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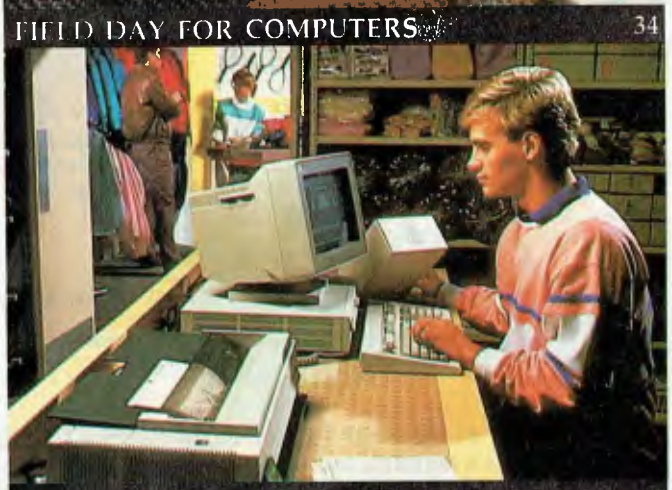

IBM'S MODEL 30 AT 42

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If your needs call for colour or high-resolution printing, our coverage of ink-jet and thermal printers will show the state-of-the art and make your choice easier. We might like to think of ourselves as a high-tech, industrial society, but the rural sector is still the biggest source of exports – in April, we'll be presenting a new series of articles covering computer happenings (and problems!) in the country. For those in the city, there's the first in a two-part series: 'Computer Generated Information: Potential for Fraud?' And – who says you need a VGA monitor to run VGA programs?

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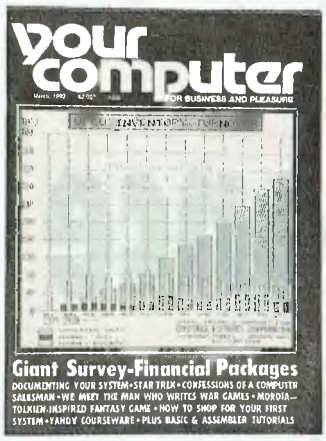
JAKE KENNEDY

# Shot yourself in the foot?




*March 1982*

'We are witnessing today a new era – the information age. It will ultimately mean half the nation's Gross National Product will be directly or indirectly derived from the dissemination of information.' – *News, p8.*

'The Dirty Book concentrates on erotic software for the Apple, TRS-80, Atari and Commodore personal computers. It even sponsors a quarterly contest aimed at stimulating sensual software development.' – *News, p10.*

'Good writing for technical publications is not difficult. the basics may be summed up in a short rhyme, written, I believe, by Rudyard Kipling –

I keep six honest serving men,
They taught me all I knew.
Their names are *what* and *where* and *when*
And *how* and *why* and *who*.

– *Les Bell, 'Make Your Hobby Pay'.*

PEOPLE FAIL for the most part because they shoot themselves in the foot. If you go for a long time without shooting yourself in the foot, other people start calling you a genius.' That bit of pith is from Dr An Wang's autobiography, *Lessons* (Addison-Wesley, 1986) – it made me start thinking of instances of foot-shooting that we've seen over the years in this industry. Never mind individuals (the world is littered with limpers), but companies: in the March '82 issue of *YC*, hindsight shows two instances where the bullets were being loaded.

In that issue we reported on the release of Applied Technology's Bee which offered a powerful, flexible and expandable computer (as a kit) for $399. For tens of thousands of us, that machine and its descendants were an introduction to personal computing – and it was a stayer whose range of applications is still growing, as Jeff Ponton's report on the kiln controller in January's 'Microbee File' attested.

But, Applied Tech eventually shot itself in the foot with the Gamma. The bullet was the enormous cost of developing that 32-bit wonder at the expense of support and continuing development of the company's bread-and-butter 'bee range.

The second example was Adam ('From the Fountainhead') Osborne's O-1. This promising portable came fully configured (albeit with a tiny 5-inch screen) and included a stack of software, for $1795. It looked set to take on the world – comparable computers were priced over $5000. But, Osborne was as quick on the draw as he was on the mouth – from the beginning there were problems with marketing and support. For example in early '82, the company was still promising a 12-inch monitor in *late '81*! Bang!

I wonder how many 'names' are loading up at the moment?

The mention of Osborne brings another passage from *Lessons* to mind: 'It seemed to me that the more eloquent the speaker, the less likely it was that he would practice what he preached.' That certainly pulled my 'eloquent preaching' up short – I've resolved to practice more in '89.

A third quote from Wang's book: 'The key to doing something right may lie in the feedback you get from doing something wrong.' I've heard that homily in various forms many times – the man behind Avis Rent-a-Car's 'We try harder because we're only number two' theme made the point in *Up the Organization* that to keep a business dynamic, decisions must be made or procrastination will soon filter through an entire company. (He also made the point that those decisions don't necessarily have to be right – he claimed an average of only about 50 per cent – but you are only going to get the feedback if the decisions are made, and things tried, in the first place.)

Then there's Edison's comment when his offsider Watson lamented that they'd tried 50,000 substances for the filament in a light globe, none worked, so it was time to give up; in paraphrase, Edison pointed out that 'we now know 50,000 things that won't work – let's try another.'

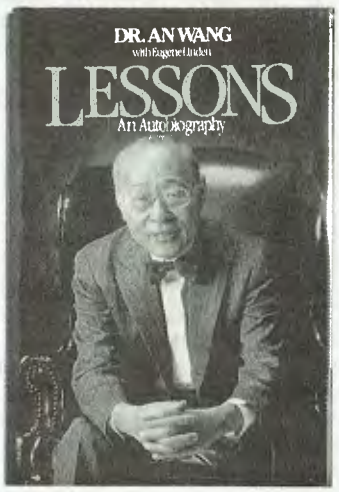
*Lessons* – that's what it is. Give a copy to a friend who might be loading up.

## Stolenware

Is it our convict heritage? Less and less excellent Shareware is being distributed as such in Australia because of the lamentable level of registrations emanating from these shores.

Sadly, it's not just the users who are ripping the authors off. Over the past twelve months, I have purchased four Shareware products from three local organisations (two companies and one user group), which, I expected, would forward my registration and a fee to the author; in due course I would receive updates. I noted on a bulletin board recently that one of the programs I paid for was two versions down the line. My curiosity made me contact the authors of all four products – only *one* of them had me listed as 'registered'! So – beware!

That example makes it clear why we are seeing less new user-supported software here. Many of the best products are now distributed in Australia as 'commercial' – no place else in the world has this happened to such an extent!




At least one company here is doing more than just the right thing (undoubtedly there are others – and I'd be glad to hear from them – but I *know* this company is trying very hard to keep Shareware as that). Ian MacKay's Manaccom has negotiated with Jim Button (of Buttonware, publisher of PC-File and Baker's Dozen) and other US authors who were going to appoint commercial distributors in Australia. As a result, the products from these authors will remain Shareware, with a local distributor. □

MATT WHELAN

# Games of violence

TWO OF MY children are behind me, in my study, hitting each other with baseball bats and whips, and calling each other names. Ever the loving brother/sister, they're 'playing' together – their newest *rad* game for the Amiga, Double Dragon. In it they control two martial-artist brothers out to rescue the girlfriend from a horde of street thugs and, ultimately, the gun-toting big boss.

They have to fight their way through the streets, kicking and punching to get past assorted bad-guys, grabbing weapons when they can. They would be a world championship team if they didn't continually resort to battering each other.

'If I want to kill you, I'll just do a flying kick', Jodie said to Byron a second ago. But she wasn't quick enough – he battered her to death with the baseball bat. 'You pig!' she yelled, 'just leave me alone!'. When she's being polite, she takes the edge off her language: 'You piglet,' she said to Byron a few minutes later, 'you did that on purpose'.

The thugs yell as they slap my kids around, but not for long – a few swift kicks to the groin and a flying kick to the face flattens them, and then they die, with a suitable groan which sounds almost like someone dry-reaching ...

I'm starting to wonder about these games. The most popular ones these days – both on home computers and in the arcades – involve constant killing. Our lineup is dominated by games of violence; violence done to people, not just featureless 'space invaders'.

I guess it's all innocent enough. I'm sure my kids aren't learning the solution to all life's problems is a baseball bat. Are they? And, as they tell me when I question their aggressive approach to each other, 'at least it stops us from fighting for real, dad'.

*I'm sure my kids aren't learning the solution to all life's problems is a baseball bat. Are they?*

Yes, maybe it does keep them off the streets; or maybe they're practicing what they'll do to each other and everyone else when they *are* on the streets? Is pointing an Actionware light gun at comic human figures better or worse than watching the Clint Eastwoods on television as they blow away the bad guys?

My wife thinks the violent games are A Bad Thing, but that could be because she thinks computers are A Bad Thing – with two bulletin boards, a work machine, a Macintosh and two Amigas they get more space (and time) in the house than she does.

So far, I only wonder – there's no evidence to tell me computerised 'killing simulation' does any damage to these growing minds. After all, I enjoy shooting Al Capone's mobsters as much as the kids do, and I'm not a violent, deranged type (well, not often, anyway). But there is a lurking suspicion that 20 years into the future we might just be reading the results of hair-raising research into the 'kids of the computer age'.

'Help me dad, he's killing me,' Jodie just shouted across the room. 'Help!' followed a high-pitched squeal.

'Haha, you idiot,' Byron replied to his younger sister, 'you're dead meat. I won!'

Having beaten all the thugs, the traps, and the machine-gun toting Big Boss, the computer told the kids to fight it out between themselves – only one brother could get the girl. So after all the team effort to get to bad-guy HQ, the good-against-evil sacred quest, they stood in the centre of the room and slugged it out.

At first Jodie controlled the baseball bat – one of the most effective weapons in the game – and just stood there, clobbering her brother each time he picked himself up off the floor. Then Byron, only one hit away from death, got through with a flying kick and floored his sister's charge. Taking the baseball bat, he set about beating her to a pulp.

Down to one life left, Jodie couldn't take it any more. She suicided, jumping off the cliff. Byron got the girl.

It's all good, clean fun. I hope ... □

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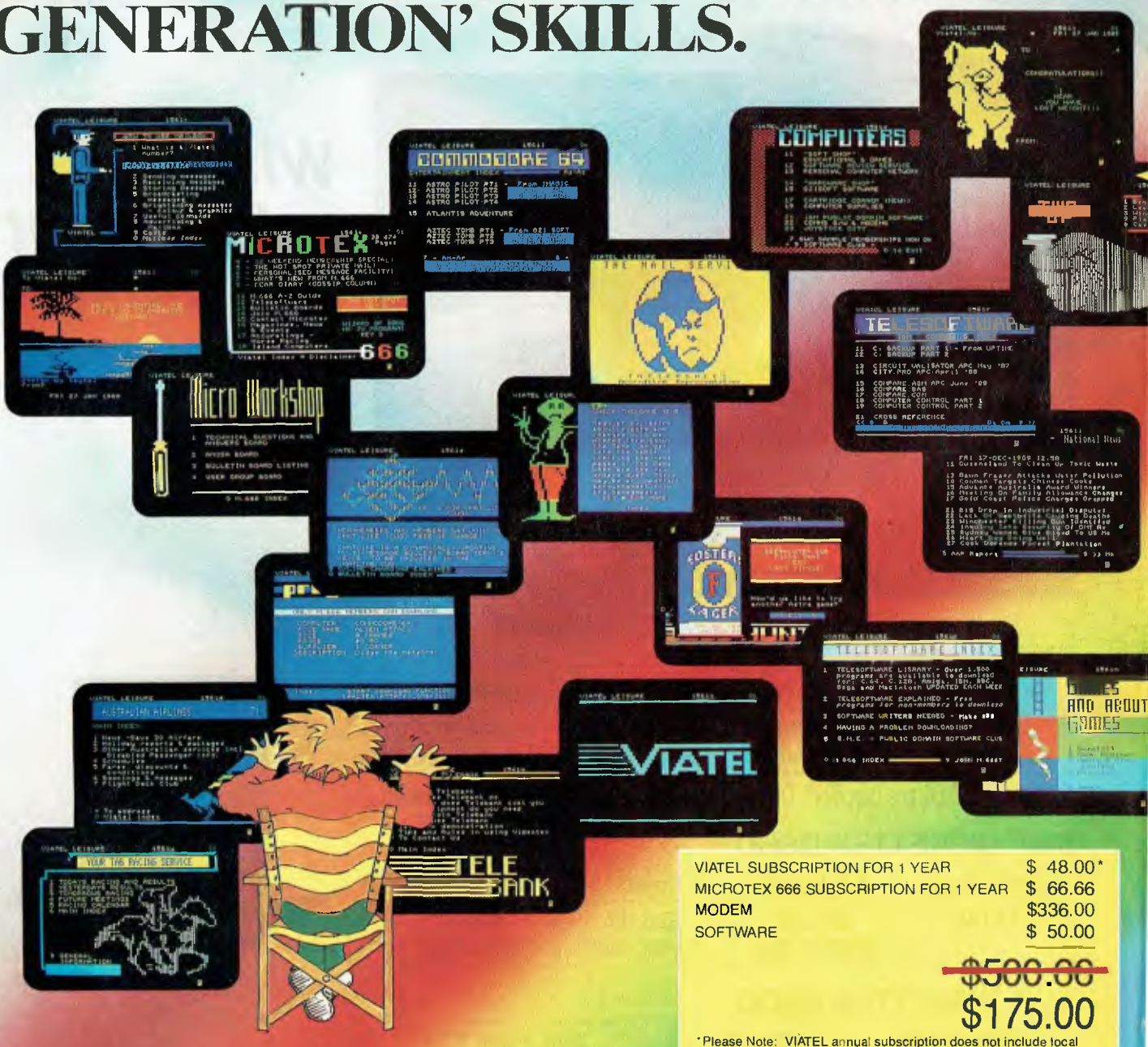


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WILLIAM OLSON

# Telecom and taxes

SPENDING MONEY on an Australian National Super Computer Centre was a waste of time unless funds were also available for constant upgrading, the First Australian Super Computer Conference was told recently in Canberra. Professor Larry Smarr from the University of Illinois, USA, said that super computers were developing so rapidly buyers needed constant updates to stay with the sharpest technology.

Smarr added that even in the US, many people did not understand the need for constantly upgrading super computer centres. 'Otherwise you won't have a super computer for very long – you'll have a machine you are paying an enormous mortgage on but it will not be the best.' he said.

He gave as an example the Cray III super computer now being planned, which had ten times the speed and four times the memory capacity of the Cray II. By 1993, the Cray IV will have 64 CPUs instead of 16, and will be six times faster than the Cray III (planned for release in 1990).

Super computing was useless without good quality scientists, Smarr told his audience. He said no matter how big a super computer is, if you haven't got good quality scientists you might as well save your money.

The PC end of the super computer was also vital, Smarr added. Users should only be vaguely aware that the super computer was at the back of the PC – it should be as transparent as possible.

'It's hard to believe only five years ago that PCs numbered tens of thousands in the US. Today there are 20 million. Even if you take the extreme view that a PC is one thousandth of a super computer then those 20 million PCs represent 20,000 super computer equivalents. In the US we only have 200 super computers.' He added that the computer revolution has come and gone in the last five years – and the PC won!

Skeptics claim they can do the same science on regular computers by taking more time, Smarr said. 'That's false – you can only do that with problems thousands of times less complex. If you choose to limit yourself with the machines you use, then your science will be thousands of times less effective.'

*By 1993, the Cray IV will have 64 CPUs instead of 16, and will be six times faster than the Cray III yet to be introduced.*

The effectiveness of any super computer was only as good as the desktop system scientists were using, Professor Smarr said. The three workstations 80 per cent of scientists and engineers used were Macintoshs, IBM ATs or Sun Unix-based systems.

'Because every year PCs get cheaper and more powerful, a super computer centre must always have the latest in PCs to get the most out of the super computer,' according to Smarr.

The data processing market was a very mature one worth some $200 billion a year, but with only about a three per cent annual growth rate. Smarr thinks that the real growth for computers is now in science and engineering.

*Don Faulkner, co-ordinator of the First Australian Super Computer Conference (left) and Professor Larry Smarr from the University of Illinois, USA. Smarr told the conference that unless funds were also available for constant upgrading, spending money on an Australian National Super Computer Centre was a waste of time.*

'However the systems needed are different to DP demands; scientists and engineers want open systems in the Unix or Macintosh style. One thing a national super computer centre can do is provide a focus for computer manufacturers to develop the sort of systems scientists and engineers want.'

Professor Smarr also exploded the myth about US superiority in super computers. He told the conference only 15 per cent of the 500 top US corporations had a super computer; none had a Cray. The reason was that between 1970 and 1985, the US government did not support advanced computing in American universities.

'This meant that for 15 years US companies hired no one who knew about super computing. While you say the US is ahead of other countries, Japan, for instance, in fact, I think we are dead even. It is only since 1985 that US universities have got into super computing.

'The one area where we did preserve some super computing expertise was the National Nuclear Weapons Labs. That expertise has now gone into the civilian economy. At present only 150 US universities have about 800 super computer projects involving 2000 scientists. This has only happened in the last two years.'

Turning to software, Professor Smarr told the conference that scientists want super computers with easy to use interfaces. The software should conform to the desktop environment. One new approach was called visualisation, allowing scientists to see their results in graphic form.

'We have software which uses the eye/brain system rather than simply the analytical brain,' Smarr pointed out. 'The software allows scientists to represent graphically on screen in colour with three dimensions anything that might occur in nature.'

Smarr thinks that the computer was the greatest change in scientific technology since the printing press. 'Computers are breaking down academic barriers and bringing researchers from many different disciplines together,' he said.

The other benefit of a national super computer centre would be in attracting super intelligent scientists and engineers.

'That's what will change Australia,' Smarr added.

## Telecom charges

Rumours about time charging for local calls have started again, following release of a discussion paper from Australian National University economist, Dr Robert Albon. Time charging stories circulated last year with initial support from the government. However, the issue then faded following strong opposition from many business and community groups.

*The AIIA has always said that software tax seriously handicapped computer development in Australia.*

Albon's discussion paper suggests timed calls are inevitable. This is particularly likely when the ISDN, or Integrated Services Digital Network, becomes widely used. Telecom originally dropped the timed call idea when it discovered the costs of administration were as great as the extra money generated. However, Albon's paper questions Telecom's calculations – he estimates a 22 per cent increase in profit from time charging.

Albon's plan is to charge 16c per four minutes between 9.00 am and 6.00 pm. After 6.00, the rate would be 16c per six minutes and after 10.00 pm the rate would be 16c per 30 minutes. On Sundays the rate would drop to 16c an hour. With high weekday charges, the plan is obviously aimed at business fax and computer links.

Dr Albon claims that timed local calls would fit in with the government's policy of deregulating the telecommunications industry, although Telecom and OTC. still have network monopolies. Turning the telecommunications industry over to private operators is Dr Albon's preferred option.

Telecom's attitude to charging for calls is backward when compared with countries such as New Zealand and the US where local calls are free. Telecom's problem seems to be in deciding exactly what business it is in. For instance phone installation costs and call charges discourage phone use even now. Telecom has the same problem as Kodak, Polaroid and Sony had some years ago. Once these three companies realised the market was largely in software, not hardware, their sales took off.

Telecom should be trying to put as many phones into Australian homes and offices as it can at the lowest possible price. As a nation we are not big phone users because many of us regard the telephone as an expensive necessity.

## Software tax back-down

The Federal Treasurer, Paul Keating, recently announced that software sales tax was being scrapped. The Australian Information Industry (AIIA) has been trying since 1986 to have the tax removed. The AIIA has always said that software tax seriously handicapped computer development in Australia.

Another reason for dropping the tax may be because the legislation had too many loopholes. Sales tax remains on hardware.

AIIA's executive director, Bob Mounic said removing the software tax was good news for the computer industry. He added the AIIA was grateful for support from Senator Button, the Minister for Industry, Technology and Commerce – Button's department had helped to get a speedy decision on the sales tax problem from the tax department.

## Gaol for computer criminals

A legal committee has recommended harsher penalties for all types of computer crime. The committee headed by Sir Harry Gibbs, retired Chief Justice of the High Court, said in its report that a new range of computer offences should be listed. These include obtaining access to data from a federal government computer without permission; destroying, altering or erasing data in a federal computer; interfering with the lawful use of a federal computer and committing the same offences through a Telecom line to any private computer.

The committee recommends that the maximum penalty be increased to ten years gaol or a $48,000 fine. The committee said it believed the new penalties would deal specifically with computer hacking. Hacking is not well covered in state or federal laws at present.

Most unauthorised access to computers now was by employees who had some level of authority. They were usually illegally exceeding their permitted operating level, the committee concluded. □


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HOWARD A. KARTEN

# AMERICAN GRAFFITI

ONE OF THE things I've often observed about people who are basically favorably disposed to technology is that they're usually curious. They often like to play with technology, and they can usually spot a technotoy right off. I call it the 'Hey-that's-neat' reaction. 'Hey, Zeke, lookit this whatzit.' 'Hey-that's-neat, what is it?' Even before he knows just what he's looking at, Zeke will understand that it's a 'technotoy', something that bears closer investigation.

Typically, Zeke will start by putting the new technotoy through some of its paces. Eventually, he'll start doing something fancy, or offbeat, or simply elegant. (This, of course, is what hacking really is – playing with something in a sophisticated way, wringing more and more out of it.) Maybe eventually he'll stumble onto a way to make a buck off it. And, ultimately, the newness will wear off, and 'Gee-whiz' is replaced by a bored yawn and a closer look at a new toy. This seems especially true for anyone who encounters technology at a comparatively early age. A key thing is that the whatzit has to be inexpensive enough in the first place to make it possible to play.

You can see at least some of this happening now with laser printers, and with AI. For a long time, you needed a mainframe and sophisticated software to do anything even faintly complex with AI; and even then, so many AI projects one heard about were something less than earth-shaking. I remember one AI professional meeting in which a graduate student described his AI project. It would ponder a list of the food ingredients you had on hand and your own preferences, and generate a list of possible Chinese recipes to cook. I knew AI still had a long way to go when he proudly displayed a sample output: a recipe for sardine chow mein, with raisins.

(Okay, I understand about crawling-before-walking, but why is it that AI folks persist in showing off these barely-formed efforts? Some day, I'll write a column about slow-wittedness in advertising dumb things.)

Today, several very affordable PC AI 'shells' on the market will speed you along in constructing your own expert system. The shells are just that – you have to supply the knowledge base, of course – but at least they're a tool to get people started. I think they'll finally start producing some real results very soon. One of my friends, for example, is thinking about commercialising a small expert system that will help you decide what to plant in your garden, based on how much sun you have, eating preferences, and so on. This expert system arose from a class project, but in a small way, maybe it's representative of what some of these expert shells can do.

Another possibility: given the relationship between younger folks and cars – fondness for tinkering, breakdowns produced by the interaction of tight budgets and older cars – I expect any day to see some kind of expert system that diagnoses mechanical problems. Here in the US, there's a nationally-broadcast radio program about car ills hosted by The Tappet Brothers, Tom and Ray. The brothers use their literally encyclopedic knowledge of cars, repair prices, and other trivia to help callers-in understand the problems their cars may be experiencing. There's probably no reason information such as theirs could not be fit into one of today's shells and sold for a reasonable price.

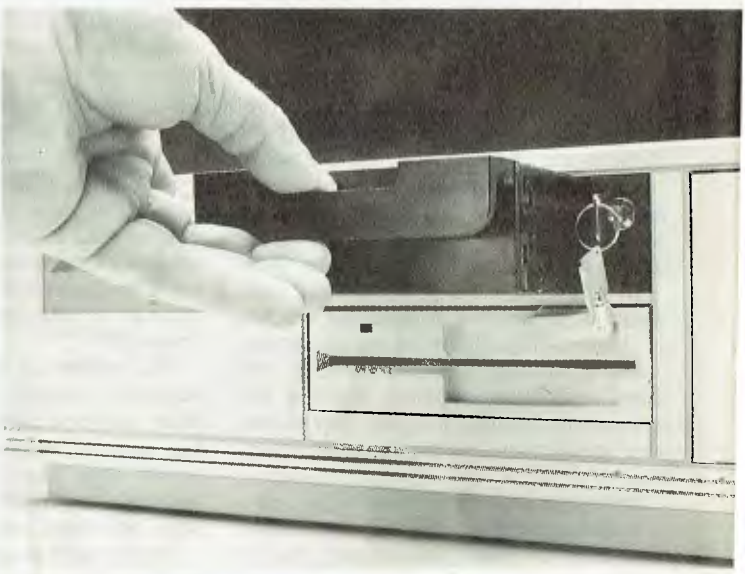
The incredible range of software and hardware available today (and its prices!!) was undreamt of just a few years ago; I suspect this will be the situation with AI a few years from now – we'll be stunned at the commonplace software that today we literally have difficulty even conceiving!

## Human behaviour

I suspect, too, that one of the most important benefits AI ubiquity will bring will be what we learn about human behavior. AI and the knowledge engineering process are intimately connected with human behavior and cognition. There are already strong links between the AI, cognitive science, and psychology communities – there have to be, because in order to simulate human behavior on computers, you have to keep asking questions about human behavior, and you have to get some repeatable or reproducible answers. Quite a number of artificial intelligencers are psychologists or have strong connections to that discipline, and within a few years, some AI specialties or skills will be recognised as important research tools into human behavior.

A similar phenomenon is being played out with that latest toy of the PC era, the laser printer. Once upon a time, lasers were exotic stuff, reserved for hi-tech labs, engineers with slightly crazed looks to them, and James Bond films. Just a few years ago, buying a laser printer meant plunking down approximately enough to outfit a revolutionary army in a third world country.

I suspect that when some future PC historian writes a comprehensive history of the era, we'll find that a lot of today's software, and concepts, has its origin in tinkering with nascent technologies. I'll bet that desktop publishing, for example, has its origin with some hacker tinkering with a laser printer in the early days (laser printers, too, have been around for a long time on main-



*Technotoys are particularly popular with those who encounter technology at a young age – the key is that they must be inexpensive enough to play with.*

frames – and have been hideously expensive) and realizing 'Hmm ... I bet it would be an easy thing to set up a routine to put a line down the page here, and another routine to change type styles or sizes in the middle of a document, and ... Hey-that's-neat!'

The new printers also brought a new sophistication to playing with them. In the old days, we did essentially goofy stuff with printers. For example, printers then were big and noisy, and had mechanically-operated covers that could be raised or lowered with computer commands. One of the mindless tricks we did was to make the cover go up and down a few times via a program. Or you could use the printer to create halftone pictures – different characters, or character combinations, could simulate the dots of a newspaper halftone.

Pictures of Miss January and her friends were quite popular back then, of course; now, laser printers can provide far more polished renditions.

By now, it should be clear that I think playing with AI shells, laser printers – all this computerstuff – is a wonderful thing. If you get the chance to play with any kind of advanced stuff, by all means, grab the opportunity. Aside from the inherent fun of it, and keeping you off the streets at night, who knows what kind of marketable product you might come up with.

## Important stuff!

All of this reminds me of something from my childhood. Around the time of the first Sputnik, my adolescent colleagues and I in year 7 were concerned with much more important matters than memorizing history dates and the names of rivers. Like rockets. And electronics. And girls.

Our preoccupation with this important stuff often resulted in punishment assignments from one of our teachers. Often, this consisted of producing 5 or 10 or 20 copies of documents or passages of varying lengths and difficulties, given in the belief that repeated copying of a passage with appropriate moral and behavioral lessons would somehow breed Worthy and Noble behavior in us, as though through osmosis. Mrs Towger – Towger the Ogre – was inventive, so you never knew just what you'd get for misbehaving.

Towger the Ogre allowed us to type these copies, since she believed keyboard skills would be important to us all when we went off to college. Eventually, this led me to a brilliant idea.

I'd already started thinking about how computers and technology might make our lives easier. About 10 of us incorrigibles got together one weekend, and each of us typed about three of Mrs Towger's favourite passages to be copied, using different typewriters. Thereafter, when we incurred Mrs Towger's wrath, what we did, of course, was to make first-quality photocopies from the originals. Given her deteriorating eyesight, it was a while before she began to notice a similarity in the punishment copies we turned in, but by then, we'd settled down.

If we'd had laser printers and some AI software, we could have used it to predict what kind of misbehavior would produce what kind of punishment assignment and how many copies of which passage, and then produced them on the laser printer in a different type face. Think of what a hell of a use of AI and laser printers *that* would have been. I bet even Mrs Towger would have been proud of us.

