, we know Unix because we've been using it for a long time and we have adequate capital backing.'

Another Brisbane entrepreneur who has demonstrated he understands software distribution is Fred Muys of Arcom Pacific. It has been 18 months since Muys and a partner bought an over-extended Arcom Pacific from its receivers and breathed new life into the seven-year-old company. In the process of stabilising Arcom Pacific, Muys has turned the issue of grey marketing (or parallel importing) into a matter for legitimate debate.

'The debate is still simmering in NSW and I am not a liked person in some quarters down there,' Muys said. The recent trends toward fewer 'exclusive' distributorships can be read as a vindication of Muys' stance. It all goes to prove that in the micro industry, as in politics and sport, you can love Queenslanders or loathe them, but you can't ignore them. □

Anvil Designs

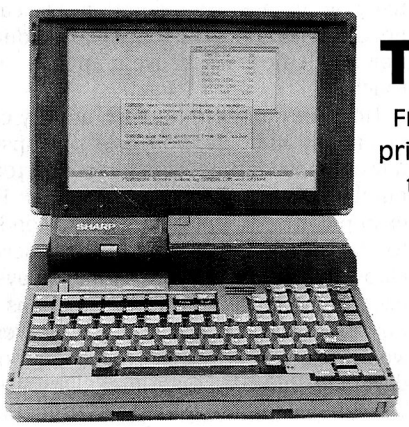
TOOWONG-BASED ANVIL Designs is showing the world that the Queensland computer industry isn't in the outback – the company has gained international recognition for its expertise in developing performance enhancements for the Unix market. Founded in 1985, the company brought together the expertise of Bob Waldie, Michael O'Brien, Tony Meranda and Kim Laurie – a team which which had developed one of the first Unix System V ports for Intel's 80286.

Anvil has grown to a staff of about 30 with a wholly-owned subsidiary in Silicon Valley and a distribution network covering the world; the company also owns 30 per cent of Brisbane-based Command Electronic Services, a computer importer and repairer – it expects turnover to reach $7 million dollars in 1989, half of it from overseas.

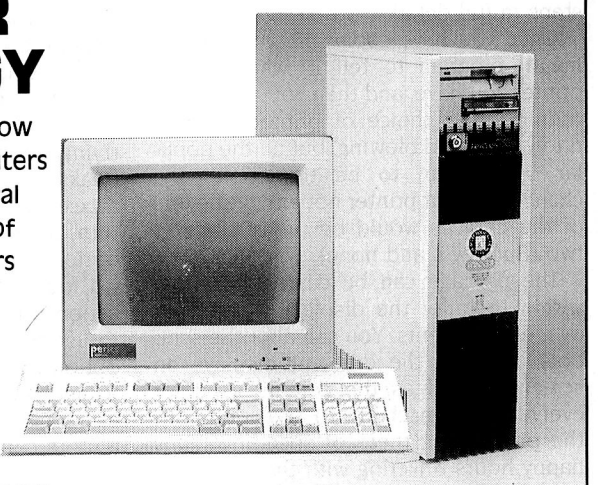
The primary reason for Anvil's success in a world market is that the company's design team has solved the problem of deteriorating performance in an AT as users multiply on a Unix system. The team came up with a multi-processing input/output subsystem that eliminates terminal I/O overhead. That same team has now taken up the I/O challenge offered by the i486 chip, because, as Waldie pointed out, 'Users are going to get tired of seeing that disk drive red light come on all the time.'

Anvil's current product range includes the Stallion intelligent serial communications cards built round Intel's 80186 processor and a variety of memory and parallel to serial conversion chips and line drivers. The company's design team – headed by Merenda and comprising eight software and three hardware engineers – is working to expand the product range with other cards to relieve the central processor of memory intensive task.

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INSTAPLAN FOR SCHEDULING

INSTAPLAN HAS the potential to be one of the great scheduling packages around today. The two things that count against it from the beginning are its cost, and the quality of the printouts. On the subject of cost, I have to confess that when I was confronted with a scheduling package priced under $300, my first thought was that InstaPlan would be another toy that's worse than useless. Well, I don't mind admitting I was wrong (only this once mind you).

InstaPlan (IP to its friends) is not too fussy about what you use – 640K of RAM is desirable (although it will function with 512K, but only just), twin floppy drives or a floppy and a hard disk and a monochrome or colour monitor. I would recommend a hard disk and IP will make full use of EGA graphics if you have them available. Installation is a snack, simply a matter of copying the files off the floppies onto your hard disk. The installation instructions assume a very limited knowledge of DOS (which is good), and go through all the steps in full detail.

Once you have copied IP, you run the Install program to tell IP what sort of printer you have, and then you are off and running. The choice of printers is definitely not mind blowing, but all the popular ones seem to be there, and the chances of your printer not emulating one of the choices would be pretty close to two (Buckley's and none).

The package can be customised from within to tailor the display to suit your own requirements. You can alter the symbols used for the different displays on screen as well as the colours used for everything from charts to text. Certainly, the prospect is there of spending many happy hours tinkering with the display to get what each user considers to be their perfect combination of colours and symbols.

In use, IP is certainly very easy to pick up. The manuals are almost unnecessary because the context sensitive help system tells you almost all you need to know. The manuals do, however, give you a background explanation of critical path planning and scheduling of projects and some information which is not found in the help screens. Overall I would rate the manuals as very good, my main complaint being the quality. The screen shots look a bit amateurish, and the overall impression is of a low-budget publication, but at the price, who can really complain?

InstaPlan is a low-priced scheduling package aimed at Microsoft Project's slice of the market – David Chatwin gives it the thumbs up!

Menus

THE WHOLE PACKAGE is menu driven, with the menu at the bottom of the screen. The menu is invoked by pressing either the F10 key, or (in true 123 fashion) by pressing the / (slash) key. Why they have two means of invoking the menu eludes me, but I suspect they may be trying to make things easier for Lotus freaks. Choices within the menus can be accessed by using the arrow keys and return, or by pressing the first letter of the option.

I found it a little hard to adjust to the action within sub-menus, since you have to use the spacebar to select or alter the option you want. Sometimes this will lead to another menu, and sometimes it acts as a toggle; I would have preferred to seen a more consistent user interface. In addition to the menu system, IP also supports a number of function key assignments which make some of the more commonly used actions a whole lot quicker and easier to use than the menus would otherwise allow. Some of the things supported by function keys include changing the view and linking tasks.

Setting-up your new project is simplicity itself, although IP insists on a project name, before it will let you start playing around with the actual scheduling process. I find this a little bit annoying, as sometimes I just like to dabble for a while in a package, with no intention of saving my work.

Entering tasks is very easy, you just select the appropriate display that you like (be it Pert, Gantt, Activity or whatever), move to where you want to put the task, and press the Ins key. InstaPlan shows some finesse here, in that you can actually enter activities in various levels or groups of tasks. This allows you to do things like setting a heading called 'Painting', and then below this heading, set out the various areas to be painted. When you are looking at the project you can elect to see all the detail, or to summarise each heading, so that you only see the overall duration for that group of activities.

It is also possible to have sub-headers and sub-sub-headers and sub-sub-sub . . ., but maybe you get the message! This is a very powerful option, and it makes IP just that much nicer to use as most managers tend to like to group tasks into various activity groupings. The duration for each header also shows the total elapsed duration for all the tasks it covers, another nice touch.

Time (or duration) for each activity can be entered in hours, work days or elapsed days. Elapsed time is simply the total number of days between two dates. For example, if something runs from Monday to Sunday inclusive, it covers seven elapsed days, but only five working days. I liked this option for time input, as it makes it easy to input times of several weeks, without having to worry about holidays and the likes. One immediate use I can think of for this is to allow curing time on concrete, which will take seven days, regardless of whatever holidays occur in the meantime.

Linking tasks is not hard, but can be a little bit tedious, especially if you use the menus. Using the menus to link tasks involves too many steps to make it practical for a large project. Luckily, there is a function key assignment which allows you to short-circuit the menus, and that makes the task of linking almost bearable.

One thing that I welcome in any package is the Undo option, and IP has it.

Undo will restore your chart to the way it was before the last change you made. Great for us klutzes! Resources in IP can be centred around dollars or time. This is a good thing, as some people will want to work in dollar terms, while some will want to work in hour terms, and IP seems to cater reasonably well for both.

Allocating resources

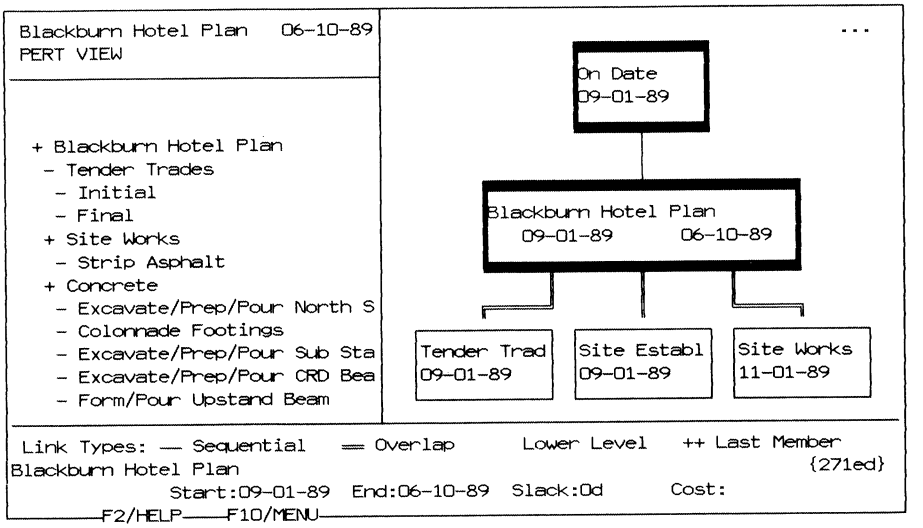
I LIKED the ability to allocate a resource to a task in any number of ways. You can assign the resource by defining a proportion of it's available time that can be spent on the activity (half or full time, and so on), or in terms of a certain number of hours per day, or even just as a total dollar value. Even nicer is the option of defining just when during an activity the cost of the resource will accrue to the project. It can accrue at the beginning, the end or over the duration of the activity.

Resource allocation can be reviewed in dollar terms in the spreadsheet view, which shows all the resources that go into an activity and their costs, as well as the total cost. As you would expect there is a screen which shows the resource loading on a histogram type chart. This chart is no better or worse than those available in the majority of these types of packages. IP offers the user the option of defining as group of activities to 'focus' on. These can be selected on the basis of a number of criteria, including dates, linkages and status (critical, completed, and so on).

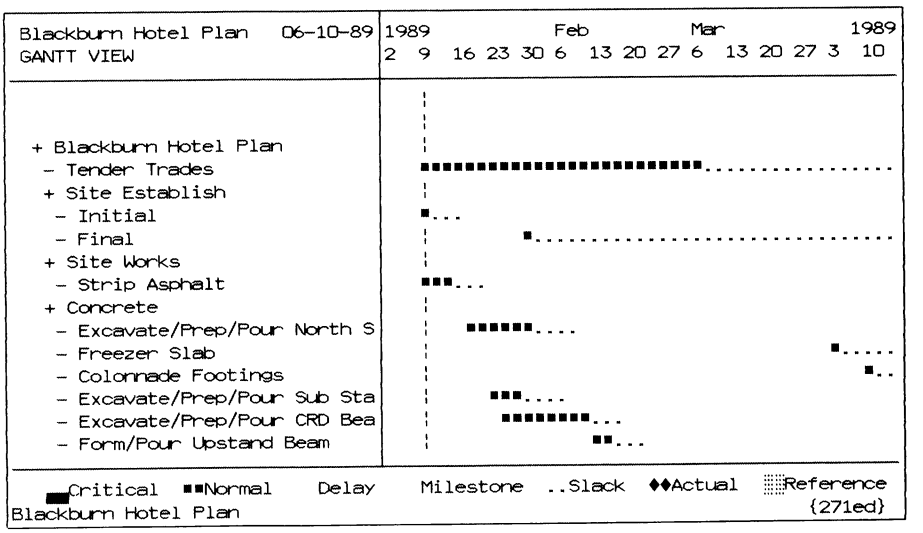
As I said before, one area that IP fails to really shine is in the area of output. The printouts for most of the graphical charts range from acceptable to mediocre at best. On the plus side, the tabular printouts are not too bad at all, and are in most cases quite good. I found it near impossible to get a decent looking Pert or Gantt chart with IP. Even the Classic Pert option prints out a Pert chart which I would not really be proud to own up to. The layout of tasks seems somewhat arbitrary, and the links between them can get very confusing on the printout.

This is a shame, as this side of IP really lets down what is otherwise a very good package with a lot of good features. If they could only incorporate Pert charts like those found in SuperProject and the likes, the whole package would be so much better. On the positive side with reports, as I said before, the tabular reports that can be produced are quite good. You can produce tabular reports for activities, resources and the overall schedule.

IP requires you to define a report before you can use it. When you define a report, you specify basically how you want the report to appear, including selecting specific activities, the time scale to use, what level of detail to go to, headers to use and so on. This process is a bit tedious if all you want to do is quickly run off a single report, but it does allow you to build up a library of standard reports for each project, which can be easily recalled for repetitive printing over a period of time. You can



The Pert chart is quite rudimentary, although the links between activities are clearly shown as long as there are not too many.



InstaPlan's Gantt view clearly shows the relationship between individual activities and their header.

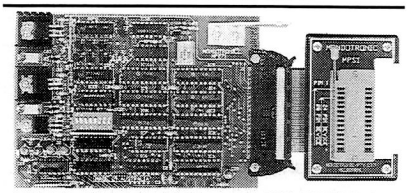
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If you are thinking of buying a project scheduler, check the quality of IP's output before you decide – if the graphs are good enough for your use, you will be getting a real bargain.

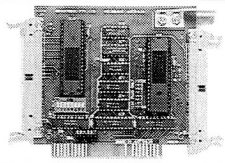
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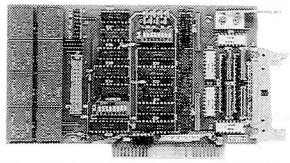
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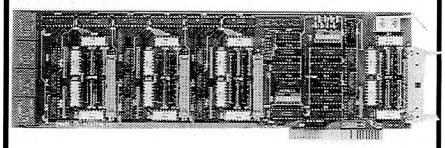
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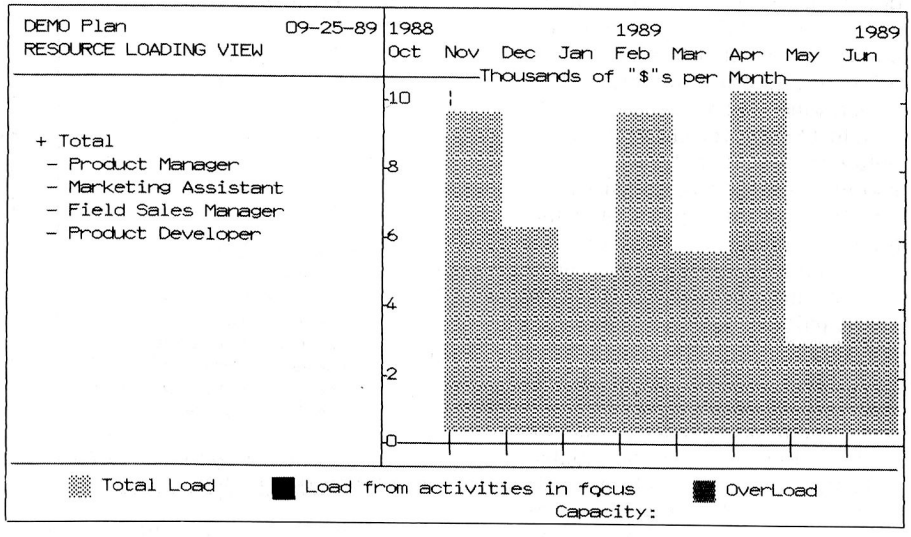
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INSTAPLAN

DEMO Plan SPREADSHEET VIEW	11-25-87	Total	Product	Marketin	Field Sa
+ DEMO Plan	{381ed}	$93290	$22000	$31000	$28350
- Consumer Research	[4w]	$14400		full	full
+ Product Development	{112ed}	$20540	$2000	$3000	$8400
- Develop Alternatives	[5w]	$1500			
- Develop Packaging	[4w]	$8600	2h/d	2h/d	full
- Conduct Customer Test	[2w]	$5400		full	full
- Incorporate Changes	[1m]	$5040			
+ Test Marketing	{98ed}	$16600		$4000	$12600
- Akron Introduction	[4w]	$9600		full	full
- Conduct Test	[8w]	$5600			half
- Evaluate Test	[2w]	$1400			half
+ Market Launch	{141ed}	$41750	$20000	$20000	$1750
- Buy Media Space	[2w]	$4000	half	full	
- Prepare Advertising	[16w]	$32000	half	full	
DEMO Plan					{381ed}

The Spreadsheet view shows how resources can be allocated to an activity by dollar terms, or on number of hours per day, or on the basis of available time.

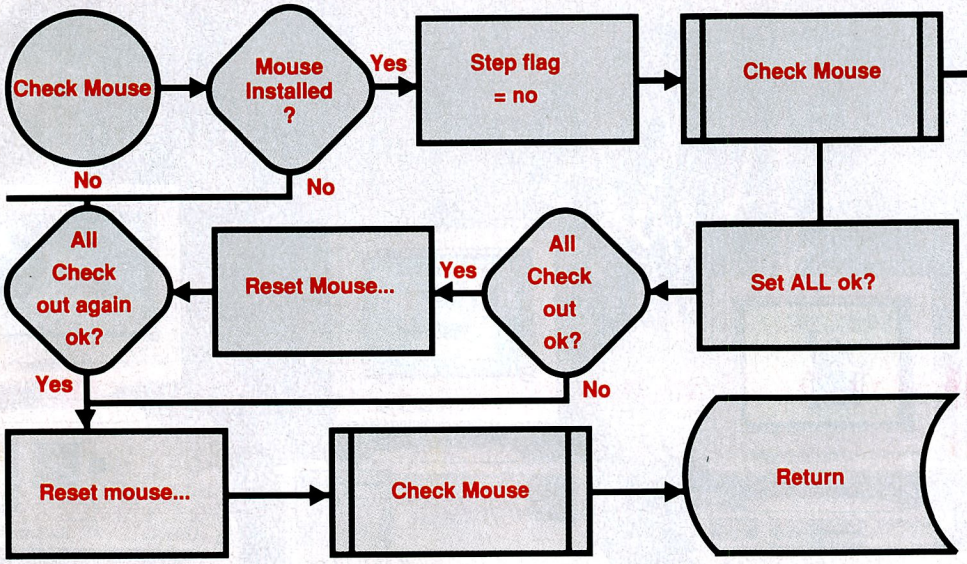


Resource loading is shown on a histogram-type chart – users have the option of defining as group of activities to 'focus' on. These can be selected on the basis of a number of criteria, including dates, linkages and status (critical, completed, and so on).

even define different formats of the same type of report, say for issue to different people. As another plus, IP will export to a variety of its information to a number of different file formats, including Lotus and DBase.

In the long run, IP is obviously gunning for the likes of Microsoft Project. In most aspects, it makes a worthy competitor for this level of package. Where it falls behind is in the graphical output area. If IP could lift its game here I might think about giving it an unqualified seal of approval. If you are thinking of buying a project scheduler, check the quality of the IP's output before you decide – if the graphs are good enough for your use, you will be getting a real bargain. This is especially true if you just want to play around with computerised scheduling. If you decide you don't like it, the financial loss will not hurt too much. If, on the other hand, the quality of the graphs is important to you, then it might well be worth spending the extra money on a package with better graphics. □

IS FLOW CHARTING A DRAG ON YOUR RESOURCES





Flow Charting II+ is the simplest and easiest way to produce flow charts. Don't spend hours designing and drawing flowcharts, and then have to redraw the whole thing because you want to add one small step in the middle. With *Flow Charting II+* you save your flowcharts to disk and should you need to make an alteration, just call it back, make the changes and reprint.

Flow Charting II+ is a precision instrument specifically designed for flowcharts and organisation charts. Flow chart construction is not just a sideline on a graphics program that has other things to do. *Flow Charting II+* lets you: Type inside or outside shapes, on line or free area. Define pieces of your chart to save in special images files for later use in other charts. Define pieces of sections anywhere on the chart, to move, copy, or even delete. Zip across your charts with an accelerated cursor or use the cross hairs on the shrink screen at a faster pace.

FLOWCHARTING II+ FEATURES.....

10 Font Styles: You can choose from normal, bold, high, wide, fat, Greek, super-script, sub-script, or title.

A Wide Variety of Shapes: 26 shapes available. Shaded boxes available. Perfect for organisation charts and a summing function for the mathematicians.

Undo Lines: If you draw a line to the wrong place, your back space key in line mode will erase it right back to its origin, redoing connectors and bypasses as it travels.

Text Functions for Quick Editing: Blocks of text, words, or even just letters can be moved, deleted or inserted quickly and neatly. Select Auto Centring and let the program do the placement within shapes - or turn Auto Centring off and put comments alongside the chart.

Comfortable User Interface: Function keys or alpha keys to select options. Full mouse support for the non-typist.

Print Multiple Files Without Interruption: Charts are constructed for standard paper sized, 8 1/2" x 11", 8 1/2" x 14, or 14" x 11". Select charts to be printed, and the computer can print them without interruption.

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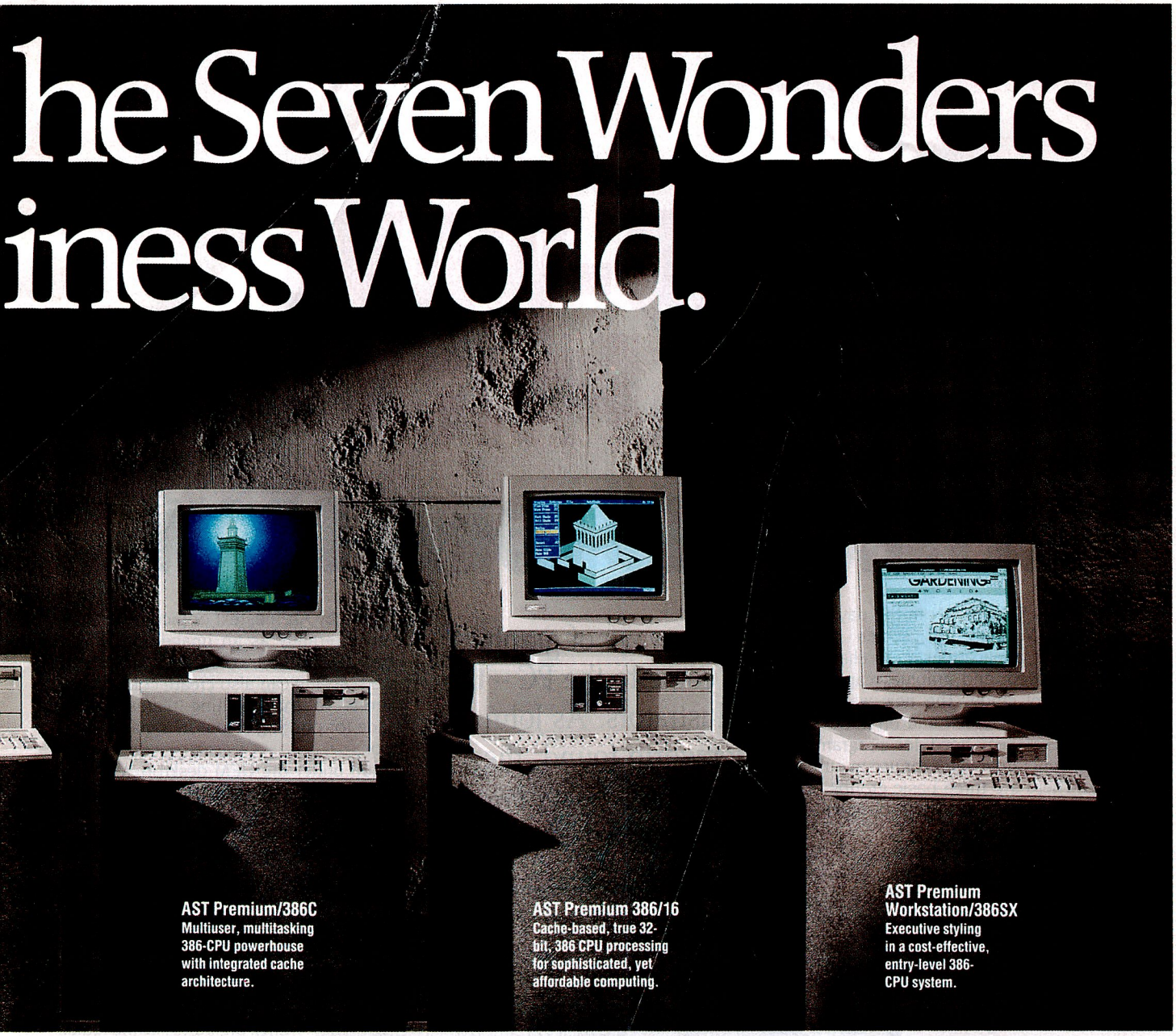
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THIRD-WAVE GRAPHICS

ARTLINE AND COREL DRAW

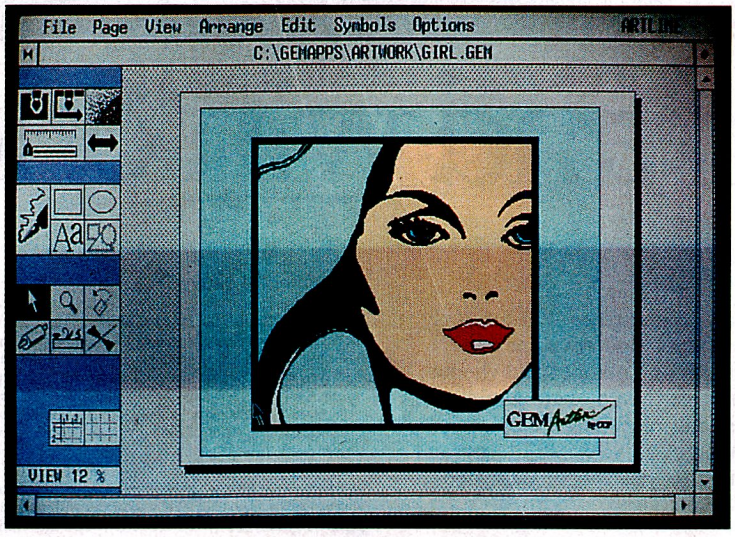
A new wave of graphics has come to the PC – the illustrators. As John Hepworth found, they bring a whole new dimension to drawing. . .

THE PC WAS BORN in the days of text. Virtually all screen and printer applications were character based, and graphics capabilities were very crude. The new wave is graphics, both on screen and on paper – and there is a real need for programs which can generate images for use in publications. There are three basic groups of graphics programs: painting programs, CAD and illustrators.

The initial painting programs, like PC Paintbrush and Windows Paint, created crude graphics and stored them as individual pixels. Their output is barely satisfactory on screen or low-resolution dot matrix printers, and quite inadequate on lasers.

For engineering and architectural drawings, CAD packages like AutoCad offer a solution. These are very useful for creation of drawings, which can be plotted in full for use in the workshop, or can be read into Ventura and similar in small size. Their output is rather clinical and not always suitable for creation of illustrations in a manual or book.

The third wave are illustrators. The Adobe program Illustrator on the Mac lead the way; now there are a number for the PC. One of the latest, Artline, comes from Digital Research.



In Digital Research's Artline, objects can be filled with one of 16 colours and various textures (colour mixing is not possible). The effects are somewhat like a cartoon, but are attractive and usable.

Artline

ARTLINE IS AN illustrator, but it is an illustrator with a difference: while it is very competent at creating pictures, it is exceptional at generating fancy text. Everything created by Artline, text or pictures, is handled internally as an image and can be stretched, turned, coloured and manipulated. Artline can also create colour separations so that printing plates can be made for printing colour in a magazine or book.

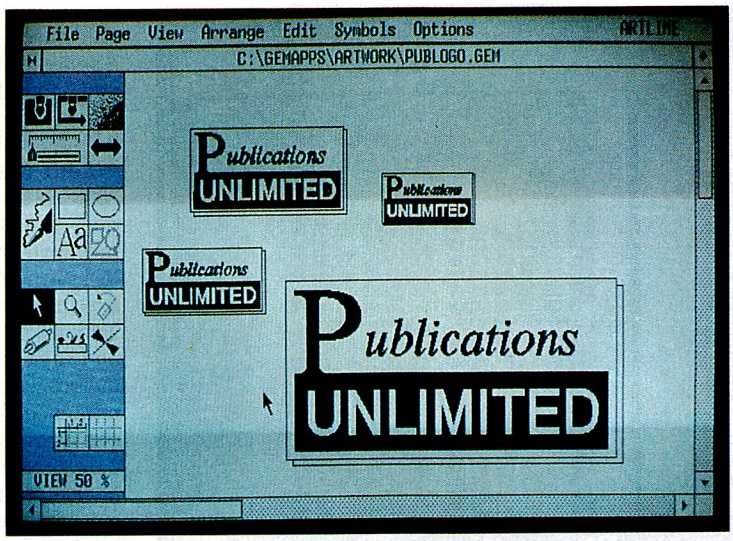
Run under the GEM desktop, a device-independent graphics environment also from Digital Research, the resolution of its output is limited only by the device used. A printout on a dot matrix printer has a resolution of one pin diameter; on a laser printer it is the minimum dot size of the printer; and on a PostScript typesetter like a Linotronic it is even finer.

After installation (which I'll talk about later), fire up GEM. One of the icons will be Artline. Click on it and Artline loads. A mouse is virtually essential, as while most actions have a keyboard equivalent, mousing is far more convenient. The screen that appears has a menu bar across the top, an area for tools at the left, and a drawing area in the middle. Menus can be popped down by pointing to an entry in the menu bar.

Drawings can be in five sizes: Letter, Legal, B5, A5 and A4. In each case, they can be in landscape or portrait modes. The image can easily be zoomed, using various techniques, though the easiest is probably to use the grey plus and minus keys at the right of the keyboard. When zoomed in,

only part of the page can fit within the drawing area, but by clicking on a scroll bar at the right of the screen and another at the bottom of the screen, allows the area of interest to be seen.

Various selections can be made in the tools area. The line width, line end style, line colour, fill colour, and fill density start off the range. Drawing tools include rectangle, ellipse, text, quill and symbols. Image manipulation tools are selector, magnifier, rotator, rolling pin, plane and flip. A picture can be drawn using three tools, rectangle, ellipse and quill. Rectangle and ellipse allow those shapes to be drawn by clicking on a start point and dragging to an end point. Naturally, squares and circles can be drawn with these tools, as these are just specialised examples of rectangles and ellipses. Quill is special – it allows straight lines and curves to be drawn. A curve is drawn by marking an anchor point at each end of the curve, and marking lines that are at a tangent to the curve at each anchor point. By varying the angle and length of the tangent line, the shape of the curve changes. Curves drawn this way are known as bezier curves, and the technique allows quite complex curves to be drawn very smoothly. Images loaded from a scanner can be manually traced provided the system has expanded memory.



Artline is an illustrator, but it is an illustrator with a difference: while it is very competent at creating pictures, it is exceptional at generating fancy text.

Text is inserted by clicking on the text tool. Next click on the drawing at the place where the lower left corner of the text is to appear. A window now opens and the text is typed in, with the user being able to select type size and type face. When satisfied, the text is placed on the screen.

In Artline, everything is a series of curves. A character is just a series of curves grouped together. A word is a series of characters grouped together. A drawing can consist of straight lines, curves and text. Each element in a group can itself be a group of lower-order elements. This concept allows the image manipulation tools to change the shape of any drawing, text, or part of either.

When the selector tool is chosen, any one group can be selected. It can then be stretched or shrunk vertically or horizontally, or moved in any direction. The rolling pin can be used to fan out an image, so that one side is stretched while the other side stays the same. The plane allows a number of points within a group to be selected, and for those points to be moved while the other points in the group are unaffected and lines joining moving points to fixed points are stretched and realigned.

An image can be saved in its own file. As an alternative, several images can be saved as symbols in a symbol file. With Artline come several symbol files, with a good range of symbols. The user can use theses as a basis for an illustration, or can create new symbols for inclusion in a symbol library.

The Artline package comes with twelve 5¼ inch and seven 3½ inch disks for Artline, GEM and Bitstream fonts. The installation is reasonably easy. First install GEM, by running the program GEMSETUP on the first GEM disk. This leads the user through a series of questions to determine the hardware configuration, and then creates the directories and copies files across.

Artline is installed from within GEM by putting the first Artline disk into the A drive, selecting the A drive and clicking on the install program; installation is automatic.

When the automatic program terminates, there are 9 font combinations available, using 3 basic type faces in various combinations of bold, italic and so on. Also included in the package are some Bitstream fonts. While these can be used for general GEM applications, Artline requires fonts to be installed for PostScript printers regardless of the printer actually used, and the disks supplied would not create fonts for PostScript.

Artline is suitable for use with IBM PC, AT, PS/2 and compatibles; 640K of memory and a hard disk are required. Monitors supported include CGA, EGA, VGA, WY700 and several others. Printers supported include PostScript, LaserJet, various Epsons, Toshibas and IBMs. Additional driver packs are available at nominal cost form Digital Research.

There are no less than eight manuals supplied with Artline. All are quite well written, though one result of having so many is that quite frequently one has to jump from one to another to get information, and there is occasionally a need to resolve apparent difference between them.

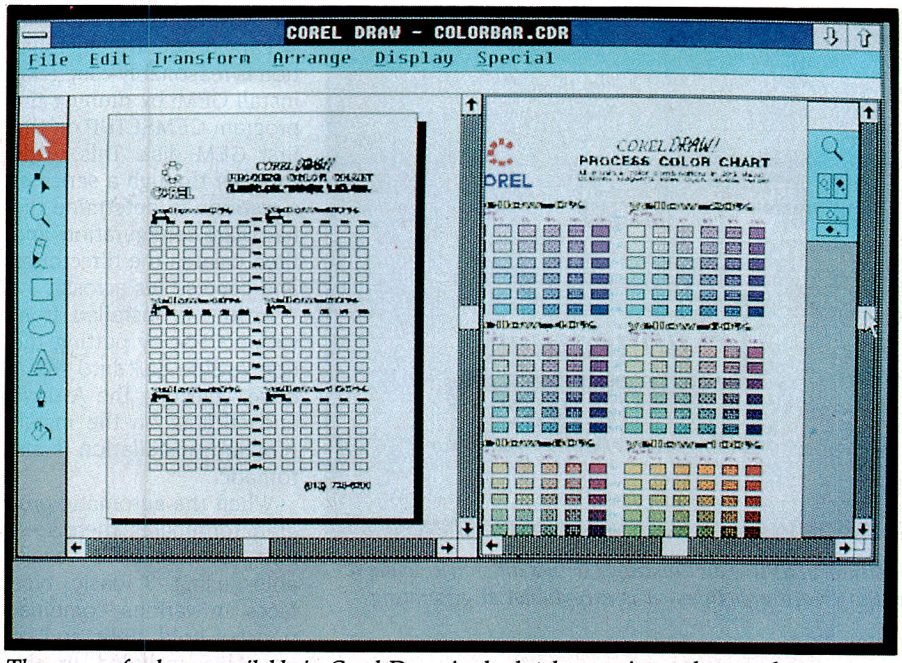
Artline is a product fighting for a place in a tough school. The competition includes Corel Draw and Adobe Illustrator. Both of these are more powerful than Artline, but Artline has two significant advantages: it is cheaper, and it runs on lesser hardware. Corel Draw requires an AT or better with 640K of memory and Illustrator requires an AT or better with 1 MB of memory. By contrast, a plain vanilla PC with 640K of memory suffices for Artline.

Artline is an excellent tool for anyone working in desktop publishing: its abilities

Product Details

Product: Artline
Distributor: Quercus Distributors Pty Ltd,
4/159 Burbridge Road,
Hilton 5033 SA
(08) 234 1511
Price: $750

Artline is an excellent tool for anyone working in desktop publishing: its abilities to create amazing text effects, custom logos, and illustrations are invaluable.



The range of colours available in Corel Draw is absolutely amazing – they can be defined as one of the widely-used Pantone series; or, the primary colours magenta, cyan and yellow, along with black, can individually be specified in steps of 1 per cent from 0 to 100. Colour printers like the Paintjet can print the output in colour directly.

to create amazing text effects, custom logos, and illustrations are invaluable. The whole process is so totally visual that any written description is inadequate. It is easy to use, though some experience is necessary to exploit it fully.

Corel Draw

COREL DRAW IS an illustrator which runs under Microsoft Windows. It allows lines, rectangles, ellipses, and freehand curves to be very easily drawn. Text can be entered, in almost any size imaginable and with a vast range of type faces, and can be aligned to an arbitrary curve if desired. There is fantastic control of the colour and width of outlines, and of the colour and texture of fill. There are a good range of functions to rotate and skew shapes and groups of shapes, and an excellent range of file types for import and export of images. It can also accept images from scanners and trace the bitmaps images that these create.

All the drawing and editing functions are instinctive, though naturally, as with all drawing, artistic talent is necessary if a masterpiece is to be achieved. The important thing is that Corel Draw takes away most of the drudgery associated with sketching either on paper or with many other drawing packages.

Corel Draw stores all its data, both shapes and text, as smooth bezier curves rather than as individual pixels. A bezier curve is not just as one arbitrary dot after another, but a smooth curve joining a point marked at the start of the curve to a point at the end of the curve. At both the take-off point and the landing point are tangent lines. These leave the points in the same direction as the curve, and their length sets how sharply the curve may be bent near each end. The shape of a bezier curve can be changed by moving either the take-off or landing point (known as nodes), or by changing the length or angle of either of the tangent lines. Very complicated shapes become a series of beziers joined end-to-end.

In Corel Draw, curves entered freehand are automatically converted to a series of beziers, while ellipses, rectangles, straight lines or text immediately become Beziers as they are entered. Text is a series of curves forming the outline of each character.

Any object can be edited by moving the start, finish or intermediate nodes, or the length or angle of any of the tangent lines. Individual nodes can be deleted or added as required. Amazing text effects are available based upon the fact that any letter is a series of Bezier curves attached end-to-end, and thus individual letters can be edited by moving any of the nodes that define its shape.

Corel Draw requires either an 80286 or 80386 processor, so at least a PC AT is required. As a result, it comes on three 1.2 megabyte 5¼ inch disks, with 3½ inch disks available as an alternative. The package includes an excellent manual around 2cm thick, well-illustrated, spiral-bound, and logically and clearly expressed. Also included are a character-and-typeface reference chart, a colour chart, a transparent typescale for measuring printed type, a quick reference booklet with last minute advice of the sort usually found only in a read-me file on disk, and a booklet showing small samples of each of the Clipart images which come on disk with Corel.

Corel Draw runs under Microsoft Windows, though no run-time copy of Windows is included, and Windows must be separately purchased. If Windows is not already on your machine it must be installed before the Corel installation can proceed. Next, an install program on the Corel program disk takes care of installing the program, asking the user for choices from time to time and prompting when a disk must be changed. In the process, a subdirectory for Corel Draw is created below the directory containing your copy of Windows, and a batch file is created which will load Windows from DOS and go straight to Corel Draw. Alternatively, change to the Corel Draw directory from within Windows and run Corel Draw by clicking on CORELDRW.EXE.

First the main Corel Draw screen appears. It is in standard Windows format, with a title bar across the top, menu bar beneath it, and borders and scroll boxes. The menu bar shows the headings for six menus, File, Edit, Transform, Arrange, Display and Special. A toolbox bar appears vertically at the left of the window. While only 9 tools appear in the toolbox, between them they achieve more than the greater range of tools found in many drawing packages, and with less frustration from having to change tools all the time.

Most of the window is reserved as the drawing area. In it is outlined an area imitating the area of a printable page. Only the outlines of the various objects are visible within the drawing area. None of the fill colours and textures can be seen. When foreground objects overlay background objects, the outlines of all of them can be seen, making it easy to select a

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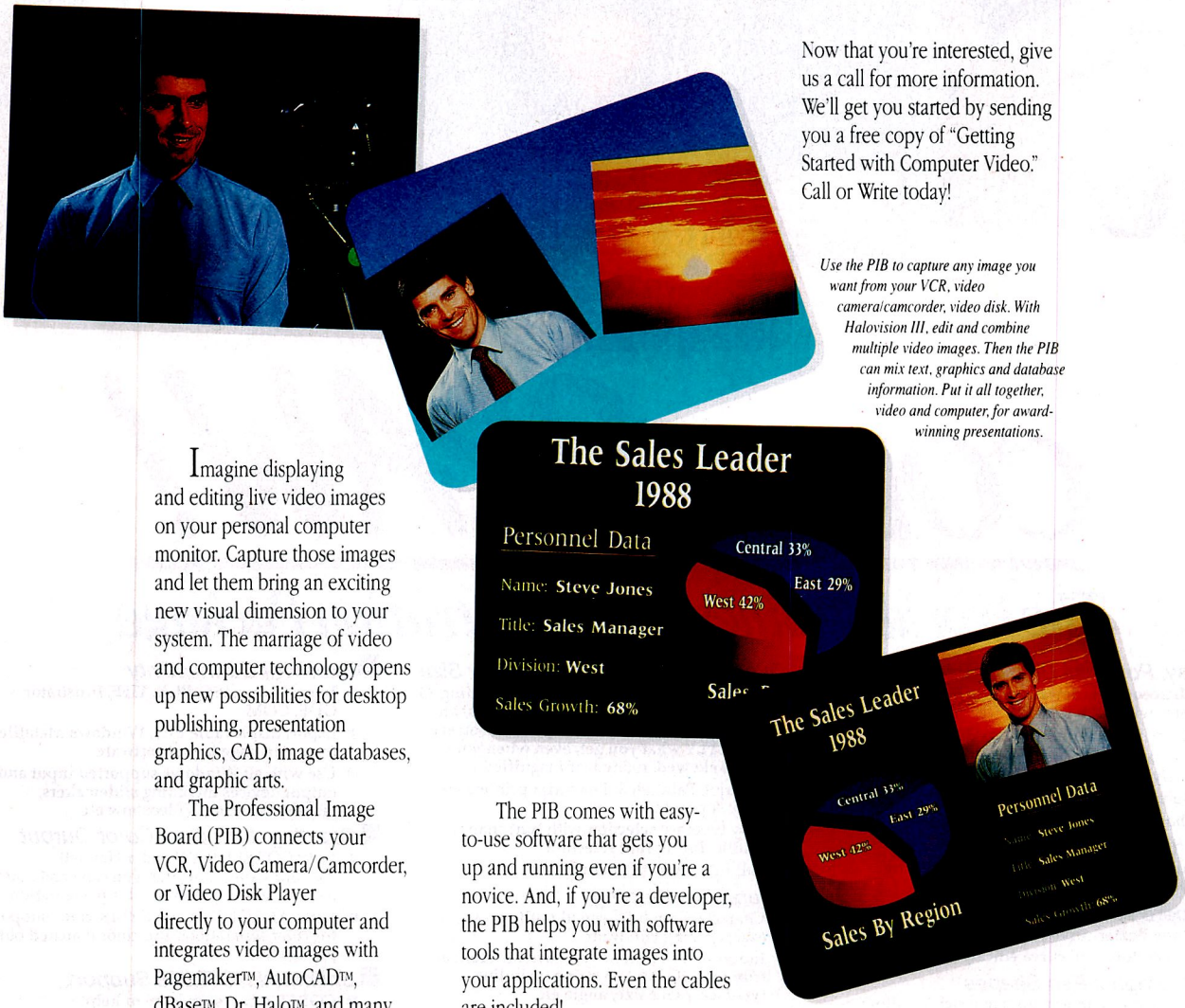


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background object for manipulation.

To see the final result, select Show Preview from the Display menu. Now the screen divides vertically into two windows, with the drawing area and its wire-frame images at the left, and a preview area at the right showing the finished result in colour and texture. The relative size of the drawing and preview windows can be altered, they can be arranged side-by-side or one above the other, and they can be independently zoomed.

The Pick tool selects, rotates and skews objects, which can be drawings, text, or groups of drawings or text. The Shape tool allows nodes where one curve joins another to be moved. It can also change the length or angle of tangent lines, and so alter the shape of the curve. Zoom allows zooming in to see fine detail, or out to see the whole page, with almost infinite range between.

Pencil takes care of freehand drawing. The user holds down the left mouse button, and draws a freehand line on the screen. When the button is released, Corel Draw analyses the line, and converts it to a series of bezier curves. The same tool is used to draw straight lines by clicking and releasing. Rectangle draws a rectangles of any dimension by clicking to define one corner, and dragging to mark the diagonally opposite corner. Ellipses are similarly drawn by clicking and dragging to define the major and minor axes. Text allows text to be entered, type faces and sizes selected, and the result placed on screen at the desired place.

Outline allows the colour and width of the outline of the selected object to be altered, while Fill controls the colour and texture of the colour filling an object. The range of available colours is absolutely amazing. They can be defined as one of the Pantone series, consisting of several hundred colours. Alternatively the primary colours magenta, cyan and yellow, along with black, can individually be specified in steps of 1 per cent from 0 to 100. The preview screen displays the results. Colour printers like the Paintjet can print the output in colour directly. Other printers, particularly laser printers, can create colour separations from which printing plates can be made.

Corel Draw offers around 50 type faces, many of which match closely the standard PostScript type faces. On screen the type faces resemble very closely the image that will be printed on paper, subject to the inevitable distortion that occurs with the subtle variation between monitors. Individual characters in a string can have different attributes to each other. Interactive kerning allows characters to be dragged so that the space between them is exactly what you desire. As indicated before, once text is on the screen, the shapes of individual letters can be edited, and text can be fitted to a curve or to available space.

Any object, including multiple objects which have been grouped together, can be selected by pointing with the Pick tool to any point on the boundary and clicking the mouse. At this point the selected items can be moved, stretched, shrunk, skewed in parallelogram mode, or rotated. It is possible to move or rotate through infinitely small steps, or set the grid to a predetermined size, and have movements snap to grid positions. Rotations can likewise be infinitely small or constrained to increments of 15 degrees. Any node, or multiple nodes, can be selected while other nodes, even in the same object, are not selected.

There was only one manipulation mode that I wanted that wasn't included in Corel Draw version 1.0. It could not do a wedge type skew, which would allow one side of a rectangular area to be stretched or shrunk while the opposite side remains the same length. A reliable source indicates that this valuable feature will be added to version 2, available in late 1989.

Corel Draw can import and export graphics files in a variety of formats, essential if you want to enhance drawings from other sources or send output to desktop publishing packages or to other applications. The import formats are PC Paintbrush, TIFF, Lotus .PIC and Adobe Illustrator, while export can be as Encapsulated Postscript (the best option for export to Ventura or PageMaker), Windows Metafile, PCX (PC Paintbrush) or TIFF. In addition one Corel Draw file can be merged into another drawing.

Tutorial

ON VHS VIDEO tape comes a tutorial which runs for around two hours. In it, one of the chief designers of the program runs through a comprehensive demonstration of the package, and shows on screen and audio what can be achieved, and how it is done. The things shown are vital, the sequence is good, and the presenter knows the subject. The only negative about it is that it is presented almost completely unedited, and when there are minor 'fluffs' in reading the script, they remain in the tape. It remains very, very useful, and is at least as good as having a personal demonstration from one of the creators of the package.

Both Artline and Corel Draw are highly competent at creation of fancy text and in the quality of actual output to a printer, but both have their place. Corel Draw has far better freehand drawing, and a vastly better range of colours and type faces than Artline. Corel Draw will auto-trace bit-mapped images, while Artline only offers manual tracing. Artline includes a copy of GEM, while Corel Draw runs under Windows and a copy of Windows must be purchased separately. Artline plus GEM costs a little less than Corel Draw on its own, and around 75 per cent of the cost of a copy of Corel Draw plus a copy of Windows. Artline will run on any PC, even a 4.77 MHz 8088, and has adequate speed on even a slow machine, while Corel Draw requires a 80286 or better.

Weighing up all the variables, I come down in favour of Corel Draw by a big margin. Its freehand drawing simplicity and colour flexibility are easily worth the extra cost, provided a suitable machine is available, though for 8088 machines or users with a tight budget, Artline is a good alternative. As a result, Corel Draw has joined the select group of applications with a permanent home on my PC. □

Product Details

Product: Corel Draw 1.1
Co-distributor: Trio Technology
2/115 Bluff Rd,
Black Rock 3193 Vic.
(03) 521 0099
and
Co-distributor: Webster and Associates
2A/4 Aquatic Dr,
Frenchs Forest 2086 NSW
(02) 975 1466
Price: $1095
Note: Version 1.0 was reviewed; version 1.1 is now available: new features include over 100 fonts, a convertor for Adobe and Bitstream fonts, full clipboard support, a Skodel interface for film recording devices and an expanded Clipart range. Upgrades are available from $195.

Its freehand drawing simplicity and colour flexibility are easily worth the extra cost, provided a suitable machine is available, though for 8088 machines or users with a tight budget, Artline is a good alternative.

Look what I did



"I didn't think it was possible on a PC, but COREL Draw changed my mind!

The powerful type control and illustration features were beyond my wildest expectations.

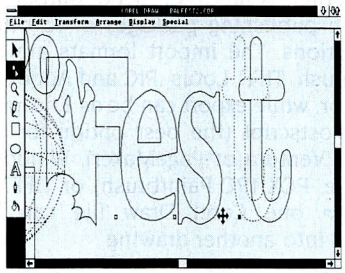
I can adjust character spacing on the screen. Fit text to a curve. Stretch. Skew. Rotate. Or transform individual letters, words or sentences.

COREL Draw includes over 70 professional typeface outlines. And it lets me add hundreds of other typefaces.

I can edit any of these to create my own custom letter shapes.

COREL Draw creates smooth bezier curves. It adjusts the finer points of my freehand drawings, lets me make subtle changes and refine each element. The curve editing features are awesome!

With the Autotrace feature I can convert bitmaps to vector-based artwork.



The unique calligraphic pen adds a human touch to my line drawings.

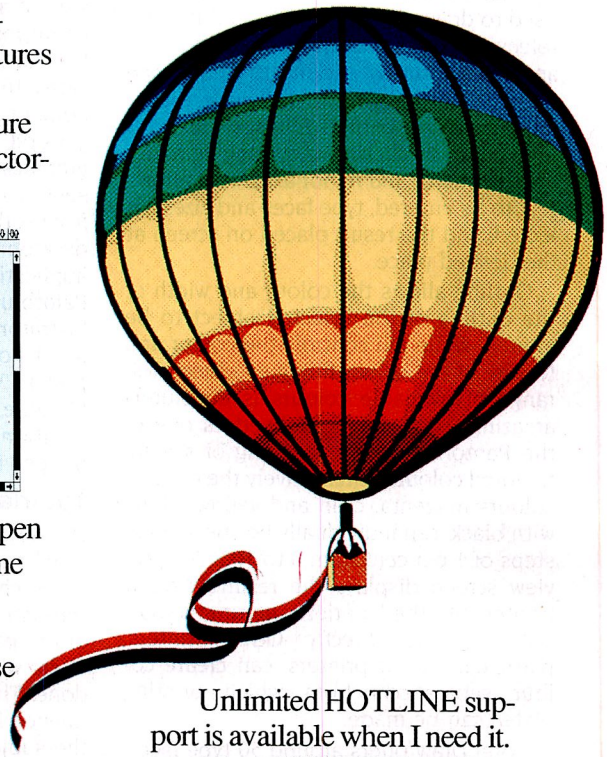
And talk about color! COREL Draw lets me choose colors from the Pantone™ Color Matching System or mix my own. I can even blend from one color to another using fountain fills.

Color separations and color-matched printing is just a mouse click away.

HP LaserJet®, PaintJet® and other Windows' printers perform like PostScript® printers with COREL Draw!

Extensive export features let me include my graphics in PageMaker® and Ventura Publisher™. Even the IBM® mainframe understands my files.

A comprehensive manual, video tutorial, type gauge, and clipart library are included in this feature-packed program.



Unlimited HOTLINE support is available when I need it.

I found COREL Draw incredibly fast, uncompromising in quality and very easy to use. The rave reviews were right on!

Let's see what YOU can do with COREL Draw!"

with CORELDRAW!



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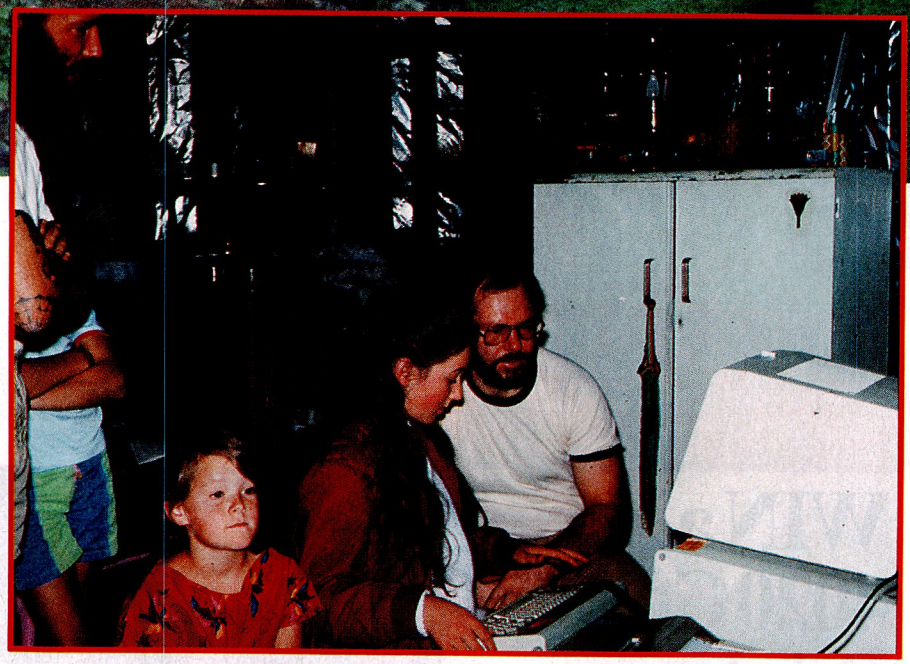
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THE LONG-DISTANCE LEARNER

Computers are hardly new to classrooms – but as Sharon France reports, those 'classrooms' can now be hundreds of miles from the teacher.



Tara Nash, of Elands NSW, was one of the Year 7 students who took part in the Department of Education's Correspondence School's trial using computers and telecommunications to bring learning 'on-line.' Tara is shown receiving instructions from John Reynolds of the Technology Unit (seated) while other members of the family look on.

YOUNG JAMES WAITS by the door for his father to return from town. On the way back he will pick up the mail from the letterbox at the end of the long, dusty road which leads to the boundary of their cattle station. James knows there will be a package for him. No, it's not his birthday, James often receives mail because he is one of many children around Australia who study by correspondence.

He is especially anxious today because he is waiting for the results of his maths test which he completed four weeks ago. Studying by correspondence can seem to be a long, drawn out process – especially if the post is delayed. Being isolated from your school mates can sometimes be difficult and the delay in feedback for completed work would make Pavlov howl! But, in all, the system does the job and there are improvements in sight, as many correspondence schools turn to computer technology to address some of the problems associated with 'the tyranny of distance.'

The NSW Department of Education Correspondence School is a fine example of the integration of computer technology in the field of education. Not only are students in isolated pockets of NSW benefiting from being on-line, all correspondence students are the recipients of better produced notes and literature created by



teachers and staff who are ably assisted by a bank of Macintoshes at the Correspondence School in William Street, Sydney. The computer technology does not stop there, but extends to course and project management (using Toshiba and Sharp laptops) word processing en masse (with Sperrys and Macintoshes), staffing (with Macintoshes), student enrollment and general record keeping (on Hyundais) and the specialised areas of music and language (in particular Japanese) course material production (using Macintoshes for music and Toshiba and Epson POs for Japanese).

Keylink

PERHAPS THE most obvious application for computers in distance education is telecommunications. The NSW Correspondence School is in the first stage of implementation of an electronic mail system using Keylink. This comes after an extensive trialling period in 1986/87 which encompassed secondary and primary students both full and part-time.

The Keylink telecommunications system is not intended to replace the more traditional methods of distance learning – printed course leaflets, audio and video cassettes – but rather to complement them. Telecommunications used in this way can enhance motivation and learning through rapid feedback and immediate attention to difficulties, enabling remedial work to be given soon after an assignment has been marked, or advanced work to be issued to faster students. A peer communications network is also possible allowing isolated kids a chance to send messages to each other and generally 'chat' about their work and their lives. It also promotes an interactive bond between students and teachers – another product of immediate feedback the system provides.

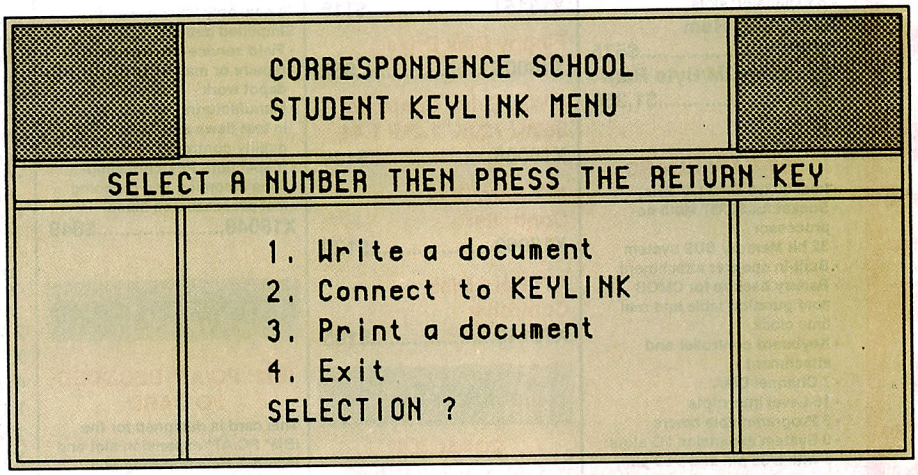
Because Keylink deals in strict ASCII code, transmitted material is limited to standard text, effectively excluding graphics and foreign language courses. The corresponding advantage is the system is not hardware and/or software specific. If a student has a computer, telecommunications (and word processing) software, a modem and access to a telephone outlet, then they can be hooked-up to the Correspondence School's bulletin board.

Currently, the Correspondence School has Keylink up and running with a class of Year 7 students, who, by the end of the year will be complementing their Social Science, English and Industrial Arts programs with on-line work. Students are currently able to down load worksheets, answer the questions and then post them, electronically, back to the teacher. Their work is marked and re-transmitted to them within a week.

Each of the students in this Year 7 class has been visited by a member of the Correspondence School, when computer equipment, on loan from the School, was delivered. At this time, the students and their families were instructed in the use and care of the equipment and taught how to use the word processing software and log onto the Keylink electronic mail system. The loan equipment is a mixture of IBM portables and Apple IIe computers, Sendata, Avtek and NetComm modems, dot matrix printers and a 'ring-in' acoustic coupler. The students are also supplied with word processing and communications software.

Apart from a few hiccups, telephone line failures and the like, the implementation is running smoothly. At this stage it is being administered by John Reynolds, Leona Wilson and the other teachers in the Technology Unit as well as the subject teachers. This means that there is a little double handing of some material, but it is felt that the students need to build up their confidence in the system and be supported by experts in the first instance to get the system on its feet. It is hoped that by 1990, students and their teachers will be on the system and interacting directly.

According to the 1986/87 trial and comments by John Reynolds, students adapt to the system well and benefit immediately from the feedback and camaraderie afforded by being able to send messages to each other. Questions about administration or understanding instructions for a set course can be answered and acted upon within a day or two.

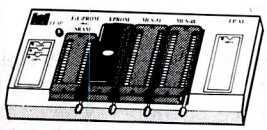


The NSW Correspondence School is in the first stage of implementing an electronic mail system using OTC's Keylink – The telecommunications system is not intended to replace the more traditional methods of distance learning, but rather to complement them.

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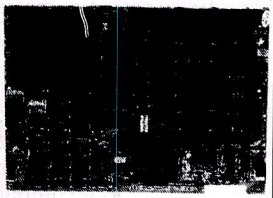
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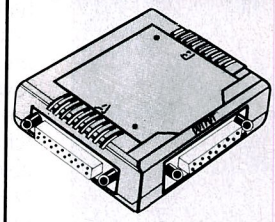
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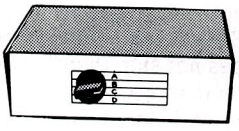
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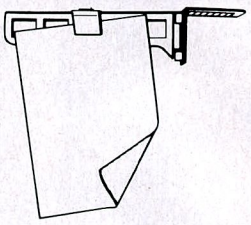
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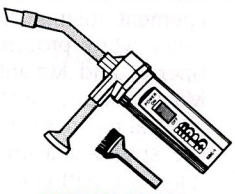
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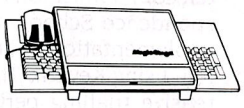


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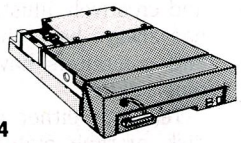
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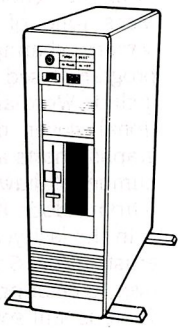
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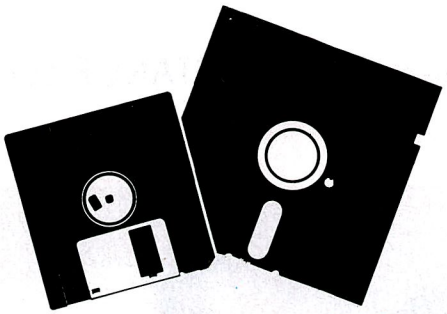
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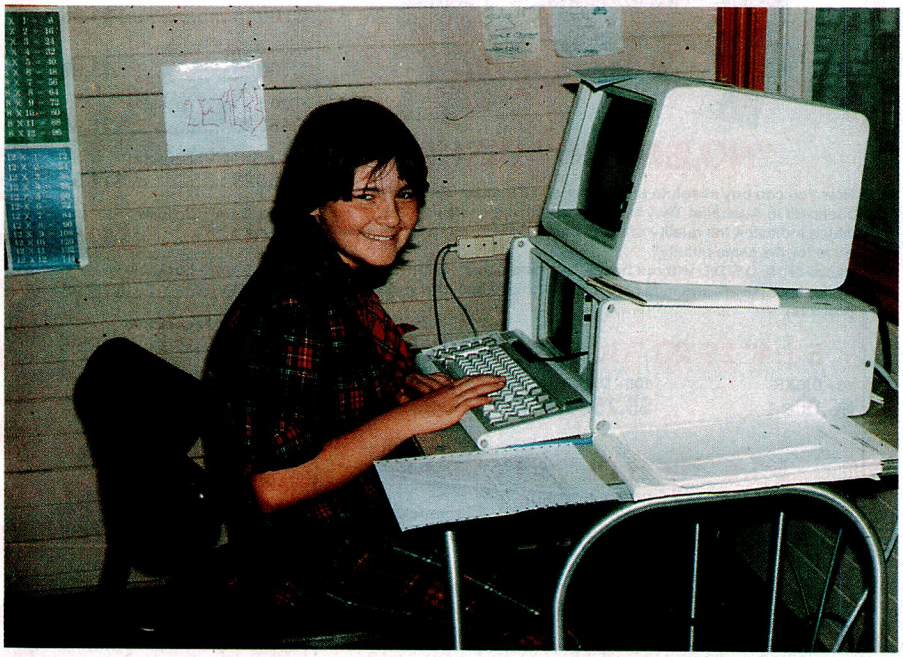
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Louise Butchard of Newnes, a ghost town near Mudgee, was one of the many students who were able to reap the benefits of real-time learning – students and teachers found during the trial motivation and learning was greatly enhanced by rapid feedback and immediate attention to difficulties. The system also promotes an interactive bond between students and teachers – another product of immediate feedback.

Administration

THE NSW CORRESPONDENCE School is the largest school in Australia. It serves an estimated 200 full-time and 2200 part-time students. There is a great diversity of subjects taught (all subjects on the NSW curriculum – a total of 234 different courses), with languages other than English being particularly popular with part-time students who attend other schools, where they are not offered the language of their choice.

It has the potential to be an administrative nightmare. Not surprisingly, a number of friendly number-crunching micros have come into their own, particularly with administration and project management at the School. Management is the key to successfully co-ordinating the numerous processes involved in the preparation of all course materials. The School has used the Harvard Project Manager to great effect time-lining the processes of planning, writing, editing, illustrating, producing and even filming and taping lesson segments.

Computer technology has also made it possible to more easily review and rewrite materials when curricula evolve or change emphasis (and text materials). Coralie Egan, Deputy Principal (Learning Materials Production) commented on the impact computers had made on the school. 'It is amazing how our people have taken to computers. Almost all staff have some degree of computer literacy, with a number achieving impressive specialization in certain areas.'

There is a great emphasis placed on servicing staff in instructional design. This commitment to professional development in in line with changing technology has seen the Computer section of the Technology Unit grow from one staff member to six in the last five years, and the number of computers, used in the various facets of teaching, materials production and administration, explode.

The difference with DTP

THE FIRST MAJOR inroads computers made into the Correspondence School came six years ago when word processing revolutionised materials production – editing and re-drafting became so much simpler. The best, came with the introduction of desktop publishing and graphic design programs using Macintoshes. Presentation of information can make all the difference in inspiring students. Well set out and creatively illustrated course material has always been the aim of the School, and computers have made the task so much easier.

Teachers either compose courses on disk, or their material is transcribed by secretarial staff onto IBM compatibles. These disks are then transformed into a Macintosh readable format for manipulation. The School has one cluster of eight Macs (one of which has an A4 Xerox screen), sharing a LaserWriter Plus. The programs used to prepare course material include Word and PageMaker. For inspirational cover designs and illustrations, graphs, charts and figures, the team use a number of drawing and painting programs – from Adobe Illustrator to MacDraw.

In the last year, illustrators and graphic artists at the School have started to move over to creating artwork on the computer. There is still some reliance on the old ink and paper and cut and paste methods, but even these may find themselves scanned into a document for final printing.

The strange thing about computers and their role in course material production is that they have not made the work load lighter. The more the staff members learn about the technology and its applications, the more they want to do with the machines. Wendy Priestly, the Instructional Design Co-ordinator pointed out, 'As staff members have become more conversant with the computers, there is a greater demand for them to share their knowledge with other staff. What results is a greater spread of information, with a greater demand placed on the equipment.'

The content of course materials has perhaps evolved as it normally would, but the presentation of printed matter has taken a distinct leap forward. Much of the material, particularly in the language areas, is commercial quality. As units of work, they would be valuable to other institutions including WEAs and other schools in Australia and perhaps overseas.

Nocturnes and Nihongo

APART FROM THE cluster of Macintoshes, the Sperrys used for word processing and a number of laptops (for administration), the School uses computers in a few other specialised areas. The Music Department uses a Macintosh connected to a Roland keyboard and a Midi interface to produce musical scores for course material production. The software used is Professional Composer, which has made life a lot

easier for the teachers and has enhanced the look of the printed material (which is printed out on the laser printer).

Another niche in which computers can be found at the School, is in the production of musical scores as soundtracks for video and audio productions. Because of the strict copyright laws, the Correspondence School has found it a lot easier to produce original scores rather than seek permission to use copyright material. In this instance, 'Notator', software from C-Lab is being used on an Atari with a Kurzweil (K100) keyboard and a Midi interface to produce the desired music and effects.

Japanese (or Nihongo) is another surprise package for computer use where the production of course material is being aided by the use of Toshiba JW8QP laptops. The computer itself looks remarkably like a standard Qwerty keyboard, with a few extra function keys. The operator can type directly in hiragana or katakana (the two phonetic Japanese writing systems), Kanji (the Japanese characters), Romaji (Romanised Japanese words) or English – or a combination of any or all of these!

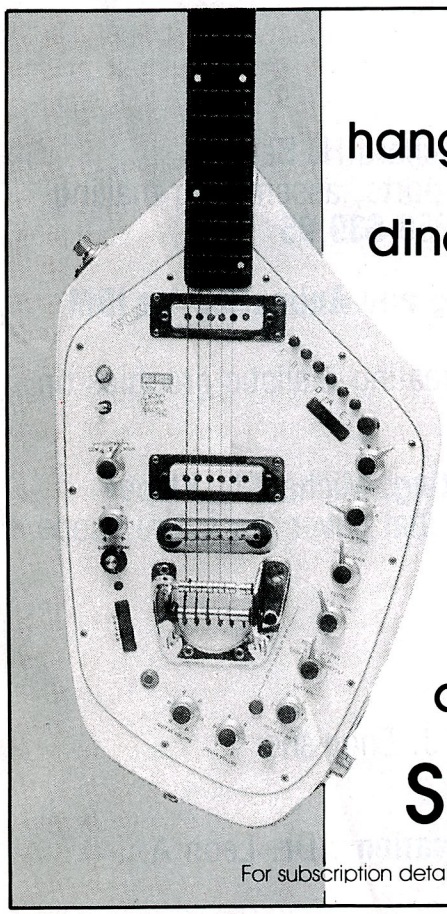
The NSW Department of Education Correspondence School is a fine example of integration of computer technology in the field of education.

Japanese text and characters can be added into instructional English text in one document, instead of inserting handwritten characters. Output is onto thermal paper which is then photocopied to give better definition. Unfortunately, current desktop publishing systems cannot handle the non-ASCII Japanese character set and thereby produce final pages incorporating Japanese text, pictures and other graphics – instead, the old method of cut and paste is used. However, the ability to type in various character sets – English and Japanese is a boon to Japanese course materials production.

More power to them!

IT IS SATISFYING to see computers so ably used and directed. The enthusiasm for the technology is infectious in the School, encouraging all staff to be involved with computers in one way or another. Computers in the field of learning materials production are well established. The early stages of the Keylink implementation are also sure to prove beneficial to all concerned and we will in time, hopefully, see it spread into other grade and curricula areas.

The strengths of the NSW Correspondence School and its approach to computer technology lies in its attitude to professional development through servicing. It is a pity that this intensity of participation in computers and education is not available to each and every school around Australia. It is unfortunate that many of our teachers who would love to be more familiar with the technology, live and teach in remote areas. Again, it is a case of the tyranny of distance. □



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BUYING AND UPGRADING A PC

Whether you are a computer novice thinking of buying a system or a veteran user thinking about upgrading, here's a guide to get the best value for your money and help you get started. . .

WE CAN'T ALL justify purchasing a top-of-the-line, 33MHz '386 with 16Mb (megabytes) of memory and 100Mb of hard disk – in fact, most of us don't need the advanced features found on such machines. High performance may be necessary for high-speed number crunching, and fantastic graphics might be vital for CAD and desktop publishing, but the majority of applications for those millions of micros out there are word processing, databases, spreadsheets and games. None of these are particularly demanding of disk or processor speeds, and many ten-year-old CP/M machines are still in daily use on similar tasks.

The first concern of most potential users is cost; second should be reliability and support for both hardware and software. If you have never used a computer before, then support is going to be very important until you are able to do at least basic troubleshooting for yourself. Probably the best advice to give new comers is 'buy popular:' if you are using the same software and similar hardware as tens of thousands of others, finding someone to help when problems arise is going to be much easier. Many companies maintain bulletin boards and support user groups for their products (watch next month for a complete listing of Australian User Groups); most at least maintain a technical 'hotline' – it's worth finding these things out *before* you buy. Another point to keep in mind when buying is the guarantee offered with the computer – it can range from three months to twelve months.

The question of cost can only be addressed after some investigation. Don't buy the first machine you see at the first store you visit – collect brochures and prices, then compare features. Don't be afraid to pester the sales people with questions, no matter how dumb you think they are (take that either way). How a vendor handles 'dumb' questions is a good indication of their attitude towards customers and reflects the type of service you are likely to get after laying down your money.

What type of machine?

THERE ARE several stages in the process of selecting a computer. First, determine what tasks the computer is needed to fill and then check out a variety of software that claims to fill those needs. The software has a significant bearing on the con-

figuration of machine that will be needed – you may find that a hard disk, two floppy drives, a colour monitor or extra memory are (or are not) essential. Once you've determined the specifications necessary, it's time for some serious shopping. Set a budget and scour the marketplace for a machine that is affordable, meets the specification and appears to be reliable.

One has to consider a great range of machines from IBM and compatible clones, Macintosh, Atari, Amiga, Amstrad and Commodore. If you use a PC at work, it makes sense to buy a similar machine for home (and vice versa) if similar applications are going to be run in both places. If the machine is intended for use by the kids at home to supplement the ones at school, then a good choice would be to buy one that can run the same software. If games and animation are the prime interest, or DTP a major requirement, then different machines will suggest themselves as you shop around.

For many new users, an IBM PC, and its various compatibles and variations, form a group which is hard to ignore. There is a wealth of software available for it, commercially and as Public Domain (free) and Shareware (pay if you use it). Business applications are particularly well represented while education, graphics and music software are either less common or less sophisticated than that available with other machines.

While it may not cover any particular area of activity as well as more 'specialised' machines, the PC and compatibles tend to be the jack-of-all-trades, able to cope competently in most areas. It is now possible to buy a PC clone with two floppy drives, clock/calendar, serial and parallel ports, 640K of RAM and a monochrome monitor for less than $1000; $2000 (and change) would give a colour monitor, 20Mb hard disk and printer.

If you are interested in graphics applications, it would be worthwhile looking at the Commodore Amiga range; for music, start with the Ataris; for educational packages, the Apple range; Amstrad has been the largest selling computer in England for years and probably offers the greatest range of software for home users – these will all give a basis for comparison; even if you have *almost* decided on an IBM-type machine, check out one of those mentioned so you are at least aware of the alternatives.

Which computer?

LET'S ASSUME YOU'VE decided on an IBM or clone (regardless of the type of computer, the decision-making process is about the same – it's just that there are generally more choices and confusions in the IBM world). There are two major divisions in the camp, and variations within both groups. The classic 'personal computer' started with the original IBM PC, running an 8088 processor at 4.77MHz, introduced in 1982. The first significant performance improvements came with the introduction of the IBM PC AT, with a 6MHz 80286 processor; today 33MHz 80386 machines are increasingly easy to come by. (Don't let processor speed *per se* influence your decision: it's only important if you need that speed and it can, in itself, be misleading – an Amiga with a clock speed under 3MHz is much faster at graphics applications than a 12MHz AT, for example.)



While the IBM range and all of its clones do not cover some applications as well as more 'specialised machine', the wealth of business and general software available for them is hard to ignore.

In all of these categories there are machines in the traditional form, a box on the desk with a monitor on top, as well as portables with various configurations of keyboards and display types. Portables, whether in 'sewing machine' or laptop form, are more mobile and convenient, but are less adaptable (and usually more expensive), while desktops require half a table top. If you are considering a portable, bear in mind that for any long term use, you will still need a mains power supply, particularly if you are making use of a hard disk.

If you want to run OS/2 applications at home for the sake of compatibility with your office's computer system, an AT or '386 machine is going to be necessary. For the time being there doesn't seem to be much other reason to become involved with OS/2 – IBM's 'operating system of the future' hasn't arrived for most users. OS/2 applications are memory-hungry and don't return that much benefit to most users, so, unless there is specific reason to run them, you are better sticking with another operating system.

If you are buying other than 'industry standard' (a euphemism that means IBM-compatible), the operating system of choice won't be that hard to decide: the Atari, Amstrad, Amiga, Commodore 64/128, Apple and Macintoshs all have their own 'proprietary' (another euphemism that means no one else uses it) operating systems. Several of these companies also offer industry standard versions of their wares. Bear in mind that if you need IBM-compatibly, that it is possible to convert text (as opposed to graphics files) from most other formats: public domain conversion utilities are available from User Groups and there is also a variety of commercial programs that do the same thing. Commodore also have a Bridgeboard option that effectively gives two computers in one: an 80286 processor is incorporated so DOS programs can be run, while the 68020 is used for Amiga programs.

And – Peter Philips explained how to transfer files from an Apple II to a DOS machine in our July issue; Bruce Iliff did the same for Commodore 64/128s in June. Another option to transfer files between incompatible formats is two link the two machines using modems at each end and transfer them using communications software.