Of course, even if we'd had all this stuff then, we'd probably not have been smart enough to do what the kids do today – get out there and earn zillions with it. Sometimes, no matter how much artificial intelligence you have, it's hard to get away from real stupidity. □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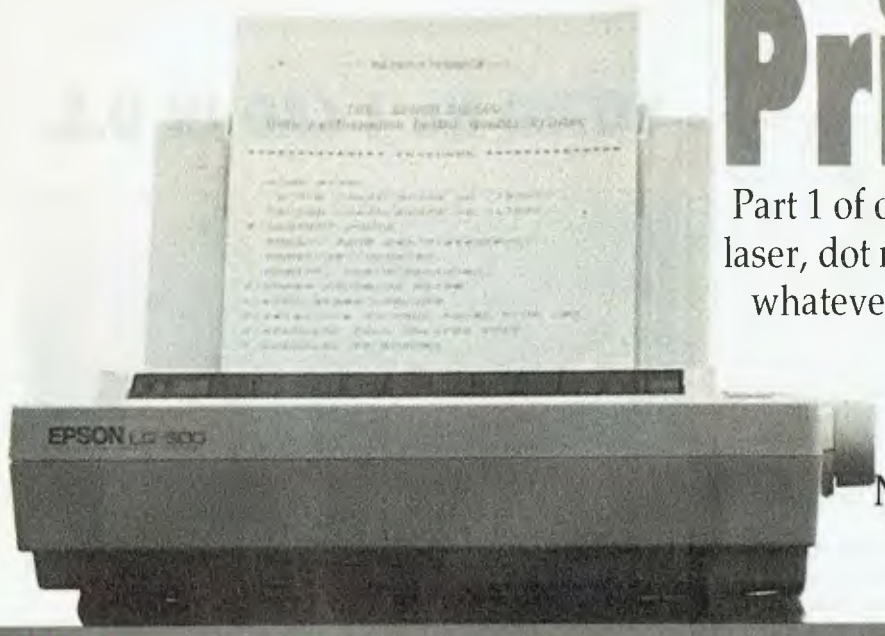



# Print it!

Part 1 of our annual Printer Feature covers laser, dot matrix and daisy wheel printers – whatever your requirements, from draft quality listings to letter quality reports, our survey will help you find a printer that suits. Next Month, for those who need high quality colour, we'll cover inkjets and thermal printers.

## – with a laser, dot matrix or daisy wheel

TWENTY-FOUR pin dot matrix printers are now dominating the new printer category. Those available range from Seikosha's SL80, a basic machine priced under $700, to Fujitsu's 450 cps DL5600 (around $4800). In fact, dot matrix machines are still the cost effective solution to most printer requirements, from the humble 9-pin for home and basic office use to high volume, 24-pin workhorses suitable for use with data processing.

If your printer needs to be able to produce spreadsheets, then you'll most likely want a wide carriage (132 column) model; even if a wide carriage model isn't listed, ask the distributor – we've tried to make the survey as up-to-date as possible, but new models are being released as fast as you can say 'cps'.

Last year, Epson introduced paper parking, which made the switch from continuous feed stationery to single sheets much quicker and less frustrating. Most new models from other manufacturers have now incorporated it – if your printing needs call for a few high quality letters between long continuous feed runs, or vice versa, this is a feature worth looking for.

While dot matrix machines continue to be the big sellers, laser printers are ready to close the gap. While the cheapest in our survey is priced at $3000, shopping around is always a good idea – 'name' brand lasers are often advertised for much less. If you are considering a laser printer for desktop publishing, you are no longer restricted to PostScript printers for high quality output and font manipulation: President Computers, (02) 476 2700, market SoftScrybe, and Software Express, (03) 663 6580, have Digifont; both of these products give almost any laser printer the practical power of PostScript.

If you are buying a new printer to use with 'old' software, ensure that the software has a driver for one of the printer's emulations (and don't take anyone's word for it: if necessary take the software and a sample file with you and ask to see it printed out from the *software* before agreeing to take the machine – even better, ask to have the printer demonstrated with your computer, since few things are more frustrating than bringing home a new printer and discovering that either your computer refuses to be introduced or that a gender-bender or other 'bit' is required).

It may be tempting to pay extra money for a machine with more resident fonts and emulations than another, but few offices actually use more than 2 or 3 fonts (plus italic, bold and other variants) – so consider if the expense is justified. However, if you need (or seriously anticipate the need for) more fonts than a printer under consideration has, look at another printer – optional font cartridges can be expensive 'add-ons' (if they are available: many manufacturers have an extensive catalog of cartridges and other options, but how many of these are available in Australia, even with an 8-week wait, is another story).

In fact, with any computer equipment we advise 'to buy more than you need today' – after-market add-ons are expensive; you can save a great deal of money by getting everything you need in one bundle, whether it's as standard features or a selection of options.

One final warning: beware of printers with an LCD display that gives cryptic codes rather than plain English – if you are trying to reset default font styles, or change other parameters, or figure out what ERR@43 might mean, you could spend a lot of time searching the manual (if you can find it)!

***Note:** Print speed, decibel ratings and other specifications are manufacturer's ratings; these should be taken as a guide only. Distributor's phone numbers are included with each printer, in case your local dealer doesn't handle a model you are interested in.*

## Laser Printers

### Six Pages Per Minute

The range of laser printers increases each year, and inevitably, the prices gradually fall. From the present range, the ones that represent the best value are the Brother HL-8e 8 page per minute printer with plenty of fonts and emulations as standard, and Texas Instruments' Omnilaser 2106 PostScript printer (reviewed this issue). All of the laser printers have a maximum resolution of 300 dots per inch, and most of them are clones using either a Canon or Ricoh engine (the practical difference between the two is that the Ricoh-based machines tend to be a bit smaller).

***Informate LP6000***
***CC Data Computers,***
***(02) 281 5122*** ***$3000***

This laser printer is driven via a video interface, which provides faster data transfer rates than the usual parallel or serial interfaces. It requires a controller card with one megabyte of RAM to be installed inside the host computer. The Informate LP6000 is provided with all FX-105 compatible fonts and over 230 other fonts on disks that are compatible with HP LaserJet Plus cartridges and soft fonts.

***Epson GQ-3500***
***Epson Australia,***
***(02) 452 0666*** ***$3360***

The GQ-3500 is a 6 page per minute page printer with a parallel interface, a 150 page input tray, and 0.5 megabytes of RAM which can be upgraded to 2Mb. It has three internal typefaces, each with enhancements such as double width, double height, superscript and subscript. Resident emulations are LQ-1500, line printer mode and page printer mode. Additional fonts and emulations (Diablo and HP LaserJet Plus) can be accessed with the use of plug in cards. Also optional is a 250 sheet input tray.

***Commodore LP 806***
***Commodore Business Machines,***
***(02) 427 4888*** ***$3999***
This printer has 15 built in fonts, auto and manual feed, and a standard 113K of memory. An MS DOS diskette is supplied containing five extra printer emulations, extra fonts, and a laser control program to specify number of copies, justification, layout and graphics. There is an optional memory upgrade to a total of 497K. It is compatible with Commodore Amiga and PC compatible computers.

***OKI Laserline LL6E***
***IPL Datron,***
***(02) 698 8211*** ***$4194***
6 pages per minute print speed, three type faces with enhancements, and HP LaserJet II emulation. Options include extra RAM to 2.5Mb, plug in font cartridges, a 3-port serial/parallel interface, and a 550 page auto load paper input tray.

***Tandy LP 1000***
***Intertan Australia,***
***(02) 675 1222*** ***$4299***
A 6 page per minute laser printer with 1.5 Mb of memory. Front panel controls allow selection of fonts and type styles. A parallel port is standard, and it emulates the IBM proprinter, Tandy 2110 and HP LaserJet Plus. It has four standard fonts, with extra downloadable fonts as options.

***Ricoh PC 6000***
***Mitsui Computer,***
***(02) 452 0452*** ***$3995***

In its basic form, a 6 page per minute laser printer with 1Mb of memory. It has both serial and parallel interfaces and it has Diablo 630 emulation as standard. Optional emulations include HP LaserJet Plus, IBM ProPrinter and Epson FX-80. Memory can be upgraded to 5.5Mb. The input tray takes 150 sheets and it can feed letterheads, envelopes, labels and transparencies. A version with a Mitsui controller costs $5559, and a PostScript upgrade, available soon, costs $2500. Alternatively, a Ricoh PC 6000PS, which has PostScript installed, costs $7995.

***Sharp JX-9300***
***MPA International,***
***(03) 894 1500*** ***$4150***
Six pages per minute and five standard emulations including Epson FX-80, IBM ProPrinter, HP LaserJet Plus, Diablo 630 are features of this printer. There are two resident fonts, and additional fonts are available via downloading and optional font cards. The JX-9300 has both parallel and serial interfaces. Options include a 1.5Mb expansion memory.

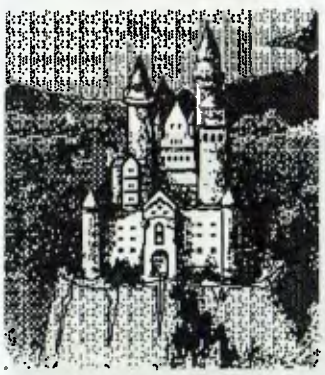
***Omnilaser 2106***
***Texas Instruments,***
***(02) 887 1122*** ***$8757***
This printer has features that make it almost ideal for a single user desktop publishing workstation. With multiple emulations and interfaces, the 2106 is suited to a wide range of host computers and software (see the review this issue). It has the PostScript language resident, 35 PostScript typefaces and the ability to print both envelopes and transparencies. It has a 3000 prints per month duty cycle, 2Mb RAM, parallel, RS-232-C, RS-442 serial and Apple Talk interfaces, and emulations include Diablo 630, HP LaserJet Plus, TI 855 DP/WP and HP 7475A Plotter (HP-GL language). Extra fonts can be downloaded from the host computer or via font cartridges.

## Eight Pages per Minute

***LaserPro Series II Express***
***Kenelec,***
***(03) 560 1011*** ***$3695***
This printer has as standard 1 Mb RAM, parallel and serial interfaces and 27 fonts. It emulates HP LaserJet Plus, IBM ProPrinter, Epson FX-80, Diablo 630, Qume Sprint 11, NEC Spinwriter and lineprinter. It has one font cartridge slot, fully compatible with HP font cartridges, and you can put as many fonts on a page as memory allows.

***LaserJet Series II***
***Hewlett Packard Australia,***
***(03) 895 2895*** ***$4680***
An eight page per minute industry standard printer, with HP's PCL printer language built in. It is compatible with the same software, font cartridges, and soft fonts that work with the original LaserJet and LaserJet Plus printers. It has a parallel interface and an RS-232C/RS-422A serial interface. There is a 16 character LCD status readout on the control panel, and 512K of memory is standard. Paper handling is via a 200 page input tray, and a 100 sheet capacity output tray. The printer handles envelopes using the manual feed tray, or an envelope feed accessory. Optional extras include memory expansion up to 4.5 Mb and there are many font cartridges available. A new dual bin version (LaserJet IID) has been released, which doubles the paper capacity to 400 sheets, and is equipped with two paper trays, duplex (two sided) printing and it also has 24 fonts. The IID sells for $8880, taxed.

***Brother HL-8e***
***Brother Industries,***
***(02) 887 4344*** ***$5550***



An enhanced eight page per minute Canon engined printer with plenty of features including five resident type styles, which can provide over 30 resident fonts. Emulations include HP LaserJet Plus, HPGL (Hewlett Packard Graphics Language) for plotter emulation, Diablo 630, Brother Twinriter, IBM ProPrinter XL and Epson FX-80. One megabyte is standard, but this can be expanded to 3. The HL-8e has both parallel and serial interfaces, and options include font cartridges.

***LaserPro Gold Express***
***Kenelec,***
***(03) 560 1011*** ***$5785***

A flexible eight page per minute printer that is a plotter as well, so that it is suitable for a range of applications from word processing to CAD/CAM to printing bar codes. Emulations include HP Graphics Language (7475A Plotter), HP LaserJet Plus, Epson FX-80, Diablo 630, IBM ProPrinter, Qume Sprint 11, NEC Spinwriter 3550 and line printer. Thirty-three fonts are standard, and a slot accepts HP font cartridges. Custom fonts can be generated, graphics are supported, and there is 2.5 Mb RAM standard, which can be upgraded to 4.5 Mb.

***Apple LaserWriter IISC***
***Apple Australia,***
***(02) 452 8000 $5995***

An entry level, single user model for the Macintosh. – it produces eight pages per minute using a Canon SX second generation print engine. This model has a SCSI (Small Computer Systems Interface) connector, which allows high speed data transfer for fast printing. A PostScript model, the LaserWriter IINT, is available for $9495, and it can be networked. At the top of the range is the LaserWriter IINTX, for $12995, with a 68020 processor.

***Ricoh LP4081M***
***Mitsui Computer,***
***(02) 452 0452 $9250***

With a rated duty cycle of 10,000 pages a month, this printer is built to last. It has Diablo 630 emulation as standard, with other emulations, such as HP LaserJet Plus, Epson FX80 and IBM ProPrinter available as options in cartridge form, or they can be downloaded from the host computer. It has 1.5 Mb of memory which can be upgraded to to 6 Mb, serial and parallel interfaces, a 250 sheet input tray, and it can feed letterheads, labels and transparencies, but not envelopes. A PostScript upgrade will soon be available.

***Omnilaser 2108***
***Texas Instruments,***
***(02) 887 1122 $10057***

This printer has many of the features of the 2106, with built in PostScript, 35 resident PostScript typefaces, a M68000 processor, and a host of emulations and interfaces. But it is a more rugged version, rated at 10,000 prints per month duty cycle with a 250 sheet input bin. It also has two font cartridge slots, four non-PostScript resident fonts, and 2 Mb RAM.

## Ten and Twelve Pages per Minute

***Panasonic KX-P4450***
***National Panasonic (Australia),***
***(02) 886 0224 $4995***

This printer is rated at eleven pages per minute. It's wide selection of fonts and emulations include HP LaserJet Plus, Epson FX-286, IBM ProPrinter, and Diablo 630. It has 512K of RAM, both parallel and serial interfaces, a duty cycle of 5000 pages per month, and two paper input cassettes, holding 250 sheets each. Options include 1 Mb expansion RAM and font cards.

***Mannesman Tally MT910***
***MPA,***
***(03) 894 1500 $7150***

A ten page per minute printer with 512K of memory, two resident fonts, a 16 character LCD display on the front panel and dual paper feed cassettes. Emulations include Epson FX, IBM ProPrinter, HP LaserJet, Qume and Diablo. There are three modular interfaces: Dataproducts parallel, centronics parallel, and serial.

***Dataproducts LZR 1230***
***Dataproducts,***
***(02) 451 3233 $8340***

The LZR 1230 outputs at a fast 12 pages per minute. It has three concurrent interfaces (one parallel and two serial), which means it can be shared by three simultaneous systems; up to 10 work stations can be supported in a network. A 16 button keypad and a 16 character status LCD allow menu operations from the front panel. The LZR 1200 print engine is the same as that found in the 1260 (which also has PostScript; the 1230 can be upgraded to the 1260). The 1230 emulates Diablo 630, Epson FX 80 and HP LaserJet Plus). It has six resident fonts in different sizes and proportional.

***Toshiba PageLaser12***
***Toshiba,***
***(02) 887 3322 $7524***

A heavy duty, 12 page per minute printer with up to 25,000 page per month duty cycle. A single input bin holds 250 sheets, and up to 750 sheets can be handled with an optional dual bin holder. Standard emulations include HP LaserJet 500 Plus, Diablo 630, Toshiba P351/Qume Sprint 11, IBM Graphics Printer, Toshiba Graphics Draw command set. Standard memory is 512K expandable to 2 Mb. One parallel and one serial interface is standard. Options include font cartridges, download fonts, envelope feeder, and an output jogger/collator.

***Fujitsu RX7200***
***Fujitsu Australia,***
***(02) 410 4555 $TBA***

A 12 page per minute, second generation laser printer with 640K of memory as standard (expandable to 4.6 Mb). A 250 sheet internal paper cassette feeds paper, from B5 to legal size, through the printer to the top-mounted stacker where they are stacked face down in the proper order. A built in manual feed slot can handle smaller, thicker papers and transparencies. The RX7200 has three standard fonts, and HP LaserJet plus, Diablo 630, Epson FX and IBM ProPrinter emulations. Optional cards can be used for additional emulations and fonts.

***Dataproducts LZR 1260***
***Dataproducts,***
***(02) 451 3233 $15,540***

With this new versatile laser printer, standard equipment includes Postscript, 35 resident fonts (11 typefaces with enhancements), HP LaserJet Plus emulation, RS-232 serial, parallel, and AppleTalk interfaces. A 68020-based Postscript controller enables the LZR 1260 to have a throughput of 12 pages per minute for all but the most complex pages. It is suitable for multi-user networks and can support up to 10 work stations. Options include a multi-cassette paper feeder.

## Fifteen to Seventeen Pages per Minute

***LaserPro 1510R***
***Kenelec,***
***(03) 560 1011 $11,950***

A 15 page per minute printer with 27 resident fonts, a 25,000 page per month duty cycle, and emulations that include HP LaserJet Plus, Epson FX-80, Diablo 630, IBM ProPrinter, NEC Spinwriter, Qume Sprint 11, ANSI 3.64 and line printer. Paper feed is from two input trays that hold 250 sheets each.

***Ricoh LP 4150M***
***Mitsui Computer,***
***(02) 452 0452 $12,434***

This laser will print the first page in less than 12 seconds and 15 pages per minute after that. It has dual paper feed cassettes that can hold 250 sheets each, and a 500 sheet output tray. The front panel includes a 16 character LCD display, and with a 25,000 page per month duty cycle, it is ideal for heavy duty office use.

***Omnilaser 2115***
***Texas Instruments,***
***(02) 887 1122 $14,407***

Another heavy duty 15 page per minute page printer with the PostScript language on board. A duty cycle of 25,000 pages per month, two 250 sheet input bins, a 500 sheet output bin, four onboard fonts, two font cartridge slots, and interfaces and emulations as for the Omnilaser 2106. A non-PostScript version, the 2015 is also available.

***Fujitsu RX 7300E***
***Fujitsu Australia,***
***(02) 410 4555 $TBA***

Fujitsu has designed this high-end laser for use with multi-user networks. It outputs at a fast 17 pages per minute, and has a duty cycle of 25,000 sheets per month. A large capacity input hopper is available which can hold 1000 sheets, or 250 page cassettes can be used. Full page graphics printing is possible since the printer has 2.5 Mb of RAM standard. Six emulations and three fonts are standard. Noise level is less than 52 dBA.

## LED Page Printers

***Silentwriter LC-850/815***
***NEC Information Systems,***
***(02) 438 3544 $5988***

Quiet (52 dBA) operation is the hallmark of this new type of printer using LEDs instead of a laser. This machine gives 8 pages per minute output, parallel and serial interfaces, four resident fonts, and a choice of emulations

# Heavy duty printing!

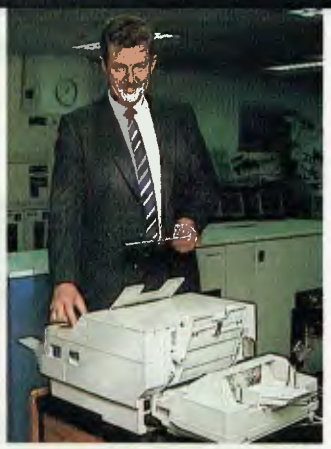
THE CONRAD International on the Queensland Gold Coast is Australia's largest hotel with 622 guest rooms and suites. Twenty-four hour entertainment is provided in Jupiters Casino, restaurants and function rooms. It also includes the Pavilion Convention Centre, which can provide maximum seating of 2300.

The Hotel and Casino's MIS Manager Peter Thomson said, 'We chose the Toshiba PageLaser 12 because it suited all of our requirements, and in the six months it's been operating.

'As we do not believe in windowed envelopes, it was necessary for the printer to be able to print names and addresses onto envelopes as well – Fortunes Disco is a good example. We send out regular mailers informing previous guests of coming events which may interest them.'

The largest job for the PageLaser 12 so far has come from the Casino where every three months a special mailer of tens of thousands of letters and envelopes need to be printed. 'This mailing list is continually growing because all winners of $50 or more at one time on the video games or live Keno have the chance of winning a luxury car at the end of each month, just by placing their name and address on a special card and placing it in a barrel. This month, we will be printing a mailer of 13,000 letters and envelopes in one day,' explained Thomson.

The PageLaser is linked to the complex's IBM System 38 through a special interface. The System 38 assists in most departments including all secretarial services, Keno and Video Departments and Fortunes Disco. 'It not only performs the function of printing major mailing lists but also the everyday word processing, and spreadsheet documents required by the MIS Department and Hotel complex,' Thomson continued.



*'Not only is the PageLaser 12 expected to do the job of a small printing press, it is expected to do so non-stop. Previously we used a letter quality printer which could take up to two weeks to to finish the job, with many many breakdowns in the middle. That printer was good, but the Toshiba is just brilliant!' –* ***MIS Manager for the Conrad International Hotel and Jupiters Casino, Peter Thomson, shown with the PageLaser 12.***

'We have also printed restaurant menus on the PageLaser 12. The printer has also performed well on all grades of paper from smooth to granulated. We have found the PageLaser extremely reliable and a true workhorse considering the amount of material we are passing through it.'

This is a heavy duty printer designed to handle up to 250,000 pages per month. It has an output speed rated at 12 pages per minute, and a duty cycle of 600,000 pages; extendable to 1.2 million pages with a service kit. Paper handling is via a single 250 sheet feeder, with an optional dual-bin feeder for an extra 500 sheets. Other options include an envelope feeder and an output collator. It has multiple emulations including HP LaserJet, 512Kb of RAM, extendible to 2 megabyte, one parallel and one serial interface, and the ability to accept font cartridges three at a time and downloaded fonts.

*The MIS department of Australia's largest hotel, the Conrad International, and Jupiters Casino needed a heavy duty printer capable of 250,000 pages per month and able to handle envelopes.*

(Spinwriter, Diablo or ProPrinter). It will print in portrait or landscape, and extra fonts are available in cartridges or they can be downloaded into the printer's RAM. These models can be upgraded to the mid range LC-860/866, and there is a PostScript version, the LC-890, with Appletalk/RS-422 interface, 35 fonts and 3 Mb RAM for $10428 taxed.

***Fujitsu RX7100***
***Fujitsu Australia,***
***(02) 410 4555*** ***$TBA***
A five page per minute printer with a small footprint, two 150-sheet paper hoppers, a manual feed slot, two resident fonts and quiet operation (less than 53 dBA). HP LaserJet Plus emulation is standard, and there are both serial and parallel interfaces. It has 640K of RAM expandable to 4.6 Mb and optional cards that can provide extra fonts and emulations.

## Dot Matrix Printers

### 9-Pin Printers

***Brother M1109***
***Brother Industries,***
***(02) 887 4344*** ***$492***
With a maximum speed of 100 cps in draft and 25 cps in NLQ,

# ExpressWriters for the Mobile

TOSHIBA recently released two new printers, designed for people on the move. The ExpressWriter 301 and 311 are both 24-in printers, capable of turning out letter quality printing.

*The ExpressWriter 301 provides portable printing for those on the move. Built in NiCad batteries supply power for one hour of printing before they have to be recharged.*

*The ExpressWriter 311 has a compartment for storing the power cord, and a carry handle. It can accept font cards, deluded fonts and RAM can be boosted to 48Kb.*

The ExpressWriter 301 is a true portable, with power supplied from a built-in battery, or from connection to a mains outlet. It is also a quiet printer, at 47 dBA, and it weighs just 1.8 kg. It is quite small, measuring 7.6 cm high, 31 wide and 13.9 deep. Toshiba are aiming this product at mobile professionals and executives in the areas such as sales, insurance, medical, investigation, and real estate: in fact, at every owner of a portable computer is a likely customer.

The NiCad battery can be recharged, and it will last for about one hour of printer use. The 301 has a Centronics parallel interface, Toshiba/Qume P321, Epson LQ emulations, four fonts, and the IBM extended character set.

The 301 prints at a speed of 60 cps in draft mode, which is not particularly fast, but for a battery powered 24-pin printer, you have to make some sacrifices. The ExpressWriter 311, on the other hand, prints at 180 cps and 60 cps in letter quality mode. The 311 is mains powered, but is still portable, with a special compartment built in for storing the power cord, and a carry handle.

Resident emulations are Toshiba/Qume, Epson LQ and IBM Proprinter. It has a parallel interface (serial optional), tractor and friction feed, five fonts, 360 *x* 360 dpi graphics, the extended IBM character set, and a rated sound level of 56 dBA, or 53 dBA in quiet mode. Optional extras include a RAM card to boost RAM to 48Kb, font cards, downloadable fonts, and a carry case with shoulder strap. It weighs 4.9 Kg and measures 12 cm high by 40 wide and 31.7 deep.

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this 80 column printer is one of the least expensive. It has Epson FX-80 and IBM Graphics printer emulation, serial or parallel interface, and Prestige is the standard font. Options include a pin feed unit and a roll paper holder.

***Tandy DMP 107***
***Intertan Australia,***
***(02) 675 1222*** ***$499***
A 9-pin printer with Tandy and IBM operating modes. It is suitable for data processing, word processing (in Tandy mode only), and graphics. It can print at 100 cps maximum speed, or 20 cps in near letter quality (NLQ) mode. Print options include proportional spacing, italics, super/subscript and microfont. It has a noise level of 55 dB; a parallel port and a Tandy 4-pin serial port.

***Commodore MPS 1250***
***Commodore Business Machines,***
***(02) 427 4888*** ***$525***
A bi-directional 9-pin print head produces 120 cps in draft, and 24 cps in NLQ (near letter quality). This printer is suitable for Commodore users who wish to upgrade from the Commodore 64 or 128 to IBM PC compatibles or to the Amiga, as the dual Parallel/Commodore Serial (ports accommodate each of these computers). It has a tractor feed for fanfold paper and friction feed for single sheets. User definable print types and styles include Elite, Pica, Expanded, Compressed, Emphasized, Doublestrike, Italics and more.

***OKI Microline ML182/183***
***IPL Datron,***
***(02) 698 8211*** ***$526/$958***
Respectively, 80 and 132 column versions at the low end of OKI's range of printers. They have a bi-directional print head, and a

speed of 120 cps utility printing, 20 cps NLQ. Graphics resolution is 240 x 144 dots per inch. Parallel or serial interface.

***Epson LX-800***
***Epson Australia,***
***(02) 452 0666 $550***

An economical 9-pin printer from Epson, with a 180 cps draft printing speed, or 25 cps in NLQ. It has two NLQ fonts, the IBM graphics character set, a built in tractor feed unit, a parallel interface, and a Selectype control panel. Options include a serial interface.

***Tandy DMP 132***
***Intertan Australia,***
***(02) 675 1222 $599***

This-9 pin printer has three operating modes: data processing, word processing and graphics. It has Tandy and IBM character sets, a noise level of 58 dB, 120 cps maximum speed, tractor feed and friction feed. Print options include italics, proportional spacing, 'correspondence quality' super/subscript, and microfont. A parallel port and a Tandy serial port are standard.

***Commodore MPS 1280***
***Commodore Business Machines,***
***(02) 427 4888 $899***

A wide carriage bi-directional 9-pin dot matrix, with 120 cps in draft and 20 cps in NLQ mode. It has all points addressable graphics and friction or tractor feed, with the tractor feed from the bottom or back of the printer. It is suitable for all printing applications, especially for printing out spreadsheets. For Commodore Amiga and PC compatible computers.

***OKI Microline ML320/ML321***
***IPL Datron,***
***(02) 698 8211 $958/$1198***

Respectively, 80 and 136 column printers, with a maximum speed of 300 cps; 63 cps NLQ. Other features include a bi-directional print head, and 288 x 144 dpi graphics. These printers have Epson FX and IBM ProPrinter emulations and parallel or serial interfaces.

***Epson FX-850/1050***
***Epson Australia,***
***(02) 452 0666 $1000/$1225***

These are 80 and 136 column successors to the FX-800 and FX-1000 models. They have paper park, top of form memory, short tear off, paper thickness adjustment and a paper tensioning facility which allows printing on the top inch of the paper. They print at 264 cps in draft mode, and 45 cps in NLQ. Rated sound level is 65 dBA.

***Epson EX-800/1000***
***Epson Australia,***
***(02) 452 0666 $1057/$1280***

Narrow and wide carriage printers with a speed of 300 cps draft and 50 cps in NLQ mode. Centronics parallel and serial interfaces are standard, and there are two built in NLQ fonts. A colour kit can be added by the user.