Under the cover

DESKTOP PCS GENERALLY come in three pieces: system unit, keyboard and monitor (or screen or display). The system unit contains the intelligent circuitry. It typically has a sheet steel case, with a cover that either slides off forwards after a few screws are removed, or has a lid which can be tipped up to reveal the innards. The most noticeable object under the cover is usually a very plain looking box, the power supply – before buying ensure that it is heavy-duty enough for your future needs. If you are likely to add a hard disk or other bits and pieces that draw from the power supply, make sure you buy a machine with over 150W available: much less and you'll be replacing it at some stage. The other sizable hardware bits of interest are the

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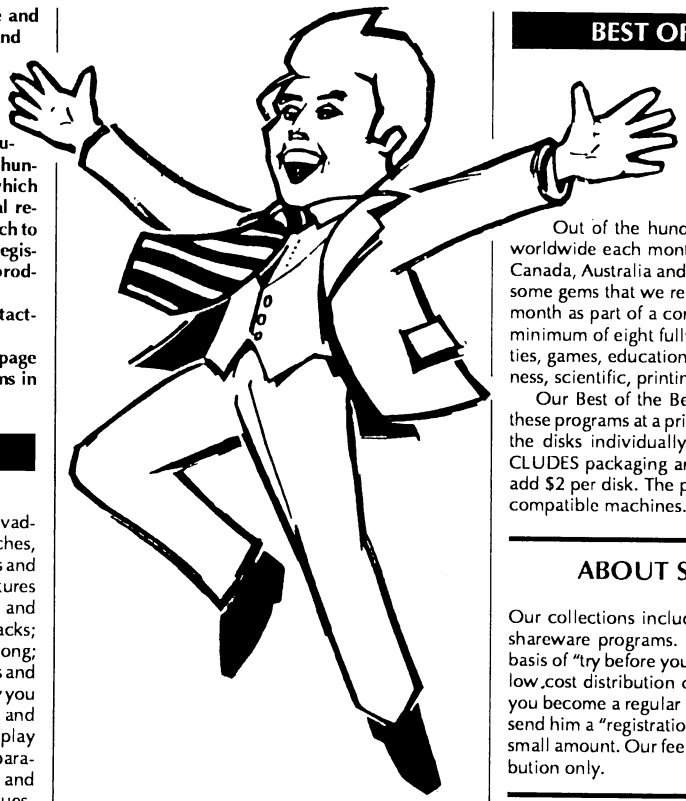
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disk drives – it's worth noting how many 'devices' (additional floppy drives, hard disks, tape backup units, whatever), can be added before the case is full.

Flat across the bottom of the unit usually, running from front to back at the left side, will be a large printed circuit board full of electronic components – the mother board; into it are plugged all the other, daughter boards, for specific applications. The IBM mother board will have a number of sockets (slots) into which plugs from other boards fit. These are used to add the likes of enhanced graphics cards, additional RAM, and internal modems and fax cards (expansion for other systems may not be so straightforward – many of them require any expansion devices to be mounted externally in their own case).

The sockets will either be 8-bit or 16-bit slots (ask to look inside an AT machine when you're shopping: the 8-bit slots are the ones about half the length of others), so if you are considering adding a card make sure it fits a free slot on your machine. Brochures and advertisements often claim something like 'eight expansion slots;' before using that in your decision making, check to see how many of these are free (unused) – it's not uncommon for the computer to use three of these 'expansion' slots for its own purposes, typically, for the video and hard disk controllers and system I/O (input/output).

When someone tells you a PC has eight slots it must have eight connectors on the mother board for expansion cards, and while it may have extra vertical openings on the rear panel these are not slots.

Behind the display

THE BIGGEST CHOICE to be made when buying a PC is the type of monitor: colour or monochrome. If you are only likely to use the computer for straight text work such as word processing, database manipulation or spreadsheets, a high-resolution monochrome monitor will suffice – but even these rather mundane applications are more pleasant to work with in colour and the reduced contrast that colour affords, can make them easier on the eyes during long sessions. The price of colour monitors has come down so much in the last few years, that only the strictest budget restraints should stop you buying one with your system. (Remember that when you are buying a complete system, you have more 'purchasing power' then than you will have when shopping for add-ons later – it's good purchasing to buy whatever you think you'll need within the next twelve months in one go – that way you are likely to get the best deal.



Before thinking about what type of computer to buy, first decide what you want to do with it. You'll quickly find that your chosen application will strongly suggest a machine to run it on – the Atari range, Amigas and Macintoshs are all good choices for graphics and music programs, for example.

Once you've settled on a monitor, you need to decide what type of video board you want to drive it. In almost all PCs there is no circuitry on the mother board to drive a monitor, and the first, essential, expansion board is the video board. IBM has, over the last few years, defined several video standards. Many other manufacturers make video boards and monitors to the IBM standards, and some have also developed configurations of their own.

The most common video standards are IBM's Monochrome Display Adapter (MDA), Colour Graphics Adapter (CGA), Enhanced Graphics Adapter (EGA), Multi Colour Graphics Array (MCGA) and Video Graphics Array (VGA), together with the Hercules Graphics Card (HGC or MGA) standards. IBM's original boards were the MDA and CGA, with the MDA offering high-resolution text (without graphics) on a specialised monochrome screen. (It's only in the IBM world that such a collection of 'standards' exist.)

The CGA offered colour, graphics and lower resolution text on a colour screen. The HGC board was announced at the same time, and gave the same text on the same monitor as did the MDA, but with the addition of high-resolution graphics. HGC graphics and CGA graphics are not compatible and, while all graphics software can drive the CGA, typically the cheaper graphics software cannot drive Hercules board in graphics mode. Text software runs perfectly on the Hercules, but on CGA is hard to read if one is going to use it hour after hour. The EGA offers high-resolution text and graphics in colour.

More recently IBM announced the VGA and MCGA with the PS/2 series, and expansion boards for older PCs are available to give them VGA. MCGA and VGA offer enhanced graphics, and text in colour with resolution to rival that of the MDA and EGA. At the low end the choice comes down to CGA with a colour monitor or 'composite video' monochrome monitor, or a Hercules compatible board with a TTL monochrome monitor. As indicated, all graphics software (including games) will run on CGA with either of these monitors, but with marginal text. While the Hercules

Shopping list for a PC

WE'VE PUT software first, because that's when you should consider it.

□ Operating system: once you have decided on the particular type of applications you want to use primarily, the operating system will suggest itself. Most dealers include the operating system and a version of Basic in their basic price, but check to be sure. If you are thinking IBM, the latest version of the operating system is DOS 4.0, but about the only reason to use it is if you have a 40Mb or larger hard disk.

Most manufacturers are currently supplying DOS 3.3 which is less memory hungry and has most of the features found in 4.0. Note that for all practical purposes MS-DOS and PC-DOS are the same Disk Operating System – MS stands for Microsoft (it was billionaire Bill Gates who co-wrote the original DOS and founded Microsoft) which grants licences to hardware suppliers to use the operating system; these companies then supply (a some times slightly modified) version referred to as PC-DOS.

□ See any applications software you want to use – such as spreadsheets, word processors, graphics packages, and so on – running on your prospective computer, monitor and printer before finally making up your mind. Be especially careful if you're buying software that is copy protected – the software itself may be compatible with your system, but the copy-protection scheme may not be. It's a good idea if you can buy both software and hardware from the same distributor; otherwise, try to test a copy of the software you want on the dealer's machine.

□ Software manuals. If you buy DOS or any other software, you should get a manual to accompany it. If you don't, the originals of your software may be suspect.

□ Utilities. In addition to application programs and an operating system, we strongly recommend including a set of utilities in your initial purchase. These can help you manage your files, recover from accidental formats, protect your system from the likes of viruses and make backing-up your work an almost automatic process. Many of them also include the likes of a calculator, a telephone directory, appointment scheduler and other 'personal productivity tools;' almost every dealer will have their own favourite set, so ask to see them demonstrated. After you've bought the software, don't forget to send in the registration card – registered users are usually offered upgrades to a later version of the software at much reduced prices; you may even find yourself on a mailing list for productivity and technical tips.

Hardware

□ A basic system will have a single floppy drive – try the applications you want to use on such a machine. If the disk swapping, doesn't deter you, that might be all you need. More likely though, you'll find a dual floppy set-up will make life easier; if your applications are 'disk intensive' (that means the computer needs to write to and read the disk frequently), a hard disk is a must, since writing to and reading from a hard disk is much faster than the same operations on a floppy.

If you are buying IBM, don't settle for less than 640K of RAM; because of their more efficient operating systems, non-IBM-type computers can often run full-blown applications with less but, depending on the programs you want to run, 1Mb of memory might be required.

Four other items to watch for are the location of the reset button (should be conveniently located, but not where it is likely to be pushed accidentally – if you buy a system without a reset button, you are going to spend a lot of time waiting for the system to boot up after every crash); the location of the power switch; clearly visible hard and floppy disk drive lights (these are handy 'status' indicators); and a power on light which is another very handy status indicator.

□ Buy the best monitor you can afford – you are going to spend a lot of time staring at it, so do the right thing by your eyes. Note that you may need a different video card than that supplied as standard with the machine you choose – so ask. Don't get a CGA (Colour Graphics Adaptor) monitor and card for an IBM – the resolution is abysmal and within months you'll probably be looking for an upgrade. Monochrome monitors give better resolution for a lower price. If you need colour, then pay the extra and get an EGA card and monitor. Your choice of monitors for other-than-IBM systems will be less confusing, but the selection will still range from using a TV as a monitor to a range of higher and sharper resolution displays. Note that monitors can either draw their power from the computer or plug directly into the mains – this can make a difference if you have limited power points. And – make sure before leaving the shop with your purchase that you have all the necessary cables. In fact, it's a good idea to ask to have your system set-up and running, including the printer, in the shop before you take it home – if the dealer thinks that's too much trouble, take your money and go elsewhere.

□ Keyboard – in the non-IBM world your choice will be limited, but try a number of keyboards for 'feel'. IBM keyboards come in two varieties: the 'standard' 84-key PC keyboard with the function keys down the left side, and the 'enhanced' AT-style 101-key model with the function keys across the top and additional keys between the alphabetic keys and the numeric keypad. There are variations on these standards though – avoid keyboards with small Control and Enter keys or with these keys *not* located in line with the ASD ... JKL keys. Insist on keyboard lights for Caps and Num Lock.

□ A printer – as we mentioned the best time to buy this is when you buy your system. A dot-matrix printer will probably suit your needs – these are available in variations ranging from basic 9-pin models up to 48-pin ones with prices and quality to match. If you think you might need colour printing at some stage, check that the printer you chose has such an option. Laser printers, inkjets and thermal printers are best-suited for speciality

does give great text and graphics with appropriate software, some graphics and games software cannot be used with it.

An IBM PC can have up to 640K of memory, holding just over 640,000 'characters,' which can be operating system, programs or data, but can have as little as 64K. When the IBM PC was originally released, much software could run in a 64K machine, but as more powerful software has become available, the amount of memory required has risen. You may be able to make do with less, but if at all possible get the full 640K when buying the machine. You will find problems if you have less than around 256K to 384K, and with memory being cheap, 640K is good value.

Memory is the main reason you should determine the software you are going to be using before buying a computer – there are few things more frustrating than buying a software package that's all you've been looking for, only to get a 'not enough

applications, particularly those needing high-resolution or colour graphics. While the latest inkjet printers are still quite slow, they offer a good compromise between colour, price and quality.

If you chose a dot-matrix printer, try it before taking it home – some can be quite noisy. For printing speed, go for at least 180 characters per second (cps) in draft (lower quality) mode and about 100 cps in NLQ (Near Letter Quality) mode. A tractor feed mechanism for the printer will let you use continuous paper. While many printers already have a tractor feed built-in, for others it is an option. If you need to produce many letters, envelopes, or other single-sheet documents, you may want to invest in a cut-sheet feeder. However, it is possible to get high-quality tractor-feed paper with clean edges which makes a sheet feeder unnecessary in most cases.

□ Cables. The most common problem new users face is getting the system unpacked and then discovering that an essential cable is missing – some suppliers include the cable to connect the printer to the computer as standard, while for others it is an option. Check whether the printer you chose is a serial or parallel type and that the cable matches the port on your computer – you might need a 'gender bender,' a connector that changes female plugs to male and vice versa.

□ User guide and hardware manuals. You should get a guide to tell you how to get your computer up and running, and you should also get manuals for your printer, monitor, any add-on cards, and any other peripherals.

Extras and on-goings

□ Floppy disks are going to be a necessity, both for transferring data to and from your computer and for backing-up. Don't scrimp on these – for 5¼ inch floppy drives, a minimum of two boxes of ten will be needed to start with and four boxes wouldn't go astray. Note that IBM PC XT drives can only put 360K of data on a disk while ATs can put 1.2Mb on high-density disks and 720K on low-density ones, so you will need fewer disks to store the same amount of data. The smaller 3½ inch floppies (which are actually hard plastic) can hold more data, so you will need proportionately fewer. In very short order, you will find yourself with a diverse collection of disks, so a floppy disk storage box will help keep you organised and protect your disks from the likes of cigarette ash and coffee cups.

□ Box of continuous printer paper for the printer. You can get various qualities, from crumby stuff to good bond paper – check how clean the edge is when you strip off the tractor feed holes.

□ Printer ribbons. Find out the printing life of your particular printer's ribbons, and the replacement costs *before* buying – some ribbons cost as much as $70 to replace, while others sell for under $10. Buy extra ribbons to take home with your printer, because it's certain that your ribbon will only run out late at night when you are trying to finish an urgent job.

□ Warranty. You should be able to get a 12-month warranty on all your equipment – computer, monitor and printer. Check what it covers – do you have to return the computer to the dealer for service or is on-site service is included or available; and how long the average problem takes to fix.

□ Service contract. When your warranty expires, it is worth investing in a service contract. Check whether your computer dealer can offer you one, and check the various independent service companies to see if they'll provide a contract on your machine. Contract terms differ widely and so does the standard of service (and length of time it takes to fix your machine). Before signing, try to talk to someone who has already had experience with the service company. If the service contract price seems too steep, check the hourly rate charged by service companies and/or your supplier. A service contract is like any insurance cover – you may prefer the risk of not having a contract.

memory to run this application' error message when you fire it up. Adding memory (RAM) can be an expensive proposition once you've made your purchase, so make sure you get all you need at the beginning.

At some stage, every users needs to connect external devices to their computer whether it's a printer, a mouse or a modem. These are connected to the computer by plugging cables into ports, which are sockets on the rear edge of an expansion card, poking out through the opening in the rear panel. The most common configuration in an IBM-type computer is one parallel and two serial ports. At this stage nevermind what 'serial' and 'parallel' mean, just remember that you will most likely need a parallel port for a printer (some use a serial port), while serial ports are used for modems, mouses and a variety of other external devices. The one/two combination is most probably all you'll need to begin with; there are quite inexpensive boards with additional serial ports that can be added if you need the extra expansion later.

Often the serial and parallel ports will be on the same expansion card along with other functions like memory and the clock/calendar. These combination boards will be called multi-function or multi-I/O boards, but what is on them will vary from one to the next, so check them carefully.

A battery-backed clock/calendar is a nicety that shouldn't be overlooked when shopping; without it, the computer will forget the time and date whenever it's powered down (shut off); if you want these to be correct while using the machine, it will be necessary to reset them at each start up. Since many software packages read the date from the operating system, and a file's creation date can be a handy check on which is the latest version of a file, it's worth the added expense (if any) to have the date right without user intervention. Even more importantly, many backup utilities can be configured to backup only those files changed since the time/date of the previous backup – this can not only save a great deal of time, but this method uses less backup media, whether it be floppy disks or streaming tape.

If you think you've found a bargain, but it doesn't have a battery-backed clock, add-on boards with a battery and clock can be had for around $100.

Drive it!

ANOTHER MAJOR choice to be made is in disk drives. The original IBM floppy disk drive had a front panel 150mm wide and 90mm high, and drives with this size front panel are called 'full-height.' Over the years, more compact drives have been developed; typically these are still 150mm wide but only 45mm high, and are called 'half-height.' It is essential that any PC has space to fit at least two half-height drives, and the ability to fit three or four is strongly recommended.

What drives should you fit? Every PC needs at least one floppy drive, in the IBM world, this could be either a 5¼ inch or a 3½ inch drive. Most machines in use are being sold at the moment have 135mm

Hot New Software

More great software from Freeware. The latest software from around the world to you at LOW PRICES, that's what we offer. Listed below are some of our new additions for the IBM PC and compatibles. All of it has been carefully selected by our librarians to be the best available. Our price is still only $12 for 5.25 inch format and $18 for 3.50 inch format per disk, and we pay all postage and handling charges for you. So browse through our listing, we are sure you will find something of interest there.

BUSINESS APPLICATIONS

PC1012 SOFTKEY EDITOR: Very user friendly text editor with many advanced features. Designed for both new user and experienced users alike. On screen help available at all times and most features are displayed on the on screen menus. Supports all video cards and provides 43 line support for EGA and 50 line support for VGA.

PC1021 THESAUR: Easy to use menu driven thesaurus program. You enter a word and several synonyms are displayed. You can then select a synonym and see its synonyms. You can edit synonyms, and also get a cross reference list of words used as synonyms for other words. Not memory resident.

PC1042 FORM MASTER: Powerful forms software that allows you to create, modify, fill in, and print forms. Allows you to create blank forms to fill in later, produce forms with data already filled in, or just print data onto forms previously produced.

PC1204 PC FILE-DB: Excellent new database program which allows you to read and write dBase compatible files. Menu driven, features include graphic capabilities, 10 levels of sorting, macros, mail merge with built in word processor, context sensitive help screen, sophisticated report facilities, customised data entry screens, and much more. Requires hard disk and 416K RAM. **THREE DISK SET.**

PC1221 dLITE: Memory resident "pop-up" program which gives access to up to ten dBase III compatible applications from within virtually any text based application. Allows you to add entries, display or update records with upto seven indexes, create entry screens, create customised lists, labels, and reports, and more.

PC1253 CONTACT PLUS: Excellent program for keeping track of business contacts. It automatically sorts contacts by surname, postcode, and two user defined fields. It allows you to add unlimited number of notes per contact, and produce personalised letters, labels etc.

PC1602 GENERAL LEDGER II: Full featured general ledger package for professional use in businesses of all sizes. Handles up to 300 user defined accounts, has comprehensive reporting facilities, easy to use transaction entry features, cheque register and audit trail facility, cash journal facilities, password protection, and more.

PC1624 HOME ACCOUNTS: Full featured home accounting system that is easy to use. Online help is available at all times and pop up windows provide you with an easy choice of entries at all times. Bill paying feature reminds you when regular bills are due, and even lets you know if you can afford them. Summarised reports can be produced, and it even projects expenses to help keep you within a budget.

PC1643 THE INVOICER: Complete invoicing and statement generating program for small to medium sized businesses. Allows you to produce invoices on standard paper, and will then post that invoice to the accounts receivable module which will produce monthly statements and provide updated reports for you on your customers accounts.

PC1751 TINY MASTER: Inventory control program with many features. Easy to use it handles storing, updating, viewing, and adjusting inventory information. It also provides several report features as well as automatic updating of all relevant files. Suitable for all uses from home inventory to warehouse inventory control. Complete on line help available at all times. Requires 384 K RAM.

PC1803 RESUME: Program teaches you the art of good resume writing while coaching you through 8 available topics. Saves your resume to disk for easy printing. Requires BASIC.

PC1852 PROPERTY MANAGER: Program designed to help those who manage multiple properties. Keeps track of all relevany details in an easy to use format.

PC1871 MY-DESK: Memory resident "pop-up" utility that includes a powerful editor, an appointment calendar with alarm and daily reminder, a calculator, an ASCII table, and DOS file commands.

PC1875 PRODEX PLUS: Memory resident personal information system that combines a phone manager, to-do list manager, correspondence manager, and a "loose data on the desk" manager in one easy to use program. Not a simple desktop utility, but a powerful productivity tool.

PC1922 TIME TRACKER: Time management and billing package for people who bill their service by time. Allows you to keep track of clients, time spent on their projects, Produces invoices for your services as well as keeping track of accounts.

PC1964 PC-PROJECT: Complete critical path project management application for use with Microsoft Windows. Features pull down menus, mouse and keyboard support, PERT chart, Gantt chart, and text report facilities, and much more. Very powerful. Requires Microsoft Windows 2.0 or higher.

GAMES

PC2061 FORD SIMULATOR: Test drive a wide assortment of 1988 FORD automobiles on your choice of four different tracks including touring, slalom, drag strip, and Grand Prix. Great graphics, and can even be educational.

PC2062 RACETRAK: Horse race game for up to ten betters. Simulates being on the track. Place your bets, watch the race, and let the computer tell you how much you have lost.

PC2063 OFF ROAD RACER: Good graphics game where you must drive your jeep along rocky terrain whilst avoiding the offending motorcycles and shooting obstacles.

PC2064 BERMUDA TRIANGLE: Sail 3 legs of the Bermuda Traingle picking up swimmers and rafters stranded in the water, and finally sail into port. However you must avoid the mystic forces of the Bermuda Triangle.

PC2091 GORILLA BALLS: You are on a constantly shrinking pool table and you must avoid colliding with the gorilla balls coming from all corners. Game gets harder as you play. You need great eye-hand coordination to play this one.

PC2120 NIOSA: Graphics based adventure game. You are at San Antonio Fiesta where you have to eat, drink, and investigate as much as you can to find your friend and be home before midnight.

PC2208 GIN RUMMY: Excelleny computerised version of the old card game. Play against the computer, or if your lazy watch the computer play itself.

PC2209 DRAW POKER: Program allows you to play five card draw poker against the computer. See your cards on screen and bet like the professionals. Provides challenging game for the serious player as well as helping the weaker players sharpen their skills.

PC2210 PONTOON: Good pontoon game with a difference. This game can be loaded as a memory resident "pop-up' program so whenever you get bored and feel like a game of pontoon, hit the hot key combination and play, and when the boss is watching, just press a key and away it goes.

PC2211 TOMMY'S 21: Wise cracking computerised black jack dealer. Good game play as well as variations to the game. Good fun.

from Freeware

PC2306 FRIGATE: Strategic game which pits you against a Soviet fleet. The object of the game is to destroy as many Russian ships as possible while avoiding destruction. At your disposal you have radar, sonar, jamming equipment, anti missile capabilities, and three types of ordinace.

PC2308 BASS TOUR: Fishing tournament game in which you have complete control of a fully rigged bass boat with all the latest equipment. and your aim is to catch as many fish as possible. Excellent graphics .

PC2309 STAR TREK: Graphics based implementation of the famous Star Trek game. Each player starts with a starbase and up to 12 starships. The object is to map the galaxy, discover planets that have energy and other goods, and avoid the Klingons.

PC2660 CAPTAIN COMIC: Excellent arcade game for those with EGA ststem. You are Captain Comic, galactic hero. Your mission is to recover 3 treasures from the planet OMSOC which have been stolen. Requires EGA video card.

PC2661 CUNNING FOOTBALL: Dynamic, interactive, menu driven football game for EGA systems. Simulates a real American football game as closely as possible. Can be controlled by keyboard, joystick or mouse. Requires EGA video card.

UTILITIES

PC3070 WEAK LINK: Program allows you to connect two computers together via their RS-232 ports and transfer files at speeds of up to 115 kbaud. Good for transferring files between computers with dif-

PC3104 TREEVIEW: Good hard disk and file maintenance utility program. Gives you simple and straightforward commands for manipulating your files, and provides a directory tree view of your hard disk subdirectories and files.

PC3105 GALLERY: Unique DOS menu system and file manager that utilises a graphic interface. You can easily create your own menu, selecting an icon for your application from the library of pre drawn icons. Also the file manager uses friendly and easy to understand icons to make DOS friendlier. Excellent for DOS newcomers and experienced users alike, and will even work on most Networks.

PC3175 BACKUP MAESTRO: Program designed to make your hard disk back up fast and easy. Menu driven program also provides password security, and support for many networks.

PC3291 PRTLABEL: Powerful and flexible label printing program. You can specify label size, number of labels across, and printer model. Supports most printer fonts and even prints borders.

PC3411 BRADFORD: Printer utility that allows you to print ASCII or Wordstar files in very high quality using a number of different fonts on Epson FX, IBM Graphics and Proprinters, and Star Gemini printers. Comes with over fourty fonts including Greek, Hebrew, Jazz, Orator, and more.

PC3415: ON-SIDE: Sideways printing program suitable for Epson and IBM graphics compatible dot matrix printers. Gives you choice of various font styles.

PC3558 PERSONAL C COMPILER: Fast, powerful C compiler. Full featured suitable for all programmers. Includes comprehensive documentation on disk and number of sample files. **TWO DISK SET.**

GRAPHICS

PC5011 DRAFT CHOICE: Object based drawing package. Unlike most drawing programs this program uses floating point mathematical algorithms to record details of objects you design. Allows for extremely detailed drawing, suitable for CAD work, and standard graphics work. Supports Epson compatible dot matrix printers, HP Laserjet, and HPGL pen plotters.

PC5300: ICONVERT: Graphics format conversion program. Allows graphics produced by one program to be used by another. Converts to and from PrintMaster, Printshop, NewsMaster, Newsroom, Fontasy, Macpaint, Windows Paint, and PC Paintbrush. Allows you to view graphics on screen.

PC5610 CHARTS UNLIMITED: Program integrates graphics and text processing into one powerful system to allow quick and easy creation, editing, and printing of flowcharts, organisational charts, floorplans, electrical diagrams, and much more. Program hass library of flowcharting and geometric shapes which can be resized, allows you to create your own objects, print charts vertically or horizontally, import from other programs, and more.

EDUCATION

PC7302 FAMILY 3: Geneaology program which allows you to organise your family tree information and allows you to print it in several different ways including descendant charts, ancestor charts, descendant trees, and more. Requires 320K RAM.

PC8006 SPEED READING: Excellent speed reading tutorial for all ages. Evaluates your current reading speed and shows you how to increase your speed.

PC8007 FUN LETTERS AND WORDS: Educational program for pre schoolers. Includes number recognition, counting, grouping, adding, and subtracting. Educational value enhanced by the use of animation, graphics, and music.

PC8095 TRIVIA MACHINE: Educational game based on Trivial Pursuit. You select one of four categories, and your level of play. You are given 20 multiple choice questions to answer against the clock. Good fun for all ages. **TWO DISK SET.**

PC8101 CHINESE CHARACTERS: Good tutorial program on how to write Chinese characters stroke by stroke. Covers numbers and several Chinese words.

PC8823 PWRSTAR: Numerical data analysis program. Provides a polynomial best fit to a given set of data. Will provide automatic display of input and fitted curve.

PC9201 NUTRITION ANALYSIS: Program allows for complete nutritional analysis of various types of foods and diets in terms of protein, carbohydrates, cholesterol, fiber, and 15 essential vitamins and minerals. It also produces a customised diet and RDA analysis for you.

PC9354 MAYAN CALENDAR: Program uses the astrological system of the Ancient Mayans to convert modern calendar dates to their Mayan equivalent, and then give an astrological interpretation based on ancient Mayan astrological techniques.

HOW TO ORDER

To order any of the software on these two pages just send your name , address, and a list of the programs you want along with payment to

FREEPOST 3
FREEWARE
PO BOX 496
NEWTOWN NSW 2042

No stamp is required if mailing to this address. Payment can be by cheque, money order or credit card. Please give full credit card number and expiry date and type of card.

If you prefer to order by phone call us on

(02) 519-4233

or fax your order to (02) 516-4236
Bankcard, Visacard, and Mastercard.

PRICES

$12 a disk for 5.25 inch format
$18 a disk for 3.50 inch format

Unless noted all programs are one disk. Where more are specified price is per disk.

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drives, but the trend is clearly swinging (and fast) to 90mm drives. Right now, the first drive probably should be a 135mm drive, both to make software transfer to other machines easy, and because 5¼ inch drives are half the price of 3½ inch drives. In addition to this first drive, you can add a second floppy of either size, and/or a hard disk drive. The greatest performance improvement one can make is by installing a hard disk drive, and with hard disks and controllers at just over $500 and with a second floppy costing around $200 configuring a system with one floppy and one 20-megabyte hard disk is good value, while two floppies and one hard disk is recommended if possible.

When we talk of drives we must not forget that each of the drives is connected via a flat ribbon cable to a controller card in one of those expansion slots. The controller may only control floppy drives, or only hard disks, or may be able to control both.

Software

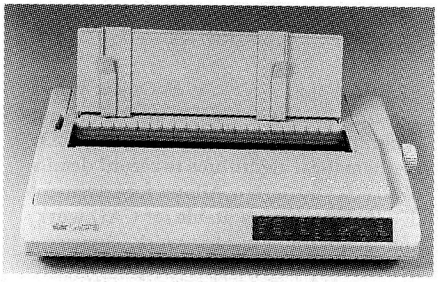
A COMPUTER without software is useless. The most common software needs are a word processor, database and spreadsheet, plus communications software, if required. There are a number of integrated packages that supply all of these in one package, or offer various other application mixes. If it suits your needs (or several of them) these can be good value, not only in dollar terms, but in ease of learning since the applications will share a similar 'user interface' – that's computer jargon for how a program looks when you are using it and the actions necessary to accomplish tasks like entering data and saving files: these can include various key combinations, commands and different ways of using a mouse, some of which you will quickly discover are almost intuitive, while others will never seem natural.

Many suppliers bundle a selection of software with computer systems, so keep that in mind when shopping around – it could save some money if it's the software you need. If you buy a collection of packages from different software manufacturers ('publishers'), check how compatible they are – can your spreadsheet accept data from your database, for example.

Software alternatives from the Public Domain and user supported arena include PC-Write (word processing), PC-File (database), AsEasyAs (spreadsheet) and Telix (communications). All of these are excellent starting points, and allow users to more closely define their needs before buying the market leading software in each category at hundred of dollars each.

What next?

WHEN YOU HAVE decided to buy a PC, remember that there will be a few necessary extras. Initially you may be able to avoid buying a printer, but, inevitably, you will find you need one. Good quality dot matrix printers are now down around $700 and machines with can be had for as little as $200 – they might not give 'letter quality,' but the results are perfectly adequate for many uses. When you buy that printer, make sure that you get a cable to suit.



The best time to buy a printer is at the same time as you buy a computer – your bargaining power will be at its greatest and it's a rare computer user who doesn't find use for a printer almost immediately.

Even without the printer, you will need some disks, and less than around 30 won't be enough. Buying disks a hundred at a time will often get a discount, so consider this when deciding how many to buy. Paper and ribbons for the printer will be needed. A box of paper will cost between $50 and $80, and you should always have one spare box in addition to the one in use. Ribbons always wear out at the wrong time, so always have at least one spare – at around $15 each for most printers, the expense is not too great.

Hard-where?

ARMED WITH your a list of your needs (don't worry if they seem vague to begin with, as you look around, you'll soon tighten up them up and fill in the details on your want-list), look through your local Yellow Pages, and the computer sections of newspapers. To get a feel for things computer-ish, spend a half an hour or so in a newsagency with a good selection of computer magazines – beware though, that most of these magazines are from overseas and the information in them is usually out of date and not relevant to Australia. That aside, these magazines are still an excellent source of general information on the capabilities of the various machines, particularly those with the proprietary operating systems mentioned earlier, and of the range of software available.

You should then be able to draw up a short list of software that meets your specifications and of the hardware that can run the software. Now, visit three or four computer stores – the bigger, the better. While you might get a better price and more personal after sales service from one of the smaller retailers, when you first go shopping you want to be able to see the largest range of products you can – so, start by visiting the big stores and once you have made your decisions, approach two or three smaller dealers as well as one or two of the larger, and ask them to quote.

If you are lacking confidence, attend a local User Group meeting armed with your list – we can't stress enough what a valuable source of information and expertise these groups are – and discuss it there. Everyone there will have been a new user at one time or another and you'll probably hear a number of tales of the pit falls to be avoided – you'll soon learn who the good and bad companies to deal with are. Initially, you might even want to take a computer-literate friend or business associate along when you go shopping.

When selecting a dealer, Jerry Pournelle of *Byte* has some advice which may be paraphrased rather loosely as 'if you don't know about computers, deal with someone who does.' Take your time, compare prices, quality and advice, and you should soon be able to sift out the charlatans and come up with a deal and dealer to suit you.

Mother boards, 32-bit, HGC, megabytes – it all sounds unfathomable to newcomers. But don't be daunted: the only way to learn is to start asking questions and having a look around. A PC system can represent a sizable purchase, whether it's for home or the office, so you want to be able to make an informed decision and the only way to do that is to be informed. Take your time, ask even the dumbest sounding questions (walk away from condescending replies), *try* – not just look at – a number of computers from different manufactures and the software that runs on them: small things like the feel of the keyboard and presentation of software error messages will make a difference to how happy you'll be with your purchase in six months.

DECIDING ON UPGRADING

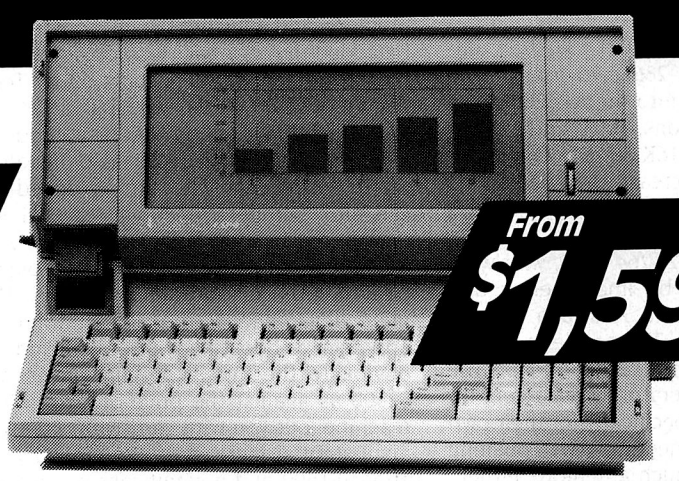
As the high-technology race speeds up and its demands affect the office environment, whether to upgrade existing equipment or simply replace it is a common dilemma. Jill Hamilton covers the pros and cons. . .

ONCE IT WAS a rare sight in an office, but these days, where ever you look there are people slugging away on computer keyboards. In some areas of industry, one in three people work on computers now. And lately, the term 'kilobytes' has begun to seem strangely anachronistic – like the measures of 'chains' and 'roods' from a bygone era. We are no longer in the infancy of the PC and most of our desktop computers are well past their prime. Some are showing the paunch of middle age and others are positively obese with add-ons, and fast approaching senility.

Users talk in terms of megabytes of memory these days as a matter of course, which is some measure of how far personal computing has progressed in the last decade. So what do you do when you begin coming up against the limits of your old PC, XT or even AT? Typically, you have gone out and bought a new application, and suddenly you find that you need increased speed and memory beyond 640K. Possibly your job calls upon you to run one of the new database, graphics or CAD/CAM applications, or you can see OS/2 looming eventually over the horizon. And none of this is possible on your existing system.

Obviously you need a machine with a 80386 chip or a 80286 as a minimum. I'm afraid it is true that our much-loved eight-bit PCs are now almost obsolescent: modern applications just can't run on these machines unless we do something to boost memories and clock speeds. And once you've got over the shock of pricing a

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new machine you discover that the obvious solution is add an accelerator card – or perhaps go the whole hog and replace the motherboard.

But the obvious isn't always the wisest move. The price of an upgrade might be significantly cheaper than buying a new computer, but the life span of upgrades is progressively less than that of a new system. New '286-based machine are currently on sale for between $2500 and $7000. Accelerator cards which supposedly do the same thing will cost from $600 to $3000, and with some of the more expensive of these you'll get a memory boost as well. This sounds like a reasonable bargain – and in some cases it is. But in others it isn't!

Accelerator cards

ACCELERATOR CARDS, booster cards, turbo cards – they all essentially mean the same thing. They aim to extend the life of your existing PC by adding a faster processing chip and some add memory, too. But they are not all alike by any means, so let's have a look at a random selection.

At the lower end of the scale is Blythe Software's Fast 88 at a price of only $260 including tax. This is a no-slot board that sticks onto the wall of your computer cabinet and makes its connections via a short cable to the socket of the old processor. The Fast 88 is specifically designed for the old 8088 PCs, and it replaces this chip with the later 8088-2 which runs at 7.1MHz. There's no RAM on board this chip, and it's only function is to boost the clock speed.

Peripheral Systems, (02) 437 6255, import the Breakthru 286 card for 8088/86 PCs to boost them into the AT '286 class. They have two versions, 8MHz and 12MHz, and both include a 16K cache memory onboard to further increase the speed. This cards have a RRP of $611 and $766 including tax, respectively.

AST Research, (02) 264 5055, who were originally handled by Imagineering and then went it alone in Australia, at one time led the XT-to-286 accelerator card market, but now they've abandoned the production of accelerator cards, except for one model made specifically for their own compatibles. Imagineering aren't pushing accelerator cards much any more, either.

Australia's own Hypertec, (02) 819 7222, makes three versions of the Hyperace II (286) boards which boost an XT to run at 10MHz, 12MHz or 16MHz. These are still the big sellers, and the price has just been radically revised downward. They are quoting RRP prices, respectively of $678, $774 and $870 including tax.

The Quad 386XT from Sourceware, (02) 427 7979, is specifically for the XT. You remove the existing 8088 chip, plug in the board, and link to the old CPU socket by cable. 'Any competent end-user can make the change,' Phil Haddock of Sourceware claims. The board includes one megabyte of memory on board and you can cross-link it (through a 32-bit separate bus) to a further 2Mb. It also takes advantage of the existing eight-bit memory in the system. RRP is $2295.

At the top of the list for business these days is LANs incompatibility. Accelerator cards very often cause problems with other boards in the system – especially with LANs links.

The use of faster processors and onboard RAM in an accelerator card like the Intel Inboard 386 can improve performance up to ten times that of the standard IBM XT. It can hold one megabyte of memory, and a further two megabytes can be added in piggy-back fashion. In Australia the Intel boards are handled by Tech Pacific, (02) 669 3077, who put a RRP of $1708 including tax on the basic model.

In many cards you can also install a maths co-processor to further speed up specific number-crunching operations, and there is a wide range of memory configurations and possibilities with piggy-back boards, or additional add-ins. The main advantage of the accelerator card approach to boosting your old machine is obviously the cost; top-gun prices are $2300 as against the price of a new '386 machine, but you with cards can often get a substantial increase in functionality for about $1500 and a significant boost with the eight-bit systems down at the $250 level.

Of course on a cost basis, it isn't fair to just compare the price of the add-in card with the cost of a basic AT or '386 compatible. If you change machines you'll also need to change disk drives and printers and replace all the other add-in cards already installed in your machine – and some people have a considerable investment here.

On the other side of the coin: is a '386 card equivalent to a '386 machine? Obviously not – but it may be good enough! Where accelerator cards really prove valuable is that they boost speed and power while creating a minimal disruption to your working life. You won't have to transfer data and buy new applications, and all your other memory expansion boards, special purpose boards, and your printer will continue to work on your upgraded system.

The advantages you gain will probably include the ability to run larger spreadsheet and databases since you'll no longer be stuck with the old 640K limit. Applications will sort and recalculate at up to ten times the speed you are use to, and you may even be able to run them under a graphic interface like Microsoft Windows or (in some cases only) the new OS/2.

But the above is only half the story. Obviously with such a range of functions, architectures, design approaches and installation procedures, it is impossible to generalise about accelerator cards, but there's always a trade-off in some way. The best I can do is to identify potential problem areas so that you have a list to check against.

Problem areas

AT THE TOP of the list for business these days is LANs incompatibility. Accelerator cards very often cause problems with other boards in the system – especially with LANs links. Network managers often complain that accelerators increase the complexity of the task of identifying and supporting hardware and software. It becomes very difficult to isolate problems when what purports to be an AT, is actually an XT with a card.

Virtually every vendor I spoke to maintained that he/she didn't get any complaints about software compatibility – but most hinted fairly openly that their competition did have problems. It was the old story of 'everything's clean in my backyard – but the neighbours are pretty scungy!' The fact is that some applications just won't work with accelerator boards and plenty will show minor bugs. Furthermore, many of the existing cards on sale won't support OS/2 or EMS (Expanded Memory Specification 4.0) so if

you are heading in this direction, think twice about accelerators.

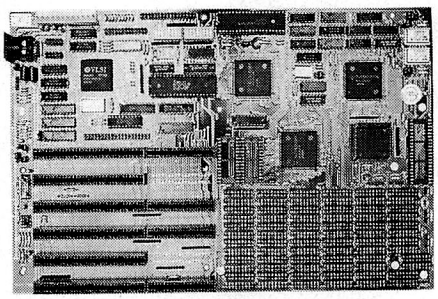
Most vendors also stressed that it was 'easy for a competent end-user' to install the cards themselves – to the point where it started to sound like an echo. The constant emphasis on 'competent' suggests to me that 'less-than-competent end-users' (and that's the vast majority or people) had better watch out. They are very obviously likely to stuff installation up, and probably void their warranty at the same time.

Some cards you can obviously install very easily; some you'd leave to a technician. So check out the provision of a good manual and find out what hot-line support you'll get if you intend installing yourself. Here's a couple of examples: Australian Everex Systems provide a manual and instructional computer program with their Everex card – which seemed like a great idea, until I began to think about it; Intel's Inboard comes with a 200-page installation manual. To be fair, it does start out recommending that you get the dealer to do the job; Blythe say that anyone can install the Fast 88 in about twenty minutes.

All of the early 8088 and 8086 PCs and XTs have the old eight-bit bus; newer '286-based AT systems have the 16-bit bus, and the latest '386 machines have the 32-bit bus. The bus width used by the IBM PC/XT/AT/386 series has been doubled in each of these evolutionary stages for a number of very good reasons – most of which boiled down to 'speed.' The point is, that by installing an accelerator card in an old system, you are still left with the old bus, and this remains the primary limitation of your new turbo-charged machine. It is for this reason that many of the cards have on-board memory, and when memory is extended it either piggybacks directly onto the card or the add-ins includes a 16-bit or 32-bit ancillary bus/strap. The real solution to the bus problem, however, is to replace the motherboard as a whole – which, these days, is a very viable option.

Older machines also had smaller power supplies and considerably slower hard-disk drives than the ATs and '386s. The result of adding a really good accelerator card is that you end up with a machine which is out of balance – it might crunch the numbers fast, but it will still be slow and sluggish when accessing the disk. And if you add an accelerator and a couple of extra special-purpose cards, the power supply might well overload.

We've got to face facts: an accelerator card doesn't make a PC the equivalent of an AT or '386 machine. If you've got a specific reason for needing number-crunching speed or if you've already invested heavily in your system, then an accelerator might be the way to go for the time being, while not being a long-term solution. But it could well add one or two years to the productive life of your existing machine, and allow you to make your next step-up, directly into some native '386 multi-tasking PC running OS/3.



Replacing the mother board provides a more integrated solution than adding an accelerator card.

System board replacement

A LARGE NUMBER of the smaller importers who used to bring accelerator cards in from Taiwan, have now swapped to importing motherboards. These cost more and need a technician to install, but they provide many advantages over plug-in cards. A motherboard provides a more integrated solution. By replacing the system board you also change the bus and slots, and improve the video and disk I/O subsystems. One word of warning: most motherboard replacements also come with a set of Phoenix BIOS chips, so some compatibility with the Basic interpreters included with PC-DOS may be lost.

Replacement of a motherboard isn't a simple skill, especially when the cabinet is too small for the new board. Motherboards for '386 systems aren't standardised much and, even if the board fits, you may have troubles with expansion slots not lining up with retaining brackets, and so on. Boards often use different wiring schemes, and so old power supplies might not fit or work, and they could clearly be insufficient for the new tasks if you use a number of add-in cards. Disk controllers for ATs are also physically larger than those supplied with the old PC and XT machines, and in some cases communications adaptors may fail at higher clock rates.

Keyboards are also a problem since the IBM system uses three different types, but you can usually get over this problem at a cost of about $200 to $300 from a mail-order house – but you need to take this into your calculations when considering the path to take.

Complete replacement

COMPLETE REPLACEMENT of your old machine with a new AT ('286) – or even, perhaps, with the ultimate in '386 machines – is the obvious choice if only you can afford the money. Those ATs running OS/2 will also remain viable as workstations for at least another four or five of years, and '386-based machines will last even longer. AT, PS/2 and '386 machines will also offer better compatibility with existing DOS applications, OS/2 and networks. The '286-based ATs and compatibles will be able to handle all DOS applications, windowing environments and network applications: accelerator boards probably won't. With a new machine you'll get faster processing and acquire all the later technological improvements, such as the AT or micro channel (MCA) bus. New machines will also give you faster and larger hard disks and more substantial power supplies.

The advantage of a new machine over a motherboard replacement is also in acquiring new mechanical components in your system. Most problems with computers stem from mechanical items like keyboards and disk drives, and from analogue/electrical parts like power supplies and video-tubes.

Yet when you replace the motherboard, these are the components of the system that you keep. You are replacing the most reliable side of the computer, and retaining the least. If you are to compare the prices of a new compatible with that of an accelerator card or replacement motherboard, you'll find that the price differential has dropped substantially in the past six months – both for the genuine IBM article and for compatibles.

One advantage of buying a new machine, often overlooked, is that you retain the value of the old machines. These are often ideal tools for entry-level users and, in any business, there are always stand-alone applications for word processors and small spreadsheets. Many companies make these machines available as loaners to senior staff who are often called upon to do extra work from home. □

DOUBLE VISION ON A PC



Need two monitors on your PC? Here's some tips and a free set of utilities from Peter King to make it easy. . .

YOU MAY ASK why anyone would want two video screens, surely it would send you cross-eyed. Well, firstly let me clarify the situation. We are not talking about just providing a second screen to duplicates the display of the first. This is possible by simply connecting two composite monitors to a suitable CGA card on the computer. What we are referring to is the installation of both a monochrome display (or mono-graphics/Hercules card) and a CGA (or suitable EGA) card on the one system.

For someone, like myself, who's constantly developing programs for the IBM-PC, it allows me to use the higher resolution monochrome screen for word processing and software development whilst using the colour screen for graphics and games. Another advantage is in debugging programs. I can test a program using the different video interfaces simply by swapping from one screen to the other. Recently I purchased a copy of Microsoft's Codeview version 2.20 which supports the dual screen system. I can now debug a graphics program with its output in the colour graphics screen and, at the same time, view each instruction line and registers content on the monochrome screen!

Unfortunately, there are no programming languages (that I'm aware of anyway) that directly support the dual screen system.

Installation

TO INSTALL A dual screen you must have available both the monochrome display adapter (or mono-graphics/hercules card) and a CGA (or EGA) card. If you already have a colour monitor then purchase a mono-graphics card and TTL mono-display (should cost around $200) and you'll be ready for dual screen business.

To install the set-up, first turn off the power and unplug your system. Open the lid (if it's an IBM, then unscrew the lid) and install the new display card in a spare slot. Before closing the lid and powering on, make certain that the system is set for monochrome operation, the main board switches 5 and 6 must both be set to the OFF position. Finally, close the lid and plug in the monitors to the respective display cards (make certain that this is done correctly, otherwise damage can occur to the monitors).

Now you're ready to power on. Switch on the system and check that the usual power-up sequence occurs on the mono display. If you have a standard IBM-PC then you may find that the colour display has not been initialised (in other words it's rolling up and down). If, however, you have a system with the phoenix BIOS (mine's 2.13) then the colour screen should be stable with the cursor in the top left corner. The MODE command supplied with DOS can be used to swap form one screen to the other. Enter: MODE MONO to swap back to the mono screen.

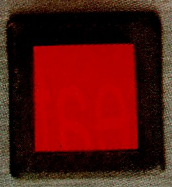
Two display cards can quite happily co-exist in the IBM-PC because the I/O addresses of the control registers are different and the display RAM addresses are also located in separate areas of memory. The monochrome display card has its I/O control registers at 3B0 to 3BF hexadecimal whilst the CGA card has its register at 3D0 to 3DF. The video RAM for the monochrome card starts at segment address B000 hex whilst the CGA's RAM starts at segment address B800. The IBM-PC BIOS is capable of swapping from one screen to the other by changing the equipment flag bits 4 and 5 at memory location 40:10 Hex. These bits reflect the setting of the main board switches on power-up. Setting bit 5 on will change the output to the colour graphics 80 x 25 screen, setting bit 5 off again sets it back to the mono display. Care must be taken to ensure that RAM addresses do not overlap.

Utilities

I HAVE WRITTEN a number of utility programs to make life easier for dual screen systems. One is called SCREEN which initialises both screens when powering up and turns off the cursor on the screen not currently in use (MODE doesn't do this). Another program is called SWAP, this swaps form on screen to the other automatically. Finally a memory-resident program called DUALS was developed to allow GWBasic to conveniently output to either display by simply using the BASIC SCREEN command.

A copy of these programs, plus other useful utilities, is available to the first 100 people that write in to me at Procon Software, PO Box 43, Essendon Vic 3040, before the end of this month. □

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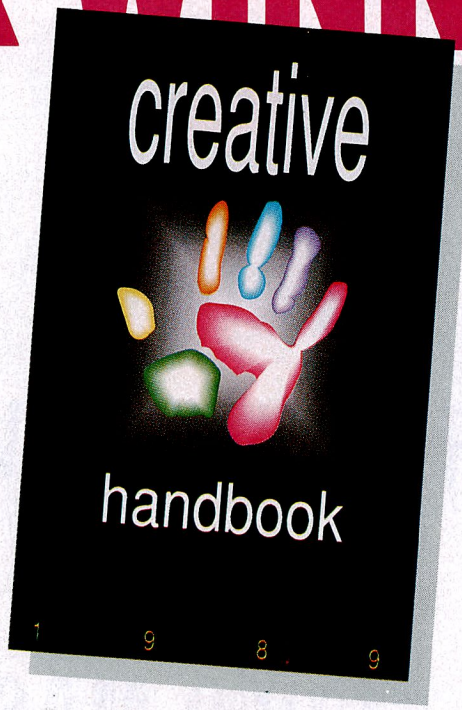
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GRAPHICS FOR WINNERS



Gerry Haggerty put his Mac II and Adobe Illustrator '88 to good use – he won the competition to produce a cover design for the graphic arts industry 'bible', the *Creative Handbook*.

EVEN WITH THE help of today's superb computer technology, creating a visual image still requires the unique skills of a gifted person. However, by using particular programs like Adobe Illustrator '88 for the Mac II, graphic artists can quickly utilise their intuitive skills to become award-winners. Gerry Haggerty, of Sydney-based Thor Enterprises, proved this when he used it to create the winning entrant in the competition to design the cover of Federal Publishing's *Creative Handbook*, a graphic arts industry standard reference for sourcing products and services.

Several thousand graphic artists, from all over Australia, were invited to submit designs for the cover. The entries were quickly narrowed down to about 50, but Thor's effort, incorporating a visual pun, was the unanimous choice of the judges.

After discussions, Gerry and Louise Haggerty, who handles the company's marketing, agreed on the approach and then Gerry was left to come up with appropriate designs. Eventually, he arrived at three designs that they felt were competitive enough to submit. They entered all three partly because it was a great way to show the flexibility of their work using the hardware and software tools at their disposal, and partly because they just couldn't decide between the three themselves. Once the designs were agreed on, a colour print was generated by Sydney-based Macaxis, an imaging centre.

Gerry has found that the big difference between normal graphic design and design on the Mac II, is that the Mac has shortened the steps taken in the design process. Traditionally, after discussions with whoever is commissioning the design, a graphic artist would produce pencil roughs, gain agreement, produce colour roughs and then after final agreement, one of these would be produced as a hand-rendered, full-colour visual. The process could take several days of work by the artist.

While Adobe Illustrator can be difficult to learn to use effectively, especially if the user has had no previous computer experience, this is a reflection of the powerful features it includes – Illustrator was a Finalist in *YC's* Software Product of the Year in both 1988 and '89; and, incidentally, the Macintosh II won the Computer of the Year Award in 1988. However, given time to come to grips with Illustrator, and some practise with the tools, artists will find themselves creating more advanced and exciting designs than ever before. And, the Mac II's 16 million colours opens a whole rainbow of possibilities for the artist.

However, because Illustrator is a fully interactive WYSIWYG (What You See Is What You Get) program, the design can be worked on and discussed in front of the marketing people – the ability to incorporate suggestions and view them immediately makes for a very dynamic and interactive design process; the result is that most designs have a very high level of client 'satisfaction.' Text heights and styles can be modified, textures added, illustration and background colours changed and so on, and finally several full-colour finished design choices can be produced. These can be viewed as high-quality, full-colour presentations before a final decision has to be made.

Another difference between computer-generated graphic design and regular design besides the turn-around time and quality of output, is increased organisation in the art department. Before Thor Enterprises used Macs for design, the art area always looked as though a bomb had hit it. Past jobs were difficult to find and paint was a constant threat to clothes and materials. Not any more: all the company's jobs are under control, past jobs are easier to find, and the company has been able to build an adaptable library of designs. Even if a client's budget changes and they decide to produce a brochure in four-colour instead of two-colour, it is not a problem: a few minutes work on the Mac – or, at worst, 2 to 3 hours – and a new presentation is ready.

And – imagine being able to 'see' several possible package designs on a shelf full of competitor's products before you choose the final one, or actually researching ads and package designs with several cost-effective options, or having a real-life brochure in front of you to gauge impact and comprehension, all *before* you go into the cost of production. These are just a few of the real benefits this technology has brought.

With the advent of computer technology in graphic design, it was only a matter of time before changes were felt in the print industry. The PostScript language for typesetting and image-setting has become a world standard and has

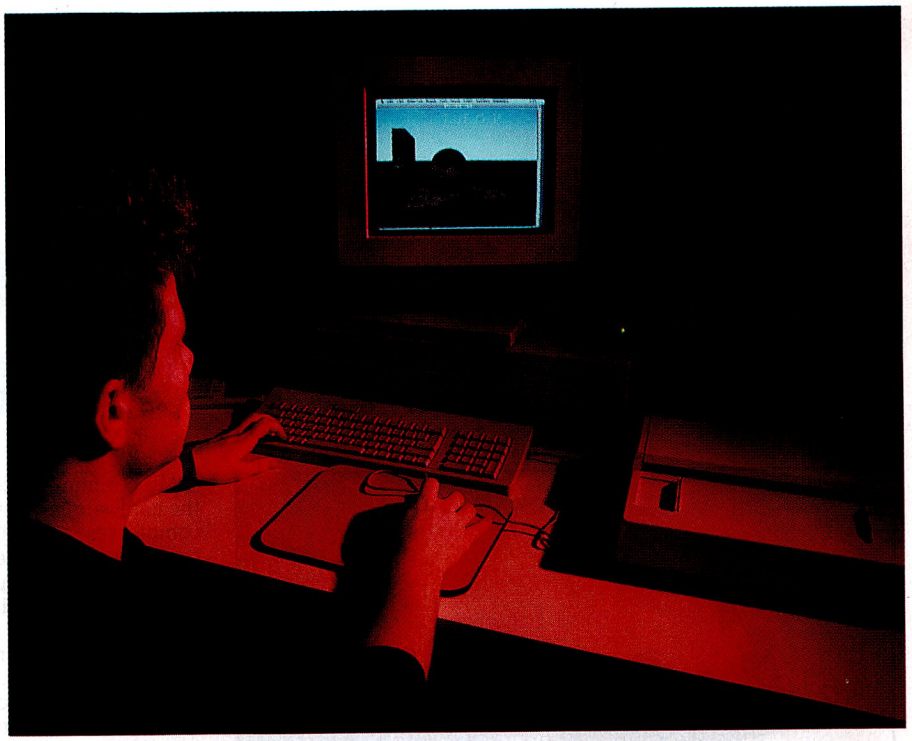
opened up the door of graphics and publishing to PC users. By using a machine like the Macintosh, users are also able to successfully compete in almost every possible medium: three-dimensional modelling, animation in video and architecture, producing 35mm slides and overheads, music and sound production – all manner of multi-media presentations, as well as illustration.

Before this mini-revolution took place, computer graphics was restricted to high-end, and therefore, high-expense, professionals with access to minis or mainframes. Although the technology is in its infancy, developments in the past several years have ensured its survival. Now full-colour separations of magazine-quality resolution can be achieved through the use of the Linotronic series of image-setters, and thermal colour proofing of PostScript art is now a reality in the USA and should available in Australia any time now.

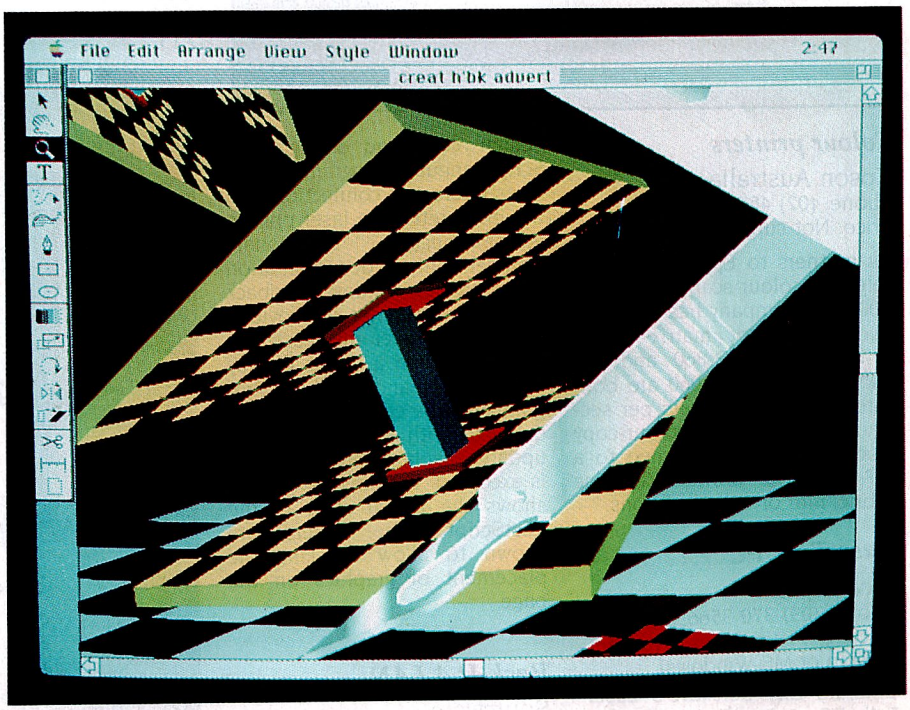
There are still teething problems, though – one of the biggest being to the initiation of computer users into the complexities of colour printing – a highly specialised field. The potential of PostScript has not been fully appreciated either by the software manufacturers or the printing industry who still view the technology with a certain amount of skepticism. The only people who seem to be aware of its potentials at the moment are the artists/users themselves.

This group are busy expanding the horizons of image-making, creating stunning visuals on-screen, limited only by their own imaginations and by the output technology available. Already large sections of corporate and government sectors are investing in desktop publishing. If used properly with good design sense the output quality can be as high as the most expensive computer systems, but at a fraction of a the price. The power of money needs no explanation, and it will be because dollars can be saved that the continuation of computer-generated art is guaranteed.

The *Creative Handbook* is distributed to some 10,000 advertising agencies, commercial art houses, printers, typesetters, photographers and marketing consultants; it's also available through selected newsagents. At press time, this year's cover price hadn't been set, but it will be similar to last year's price of $19.50. If you're interested in obtaining a copy, call (02) 693 6666 or write to *Creative Handbook*, PO Box 227, Waterloo 2015 NSW. □

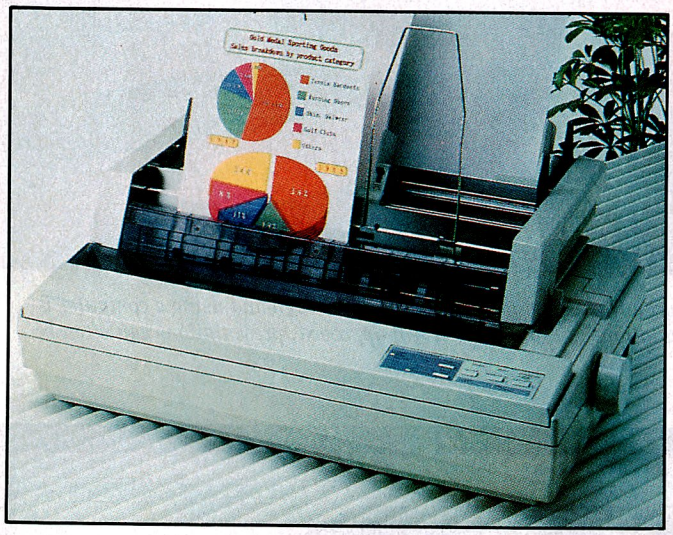


A major difference between traditional methods of graphic design and using a computer is the quality of the presentations that are possible – if approved, presentations can often be used as 'final' art.



Once mastered, computer software can allow graphic artists to realise their potential – there's very little wasted time on the mechanics of design, and more advanced and exciting designs can be created than ever before.

NEW PRODUCTS



Colour printers

Epson Australia
Phone: (02) 452 0666
Price: Not supplied

As partners to Epson's recently released colour scanner, the GT-4000, the company has launched two 24-pin dot matrix colour printers. The LQ-860 and the wide carriage LQ-1060 are both rated at 300 characters per second and can directly colour-copy documents when attached to a GT-4000. The printers can use fabric, film or colour ribbons.

LaserTalk PC

Pica Pty Ltd
Phone: (03) 370 3566
Price: $995 (includes a run-time version of MS-Windows)

Emerald City Software's LaserTalk PC, a PostScript development environment, is now available for MS-Windows. The package provides necessary tools to design, code and debug PostScript language programs. It features interactive connection with the interpreter in a laser printer, editor/debugger. dictionary browser, online documentation and a preview window. Feedback to the programmer is provided by the interpreter after each line is entered with a status display of any stacks and variables. Programs can be edited, traced and debuggd with error and status updates displayed after each line is executed. The preview window shows the actual state of the PostScript page; rulers are shown to allow checking the placement of graphics on the page.

Back-It 4 LAN

Sourcware
Phone: (02) 427 7999
Price: $630

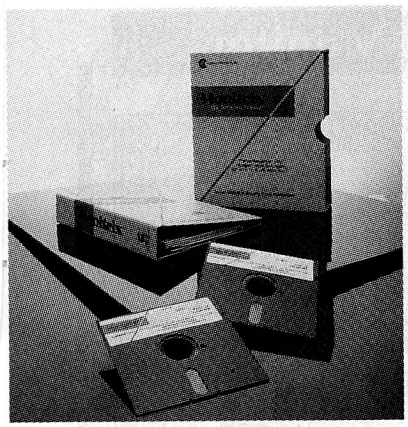
Capable of back up speeds up to 10Mb per minute (depending on the hardware), Back-It 4 LAN also compresses data 50 to 70 per cent to save storage space. The Scheduler module provides automatic, unattended back-ups at pre-set times and the Restore Manager makes file restoration a straightforward task. The system has dual-level verification to ensure reliable data storage. Back-It is claimed to back up any DOS device to any DOS device, including floppy disks, hard disks, tape drives and networks; drivers are supplied for a number of popular tape drives – it also supports the Apple File Protocol in NetWare 2.15.

Monitrix

Com Tech Communications
Phone: (02) 317 3088
Price: $1380

Monitrix facilitates network management by monitoring network resources, collecting statistical node and traffic information, and running connectivity tests from the file server, working as an extension of a NetWare operating system (version 2.1x or higher is needed). The Network Monitor can accumulate traffic statistics for 100 nodes and store the data in a database – time and date intervals, sampling frequency and maximum database size are all





configurable. Monitrix stores the hardware and software configuration of each network node in a database and builds a graphic display of the internet – node data can be edited and the software automatically updates the database as changes are made to nodes. Other features include monitoring available disk blocks and directory slots and notifying the console operator if a threshold is crossed; and advising the operator if a printer goes off line.

Virtual Memory for the Mac

Keyway Computers
Phone: (02) 693 1677
Price: Not supplied

A virtual-memory system for Macintosh computers is now available from Keyway – Virtual is an initialiser which moves Mac memory space to the hard disk, then creates an intelligent cache in RAM to implement a demand-paged virtual memory system. This can effectively expand the Mac's memory to 8Mb (the maximum allowed under System 6) without the need for memory modules. Virtual requires an A/UX machine, a Mac IIx or any Macintosh with a 68030 processor; a Mac II will need a 68851 Paged Memory Management Unit (PMMU) co-processor which can be supplied with the software.

Concept Keyboard

Barson Computers
Phone: (03) 419 3033
Price: Not supplied

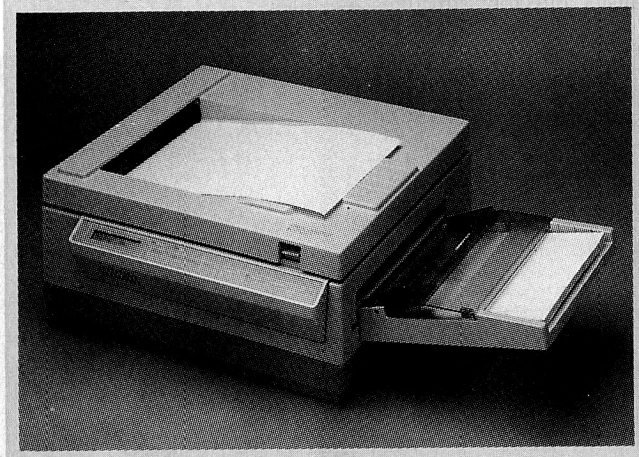
Barson has announced sole distributorship of the Concept Keyboard, an alternative input device intended for use in industry and education, particularly where children have not yet developed keyboard skills. A large range of educational software is supplied with the Keyboard so that teachers can quickly set up the device for individual students or subjects. The touch-sensitive digitised pad forming the keyboard has 128 cells which can be split into 256 or grouped to form sets that can range from finger to hand-size. Each cell can be assigned a shape, function, word or character. Additional software for the Keyboard is under development by West Ed Media, a development group established by the Western Australian Education Department.

PDQ²

Logo Distribution
Phone: (02) 819 6811
Price: $169

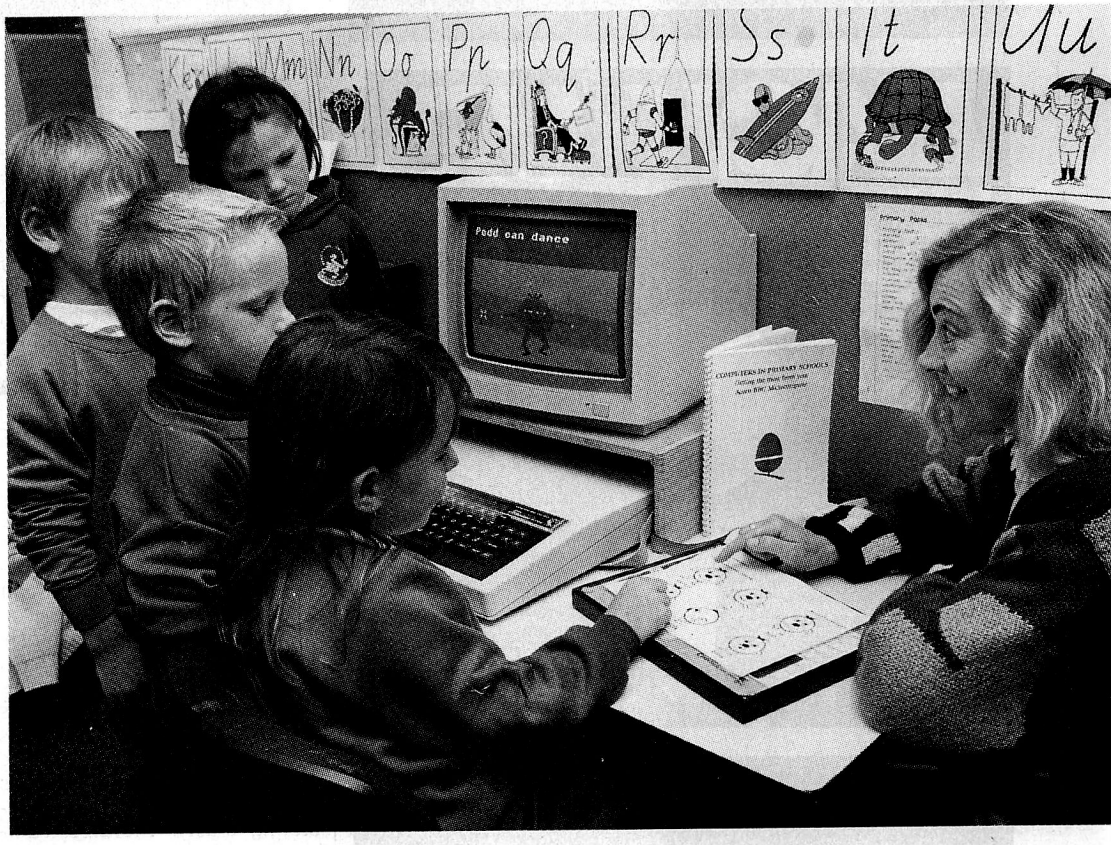
Claimed to be the world's fastest data transfer program, PDQ² PDQ² transfers files at up to 2Mb per minute using the parallel

Facit P6060 laser printer

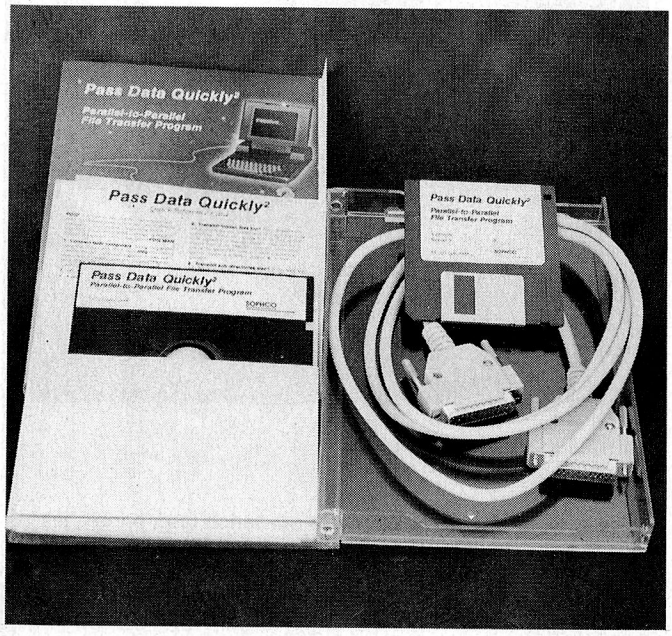


Elmeasco Instruments
Phone: (02) 736 2888
Price: $3311

Facit's 6-page per minute P6060 workstation laser printer, features a new engine with a rated life of some 300,000 pages. The standard 0.5Mb of RAM can be expanded to 1.5, 2.5 or 4.5Mb. Six fonts and LaserJet II emulation are standard and Facit offer some 20-odd HP-compatible font cartridges and three soft font packages.



ports. Featuring a built-in test routine to verify the connection between computers, PDQ² can transfer directory structures as well as files and commands can be implemented either from the command line or by using batch files.



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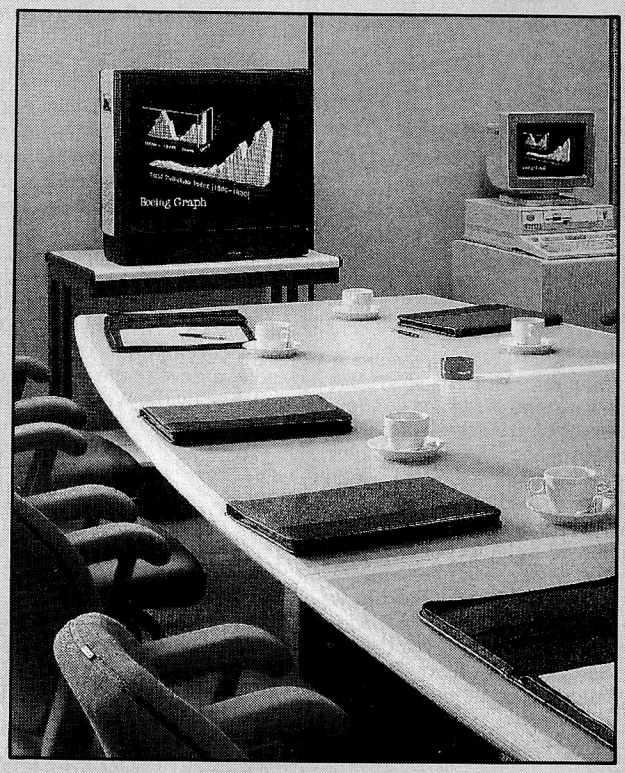
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WARNING: EDD is sold for making archival copies only.

Multidata Monitor



Trace Technology
Phone: (03) 646 5833
Price: $4600

The 28-inch (71cm) Multidata OCM 2846 Universal Data and Video Monitor can reproduce images from all commonly used computers, including IBM and compatibles and the Apple and Macintosh ranges. Offering a resolution of 600 by 500 pixels, it is compatible with Hercules, CGA, EGA and VGA displays and has full support for PAL, SECAM, NTSC and SuperVHS formats. The Multidata features autolock circuits – 15 to 36kHz horizontal and 45 to 120 vertical. Two speakers are incorporated in the front of the unit.

Whole Earth MacCatalog

Dataflow
Phone: (02) 331 6153
Price: $239.95

Through their Australian distributor Dataflow, Broderbund Software has released Stewart Brand's *Whole Earth Catalog* on compact disk for the Macintosh. The package includes more than 3000 full-screen digitised images and more than 3500 entries covering an array of subjects from building your own home and managing a small business to desktop publishing and restoring a city. The cross-referenced entries each include a review of the product by experts in the relevant field and information on where to obtain the product or service. Requirements are an SC-CD drive, HyperCard 1.2 or later and System 4.2 or later.

Direct Access Secondary Storage

Hewlett-Packard Australia
Phone: (03) 895 2895
Price: See below

Hewlett-Packard have announced two 5¼ inch rewritable optical storage products, which

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PC Magazine (USA)



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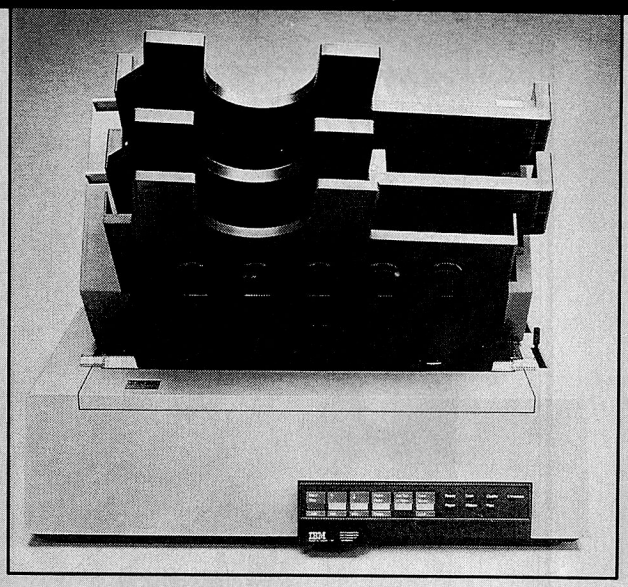
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Signature:.....

PS/2 printers

IBM Australia
Phone: (02) 634 9111
Price: $896 ProPrinter III
$1127 ProPrinter III XL
ProPrinter XL24E
$2377 Quickwriter

IBM have released four new printers intended for use with PS/2 systems. The Quickwriter is a heavy-duty 240-pin dot matrix machine with a rated draft speed of 330cps at 10cpi, a letter-quality speed of 110cps and a Selectric Font speed of 55cps. A dual-drawer cut-sheet feeder with automatic envelope option can print letters and envelopes in sequential order. The eight resident fonts can be expanded with plug-in cartridges and five pitches are available: 10, 12, 15, 17cpi and proportional spacing. The 9-pin ProPrinter III (narrow carriage) and IIIXL (wide-carriage) feature all-point addressable graphics and a rated burst speed of 320cps in Fastfont mode and 270cps at 10cpi. A 32K print buffer and single-drawer sheet-feed are optional. The 24-pin ProPrinter XL24E can print up to 4-part forms at 288cps (12cpi) in draft mode. Other features include a 14K print buffer; a single-drawer sheet feeder and Fontset, which offers 11 additional fonts, are optional.



the company terms Direct Access Secondary Storage. The HP C1710A optical disk library system holds 32 optical disk cartridges, each with 650Mb capacity, giving a library of 20.6 gigabytes. The C1710A includes two rewritable optical drives specifically developed for the product by Sony. The drives are based on magneto-optical technology and conform to the ISO and ANSI definition for continuous composite format. The HP C1711A is an OEM standalone optical disk drive which is compatible with the C1710A. The drive, which has a SCSI interface, has a 95ms average seek time and has a rated sustained read-transfer rate of 680Kb per second. The C1711A is priced at $10,900.