***Fujitsu DX2300/2400***
***Fujitsu Australia,***
***(02) 410 4555 $1260/$1620***

These are 80 and 136 column versions of Fujitsu's 9-pin printer. They print up to 270 cps in draft mode. A user installable colour upgrade kit is available. Epson FX, IBM graphics printer and ProPrinter emulations. Parallel or serial port. NLQ Courier font with italics. It is possible to insert cut sheets without removing continuous forms. Noise level 55dBA.

***Seikosha MP-1350***
***Mitsui Computer,***
***(02) 452 0452 $1285***

This printer prints at 300 cps in draft mode, and 50 cps in NLQ. It has both parallel and serial ports, Epson FX and IBM Graphics printer emulation, It is an 80 column printer, and a 136 column printer is available (MP-5350). Options include a colour kit and a cut sheet feeder.

***Commodore MPS 2020***
***Commodore Business Machines,***
***(02) 427 4888 $1299***

Suitable for both Commodore Amiga and PC users, this printer has a print speed at 300 dps in Superdraft, and the ability to print in colour. It has a built in pin feed mechanism for continuous feed paper and it also prints on standard single sheet paper. It prints at 100 cps in NLQ mode and can handle bit image graphics. Options include a tractor feeder and a cut sheet feeder.

***Tandy DMP 440***
***Intertan Australia,***
***(02) 675 1222 $1499***

A wide carriage 9-pin printer, with a maximum print speed of 300 cps (50 cps in NLQ mode). It has three modes for for word processing, data processing and graphics, and it prints correspondence quality, condensed, super/subscripts, and italics. Parallel and Tandy serial ports.

***Epson DFX-5000***
***Epson Australia,***
***(02) 452 0666 $4485***

A 533 cps printer for high volume requirements. For business correspondence, the DFX-5000 has an NLQ mode that is rated at 80 cps. In addition, there is a dual paper path, allowing the use of two different kinds of fanfold paper at once. A button on the front panel selects front or rear paper feed, so you can fill out a form one minute, print a spreadsheet the next. A tear off button can be used for feeding the last page to the rail for tearing at the perforation, then it retracts the paper to a position for printing the next document. Both parallel and serial interfaces are provided and options include Twin-ax and Co-ax for IBM systems, or the IEEE-488 interface.

## 18-Pin Printers

***Mannesman Tally MT340***
***MPA,***
***(03) 894 1500 $4620***

A heavy duty printer with 600 cps draft and 120 cps NLQ output. The print head is circular and uses a ring magnet technology. It has a duty cycle of 13,000 pages a month and a noise level of 53 dBA. It is compatible with Epson FX-105, IBM Graphics and ProPrinter, and has a parallel interface, serial optional.

***Brother M4018***
***Brother Industries,***
***(02) 887 4344 $3252***

A high speed printer with 480 cps draft, 100 cps NLQ, and 67 cps letter quality printing. It can handle all types of word processing, data processing and graphics tasks in a high volume environment. It has paper parking, and paper can be fed through top, rear or bottom (optional) for multi-part forms up to six parts. The two resident fonts can be enhanced with an optional font card. The M4018 uses fabric or multistrike film ribbons, and colour ribbons are optional. Both parallel and serial interfaces are standard, with IBM ProPrinter and Epson FX emulations.

***Dataproducts 8070 PLUS***
***Dataproducts,***
***(02) 451 3233 $3870***

A ruggedly built printer designed for high volume output with 400 cps maximum output In draft mode, 300 cps correspondence quality printing, and 100 cps letter quality output. It has both a parallel and a serial port, 132 column print width, tractor feed, and auto cut sheet insertion from front, bottom, and rear. Standard emulations are IBM Graphics, IBM Colour, and Dataproducts P-Series. A colour version is also available.

***Seikosha SBP-10***
***Mitsui Computer,***
***(02) 452 0452 $6533***

The fastest printer on the block: 800 cps in draft mode, 400 cps in correspondence mode, and 200 cps in NLQ mode. This is a high volume, heavy duty printer with many features such as paper parking, a cut sheet feeder, bi-directional printing, a 32 character LCD readout on the front control panel; rear, bottom and front paper path feed; 136 column printing, and a bi-directional push/pull tractor. It has two resident fonts, extra optional font cartridges, parallel and serial interfaces, and Epson ESC/P and IBM ProPrinter emulation. An IBM Twin-ax version for operation in the IBM 34/36/38 environment, and a Coax interface for the IBM 3270 environment are available also.

## 24-Pin Printers

***Facit B1400***

***Elmeasco Instruments,***
***(02) 736 2888 $926***
A basic 24-pin printer with 135 cps draft printing, and 45 cps in letter quality. It emulates the IBM ProPrinter X24, and has a parallel interface. It has a simple control panel, and it is compact and quiet (50 dBA).

***Seikosha SL80***
***Mitsui Computer,***
***(02) 452 0452 $653***
An 80 column printer that has a maximum print speed of 135 cps in draft and 60 cps in letter quality mode. It has a pull tractor, a parallel interface, and Epson LQ1000 and IBM Graphics emulation. A 132 column version, slightly faster as well, costs $1642.

***Epson LQ-500***
***Epson Australia,***
***(02) 452 0666 $888***
A compact, economical 24-pin printer with a draft speed of 180 cps, and a LQ speed of 60 cps. Two resident LQ typefaces can be augmented with optional font cartridges. Print enhancements include outline and shadow printing. It has a pull tractor as standard that attaches to the top of the printer body. Noise level is rated at 62 dBA.

***Panasonic KX-P1124***
***National Panasonic (Australia),***
***(02) 886 0224 $899***
A newly released 24-pin model, with a carriage wide enough to accommodate an A4 page sideways for spreadsheet printing. It also has a push-pull tractor feed, paper park, a front feed path for printing on cards or stiff paper, a bottom feed path for use on a slotted table, and an optional cut sheet feeder. Margins, fonts and pitches can be adjusted from a front operation panel. Internal fonts include courier, prestige, bold proportional spaced, script, sans serif and two draft fonts.

***NEC P2200 Pinwriter***
***NEC Information Systems,***
***(02) 438 3544 $942***
A maximum print speed of 168 cps in draft, and 60 cps in letter quality mode with Epson LQ emulation. A single parallel interface with an optional serial kit and five pitch settings. Paper handling includes a push/pull tractor, tear off bar and a single sheet front feed slot. Noise level 57 dBA, or 54 dBA in quiet mode (selectable from the front panel).

***Brother M1224L***
***Brother Industries,***
***(02) 887 4344 $954***
A compact model with a clean cut design that can produce letter quality printing at 54 cps, and draft at 162 cps. It can handle both cut sheets and multipart continuous forms paper, with an attached pull tractor. It does not have a paper park feature. The M-1224L has a parallel interface and it emulates the Epson LQ500. It would be suited to printing personal letters and executive correspondence in a situation which does not require the frequent changing between cut sheet and fanfold paper.

***Toshiba P321SL/P341SL***
***Toshiba,***
***(02) 887 3322 $1310/$1660***
Narrow and wide carriage versions with a maximum speed of 216 cps in draft mode and 72 cps in letter quality. Resident emulations are IBM ProPrinter and Toshiba/Qume. Graphics are 360 x 360 DPI maximum. There is a built in tractor, a fanfold bypass, and an auto load feature. Serial and parallel interfaces are standard. Options include extra emulations and fonts; extra memory and a single/dual bin sheet feeder.

***Epson LQ-850/1050***
***Epson Australia,***
***(02) 452 0666 $1215/$1560***
80 and 136 column versions of Epson's mid range 24 pin printers. Smart park paper parking, 264 cps draft and 88 cps letter quality printing, two resident LQ fonts with enhancements and both serial and parallel interfaces. Options include a pull tractor, a cut sheet feeder and font modules.

***P5200/P5300 Pinwriter***
***NEC Information Systems,***
***(02) 438 3544 $1194/$1788***
80 and 132 column versions of NEC's 24-pin text and graphics printers. Maximum resolution 360 *x* 360 dots per inch. Maximum print speed 265 cps in high speed draft; 94 cps in letter quality. A wide range of standard fonts include Courier, Prestige Elite, Times Proportional, ITC Souvenir, Bold Proportional and Helvette; with variations such as bold and italics, you have access to over 36 type styles. An 80K print buffer increases processing speed, and options include a snap-in colour kit, sheet feeder and font cards. Paper parking, a tear off bar and a built in push tractor assist efficient paper handling. Noise level is 57 dBA, or 54 dBA in quiet mode.

***Brother M1724L***
***Brother Industries,***
***(02) 887 4344 $1662***
A versatile text and graphics 24 pin printer from Brother, with 216 cps draft printing and 72 cps letter quality. Paper parking makes the loading of paper easy.

Two resident typefaces can be altered with a full range of enhancements, and extra fonts are optional. The M1724L has a dual serial/parallel interface and emulates Epson LQ-1000, IBM ProPrinter XL, Brother HR and Xerox/Diablo 630. Options include a cut sheet feeder and the LQ-300 font/RAM board.

***Fujitsu DL3300/3400***
***Fujitsu Australia,***
***(02) 410 4555 $1740/$1980***
Respectively, 80 and 136 column printers with two letter quality fonts for business letters or pie charts. Print functions include underscore, bold overprint, shadow print, justify, italics, double high, double wide. Maximum speed in draft mode is 240 cps. Automated paper handling and a simple control panel. Optional snap-in font cards, cut sheet feeder and colour kit. IBM ProPrinter, Graphics Printer, Epson JX-80 and Diablo emulations. Noise level 55 dBA.

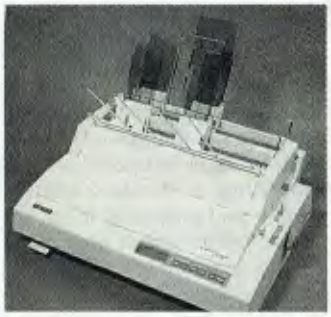
***Accel-500***
***Kenelec,***
***(03) 560 1011 $1990***
This printer specialises in high speed draft (480 cps) and high resolution colour graphics (up to 240 *x* 480 dpi). It prints at 200 cps in memo quality, and 80 cps in letter quality. Resident emulations are Diablo 630, Xerox 4020, Epson JX, Epson LQ-2500, IBM XL24, IBM 5812. There are four resident fonts and a Select dial with LCD English display for making selections and moving paper. The 256 character IBM graphics set is supported. Noise level 55 dBA.

***Dataproducts 9044C***
***Dataproducts,***
***(02) 451 3233 $2094***
One of the Dataproducts 9000 range of 9- and 24-pin 300 cps printers. This one has a wide carriage and colour capability. Standard interfaces are parallel and serial, with Gothic and Courier fonts. The 9044C emulates Epson LQ 800/1000 and Diablo 630. It has a paper parking facility for quick changes between fanfold and cut sheet paper, and options include extra fonts, extra memory and automatic sheet feeders.

***Fujitsu DL2400***
***Fujitsu Australia,***
***(02) 410 4555 $2250***
An 80 column printer designed for a high production environment that requires speedy draft

output as well as letter quality printing. A colour model is also available. Print speed is a maximum of 216 cps (12 cpi draft). There are two letter quality fonts, and optional font cartridges are available. The front panel contains a sixteen character LCD status display. Noise level is 53 dBA, and other features include paper parking, IBM Graphics Printer and Diablo emulations.

***Toshiba P351SX***
***Toshiba,***
***(02) 887 3322 $2651***
Wide carriage 360 cps draft and 120 cps letter quality printing, with a colour kit option. 360 *x* 360 dots per inch graphics resolution, parallel and serial interfaces, 32Kb RAM are standard. Emulations provided are IBM ProPrinter/Graphics Printer and Toshiba/Qume. Five resident fonts can be added to with type font cards. Options include a RAM card, envelope/sheet feeder, and extra emulations. Noise



level 54 dBA, or 51 dBA in quiet mode.

***NEC P9XL Pinwriter***
***NEC Information Systems,***
***(02) 438 3544*** ***$2958***
High speed 384 cps draft and 128 cps letter quality for high volume printing environments. Features include 360 *x* 360 dots per inch maximum resolution, a built in colour feature, and multi-strike film ribbon for crisp black letters. Parallel interface with Diablo 630 emulation as standard. A dual ported model (serial and parallel) is available. Options include single and dual bin cut sheet feeders, a pin feed tractor and a bi-directional tractor. Noise level 53 dBA or 48 dBA in quiet mode.

***OKI Microline ML393***
***IPL Datron,***
***(02) 698 8211*** ***$2998***
A 136 column high speed printer with parallel and serial ports, IBM ProPrinter and Epson LQ emulations. It prints at 450 cps in draft, 360 in data processing mode, 180 in NLQ and 120 in letter quality. It has paper park, and a colour version, the ML393C costs $3238. Options include a pull tractor assembly, cut sheet feeders and font cartridges.

***RuggedWriter 480***
***Hewlett Packard Australia,***
***(03) 895 2895*** ***$3104***
Designed for a high volume environment, this 24-pin printer has a maximum speed in draft mode of 480 cps, and 240 cps in letter quality mode. It has dual parallel and serial interfaces, and three independent paper paths to accommodate hand fed paper, tractor fed and a sheet feeder accessory. It has HP PCL and Epson compatibility, and it can accept font cartridges.

***Brother M352L***
***Brother Industries,***
***(02) 887 4344*** ***$3204***
Featuring 432 cps high speed draft printing, and 108 cps letter quality, this printer has a dual parallel/serial interface and IBM ProPrinter XL, Epson LQ-2500, and Diablo emulations. Continuous forms and cut sheets are handled with paper parking and options include a bottom feed pull up tractor, extra fonts, colour ribbon, multistrike ribbon, and a dual bin cut sheet feeder.

***Epson LQ-2550***
***Epson Australia,***
***(02) 452 0666*** ***$3360***
Designed specifically for business applications, with 400 cps draft, and 133 cps letter quality. Seven typefaces, in three different pitches and proportional spacing, serial and parallel interfaces, and seven colour printing are standard features. Paper handling extends to one touch control of friction gap, micro feed, load/eject, tear off, and paper park. The control panel has a 20 character LCD status readout, and up to four different printer settings. Rated at 55 dBA.

***Fujitsu DL5600***
***Fujitsu Australia,***
***(02) 410 4555*** ***$4800***
A high speed 24-pin printer, printing at a maximum speed of 405 cps draft, and offering reliability up to five years. It has seven letter quality type styles, and a straight paper path feature.

## Daisy Wheel Printers

***Brother HR40***
***Brother Industries,***
***(02) 887 4344*** ***$1896***
A 40 cps daisywheel printer with 136 column printing, serial and parallel interfaces, and an 8K buffer. It emulates a Diablo 630, has a push tractor with paper parking, and a 30 sheet A4 bin feeder. An optional dual bin cut sheet feeder is also available.

***Brother Twinriter 6***
***Brother Industries,***
***(02) 887 4344*** ***$2820***
The best of both worlds is available in this dot matrix /daisywheel printer. With two print heads in the one machine, the Twinriter can print draft text at 200 cps, or at 36 cps in daisy mode. It has a 136 column wide capability and has a parallel and serial interface. Letter quality text and graphics can be mixed on the same page.

## For the Speed Freaks

YOU MIGHT think that a print speed of around 400 cps (characters per second) is fast: this is what high end dot matrix printers, such as the top of the line Epson LQ 2550, can output in draft mode. For data processing applications, the fastest 18-pin printer in our survey is the Seikosha SBP-10, which prints at 800 cps in draft mode, 400 cps in correspondence mode, and 200 cps in NLQ.

For comparison, the highest page output speed of the laser printers in our survey is from the Fujitsu RX7300E, rated at 17 pages per minute. Assuming an 80 column document with 66 lines per page, 17 pages per minute works out to be roughly 1400 cps, in letter quality.

These speeds pale in comparison with those achieved by commercial line printers that are used in mini and mainframe environments. The Dataproducts BP-Series high performance band printers print at a maximum of 2000 lines per minute. With 80 column printing that works out at 2666 cps – beat that! These line printers have a paper slew speed of 50 inches per second; they can print an original plus five copies; they weigh 255 kg; and they consume around 1000 watts when printing. To keep everything under control, they have four forms tractors, a paper puller, paper motion sensors, and strange mechanisms such as 'scopeless hammer flight'.

A touch sensitive control panel includes a self test function and selection of 80 or 132 columns. A rear control panel is used for paper set-up and servicing. A swing gate facilitates paper, ribbon and steel print band changing, all of which the operator can do. A number of features including modular design and diagnostic status indicators make it easy for maintenance to be achieved with very little down time. Mean-time-to-repair is just 30 minutes.

These band printers are designed to run for twenty four hours a day, flat out, and are mainly used in data processing application environments. And the cost? The base price for a BP 2000 is around $51,000 ex tax.

# Omni-printing

MANY LASER printers are sold in a basic form, with an average of two resident emulations and several typefaces. This configuration might be all you need for simple word processing tasks, and you can choose to ignore lists of optional extras such as additional font cards and emulations. But if your work involves printing reports and letters with style and panache, and if your office tasks extend into desktop publishing, engineering or architectural reports, the configuration of a basic laser printer begins to look inadequate.

The latest from Texas Instruments has so many features built in to it that you can forget about optional extras – for a start, it has a built in PostScript controller (as do all of the TI 21xx-series), a 68000 microprocessor and 35 PostScript typefaces in residence. This means that it can be used in conjunction with any software that outputs PostScript files, such as Ventura or PageMaker, with the ability to manipulate any typeface character through any angle and any size. In addition, full page graphics can be printed out since the Omnilaser is equipped with 2 megabytes of RAM as standard.

But that's not all: the Omnilaser 2106 is actually several printers in one – resident emulations include the usual Diablo 630, LaserJet Plus and Epson MX/Qume plus TI 855 DP/WP emulation as well as an HP 7475A Plotter emulation with HP-GL (Hewlett Packard Graphics Language) which can be used for printing out CAD files.

**Since its release two years ago, Texas Instruments' OmniLaser family has gained a reputation for flexibility and reliability – Robert Thirlwell found the latest in the line is a worthy successor.**

The Omnilaser 2106 weighs only 17 kg and has a small footprint – it proved to be quite unobtrusive on my desk, taking up less space than most high end dot matrix printers (it's much quieter, too). Connecting it to our IBM compatibles was simply a matter of inserting a standard parallel Centronics cable and switching it on.

Connection to other type of computers can also be accommodated, with a 25-pin RS232 serial interface, RS422 9-pin connector or an AppleTalk 9-pin connector.

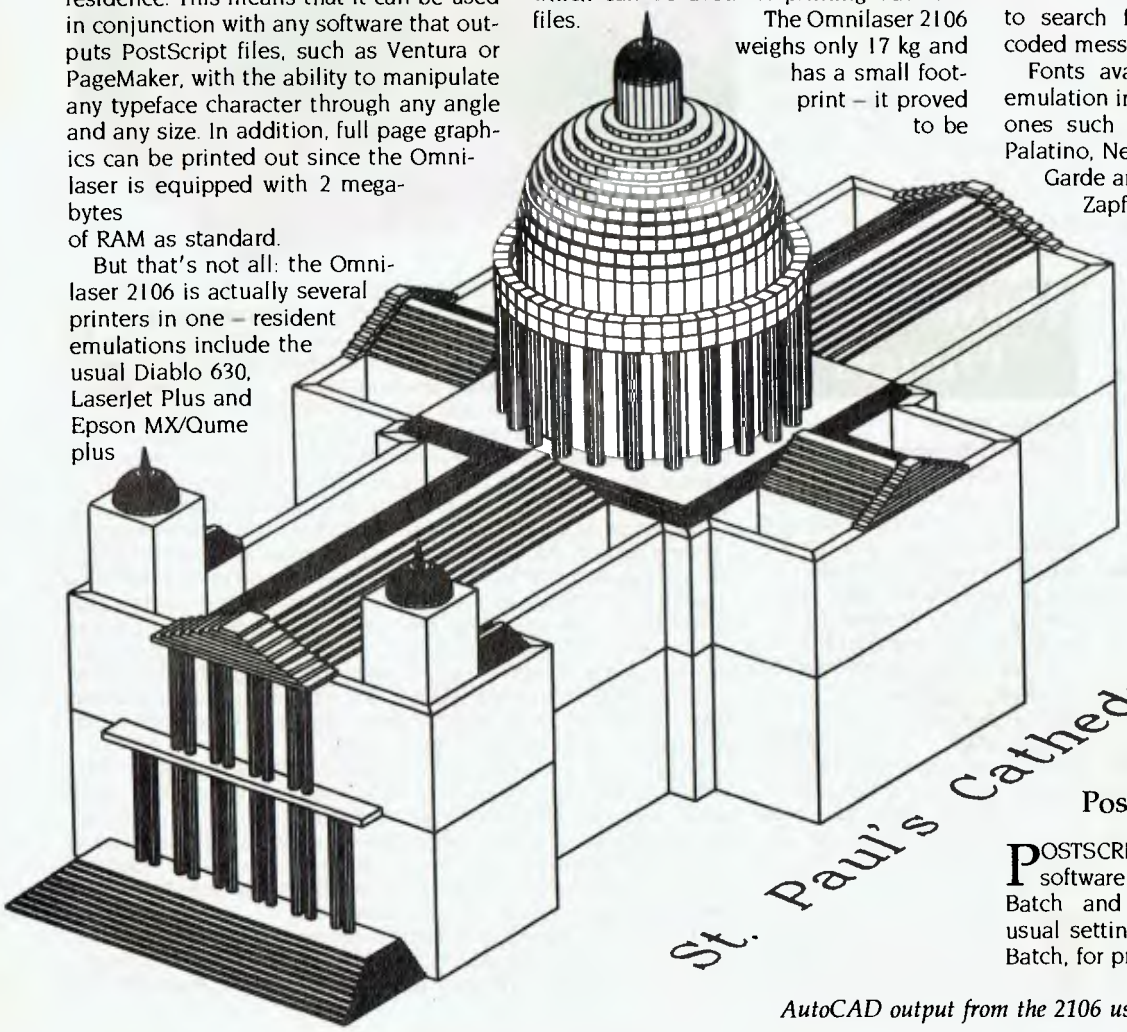
## In control

THE 2106 has an unobtrusive front panel, with ten touch switches and a 2-line, 16-character LCD status display. Using these, emulation, fonts, and page orientation (portrait or landscape) are selected. The top line of the LCD displays status information, and the bottom line displays selections or error messages. These are all in plain English, so you are saved the trials and tribulations of having to search for the manual to decipher coded messages.

Fonts available under the PostScript emulation include all of the more popular ones such as Times Roman, Helvetica, Palatino, New Century Schoolbook, Avant Garde and there is also a symbol set, Zapf Dingbats and Zapf Chancery.

All are available in variations such as bold and italic, and are proportionally spaced, except for Courier, which has a fixed pitch. Courier is the only resident font available for printing under the non-PostScript emulations: LaserJet Plus, Diablo 630 and TI 855.

Extra fonts for use with the LaserJet emulation can be downloaded into the printer's RAM. Also, using the LaserJet emulation, it is possible to print rules, patterns and shades of grey.




*AutoCAD output from the 2106 using the PostScript Batch mode.*

## PostScript Interpreter

POSTSCRIPT can be accessed under two software interface settings: PostScript Batch and PostScript Interactive. The usual setting to use would be PostScript Batch, for printing from programs with an

integrated PostScript driver, such as desktop publishing files. Interactive mode allows the user to give commands directly to the PostScript interpreter.

Documentation is complete, with separate manuals for both the physical set-up and operation of the printer, and a technical reference manual, which contains information regarding operation of the various printer emulation modes. Chapter 4 contains information for people experienced in PostScript programming to allow them to get the most out of the printer.

Paper handling is via a 150-sheet input tray, a side output tray that accepts sheets face up or the top output tray that accepts sheets face down. Selections for paper size are made at the front panel, from A4, Legal, B5, A5, Half Letter and Letter. It can also print envelopes, transparencies and labels. the machine has a duty cycle of 3000 pages per month.

For slightly faster output and for small cluster environment, Texas Instruments recommend the 8-page per minute Omnilaser 2108. At the high end of the range are the 15-page per minute workhorses, with a rated capacity of 25,000 pages per month: the 2115 or the 2015 (the 2015 is the only one of the range without PostScript).

*The Omnilaser 2106 from Texas Instruments has a small footprint, weighs only 17 kg, and has enough RAM to print out a full page of graphics – and includes PostScript.*

Optional extras include a range of PostScript font cartridges or custom cartridges can be ordered. All 2106 font cartridges are compatible with the 2108 and 2115. An optional input paper tray holds up to 250 sheets.

The Omnilaser 2106 is not a high speed, high throughput machine, but for a single user involved in the production of high quality word processing, proofing or desktop publishing, the 2106 is ideal. The wide range of emulations make it perfect for printing technical manuals, complete with CAD and Plotter graphics. □

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| 193 | 9PIN | 240cps | 40NLQ | 136col |
| 292 | 18PIN | 300cps | 100NLQ | 80col COLOUR |
| 293 | 18PIN | 300cps | 100NLQ | 136col COLOUR |
| 294 | 18PIN | 400cps | 100NLQ | 136col COLOUR |
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# The Light Fant

TO MODIFY A CD-Audio player so that it can be used with CD-ROM you would theoretically need to add only the error-checking chips and the output connections; CD-ROM players don't need the digital-to-analogue decoding for audio either. But a mechanism designed primarily for audio doesn't necessarily make a good computer peripheral.

The main problem is that of head access time. In CD-Audio the finite time the head takes to find and begin playing a selected track is of little consequence; a one-tenth second, or two seconds gap hardly matters. We can live with a pause between music tracks.

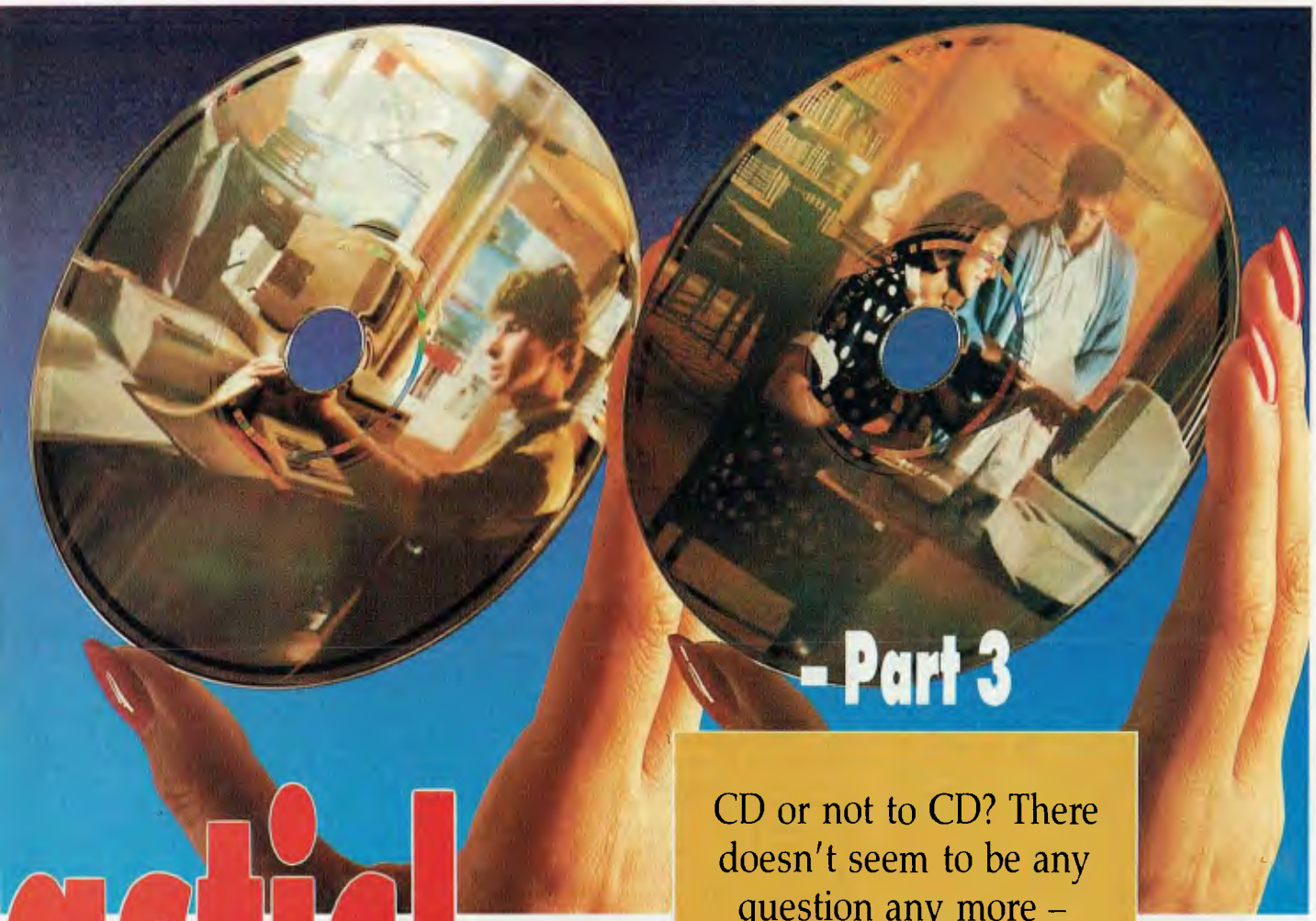
However, if optical peripherals are going to be used on computers, this slow access time can be a problem. There is an assumption here that at some time in the future, a large part of our data recording and replay will come from optical disk, and that these will all share a basic standard. CD seems to be that standard. So a slow access time is not much of a problem, perhaps, for CD-ROM read-only systems, but it certainly will be for the erasable and recordable systems that are now appearing.

## Future focus

IN THE FUTURE we will obviously use CD-ROM system for public database retrieval and general encyclopaedic reference, and here access time isn't critical. But recordable devices are often used as extensions to the computer's normal RAM functions, and so it is important that the writable forms of CD approach normal hard-disk access times.

Shifting an optical head with lenses and prisms is a relatively slow process when compared with swinging a lightweight arm fitted with only the thin magnetic read/write heads. Access time for hard disk is now down in the 30 millisecond range, while CD-ROM takes about 400 milliseconds. This is only the time it takes to position the head, the laser-burning (writing) process may slow the procedure down even more.

There is a possible solution to the head-seek problem by using holograms to replace lenses, but this will necessitate a complete redesign of the CD optical system. A hologram of a lens will act like a lens in focusing the light, and good lens-holograms can now be generated mathematically. So future optical disk drives may have no conventional heads at all and no mass to swing across the disk face. There will have to be some mechanical movement of the hologram, but that will probably be a pivoting motion, rather than a swinging arm.



# astic!

## – Part 3

CD or not to CD? There doesn't seem to be any question any more – compact disks are the way of the future. But, as Stewart Fist points out, there are still problems to be overcome . . .

However there is still another mechanical problem to overcome, in that a CD disk does not rotate at a constant rate. In the vernacular, it is a Constant Linear Velocity (CLV) technology where the disk rotates slower when reading the outer tracks on the disk, and quicker when reading the inner.

This is a hang-over from the-audio origins of CD where the progressive speed change was made to keep the pace of the track moving under the head constant. CD-Audio and CD-ROM drives change their rotational speed to match the circumference of the track being replayed, because this allows you to get the maximum possible data onto a fixed area of disk surface.

This is probably not a major problem with CD systems used for reading computer data since our computers are capable of taking in data at these substantially different rates (about 3:1, from outer to inner tracks), but marks another difference between the requirements of a CD-ROM (read-only) drive, and the new write-once (CD-R) and erasable-recordable (CD-E) standards.

For writable disks the rotational speed variation poses a significant problem. The recorder must provide feed-back on head-to-track speed to allow control of the data-rate (and the laser intensity also) when writing – either that, or it must always wait until the head-to-track speed has been mechanically adjusted to a preset constant. One further limitation with the system is that the maximum rate of data-flow from a CD-ROM disk has been set at 153.6 kilobytes per second (1.2288 megabits/sec). In CD-ROM, each block carries 2048 bytes of user data, and at the standard rotation these come past the head at a rate of 75 per second, so this 153.6K/sec figure is intrinsic in the standards – it represents the maximum 'bandwidth' of the system.

But a full-screen 8-bit colour VGA-format image requires about 50K at a minimum, so the best we can expect in full-motion video is 3 screen changes per second instead of the normal 25 (or 30 in USA) of television. Alternatively, we can have a trade-off with full-motion video in an area of only ten percent of the screen at the normal full-motion rate. So there are still plenty of problems to be overcome before the CD standard becomes a recordable peripheral or a source of high quality colour video. But this shouldn't detract

# Optical Storage Tec

## Floptical Insite

IMPROVEMENTS in magnetic disk media could detract from the expected sales of optical disk drives. A study released in the US in December '88 predicted that sales of optical units would reach 165,000 in 1991; magentic media sales are expected to pass 10 million units that same year. Winchester and 'floptical' disks (which use laser tracking rather than of servo motors and allow much higher track densities) are in late stages of development by a number of manufacturers and may make development of rewritable optical disks a moot point.

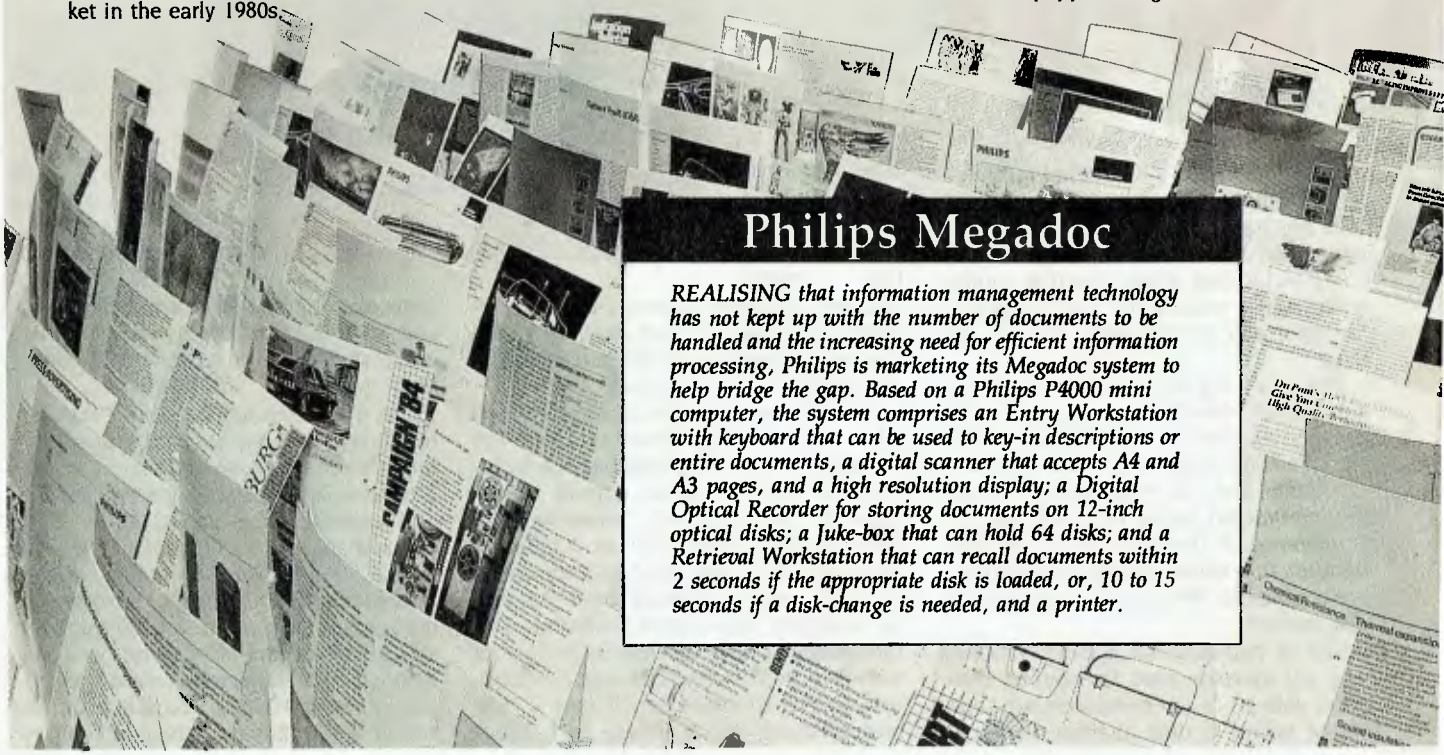
However, some industry-insiders feel that optical disks have 'archival reliability' that cannot be matched by the more volatile magnetic media. It's felt that WORM disks will find their place in the market, simply because the data can't be written over. The consensus seems to be that rewritable media will continue to dominate interactive and multimedia applications, leaving WORMs the archiving niche. Insite Peripherals of California hopes to start shipping evaluation units of a floptical disk drive, the 1325, 'early in '89.' Insite's Jim Adkisson (one of the originators of the 5¼ inch floppy while at Shugart Associates), says floppy disk technology has been stagnant ever since Japanese companies took over that market in the early 1980s.

*With CD-ROM and the other optical disk technologies currently under development, we have reached the point where information overload becomes a serious problem. Along with the physical development of optical disks, there has been a less successful effort to create information retrieval systems capable of handling the data. (As nineteenth century Scottish author James Barrie noted, 'The printing press is either the greatest blessing or the greatest curse of modern times; one sometimes forgets which.') One CD-ROM disk holds the equivalent of one thousand 250 page books, or 1500 (320 Kbyte) floppies, or 25,000 black-and-white photos, or 8000 full-screen colour photos, or 72 minutes of hi-fi stereo sound, or 19 hours of low quality speech.*

'The 1325 drive will be a plug-and-play substitute for a SCSI-equipped Seagate 225 hard drive,' Adkisson said. 'The difference is that the Insite drive uses removable 3½ inch disks that are identical to IBM's 2 megabyte floppies, but with optical tracking guides engraved on the disks by laser, pushing the capacity to just over 20 Mbytes.'

The 'floppiness' of a floppy limits track densities because of the wobble that takes place while the disk spins – the tracks have to be far enough apart to prevent the magentic heads from reading adjacent tracks. For example, a standard 3½ inch floppy has only 135 tracks per inch (tpi), while an optical disk drive can read up to 15,000 tpi.

Insite solves the floppy problem by using a closed loop optical servo system to track the trackmarkers which are etched by laser (that means they can't be accidentally erased). Adkisson feels that the most significant development, though, is the low cost of the tracking head. Because it uses an infrared LED instead of a laser for tracking, the head carriage assembly about the same price as that used in a 20 Mbyte hard disk. With competitive pricing, seek time and capacity, Adkisson is expecting the 1325 to do well in head-on competition with floppy drives. Insite plans to initially sell the drives to OEMs at the same price as a SCSI-equipped Shugart 225.



## Philips Megadoc

*REALISING that information management technology has not kept up with the number of documents to be handled and the increasing need for efficient information processing, Philips is marketing its Megadoc system to help bridge the gap. Based on a Philips P4000 mini computer, the system comprises an Entry Workstation with keyboard that can be used to key-in descriptions or entire documents, a digital scanner that accepts A4 and A3 pages, and a high resolution display; a Digital Optical Recorder for storing documents on 12-inch optical disks; a Juke-box that can hold 64 disks; and a Retrieval Workstation that can recall documents within 2 seconds if the appropriate disk is loaded, or, 10 to 15 seconds if a disk-change is needed, and a printer.*

# hnology

*With the current level of correction, Philips and Sony say that isolated error-bursts of up to 4000 consecutive bits can be completely corrected, which is why you can handle CD-ROM disks without worrying too much about small scratches on the surface. But Philips and Apple (amongst other CD-ROM proponents) are pushing the use of disk caddies so obviously they want you to keep your fingers off the disk!*

## Optical Games

PUBLISHERS of entertainment software have been losing shelf space at software retailers, and seen their user base actually shrinking in per centage of total computer users. It's generally felt that PCs available today are too primitive to create a broad consumer base for entertainment software – the most popular games machine today is a cheap PC clone, but a standard clone with CGA isn't friendly enough for consumers.

At one time, there were several hundred companies publishing and distributing games and entertainment software (mainly to males, aged 12 to 45), but many of these have gone out of business, particularly in the past 12 months. The survivors hope that optical drives will put games and other 'non-business' software back on the shelves, since CD-ROM will allow developers to put megabytes of data on a single disk, creating more elaborate games with very high levels of interaction.

However, access times of CD systems are still too slow to makethe games perform well (an 'average' hard disk has a seek time of 30 milliseconds, while released CD-ROM drives are generally in the 400 millisecond range).

from its obvious uses as a source of public data. At present it is a publishing medium, just like books – and although it has pretensions in other directions, it is quite capable of standing on its own, without further extensions.

I've never understood why so much importance has been attached to the need to provide recordability – the CD-ROM standard is a dramatic breakthrough in technology even in the read-only state. CD-ROM disks in large production runs can provide data at a fraction of a cent per Megabyte – which is about one-tenth of the comparable prices of magnetic tape, the next cheapest medium.

One recent invention using a optical paper-disk for replay could drop this price per megabyte by one order of magnitude again, and a number of optical spectrum-recording ('rainbow disk') technologies which we will see in the next decade, could well drop the price another magnitude again. So within ten years we might have information reference systems which can deliver their information at ex-factory prices of 0.001 cents per Megabyte. A paperback book, by comparison, costs a minimum of $2 per megabyte ex-factory, and about $8 per megabyte retail.

This is one of those gee-whiz statistics that actually doesn't mean much when you examine it closely; below 1 cent per megabyte the cost of the medium (the disk) becomes insignificant anyway. The CD-ROM disk itself is the first information storage medium which is actually cheaper than paper. The ex-factory price of a CD-ROM disk at present (even with comparatively short runs) is only $3 to $5 anyway – but you'll pay $300 to $1200 for it retail.

The difference (apart from rip-off profit-making) reflects the costs of the pre-mastering process, and of collecting the data and organising information on the disk in a way that allows it to be retrieved. It is useless having 650 megabytes of information on a disk if you can't find what you want.

## Information overload

WITH CD-ROM and all these optical disk technologies of the future we have reached the point where information-overload becomes a serious problem. Along with the physical development of optical disks, we have a parallel (but less successful) effort to create information retrieval systems capable of handling the data in the form(s) that we need.

One CD-ROM disk can carry the equivalent of one thousand 250 page books, or

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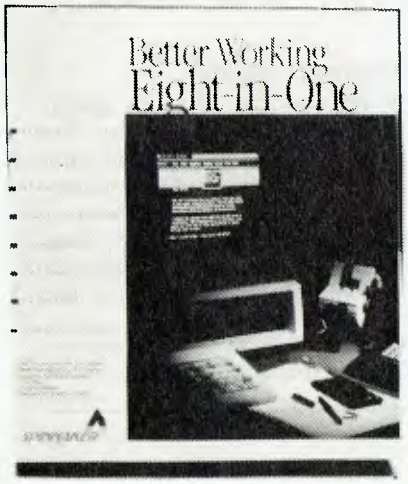


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We'll look at the logical format of data on the disk, and the efforts in creating retrieval systems capable of handling this amount and variety of 'data' in another article.

## Error-checking

CD SYSTEMS use two standardised forms of error-handling: error-detection and correction (mainly the Reed-Solomon codes) and substitution (data interpolation).

Naturally, where you are replaying textual data the integrity of the information is far more important than it is with audio or image. A CAD/CAM specification that has one digit in error might cost a manufacturer a few million dollars; an error in a prescribed dose of medicine might cost a life; but even gross errors in the flow of video and audio signals only appear as transitory glitches, hardly noticed.

Substitution 'correction' is for video and audio use only (not for data), and it is the form of error-correction found in VCRs, television sets and other electro-mechanical systems. When the system finds a problem with the data stream (usually a drop-out – a white flash on the screen or a pause in the sound), it simply adds a bit taken from a track nearby. Near enough is good enough!

With home VCRs, the problem of drop-out (lack of signal due to dirt or damage) is solved by inserting all, or part of, the previous line of the image. Video systems are able to do this because they hold the previous line in short-term (acoustic delay) memory. Any time a drop-out is detected, the system 'throws a switch' and temporarily takes its output from the acoustic memory, thus filling in the gap on the screen.

Obviously you can't use this for data. Data errors need to be detected, then corrected – not replaced. In fact, in designing a data/error scheme there's always a trade off between the detection functions and the correction – if you want more of one, you will have less of the other.

The correction codes used in CD-ROM can handle error-bursts of up to a 1000 bits and still regenerate the correct code for all but one bit in ten quadrillion. The detection (but not correction) rate is even higher – one missed faulty bit in two quadrillion CD-ROM disk.

These figures are so astronomical they appear almost ridiculous, but whether you believe them or not (I don't!), it is evident that very reliable data is usually coming off a CD-ROM disk. The cost of these error systems, in terms of storage overhead, is high; 11 per cent of the CD-ROM disk's total capacity is reserved for redundant error-checking information. Fortunately there's more space than most disk publishers can use anyway.

*CD-ROM disks in large production runs can provide data at a fraction of a cent per megabyte – which is about one-tenth of the comparable prices of magnetic tape, the next cheapest medium.*

Substitution is only used in CD-Audio for gross errors – large scratches across the disk surface. In most cases CD-A relies on its two levels of Reed-Solomon 'correction' codes to achieve an error rate of only one in $10^9$ bytes. This is quite enough for audio.

When it comes to pre-mastering CD-ROM disks, the engineers then add two further levels of error checking. Firstly, there is the Layered ECC which does a series of checksums against 288 bytes of redundant data at the end of every 2048 bytes (a sector or block) of user data. Then this is followed by Cross-Interleaved Reed-Solomon Codes (a family of codes known as CIRC) which handle 24 blocks at a time, adding a few bytes of extra information, then scrambling (interleaving) the order so that long error-burst are chopped up into more smaller ones.

I'm not going to dig deep into error codes mainly because the matrix maths are quite complex. Reed-Solomon codes are an offshoot of Finite Field theory developed by Evariste Galois last century, and they are used in such esoteric applications as inter-planetary probes to ensure that the radio data gets back to Earth in a reliable form.

With the current level of correction, Philips and Sony say that isolated error-bursts of up to 4000 consecutive bits (corresponding to 2.5 mm of track length) can be completely corrected, which is why you can handle CD-ROM disks without worrying too much about small scratches on the surface. This claim I don't entirely believe – Apple and a few other CD-ROM proponents are pushing the use of disk caddies so obviously they want you to to keep your fingers off the disk!

When Philips and Sony first devised the Yellow Book (CD-ROM) standard, they concentrated on the physical format and the error-checking aspects. Most of these had been taken over from the CD-Audio (Red Book) standard anyway, so CD-ROM wasn't a dramatic change.

CD-ROM can store Red Book information on a disk along with the other data (text, programs and images), and it can either play the hi-fi stereo audio, or read data. You need a dual-mode CD-ROM drive to do both functions, of course. Unfortunately, you can't simultaneously access data and play the CD-A audio unless you buffer the data in the computer memory before you begin to play. This is simply because, at this fidelity, the audio needs to come in a constant stream which occupies almost the entire 'bandwidth' of the system and so it can't be interrupted by bursts of data.

If you choose a lower audio quality standard, however, you've got room to interleave the data with the audio, and then separate and buffer the two streams on a computer expansion board. In part, this is what the recent extensions to the CD-ROM standard (XA) set out to accomplish by taking over the CD-I (Interactive) audio standards.

The CD-I Green Book formalised a compressed hi-fi and a couple of low-fi audio technologies using the Adaptive Differential form of Pulse Code Modulation (ADPCM) which cuts the number of bits required for different levels of fidelity.

CD-I's 'A' level is very nearly as good as the now-standard CD-Audio system (at least as good as the best of the old black-vinyl LP records), but it only uses 8-bit sampling at a 37.8 kHz sampling rate and thus can store 2 hours 28 minutes of

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stereo on a 12 cm disk, or nearly 5 hours of mono.

At level 'B' (with the same sample rate but only 4-bits per sample), you still get good music with a bit extra system noise, equivalent perhaps to average FM radio reception. But you've now got ten hours of mono to each disk.

The 'C' level doubles the recording times again by cutting the sampling rate in half (18.9 kHz, 4-bit), for a maximum of 19.2 hours of mono at a quality level about equivalent to average AM radio reception. In each case, there's stereo also at half the playing time.

## CD-ROM XA

PHILIPS, Sony and Microsoft have since created CD-ROM XA (extended architecture) to 'bridge CD-ROM and CD-I'. They have now bought into the CD-ROM standard the audio and graphics technology that they devised for CD-I, and they've standardised some aspects that make motion video possible.

Video wasn't envisaged originally as part of the CD-ROM system, mainly because the maximum data-rate for a CD drive is only 150K per second, and this is too slow for uncompressed, full-screen colour video. The later CD-I standard provided for some rather limited partial-screen video.

But much to Philips and Sony's surprise, RCA/GE Laboratories came up with DVI (Digital Video Interactive) which uses very sophisticated video compression techniques (4 minutes per image-frame in a VAX minicomputer), plus a twin-set of 12 MHz VSLI decoding chips to reproduce about 75 minutes of medium-quality colour video from a standard CD-ROM format disk. It has full interleaving capability so you can divide the screen into windows and have text, graphics, still and motion image running simultaneously – each occupying a variable area of the screen surface.

Like CD-ROM, DVI is a computer peripheral, although it could obviously be incorporated into some form of stand-alone box that plugs into a TV set. The DVI technology has since been sold to Intel, the makers of the processing chips, and companies like Microsoft have swung a lot of weight behind it as a potential world standard instead of CD-I.

I think it is obviously the way of the future, but Philips and a number of Japanese companies would much prefer that DVI would go away and die. They've already spent a couple of small fortunes developing the CD-I technology which is not nearly as good with motion video.

DVI does, in hardware, what CD-I does through software, and it buffers the incoming video data and varies the size of the pixels. Consequently when everything on the screen is moving (say, in a panning shot) the full amount of screen updating data is available although the pixel size may be much larger. When the screen image is relatively static, less elements are being updated, the pixel size is smaller, and the buffer gets a chance to fill again. In this way it is much more efficient in its use of the limited stream of data bytes.

You can't really talk about CD-I as an extension of CD-ROM because the term refers to a computer/hardware product rather than a disk format – although it uses an extended form of CD-ROM as the source of its data. The idea behind CD-I is that you will buy one of these players and plug it into your stereo and TV set (just like you did with video games a couple of years ago) and you'll have a joystick or mouse controller which will let you select information/ entertainment through menu selections from a range of CD-I disks.

This is a home consumer product that will be sold in much the same way as home computers and videogames were a few years ago. However it combines all the features of a Video Cassette Recorder (in replay with a limited screen size), with all the features of a videogame machine, and all the features of an interactive videodisk machine and CD-Audio player, together with some of the features of a home computer. It is obvious that you can't judge the future success of this technology on the failure of past systems.

Matsushita were to produce the sophisticated video chip needed for CD-I and they found it necessary to use 1 micron technology which worked acceptably in the laboratory but was not suitable for production. This problem has now delayed CD-I for at least a year, but Philips have announced their player, so they must have overcome most of the problems.

It is interesting to find companies like Microsoft, who are very vocal promoters of CD-ROM, joining forces with Philips and Sony on CD-ROM XA while taking the side of GE/RCA's DVI against Philip's CD-I. Bill Gates believes that DVI will wipe the floor with CD-I, but only time will tell. Ask me again next year!

One thing is for sure, CD-ROM (probably in an extended High Sierra format) will be around for many years to come. □

# CD Standards

PHILIPS and Sony have jointly devised a set for standards for compact disks that have become accepted world-wide. The first 'standard' set was, as you can imagine, for CD-Audio disks, but the spectrum has now been broadened to include almost any combination of audio, video and data recording and replay –

***Red Book:*** For CD-Audio, originally released in Jan 1981; it specifies:

*Physical size of the disk and layout of the spiral track;*

*Constant Linear Velocity (CLV) rotational speeds;*

*Table of Contents on the disk;*

*Basic error detection and correction standards;*

*Use of 16-bit pulse-code modulation audio format; and*

*Highest level of audio; 8 channels.*

***Yellow Book;*** For CD-ROM as a computer peripheral, originally released in Oct 1983. This assumes the Red Book standards, and adds the following:

*Two extra modes of CIRC error correction; and*

*Defines two types of track (for audio and data).*

***CD-ROM XA Extensions:*** For business and reference use. Disks should be playable both by CD-ROM drives and by CD-I. Released Aug 1988.

*Incorporates the use of ADPCM (Adaptive Differential PCM) interleaved audio (B and C levels only);*

*Allows text, graphics and still images to also be interleaved with audio for real time simultaneous playback; and*

*Defines a 640 x 480, 8-bit screen presentation format for PC displays.*

***High Sierra Group standards:*** Released Oct 1985. Devised by a group of hardware and software companies, these added the 'logical' file format standards to CD-ROM's physical standards so that consistent access (retrieval software) could be devised. Now known as the ISO 9660 standard. They defined:

*How the volumes would be named;*

*Where the main directory would be found; and*

*The hierarchical file structure.*

***Green Book:*** For CD-I as a TV or home stereo-system plug-in device. Announced in Feb 1986 and finalised in June 1987. This assumes both the Red and Yellow Book standards, and adds more. It specifies both the disk structures and the hardware – in fact it is primarily the specification of a computer which will be used with the home TV set, and operated by a joystick or mouse.

*After finalising the CD-I specifications with Sony, Philips shipped several hundred CD-I systems to software developers in the US, Europe and Japan in the last quarter of '88. A modular system (pictured) comprising separate CD player, multi-media controller and monitor, has been promised to institutional and professional users for the second half of '89; the system can be extended with an expansion box by connecting to other peripherals or a network. Philips see the main market for the system as general consumers, so they are doing what they can to ensure that there is a sufficient range of software available to appeal to that market.*

The specification is based on the 68020 chip, and it has a ROM-based 'real-time' operating system (CD-RTOS) which is a modified version of Microcom's OS-9. The operating system has file protection, one-seek file opening through a hierarchical file structure, and standard graphics functions and user interface (mouse).

The CD-I standard includes three new audio standards in addition to the normal PCM CD-Audio:

***A:*** *with a frequency range of up to 17 kHz, using 8-bit Adaptive Differential PCM with 4.8 hours mono playing time;*

***B:*** *with 4-bit ADPCM giving 9.6 hours in mono; and*

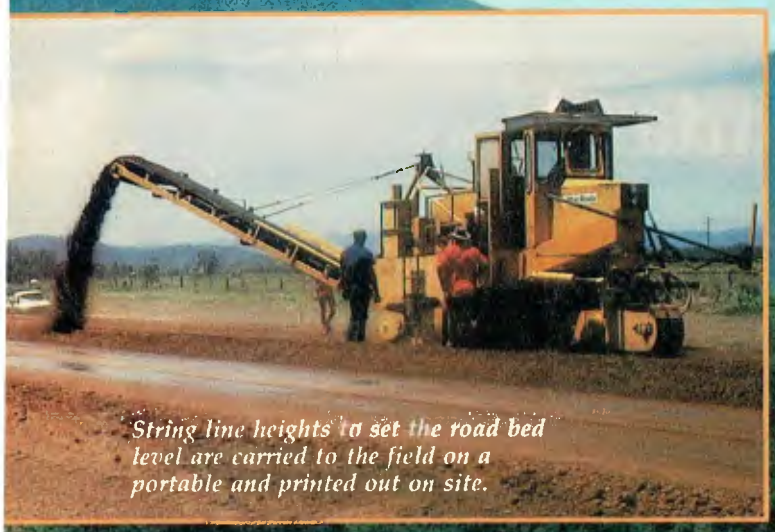
***C:*** *for speech (to 8.5 kHz) giving 19.2 hours of mono.*

*In video, there is one common format for both NTSC and PAL (but they don't say anything about SECAM). Monitor resolutions are: normal 360 x 240, double 720 x 240, high 720 x 480 for NTSC; and normal 384 x 280, double 768 x 280, high 768 x 560 for PAL. Pixel coding is also specified, along with details of wipes, dissolves, overlays, scrolling and partial updating procedures.*

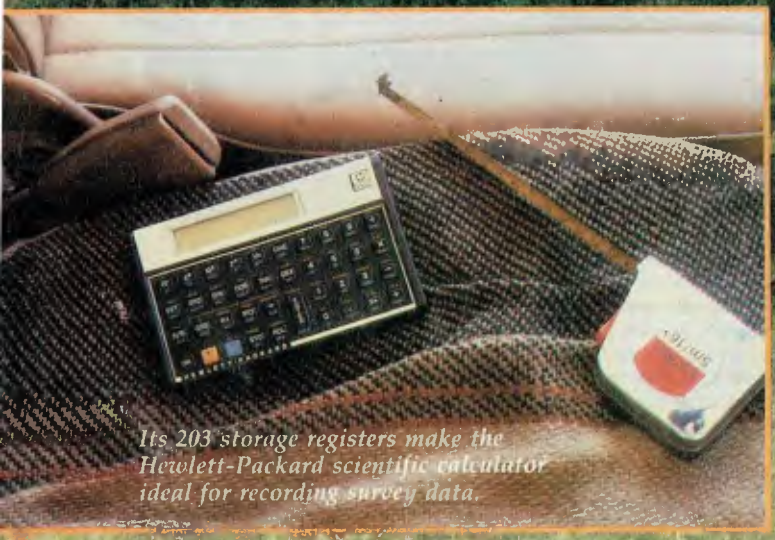
***Blue Book:*** Rumoured to be the specification for CD-R (ex-CD-PROM or write-once, WORM) disk standard. There doesn't appear to be a colour chosen for the new CD-E (erasable-recordable) standard at the time of writing, in fact Philips and Sony may not have, as yet, reached agreement.