Zenith MinisPort

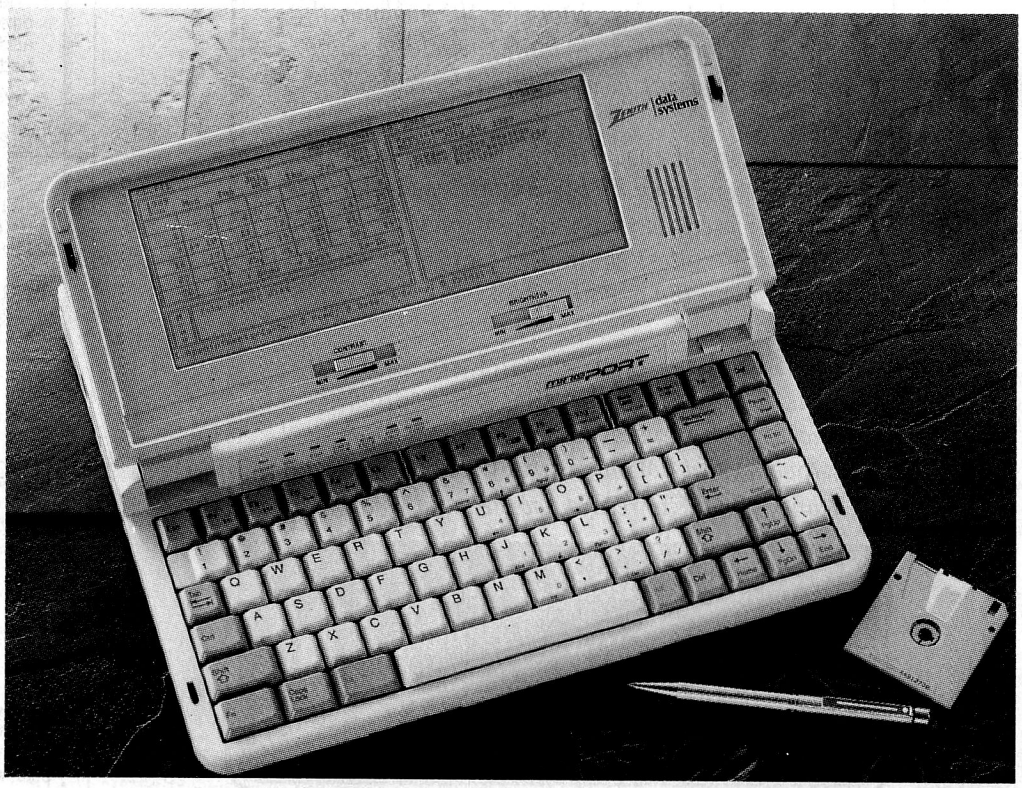
Zenith Data Systems
Phone: (02) 502 2566
Price: $2999 with 1Mb RAM
$4299 with 2Mb RAM

Based on an 8Mhz 80c88 chip, the MinisPort weighs only 2.7kg and measures 31.5 *x* 25 *x* 3.3cm. A single 2-inch 720K floppy drive is standard and 360K of RAM is battery backed and can be used as a second disk. A 9-pin serial port, parallel, RGB and external floppy drive port are standard. The backlit liquid crystal display is 80 characters by 25 lines; the rechargeable battery-pack offers up to three hours of use. A ROM-based DOS 3.3 implementation and a self-cloning data transfer program are included.

AST Premium 386/33

AST Research
Phone: (02) 906 2200
Price: $11,000 Model 5
$14,995 Model 105
$18,595 Model 325
(monitor not included)

AST have topped their Australian range with a 33Mhz 80386 featuring an 82385 cache controller and 2Mb RAM, expandable to four (optional memory cards can give a total of 36Mb RAM in 1Mb increments). The range com-



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CM106 Word Processing for Kids-A word processing designed specially for kids.

CM107 Origami- Teaches you the Japanese art of paper folding.

CM108 Arcade Games Collection- An assortment of the finest 'Arcade type' games including Scramble and Donkey Kong.

CM109 ImagePrint-Allows you to produce letter quality print on your Epson or compatible printer.

CM110 ProComm- Communication program that allows you to go to DOS without terminating.

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CM112 PC Outline-Helps you to organise your thoughts.

CM113 PC Style-Analyses your writing to help you make your writing easier to understand.

CM117 PC-Stock Plot stock analysis graphs on monitor or printer.

CM119 Basic Games-Various games in Basic including Bowling, Keno, Spacewar and more.

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CM122 Bookkeeper- A simple bookkeeping tool for small business and personal use where complex accounting software is not required.

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CM126 HDM III- Hard disk menu system with unlimited menus and selection.

CM128 ABC Fun Keys- For ages 2-5; learning Alphabet keyboard.

CM130 PC-Flow-A flow chart designing program.

CM133 T.O.P.- Over 40 procedures and functions for Turbo Pascal 4.

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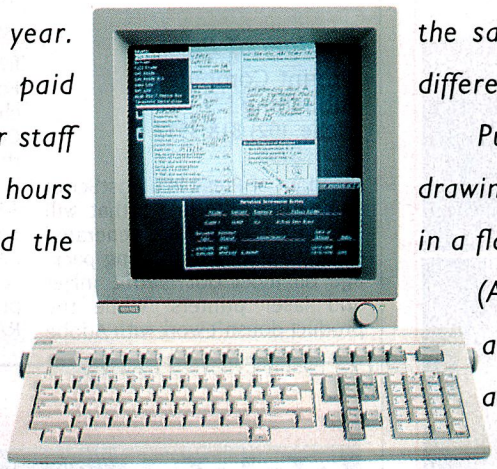
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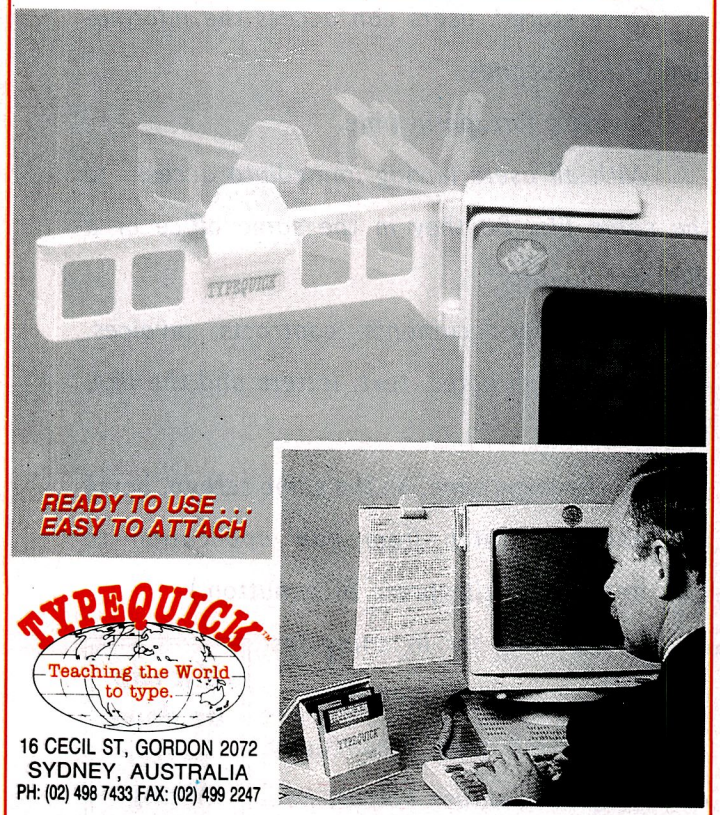
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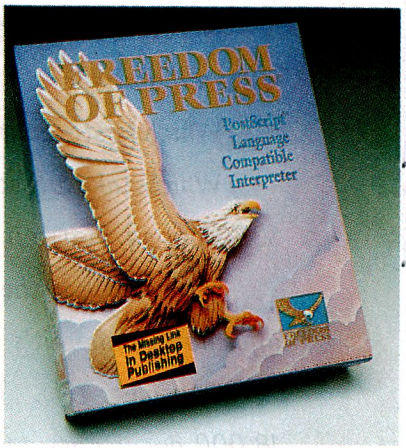
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Freedom of Press

Imprint Computer Publishing
Phone: (02) 818 3577
Price: $795

Freedom of Press is a PostScript compatible interpreter that will print PostScript files generated by any desktop publishing package on most dot matrix, inkjet and laser printers. While the product doesn't work with Adobe fonts, it works with Bitstream's Fontware and EPS graphics. Included with the package are 35 Compugraphic fonts similar to those used in the Apple LaserWriter Plus. DOS 2.1 or later, an AT or compatible and 512K of EMS RAM are required; 4Mb of hard disk space and a co-processor are recommended – laser printers need a minimum 1Mb of RAM to print full pages. □

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Model 2400XR

$299.00 Incl. Tax

Telecom Approved

Features - *Automatic Everything* and
- Hayes 2400 "AT" command set compatible
- 27 "S" registers
- Extensive self-testing
- Non volatile RAM
- Call progress monitoring
- Uses the latest technology DSP chip-set
- Asynchronous / synchronous

V.22, V.22bis Bell 103, 212, 2400

2400 B.P.S. FULL DUPLEX MODEM

Money Back Guarantee If Not Completely Satisfied Within 14 Days

The Amazing ...

MAESTRO *2400ZXR*

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Telecom Approved

Uses the Latest Technology D.S.P. Chip-set with Performance Equal to or Better than Modems Costing ***$1600.00*** or **More!**

Automatic Everything ... Auto-Answer, Auto-Dial, Call Progress Monitoring, Pulse / Tone Dialling, Line Condition Monitoring, Hayes Compatible.

V.21, V.22, V.22bis, V.23 (300/300, 1200/75, 75/1200, 1200/1200, 2400/2400)

V.23 with automatic bit rate converter

NEW

1234 V.PLUS In MODEM

All the features of the 2400ZXR in a PC CARD MODEM

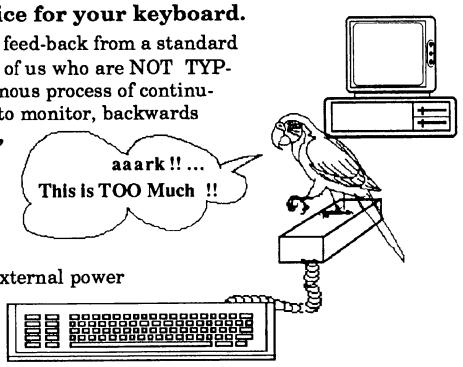
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KEY TALK is HERE!!

$99.00 Incl Tax

The ULTIMATE feed-back device for your keyboard.

THE PROBLEM: To achieve audible feed-back from a standard IBM or compatible keyboard for those of us who are NOT TYPISTS and who are tired of the monotonous process of continually moving your eyes from keyboard to monitor, backwards and forwards in a *dizzy loop* - **WELL, NOT ANYMORE !!**



THE SOLUTION: Simply plug the Maestro Key Talk between your keyboard and computer (in series with your current keyboard) and instantly you have the **ULTIMATE** in **feed-back ... THE KEYBOARD COMES ALIVE.** It actually speaks the letter as soon as you strike a key ...**MAGIC !!**

SPECIFICATIONS: Requires a standard IBM keyboard (AT or XT) or compatible. No external power supply required. Does not interfere with the standard operation of your keyboard or slow it down in any way. Vocabulary - all QWERTY, ASCII characters plus function keys and control characters. Audio level adjustable.

9600 V.32 Super Executive

V.32 9600 FULL DUPLEX on a standard telephone line

V.32 - V.21 - V.22 - V.23 - V.22 bis ... The absolute latest in technology. Uses an awe inspiring three **digital signal microprocessors,** controlled by a Super 8 microprorcessor running at 20MHz!! Hayes compatible, auto dial, auto answer, auto disconnect modem.

AN **INCREDIBLE $995** (incl tax)

2400 DATA OPTIMIZER

V.22 - V.22 bis - **MNP** Mode 5 data compression with Hayes compatibility, auto dial, auto answer,auto disconnect with error checking. This modem is capable of doubling the data flow withMNP Mode 5. Depending on the file you can reach a staggering 4800 bps peak compression - error free!

Astounding Value!!

$399 (incl tax)

1200 Bit Stream Flyer

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- Manual dial
- Manual answer
- V.22, Bell 212

Undoubtedly the cheapest 1200/1200 bps V.22 modem in Australia

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Calool Street, South Kincumber 2256

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THE PROPHET



LARRY LEWIS

National BBS listing

Primary electronic collection points

ACT – PC Exchange RIBM(062) 58-1406

NSW – Prophet TBBS(02) 628-5222

Vic. – Custom Programming Opus (03) 848-3331

Qld. – AMPAK Opus/PRBBS (07) 263-7070

SA – Oracle PC-Network(08) 260-6222

WA – Nemo Multiple BBS RAPL (09) 370-1855

Tas. – Hobart Users Bulletin Board (002) 43-5041

BBS Listing 8907

New systems: 23
Online: 4
Unknown: 2
Offline: 19
Name Change: 3
Amended: 50
TOTAL Systems: 339

QUEENSLAND

Access North Queensland
Phone: (070) 51-0566
Baud: V21 V22 V23
Access: Reg LVA
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: CMVideoTeX

AMPAK NorthGate Opus/PRBBS
Sysop: Brian Wendt & John Bews
Phone: (07) 263-7070
FIDOnet: 3:640/205
Baud: V21 V22 V22bis V23 B103 B212
Access: Mem Reg VA
Computer: Sanyo 18 Plus 386
DOS: MS DOS
BBSoftware: Opus

Apple-Q Node 1
Sysop: Graham Black & Vince Crosdale
Phone: (07) 284-6145
Baud: V21 V22 V22bis V23
Access: Mem
Computer: Apple //e
BBSoftware: GBBS PRO

Complete BBS Registry listing

We are publishing the complete listing for the ACT and New South Wales in July, October, January and April; the listing for Victoria, Tasmania and the Northern Territory in August, November, February and May; and South Australia, Western Australia and Queensland in September, December, June and March.

BaudWalk BBS
Sysop: Geoff Ryan
Phone: (07) 285-5814
Baud: V21 V22 V22bis V23 B103
DOS: PC DOS
BBSoftware: Focus

Blue Lagoon BBS - QLD
Sysop: David Webb
Phone: (07) 343-9353
FIDOnet: 3:604/943
Baud: V21 V22 V22bis V23
Access: Public
Computer: Amstrad PC1640DD
DOS: MS DOS
BBSoftware: QuickBBS

Brisbane MicroBee User Group
Sysop: Graham Scott
Phone: (07) 366-4833
Access: Mem VA

Catch-22
Sysop: Ray Nugent
Phone: (075) 38-5824
Baud: V21 V22 V23
Access: Public
Hours: Daily: 2200 - 0600
Computer: CCS XT
DOS: MS DOS
BBSoftware: QuickBBS

Commodore Computer Users Group Qld
Sysop: Greg Shea
Phone: (07) 344-1833
FIDOnet: 3:640/304
Baud: V21 V22 V22bis V23
Access: Mem VA
Computer: President 200e XT
BBSoftware: Opus

COMTEL BBS
Sysop: Warren Mason
Phone: (077) 89-1655
FIDOnet: 3:640/740
Baud: V21 V22 V22bis V23 B103 B212
Access: Mem LVA
Computer: FUJITECH ST
DOS: MSDOS
BBSoftware: Lynx

Contention BBS
Sysop: Gregory Bradley
Phone: (077) 73-7524
FIDOnet: 3:640/720
Baud: V21 V22 V22bis V23
Access: Reg
Hours: Daily: 2300 - 0600
Computer: IBM Clone
DOS: MS DOS
BBSoftware: Opus

Educational RBBS
Sysop: Andrew Waddell
Phone: (07) 266-3369
Baud: V21 V22 V22bis V23
Access: Mem VA
Computer: IBM XT clone
BBSoftware: Mailbox
Note: USERWORKS Node ?1

Electric Dreams BBS
Sysop: Joe Altoff
Phone: (07) 399-1322
Baud: V21 V22 V23
Access: Mem VA
Note: User Works Node ? 5

Excalibur BBS / The Missing Lynx
Sysop: Andrew Johnston
Phone: (077) 79-5959
FIDOnet: 3:640/220
Baud: V21 V22 V22bis B212 PEP
Access: Public
Hours: Weekdays: 1500 - 0800
Weekends: 24 Hours
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: Opus / Lynx

FAR-NOR-64 BBS
Sysop: Ian Pearse
Phone: (070) 54-6892
Baud: V21 V22 V23 B103 B212
Access: Mem Reg LVA
Computer: C-64
DOS: BASIC IEEE
BBSoftware: BBS64

Grammar BBS
Sysop: Barry Taylor
Phone: (077) 72-6052
FIDOnet: 3:640/702
Baud: V21 V22 V22bis V23
Access: Reg LVA
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: Opus

Greenhorn Experimental
Sysop: Mike Richardson
Phone: (07) 208-2640
FIDOnet: 3:640/301
Baud: V21 V22 V22bis V23
Access: Reg LVA
Computer: SKAI 286
DOS: MS DOS
BBSoftware: QuickBBS

Gumtree BBS
Sysop: Peter Brewer
Phone: (075) 63-2621
FIDOnet: 3:640/601
Baud: V22 V22bis
Access: Mem Reg
Hours: Weekdays: 2100 - 0800
Weekends: 24 Hours
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: Opus

Hi-Tech CBBS
Sysop: Clyde Smith-Stubbs
Phone: (07) 300-5235
Baud: V21 V22 V23

Hitek Junkyard
Sysop: Ernst Preuss
Phone: (07) 893-1979
FIDOnet: 3:640/730
Baud: V21 V22 V22bis
Access: Public
Computer: CCS 286
DOS: PC DOS
BBSoftware: Opus

JabberWOCky
Sysop: David Drummond & Peter Lane-Collett
Phone: (07) 398-4288
FIDOnet: 3:640/304
Baud: V21 V22 V22bis V23
Access: Mem LVA
Computer: Imagineering XT
DOS: MS DOS
BBSoftware: Opus

Kangaroo Point TAFE
Sysop: Nigel Roulston
Phone: (07) 393-1763
Baud: V21 V22
BBSoftware: GTPower

Listline Experimental
Phone: (07) 353-3718
Baud: V21 V23

Mackay High School BBS
Sysop: Bob Chalmers
Phone: (079) 51-4815
Access: Public
Hours: Weekdays: 1600 - 0730
Weekends: 24 Hours

Marlin-Coast BBS
Sysop: Ray Chalmers
Phone: (070) 57-7658
FIDOnet: 3:640/501
Baud: V22 V22bis B103 PEP
Access: Reg VA
Computer: Pericomp 386/20
DOS: MS DOS
BBSoftware: Opus

Marwick's MadHouse
Sysop: Paul Marwick
Phone: (07) 371-5864
FIDOnet: 3:640/820
Baud: V22 V22bis PEP
Access: Mem VA
Computer: Skai 386-20
DOS: MS DOS
BBSoftware: Opus

Mel-Born BBS
Sysop: Wade Short
Phone: (075) 38-0817
FIDOnet: 3:640/753
Baud: V21 V22 V22bis
Access: Public
Computer: Wyse 1500
DOS: MS DOS
BBSoftware: OPUS - QuickBBS

Missing Link BBS
Sysop: Mike Barber
Phone: (07) 808-3094
Baud: V21 V22 V23
Access: Reg
Computer: C-64
BBSoftware: Punter

Modem Magic
Sysop: John Wain
Phone: (07) 264-4747
FIDOnet: 3:640/212
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: 386
DOS: MS DOS
BBSoftware: Opus

Nightlife QuickBBS
Sysop: Jonathan and Gillian Levine
Phone: (07) 849-5927
FIDOnet: 3:640/349
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: QuickBBS

NQ Connection
Sysop: Geoff Gordon
Phone: (077) 79-7660
FIDOnet: 3:640/710
Baud: V22 V22bis PEP
Access: Reg VA
Computer: Kaypro XT
DOS: MS DOS
BBSoftware: Opus

Phoenix BBS
Sysop: Kelvin Saggers
Phone: (07) 800-4660
Baud: V21 V22 V22bis V23
Access: Mem

Redcliffe Library
Sysop: Andrew Osborne
Phone: (07) 283-0315
FIDOnet: 3:640/203
Baud: V21 V22 V22bis V23
Access: Reg VA
Hours: Weekdays: 1700 - 0800
Weekends: 24 Hours
Computer: IBM Clone
BBSoftware: Fido

Rock Cave BBS
Sysop: Rick Dalley
Phone: (07) 395-1809
Access: Mem VA
Note: User Works Node ? 4

Sidecar Express BBS
Sysop: Brendan Pratt
Phone: (075) 46-3252
Baud: V21 V22 V22bis V23 B103 B212
Access: Mem Reg
Computer: Amiga Sidecar
DOS: MS DOS
BBSoftware: Focus
Note: User works node 7

Silicon City Brisbane BBS
Sysop: Silicon City
Phone: (07) 391-6176
FIDOnet: 3:640/391
Baud: V21 V22 V22bis V23
Access: Public
Computer: ULTRA AT
DOS: MS DOS
BBSoftware: Opus

Software 80 BBS
Sysop: Tony Melius
Phone: (07) 369-7103
Baud: V21
Access: Reg VA
Hours: Weekdays: 1930 - 0800
Sat: 1430 - Mon: 0800

Sunshine Coast Connection
Sysop: Brian Boseley
Phone: (071) 44-2889
FIDOnet: 3:640/401
Baud: V21 V22 V22bis V23
Access: Public
Hours: Mon - Sat: 2000 - 0800
Sun: 24 Hours
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: Opus

Swiss Connection
Sysop: Andrew Osborne
Phone: (07) 283-0314
FIDOnet: 3:640/204
Baud: V21 V22 V22bis V23
Computer: IBM AT

The Galaxy GateWay Computer System
Sysop: James Collins
Phone: (07) 207-8900
FIDOnet: 3:640/230
Baud: V21 V22 V22bis V23
Access: Reg
Computer: IBM XT Clone
DOS: PC DOS
BBSoftware: Lynx

Toowoomba RBBS
Sysop: Chris White
Phone: (076) 30-1762
Baud: V21
Access: Mem Reg LVA
Hours: Daily: 2100 to 0630
Computer: C-128

Townsville Apple Bulletin Board
Sysop: Christopher Griggs
Phone: (077) 73-3651
Baud: V21 V22 V23 B103 B212
Access: Mem Reg LVA
Computer: Apple //e
DOS: ProDOS
BBSoftware: GBBS

Transcendental Connection
Sysop: Kenneth Page
Phone: (07) 281-9418
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: C-64
BBSoftware: BBS64

Youth Extension Service (Toowoomba)
Sysop: Wayne Bucklar
Phone: (076) 39-1790
FIDOnet: 3:640/302
Baud: V21 V23
Access: Public
Computer: Sperry
DOS: MS DOS
BBSoftware: Opus

SOUTH AUSTRALIA

ADelaide AMiga (ADAM) TBBS
Sysop: Greg Hicks
Phone: (08) 370-5775
FIDOnet: 3:680/805
Baud: V21 V22 V22bis V23
Access: Reg LVA
Computer: IBM AT
DOS: MS DOS
BBSoftware: TBBS

Amiga Line Forever (ALF)
Sysop: Greg Parr
Phone: (08) 266-3055
Baud: V21 V22 V22bis V23
Access: Reg LVA
Computer: Amiga 1000
DOS: AmigaDOS
BBSoftware: Atredes

Cadzow Access
Sysop: Scott Cadzow
Phone: (08) 338-2272
FIDOnet: 3:680/811
Baud: V21 V22 V22bis V23 PEP
Access: Public
Computer: NEC 386
DOS: MS DOS
BBSoftware: QuickBBS

Coffee Time BBS
Sysop: Terry Mulvaney
Phone: (08) 254-9423
FIDOnet: 3:681/860
Baud: V21 V22 V22bis V23
Access: Reg LVA
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: Opus

Computer Connection
Sysop: Ray Crawford
Phone: (08) 384-7316
FIDOnet: 3:680/809
Baud: V21 V22 V22bis V23
Access: Public
Hours: Daily: 1730 - 0900
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: Opus

Computer Talk
Sysop: Bruce Kelly
Phone: (08) 326-2354
FIDOnet: 3:680/816
Baud: V21 V22 V22bis V23
Access: Reg
Computer: IBM XT Clone
DOS: PC DOS
BBSoftware: Opus

Multiple System BBS
Sysop: Danny Vozzo
Phone: (08) 255-5116
Baud: V21 V22 V22bis V23
Access: Reg LVA
Computer: Apple //+
DOS: Apple DOS
BBSoftware: GBBS

Nexus Education Dept BBS
Phone: (08) 243-2477
Baud: V21
Access: Mem

Oracle PC-Network
Sysop: Don Crago & Grayham Smith
Phone: (08) 260-6222
FIDOnet: 3:680/804
Baud: V21 V22 V22bis V23
Access: Mem LVA
Computer: IBM AT Clone
DOS: PC DOS
BBSoftware: TBBS

Phone Box BBS
Sysop: Darryl Merritt
Phone: (08) 380-5505
FIDOnet: 3:681/854
Baud: V21 V22 V22bis V23 V32
Access: Public
Computer: Kaypro AT
DOS: MS DOS
BBSoftware: Opus

S A C BBS
Sysop: Austen Evans
Phone: (08) 387-0249
Baud: V21 V22 V23 V23ORG B103 B212
Access: Mem LVA
Computer: C-128
BBSoftware: Blue Board

SA Country CLUB
Sysop: Martin Crockett
Phone: (085) 22-4434
FIDOnet: 3:681/853
Baud: V21 V22 V22bis V23 V32
Access: Public
Computer: IBM AT Clone
DOS: PC DOS
BBSoftware: Opus

Sorcerer Users Group BBS
Sysop: Steve Fraser
Phone: (08) 260-6576
Baud: V21
Access: Mem LVA
Computer: Pulsar LBB
DOS: CP/M
BBSoftware: ROS

The Bureau BBS
Sysop: Patrick Browne
Phone: (08) 258-2002
OZnet: 7:833/384
Baud: V22 V22bis
Access: Reg VA
Computer: Kaypro XT
DOS: MS DOS
BBSoftware: Opus

The Daily Planet
Sysop: Rick Morris
Phone: (08) 231-2053
Baud: V21 V22 V22bis V23
Access: Reg LVA
Computer: IBM AT Clone
BBSoftware: PC-Board

The Key Board
Sysop: Paul Lawrence
Phone: (08) 344-5354
FIDOnet: 3:680/814
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM Clone
DOS: MS DOS
BBSoftware: Opus

The Realm
Sysop: Matt Rubinstein
Phone: (08) 374-0462
Baud: V21 V22 V22bis V23 B103
Access: LVA
Computer: Acorn Archimedes
DOS: Arthur
BBSoftware: The Realm

Trivia BBS
Sysop: Daron Ryan
Phone: (08) 377-0049
Baud: V21 V22 V22bis V23
Hours: Weekdays: 1800 - 0800
Weekends: 24 Hours
DOS: MS DOS
BBSoftware: QBBS

Typelink SA
Sysop: Kathy Fraser
Phone: (08) 211-8510
FIDOnet: 3:681/863
Baud: V22 V22bis
Access: Reg
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: Opus

WESTERN AUSTRALIA

Blood & Silicon BBS
Sysop: Mark Rae
Phone: (09) 481-1311
Baud: V21 V22 V22bis V23 B103
Access: Reg LVA
Computer: ALR 386/220
DOS: MS DOS
BBSoftware: The Major BBS

CITADEL BBS
Sysop: Adam Blake
Phone: (09) 367-8856
FIDOnet: 3:690/632
Baud: V21 V22 V23
Access: Public
Computer: IPEX AT Turbo
DOS: MS DOS
BBSoftware: QuickBBS

COMMlink
Sysop: Andrew Waite
Phone: (09) 451-7288
FIDOnet: 3:690/628
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: Atari ST
BBSoftware: FoRem ST

Computex BBS
Sysop: Russell Stokes
Phone: (09) 447-0522
Access: Reg VA

Gamma Istari
Sysop: Richard Dale
Phone: (09) 493-1534
FIDOnet: 3:690/626
Baud: V21 V22 V22bis V23 B103
Access: Mem LVA
Computer: IBM AT
DOS: MS DOS
BBSoftware: Opus

GOLDFIELDS Opus
Sysop: Graham Clark
Phone: (090) 21-7755
FIDOnet: 3:690/615
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: Opus

Hedland's First Bulletin Board
Sysop: Wayne Wessling
Phone: (091) 73-2275
FIDOnet: 3:690/622
Baud: V21 V22 V22bis V23
Access: Reg
Computer: Epson PC+
DOS: MS DOS
BBSoftware: Opus

Kardinya Turbo BBS
Sysop: Tony Salmeri
Phone: (09) 331-1695
Baud: V21 V22 V22bis V23 B103
Access: Reg LVA
Computer: IBM XT Clone
DOS: PC DOS
BBSoftware: Turbo BBS

Lightning BBS Line 1
Sysop: Simon Blears
Phone: (09) 275-8225
FIDOnet: 3:690/601
Baud: V22 V22bis B212 PEP
Access: Reg LVA
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: Opus

Mini Omen
Sysop: Greg Watkins
Phone: (09) 279-8555
Baud: V21 V22 V23
Access: Public
Computer: TRS-80
DOS: NewDos
BBSoftware: Omen

Murdoch University ES-BBS1
Sysop: Roger Atkinson
Phone: (09) 332-2604
Baud: V21
Access: Mem VA
Computer: Commodore 128D
DOS: CP/M
BBSoftware: Turbo BBS

Nemo Games Machine
Sysop: Graeme Platt
Phone: (09) 370-2666
Baud: V21 V22 V22bis V23
Access: Mem LVA
Computer: Apple //e
DOS: ProDOS
BBSoftware: GBBS Pro

Nemo Multiple BBS RAPL
Sysop: Graeme Platt
Phone: (09) 370-1855
Baud: V21 V22 V22bis V23

Oasis ST BBS
Sysop: Lou Schillaci
Phone: (09) 430-5431
Baud: V21 V22
Access: Mem LVA
Hours: Mon - Sat: 1800 - 0800
Sun: 24 Hours
Computer: Atari
DOS: TOS
BBSoftware: Michtron

Paragon Computers BBS
Sysop: Paul Reeves Steve Quartely Chris Parker
Phone: (09) 325-5160
Baud: V21 V22 V22bis V23
Access: Public
Computer: Atari ST
DOS: Gem
BBSoftware: Michtron

Perth Omen
Sysop: Mark Dignam
Phone: (09) 244-2111
Baud: V21 V22 V22bis V23 V23ORG
Access: Mem Reg
Computer: TRS-80
DOS: NewDOS
BBSoftware: Omen TRBBS

Student Access Message Service
Sysop: Peter Walton & John Bramley
Phone: (09) 321-9721
Baud: V21 V22 V23
Access: Reg VA

Terminal BBS
Sysop: Andrew Milner
Phone: (09) 389-8048
FIDOnet: 3:690/625
Baud: V21 V22 V22bis V23 B103 B212 HST
Access: Reg VA
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: QuickBBS

The Bombay Duck
Sysop: Steve Hodges
Phone: (091) 44-2253
FIDOnet: 3:690/614
Baud: V21 V22 V22bis V23 B103
Access: Mem Reg LVA
Computer: Comsys XT
DOS: MS DOS
BBSoftware: Opus

The Gas Station
Sysop: Don Hill
Phone: (091) 82-2469
FIDOnet: 3:690/624
Baud: V21 V22 V22bis V23
Access: Public
Hours: Weekdays: 1700 - 0630
Weekends: 24 Hours
Computer: NEC PowerMate 1
DOS: MS DOS
BBSoftware: Opus

The Gathering BBS
Sysop: Ken Peters
Phone: (09) 272-4711
FIDOnet: 3:690/630
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: Opus

The Library BBS
Sysop: Colin Wheat
Phone: (09) 293-2857
FIDOnet: 3:690/613
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM AT
DOS: MS DOS
BBSoftware: Opus

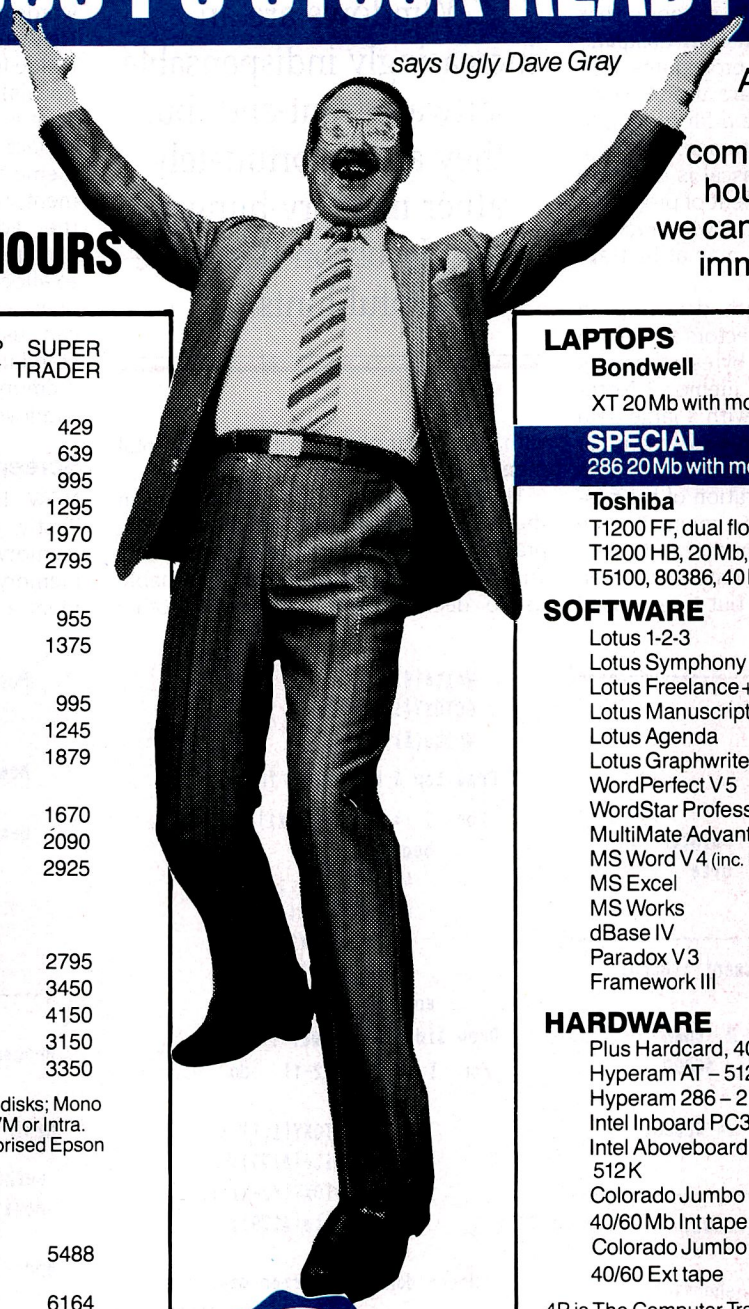
Treasure Island
Sysop: Gloria Platt
Phone: (09) 271-0471
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: Apple //e
DOS: ProDOS
BBSoftware: GBBS Pro

West-Gate BBS
Sysop: Phil van Leen
Phone: (09) 481-0489
FIDOnet: 3:690/611
Baud: V21 V22 V22bis V23 B103
Access: Reg VA
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: Opus

Z-Node 62
Sysop: Lindsay Allen
Phone: (09) 450-0200
Baud: V21 V22 V22bis V23
Access: Public
Computer: BigBoard II
DOS: ZCPR
BBSoftware: Z-MSG □

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$3,000,000 PC STOCK READY TO GO!

AT LAST! FROM WAREHOUSE TO YOU IN 24 HOURS



After five months of installing our computerised warehouse stock system we can now guarantee immediate delivery.

PRINTERS/ PLOTTERS	4P PRICE*	SUPER TRADER
Epson		
LX 800	399	429
LQ 500	599	639
FX 1050	965	995
LQ 1050	1239	1295
LQ 2500+	1810	1970
GQ 3500	2695	2795
NEC		
P5200	895	955
P5300	1295	1375
Toshiba		
P321SL	955	995
P341SL	1212	1245
P351SX	1820	1879
Roland		
DXY 1100	1570	1670
DXY 1200	1964	2090
DXY 1300	2750	2925

SYSTEMS		
Epson		
PCe, 40 Mb, mono	2695	2795
PCe, 40 Mb, EGA	3295	3450
PCe, 40 Mb, VGA	3895	4150
AX2, 20 Mb, mono	2995	3150
AX2, 40 Mb, mono	3195	3350

Epson systems contain Miniscribe hard disks; Mono monitors are Eizo; color monitors are TVM or Intra. NOTE: The Computer Trader is an authorised Epson warranty service centre.

NEC		
Powermate 1, VGA, Multisync II, 20 Mb	5268	5488
Powermate 1 Plus, VGA, Multisync II, 42 Mb	5917	6164
Powermate SX, VGA, Multisync II, 42 Mb	7674	7994

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The Computer Trader

TCT 949

WIDE OPEN WINDOWS

Windows are an increasingly indispensable software front-end, but they are unfortunately rather memory-hungry. Gary Jacobson has some helpful hints. . .

THE SUBJECT OF windows has been discussed in *Your Computer* before, and the procedures outlined were, and are useful. However, it is possible to use a far more efficient method of screen storage, and, with the limit of 64K Turbo Pascal is forced to impose on the Data Segment of programs, this means of implementing windows is of more importance than it may at first appear.

So what is wrong, with declaring an array of screen storage vectors with each vector comprising 4000 bytes (character plus attribute) of screen memory? Nothing, as such, except that with a large data structure if we want from two to four or more windows in operation at any one time, we must for the duration of the program give up 16K of Data Segment. If more windows are utilised, then that Data Segment requirement is, naturally, even greater. Call me miserly, but I was raised with computers that hardly had any total memory.