The specification for the WORM drive/-disk appears to be almost identical with the CD-ROM (Yellow Book) standard and conforms to the CD-A (Red Book) standard, as you would expect. It is aimed at the audio recording market as well as at the data industries.

It differs from the CD standards to date in using a one-sided disk that is pre-grooved to provide a guide to the writing laser head. It is not clear whether the disks produced on these writable-machines can be read on a conventional CD-A or CD-ROM player, but the reverse is true; the CD-R player can read normal CD-A and CD-ROM disks.



*String line heights to set the road bed level are carried to the field on a portable and printed out on site.*



*Its 203 storage registers make the Hewlett-Packard scientific calculator ideal for recording survey data.*

# Field day for

## Using computers for fie dramatically in the past th reports (and loo

IT HAS ONLY been in the last three years, or so, that computer usage in field conditions has really taken off. Although journalists, musicians, and traveling managers have been using them (for text applications) since the early '80s, they really were pioneering them under difficult conditions.

Going back another decade to the start of the '70s, complex arithmetic was done using seven figure log tables. The odd mechanical calculator, such as the Kurta, was used, but they were rare and expensive. Adding machines were bulky and subject to a short life in the outdoors. Electronics soon intervened, and the birth of the electronic calculator saw log tables put away.

Calculators suited field conditions perfectly. They could be put in any pocket, were cheap, and took away the need for lugging around books and note paper. Computers, at this stage were not in the race for any 'field' worker, in other words, any person working outside an office situation.

### Users

THIS 'LIST' of those working outdoors was much bigger than it is today. Information technology has seen a change in the roles of many field workers – information is increasingly gathered by field personnel and dealt with by office personnel, whereas before, the same person more than likely did both jobs. A quick look in the employment pages of 1988/89 will reveal a significant difference in the type of employee required today, compared to 1978/79; for example, computer EDP now has its own category in the classifieds.

Most professional people today, whether in city or country areas, would use a computer for analysis, or on the spot calculations. Architects, accountants, businessmen, engineers, lawyers, managers, surveyors, salesmen, and others generally have access to computers for their work. Tradesmen, as well, are at the stage where computers are becoming integral part of their working life.

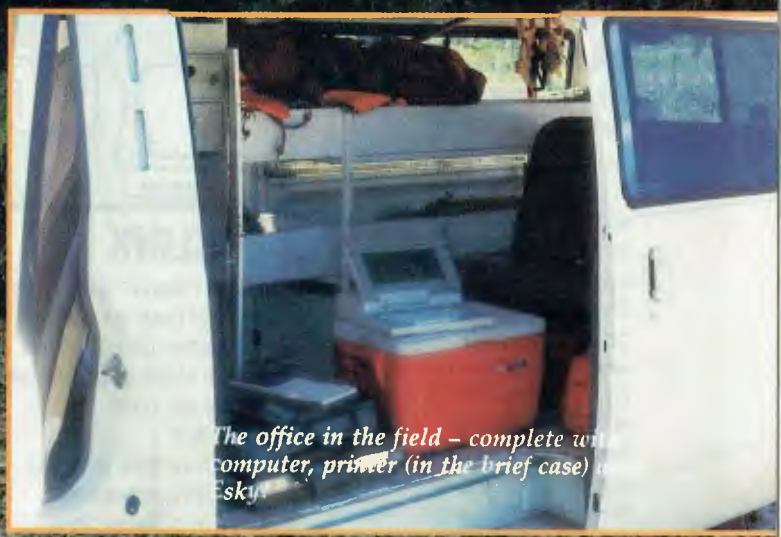
Laptops and hand held computers are creeping into areas unheard of before. Insurance salesmen these days carry life and superannuation policy possibilities around, in the form of a laptop and special software

Transport Authorities in Australia will soon be able to access computer data banks for vehicle details, as the American police do now with on-board computers. Courier services now use 'computer-aided delivery' techniques in the larger cities. Meter readers may soon be adopting the UK's method of 'data recording' using hand held computers or laptops. All these users are finding they can eliminate 'dou-

# computers?

ld work has progressed
ree years – Kevin McLean
ks to the future).

*Output of this gravel crushing plant is determined by input from computers on roadmaking equipment.*



*The office in the field – complete wi computer, printer (in the brief case) Esky.*

ble processing' of information, as well as saving time in the collection of raw data.

## Existing equipment

PRESENTLY, in Australia, we are quite advanced in the equipment we are using, compared to other countries. Any hardware released in the US or the UK generally reaches our shores in a matter of a few months, rather than years, as was the case in the '70s. Many multinationals with offices in Australia have product launches here within days of the release in the home country.

Cost of the hardware has always been the bugbear for the field user. For this reason, a wide variation in equipment can be found throughout the country. Some government departments are using different brands of hardware – this started in the office, and has filtered through to the field worker.

There are three main types of instruments used in the field for mathematical calculations today. The first of these, the electronic calculator, has been designed to be job specific; for example, scientific or financial. These still play a big part in our present workforce, and most workers required to do maths can invariably be found with one in their pocket. We're still waiting for a 'true' pocket-sized computer.

Electronic calculators range from the simple to the very sophisticated. They usually have several dedicated function keys and typically would be able to store a number of 'program steps' or 'input data' in a small amount of reserved memory. Some are capable of being programmed in a machine specific language and, in some instances, can have more powerful functions than a computer. These functions take the form of routines stored in ROMs or EPROMs.

The second type of instrument used is the pocket computer. These machines generally have between 8 and 32 Kbyte of memory, with the odd one having 64 Kbyte of RAM. This RAM memory is usually kept 'alive' by feeding it some current via rechargeable batteries. Some of these 'pocket computers' have storage via mini disk or audio tape available. Unfortunately these devices do not handle field conditions well, and the tapes, in particular, are prone to data errors. The main drawback with these machines is the limited memory and storage. Different manufacturers use their own languages, and this, in itself is a problem.

Lastly we come to the instrument which appears to be overtaking the other runners in the 'field calculator' and 'data gathering' stakes – portable computers. These have been around for some time, but it has only been the drop in price and

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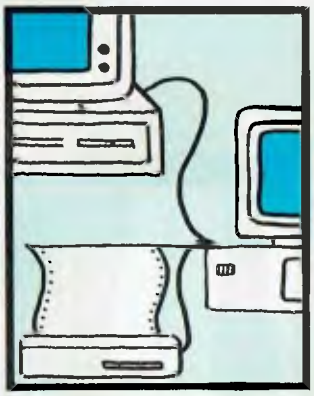

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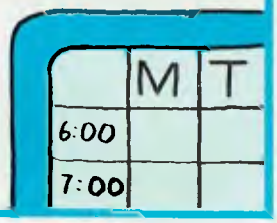

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## Trans-portable computing

FOR THOSE interested in 'field' computing, Michael Floyd reviewed the Epson PX-4, Tandy Model 102 and Cambridge Z88 in 'A Hand-Held Wish List' in our December issue; for those who want something even smaller, he also discussed Sharp's PC-1360 and Casio's PB-1000. In that same issue, we offered an application story on the Toshiba T3200 and an overview of Toshiba's latest, the T1600 and T5200.

Our February issue featured portables and laptops. A comprehensive survey, detailed (with prices) the current offering in Australia; we also featured a variety of portable application stories. Compaq's new laptop and NEC's Portable SX were reviewed in detail.

a more mature technology that have made them a viable proposition in field conditions.

Portability, has become a key issue for using computers in field conditions. Sure, we had portable computers from 1978 onwards, but they were heavy and almost needed a generator for power. Now, the technology has given us smaller electronic components and smaller, more powerful batteries. Designers have also come up with new power saving techniques.

These include automatic powering down of peripherals not used for any length of time. The new Compaq laptop, for example, automatically switches off the power hungry hard disk, if unused for more than a few minutes.

In between 'pocket computers' and 'laptops' falls an instrument imaginatively called the data recorder. These machines typically hold 200 to 400 Kbyte of raw data and are usually part of an integrated system. Some manufacturers are just now starting to see a larger market for these machines in field conditions and are offering them as standalone alternatives for data collection, pocket diaries and small databases.

### Problem areas

COMPUTERS in the field have many enemies. Mother Nature being the cruelest and users running a close second. Dust and moisture can wreak havoc on any disk drive, no matter how durable it might be. The floppies themselves are vulnerable to the smallest dirt particle and the old adage of 'backing up' certainly will save some hair pulling in the field. Hard copy is essential for field staff and, unfortunately, this involves pitting the mechanical parts of portable printers up against the wind, dust and rain. Regular maintenance seems to be the key to keeping portable printers and disk drives running as they should.

Rough roads will always be a problem whilst in transit, but the new crop of laptops appear to have FJ Holden type capabilities when it comes to bumps! Low quality 3½ inch disks are rapidly challenging stubbies as the most common roadside garbage. Lanolin from wool fleeces has also been found to be good for the plastic of most laptops, if you happen to be using them in the shearing shed (as some West Australian sheep farmers are now doing)!

Readability of laptop screens is improving, but still has some distance to go. Gas plasma screens may solve the problem, but they are expensive and chew into the power fiercely. Still, anyone who can remember squinting at seven-figure log books, slide rules, or the earlier 'take your guess at the display' type calculator screens, may consider the new laptops to be more than adequate for the job.

### Future trends

INFORMATION gathers now have the capability to record field data on small computers. Methods vary throughout the country, but it would be safe to say that the majority of field data is now collected electronically. Memory constraints and the general fall in the price of hardware has seen a shift to laptops rather than pocket computers. Another commonly used data collection method is by the data recorders mentioned above. These small calculator-type instruments can be used to record the data and this can be 'dumped' when the machine is full, or, at the end of the day, to a field laptop or office PC.

Radio modems are used, to a lesser extent, in confined areas. These allow data to be sent via radio waves to the receiving PC. Mine sites are an ideal application for these radio modems. Security firms are another possible user of radio modems, and, in fact, a Gold Coast company already has a computerized system on trial.

Within one or two years we should see the 'truly' portable computer. I would envisage this machine to be about the size of a James Mitchener novel with MS-DOS or OS/2 as an operating system. The current development in smart card technology may also have a bearing on the future direction of computers in the field. □


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**Queries to Mark Laforest Group Systems Development Manager, on 693-0024**

# Control DOS with the Norton Commander V2.0

IT'S NEVER been easy to manage a hard disk. The DOS prompt was okay in the days of DOS 1 and 360 kilobyte floppies. With the advent of big hard disks, it became just too difficult to remember where files were. Using DOS commands to copy, rename and otherwise manipulate files and directories on a hard disk is just not the answer.

DOS shells are the answer. They are programs that sit between the user and DOS, and make it easy to run programs, copy, delete, rename and otherwise manipulate files, and create, rename and delete directories. In addition they make it quite simple to run programs without having to remember a list of arcane commands.

Three DOS shell programs which immediately come to mind are XTree (including XTree Pro), the DOSSHELL which comes with PC-DOS 4.0, and the evergreen Norton Commander. The first versions of XTree and Norton Commander took different approaches to disk and file management. XTree used a visual tree of the directory structure on a disk plus a list of file names, while Norton Commander had two panels, each of which showed the list of files in a different directory.

DOS can be a nuisance for even the most experienced users – but, as John Hepworth describes, the Commander takes the bother away.

Recently version 2 of the Norton Commander (NC) was released, a useful and welcome enhancement of this reliable standby. The two panels remain, but now either can show a list of files or a tree display. NC 2 has some features which make it particularly good for some tasks, and it is at least competent at all the tasks expected of a DOS shell.

## Features

FEATURES include the ability to create, delete or rename directories, and to copy, rename, edit, view or delete files. Most programs which offer a file viewing mode cannot handle anything except ASCII text files, and often only of limited length. Not the Commander – it can read files from Lotus, dBASE II and III, and ASCII files of any length. NC also makes it simple to create a custom menu system to allow even the novice to easily run a vast range of applications. Programs can be run by either 'point and shoot' techniques or by use of a user defined menu system.

Fire up the Norton Commander by typing either NC or NCSMALL at the DOS prompt. These commands run either of the two versions of the program on the distribution disk. Both function identically except that when a child program is run from NC, all the code remains in memory, taking up about 145 Kbyte; by contrast, when NCSMALL runs a child program it frees most of the memory it occupied, leaving just a stub program to reload the rest of NCSMALL when the child program terminates. This uses only about 18 Kbyte, much of which appears to be the second copy of COMMAND.COM required to run the child program. In all other respects the programs appear identical.

The first time that the Commander is run, a panel pops up over the right half of the screen. In this is shown the files in the current directory in 'brief' form. Only the file names and extensions are shown, and are displayed in three columns. It is possible to have a second panel at the left of the screen. Both can be displayed, both can be hidden, and either can be displayed while the other is hidden. A digital clock can be displayed at the top right of the screen. A builtin editor, invoked with F4, can be used to edit files. Typical of the flexibility of the Commander, users can change the configuration to an external editor or word processor instead.

While the default display in a panel is

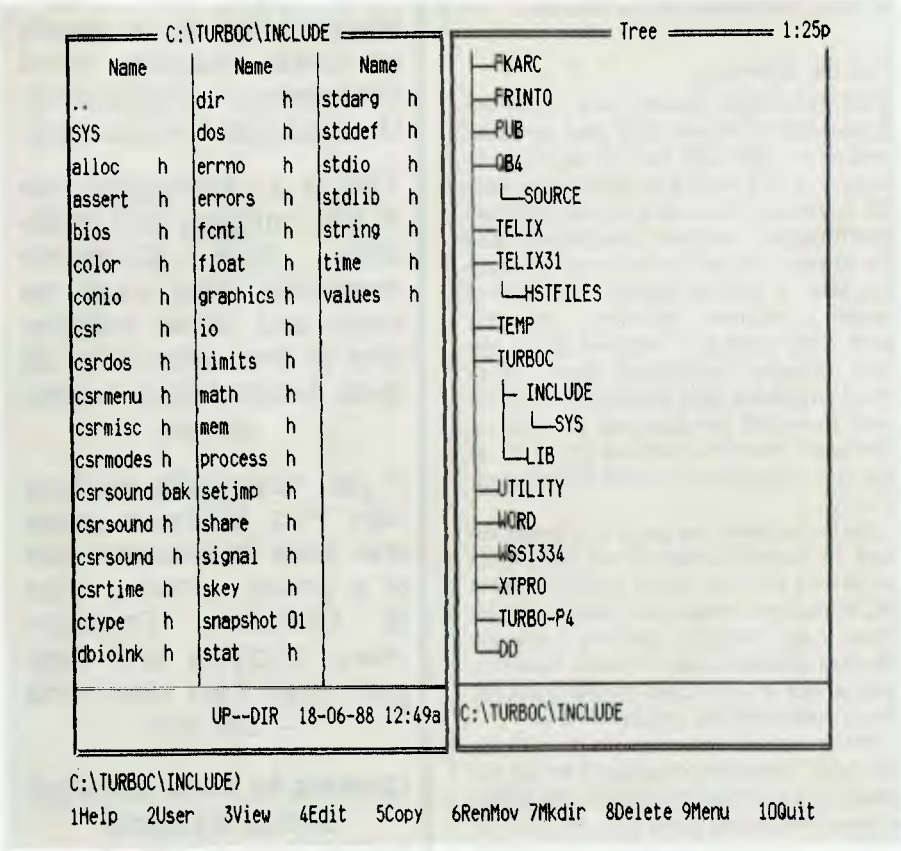


***Figure 1.*** *Version 2 of the Norton Commander hard disk manager features the option of having the directory tree structure displayed in either panel. The current directory can be changed simply by moving the highlight bar to another directory.*

the brief listing of files in a directory mentioned above, there are several alternatives. A 'full' display shows a list of files with name, extension, size, creation date and time. A 'tree' display shows the directory structure in a visual tree form. The 'info' display shows details of the disk. The panel displays can be of different drives or directories, and the file listings can be unsorted, or sorted by name, extension, time (including date) or size.

The user can save the desired configuration to disk, where it resides in a file called NC.INI. When it is run, Norton Commander looks for this file and configures the display accordingly. If NC.INI is not found, the default settings apply. Many other factors can be saved in the configuration file, including the ability to automatically go into the menu system instead of the standard display whenever Norton Commander is run.

## Command performance

A SAMPLE session will give the flavour of the Commander, with the program configured to have a 'tree' in the left panel and a 'brief' listing in the right panel. In one window will appear a reverse video cursor, called the file selection bar. The Tab key will toggle it from one window to the other, and the arrow keys can be used to move the cursor to a different file or directory.

Enter changes the directory, with the cursor over the name of the desired directory. To run a program, Enter is pressed while the cursor is over the name of a .BAT, .COM or .EXE file. The user can define other applications to be run with files having other extensions; for example, pressing Enter with the highlight over a file with the extension .ASC can be used to invoke WordStar in non-document mode, or, .BAS files can be loaded under a specified basic. A mouse is supported – while the Commander is great with the keyboard, it is fantastic with the mouse. Want to find a particular file or directory? You can search for a directory or file by pressing Alt while typing the first letter of the file name and/or directory (depending on whether one is in the file panel or the tree). As each additional letter is typed, the first entry that matches is shown.

A DOS prompt is at the bottom of the screen and any DOS internal command can be used just as if NC weren't present. Likewise, any program could be run by typing its name and pressing Enter. As mentioned above, it is possible to change directories from within the Commander by point-and-shoot (or by entering NCD – Norton Change Directory – and the first letters of the directory name), but the DOS prompt at the bottom of the Commander screen can also be used to run the DOS CHDIR or CD command.

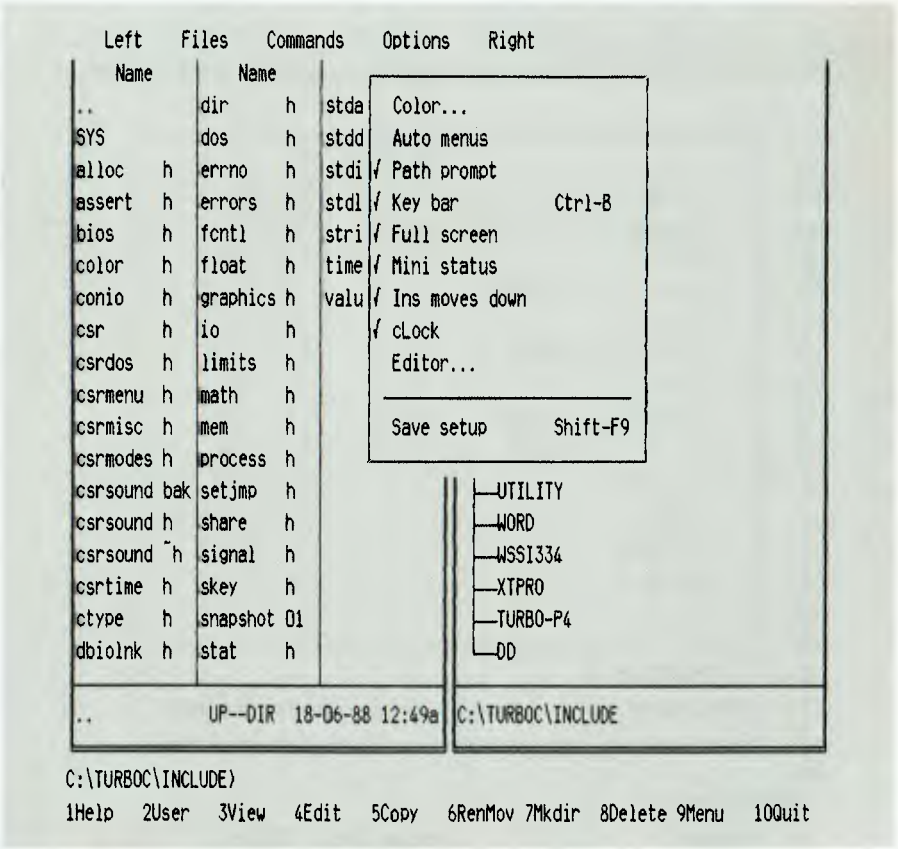


***Figure 2.*** *In the Commander's main menu across the bottom of the screen, F9 can now be used to drive the program entirely by menu (or mouse), including the definition of options.*

## Menus

THERE ARE two types of menus used by the Norton Commander. User defined menus are used to run external programs from a pop-up window which shows the name of the program. The information on the prompts for the screen, the commands to run the application and the keys to press to select from the menu, are saved in a file NC.MNU, which is created and edited with any word processor or editor, including the internal editor in Norton Commander.

The other menu system comprises the control menus used to operate Norton Commander. Five different menus can be popped down from the top of the screen either with F9, or by moving the mouse pointer to the top of the screen and clicking the left button. Five labels are seen across the top of the screen: Left, Files, Commands, Options and Right. Pressing the leading letter of the desired menu, or, moving a highlight with the arrow keys and pressing Enter, pops down a window. Within the window will be seen a number of options. They can be selected by moving the cursor with the arrow keys and Enter, or by pressing the capitalised letter in the name.

The Left and Right menus control the appearance of the left and right panels. Brief, full, info and tree displays can be selected. The panels can be turned on or off, which can also be done with Ctrl-F1 and Ctrl-F2 from the main screen. The sort order can also be selected from this menu. The Files menu allows the user to select from a menu many of the functions which can be done with function keys, including view, edit, copy, rename, move or delete files, and make or delete directories.

From the Commands menu a host of other functions are available. A full screen tree display is popped up with the NCD tree command, also available from the main screen by pressing Alt-F10. The Find

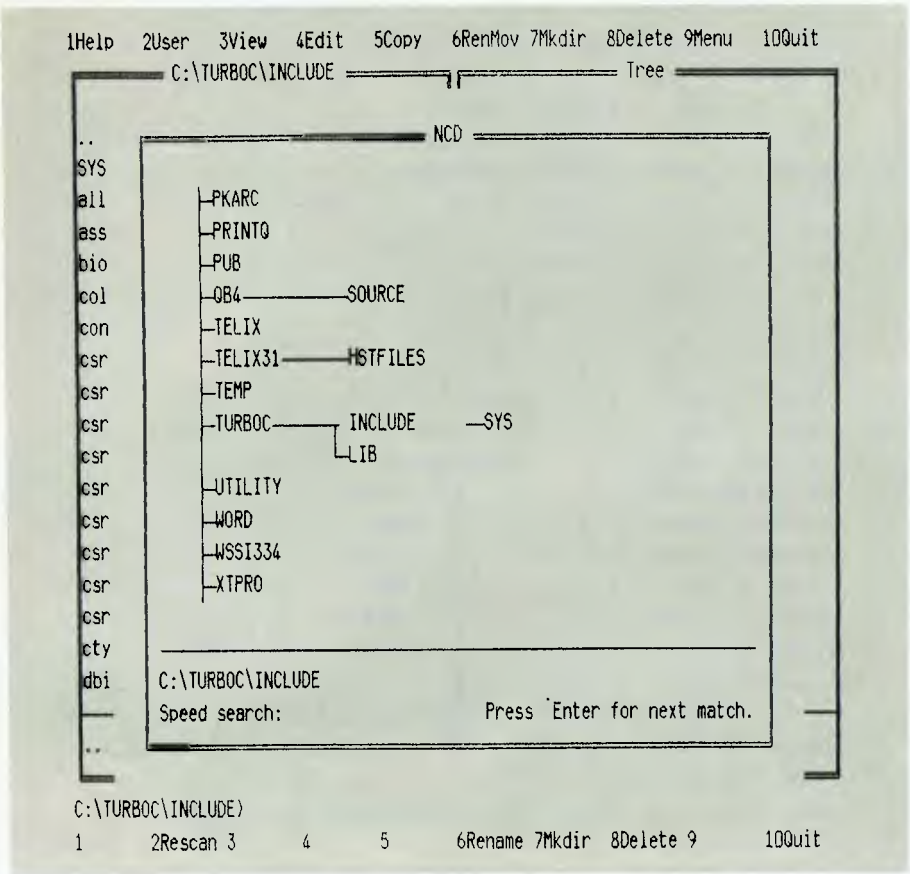


***Figure 3.*** *The features of NCD (Norton Change Directory) have been enhanced to include a pop-up window, displayed over the current panels with Alt-F10.*

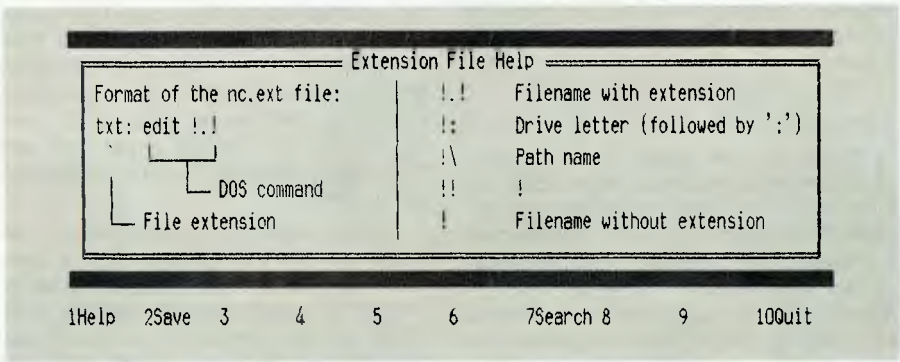


***Figure 4.*** *Among the many enhancements in Version 2, is this Extension File Help screen.*

File option scans the disk for files whose names match a pattern, which can include wildcards. Alt-F7 can also be used to invoke Find File. Sometimes users need to recall commands previously typed at the DOS prompt. Alt-F8 from the main screen, or History from the Commands menu allows old commands to be recalled, edited and reused. The EGA Lines option, or Alt-F9 allows the number of lines on screen to be changed.

Many other tasks are available from the Command Menu. Compare Directories compares the files in two directories. Where a file appears only in one directory it is tagged, and where both directories have a file with the same name, the newer version is tagged, making it easy to ensure that a disk has the latest version of every file. Menu File Edit allows the user defined menu file NC.MNU to be edited, and shows the relevant syntax in a help screen at the bottom of the screen. Extension File Edit creates or edits a file used to associate data files with the appropriate program, such as all .DOC files with your favourite word processor. Now clicking on a .DOC file would run the word processor and edit the .DOC file.

From the Options menu, the Color option allows the display to be set for black and white, color or LCD. Auto Menus invoke the user-defined menu system automatically whenever Commander is run. The DOS prompt at the bottom of the main screen always shows the default drive. The path can optionally be seen, and is toggled on or off by Path Prompt. Key Bar toggles on or off the labels for the function keys normally seen across the bottom of the screen. Full Screen allows the panels to take the full height of the screen, with the alternative being that the panels only take the top half of the screen. There are other options, and last of all Save Setup saves all the user's choices to disk so that they are all used next time the Commander is run.

## Summing up . . .

MOST OTHER disk menu or DOS shell system take a narrow focus and only cover some of the tasks in managing a disk system and running programs. Norton Commander makes it easy to maintain a disk, with two directory displays and optional tree displays. All necessary copying, renaming, deleting and moving of files is far better done with the Commander than with DOS commands. In addition, the advanced file viewing options, builtin editor (perfect for batch files) and the point-and-shoot method of selecting drives, directories and running programs is a boon. The simple creation of menus is fantastic. Yet another program finds a permanent home on my hard disk! □

### Product Details

**Product:** Norton Commander V2
**Distributor:** PC Extras
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(02) 319 2155
**Price:** $137 untaxed

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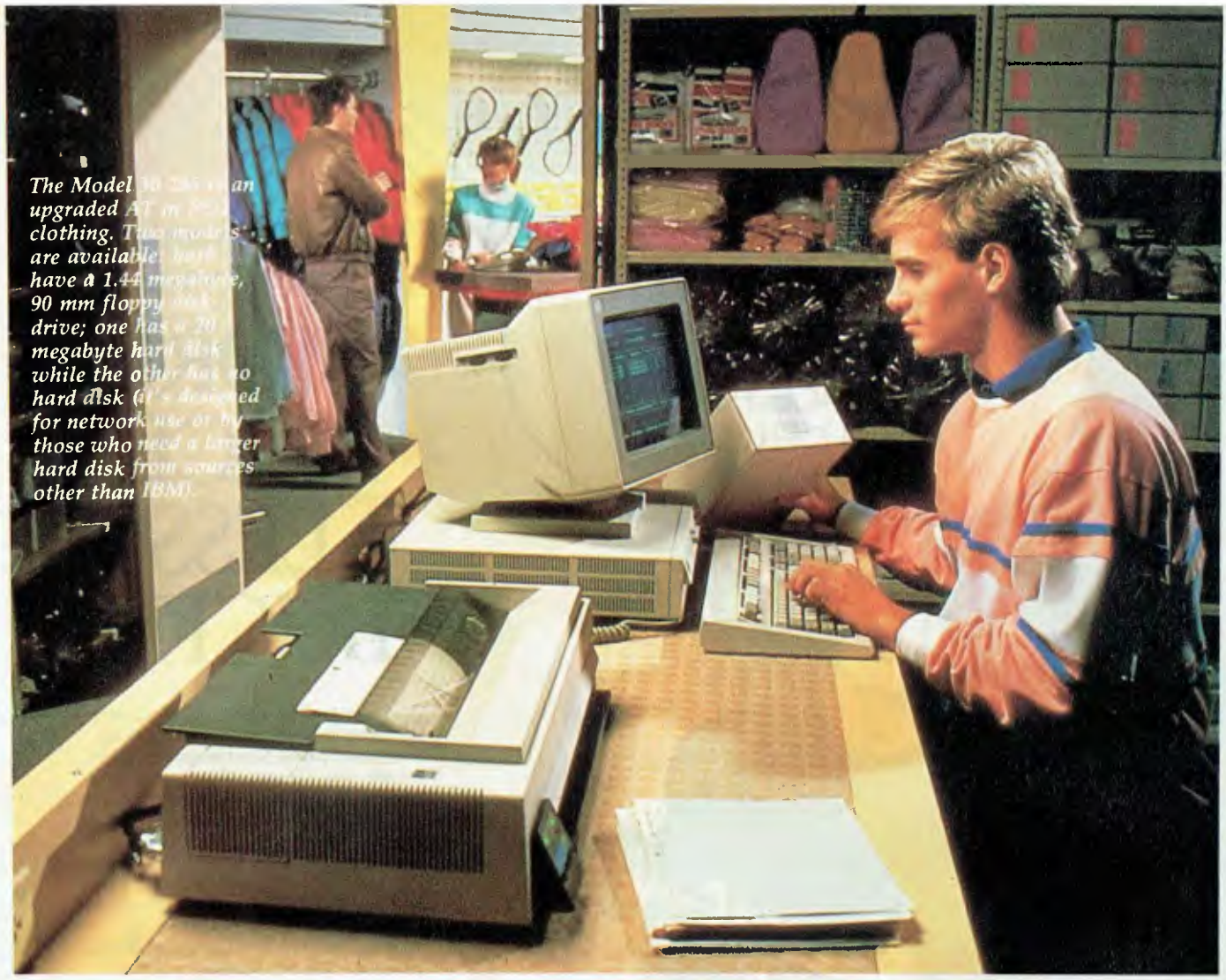

*The Model 30 286 is an upgraded AT in PS/2 clothing. Two models are available, both have a 1.44 megabyte, 90 mm floppy disk drive; one has a 20 megabyte hard disk while the other has no hard disk (it's designed for network use or by those who need a larger hard disk from sources other than IBM).*

# IBM's Model 30 286 - the AT returns!

## IBM hasn't forsaken the DOS world! John Hepworth reports . . .

IN THE middle of September last year, IBM made a momentous announcement. It was the release of the IBM PS/2 Model 30 286, a Model 30 upgraded with an 10 MHz, 1 wait state 80286 microprocessor, VGA, three AT-compatible expansion slots and many other enhancements.

Hidden beneath the announcement was something very significant. The Model 30 286 is an upgraded AT in PS/2 clothing, which may placate those users reluctant to commit themselves to the micro channel architecture of the Model 50, 50Z, 60, 70 and 80. There is something else significant – while IBM has not announced the end of the original Model 30 with a 8086, rumour has it that it is being phased out. This will make the new machine the entry level IBM, aimed at the DOS user, though it can run OS/2.

Two Models of the Model 30 286 are available. Both have a 1.44 megabyte, 90 mm floppy disk drive. One has a 20 Megabyte hard disk. The other has no hard disk, and is designed for network use or by those who need a larger hard disk from sources other than IBM.

### Appearance

FROM THE outside, the Model 30 286 appears almost identical to the original Model 30. Only the colour of the power switch has been changed. On the right side is a keylock for the case, which has no electrical connections and cannot be used to lock out the keyboard, as can keylocks on some other machines. The rear panel has connections for the parallel port, serial port (25-pin), mouse, keyboard, voltage selector, power inlet, fan and video output. Also visible are the covers for the three expansion slots. A U-bolt can be fitted to the rear panel to allow attachment of a padlock and security cable, and a hole in the bottom of the case can be used to bolt the system unit to a table.

One very interesting matter came to light, both from the product announcement and from inspection of the nameplate on the rear of the machine. It was made in Australia, in the IBM factory at Wangaratta in northern Victoria.

The keyboard is the now familiar IBM enhanced (AT) keyboard. It has a very good touch, and overall good key placement. I found it easy to use, though many software packages have been optimised for the vertical function key layout of the original IBM PC keyboard and are not as convenient to use on the newer layout.

*While IBM has not announced the end of the original Model 30 with a 8086, rumour has it that it is being phased out.*

## Video

THE MODEL 30 286 sports VGA built into the planar board, and the test machine came with an IBM 8513 colour monitor. Performance was typical VGA, with good resolution and colour. The monitor had good brightness and contrast, when used in either bright or dimly-lit locations. VGA does not exactly implement all features in EGA – while nearly all VGA software ran well, a couple of EGA demo programs which rely on EGA-only features did not run.

Opening up the machine is easy. Just undo two screws, one on each side, slide the cover back a couple of centimetres and lift it up. The first impression is that there is very little inside. A small planar board (called motherboard in years and machines gone by) runs from to rear and from the left to the middle. The power supply is at the right rear, and the disk drives at the front. The fan is built into the power supply.

Almost everything is on the planar board, using surface mounted components and very fine printed circuit board tracks, though a couple of tiny boards are attached vertically to the planar board. The planar board includes all the ports, the VGA video and the floppy and hard disk controllers. None of the three AT-

# The PS/2 range

THE MODEL 30 and Model 30 286 use the classic PC and AT bus. The others in the PS/2 range have Micro Channel Architecture. All have standard serial and parallel ports, mouse port and clock calendar. The Model 60 and 80 machines are tower style, and stand vertically on the floor. The others are desktop machines.

### Model 30

**Model 30**
8086, 8 MHz, 0 wait states
640 Kbyte memory
MCGA
Two 720 Kbyte floppies or one 720 Kbyte floppy and one 20 Mbyte hard disk
$3,593 (2 floppies)
$4,853 (1 floppy, 1 hard disk)

**Model 30 286**
80286, 10 MHz, 1 wait state
512 Kbyte RAM (maximum 4 Mbyte on the system board, 16 Mbyte with expansion boards)
VGA
One 1.44 Mbyte floppy or one 1.44 Mbyte floppy and one 20 Mbyte hard disk.
$4,678 (1 floppy and 1 hard disk)
$3,751 (1 floppy, no fixed disk drive)

### Model 50

**Model 50**
80286, 10 MHz, 1 wait state
1 Mbyte RAM (up to 7 Mbyte with expansion boards)
VGA
One 1.44 Mbyte floppy and one 20 Mbyte hard disk
$7,700

**Model 50Z**
80286, 10 MHz, 0 wait state
1 Mbyte RAM (up to 2 Mbyte on system board 16 Mbyte with expansion boards)
VGA
One 1.44 Mbyte floppy
One 30 Mbyte hard disk or one 60 Mbyte hard disk
$7,490 (30 Mbyte hard disk)
$8,990 (60 Mbyte hard disk)

### Model 60

**Model 60**
80286, 10 Mbyte, 1 wait state
1 Mbyte RAM (up to 15 Mbyte with expansion boards)
VGA
One 1.44 Mbyte floppy
One 44 Mbyte hard disk or one 70 Mbyte hard disk
$11,381 (44 Mbyte hard disk)
$13,488 (70 Mbyte hard disk)

### Model 70

**Model 70 E61**
80386, 16 MHz, 0-2 wait states

1 Mbyte RAM (up to 6 Mbyte on system board, 16 Mbyte with expansion boards)
VGA
One 1.44 Mbyte floppy
One 60 Mbyte hard disk
$11,800

### Model 70 121

80386, 20 MHz, 0-2 wait states
2 Mbyte RAM (up to 6 Mbyte on system board, 16 Mbyte with expansion boards)
VGA
One 1.44 Mbyte floppy
One 120 Mbyte hard disk
$14,801

### Model 70 A21

80386, 25 MHz, 0-2 wait states
2 Mbyte RAM (up to 6 Mbyte on system board, 16 Mbyte with expansion boards)
VGA
One 1.44 Mbyte floppy
One 120 Mbyte hard disk
$23,000

## Model 80

### Model 80 041

80386
1 Mbyte RAM (up to 16 Mbyte with expansion boards)
VGA
One 1.44 Mbyte floppy
One 44 Mbyte hard disk (second 44 Mbyte optional)
$14,579

### Model 80 071

80386
2 Mbyte RAM (up to 16 Mbyte with expansion boards)
VGA
One 1.44 Mbyte floppy
One 70 Mbyte hard disk (alternative 115 Mbyte optional)
$17,658

### Model 80 111

80386
2 Mbyte RAM (up to 16 Mbyte with expansion boards)
VGA
One 1.44 Mbyte floppy
One 115 Mbyte hard disk (additional 70 or 115 Mbyte optional)
$14,579

*All prices are taxed. For further information contact IBM Australia, Coonara Ave, West Pennant Hills 2120 NSW; (02) 634 9111.*

style slots had an expansion board in them in the test machine.

Three AT-compatible slots are provided. These are on a vertical board that plugs into a single slot on the planar board. The expansion boards themselves slot in horizontally. Memory is not on the planar board, but is installed on tiny expansion boards about 70 *x* 20 mm, each of which carries 9 chips.

Either 256 kilobytes or 1 Mbyte chips can be used, though the two varieties cannot be mixed in the same machine. These boards plug into four special memory slots, and don't take up any of the three AT-style slots. Standard memory is 512 Kbyte, and kits are available to increase this to 4 Mbyte, again without using the AT-style slots. If 4 Mbyte is not enough, other memory boards can be plugged into the AT slots, and the absolute maximum memory which can be fitted is 16 Mbyte.

*This will make the new machine the entry level IBM, aimed at the DOS user, though it can run OS/2.*

## Setup

GETTING started could not be easier. Just put a monitor on top, plug it into the video connector, plug in power cords for both, and turn them on. If the machine has not previously been used, a starter disk is provided to get things going. It has an automatic configuration program which lists the installed devices and assigns them to operate correctly. The configuration is then stored in non-volatile RAM. Subsequent sessions don't require the starter disk, though it is needed any time the configuration is altered.

I ran a representative range of software on the Model 30 286, to test both its speed and compatibility. All text based software ran well. As mentioned above, with all true VGA, some EGA demo programs would not work, nor would self-booting graphics games. Most other graphics programs worked well. LapLink ran at 115,000 baud, while Brooklyn Bridge would not run at any speed. As with any machine, if you have a range of software that you already use or want to use, make sure that you test the combination before buying.

The hard disk had only the size and performance of the typical hard disk in an XT, not an AT. The processor ran around 4 times faster than an XT on most benchmarks, and around 7 to 10 times faster on some obscure integer operations written in Assembler. The machine is fast and useful, but somewhat hobbled by a slow and ordinary hard disk. The availability of one version without a hard disk opens up an opportunity for other suppliers to make available faster and/or larger hard disks.

## Conclusion

IN ITS most common form, with a 20 Mbyte hard disk and a 8513 colour monitor, the Model 30 286 is an excellent entry level machine, though at somewhat of a premium price compared to no-name clones. In return for the higher price (though lower than the price for the original Model 30), it has VGA as standard, along with the one factor which reassures many users – the IBM logo on the front. Performance is good, though the slow hard disk is the limiting factor.

Some users may need a larger or faster hard disks, for OS/2 or large databases under DOS. For them, the answer could be to buy the version which has no hard disk, and fit another drive of their choice. □

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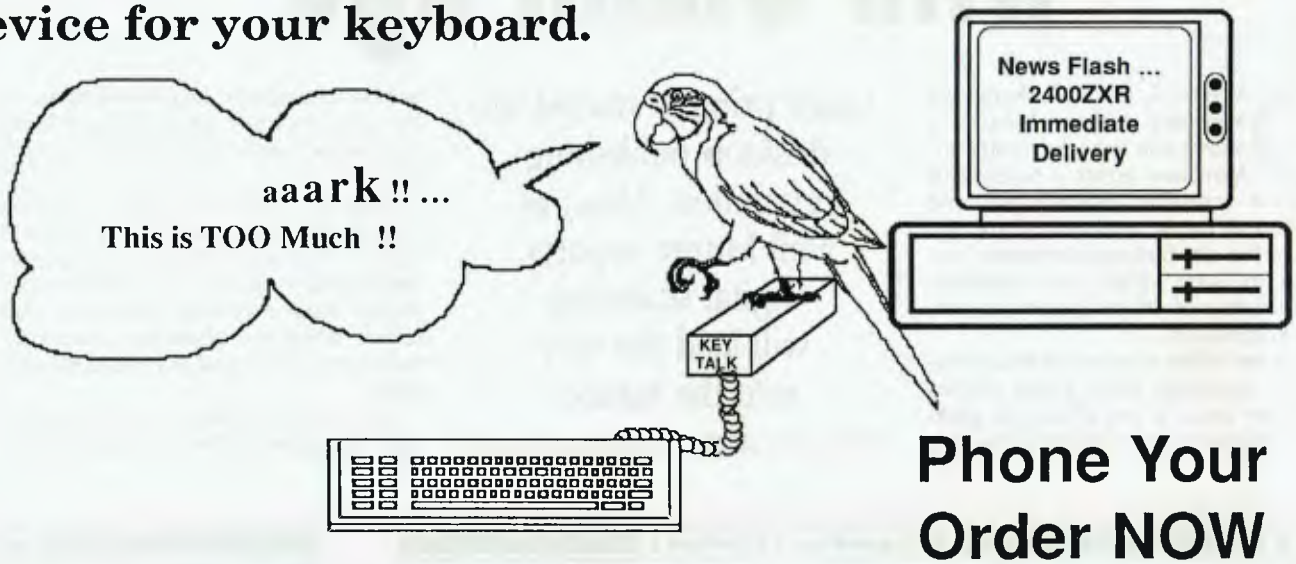


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# Bridging the paper canyon with OmniPage

OMNIPAGE IS an information *ownership* package, because it allows you to make printed information yours – to bring it into your computer environment and store it either in text or graphics form. Any font, any file, any business computer,' according to Larry Miller, the California-based Director of Office Systems for the Caere Corporation.

Of course, Miller is biased in his assessment of OmniPage since Caere created the system and it is one of the first packages of its kind designed for PCs. The 'any business computer' he referred to are the two editions which work on IBM PCs and compatibles and the big-memory Apple Macs.

Laser printers started the desktop publishing revolution. Now, as Neil Munro reports, digital scanning will lead the way into the future.

Used in conjunction with a desktop scanner, the OmniPage system allows PC users to scan and store pages from newspapers and magazines, government documents, legal contracts, insurance claim forms, telephone directories, transcripts and almost any typed or typeset business page.

Text on these pages can be automatically translated by the OmniPage software

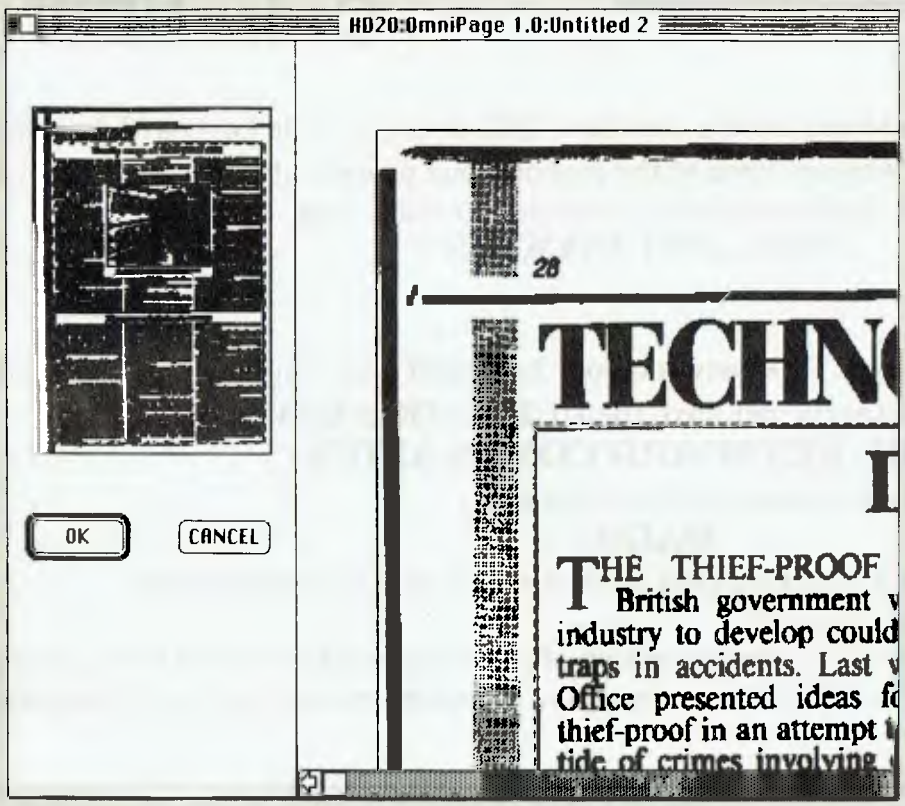


*Figure 1. OmniPage can scan text in any font – on paper or screen – up to 72 points in size. On a typical, well-printed page of standard quality type, there should be no scanning errors. With lesser quality or a very fine font type, the error rate will rise, but more than five errors per page is considered high.*

*Figure 2. The OmniPage system, when allows PC users to scan and store pages be automatically translated by OmniPage Alternately, pages of text and/or pictures*

into word processing file format for storage or editing. Alternately, pages of text and/or pictures can be scanned as graphic images for archival purposes.

The practical applications for information technology like this is medium to large business environments – and well-heeled hackers. Miller anticipates that corporations and public service departments to be the initial users of the system.

'I expect large organisations such as government to be the perfect place for this technology,' Miller said. 'In fact, right now, we have a team in Washington DC talking to the Internal Revenue Service because that place is full of paper. Schools, universities and libraries are other obvious users.'

The motivation behind Caere's confidence in OmniPage is the fact that most of the world's information is paper-based – making paper still the most compatible medium in business.

*sed in conjunction with a desktop scanner, om almost any typed or typeset page. Text can nto word processing files for storage or editing. n be scanned as graphic images.*

*'OmniPage is part of a significant change in the way computers will be used in the office from now on. As Apple boss John Sculley pointed out, the scanner will be part of the office of the future because there will continue to be more information produced on paper – and more information than any individual can handle.*

*'There is a certain amount of information that you file, but there is a gap of valuable information that you can't afford to file because you as sure as hell aren't going to type it in. By the time you had built a cross-reference file that made it valuable to you, it would become too expensive and too bothersome. So you let it go.*

*'I found myself reading magazines and trying to burn articles into my memory as I dropped them into the waste basket. I knew I couldn't file it, but I knew it was valuable. A program like OmniPage is a bridge over that canyon.' – **Larry Miller, Caere Corporation, creators of OmniPage.***

## The paper trail

BUT PCs are catching up and much of the information which ends up on hard or floppy disk systems is originally sourced from pages of print. Transferring large volumes of paper-based information into computers for manipulation and storage requires hours of re-keying. That's where Caere believes that OmniPage comes into its own.

Early reviewers of the system complained about getting a high percentage of errors when the software was set to read text and convert it into standard ASCII characters. As a result, the package was often written off as 'novel but not really practical'. But in most cases the fault lay in the scanner density setting.

Set too light the software will read characters such as *e* as *c* and *f* as *l*. Squint your eyes reading print and you'll see what the software sees when the scanner setting is wrong. But a little patience and experimentation should enable most printed or typed pages to be read by the system.

In practise, there is nothing very complicated about operating the software because it requires a minimum level of computer expertise – the real intelligence involved in the operation is supplied by the Optical Character Recognition (OCR) segment of the program's software.

## Patents pending

THE CAPABILITIES of any OCR software program are directly related to the programs complexity. To carry out the tasks of recognising multiple fonts and font sizes, columnar and full page formats as well as graphic scanning capabilities requires complex programming techniques. To protect their software investment, Caere has four separate patents pending in the USA.

The arrival of facsimile transmissions in businesses has increased, rather than lessened, the paper load in offices.

'OmniPage can handle fax pages as well as any other printed pages,' said Miller. 'It doesn't matter where the page of information came from – as long as the text is readable.'

Apart from scanned paper, OmniPage can also 'read' text from computer screens and fax messages received via computer. Said Miller: 'One of the things that has constrained inbuilt fax modem sales is that people want to be able to work on the text which comes into their computer, but what comes across in a fax modem is only a graphic image of the original page.)

'OmniPage solves this problem by scanning the text in any font – on paper or screen – and up to 72 points in size.'

The program handles multiple or single columns of text with equal ease and watching OmniPage 'do its thing' is fascinating: the software outlines each column in an image of the scanned page, then blocks out each line as it 'reads' the text. After 'thinking' for a while, the screen changes and the text appears as a word processing document.

On a typical, well-printed page of stand-

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ard quality type there should be no scanning errors. With lesser quality or a very fine font type, the error rate will rise. More than five errors per page is considered high. The quickest way to correct mistakes is to run the file through a spell checker – or re-scan the page with a different density setting on the scanner.

A built-in spell checker is an obvious omission from the package and Caere is considering this for inclusion in its next release of OmniPage.

## Saving an old story

AFTER TRYING different sheets of print as a test, I decided to put OmniPage through its paces with an old copy of a book I had cherished for years. It is now out of print and the pages are yellowed with age. After setting the scan area for the first page, all that was necessary after that was to turn the pages and press the button – OmniPage did the rest.

After a couple of hours of page turning I'd copied the text of ninety pages into OmniPage. A trained monkey could have carried out my contribution to the process. Most pages were free of error and I tidied up the rest in a word processor.

So, I ended up with word a processor file of an irreplaceable piece of literature, preserved in a medium undreamed of by the original author.

Miller believes that today's authors will be another group who will take advantage of this technology – as long as they use a typewriter or printer.

'In theory, you could fax the pages of a book to a publisher who would then use a scanner to translate the text into their word processor – then transmit that text to the typesetter. You could actually have a book printed in twenty fours hours of receipt,' he said.

'This what the global village is all about – time and space are not relevant any more as far as the printed word is concerned. I was talking to John Sculley about the significance of OmniPage – he's a truly visionary leader who doesn't worry about details too much – and he is using OmniPage.'

Miller's association with Apple goes back some time. Before joining Caere, he worked with Apple for five years and was part of the desktop publishing evolution.

'In those days it was three people and a couple of hundred thousand dollars trying to come up with an idea to sell LaserWriters. A few years later there is an entire industry built around desktop publishing.'

## The next wave

IF YOU look at what laser printers have done to the way people use computers you have to realise that without laser printers, desktop publishing wouldn't have happened. There are eighteen to twenty million PCs installed, but only 750,000 laser printers of any kind have been sold. So an infinitesimal number of laser printers have driven this huge change which sweeping across the world, affecting the way people relate to a computer. Scanners and OCR software will be the next wave.' Miller predicted.

Other applications for OCR technology will be the marriage of scanner/software systems with CD-ROM disks. With over 500 megabytes of text available to these disks, they could be filled with company data, histories, the *Yellow Pages* or rare books and the like.

### Product Details

**Product:** OmniPage
**Distributor:** OmniPage Australia, 90 Arthur Street, North Sydney 2060 NSW (02) 959 3644

**Price:** $4870 IBM PC XT/AT and compatibles; includes plug-in board with 2 Mbyte of RAM and a Motorola 68020 microprocessor – requires Microsoft Windows.

$1892 Macintosh SE and Macintosh II (software and documentation only); requires 4 Mbyte of memory.

*Note: both prices are taxed – OmniPage is awaiting clarification from the Federal Government on the new software tax.*

'Businesses like automated clipping services could scan pages and send a computer disk to their client,' Miller pointed out. 'Then anyone in that company could do a word search to find the clipping relevant to their job or section.'

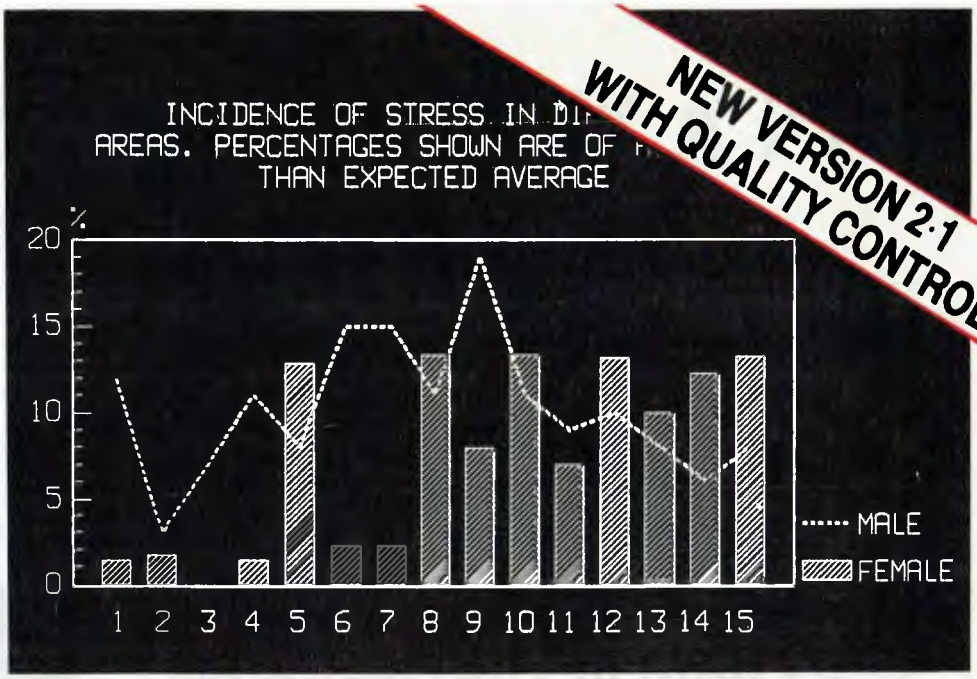
So what does Larry Miller see as the next major development for systems like OmniPage?