How do we get out of this difficulty? In theory, quite easily, and do not fear, the practical aspects are relatively simple too. Turbo Pascal, and other languages, enable us to declare New variables, in other words using the pre-defined procedures New and GetMem. Such variables do not reside in the Data Segment, or in the Stack (locals), but are dynamically allocated in what is unceremoniously called the Heap. In fact, this amounts to using the free memory remaining above the Data Segment, Code Segment(s) and Stack. A further advantage of this approach, apart from reducing the Data Segment usage, is to allocate the memory required for a window only when that window is active. We can use Turbo's Dispose or FreeMem standard procedures to de-allocate the memory used when we wish to close a window.

Screen segment

NOW, DOWN TO more specific matters. Firstly, we must know where the screen memory starts within the total available memory. The simple function Screen Segment achieves this neatly (see Listing 1).

```
{-----------------------------------}
Program       Windows;

Uses      Crt;
Var
  Screen1, Screen2 :   pointer  ;
  i                :   byte     ;

{-----------------------------------}
Function     ScreenSegment : Word;
Begin
     If Mem[$0:$449] = 7  then
        ScreenSegment := $B000
     else
         ScreenSegment := $B800;
end;
{-----------------------------------}
procedure      Framewindow1;
Var
     I,X1,Y1,X2,Y2   : shortint;
     base,offset,pos : word;
 begin
    X1 := Lo(WindMin);
    Y1 := Hi(WindMin);
    X2 := Lo(WindMax);
    Y2 := Hi(WindMax);
    GOTOXY(1,1) ;
    Write(#218);
    GOTOXY(X2-X1+1 , 1) ;
    Write(#191);
    GOTOXY(1, Y2-Y1+1) ;
    Write(#192);
{ Draw top & bottom of frame. }
  For  I := 2 to (X2-X1)  do
       begin
         GOTOXY(I,1) ;
         Write(#196);
         GOTOXY(I, Y2-Y1+1) ;
         Write(#196);
       end;
{ Draw sides of Frame. }
  For  I := 2 to Y2-Y1   do
         begin
              GOTOXY(1,I) ;
              Write(#179);
              GOTOXY(X2-X1+1, I);
              Write(#179);
         end;
  { Where does the screen memory
                              start  ? }
 {-----------------------------------}
          If ScreenSegment = 7 then
            base := $B000
          else
            base := $B800;
{-----------------------------------}
  { Find position of bottom right-hand
    corner in screen memory }
    Pos :=   Lo(WindMax)+ 1 +
                  Hi(WindMax)*80;

    Mem[base:(2*pos)-2] := ord(#217);

    Mem[base:((2*pos)-2)+1] :=
              Mem[base:((2*pos)-2)-1];

      end;
               { End of FrameWindow1 }
{-----------------------------------}

Procedure  SaveScreen(var Screen
                              : pointer);
Begin
 GetMem(Screen,4000);
 Move(Ptr(ScreenSegment,0)^,
                        Screen^,4000);
end;

{-----------------------------------}

Procedure  RestoreScreen(Var Screen
                              : pointer);
Begin
 Move(Screen^,Ptr(ScreenSegment,0)^,
                                4000);
 FreeMem(Screen,4000);
 end;
```

It is a common method, simply checking the memory location for a value which indicates a mono, or colour screen, in use.

Procedure FrameWindow 1 draws a single line border inside the window using standard ASCII characters. The frame can obviously be made a double line by substituting the characters of your choice, or indeed, a combination of both. The only point of interest in this procedure is the apparently elaborate method used to calculate the value of the Pos variable.

This is implemented so that we can write directly to the screen memory at the last position in the window. Otherwise, as with the full screen, if we were to write to the last window location, the BIOS scroll routine would be called to move the window contents up by one line. The character (#217), in this instance, is written directly to the screen memory via the Mem standard array, pre-defined in Turbo Pascal. You may wish to avoid this detail, and gain a (minute) fraction of speed, by indenting all the characters by one, symmetrically around the edge of the window. You will lose a little window area, but the effect is similar; and, you can always make the window slightly larger, can't you?

Finally, let's have a look at the use of a pointer variable to save screen images. At the start of Listing 1, I have declared two pointers. You may declare as many as you wish, but five or six is usually adequate in most programs. These are untyped pointers and use only four bytes of Data Segment each; quite cheap, when you compare the aforementioned 16 to 24K, for a similar number of windows. Moving on now to the procedure SaveScreen, we see that it requires one variable of type pointer. So, for each screen we wish to save we simply pass the procedure Screen 1, Screen 2, and so on (in other words the relevant pointer to that screen).

The first line of SaveScreen allocates 4000 bytes of memory to the variable Screen (local pointer), using the standard GetMem procedure Turbo provides.

The second line of this procedure does the work, using the Move standard procedure to shift a specified number of bytes, (4000 in this case), from a source range to a destination range. Our destination is that block of memory pointed to by Screen, and written Screen ^ in this line. The caret (^) in Pascal, written after the variable, indicates the block of memory pointed to by the pointer, rather than the pointer itself. The first part of the statement is a little more complex, namely – Ptr (ScreenSegment, 0) ^. The Ptr function converts a segment base, and an offset address, into a pointer-type variable. In our case, the segment base is ScreenSegment, or the start of the screen memory, the offset is zero, because the block of memory we are interested in moving starts at the very first byte of the screen memory. By writing a caret after this function call we are setting the source of our 4000 bytes of memory to be that block 'pointed to' by the newly created pointer variable.

Well, that's all very well, but how do we put it back the way we found it? Simple – do everything backwards! We reverse our destination and source arguments to the Move procedure in the next step RestoreScreen. Again, we must specify which screen we want to restore, Screen 1, Screen 2, and so on. The last step is to free up the dynamically allocated memory in the Heap, using Turbo's standard FreeMem procedure.

This requires exactly the same number of bytes passed to it as was used to GetMem, otherwise you may get a program crashing, with 'Illegal pointer operation' being the probable complaint from the compiler.

So that's it! The main program is only a short, highly commented piece of code which opens two windows on the screen, one by one, with a short delay between each, so you can follow the action. It then writes a little piece of text to each window, and proceeds to restore the screen, window by window, to its original state.

Is this the most memory-efficient way to implement windows in Turbo Pascal on an IBM machine, or clone? The short answer is, 'No!' There is another, even more memory-efficient technique, which stores only those parts of the screen overwritten by the window, or windows. It is possible to implement this 'other' technique with pointers, thus placing the stored screen in the Heap space – but, that is another story. □

```
{-------------------------------------}
    { Begin Main Program }

Begin
{ Clean up screen to start with. }

    TextBackground(Blue);
    TextColor(White);
    ClrScr;
{ ..and then.... }
{ Create some background !! }

{-------------------------------------}
For i := 1 to 99 do
  Write('This short sentence.');

TextColor (black); { Color of Frame  }

{-------------------------------------}
      { Save screen image }
SaveScreen(Screen1);
{-------------------------------------}

      { Open Window, etc. }
TextBackground(lightgray);
Window(10,15,70,23);
ClrScr;

{-------------------------------------}
       { Create Frame }
FrameWindow1;
GOTOXY(20,1);
Write(' A Title for this Window ');
Delay(2500);
{-------------------------------------}
   { Save screen image, again. }
SaveScreen(Screen2);
{-------------------------------------}
     { Open ANOTHER window }
TextBackGround(Cyan);
Window(5,5,40,20);
ClrScr;
{-------------------------------------}
       { Create Frame, again. }
FrameWindow1;
GOTOXY(7,1);
Write(' A Title for this Window ');
Delay(2500);
{-------------------------------------}
   { Put it back the way it was ! }
RestoreScreen(Screen2);
Delay(2500);
{-------------------------------------}
   { ...and the rest !!! }
RestoreScreen(Screen1);
Delay(2000);
{-------------------------------------}
end.       { End of Main Program }
```

Listing 1. The code here implements most of the techniques described in the text – it works by using dynamic variables to store window/screen images in the Heap.



RITA PLUKSS

ST tips

TALKING TO A few new and not so new Atari ST users I have found there are a number of things experienced users take for granted. Information gleaned by trial and error or casual chats with fellow users is often assumed to be common knowledge and fairly straightforward, and it is often forgotten that the newer user has not had the opportunity to ask the same dumb questions we asked a few years back. With this in mind I would like to share some of those useful hints and explanations.

Screen dumps

THERE ARE a number of ways of obtaining a printed copy of your computer screen. The Atari ST manual explains the process using the Print Screen option from the desktop. A variety of programs also exist that allow you to print the screen as a graphics dump. But the easiest way of doing it, if you have an Epson or a true Epson compatible printer, is to hold down the Alt key and quickly press the Help key. If you hold the Help key down for too long you may find nothing happens, because to abort the screen printing process you use the same keys. The ST remembers the key presses and does an internal reckoning; print on, print off, print on, print off and so on.

Before attempting a screen dump to the printer, activate the Install Printer option using the Control.acc and check that it's set for the width of your printer. If your printer carriage is the normal width (ten inches) as opposed to the wider 15-inch carriage, set the pixel/line setting to 960 not 1280. This eliminates the common problem of a screen dump that only prints three-quarters of the screen.

Another type of screen dump is one to disk. A number of utilities allow you to send a representation of the screen to disk. Two of the more popular ones are Snapshot (an accessory) and Grabber (a resident program), both of which are in the public domain. First, freeze the screen, that is, get a static picture, and have the utility sitting on the desktop as an accessory. Then, with the press of a button you can save a picture of the entire screen to disk as a picture file. Once the disk dump has been created it can be imported into an art program for modification, run using a slideshow, or even incorporated within a desktop publishing environment.

Updating a window

WHEN YOU DO a disk swap you can read the contents of the new disk in your drive without closing and reopening the window or reactivating the drive icon. Just press the Esc key. This little trick will save quite a bit of time when going through a number of disks searching for a specific file. The only confusion that could result is where there is more than one operational drive or more than one window on the screen. The updating will occur in whichever window is active at the time, so make sure you have the correct window and drive active.



When you do a disk swap you can read the contents of the new disk in your drive without closing and reopening the window or reactivating the drive icon: just press the Escape key.

The control panel

WHEN YOU purchase an Atari ST you also get a disk with it containing a program called Control.acc. This is an accessory program. When you boot up your ST, do it initially with a disk containing this accessory. The pull down menu under Desk gives access to the Control Panel which allows you to set a variety of system functions to your own requirements.

The Control Panel is divided into either five or seven sections (depending on your version): clock/calendar, keyboard response, mouse click response, audio feedback and palette control. The latest version of the Control Panel (20080 bytes) includes two more sections: RS232 Configuration and Printer Installation.

The clock/calendar section allows you to enter the time and date and keeps track of the time while the computer is switched on. This may not sound all that important, but it is useful, as it records the time and date individual files are created or revised, which gives an accurate record of the progress on any work you may be undertaking. To see the date stamp on your work, change the directory information to show your files as Text not icons. Time, date and file length information are not given under the Show as Icon option, although the information is there.

The keyboard response section controls how soon the keys start repeating and how quickly they repeat when holding down a key for any length of time. Moving the slider bar to the left quickens the repeat rate. If you feel that the cursor keys are too slow (especially moving around in word processing) adjust both these slider bars (finger icons and hare/turtle icons). To slow down the response time move both sliders to the right.

The ST is very mouse-dependent for selection of material. If your reflexes are a bit slow you may have trouble with the double clicking required to select and run programs. To overcome this problem use the mouse click response section and select a number along the left part of the selection panel (near the lying down mouse). If you want to increase the response speed, select a number near the standing mouse.

There are two types of audio feedback through the monitor. One is the sound of the keystroke click and the other is a bell sound on errors. To activate or deactivate these sounds, click on the keytop or bell icons. When the function is active it will be unshaded, when it's turned off it will be shaded.

The squares along the bottom of the Control Panel are the actual palette (colour) control where you can set up your

desktop colours to whatever suits your fancy. By moving any of the three slide bars (RGB) up or down you change the colour in the appropriate colour register: 777 is white, 000 is black, and any combination in between will give a whole range of different colours. To generate a red shade, have the R slide a higher number than the rest, for green have the G slide higher than the other two, or for blue have the B slide higher. To obtain yellow have equal parts of red and green with no blue, and so on.

The background colour is in the first box, and is the default selection. To select another box just point the arrow and click the mouse. This will place a box around it and allow changes to the colour in that colour register. Play around with this option to select the colours you want.

The RS232 refers to modem installation and the best way of overcoming any problems with modem installation, especially for the novice in telecommunications, is to find someone who is familiar with what you are trying to do. This really is one area where the easiest way of learning what to do is to watch someone else do it and ask questions as you go along.

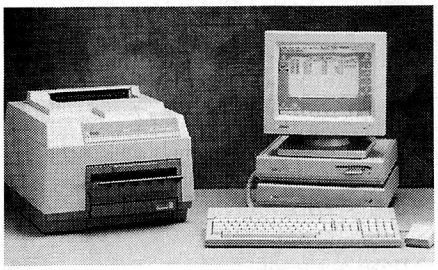
The printer installation is straight forward and self-explanatory, with the only catch being the pixel/line allowance. For a ten-inch printer carriage set it to 960, for a 15-inch carriage a setting of 1280 is required.

To exit the Control Panel click on the box at the top left hand side of the window, this will close the window and allow you to continue with your normal working.

If you know of other errors, let me know and I will include them in a future issue.

Customising your desktop

ALTHOUGH THE default desktop places all the icons along the left-hand side of the screen this may not be the optimal placement for your needs. To redesign the desktop move the icons to wherever you want them – along the top, the bottom, the right hand side of the screen, wherever – by pointing and dragging. Activate, resize and position the windows to where you want them. You can even change the familiar bland green background screen to another colour or incorporate an actual picture file within the desktop using one of the number of public domain or commercial programs available such as the public domain programs Hideal and Genlock, and the commercial Easel St.



There are a number of ways of obtaining a printed copy of your computer screen – the Atari ST manual explains the process using the Print Screen option from the desktop and a variety of programs also exist that allow you to print the screen as a graphics dump.

To save any modifications you make to the GEM desktop use the Save Desktop option. A file called Desktop.inf will be written to the disk. The size and location of windows and any changes you have made using the Desk, View, or Options menus will be saved to the Desktop.inf file.

RAM disks

A RAM DISK is a portion of your STs RAM memory which has been set aside internally as an extra disk drive. Although there is no extra physical disk drive, the ST thinks that another drive has been added to the configuration. When a RAM disk has been installed a new icon will appear on the desktop and you may manipulate files using this RAM disk in the same way as you would any other drive. The only catch is, you have to remember there is no physical drive or disk, and everything has been stored in memory, which means you must save everything back to a real floppy disk before you turn the computer off, otherwise you will lose whatever you had stored on the RAM disk.

Using RAM disks allows faster execution of programs and file manipulation. They also help to extend the life of your real disk drive by decreasing its read write operations, and gives you the versatility of two or more drives without the expense. For single-drive owners it makes file copying less time consuming as it eliminates all those tiring disk swaps.

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RAM disks may also be used for simple animation sequences. Load in your pictures in the sequence required and a slide show. Run the slide show from within the RAM disk. Picture conversion and the dearcing of programs also become less of a hassle when using a RAM disk. If you have never worked with a RAM disk before, you try one for a week or so before you decide if it's for you. You may even find that once you have become accustomed to using a RAM disk you will be lost without it. Don't go out and buy a commercial program, get one from the public domain, and then if you like the idea look around for the one that best suits your needs.

The initial installation of a RAM disk is a two-part process. The first thing is to run a program to actually create the RAM disk. This can be done in one of three ways: by using a public domain accessory that creates a RAM disk of whatever size suits your needs (Rambaby.acc is by far the best); by using a program (public domain or commercial) that creates a RAM disk – these programs may require an additional file to be written to a disk that has information on drive and size, in other words C500 for a 500K RAM disk as drive C; or by the same method the second option, but by placing the program into a folder labeled Auto – the program will then run automatically when the disk first boots-up.

The second part of the process is to create an icon on the desktop to allow access to the RAM disk. This is done by clicking on one of the drive icons, (once only so that the icon is shaded), then go across to the Options menu and choose Install Disk Drive. A dialog box will appear. Press the Esc or backspace key and the cursor will erase the default letter designation of the existing drive. Type in whatever letter you wish to identify the drive by, but be aware that if you use 'c' it must be a capital letter, as the lower case c is reserved for the cartridge port. Click on the next line, press Esc or the backspace key again and type in your drive identification name. The most common name used is Ram Disk. This last step is optional. When you have finished click on Install. Back on the desktop you should see the new drive icon. If you cannot see it, move the windows and existing icons around, it may be hidden under one of them.

Once both processes have been completed, use the Save Desktop option so that the icon installation procedure doesn't have to be gone through again. Make sure that you are in drive A window when you do this, otherwise it will save your new desktop to the RAM disk. By saving the RAM disk set-up to the desktop it saves the time taken to install the drive icon each time you start a new working session. But you will still have to run the program to create a RAM disk. To have an operational RAM disk on boot-up you would also have to place the RAM disk program within an Auto folder on the same disk.

To use the RAM disk, double click on the new icon to open the window to that drive. To start work, first copy your program over to the RAM disk and then work as usual from there. You will be amazed at the speed at which normal housekeeping tasks are carried out. I use a RAM disk so often and with great effect that I have a special boot-up disk which automatically creates a RAM disk and loads in the desktop configuration to suit my needs so I can sit down to a session of work without the tiresome and time consuming activity of resetting everything to my special idiosyncrasies. If I ever lost that disk...

TOS and GEM

THE OPERATING system (TOS) is built into the ST. The most identifiable element of this operating system is the Graphics Environment Manager (GEM) desktop. The desktop environment is actually a special type of GEM application which exists only to perform file operations including running other GEM applications.

There are different types of extensions for different types of programs. The desktop accessories which are stored and listed (up to a maximum of six on any given disk) under the Desk option may be accessed at any time, even while running another program. They are mini programs within themselves and override the main program in memory. Desktop Accessories have the extender '.acc' and are programs that automatically load in when you boot-up your Atari ST. Some of them may require a resource file on the same disk (.rsc). The only way to access these programs is from the Desk option on the desktop.

Programs with .prg or .tos extensions are run by double clicking on the program name. They have incorporated within them the various GEM features such as use of mouse, pull-down menus and so on. Some of these programs may require a resource file to be on the same disk (.rsc).

TOS Takes Parameters files (.ttp extension). This type of program usually requires you to give it some type of information that the program can use or to tell the program what to do. These types of programs do not use the GEM environment.□

TOS and GEM error codes

THE FOLLOWING two lists are for people who want to know what error codes and bombs really mean. This is the most complete list I have, if you know of other errors, let me know and I will include them in a future issue.

TOS errors

1 General error
2 Drive not ready
3 Undefined error
4 Disk checksum wrong
5 Invalid command
6 Track not found
7 Unknown media – boot sector wrong
8 Sector not found
9 No paper
10 Write fault
11 Read fault
12 General error 12
13 Disk write protected
14 Disk has been changed
15 Unknown device
16 Bad sector (verify)
17 Insert another disk
32 Invalid function number
33 File not found
34 Path not found
35 Too many files open
36 Access not possible
37 Invalid handle
39 Memory full
40 Invalid memory block address
46 Invalid ID
49 No further files
64 GEMDOS range error
65 GEMDOS internal error
66 Not binary program file
67 Memory block error

GEM error codes

Bombs and their meaning. Next time you get some, count them – yes the number of bombs are related to your problem!

1 bomb – an impossibility (let me know if you ever see a singular bomb ... they generally like company; and I love to know when the impossible happens)
2 bombs – bus error; addressing an illegal or reserved place in RAM (incorrect PEEK or POKE if using Basic)
3 bombs – address error. Odd word address
4 bombs – illegal instruction, execution of an invalid 68000 assembler command
5 bombs – tried to divide by zero in 68000 ML
6 bombs – CHK instruction, an 'outside limits' address
7 bombs – TRAPV instruction, exceeded buffer
8 bombs – privilege violation, a privileged command is in conflict
9 bombs – trace exception
10 bombs – line A emulator
11 bombs – line F emulator
12+ bombs – uninitialised interrupt

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MW050: GRAPHIC TYPING TUTOR. Req. CGA/EGA. PC-FASTYPE+, 2 screen displayed keyboards, easy to use and highly recommended.

MW037: BARCODE. Creates labels using code 3 of 9, alphanumeric code of numbers 0 to 9. Print labels up to 15 characters in length, wide range of printer support.

MW038: BUSINESS CARDS. Now you can make your own business cards, choice of text and borders, also supports colour printers.

MW020: MACROS FOR WORD PERFECT. Over 60 macros on this disk including Alt2, Boxer, Helwin, Fontsize, Automerge and more.

MW048: WRITERS TOOLS. A new collection of tools for writers programmers - features word/line count, upper to lower case, encrypt/decrypt and much more.

MW013: TEXT CONVERTERS. 2 Disks. $22. Convert files from/to ASCII to Ventura, WordPerfect, Multimate Wordstar 3, 4, 2000, DCA, Displaywrite. Do subscript, change line spacing.

PRINTING

MW040: STIKME. Excellent label printing program allows compressed, enlarged, underlined labels. Easy to use and highly recommended.

MW042: PRINTER CONTROLS-SCREEN DUMPS. (1). Gemini 10x, Toshiba- has Grafix for Epson MX-80, Herctosh, Okidump, Pan1090 and 7 more.

MW045: PRINTING AID FOR WORDSTAR Do subscript, change line spacing and more. Not compat. with Amstrad W/Star.

MW024: LETTERHEAD/GRAB. Design your own letterheads, envelopes/ logo. Grab-point at the address on the letter, grab it and print an envelope.

MW051: LASER FONT FILTERS. Convert soft fonts of LJ and produce hollow outlines and 3D effects with shadows.

GRAPHICS

MG026: 3D BLACKBOARD. Create your own design, drawing in 3D. Save, rotate, print it out. Great program.

MG036: MANDELBROT IMAGES. EGA/VGA Create patterns based on "Fractal geometry". On line help and samples included.

MG011: AUTOCAD TOOLS. Printer drivers for Epson, Okidata, read an ADI plot file and generate near plotter quality output on a dot matrix.

MG024: ANIMATED GRAPHICS. For mono, CGA/EGA. New program that runs through a series of superb graphic shows. No user input.

MG034: SUPERGRAPHICS. Excellent new program to view/print many graphuic formats-IMG, MSP, PIC, RAS, DCOPY, PC Paintbrush(Black and white only), DGI and much more.

MG030: DATA PLOTTING ANALYSIS. Show your data on a line plot graph. Danalv1.01. Output from this program may be plots, listings, and/or processed data files.

MG031: 2D DATAPLOT. For scientific data analysis and presentation. Menu driven, easy to use. Graph types include linear plot, single and multiple cycle log plots etc.

MG021: IOPTIKS. Graphics display and conversion. Reads graphic files from Macpaint and over 10 more and supports direct reads from Canon IX-12 scanners.

MG023: PRINTMASTER/PRINTSHOP TOOLS. V1. 0. 104 new sports graphics for PM/PS, prints a listing of icons in a library and converts to a windows, paint format file.

UTILITIES

MU035: SPEED VARYING/UNPROTECTION Good collection to speed up or slow down your computer. Also has an excellent set of unprotection utilities and Zork tools.

MU025: VIRUS and WORM IMMUNISATION Will give you added protection for your hard disk. Excellent program and very popular.

MU057: EMULATOR FOR 8087/287/387 Works with most Turbo programs which support maths coprocessors , memory resident.

MU034: MAGIC MENUS. Excellent DOS front end, lets you create your own menus, pop up windows for file listing, directories, full screen editing.

MU058: HARD DISK BACKUP CONTROL. 2 Disks. $22. New program includes Restore with source code. Menu driven. Recommended.

MU036: TREEVIEW. Hard disk and file management utility. Simple commands to accomplish everyday operations, full screen interface with user selectable colours. Mouse support.

PROJECT / TIME MANAGEMENT

MU048: MAKE MY DAY. Memory res. full management package, an appointment calendar, job scheduler, expense account tracker for 1 or several people

MU053: PC-TICKLE. Display your daily agenda, view current, future and past schedules, balance your chequebook and much more.

MF035: APF PROJECT MANAGEMENT Excellent menu driven set of project management tools which use high res. graphics. Fast and easy to use.

MF006: GANTT CHARTS and QUICK GANTT. Produces presentation quality Gantt charts, displays project status. Quick Gantt will allow up to 36 tasks.

GAMES GAMES GAMES

GRAPHIC

ME199: INVADERS. One of the best space invaders type games available. Lots of fun and very addictive-a top seller.

ME203: HAMBURGER. Great new arcade type game, you must shoot and catch the food to make up the burger. Also many other good games

ME208: DESERT WARRIOR. You have survived a nuclear war and are in a desert fighting for survival against the Desert Vandals. Great graphics and very entertaining.

ME184: ARTIC WAR. Excellent graphics, you are a tank commander in the artic, pitted against enemy tanks, mines and planes. You must locate and destroy the enemy fortress.

ME005: MARTIAL ARTS. Great graphics as you battle the ninjas to enter the palace. Levels of difficulty make this an exciting game.

ME193: PACMAN PLUS: 3D. Pacman is included, as well as the best of a variety of other pacman games. Good value.

ME214: OSBIT. The ultimate computer game. Requires CGA/EGA. The computer system has been hit by a power surge, some BITS have escaped into the computer - especially OSBIT

ME215: APOLLO MISSION SIMULATION. Requires CGA/EGA. Has tutorials on orbital mechanics and the physio of motion and gravity. Entertaining and educational.

ME175: CAR RACER. If you fancy yourself as a race car driver this will test you out. Beware of the oilslicks, bumps, and ramps. Batalia also included on disk.

TEXT

ME145: LEYGREFS CASTLE. Enter the mysterious castle to find the orb of power. Get the Runestaff before you teleport youself.

ME141: McMURPHYS MANSION: A Scottish uncle has left you his mansion. To claim it you must find the hidden treasure.

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ME166: PIANOMAN. Compose your own music, save it and play it back.

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ME171: OMEGA CHESS. Fantastic 3D graphics. 16 levels of difficulty and analysis of game. TOP SELLER.

ME212: PENTE. This popular board game requires CGA/EGA. A bonus game for strategy buffs is included - PYRAMIDS - have fun in the land of the Pharoah Cheops.

ME013: MONOPOLY. 3 versions of this game on 1 disk including a full graphic version.

MONO SPECIALS

ME200: MONO GAMES. (1) Excellent collection includes Attack, Starglide, Round A2, Digger and more.

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JOHN HEPWORTH

Keeping Calmer

SURFACING FROM the underground this month are the Calmer Utilities, a collection of more than 32 programs from Australian author Claude Almer. The functions covered by the Utilities are legion, and I'm certain that every user will find a need for at least one, if not more, of the programs in the suite.

Siplus

ONE OF THE most useful of these utilities is System Information Plus. It gives a very extensive report on the host system, totaling no less than seven screens full of information. If you are having trouble with a system, particularly while installing software, a quick look 'under the hood' with Siplus may give you a hint about where to go next.

The first screen is titled System Information. It shows the DOS version in use, if a mouse is present, the motherboard dip switch settings, if a math co-processor is present, the number of floppy and hard disks, the number of logical drives, the number of serial and parallel ports and their port addresses, the presence of a games adaptor, keyboard port addresses, and keyboard type. It also detects main, extended and expanded memory size.

BIOS and Hardware System Information shows the BIOS date and other BIOS information. Video Information shows the current video mode, if Ansi.sys is active, the video board, mode, display page and port address, number of columns, initial Video Mode and a host of other details. Disk Information shows details of the C drive, its type, serial number, volume label, and the DOS version under which it was formatted. It also shows the number of heads, sectors and bytes per sector, sectors per cluster, total clusters, number of FATs and number of files in the root directory. Other information includes the total capacity and the number of bytes free.

Partition Table Information shows the partition type, if the partition is bootable, the starting side, starting sector, starting cylinder and number of sectors. Active Terminate and Stay Resident Programs Information shows if the DOS Print Spooler, Append, Share, or Assign are installed, and if they can be installed. It also looks for other TSR programs like SideKick and DosEdit and details the interrupts used by them. The Environment Information shown includes the environment size in bytes, the amount of environment space free, again in bytes, and the number of variables in the environment. The actual strings assigned to each of the environment variable is also shown.

Finally, a compatibility rating is given in percentage, though no details are given as to how this is assessed or to the meaning of a compatibility rating of less than 100 per cent.

With all the concern about trojans and viruses, it's essential to regularly check your system to make sure that infection has not struck.

General utilities

THERE ARE many 'general' utilities in the set. Considering them in alphabetical order, and not in size or significance, brings us first to Diskfree.exe. This shows free disk space on the current drive, gives the drive letter, total capacity, bytes free, and the percentage free and used.

DL.exe is a directory listing utility. It allows the files in a directory to be shown, one per line, with file size, creation date and time. Various options are available including a six-column layout, and various sort options. In addition the various attribute bits (archive, system, read-only and hidden) can be shown. One of the niceties is that, should the listing scroll off the top of the screen, a reverse scroll is available to recall the lines that have disappeared, though the keys that control reverse scroll are non-intuitive and a better choice could be made. DL's final feature is by far its best. It can show only those files where a user-defined string appears anywhere within the filename, not like the usual wildcards where the leading letters must match.

EGAcolor.exe allows the screen colours for EGA text screens to be easily selected, without using the Ansi.sys driver. When run, it can be instructed to show a menu from which colours can be selected. Colours selected from the menu can be saved as new defaults, and if EGAcolor is run without asking for the menu to be displayed, the screen colours are set to the saved defaults.

Fileview.exe is a file browser/viewer. A vast range of functions, including marking files and writing sections to disk are available. When first run, a window takes up the full screen. When a file is selected, its contents will be seen in this window. To select a file, a second window pops over the centre of the first one. In the second window can be seen the names of directories beneath the current directory, plus a list of most of the files in the current directory, with just the .exe and .com files hidden.

Selecting a file name with keyboard or mouse loads it, and the user can scroll up and down or to either side to read it. Pressing F1 brings up a menu with many options, including the ability to change the current drive or directory. Most of the options on the menu can also selected with function keys or a speed-key combination. As the cursor is moved around this menu, a message on the status bar at the bottom of the screen shows the function key or speed-key combination which has the same function as the menu item under the cursor.

Killdir.exe deletes all files in the current directory and all directories beneath it. It then removes the current directory and all directories beneath it. Menu.exe is a simple to use menu system. Up to 15 entries in the menu are possible. Each consists of just one line for display as a prompt, plus one line of commands to run the program. If more than one line of commands is

needed to run a program, the entry in the Menu.exe data must call a batch file, which in turn lists the commands to run the program.

With all the concern about trojans and viruses, it's essential to regularly check your system to make sure that infection has not struck. Just using commercial shrink-wrapped software and avoiding all bulletin boards, public domain software or shareware is useless and simultaneously overly restrictive, as it is possible for a virus to be transmitted on a data disk or even on a distribution disk for shrink-wrapped commercial software. Clause Almer's solution is NBY.exe, short for Not Born Yesterday. It checks the system files and other system parameters, compares them with stored values and reports if they are found to be damaged. To safeguard against a virus aimed at NBY, two additional safeguards are incorporated. First, NBY will only run if re-named to something other than NBY, with the 'randomness' of a user-defined name helping to protect it against assault. Secondly, and more importantly, the first thing NBY does as it starts to run, is to do a checksum on itself to see if it has been corrupted, and to terminate if this is the case.

TCT.com is a TSR for AT class computers, replacing a number of well-known TSRs like DOSedit, Caps, Capslock, Bell, Lcursor, Mousekey, and programs to reset the AT keyboard speed. It changes the standard bell to a quiet, acceptable beep, activates the mouse for all programs which do not have their own mouse driver and incorporates a CMOS Alarm Handler. It ensures that letters are capitalised when Caps Lock is down, even if you press the Shift key, aborts any program after SysRq key is pressed and also puts a large cursor up on screen. It reprograms F11 and F12 and ensures that they return the correct code to caller. Typically most users will put a line into their Autoexec.bat file to load it every time the system is booted. But what about the times that you don't want TCT to load? A thoughtful feature of TCT to the rescue. Just tap a key before the batch file reaches the line containing 'TCT.' The first thing TCT does, whenever it runs, it look at the keyboard buffer. If anything is found in the buffer, TCT does not remain resident but just says 'installation unsuccessful,' frees memory and terminates.

Other utilities

THERE ARE more utilities. Whatson reads the appointments file created by the Side-Kick calendar function, plus another appointments file created by its companion program Schedule, and uses them to remind the user of important dates. Reminders can be in many forms including a specific time and date, a particular week of the year, a week or day within every month, and many other possibilities.

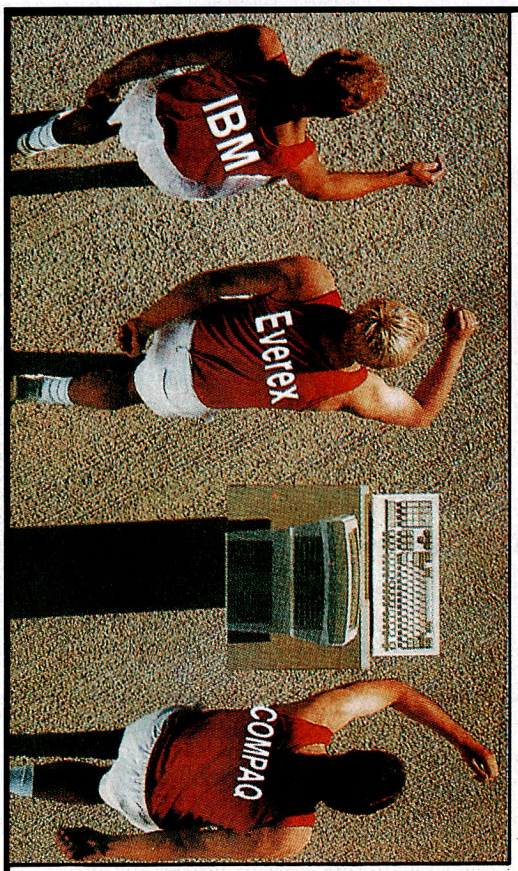
I'm certain that every user will find a need for at least one, if not more, of the programs in the suite.

@@.exe saves MGA, CGA or EGA screens to disk. @@@@.exe restores screens from disk. ATkey.exe is a programmer's utility which returns keyboard scan codes for AT keyboards, and naturally will not run on 8088/86 machines. CSEG.exe simply shows current Program Segment Prefix address and Environment Table address, of little use to anyone but a programmer, but vital if you fall into that category. Vector.exe returns the vector of an interrupt, and as an example, the command Vector 16 will display details of the keyboard vector.

Formfeed.com is a simple TSR that allows a formfeed to be sent to a printer merely by pressing Ctrl-Alt-F. There are a handful of minor printer utilities. Noprint-.exe and Prinfool.com will disable a printer, while Prtimer.exe resets the timeout values for printers.

Availability

THE CALMER Utilities are available from many bulletin boards, user groups or direct from the author at Calmer Software Services, 361 Somerville Road, Hornsby Heights NSW, phone (02) 476 2252. Registration is $30 and registered users get a $20 rebate when four more users register and mention their name. □



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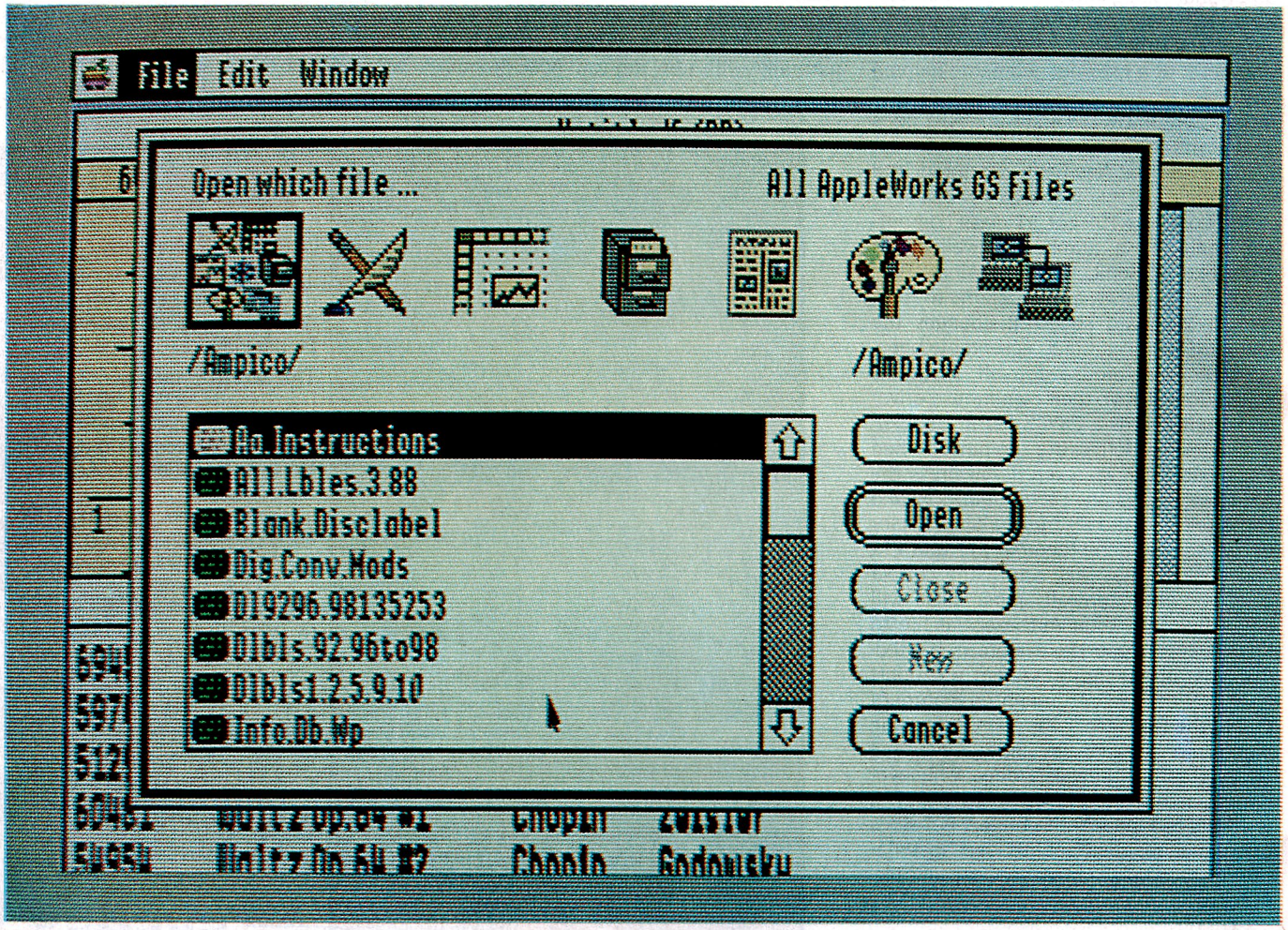
Up-beat updates

RUMOUR HAS NOW become fact – Apple are ready with GS/OS version 5, and the main feature is speed. Speed not only with disk transfers but speed in all things. I have not seen a copy yet, but by the time this article reaches the streets, GS/OS 5 should be available from your friendly Apple dealer or user group.