'The next step will be to translate foreign language text to English – maybe not poetic English but understandable English. This will be of enormous benefit to businesses which deal with foreign companies on a regular basis. That technology already exists and it is a likely future marriage with OmniPage.' □

## FEATURE COMPARISON CHART

■: Present □: Absent O: Optional L: Limited

| FEATURE | CSS | SPSS/PC+ |
|---|---|---|
| **Data Handling** | | |
| Conditional case selection | ■ | ■ |
| Computed variables | ■ | ■ |
| Free field data formatting | ■ | ■ |
| Joins data files | ■ | ■ |
| Lag variables | ■ | ■ |
| Merges data files | ■ | ■ |
| Missing values | ■ | ■ |
| Reads/Writes Ascii files | ■ | ■ |
| Reads/Writes Lotus/dBase files | ■ | ■ |
| Sorts cases/variables | ■ | ■ |
| Split data files | ■ | ■ |
| Spreadsheet data editor | ■ | O |
| Transformations | ■ | ■ |
| Transpose data | ■ | ■ |
| Variable labels | ■ | ■ |
| **Batch Facility** | ■ | ■ |
| **Macro Facility** | □ | L |
| **Contingency Tables** | | |
| Multiway tables | ■ | ■ |
| Chi-square tests | ■ | ■ |
| Other tests | ■ | ■ |
| **Nonparametric Tests** | | |
| Fisher's exact test | ■ | ■ |
| Friedman Anova-by-ranks | ■ | ■ |
| Mann-Whitney U | ■ | ■ |
| Kendall's Tau | ■ | ■ |
| Kolmogorov-Smirnov | ■ | ■ |
| Wilcoxon | ■ | ■ |
| **T-Tests** | | |
| Independent | ■ | ■ |
| Matched pairs | ■ | ■ |
| **Correlation** | | |
| Fisher's r to z transformation | □ | □ |
| Partial correlations | ■ | ■ |
| Pearson correlations | ■ | ■ |
| Spearman rank-order | ■ | □ |
| **Reliability/Test Item Analysis** | ■ | O |
| **Regression** | | |
| Standard multiple | ■ | ■ |
| Logistic | ■ | □ |
| Nonlinear | ■ | □ |
| Residuals Analysis | ■ | ■ |
| Simulataneous ridge | ■ | □ |
| Stepwise | ■ | ■ |
| **Analysis of variance (Anova)** | | |
| Analysis of covariance (Ancova) | ■ | O |
| Latin-square design | ■ | O |
| Multiway factorial | ■ | ■ |
| Nested designs | ■ | O |
| Planned comparisons | ■ | ■ |
| Post-hoc comparisons | ■ | ■ |
| Repeated measures | ■ | O |
| Split-plot designs | ■ | O |
| Unbalanced designs | ■ | ■ |
| Log linear models | ■ | O |
| Survival analysis | ■ | □ |
| **Multivariate Analysis** | | |
| Analysis of covariance (Mancova) | □ | O |
| Analysis of variance (Manova) | ■ | O |
| Factorial Manovas | ■ | O |
| Canonical correlation | ■ | O |
| Discriminant analysis | ■ | O |
| **Multivariate Analysis** | | |
| Analysis of covariance (Mancova) | □ | O |
| Analysis of variance (Manova) | ■ | O |
| Factorial Manovas | ■ | O |
| Canonical correlation | ■ | O |
| Discriminant analysis | ■ | O |
| Factor analysis | ■ | O |
| Hotelling's T-squared | ■ | O |
| Multivariate classification | ■ | O |
| Planned multivariate comparisons | ■ | O |
| Post-hoc multivariate comparisons | ■ | ■ |
| Principal component analysis | ■ | O |
| Repeated measures Manovas | ■ | O |
| **Cluster Analysis** | ■ | O |
| **Multi dimensional Scaling** | ■ | □ |
| **Quality control** | ■ | □ |
| **Time Series Analysis** | | |
| Auto correlation | ■ | O |
| Partial auto correlation | ■ | O |
| Cross correlation | ■ | O |
| Fast Fourier transform | ■ | O |
| Auto spectral analysis | ■ | O |
| Cross spectral analysis | ■ | O |
| Data tapering/smoothing | ■ | O |
| Box Jenkins ARIMA models | ■ | O |
| **Graphics/Graph types** | | |
| Box and whisker plots | ■ | O |
| Casement plots | ■ | □ |
| Chernoff faces | □ | □ |
| Contour (density) plots | □ | ■ |
| Histograms/frequencies | ■ | ■ |
| 3-D histograms | □ | O |
| Line graphs | ■ | O |
| Logarithmic/semilogarithmic plots | □ | O |
| Pie charts | ■ | O |
| Probability/cumulative probability plots | ■ | □ |
| Scatter plots | ■ | ■ |
| Stem and leaf plots | □ | O |
| X-Y-Z plots | □ | □ |
| **Graph features** | | |
| Overlaid plots | ■ | O |
| Error bars | ■ | O |
| Multiple text fonts | ■ | O |
| Free form text positioning/orientation | □ | O |
| Flexible chart sizing | ■ | O |
| Colour graphics support | ■ | O |
| Plotter support | ■ | O |
| Mouse support | □ | O |
| **Can use maths co-processor** | ■ | ■ |

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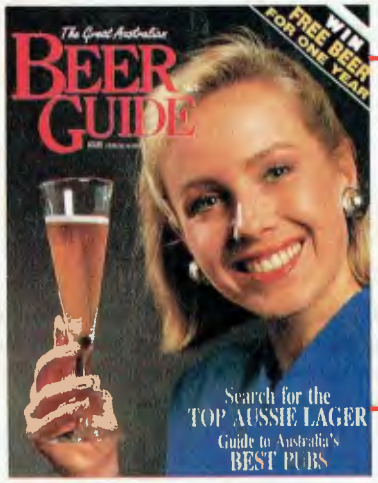


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My experience at YC has shown that our reader's tend to be an exceptionally aware crew. Not only do you want to know more about computers and gaining greater productivity from them, but, you want to find a magazine that stimulates your interest in computers — and their applications — with timely and informative articles. If the magazine is at a good price, all the better!

As I said, you all tend to be an aware crew but, the high-tech dynamics of the computer industry's competitiveness and the associated hype means you're probably more suspicious than most when asked to fork out your money in advance for anything. Who can blame you? Just before Xmas I ordered and paid for a certain article of software I thought would make my computing life a bit easier; yesterday I was told that the advertised version of the product was no longer being shipped since a new release was on the way 'real soon now.'

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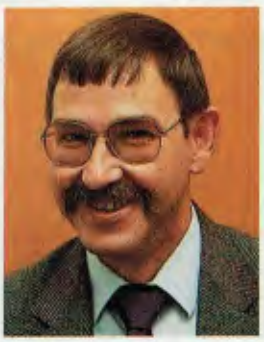
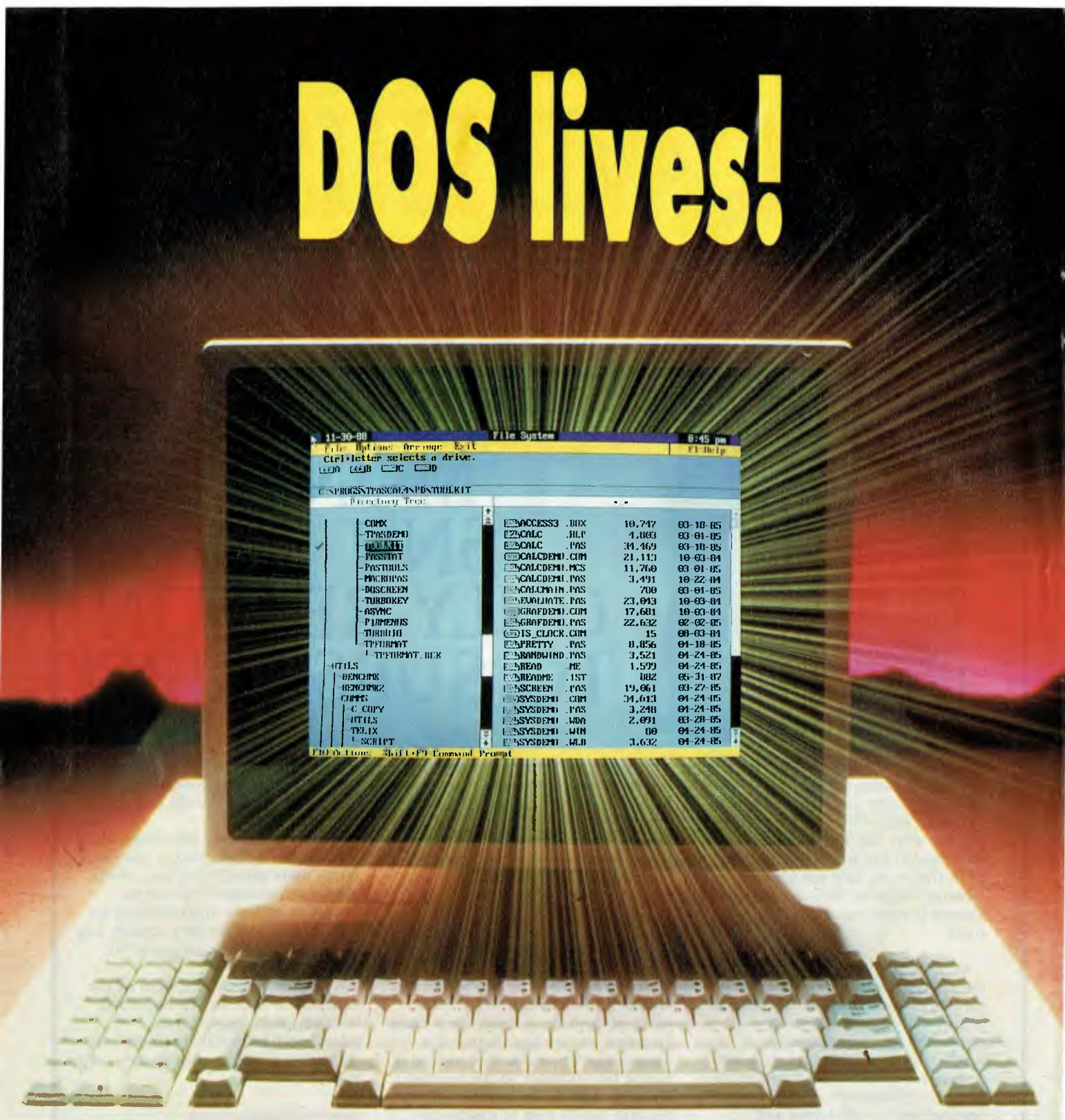


Jake Kennedy.

# DOS lives!




OS/2 may have arrived, but DOS is still fighting on. Chris Allen boots the old warhorse in new finery . . .

AT A TIME when you thought the world was about to pass you by, when the storm clouds of OS/2 were at their blackest and when all hope seemed lost, DOS, your faithful ally of bygone years, gets up from the canvas to fight again. Round 4, DOS lives!

Trifle dramatic? What the heck, DOS Version 4.0 is the first major revision of DOS since the IBM AT DOS Version 3.0 was released in 1984. As we all know, four

*Photo: Don Carroll/The Image Bank*

years is a long time in this industry, so probably the most surprising aspect of DOS 4.0 is the time it took to get here.

Is DOS 4.0 really that different from Version 3.x? The answer is yes and no. Yes, DOS 4.0 has significant improvements and changes over IBM DOS 3.x. No, if you have been using other varieties of DOS, such as Compaq MS-DOS 3.31, since several DOS 4.0 additions are already familiar to you.

## The facts

THE MOST significant improvements are the ability to use DOS disk partitions larger than 32 megabytes and the ability to access expanded memory. In one way or another, these abilities have been available through third party board manufacturers and software developers for quite some time.

The new version is significant because the changes to DOS itself should standardise the methods of utilising these features, and software developers will have a reasonably stable environment to write for. Just as software (networking, in particular) has become available which requires DOS 3.x, in the future you can expect to see software which requires or at least suggests DOS 4.x.

The most visible addition to DOS 4.0 is the DOS Shell – a menu system which can be customised to simplify the process of using application programs. As a menu system, it allows for a description of the option, the specification of path names and program filenames, optional passwords and help screens. In addition to its use as a menu system, DOS Shell also provides functions similar to utilities such as Xtree.

DOS Shell will operate with graphic and text displays and provides mouse support as standard. It conforms to the IBM Systems Application Architecture (SAA) keyboard and screen display standards.

The least visible change to DOS is its improved syntax checking on DOS commands and its vastly improved error messages. For example if your were to type FORMAT A:/D, DOS returns an error message 'Invalid Switch – /D'.

IBM sees DOS 4.0 as the primary operating system of choice for those single user systems based on 8086/8088 microprocessor and as the entry level operating system for single user systems based on an 80286/80386 microprocessor, without need of multi-tasking and virtual storage capabilities.

IBM PC-DOS Version 3.3 will still be available for those users who do not require the new functions. According to IBM, OS/2 will be the primary operating system for single user systems based on 80286/80386 microprocessors who require full multi-tasking in a more sophisticated environment.

*The new version is significant because the changes to DOS itself should standardise the methods of utilising these features, and software developers will have a reasonably stable environment to write for.*

## Hard disk organization

DOS 4.0 handles the details of file storage in a significantly different way from previous versions of DOS. The ability to support partitions of 32 Mbytes has been achieved through a combination of increased size of the file allocation table (allowing more clusters to be allocated), the capability to increase the size of each cluster and the ability to address large sector numbers. The boot record is the only file management component which has a fixed size.

The File Allocation Table (FAT), which is essentially an index of where files are located, has a variable size depending on the size of the partition being used. If the partition is less than 32 Mbytes the FAT will be the same as in DOS Version 3.x. A hard disk formatted under DOS 4.0 will be bootable under DOS 3.x if the partition size is under 32 Mbyte. The large file support of DOS 4.0 should be compatible with the file management of OS/2 Standard Edition 1.1 and Extended Edition.

## Documentation

IBM has changed the format and type of the documentation provided with DOS 4.0. Supplied as standard are two manuals, *Getting Started with DOS 4.0* and *Using DOS 4.0*. These two manuals are enough for users who rarely use more than a few commands or reconfigure their system. These manuals contain less detail on DOS commands than the standard documentation in previous versions of DOS.

To supplement the standard documentation, IBM offers the *DOS 4.0 Command Reference Manual* and the *DOS 4.0 Technical Reference and Application Programming Manual*, at additional cost, naturally.

## Compatibility

I'VE HAD DOS 4.0 running on my system for about six weeks, with no major problems. All application software I've used has performed as expected, although my system has a mere 20 Mbyte of disk space.

Programs such as XtreePro and SideKick have had no problems, though Norton Utilities was unable to recognise the format of the hard disk and had to be used with the /M (maintain parameter) switch. Utilities that directly access the disk will have to have new versions released. It's a fair guess that most of the major players are working on this right now.

It would be accurate to say that compatibility has not affected the operation of my system to date. According to IBM, applications that make use of unpublished DOS interrupt 21H functions, or make use of unpublished DOS internal control blocks, may not function correctly under DOS 4.0.

IBM claims that I/O performance has been improved significantly with DOS 4.0. This has not been obvious in my general usage, but it would be difficult to notice anything less than a 20 per cent improvement.

## The bottom line

DOS 4.0 OFFERS significant improvements to Version 3.30, though many users may not require the additional functionality at the present time. Because IBM has introduced this new version, and because of the DOS 4.0 support for larger files and memories, the life of DOS as a viable operating system has been extended yet again. Other manufacturers are sure to release their own versions. DOS 4.0 is here to stay, and DOS the war horse lives to fight yet another day! □

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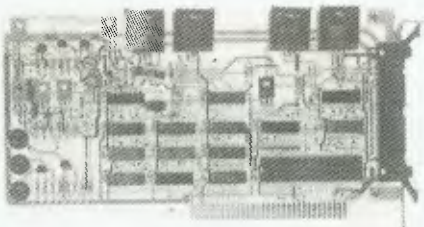

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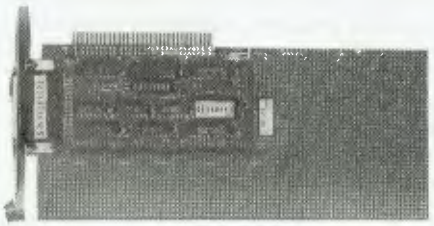

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| MB286161M | Baby 286 M/Board,16MHz/1M | 1645 00 |
| MB28616L1M | Baby 286 M/Board,16MHz/1m | 1495 00 |
| MB286201M | Baby 286 M/Board,20MHz/1M | 1895 00 |
| MB386202M | Baby 386 M/Board,20MHz/2M | 4500 00 |

### CHIPS

| | | |
|---|---|---|
| IC256K12 | 256K RAM Chip 120nS | 23 00 |
| IC256K15 | 256K RAM Chip 150nS | 19 90 |
| IC256K80 | 256K RAM Chip 80nS | 29 50 |
| IC28710 | 80287, 10MHz Co-processor | 549 00 |
| IC2876 | 80287, 6MHz Co-processor | 315 00 |
| IC2878 | 80287, 8MHz Co-processor | 450 00 |
| IC64K12 | 64K RAM Chip 120nS | 9 00 |
| IC64K15 | 64K RAM Chip 150nS | 7 50 |
| IC8087 | 8087-2, 8MHz Co-Processor | 275 00 |
| ICV20 | NEC V20 Chip | 29 00 |
| ICV30 | NEC V30 Chip 10MHz | 49 00 |

### DISK DRIVES

| | | |
|---|---|---|
| DD1037A | Disk Drive,NEC 720K,3 5in | 235 00 |
| DD1053 | Disk Drive, Japanese 360K | 175 00 |
| DD1137H | Disk Drive, NEC 1 44M | 229 00 |
| DD1157C | Disk Drive, NEC 1 2MB | 199 00 |
| DD3146H | Hard DD, NEC 40MB, 35mS | 695 00 |
| DD5126 | Hard Disk Drive, NEC 20MB | 399 00 |
| DD5146H | Hard Disk Drive, NEC 40MB | 645 00 |
| DD3142H | Hard Drive, NEC 42MB 28mS | 745 00 |

### SYSTEMS

| | | |
|---|---|---|
| SY28612 | System 286,12MHz, 1MB RAM | 1745 00 |
| SY28616 | System 286, 16MHz, 1MB RAM | 2195 00 |
| SY28620 | System 286, 20MHz, 1MB RAM | 2395 00 |

### SOFTWARE

| | | |
|---|---|---|
| SW410 | MS DOS V3.2 (NEC) | 80.00 |
| SWCCSD | CCS Designer | 179 00 |
| SWPAINT | CCS Paintshow | 55.00 |
| SWSL1 | CCS Symbol Library No 1 | 79 00 |
| SWSL2 | CCS Symbol Library No 2 | 79 00 |
| SWSL3 | CCS Symbol Library No 3 | 79.00 |
| SWWM | Wordmagic, Wordprocessing | 139.00 |

### KEYBOARDS

| | | |
|---|---|---|
| KB101 | Keyboard, 101 Keys XT/AT | 145 00 |
| KB84 | Keyboard, 84 Keys XT/AT | 125.00 |

### ACCESSORIES

| | | |
|---|---|---|
| AC2MP | Printer Cable, 2M, 25 pin | 12 00 |
| AC3MP | Printer Cable, 3M, 25 pin | 15 00 |
| AC5400 | 14 EGA Colour Monitor | 745.00 |
| ACDA | 9 pin Designer Adaptor | 10 00 |
| ACDM | Designer Mouse (290 DPI) | 99.00 |
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| ACLM | Logitech Mouse | 130.00 |
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| ACMA | Monitor – TTL Amber | 199.00 |
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| ACMG | Monitor – TTL Green | 199 00 |

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| | | |
|---|---|---|
| PR2200 | NEC P2200 Printer | 695 00 |
| PR22CSF | Cut Sheet Feeder P2200 | 155 00 |
| PR30 | Printer, Olympia 9 pin | 425.00 |

### CONSUMABLES

| | | |
|---|---|---|
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| COD360 | Diskette, box of 10, 360K | 20 00 |
| CODB1200 | Diskette, 1.2M, Bulk Pack | 6 00 |
| CODB360 | Diskette, 360K, Bulk Pack | 2 50 |
| COMD720 | Micro Disk,Box of 10,720K | 66 00 |

### I/O CARDS

| | | |
|---|---|---|
| IO1005 | Multi I/O Card XT only | 175 00 |
| IO1009 | Parallel Printer Card | 44 00 |
| IO1010 | Serial RS232 Card,XT only | 55 00 |
| IO10102P | Serial RS232 X 2, XT only | 79 00 |
| IO1014 | I/O Plus Card XT Only | 136 00 |
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| IO2240 | Multi Serial Card, 4P AT | 245.00 |
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| IO2280 | Multi-Serial Card, 8P AT | 645.00 |
| IOCHIP | Chip Set for IC1010 | 25 00 |

### VIDEO CARDS

| | | |
|---|---|---|
| VC0800 | VGA Card, 800 x 600 | 545 00 |
| VC1024 | VGA Card, 1024 x 768 | 895.00 |
| VC1623 | Turbo Colour Graphics Cd | 165 00 |
| VC1625 | Colour Graphics/Mono Card | 195 00 |
| VC1629C | EGA Card, W/Hercules Mode | 249 00 |
| VC1633 | Turbo Mono/Graphics Card | 165 00 |
| VC1635 | Turbo/Mono Printer Card | 175 00 |

### DISK CONTROLLER CARDS

| | | |
|---|---|---|
| DC1004A | Floppy Disk Card, 4 Ports | 59 00 |
| DC1220 | 1 2M/360K,720K/1 44M FDC | 125 00 |
| DC1240 | Disk Cont 2in, 2Ex, or 4in | 149 00 |
| DC2200 | Hard Disk Controller XT | 145 00 |
| DC2210 | HDD/FDD Cont/Board XT | 175 00 |
| DC2300 | Hard Disk Controller AT | 245 00 |
| DC2310 | HDD/FDD Controller AT | 249 00 |
| DC2340 | 2HDD/4DD Controller AT | 299 00 |

### POWER SUPPLIES

| | | |
|---|---|---|
| PS9150CB | 150W PSU, Circuit Board | 85 00 |
| PS9150S | 150W Switching PSU XT | 148 00 |
| PS9180 | 180W Switch PSU Baby AT | 170 00 |
| PS9180L | 180W PSU, Baby AT, L Type | 170 00 |
| PS9200 | 220W Switching PSU AT | 220 00 |

### CASES

| | | |
|---|---|---|
| CAAT | Case, hinged AT | 155 00 |
| CAATB | Case Baby AT, hinged | 135 00 |
| CAEX3 | 3 5 Ext Case + Cable | 99 00 |
| CAEX5 | 5 25 Ext Case + Cable | 99 00 |
| CAMCASE | 5 25 Case for 3 5 Drive | 25 00 |
| CATOWER6 | Case, Tower for 6 Devices | 420.00 |
| CAXT | Case, hinged XT | 95 00 |

### INTERFACE CARDS

| | | |
|---|---|---|
| IF045 | Serial RS-422 Adaptor | 135 00 |
| IF046 | Industrial I/O Card | 445.00 |
| IF054 | Universal Wire-wrap Card | 125 00 |
| IF055 | Dual Serial RS-422 Card | 195 00 |
| IF286S | 80286 Speed-up Card | 595 00 |
| IF488 | IEEE 488 Interface Card | 465 00 |
| IFADDA12 | A-D/D-A Conv, 1 Channel | 215 00 |
| IFADDA14 | A-D/D-A Conv, 2 Channel | 599 00 |
| IFCLOCK | Clock Card XT | 50 00 |
| IFEPROM | EPROM Writer Card | 245 00 |
| IFIEGA | Orchid Turbo EGA Card | 950 00 |

### RAM CARDS

| | | |
|---|---|---|
| RC1015 | Universal RAM Card,0K RAM | 99.00 |
| RC2000 | 2MB EMS Memory Cd, 0K RAM | 295.00 |
| RC2000EEA | 2MB RAM Cd, 0K LIM/EEMS AT | 295.00 |
| RC2000EEX | 2MB RAM Cd, 0K LIM/EEMS XT | 295.00 |
| RC2350 | 3 5MB M/Funct Cd 0K RAM | 495.00 |
| RC2500 | 2 5MB RAM Cd, 1S, 1P AT | 345.00 |
| RC3350 | 3 5MB RAM Cd, 0K RAM AT | 235.00 |

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- Recording method: FM/MFM
- Dimensions: 41mm (H) x 146mm (W) x 203mm (D) (not including front panel)
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The DD5126 combines advanced technology with rugged design. The DC servomotor and split steel band access mechanism provides an access time of 85ms. A dedicated head landing zone, automatic carriage lock and low mass heads protect the media during shipment.
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- Power consumption: 20W
- Size: 146mm (W) x 41mm (H) x 208mm (D)

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- Access time track to track 8ms. Average seek time 35ms (28ms for DD3142H)
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- Data transfer rate 625Kb/sec
- Power consumption 9.2W
- Non-operating shock: 40G
- Size: 41.3mm (H) x 101.6mm (W) x 146mm (D)

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CAT CAMCASE
**3.5 inch Tray**
This adaptor tray enables a 3.5 inch slimline floppy drive to be mounted in the same space normally occuppied by a 5.25 inch drive. It comes complete with a 5.25 inch to 3.5 inch power adaptor cable.
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CAT CAEX5
**5.25 inch External Drive Case**
This case permits external mounting of a 5.25 inch hard or floppy drive. It comes complete with 37 pin connector and cabling to connect to a controller with an external socket.
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CAT CEAX3
**3.5 inch External Drive Case**
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CAT DC2300
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- ON board copyright BIOS.
- Default 3 to 1 interleave. Selectable from 1 to 9 by user.
- User-friendly on screen physical format, parameter settings.
- On-screen user selectable drive types
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- Support 2 ST506-type drives. The drives can be in different types. Included: 1 x 20 way cable, 1 x 34 way cable

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- On-board copyright BIOS
- Default 3 to 1 interleave factor can be varied from 1 to 9 by the user.
- User-friendly on-screen physical format, parameter settings.
- On-screen user selectable drive types
- Shipdisk software included in the BIOS
- Supports 2 x ST506 type drives. The drives can be different types.

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CAT DC2210
**Hard Disk/Floppy Disk Controller Card**

This card provides high performance of up to two (2) hard disks, while also controlling up to two (2) floppy disk drives, either 5.25" 360KB or 1.2MB, or 3.5" 720KB or 1.44MB, for the PC "XT" or compatible computer.
- Digital Phase Lock Loop circuitry
- CRC and ECC functions ensure data integrity
- On board BIOS (copyright)
- Default 3 to 1 interleave factor. Selectable from 1 to 9 by the user.
- Shipdisk software is included in the BIOS
- It supports two (2) ST506-type drives. The drives can be different types.
- It controls up to two (2) floppy disk drives.

The drives can be different types in any combination of 5.25" 360KB or 1.2MB, or 3.5" 720KB or 1.44MB.
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3.5 inch – 720K or 1.44Mb
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# New Commands

DOSSHELL is a batch file created by the select program, which enables you to access the DOS 4.0 shell interface. This batch file calls the shell into action with all the parameters requested. These parameters control items such as mouse support, screen type and the resident/-transient nature of the shell. In transient mode, about 4 kilobytes of RAM is used to store a small Terminate and Stay Resident (TSR) program, which will call the shell into action when requested. In resident mode at least 10 Kbyte is required, but the figure can be as high as several hundred kilobytes or more, depending on the options specified.

**INSTALL** – Install provides a more efficient means of loading DOS terminate and stay resident programs. The programs supported by install are FASTOPEN, KEYB, NLSFUNC and SHARE. TSR programs such as SideKick can also be invoked in this way, though IBM doesn't mention this general capability in the DOS 4.0 documentation. For example –

```
INSTALL=C:\DOS\SHARE.EXE
```

**MEM** – Mem displays the amount of used and unused memory, and all programs presently in RAM. The syntax used is –

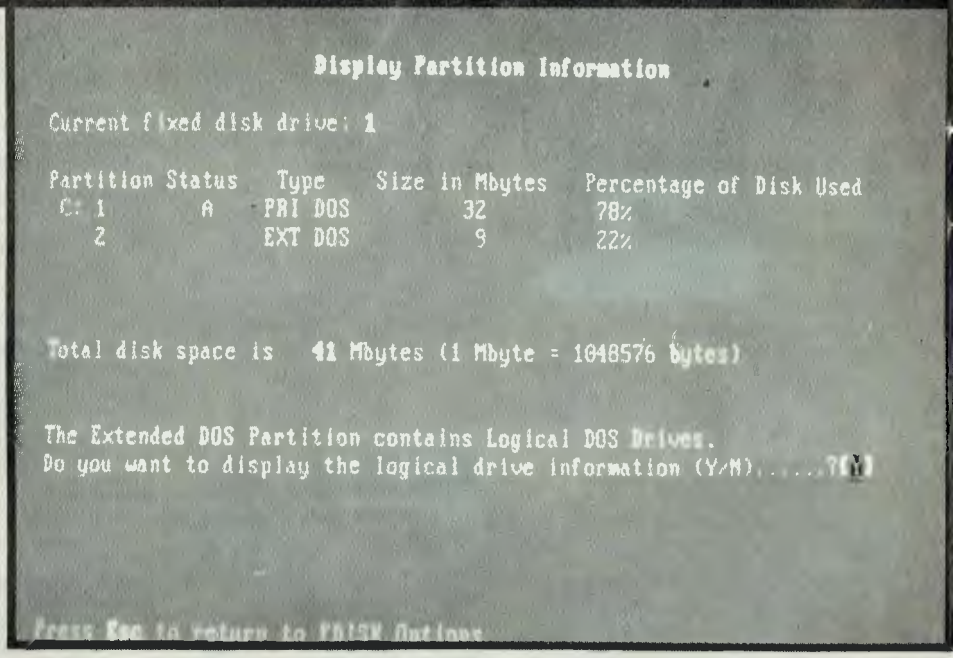
```
MEM [/DEBUG] (RETURN)
MEM [/PROGRAM] (RETURN)
```

Mem by itself will show the total amount of conventional RAM in the system as well as the extended and expanded memory available. Use of the /PROGRAM switch will also display all the programs in memory with their hexadecimal locations. Use of the /switch will display all the installed device drivers as well as the information provided by the /PROGRAM switch.

When you use this switch you may be surprised at the number of DOS programs in memory such as FASTOPEN, PRINT and GRAPHICS. These programs are in memory because they are terminate and stay resident programs, just as a program such as Borland's SideKick is, though you don't tend to notice them once they're in place.

**SWITCHES** – The SWITCHES command forces the system to use PC, XT and AT keyboard functions when an enhanced keyboard is in use. This is to provide compatibility with software that does not understand the enhanced keyboard.

**XMAEMS.SYS** – This driver emulates the IBM Personal System/2 80286 Expanded Memory Adapter/A. This is only useful if you need to emulate expanded memory on an IBM 80386-based system. Use of this function on non-IBM hardware could be unpredictable.