According to Apple, this new operating system retains its compatibility with previous systems, but now also allows a IIGS to connect to a Mac network. Graphics will operate up to eight times faster than before, and SCSI devices, such as a hard disk will be four times faster. Apparently it will also be possible to format a hard disk using a 1:1 interleave, giving faster read and write times.

As a graphic example, I have been told that it takes around 44 seconds for the IIGS to open 20 windows under GS/OS 4. With the new operating system, this time has been reduced to 13 seconds, making the IIGS as fast as a Mac plus. If you have a Transwarp card, this time falls to 6 seconds, which is comparable to a Mac II.

One has to admit that a tiresome feature of the IIGS is the speed of the graphics and evidently Apple have put their all into rectifying this problem. Apple are making the system freely available, and you will be able to get a copy for the cost of a disk, and a copying fee if your dealer insists. Like GS/OS 4, a manual will be an optional extra, probably around the $40 mark.



Apple claim GS/OS version 5 retains compatibility with previous systems and allows a IIGS to connect to a Mac network. Graphics are said to operate up to eight times faster than before, and SCSI devices will be four times faster. Apparently, it will also be possible to format a hard disk using a 1:1 interleave, giving faster read and write times.

AppleWorks GS update

BY NOW, AppleWorks GS (AW GS) owners should have received the much promised updates. Included will be two disks (System and Program) and a booklet containing errata for the previously supplied manuals and information concerning new features. The revised version is now called AW GS 1.0 v2, and according to literature supplied by Dataflow, incorporates updates to: fix all printing problems, speed up printing by 40 per cent, fix text justifying problems, speed up load times and fix all reported major system errors.



USING A IIGS or IIe computer for video mixing has now become a reality using the Video Overlay card. The card, expected to cost around $700, plugs into any slot and allows graphics to be mixed with a PAL encoded video signal.

One important addition is a memory test utility which Claris urge users to run before booting AW GS for the first time. Apparently many of the previously reported problems were traced to third-party memory expansion boards, and rather than cop any more flak (deserved or otherwise), Claris have supplied this test routine for all to use. It is quite a test, and takes over 20 minutes to run on a 1Mb system. Messages indicate if all is well or the location of the defective memory if something is wrong. My system performed well on this test, I'm glad to say.

Another extra is a facility to import Apple Preferred Format graphics developed in various other IIGS paint programs without a change in colour. This is now automatic for 640-mode drawings but requires 320-mode graphics to be originally developed with a palette from the Palette file supplied with the AW GS program. This means you can develop graphics in either PaintWorks, Deluxe Paint or Topdraw, providing you use the appropriate palette from the AW GS disk.

As mentioned, load times have been speeded up, although I have the program installed on my CMS hard disk, giving load times that are quite respectable anyway. For example, it now takes 30 seconds for the program to boot to the main menu from the desktop, and another 50 seconds for me to be actually working with my 800 item database. In this case, the database program along with the database file will have been loaded, so it really is quite slick in operation.

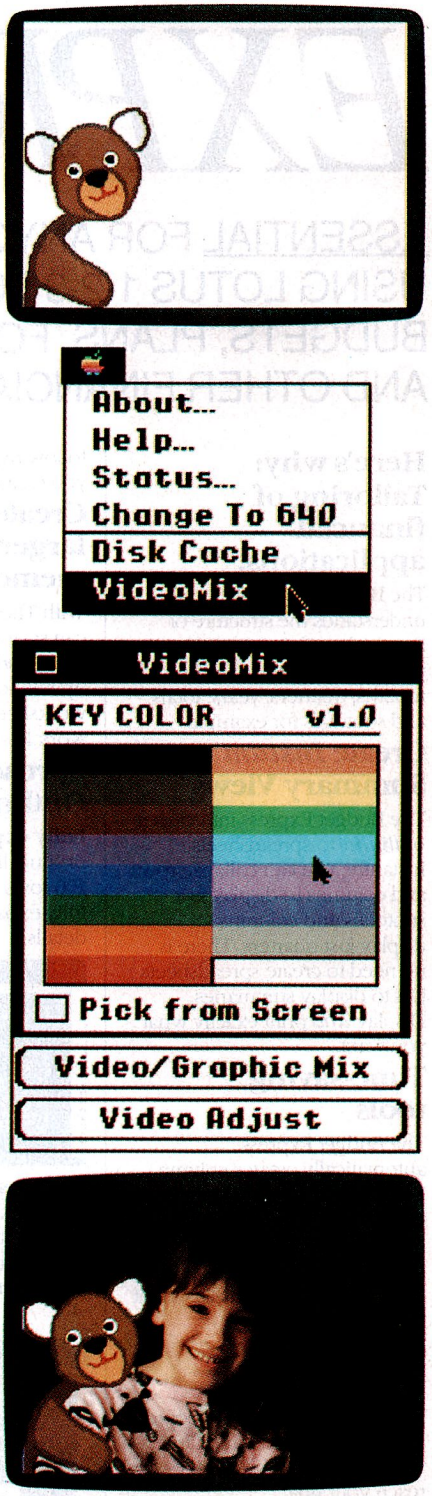
Installation on a hard disk is rather complicated if you use the Installer utility program supplied on the Utilities disk. However, because the Utilities disk has not been revised, (and is therefore not included in the update pack) there is more to do after the initial installation has been completed via the Install utility. For example, the memory test program needs to be copied to the hard disk, as does a sample data base file called 'Mail.Sample.' The file called Palettes also needs to be copied, if you intend using it with other graphics packages.

If you are using an ImageWriter, the file 'ImageWriter.CL' must be copied to the Drivers folder in the System folder of the hard disk to gain the improved printing speed mentioned previously. After you have installed everything, it then remains to update the hard disk's System icon file using the utility called 'AWGS.Install.' This routine will allow the AW GS program to be booted by merely double clicking an icon representing an AW GS file. As well, special icons are made available to represent the AW GS files.

However, I prefer to have everything in folders, including AW GS, to make the desktop less cluttered. By doing this I lose the facility of being able to invoke the program by merely selecting a document file, although the pretty icons are still present. As well, the icon update routine (AWGS.Install) won't work if you have the AW GS files in a folder.

The additional material supplied in the update package actually lists the files that have to be copied to a hard disk, and seems to provide a more straightforward set of instructions. The utility program for performing the installation is not easy to use, nor is it very intelligent. It does not seem to know if the file being updated is already updated, and lots of disk swapping is necessary.

In summary, the files you need to copy to the hard disk are the five listed in the update booklet. Then you need to run the



Using the Apple Video Overlay card is straightforward – first, create the graphic, then select VideoMix from the menu, cue the video source to the sequence to be overlayed, play it, and begin recording with a second VCR.

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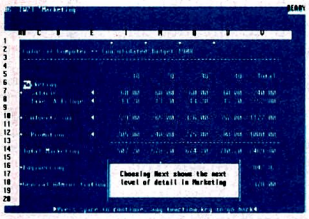
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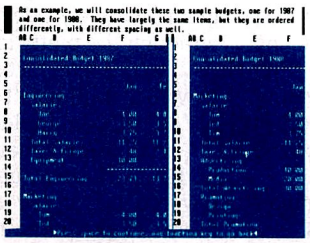
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Configurable columns and fiscal periods

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- Create more than one worksheet column for each time period (e.g. budget, Actual and variance for each month)
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icon update utility, a point not mentioned in the booklet, as the assumption is that this has already been done with the original version. Note my comment about not placing the AW GS files into a folder until you run the icon update utility however. Once you run the program, you will notice another file called AWGS.CONFIG on the hard disk. This file contains your setup of the program, such as printer type, paper size and so on.

So that's the latest on AW GS, but, of most importance, is the program fixed? Does it now perform as it should? So far I have to give it an unqualified 'yes.' And I have tried everything I know to make it hang, misbehave, crash or get confused. In went my 800-item data base file, a word processor file, some graphics and even a communications file. And it hasn't turned a hair. Everything seems to be working very well, and I am most impressed.

You may recall in my original review of the program (YC March '89) that I considered AW GS to have the potential of being a definitive IIGS program. This now seems likely to become true, as it really is a most incredible piece of software, although it does require a 1.25Mb system. I believe it warrants a hard disk, although the improved load times may make floppy disk operation bearable, providing you have two of them. The thing I cannot understand is that overseas reviewers, particularly those in the USA, never seemed to refer to the problems I and other local reviewers spoke of. The fact that the program has been overhauled is proof enough of the previous faults, and surely these problems existed in other countries. Either honesty hasn't prevailed or I haven't read the right reviews. However, it's nice to know the AW GS story has now taken a turn for the better, as this program will surely set the standard for future IIGS software.

Video overlay card

USING A IiGS or IIe computer for video mixing has now become a reality following the release by Apple of their Video Overlay card. The card, expected to cost around $700, plugs into any slot and allows graphics to be mixed with a PAL encoded video signal. In operation, the video signal source, such as the output of a VCR, a video camera, a video disc or even a TV set is routed directly to the Apple monitor, along with any graphics being generated by the computer. This means, of course, that the video signal is not being fed into the computer's memory, so you cannot get at it and modify it.

The procedure to create an overlay of a video signal is relatively simple, although if you want to record the results, you will need a VCR hooked to the output of the card. In other words, most applications will need two VCRs, one for the signal source and the other for recording the final results, unless the video source is from something other than a VCR.



If you own a video disc, you can create an interactive video production using the Video Overlay card in combination with a suitable authoring program.

The IIGS is ideal for this purpose, as there are numerous paint programs that can create very sophisticated graphics. The overlay graphic needs a transparent background so the video scenes can be seen behind the graphic, and graphics can vary from simple text to effects generated with a program like VCR companion.

There are a surprising number of practical uses for this card, apart from the obvious educational applications. For example, you could make a video of the interior of a room you wish to decorate, and then try out various colour schemes. If you have the need and the patience, subtitles could be added to a movie, or cartoon characters superimposed to enhance a video. Or, if you don't want to miss your favourite TV show while you catch up on some word processing, you could even feed the TV video signal to the Apple monitor and view it as you work.

If you own a video disc, it is also possible to create an interactive video production using the Video Overlay card in combination with a suitable authoring program. The authoring program will allow a stand alone piece of software to be created that works in conjunction with the video disc controlled via the IIGS serial port. This is fairly up-market, but useful in all kinds of learning environments. □

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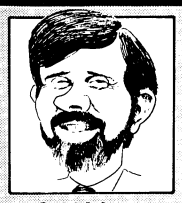
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JOHN HEPWORTH

Fast-vid, see?

WHEN I FIRST started playing with C, I was generally happy with the speed of the resulting programs. There was one area of major discontent, and it was most visible to the user. Using printf() to display strings and so on onto the screen was painfully slow on a standard PC, and slow even on an AT. I searched high and low, looked at many fast video routines by others, and finally wrote some for myself. Fast-vid.C is a simple demonstration program of my methods.

The classic way to get responsive video is to bypass the BIOS routines that print to screen, bypass the routines built into the compiler that serve the same purpose, and write direct to video RAM instead.

PC video

BEFORE WE go further, its time for a quick primer on PC video systems. The IBM PC uses memory mapped video. For every character on the screen there are two bytes of memory within the video board. One byte is the character to be displayed, the other is its attribute. The attribute byte contains the foreground and background colours, and the character's intensity. An 80 by 25 display requires 4000 bytes for a screen. The video board constantly looks at the video memory, and if a byte is changed, the actual screen image is updated.

Video RAM starts at one of two addresses, depending on the video board in use. Monochrome Display Adapters and Hercules boards use one starting address, all the colour boards use another. The first line on screen uses 160 bytes, and the second and subsequent lines start immediately after their predecessor. The first, third, fifth and so on bytes are characters. The second, fourth, sixth and so on bytes are the attributes. There are no bytes used as end-of-line markers.

There are may ways of updated the information in video. One uses the BIOS routines. Alternatively, the application can write direct to video RAM. Using BIOS is very slow. Writing direct to video RAM is fast. Sometimes library routines such as printf() write direct to video RAM, at other times they write via the BIOS. They always have a lot of overhead, and speed is not spectacular. To get adequate performance, it is essential to write routines that are so fast that the new screen appears instantly, or at least so the user sees it that way even on a slow PC.

Direct video writes

THE CLASSIC way of making direct screen writes starts by detecting whether the active video board is in the mono group or the colour group. This can be done by asking the user, but this is really

***Fast-vid C** – this demonstration program can be compiled in Turbo C in the medium model (it will not compile in Quick C 1 as this does not have puttext() or gettext()). Fast-vid saves the screen that existed before it was run and then uses printf() to display the message in the bottom of the screen. Notice how slow it is! After restoring the original screen, the message is then printed several times down the screen, with a 50 millisecond delay between each screen write. Each time, the part of the old screen above the message is restored. The whole original screen is then restored, and the message is again printed down the screen several times, but the user must press a key each time. The preparation of the virtual screens, and copying them to video RAM is so fast that no delay is seen, even on a 8088 4.77MHz PC. Finally the screen which existed prior to running Fast-vid is restored.*

```
/* FAST-VID.C

   A demonstration program of routines for saving screens to
   a string, restoring strings from a screen, and super-fast
   writing of strings and multi-line messages to screen.

*/

#include <conio.h>;
#include <string.h>;
#include <stdio.h>;
#include <dos.h>;

char message_buffer[4000];
char old_screen[4000];
int old_x, old_y, foreground, background;

static char *first_message[] = {
" IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM FIRST MESSAGE MMMMMMMMMMMMMMMMMMMMMMMMMMMMMM;",
" :                                                                            :",
" :  This is a message in the form of an array of pointers to string constants :",
" :                                                                            :",
" :  The message will be printed many times down the screen, being erased      :",
" :  each time, and thereby appear to move                                     :",
" :                                                                            :",
" :  The message will then be printed down the screen again, overprinting      :",
" :  whatever is on the screen, and waiting each time for the user to press    :",
" :  a key                                                                     :",
" :                                                                            :",
" HMMMMMMMMMMMMMMMMMMMMMMMMMM PRESS ANY KEY TO CONTINUE MMMMMMMMMMMMMMMMMMMMMMMM(",
};

#define len_msg1 (sizeof first_message / sizeof (char *))

main()
  {
     int i;

     /* find the original cursor location */

     old_x = wherex();
     old_y = wherey();
```

taking the easy way out. Better applications interrogate the hardware and detect the type of video board installed. From this information, the program calculates the address of the start of the video buffer.

The function which is printing to screen then calculates an offset from the start of the buffer to the desired character location, and then prints two bytes. The first byte is the character to be seen. The second byte is its attribute. The position of each subsequent character and its attribute must then be calculated and the bytes written, though the start of the screen only has to be found once. This technique is usable with almost all C compilers, is faster than printf(), but has a high overhead and is not the ultimate in speed.

A second way sets-up a string as a virtual screen image. Into this string is written each character and its attribute. Then the whole virtual image is copied to the video memory. The movedata() function in both Quick C and Turbo C can copy a string to video RAM. This method is fast, provided that efficient routines are used to set-up the virtual screen in the string, but has the disadvantage that code to detect the address of the video RAM must be written by the programmer, and other code is also required.

Turbo C 1.5 and 2.0 have two indispensable functions for direct writes to video RAM and reads from video RAM. The function gettext() copies from the screen to a string in memory. The function puttext() does the reverse, and copies from a virtual screen in a string to the video RAM. The function itself detects the video board in use. Performance is stunning, provided that the virtual image is created by an efficient routine.

```
    /* save the old screen to a string */
    gettext(1,1,80,25,old_screen);

    /* display the message with printf() */
    gotoxy(1,14);
    for(i=0; i (len_msg1; i++)
       printf("%s\n",first_message[i]) ;

    /* clear the message_buffer string */
    clear_message_buffer();

    /* read the message into the buffer string */
    for (i=0; i(len_msg1; i++)

        {
        load_message_buffer(i, first_message[i]);
        }

    /* write the demo to screen */

    for(i=1; i((25+2-len_msg1); i++)
       {
       puttext(1,1,80,i-1,old_screen);
       puttext(1,i,80,(i+len_msg1-1), message_buffer);
       delay(50);
       };
    getch();

    puttext(1,1,80,25,old_screen);
    for(i=1; i((25+2-len_msg1); i++)
       {
       puttext(1,1,80,i-1,old_screen);
       puttext(1,i,80,(i+len_msg1-1), message_buffer);
       getch();
       };

    puttext(1,1,80,25,old_screen);
    gotoxy(old_x, old_y);
}
```

```
/* The clear_message_buffer function resets all the bytes in the
   temporary buffer. The character bytes are set to spaces. The
   attribute bytes are set to the desired color by shifting the
   background colour 4 bits to the left and adding it ot  the
   foreground colour. */

int clear_message_buffer()

  {
    int i;

    i = 0;
    do {
        message_buffer[i++] = ' ';                    /* set character */
        message_buffer[i++] = (WHITE+(RED((4)); /* set attribute */
        } while (i ( 4000) ;
  }


/* The load_message_buffer routine loads one line of the message into the
   message_buffer string at a location which corresponds to the desired
   screen location. To obtain satisfactory speed, no computation is within a
   loop, and incrementation of variables in a loop is used instead. */

int load_message_buffer(int line, char *message)

    {
    int i, j, k;

    i = (line * 160);
    j = 0;
    k = strlen(message);
    if( k ) 80 ) k = 80;
    do {
       message_buffer[i++] = message[j++];
       i++;
       } while (j ( k);
    }
```

How Fast-vid works

FAST-VID HAS BEEN written for compactness as a large main() function, with two other functions clear_message_buffer() and load_message_buffer(). In most programs much of the code in the main() would be separated out into its own function.

Fast-vid sets up two strings in memory. Each is 4000 bytes long. One is used to store the screen that existed prior to running Fast-vid. The other will be used for the message which will be put on screen with puttext(). It then creates a multiline message as an array of pointers to string constants, and calculates the number of lines by dividing the size of the array of pointers by the size of a pointer.

After using a loop to display the message via printf(), the clear_message_buffer() function is called. It sets all character bytes in the virtual screen to spaces, and sets the attributes to white text on red background. To get speed, no computation is carried out in the loop, and instead the variable i is incremented with i++.

A loop then calls the load_message_buffer() function separately for each line in the message. The length of each line is checked, and only the first 80 characters are written. Again, by incrementing variables, each character in the message string is copied to the appropriate character in the string containing the virtual screen. The position in the virtual screen is incremented twice each time the position in the original message is incremented once. The function puttext() is then called from inside loops to display the message.

Enhancements

THIS IS A demo program that writes fast to screen. It has ideas that should be useful in a real program. It is not necessary to save a whole screen with gettext() or restore a whole screen with puttext(). The loops which print the message restore partial screens one line lower each time, and each time restore only the part of the original screen above the message.

For simplicity, a line length of 80 is used here. Similar routines can be used to write to an area of screen less than 80 characters wide. The syntax for puttext is puttext(left, top, right, bottom, string). Just ensure that the length of each line in the virtual screen is twice the new line length in the window, and not 160. Also, watch that, when calling puttext(), the values of the left and right parameters match the first and last columns of the window, and the number of lines in the message matches the number of lines in the window.

Fast-vid is just one way to save and restore partial and whole screens, and to write quickly to the screen. To obtain speed has meant that some of the constructs are inelegant, and the need to fit it into a confined space in the magazine caused other inelegances, but it works and works well. □

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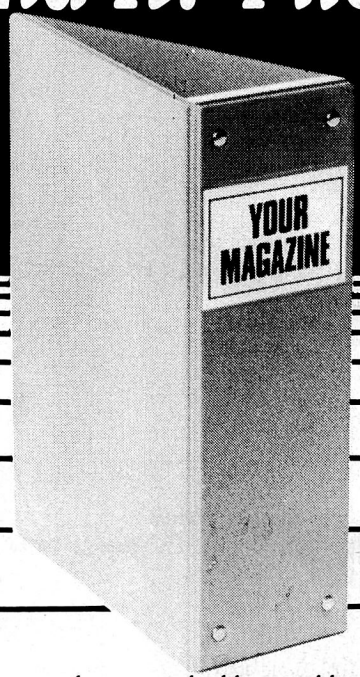
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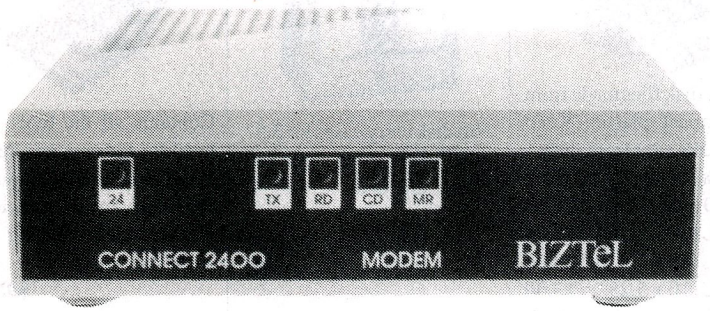


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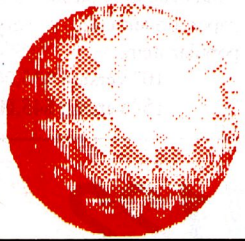
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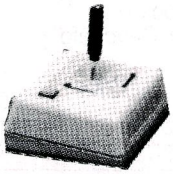
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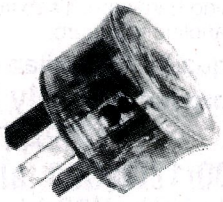
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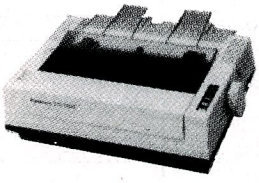
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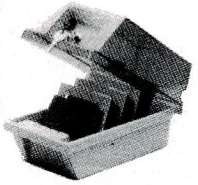
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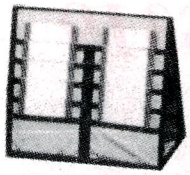
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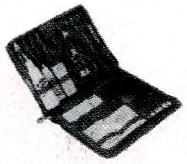
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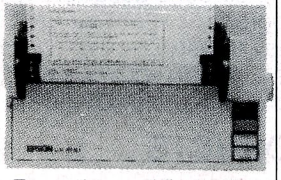
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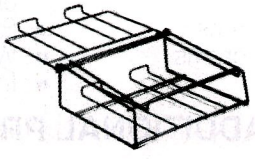
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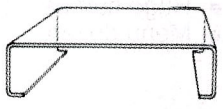
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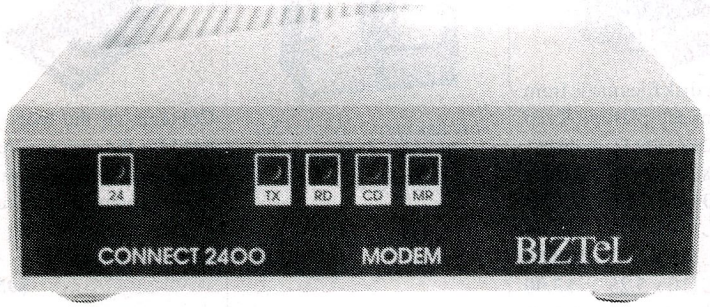
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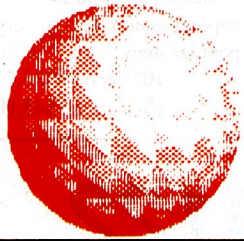
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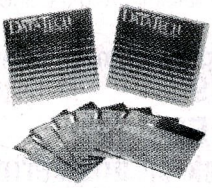
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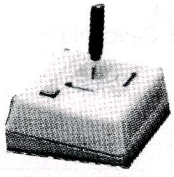
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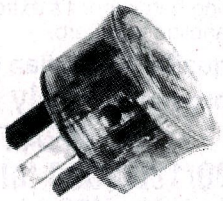
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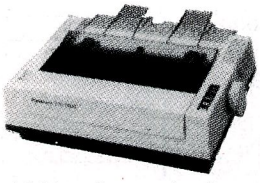
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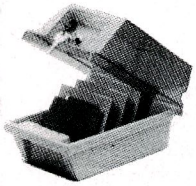
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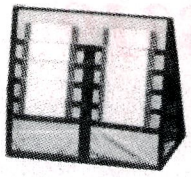
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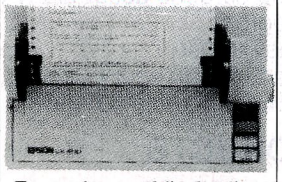
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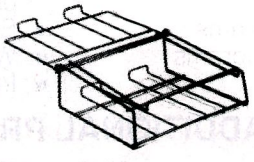
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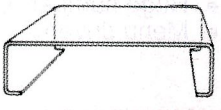
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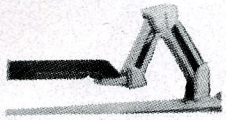
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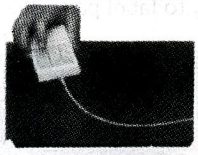
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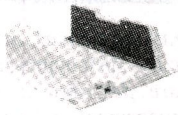
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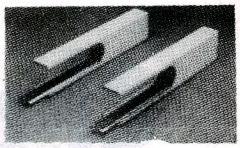
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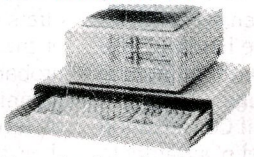
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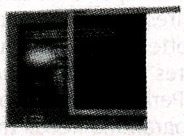
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JOHN BAILEY

Changing plans

LAST MONTH I discussed soil conservation and planning for it. The software we used (CCS Designer) is well priced and fairly effective, and it represents a good starting point for learning about mapping and design packages. Software designed specifically to draw plans and maps is usually expensive and requires even more expensive hardware like plotters and computers with humungabytes of memory and storage.

Perhaps the National Soil Conservation Programme needs that level of wizardry to work, but I know that you and I can easily get by with a lot less. One package that does a lot of what we need at the grassroots level is Design CAD from Software Suppliers. It is a step forward from the CCS Designer package and allows a number of more complex calculations and manipulations when planning or drawing.

There are several ways of drawing a plan or a map on a computer; by numbers, directly on screen or by tracing. Design CAD claims some facility with all methods because it has the ability to work with most digitising tablets and mice as well as operating quite well from the keyboard. Most of us do our mapping pretty much by the direct method in that we measure the area and reproduce the image on paper to some scale.

Design CAD has no trouble with that approach, so we can start at a point and tell it we wish to go so many metres in such a direction and the software moves the cursor and marks the spot. We can then tell it to draw the line that connects the two points and so on. I've had no difficulty using the program in that mode.

Mapping by numbers is the big problem. First I have to rework my aging grey matter to think in terms of X,Y coordinates and then visualise the lines that join the points defined by the coordinates. According to the Design CAD book and the text files inside the utility software, I can import X,Y coordinate data from spreadsheets or other mapping software and the map will be drawn from the imported data. Three times I tried and failed, then I read the book and failed again.

But – the keyboard mode is so simple to operate that I was able to draw a plan of part of the farm quite quickly with the arrow keys and a few single-keystroke commands.

Using the extensive symbol library and hatching patterns we can achieve a great variation in how different areas might be portrayed and a colour plotter or printer offers even more delights. I am well aware of the fact that drawing a map or plan is probably the easy part of conservation planning. All the measuring and shooting of levels, assessment of soil types and then fitting a working farm around these factors is a complex task involving a lot of walking and toiling. Soil type evaluation can also be a complicated business with up to 100 different types definable on one farm. Generally speaking, we don't need to differentiate more than about six soil types for practical purposes.

Clever tricks

ONE OF THE clever tricks of Design CAD is the ability to label parts of a drawing as a material. This information is attached to the plan using the 'attribute' command and a list of materials can be compiled from the 'attributable' labels on the drawing. In the 2-D package I had, there doesn't seem to be a way of directly quantifying these labels. No doubt one could include figures in the label and transfer them to a data file for outside manipulation. The logical next step is to ask that the labels record numeric data such as the area of heavy soil in a given paddock and the totals of various soil types within a farm. Beyond that step we could ask that we be able to write our production details on the farm plan and have the data recorded and manipulated to produce production statistics.

For this sort of thing we look to the mining industry and examine programs that geologists use to transform the raw data from mineral surveys into some kind of pictorial record. This appears to be a long way from drawing a farm plan, but geosur-



Complex operations such as arriving at production parameters for grazing land under a rotational grazing system present as difficult a programming task as you can get, and the 'dream software' described in the text, could be an important tool for agriculture, rangeland management and anyone dealing with shifting populations.



STEWART FIST

Consulting the Oracle

YOU PROBABLY didn't notice, but a couple of months ago, Oracle released a version of its database for the Macintosh. So what, I hear you cry. Well, quite a lot actually! I managed to get hold of a copy of 'Oracle for Macintosh' to review, but not being a mainframe computer user with access to a good-sized IBM, I've found it difficult to do a full review on this program. There's not much point in the complexity of Oracle unless you are dealing with those great lumbering databases of mainframe size, or a series of database modules distributed over a whole range of computers.

Oracle is actually a very interesting program because it is probably the world's most used database – on minis and mainframes, anyway. It is notable because it was the first program to use SQL, which as all of you will know (I am sure?) stands for Structured Query Language.

The language was developed at IBM's laboratories back in the early 1970s – although they called it SEQUEL (Structured English Query Language) back then and that's how SQL is still pronounced. Towards the end of the '70s Sequel/2 emerged, and this became the SQL that mainframers know and love today. It is part of IBM's Systems Application Architecture (SAA), which they promote as the way to unify PC-to-mainframe systems.

The idea behind Sequel/SQL was to have a single language which makes it possible for a user to access data on any database. It works on PCs, minis and mainframes; it handles local, remote, or distributed databases, and it is theoretically independent of the database management application (providing the program has an SQL 'engine') or the operating system.

These are good enough reasons to pay attention to SQL, but the standardisation process has gone even further still. ANSI, the American standards association, has taken the language under its wing and is in the process of refining it further (they've actually produced two versions). The International Standards Organization (ISO) is also involved, and SQL is being incorporated into IBM's OS/2 Extended Edition Database Manager. And, you'll find SQL in a lot of new micro-based database products like dBase IV.

Oracle is actually a very interesting program because it is probably the world's most used database – on minis and mainframes, anyway.

So SQL's importance to the Macintosh lies mainly in the fact that it further integrates the Mac into the wider networks of computers within companies. It is well worth while taking some time to get an idea about how this all works on the Mac. But first, let's get some terminology clear. Databases exist in three main forms; hierarchical (tree-structured), networked, and relational/tabular.

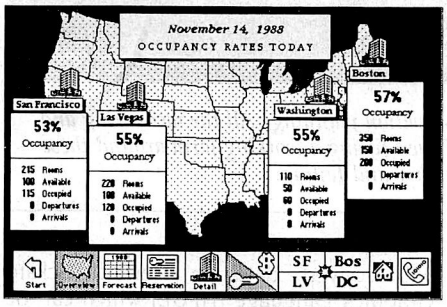
Database types

IF YOU COME from a PC background, you are probably more familiar with the relational/tabular database structure, anyway. At the base level it consists of rows and columns (like a spreadsheet), although the columns are usually called 'fields' and the rows are usually known as 'records.' A single set of records (comprising data held in fields) makes up a 'table' – and this is the basic data structure of all relational databases.

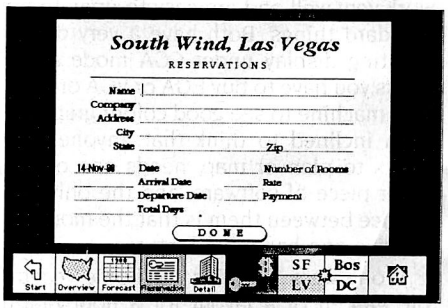
The significance of this, is that with branching-tree (hierarchical) or networked database structures, you have to understand the design of the database before you can get at any specific data. It is therefore almost impossible to create a *lingua franca* for these types of programs. The hierarchical structure is the same as DOS directories and subdirectories; you have to know which pathnames to follow before you find the file or the data you seek.

Tables avoid this problem. You can jump immediately to a row (record) and extract all the information, or you may extract data only from the columns (fields) that you need. What is more, you can extract (or duplicate) this information from numerous records and use this material to build a completely new table. 'Relational' refers to the fact that you can relate two or more tables together through some common element, so all your eggs don't have to be in the one basket (table). You can have personal details in one table, and financial details in another, and the common element will then be an account number, or the name, or whatever.

So once you know that a database is relational (and assuming you know the names allocated to the fields and the tables) you can theoretically access any data you want without needing to understand the structure or operations of the database manager further. And this is where SQL comes in. SQL is a non-procedural language, which simply means that you use it a step at a time – you don't



Oracle has hidden its database and SQL behind a HyperCard front-end.



Oracle is an easy program to use for data entry and extraction.

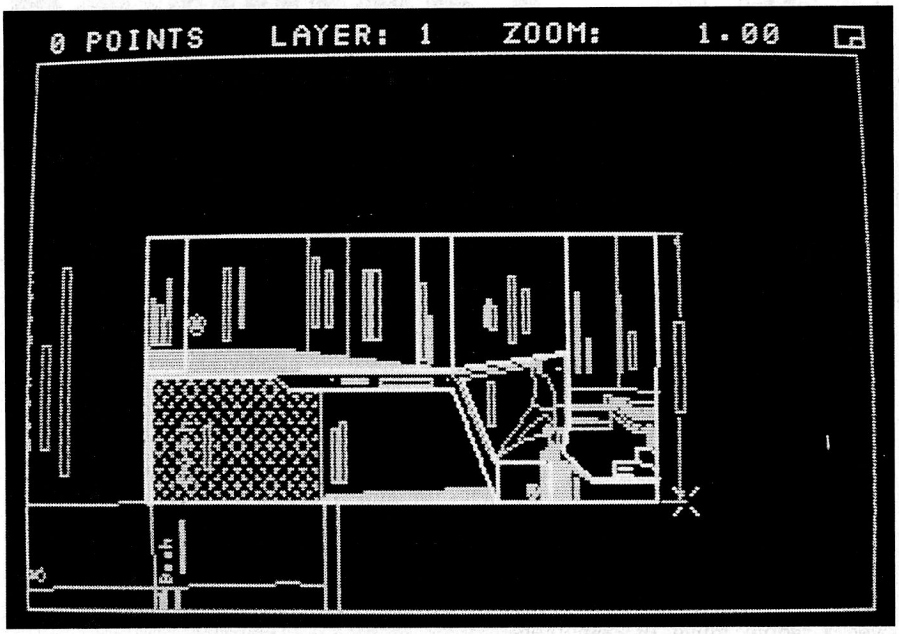
vey software doesn't know that the words 'Duplex sands' are soil types rather than geological terms, or that tonnes per hectare of wheat is not a mineral yield. It is my dream to see a software suite that will draw a map and then compile production statistics as the data is entered into the relevant sections of it.

If such a program existed it would 'know' the area of each field or otherwise defined zone (such as soil type), and when we write in the amount of potatoes produced on that area, the software could do the figuring out for us. Complex operations such as arriving at production parameters for grazing land under a rotational grazing system present as difficult a programming task as you can get, and something like my 'dream software' could be an important tool for agriculture, rangeland management and anyone dealing with shifting populations.

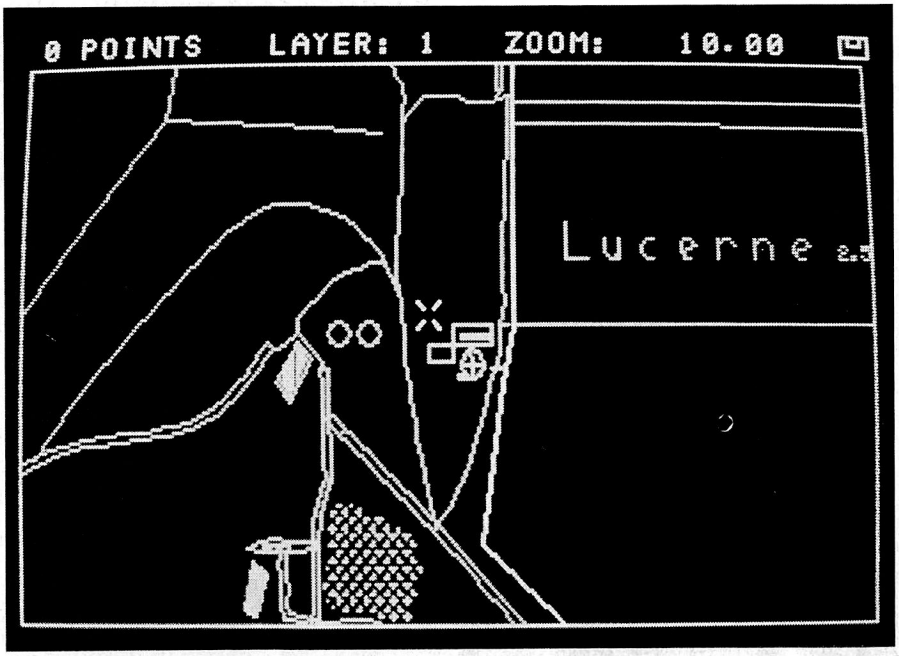
Software such as this doesn't appear to exist in exactly that form for IBM or Apple-type personal computers, but all the elements of such a program can be found. The creation of a diagrammatic representation of an area can be made using named ranges in a spreadsheet and the formulae installed as required. There are programs operating on medium to large mini-computers that are used to analyze the results of demographic surveys and of course we have the Land Information System in use in Western Australia which does some of these things. The mining industry comes closest to the dream with a program called 'Surfer' from Golden Software in Perth. Surfer has the ability to map in three dimensions, derive data from stored formulae that use added information such as mineralisation data and compile yield and overburden volumes from the information typed into a numeric table. Next month I will include a full article on Surfer and its capabilities.

As for the other software mentioned, CCS Designer and Design CAD 2-D, both work very well and are easy to operate for standard things. Both have a very disappointing display under CGA mode and I guess you have to buy EGA or VGA or get a fruit machine to see good colour graphics. I am inclined to think that anyone who wants to plan or map, needs one or the other piece of software, and the only difference between them is that the more expensive one has more features.

If one were planning the home vegetable garden or a layout for a hobby-farm then CCS Designer is about all that is needed. For the extra dollars (about $300 or $400 more) the 2-D or 3-D Design CAD package will draw the maps and provide the planning tool for a larger area such as a farm, station or wildlife park. Both items will convert data to Hewlett-Packard Graphics Language (HPGL) which can be read by the likes of Surfer and that provides the link to the next level. □



Software specifically intended for use in soil mapping, planning and conservations is quite expensive and memory-hungry – basic Cad packages, like CCS Designer and Design Cad (pictured) can provide the essentials, however.



Drawing a map or plan is the easy part of conservation planning. All the measuring and shooting of levels, assessment of soil types and then fitting a working farm around these factors is a complex task involving a lot of walking and toiling.

have to write a full program, then run that program to do what you want. If you want to automate the procedure fully, you use a language like dBase IV which has SQL commands embedded in it, but in practice, and certainly on the Mac, you step through the query stage with SQL, one line at a time.

For instance you may have a large customer file called 'custlist', where every record has, say, ten fields. A simple SQL query to display the data held in only three of those fields would be:

The fields which hold company name ('coname'), 'city' and postcode ('pcode') would be listed progressively on the screen from beginning to end of the file because we haven't limited the search in any way. Note that in SQL the two commands SELECT and FROM are used as separate clauses, and the syntax calls for fields to be separated by commas, and the full command to be terminated with a

```
SELECT coname, city, pcode
FROM  custlist;
```

semicolon. See – it's not all that difficult, is it?

If you'd wanted to select all fields in the custlist table, you could have used: SELECT * (where the asterisk is a wild-card meaning 'all'). If you need to create a new table (rather than just display the details up on the screen) you would use the CREATE TABLE command, and follow this with the new name of the table, the selected field names and the length of those fields. I'm not going to go into it in detail: this is just a taster.

Filtering data

SQL ALSO allows you to filter data at the time of entry by specifying the type of data that can be held in each field. For instance, you may wish to always use a four digit company identification number, and therefore you will add the NOT NULL command when creating this field. All four characters entered must then contain a value (you can't type three digits and a return).

Similarly SQL's automatic data validation can include the UNIQUE command to ensure you don't accidentally use the same company identification number twice. Other validation commands are DATE and NUMBER – and in the last you can specify, say, NUMBER (9,2), nine digits of which two are decimals. Other commands in SQL allow you to INSERT new fields, and in the SELECT (search) command you can limit the data to exactly match (=), or be greater than (>), or less than (<) specified numbers or strings. You've got the normal range of Boolean (AND, OR, NOT) and arithmetical operators, and a whole bunch of functions like AVG (average), SUM, MIN, and so on.

You can sort any table with the ORDER BY command, and for relational operations (with two or more tables) you use the JOIN command. Now, after having said all this, I've now got to point out that with Oracle for the Macintosh, you don't need to know any of the standard SQL commands to use it, but it does take a fair amount of experience and understanding to set the program up.

Oracle has hidden its database and SQL behind a HyperCard front-end. As a database user, you only need to know how to click on HyperCard buttons, and where necessary, to type in a few search words, and the HyperTalk language will do the work for you. For instance, you will have a card that corresponds to the CUSTLIST table (file) in the example above. On this card would be HyperCard fields into which you can type the search parameters (coname, city, and so on) and across the bottom would be a series of buttons – probably one each for Select, Insert, Update and Delete and a couple of others beside.

You type in the parameters you wish to search for into the correct field, then click on the Search button. The card background now changes – in effect you have now jumped to a new stack, probably called 'Custlist Using', and all of the records you have selected will now be in this stack, one card at a time. The buttons will now let you step through this stack, make changes to individual records, or jump back to the selection process again.

HyperCard stacks

THIS IS A VERY friendly front-end to all of those normal SQL functions. The HyperCard Stacks need to be designed to give the operator a full range of the control buttons that allow them to do whatever they need to do, but this isn't all that difficult if you are familiar with HyperCard. Oracle even handles errors through HyperCard: if you get one of SQL's esoteric error messages, you can jump to the Error Stack and find out what it means.

All this makes Oracle an easy program to use for data entry or for general office data selection and extraction, but it does add a couple of layers of complexity to the database management creation process. For instance you now have to know and understand three languages (and possibly four!): SQL itself, Hyper*SQL (which contains the extensions that bridge the Oracle/HyperCard gap) and HyperTalk, the language of HyperCard. The fourth is SQL*Plus which is another SQL extension for formatting and manipulating data, mainly for printed reports.

This isn't all as terrifying as it sounds because they are all pretty easy languages to learn, but it's not a subject you would approach as a casual evening's work. The communications between the HyperCard and Oracle 'programs' takes place through HyperCard XCMDs (External Commands) which are usually attached to your existing Home Stack. When SQL and Hyper*SQL commands are issued through HyperTalk, they must follow an 'execsql' command. The HyperCard program runs its normal course in sending the command sequence through the hierarchy looking for a normal HyperCard function which matches the command commandname 'execsql.' When it doesn't find one, it then checks the Home Stack, and here in the resource arm it will find the appropriate matching XCMD name. It then performs the XCMD function which handles the SQL commands.

A quick example will give you the flavour. Let's say that a button has behind it a script like:

```
on mouseUp
execsql "select * into :dummy; from
custlist.............. etc.............."
end mouseUp
```

A click on the mouse while the cursor is over this button will now dispatch the mouseUp message to this script. The script will then dispatch the execsql command with ?"select * into :dummy etc.? as its parameter. This will be taken up and acted upon by the execsql XCMD in the Home Stack, which will pass it off to the Oracle program.

Just to confuse you even more; there are a number of different ways you can use Oracle on the Macintosh, and the above with HyperCard is only one. You can also set the HyperCard front-end aside, and directly access the program through scripts written with a word processor, using the SQL*Plus module. You can also access Oracle directly from within another Mac program using the C language. □



GREGG FAULKNER

Foreign file formats

ONE OF THE most frequent questions I'm asked by people who don't know the Amiga is whether it is IBM compatible. My usual response is to laugh and tell them 'No – the IBM has a long way to go to catch up.' Despite my mirth I often think that it's a shame that people have come to judge a computer's worth by its compatibility with a grossly outdated format. Realistically though, I have to admit the usefulness of compatibility with the IBM 'standard.'

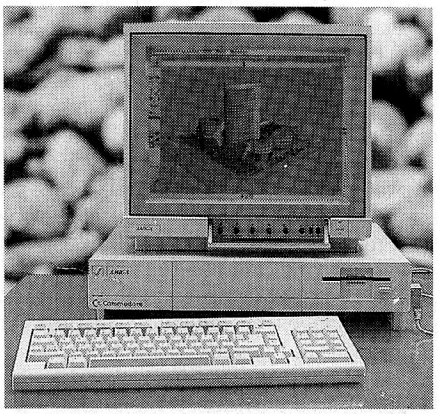
The Amiga 1000 could achieve compatibility with the addition of the 'Sidecar.' This was effectively an IBM PC/XT clone in a box with a 5¼ inch floppy drive, which could be plugged into a connector on the side of the Amiga 1000. Some clever software permitted the exchange of data between environments. With the Amiga 2000 came the Bridgeboard. Again an IBM PC/XT clone, this time built onto a single circuit board which could be plugged inside the Amiga 2000. A development in this case was the provision of expansion slots in both Amiga and PC/XT forms on the 2000 mother board. Now the 'IBM side' could be expanded as well as the Amiga side.

I guess the ultimate development of this idea, to date at least, is the Amiga 2500AT. Within the 2000-style box is a very fast Amiga 2000 and a quick IBM PC/AT compatible bridgeboard. With this machine you have the best of both worlds – at a price. To my mind the unresolved question is 'Why do I need IBM compatibility at all?' For my everyday purposes I use the Amiga for graphics and video-presentation work, animation and titling. I also use the Amiga, with WordPerfect, for my word processing. About the only time I really need IBM compatibility is in order to produce IBM format floppy disks of my articles to send to publishers.

Dos2Dos

THERE IS NO way in the world I am going to spend heaps of bucks on an AT (or XT) bridgeboard just to produce floppies for my publishers. Fortunately I don't have to. There is an excellent piece of Amiga software which provides exactly the function I need. Dos2Dos is the name of the package, and it's also a pretty good description of its function. The Dos2Dos program can be easily installed into the C directory of your favourite Workbench disk and can then be called up from the CLI as required.

When called, Dos2Dos first asks you to specify which of your floppy drives is to be treated as an IBM drive. I usually respond by specifying DF1: as the IBM drive. From that point on, until I quit Dos2Dos, DF1: behaves in every way as an IBM compatible, 720K floppy disk drive. If I load a disk into DF1: and type FORMAT DF1: the package formats the disk as a 720K IBM format disk. If I type the command DIR DF1: it even produces a distinctly IBM-style disk directory listing. In short, DF1: has become to all intents and purposes an IBM floppy disk drive.



A-Max is a hardware/software combination that gives Mac emulation on an Amiga.

This is very useful when I wish to send text files to a publisher. I can create my documents, as usual, with WordPerfect on my Amiga and save the files to disk in Amiga format. Next I load Dos2Dos and specify DF1: as my IBM drive. A floppy disk loaded in DF1: can be formatted to 720K IBM format. I then place my Amiga WordPerfect document files disk into DF0: and type the command COPY DF0:<filename> DF1: and that's all there is to it. The file is copied from DF0: in Amiga format to DF1: in IBM format. Because WordPerfect retains file compatibility between systems the 720K disk can be immediately loaded into an IBM (or compatible) PC and the document(s) read, edited, and so on.

The same thing happens with VIP Professional (spreadsheet) data files when I want to carry them across to the IBM world. They are fully compatible with Lotus 1-2-3. Many other Amiga software packages are data-compatible with software in the IBM world, and some excellent utilities are available now to convert IBM-format TIFF and CGI graphics files to Amiga IFF format.

What I'm getting around to saying is, how important is hardware compatibility? For me it's not important at all. What is important to me is data file compatibility, and the ability to read, save to, and format IBM-style disks on my Amiga. I don't want to run Lotus 1-2-3 on my Amiga. If I want to run 1-2-3 I use an IBM clone. If I want to work with 1-2-3 data on my Amiga, I use VIP professional. What is absolutely vital to me is the ability to transfer data between machine formats, and Dos2Dos performs that task superbly. And there's more good news – it's not even expensive.

Interlink Software list Dos2Dos at $79 and at that price it's a steal. Speaking of stealing, a utility this useful deserves to make a quid for its developer so do buy it, don't 'acquire' it. On a similar topic, I notice the recent release of the A-Max Macintosh emulator for the Amiga. This presents some very interesting possibilities. Unlike the IBM disks I was describing above, the Amiga disk drives cannot successfully format, read or write Macintosh 800K disks. Until now this has meant that the only way to transfer data files between Amigas and Macs was through a cable.

A-Max

THE A-MAX is a combination hardware/-software package which, for best results, includes a module which plugs into the Amiga's external floppy drive port, a genuine Mac 800K floppy disk drive which

plugs into the module, and a software package which runs the whole shebang. To get around the copyright problem, and we all know about Apple's sensitivities in this area, the A-Max hardware module is supplied without ROM chips. In order to get it to work you must supply a set of genuine Apple 64K, or even better 128K, ROM chips.

I haven't had much of a chance to play with the beast yet but when I do I'll give you all the details. In the course of a frantic hour or so I discovered that the A-Max will certainly run such Mac products as MacWrite and MacDraw and had no trouble reading several Mac format data disks. The default screen format used by A-Max is interlace mode which results in 'the jitters' unless you have a Flicker Fixer. One thing I found particularly interesting was that A-Max provides screen options to suit the yet to be released Version 1.4 chip set. This facility provides a 720 by 480 non-interlaced screen format and can even head for 1008 by 1008 with an appropriate monitor.

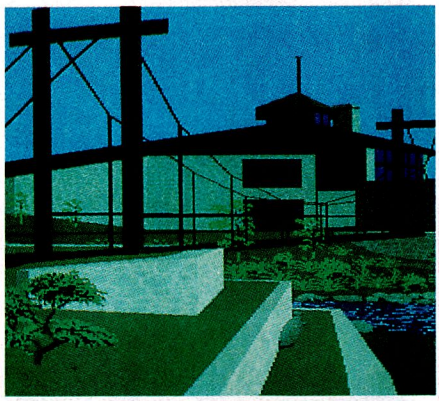
An interesting thing about this product, a little birdie told me, is that it originates from the shaky isles. Down among the sheep herders of the Canterbury Plains resides a computer whiz who worked it all out.

Disk Master

WHILE I'M ON the topic of utility software I might as well make mention of a few other items which are of great value to anyone using the Amiga productively. Disk Master has recently become my most used and useful piece of utility software. I guess the origins of Disk Master can be traced back to a package called DirUtil which hit the Public Domain arena about three years ago. DirUtil went through innumerable updates and modifications and eventually became so damned complicated that it lost its usefulness.

Disk Master is brilliant in the simplicity and clarity of its presentation. A central vertical column of control buttons command the functions to be performed on files and directory contents displayed in two side windows. A couple of drop-down menus provide additional, more general functions. Like its predecessors, Disk Master permits very easy copying of files between devices, including creation of directories and formatting of disks as required. Available functions include Delete, Rename, Protect and others. A Move command is handy, combining as it does the Copy and Delete functions.

For me the most useful functions provided by Disk Master are the Read, Print and Showpic commands. The Read command allows you to view a text file using a very friendly interface. To scroll down through the document simply move the mouse cursor down the screen. The further down the screen you move the cursor, the faster the scroll. To scroll up reverse the process and move the cursor up the screen.



ShowPrint II lets you load any IFF image and then print the image in black and white or colour, in portrait or landscape format, on your system printer.

Print allows you to print out any text file and gives you multiple options including file title, date and time, page numbering and so on. It does a nice job, too. The final command, Showpic, will display any IFF image including overscan in any format from low-resolution through interlace to HAM mode. The image displays without a visible cursor. To exit the image display the user simply clicks the left mouse button. Disk Master provides a comfortable half-way step between the WIMP (windows, icons, mouse, pointer) environment of Workbench and the often anxiety provoking CLI.

ShowPrint II

SHOWPRINT II is a shareware utility package, available through Amiga user groups or from the Fred Fish disk library. You could also try sending $25 in US funds to Datawise Technologies, PO Box 62, Touchet WA 99360 USA which will also make you a registered user and worthy of receiving updates and upgrades. ShowPrint II lets you load any IFF image and then print the image in black and white or colour, in portrait or landscape format, on your system printer. It's a lot more convenient than having to fire up Deluxe Paint, load the image, and print from there. The likelihood of error is also reduced as you are looking at the image you are going to print.

Another little utility which I find invaluable is a program called Less. Believe it or not, Less is a development of an earlier program called More. If that's not confusing enough, there is an even newer update called Most. Less was circulated on the Fish Disk circuit and it is used on many many public domain disks from all over the place. In order to use Less, you should store the small program in the C directory of your Workbench disk. You can now view a text file by typing LESS <filename> from the CLI. A new window opens to display the text and you can press the space bar to proceed to the next page, B to backup a page, or Q to quit the program.

An even easier way to use Less is to incorporate the command into the icon for the text file. After you have saved a text file, with an icon, you can click once on the icon, to select it without trying to load it. Now go up to the leftmost (Workbench) menu and select Info. Click with the cursor in the box labeled Default Tool and then type :C/Less into the box. Click on the Save box and the Info window will disappear. From now on, double clicking on the document icon will automatically start the Less program which will display your document for you.

The above procedure opens a whole can of worms regarding 'tricks' which are available in the Workbench environment but not generally documented. An excellent way to learn more about your Amiga, and to make your computing a little easier, is to purchase some of the excellent books produced by Abacus.

The set comprises some fifteen titles including *Amiga for Beginners, AmigaBASIC Inside and Out, Amiga Tips and Tricks* and *AmigaDOS Inside and Out*. I have spent many happy hours browsing through the various volumes and I strongly recommend them to all Amiga owners. In future columns I will be presenting one or two gems per month from these sources. The complete Abacus Amiga library is available from Pactronics, PO Box 187, Willoughby 2068 NSW – who have one of the most complete ranges of Amiga products on Australia – or from your local computer store. I thank Pactronics for the opportunity to examine the Abacus books. See you next month. □



IAN ALLEN

A trip to SimCity

ONE OF THE recent releases for the C-64 is a remarkable program called SimCity. It's not a game, it's a simulation program designed for the educational market, but it's so well executed and so much fun to use that it feels like a game. It should appeal to almost everybody.

Its premise is very simple. You are the mayor of a simulated city inhabited by simulated people. As the mayor, it's your job to manage the city's development and control its environment. One of the main tools you have is your ability to zone land according to the type of development you want to encourage. You can designate particular areas as residential, commercial or industrial, or even as parkland. Your other main tool is the ability to construct the city's infrastructure, things like roads, power plants, power lines, ports and airports. All of this activity naturally carries a cost, and your funds are limited by what you can collect in rates. Rates are influenced by the value of the land, which is in turn affected by the zoning and the infrastructure supporting it.

Adding to this interactivity is the fact that the city is actually living. You might control the zoning but it's the Sims (simulated people) who actually build the houses, offices and factories. They also drive their cars. (That's one of the fun parts about building roads – watching the simulated traffic arrive on them!)

It doesn't take long before you realise that looking after the Sim's welfare is very important. The game has a status menu where you can plot graphs showing the population growth, unemployment, and standard of living. If unemployment is too high or the standard of living drops too much, your Sims will begin to emigrate to more prosperous climes and your city's prosperity will decline. You can help prevent this by encouraging job-creating industry. But, you have to be careful how you go about zoning for this because industry creates pollution and pollution has a negative effect on the standard of living. SimCity is quite brilliant in the way it poses this type of town planning dilemma, and it's easy to see how educators will find it an excellent tool.



SimCity has the player in the role of the mayor attempting to come to grips with town planning dilemmas and learning how to handle disasters such as earthquakes, Godzilla and massive fires – enjoyable as it may be it's much more an 'educational' tool for adults and children than a game as such.

Bulldozers and joysticks

SIMCITY'S GRAPHICS ARE also a lot of fun. You are presented with a master menu which gives you an overview of the city rather like a Landsat map, or you can zoom in for much greater detail. It's in the zoomed in mode that you do all of your infrastructure construction. This is done by using the joystick and the bulldozer tool to clear land, and then the appropriate icon for the task at hand be it road or power or bridge. When the Sims build on a block you see it gradually fill in with little black shapes until it is full. The traffic appears as small black dots moving in both directions upon the roads. Sometimes you build roads and nobody seems to use them. That usually indicates an error in your town planning – you haven't given the Sims enough reason to travel in that direction, maybe you need some shops or jobs at the other end?

One of the nice graphic touches is with airports. Soon after you build one you see aircraft landing and taking off. On the runway they are just a cross, but as they gain altitude they become bigger (being closer to your omnipotent vantage point).

SimCity has a terrain generation feature which you can use to create completely different initial layouts, or you can use it to design your own; useful if you wanted to simulate a particular city. With SimCity are six pre-built cities including Tokyo, Hamburg and San Francisco. These are good to have as examples, but they have a second purpose in that they are tailor-made for the disaster options. These include the Earthquake, Godzilla the monster, massive fires and a tornado. Naturally there are nice graphics to go with each one. No prizes for matching the disaster to the city, but you can also inflict them on your own city as well. The educational point of the disaster menus is to demonstrate the need for multiple redundancy in vital services such as power and roads. The more redundancy, the better your city will cope.

SimCity is a simulation, so it doesn't have an end. You stop when you've got your city to the point you want it to be. There is no scoring system, and that's consistent with the designer's assertion that there is no perfectly correct way to plan a city. However, while I can appreciate their sentiment, I would prefer to see some sort of player reward, even if it was just a measure of your popularity with the citizenry. Judging from the graphics on the packaging, the Amiga and Macintosh versions do include this as well as another factor to consider, a crime rate.

Despite this one reservation I found SimCity a great deal of fun and very compelling to play. I recommend it highly, and so does my next-door-neighbour. After I showed it to him I ended up lending him my computer for the night. The next day, sporting the tell-tale bleary eyes of an all night session, he announced he was going to buy his own copy, and a computer to play it on!

SimCity is distributed by Dataflow Computer Services. The C-64 version retails for $49.95. □

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TIM HARTNELL

Read, write and repair

THIS MONTH WE'LL be looking at a way to read long documentation files on screen, a simple command to ensure that Lotus spreadsheets are printed at the right place on the page, some errors which have been spotted in the 'portable' manual and more.

Reading shareware manuals

DAVID ARON from Collaroy Plateau reports that he's managed to find a solution to the problem of reading long on-disk manuals with freeware and shareware. 'Often you don't want to go ahead and print all that stuff before satisfying yourself that it will be used,' David writes. 'If you try to read it by entering 'TYPE manual.doc' or whatever, it scrolls past too quickly, and the switch /P does not work. The solution, which is obscurely mentioned in the manual, is to use the 'MORE' filter command, by entering:

```
C) more < manual.doc
```

The manual document then scrolls past, one page at a time.

Printing Lotus spreadsheets

DAVID ALSO reports that he has had a lot of trouble getting spreadsheets from Lotus to print in the right place at the page. 'I had this problem,' he says, 'until I discovered another obscure manual instruction that must be followed. That is, you need to always press Align before Go when printing. Apparently this tells the computer that the paper is in the right position to start printing, and if you don't do this, it winds forward a random amount before starting to print. The Sage PC Planner program is the same.'

Errors in portable manual

PHIL SPENCER, from North Rockhampton, has found a few errors in the manual headed 'The Amstrad Portable PPC512/640.' His discoveries could spare you a few headaches:

Section 1.7.7 'Specifying a path' on page 48 is wrong. I found the discussion 'Paths from the root directory' misleading at best, and I know what they're trying to explain. Put a '\' at the start of each example, and it makes a bit more sense.

When specifying 'Paths from the current directory,' you could not write the path stated, in other words REPORTS\BUSINESS\ ACCOUNTS to access \BUSINESS\ACCOUNTS from \BUSINESS\REPORTS\NEW however 'the path you would actually write' is correct: ..\..\ACCOUNTS (the slightly different description in section 2.4.1.2 page 76 is better).

Appendix D:- ANSI.SIS P. 320 'Set graphics parameters' code is (ESC)[n;...;m (the '[' is missing in the manual). In other words '(ESC)[5;7m' sets blinking reverse video; '(ESC)[0m' sets 'normal' mode (eventually - it's not done quite right while scrolling MDA screens.)

Index: EDLIN commands are on page 159 not page 141.

Make room!

GOOD OLD planet Earth may one day be swamped with too many *Your Computer* readers. After you've typed one of the following listings, enter the name of the country you are interested in, its current population from the table below, and the time it takes to double. The program will then specify the population in the year you specify. Here are the figures for the populations and their growth as they stood around 1985 –

Area	Population	Pop. per square mile	Yearly growth	Doubling time (yrs)
World	4,600,000,000		1.9%	37
Asia	2,493,000,000	148	2.1%	34
Africa	452,000,000	39	2.6%	27
Europe	684,000,000	169	0.6%	119
Nth Am.	364,000,000	39	0.9%	77
Sth Am.	237,000,000	34	2.7%	26
Australia	15,000,000	5	1.5%	40

This is the listing for CPC models and those running GWBasic –

```
'makerom2.bas
CLS
PRINT:INPUT "PLEASE ENTER THIS YEAR";thisyear
PRINT:INPUT "NAME OF THE COUNTRY";a$
PRINT:INPUT "CURRENT POPULATION";cupop
PRINT:INPUT "DOUBLING TIME IN YEARS";doubyear
10 PRINT:INPUT "    WHAT YEAR DO I FORECAST FOR";year
If year(=thisyear THEN 10
growth=EXP(LOG(2)/doubyear)
pop=growth^(year-thisyear)*cupop
CLS:PRINT "THE POPULATION OF ";a$
PRINT "WILL BE";pop;"BY";year:PRINT
prop=pop/cupop;IF prop)100 THEN prop=100
FOR g=1 TO prop:PRINT "#";:NEXT g:PRINT
PRINT "EACH # REPRESENTS THE POPULATION IN" ;thisyear
```

And, the listing for those with machines running Basic2 –

```
10 REM Make Room!  Make Room!
20 REM MAKEROOM.BAS
30 CLS:KEY OFF
40 REM
50 PRINT:INPUT "PLEASE ENTER THIS YEAR" ;THISYEAR
60 PRINT:INPUT "NAME OF THE COUNTRY";A$
70 PRINT:INPUT "CURRENT POPULATION";CUPOP
80 PRINT:INPUT "DOUBLING TIME IN YEARS" ;DOUBYEAR
90 PRINT:INPUT "    WHAT YEAR DO I FORECAST FOR";YEAR
100 IF YEAR<=THISYEAR THEN 90
110 REM
120 GROWTH=EXP(LOG(2)/DOUBYEAR)
130 POP=GROWTH^(YEAR-THISYEAR)*CUPOP
140 REM
150 CLS
160 PRINT "THE POPULATION OF ";A$
170 PRINT "WILL BE";POP;"BY";YEAR:PRINT
180 PROP=POP/CUPOP:IF PROP>100 THEN PROP=100
190 REM
200 FOR G=1 TO PROP
210 PRINT "#";
220 NEXT G:PRINT
230 PRINT "EACH # REPRESENTS THE POPULATION IN";THISYEAR
```

Detoggle CPC

JOHN MARTIN-JONES has a CPC 6128 with a supplementary 5½ inch B drive, which he uses for his day to day work, keeping the 3-inch drive for masters and single purpose programs. John wants to know if any other 6128 owners have worked out a way to redefine the keys to exchange Caps Lock and Control. He learned to type on a typewriter and consequently often hits Ctrl – with disasters results – when heading for Shift. If you have worked out a solution, let me know so we can pass it on.

We'll be including *Your Amstrad* in future issues of the magazine. I'd be interested in hearing from any companies making, or importing, software and/or hardware for any of the Amstrad computers. As well, I'd be more than happy to share any of your discoveries, hints, tips, comments and programs with other users, along with details of any Amstrad-specific user groups. A copy of my *Amstrad PC Users Companion* (disk and manual) will be given to anyone supplying PC hints which are used in this column. I have some CPC software to provide in return for CPC hints. Please write to 'Your Amstrad', Tim Hartnell, *Your Computer*, PO Box 227, Waterloo, NSW, 2015. □

AutoSketch

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SERVICES PAGE

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Contribution on Disk: Contributions can be accepted in most disk formats, although some have to be converted outside our offices, which will add to the (often lengthy) delay between receipt and acknowledgment. The preferred medium is IBM standard format single-sided, single-density, 20cm CP/M disks or IBM PC-DOS minifloppies. We can also handle, in-office, most soft-sectored 13cm disks, thanks to PC-Alien – so unless you have a particularly strange format, send it on disk straight from your machine. Please pack them extremely carefully if posting and label all disks with your name, address and phone number.

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 – handwritten 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 coments of 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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NEW THE ENCYCLOPEDIA OF SHAREWARE

What is Shareware...
and why is a Directory important?

How it works
Shareware relies upon the honesty of software users to pay for the software that they use. Shareware bypasses the costs associated with conventional marketing and promotion of software by inviting users of software to give copies of the software to their friends.
If the user of the software likes the product and wants to continue to use it in any way then the user should register that software.
When a user registers the software the author gets a return for his effort in creating the software and is encouraged to improve the product and to develop new products.
Rather than implementing cumbersome copy protection schemes shareware authors do exactly the opposite — they actually encourage their users to make copies of the software for their friends.
Word would spread slowly if the author solely relied upon users just sharing copies with their friends. User groups are encouraged to share the software with their members on a non profit basis.
Many user groups set up Bulletin Boards so that members can "down load" software which they would like to evaluate for use. This is another accepted way of distributing shareware.
Some commercial operations also distribute shareware and charge for the disks. Again this is an accepted way of distributing shareware providing the disk distributor meets certain criteria set down by the authors.

What is the difference between Shareware and Public Domain Software?
Public Domain software is created by authors who chose not to seek formal rights or royalties. There is no restriction of any kind on distribution of this kind of software. Most public domain software is games or utilities. There are very few complete products in the public domain.
Shareware software on the other hand is distributed so the user can evaluate the software to decide whether he will register with the author and continue to use the software.
Shareware is an alternate method of marketing software, not really a different kind of software. In fact the more successful Shareware products hold their own against their commercially distributed competitors. The greatest difference is that the Shareware product's packaging is not as fancy and the price is much lower.

Where can I obtain Shareware trial disks?
A collection of Shareware disks is usually referred to as a Library. A Library may be kept by a user group, a bulletin board operator or by a commercial diskette distributor.
A lot has been said and written about viruses. There is no doubt that a virus could be distributed hidden in a public domain or shareware disk.
Care needs to be taken that the library you use for disks takes every reasonable step to eliminate the possibility of a virus. Careful checking is not sufficient as it is simply impossible to check every single disk to the degree which would be required.
The safest way for your library to obtain Shareware disks is to source them directly from the authors. This of course means that the source of every disk is known and the insidious perpetrator of a virus cannot hide behind a cloak of anonymity.
The Shareware authors are always releasing new versions of their software and you should ensure that the library is kept up to date with the latest available versions.
Before you purchase any disks you should ask if the software and the latest versions are sourced directly from the authors. If the answer is "yes" you can be reasonably sure that you are getting the latest versions and that they should be quite safe to use.

Do I need to join a Library?
Some commercial libraries and most user groups insist that you join before you can purchase disks. If you intend to purchase disks a properly prepared catalogue will make your selections easier and repay your membership costs many times over.
Other libraries allow purchases without any membership fees and some offer a free catalogue. The free catalogue is usually a very short description of available disks and is often given away as an insert in magazines. Of course there is no such thing as a free lunch — the brief descriptions in free catalogues mean that you will invariably purchase more disks than you really need. The descriptions are so short you really are taking a lucky dip!

What is PC-SIG?
PC-SIG is the world's largest Shareware library and contains around 1500 disks. PC-SIG does not require you to become a member to purchase disks and gives you a choice of Directories to suit your requirements.
PC-SIG are the publishers of a bi-monthly magazine, appropriately named "Shareware". The magazine lists new additions, upgrades to existing disks and compares products from different authors. "Shareware" is available at many newsagents in Australia at around $4.50 an issue or on a twelve month subscription basis for $20. Subscribers to "Shareware" also receive FREE a 48 page mini catalogue of the PC-SIG Library.
NEW from PC-SIG is the definitive reference work for tracking down the Shareware product you need. With nearly 500 pages of detailed descriptions of the programs in the PC-SIG Library "The Complete Encyclopedia of Shareware" provides a wealth of carefully organised information to help you find the product you are seeking. You can look up a program by subject category, title or disk number. There are even handy "see also" notations to direct you to other programs which may suit. The Encyclopedia is exceptional value at just $32.50 (plus $5 post and handling).
If you chose to subscribe to "Shareware" and to purchase "The Encyclopedia" you can become a member of the Library for just $38 (plus $5 post and handling). You will not only have the best reference work available but be kept up to date for a full 12 months with "Shareware" magazine. As a further bonus members are offered special discounts from time to time.
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MICHAEL BURLACE

To catch a thief

■ The NSW Government is looking at installing a vehicle tracking system which will enable police to locate stolen vehicles. More than 50,000 vehicles were stolen last year in NSW. The idea is that the device would be hidden on the car, (presumably before it was stolen) and could then be tracked whether the car was in a building, a tunnel or out in the open. It would be accurate down to a 50m radius.

I got out of a life of crime many years ago when I failed shoplifting as a child. So I'm no car thief, but if I were, the first thing I would do is build a receiver with the appropriate freqencies and an extremely directional aerial. I'd steal the car, go somewhere quiet and locate the device with my radio. Then I'd remove the device, drive off, leaving it attached to a passing taxi or police car. Or I'd take the device and sell it in a pub, after all, the police Minister expects it will cost $300 to $1000. People dumb enough to buy stuff in pubs couldn't work out that it was silly to buy an anti-theft device that had obviously been stolen.

Mind you, if the cops bothered to wipe out the market for stolen parts they would go a long way towards wiping out the market for stolen cars. They could do a few raids on the people who buy hot parts to fix other people's cars.

But since technology always appears a better approach than cleaning out the criminals, they will probably go ahead with the tracker. One of the hidden benefits of the radio tracker would be for people wanting to keep tabs on who is where. What is that person's spouse doing with that other person and where can they be found. Great for private investigators who are working for the suspicious party in a potential marriage break-up. Try some industrial espionage with it too. Sounds like a backward step for civil liberties, though.

■ The Tasmanian police have been running a pilot program to test videotaping the questioning of suspects. The idea is to reduce the number of accusations of verbals being rigged by the cops. It could turn out well all round. The cops have been getting better confessions, the suspects appear to be getting a better treatment and justice can be seen and heard to be done. Longer tests will indicate what really is going on, but it looks quite good. The Tasmanian Director of Public Prosecutions, Damian Bugg said the program aimed to provide a secure means of recording what was said in interviews. And I'd believe Mr Bugg talking about such a thing.

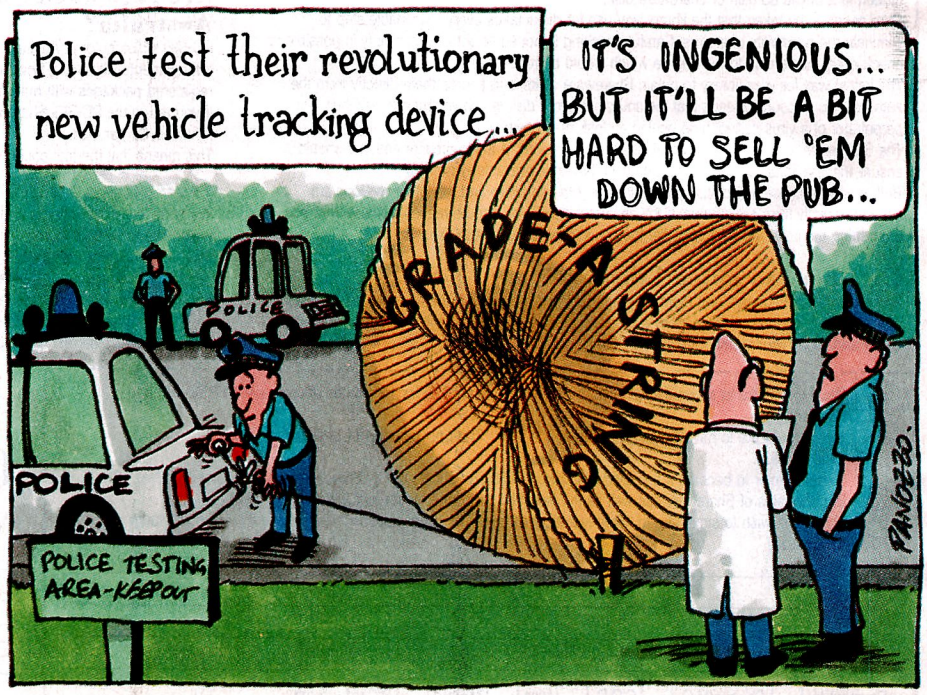
BOOTSTRAP: Printer personality management was the first time I was aware of it, then I noticed it occurring more often. In the old days we had things such as memory management, but they were fairly innocuous. We also had intelligent terminals and intelligent printers. But printers with personality, let alone printers with personalities plural! Ostensibly the personality management was referring to a program which allowed supposedly easier and better control of a PostScript laser.

But, the next thing I knew, it was plug-in personality modules. You could have a printer with the charm and humor of Mae West or Bert Newton. For awkward installations – and after all, every printer has them – the personality could be one with the questioning nature of Tony Barber but lacking the cheery smile. Obviously someone had come up with the ideal gift for the smart printer with everything else.

Ah, smart, that's right! Once upon a time there was a smart modem. And it wasn't such a dumb idea given the unlemming-like level of acceptance of the little black box. Still it wasn't enough. Perhaps the modem with personality plus would have done the trick and had us all communicating like AIDS. Maybe the modem with the John Laws personality so it can talk back to me. Or even the silver-tongued Bob Hawke style of speech so that all those transmission error-checking protocols have something to do.

Luckily the person who invented all this personality management and the plug in personalities turned the technology around in time and started producing personalities for those who had become too computer-like or too printer-orientated. Yes, just in time we had the Paul Keating personality module. Just plug it in between his foreign debt and your tax dollars and Paul's cheery clockface would come up as the minutes ticked away to the next election.

Now, if we could just get some policies for Andrew Peacock, we'll have ourselves a binary election instead of the usual Tweedledum versus Tweedledee. □



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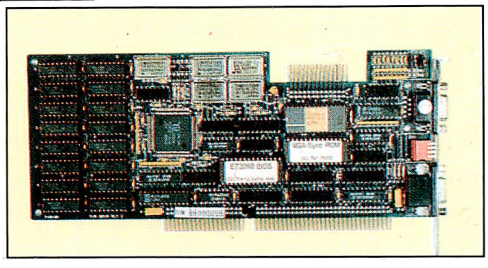
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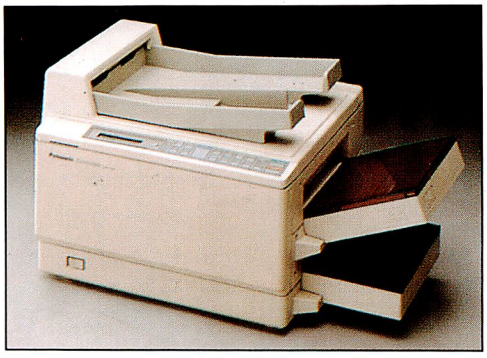
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