*FDISK has a new screen appearance which uses 80 columns instead of 40. Partition sizes may be selected in percentages and megabytes, instead of cylinders, and partition sizes of up to four gigabytes are supported.*

**XMA2EMS.SYS** – This driver supports the Lotus, Intel and Microsoft (LIM) expanded memory specification.

Modified commands include –

**ANSI.SYS** – The Ansi.sys driver has been enhanced with three new switches: /X – enables extended key values to be redefined as distinct keys; /K – prevents Ansi-.sys from using extended keyboard functions; and /L – retains the number of rows requested by the MODE command.

**APPEND** – The append command has improved control in its search operations.

**BACKUP** – The BACKUP command will now automatically format the target floppy if is appears unformatted.

**BUFFERS** – The BUFFERS command now supports expanded memory and also has a parameter to specify the number of sectors the system can look ahead before processing any input operation. The syntax is –

```
BUFFERS=n, m /X (RETURN)
```

Where n is the number of buffers (1-99 conventional RAM, 1-10,000 expanded RAM), m is the number of sectors the system can read ahead and /X indicates that the buffers are stored in expanded memory.

**CHKDSK** – CHKDSK will display the serial number of the partition and the allocation units total, used and available.

**COUNTRY** – Character support is provided for additional countries such as Japan, Korea, China and Taiwan.

**DEL** – A new switch has been added to the delete and erase commands which will prompt the user before deleting a file. For example –

```
DEL C:\DATA\*.WK1 /P
```

**DISPLAY.SYS** – DISPLAY.SYS now checks the hardware to select the type of active display if you don't specify the display adapter type. Display.sys only relates to code page switching which is not used by most Australian users.

**FASTOPEN** – The FASTOPEN command now has a /X switch to enable it to utilise expanded memory thereby leaving more space available in low memory (640 Kbyte) for application programs.

**FDISK** – FDISK has a new screen appearance which uses 80 columns instead of 40. Partition sizes may be selected in percentages and megabytes instead of cylinders, and partition sizes of up to four gigabytes are supported. This overcomes one of the most significant limitations of earlier versions of DOS and as a bonus IBM have also made it easier to configure.

**FORMAT** – The format command has two new switches /V and /F. The /V switch allows you to bypass the system prompting

for a volume label after formatting a disk. The /F switch allows you to specify the size of disk to be formatted. For example

```
FORMAT A:/F:720
```

This will format a 3½ inch disk to 720K capacity. Previously the number of tracks and sectors had to be specified.

**GRAFTABL** – Graftabl now supports the multi-lingual code page, 850.GRAPHICS – GRAPHICS now supports the VGA graphics modes and also provides support for more IBM printers.

**KEYB** – The KEYB command selects non US standard keyboards. A new switch allows the keyboard ID to be selected, making the process simpler for countries that have more than one enhanced keyboard, for example, France.

**MODE** – In addition to it's previous functionality, MODE now selects the keyboard typematic rates, the number of lines on a screen and asynchronous parameters. The typematic rate is the speed at which a key repeats itself when held down. A value of 1 to 32 can be used resulting in repeat rates of 2 to 30 times a second. The delay after a keypress before auto repeating starts can also be specified from ¼ inch of a second to a second.

**PRINTER.SYS** – PRINTER.SYS supports code page switching and has been improved with enhanced IBM Proprinter support.

**REPLACE** – The REPLACE command has a new /U switch will restrict REPLACE to only updating files when the source file has a more recent date and time than the target file.

**SELECT** – SELECT is now a sophisticated utility designed to aid in the installation of DOS. There is a version of the select command for 5¼ inch and 3½ inch media. It appears that the 3½ inch version expects to be used on an IBM PS/2 computer, and will not function correctly on older IBM microcomputers. You must specify which version you require when you purchase DOS 4.0.

**SYS** –The SYS command now allows the specification of a source drive and directory This is designed to simplify installation across a network.

**TIME** – The TIME command will accept 12 or 24 hour time, depending on how it is specified by your country code.

**TREE** – The TREE command now uses block graphics and indents at each subdirectory level.

**VDISK** – VDISK has two new switches, /X and /E. These enable VDISK to use expanded and extended memory respectively.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AHEARN DL002 LH

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# The Applix 1616

## – at last, a computer for hackers!

Tom Moffat has found the ideal hacker's computer – but first you'll have to build it!

APPLIX? WHAT'S this Applix then? Not from one of your world-shattering computer multinationals. Never a mention of it in *Byte* (although I noticed it's cracked an advert in *Your Computer*). None of them floating around the Information Science unit at Uni, or around government offices.

The Applix 1616 *looks* like a PC-compatible on the outside, and it has an IBM-style keyboard. But, inside it's got a 68000 processor, like a Macintosh – and a good old Z-80! The operating system looks a bit like MS-DOS, and a bit like Unix. Where are the Applix spreadsheets, and the word processors, and the expert systems, and the Applix version of Lotus, and dBase? Well, there ain't any. The Applix just isn't that sort of computer. And it comes not from Silicon Valley, but Sydney.

Unlike so many modern computers, the Applix speaks hexadecimal as its native number system, and it starts counting at zero instead of one. You'd think the thing was meant for Hackers! We all know that hacking is very naughty, but in the privacy of your own room . . .

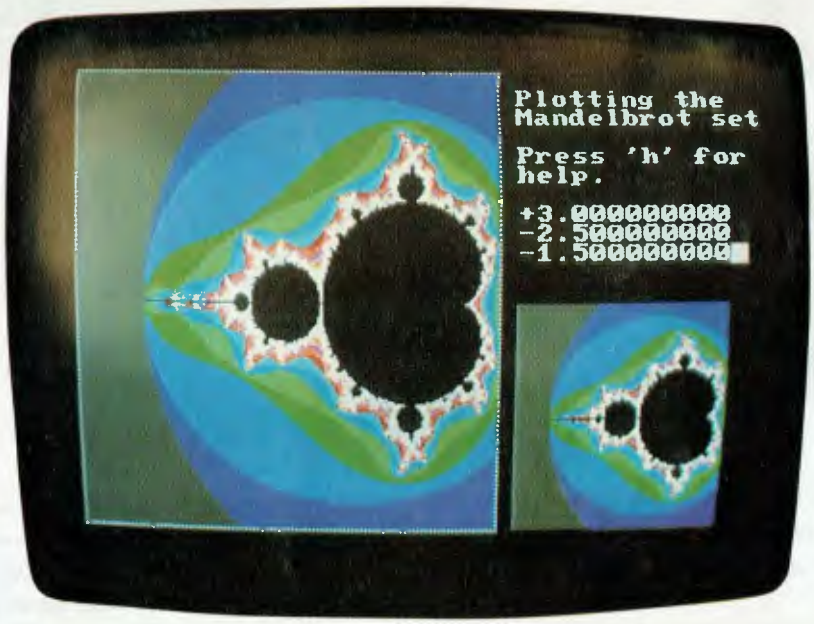
### Machine code editor

TO FURTHER this aim, the Applix forgoes all those boring old office applications and concentrates on the good stuff. It's interesting to note that the first software package mentioned in the Applix advertising blurb is an editor/assembler for 68000 machine code. In fact, in the fully configured version of the Applix, the editor (which speaks Wordstar) is in ROM, on the assumption that you'll be using it for just about everything you do.

The status line of the Applix editor is the colour of tawny port, one of the 16 colours the machine produces from its in-built graphics routines. The graphics output is designed to use a common IBM type RGBI colour monitor in the CGA mode. There are the usual 320 *x* 200 and 640 *x* 200 graphics modes, but, no text mode. With the 68000 processor, the Applix is so fast that there's no need for a special 'fast' text mode, the graphics are quite fast enough for all text applications. This means you aren't stuck to a particular character font in ROM; you could probably make the thing type in Arabic or Sanskrit if you had the mind to.

Applix offers a Basic similar to Micro-Soft Basic, supplied on disk or tape. *Tape*? – the 1616 has a genuine cassette interface, just like in the good old days. The cassette feature means you can learn to use the basic machine without spending a lot of money on disk drives until you feel you're ready for them. As well as Basic, there is an Applix version of the well-known Hi-Tech C Compiler plus the rip-roaringest version of Forth I've ever encountered! The Forth disk features a demonstration routine that makes the Applix 1616's graphics shake, rattle, and roll in most satisfying ways.

From the above comments you can see that there's no shortage of language capabilities with the Applix 1616. The idea is that you write applications yourself, getting a good dose of hands-on programming experience as you go. However, there is a big choice of applications available from an unexpected source: CP/M.




*The version of Forth supplied with the Applix features a demonstration routine that includes Mandelbrot sets plotted under Forth.*

That's not as strange as it sounds, since the Applix has a Z-80, as well as the 68000. You can search all over the circuit board and you won't find it, though: the Z-80 is on the disk controller card. It's there primarily to make disk things happen, but, with a few modifications, the Z-80 and 64 kilobytes of memory on the disk controller card can be turned into a small CP/M computer, with the main Applix machine working as its terminal.

### CP/M

THE CP/M modifications are simple. You must install a second RAM chip on the disk controller card to bring it up to the full 64 Kbyte. The

only other change is to swap a new PAL (programmable logic array) chip for the existing one on the disk controller board. Again the chip is socketed, so you just plug in the new one.

The CP/M system, which Applix calls ZRDOS, comes on three disks. One disk contains a loader, which transfers CP/M into the disk controller card. This disk also contains the 68000 code needed to interface CP/M with the rest of the computer. The other two disks are in a CP/M format, which is different from the normal Applix 1616 format. They contain the CP/M itself (an implementation of ZCPR3), as well as various utility and demo programs.

Once in CP/M mode, the Applix disks can be configured to read 'foreign' formats. The first one to be implemented was Microbee, which is not surprising. There will be many Microbee people wanting to swap software back and forth with their new Applix 1616s. There is also the option of manually configuring the drives to other formats.

I consider the Applix CP/M capabilities to be quite important for two reasons: one is that with such a lack of applications software for the machine at this stage, CP/M is the only way you're going to make it do anything 'useful' (in other words, spouse-approved).

As a CP/M machine, the Applix is as good as any other I've used – it even lets you set up the screen in pretty colours! I gave the Applix CP/M a bash with some of my favourite software – no worries.

## Operating impressions

THE APPLIX 1616 was transported to Tasmania by one of the world's most destructive air freight companies. Despite the traumas it suffered, the machine booted up on the first try. Nobody can say it's not rugged. I had read the instructions a little, but not a lot, so I decided to let the computer show me what it could do, automatically, with a supplied demonstration disk. The show began with the Applix logo flipping in from the distance onto the screen. Then, after a full 30 seconds of disk spinning, *Wham! Coke is it!* The Pickle Box speaker (see the January issue for DYI details) erupted into the familiar Coca-Cola commercial, at absolute maximum volume ...

I didn't know the Applix had a tape recorder in it. I hadn't noticed anything when I was repairing the air freight devastation. Time to read the instructions – it turned out that all the singing and the full orchestra was coming via a simple digital

*This just goes to show that any computer can have a bug! The Applix 1616/OS does not have a DEBUG routine – most of DOS's DEBUG functions (and CP/M's DDT) are implemented in the Applix as internal commands. In case you're wondering, the bug is escaping from the MEM jumpers on the system board, hurdling IC60 and preparing to attack C73. (Was it the DDT that made the bug run?)*

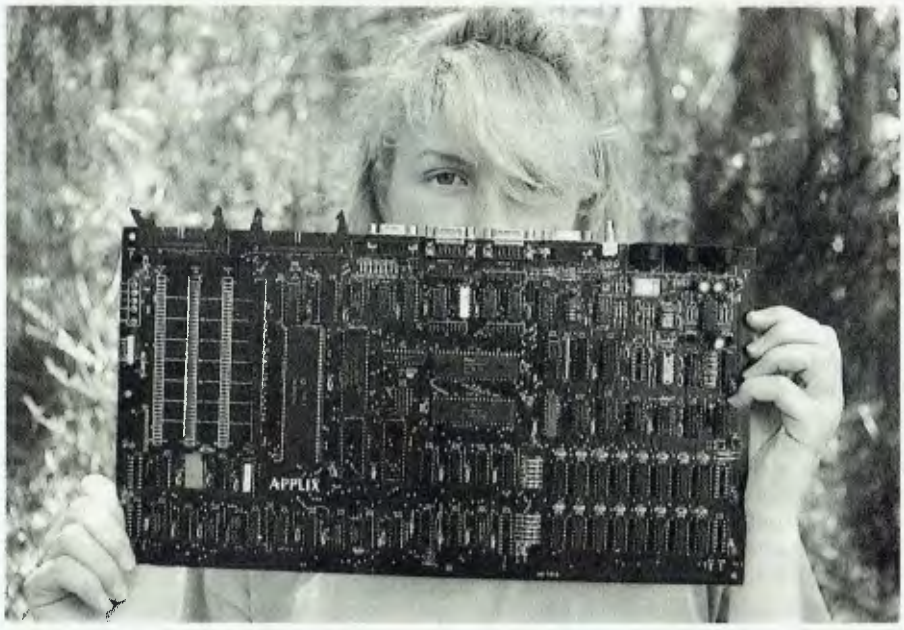
to analog converter on the system board. And all the disk spinning was to read in a disk file 318 Kbyte long, containing a digitized version of the Coke commercial. So the Applix is capable of storing high-quality digitized sound, or digitized anything, for that matter. Hmmm ...

Back on the screen, with the Coke commercial out of the way, the computer was dazzling its way through a kaleidoscope program. It must have known I'm a sucker for these things, since back in the days of *Electronics Australia's* Dream 6800 computer ten years ago. Playing around with that 68000 processor is going to be interesting.

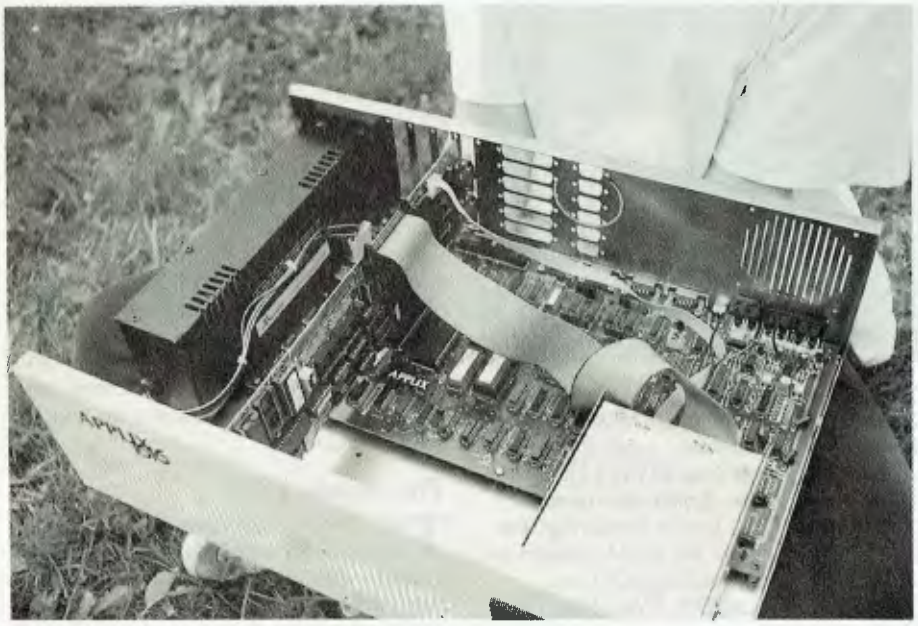
The monitor that came with the Applix is a Sakata RGBI type of about 14 inch screen size, instead of the usual 12 inches. And, it has one of the nicest CGA displays I've seen. Good, snappy resolution and precise colour registration. Normal text appears in white, and there's no sign of colour fringing.

## The Applix DOS

THE APPLIX operating system, called 1616/OS, is familiar in many ways, but in other ways unlike anything you've ever seen. When the computer boots up you get a prompt on the screen, not A> but /RD>. RD stands for the ramdisk that gets allocated in memory every time you switch the machine on. The Applix considers the ramdisk to be its default drive, and that's not a bad idea considering how it speeds things up. I have always used a ramdisk on my PC clone when working on projects such as assembly language programs.




*You can start to build the Applix with the system board only (the Mini kit). People with some electronic resources already behind them can get the Basic kit, which includes the board, the 68000 micro, the ROMS, the PALS, the manuals and the 68000 assembler software. The rest of the bits are common components which you may already have.*



*The Applix 1616: at left is the Apple-style power supply; the system board is at the bottom of the case and the drive controller is the vertical board at left.*

The floppy drives on the Applix are not the traditional A, B, and C, but /F0, /F1 and so on; hard disks are /H0, /H1 and so on. (It seems the slash is an essential part of the drive name.) The Applix DOS supports the concept of directories in the MS-DOS tradition, and it even sees its own drives as separate directories. Thus, to log onto your main floppy drive, you must type CD /F0. Most of the software that Applix supplies is slotted away into various directories on the disks, but this isn't compulsory. I've stored many files of my own on a freshly formatted 'working' disk, and I've just shoved them all into the root directory with no problems.

You can dump a section of memory to the screen, you can alter memory, you can move or search memory, and you can read or write memory into a disk file, just by typing a command from the DOS prompt. Another feature I've never heard of anywhere is a command to make the computer camp on one particular memory location and display its contents continuously. This would be handy for sorting out things like interfacing problems. For instance you could sit on the address of the RS-232 port and watch for any changes on the receive line.

This raises another interesting point: in the true Motorola tradition, every hardware device in the Applix has a proper address somewhere in main memory. So to send something to a hardware device such as a serial port, you just do a 'write' to the correct memory address. Or to get something back you do a 'read'. This is much simpler than the system with the 8088 or Z-80 where you must use special IN and OUT instructions with specially allocated addresses.

In the Applix, as with in most other computers, you're not really meant to use hardware devices by directly manipulating their memory addresses. You're supposed to follow the normal convention of using system calls. In MS-DOS, these are called interrupts and most of them are collected together under INT 21h. In the Applix, system calls are initiated under TRAP#7. In both cases you place the number of the function you want into one register, whatever parameters the function requires in other registers, and let 'er rip. This sounds simple, and it's fairly simple to use, but there's a lot of complicated technology deep down inside which we won't go into!

The Applix sports over 100 system call functions. As well as simple things like writing a character to the screen, the Applix includes functions such as calculating the sine of a number (good for sound synthesis!). There are also some very advanced graphics functions, such as the instant generation of windows via a system call. You can then use other calls to generate stuff in whichever window you want, with graphics co-ordinates relative to the top left corner of that window. Blimey! Sounds like this thing's trying to out-Mac the Macintosh!

## Some other software goodies

AS WELL AS as all the languages mentioned previously, there's some other software available as Shareware. It's not a lot yet, but given the type of people who are using the Applix, one could expect plenty of clever programs in the future.

Shareware at the moment consists pretty much of what you'd expect to find with a brand new computer, such as a Bounce-ball game, Life, and what appears to be the original text based Star-Trek, ported to the Applix. There are also some sound and music programs, and a little demonstration of what can be done with windows. And what computer would be complete without a Modem-7 program, which works very nicely. Just about all the software that came with the computer was accompanied by source code, mostly in C or 68000 Assembler. Users are encouraged to hack away to their heart's content.

One of the Shareware programs is much like the MS-DOS Readmac program that displays Macintosh-formatted pictures on the screen. This program lets you fiddle around with background, foreground and grey scale colours, so the Mac pictures appear on the Applix as simulated colour. There are a few pictures to play around with, such as a nice clear one of Max Headroom.

One of the pictures I transferred into the Applix is called Coke Girl. It shows a young woman with a Coke bottle, doing somewhat suggestive things to it with her lips. It seems it should be possible to make this picture appear on the Applix screen, and then unleash that digitized Coke commercial jingle into the speaker at the same time. Wouldn't that be impressive? Oh, well, probably not, but it would be fun trying. That's what this Applix thing is all about.

At this stage of the review I suppose I should be quoting benchmark tests – how the Applix shapes up against similar computers. Trouble is, there aren't any similar computers. Nothing to compare it against. The machine is really totally on its own. It is fast, but faster than what?

Do I *like* the Applix? I can't even answer that properly because everything is so new and foreign and I don't feel comfortable with it yet. When I master the Applix and all its flashy system functions and 68000 machine code programming, I'll certainly be a lot closer to that revered title 'hacker' – it will just take time.

## Where did it come from?

THE APPLIX 1616 was the brainchild of Andrew Morton of Sydney, who has

done what so many of us have wanted to do – designed a powerful PC, from scratch. We all have a list of things we would like to see in 'perfect' computer. It looks like Andrew bit the bullet and tied all his favourite 'good bits' into a new machine that is related to all the popular technologies, but beholden to none of them. He's wound up with a computer that looks like an IBM, has the processor efficiency of a Mac, the sound capabilities (sort of) of an Amiga, can use cassettes like early Tandys, and runs CP/M to boot!

Andrew's wife Kathy was my first point of contact with Applix – and what a breath of fresh air! At the same time I started dealing with Applix, I was trying to find an MS-DOS laptop for use with a commercial design project I am involved in. I went through the frustrating routine of responding to newspaper and magazines advertising for these laptops, writing unanswered letters, making unreturned phone calls. Eventually it became clear that since I wasn't a government department or multinational company, the laptop suppliers couldn't see much future in dealing with me.

With a horrible grump fixed in my mind I phoned Applix, fully expecting to get yet another run-around, and copped the lovely Kathy. 'No problem, Mr. Moffat, what can we do to help you?' I hit her with curly questions about microprocessors, operating systems, perceived bugs, input/output, things that would have sent the laptop salesmen scurrying for cover. Kathy knew the answers, *all* the answers. Even if that Applix computer was a real dud, just having someone to talk to about it would have made everything all right.

It's interesting to note that many of the people who were into the Microbee scene in the early days seem to be gravitating into the Applix scene now. It's the same enthusiasm and sense of fun, all over again. Remember Eric Lindsay? He's publishing an Applix enthusiasts' newsletter now. Remember Conal Walsh? His name was on a lot of Microbee software, and he's the one who got CP/M running on the Applix.

Like the first Microbees, the Applix 1616 is available as a kit, so as well as saving some money, you can say 'See that computer? I built it!' You can start with the system board only or you can get the mini kit, which includes the board, the 68000 micro, the ROMS, the PALS, the manuals and the 68000 assembler software. The rest of the bits are common components which you may already have.

The next level of the kit is the mini-kit plus all the other electronics, but no RAMS. Because of recent price variations for RAM chips, the RAM for the Applix is quoted separately. There is also a separate kit of all the sockets needed for every IC on the board.

To get the Applix running in its most basic form, you will need an in/out kit to configure all the system board's ports. Then, an IBM style keyboard and an IBM-style CGA monitor. This doesn't necessarily have to be colour, as long as it can accept the colour signals. You will, of course, require a power supply to make all this stuff go, and the one Applix offers is a switching supply similar to the one found in Apples. Oh, and don't forget the cassette recorder.

*The Applix 1616 looks like a PC-compatible on the outside, and it has an IBM-style keyboard. But inside it's got a 68000 processor, like a Macintosh, as well as a Z-80. The unique (and powerful) operating system looks a bit like MS-DOS, and a bit like Unix.*

## ProductDetails

Product: Applix 1616 kit
Distributor: Applix Pty Ltd
324 King Georges Rd. Beverley Hills
2209 NSW
(02) 758 2688
Price: $239 Mini Kit
$599 Basic Kit
$139 Keyboard
$89 Power supply
$1800 'Ready-to-run'

The next level of expansion is into disk-based operation, and Applix has the disk controller kit and both floppy and hard drives to suit. Although you could leave the system board bouncing around on your workbench forever, as I've been known to do, it would be nice to put the whole thing in a case, and Applix offers a good sturdy steel IBM style case with the holes for your disk drives already cut. By this stage you will have a machine pretty close to the one Applix sent to me for review.

I'm not guaranteeing this is absolutely correct, but I've just added up all the bits and pieces I think are in the system I have, and it comes to just under $2000, with tax but without the monitor. Leave out the disk drive capability, and the case, and share the keyboard with your existing PC clone, and you could get off for $788.

Are you game to build a kit? I have read every word of the assembly instructions, and closely examined the system board, and I'd say there is no real reason why anyone who can read couldn't successfully build an Applix system board. The circuit board itself is built like a battleship, and the pads you have to solder to are nice and big.

## Conclusion

WELL, HERE we are with our dear editor, Jake Kennedy, trying to find a way to shut Tom up before he fills the whole magazine with waffle about this new toy of his. So I'll tell you what we'll do. You people can sit and stew over what you've got so far, and maybe even rush out and buy your Applix 1616s, which would make the Mortons very happy.

In the meantime I'll do some more hacking on this interesting machine, getting right down into its many and varied system calls via some 68000 machine code programming, which I don't know how to do yet. The processor shouldn't be too hard to come to grips with (see, I'm getting more confident already!).

It seems fairly straightforward, without all those miserable segment registers and inter- and intra-segment calls and jumps that make life hard on the 8088. I cut my programming teeth on a Motorola 6800, and the Applix thing seems to follow a similar design philosophy. It's bigger, and it's got an extra zero on the end of its name. We will see what life brings. □

# EXIT FOR EXPORT

OTC and the Custom Service have jointly developed a system to streamline export procedures and collect accurate data for Balance of Trade statistics. Merv Beamish reports . . .

IN DECEMBER, the Australian Custom Service (ACS), in conjunction with the Overseas Telecommunication Commission Australia (OTC), launched Exit, a computerised exports integration system. Exit aims at reducing the red tape and delays involved in papershuffling. It will also gather statistical information and monitor the country's exports.

Primarily developed for use by freight forwarders, exporters and their agents, Exit will replace the current Export Return Scheme (ERS) which will be phased out by May or June 1989. ERS requires exporters to lodge cargo information after shipping. This has lead to inaccuracies caused by late reports, or by no reports being filed at all. One of the side effects has been the collation of wrong statistical information for use by the Commonwealth Treasury Department.

These statistics are used in calculating Australia's balance of payments. The need for a more accurate gathering of these statistics was one of the major considerations in the development of Exit.

Exit now requires the export information before shipping. This is carried out using the OTC Domestic Communication Network. Electronic mail technology has markedly reduced, in comparison with ERS, the time involved in lodging an Export Declaration and receiving an Export Clearance Number.

At the exporter's end, Exit will generally operate from a PC, AT, or IBM clone. However, for large organisations, it can operate from mini and mainframe computers. The exporter uses the system to create an Export Declaration Document, which is forwarded to ACS's IBM Mainframe in Canberra, for approval.

ACS will check quoted export permits (when required) and return approval, or request for further information, also via OTC's communication Network, usually within 10 minutes (which is fast by any bureaucracy's standards).

## Export permits

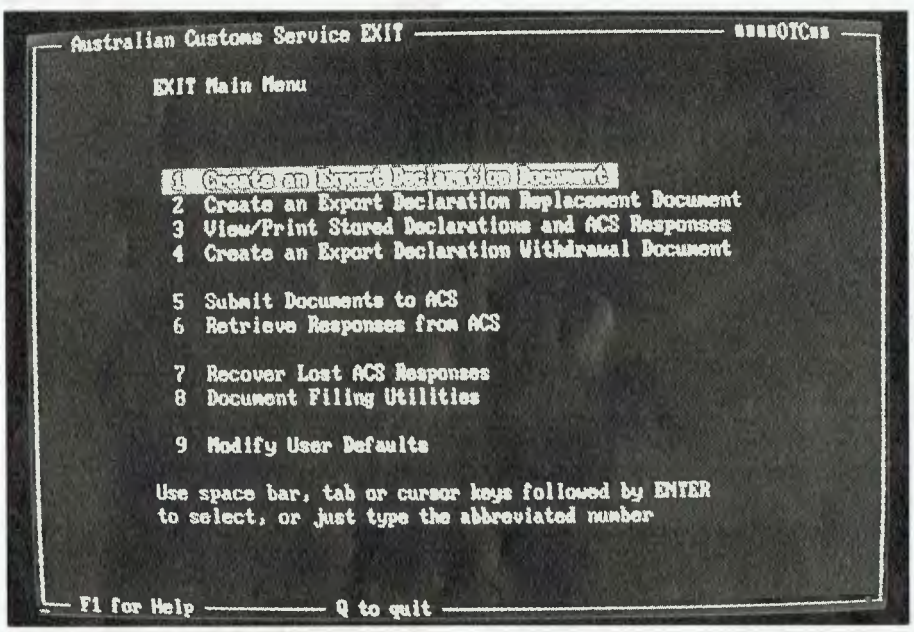
INTEGRATED into the Exit system are the export permit issuing facilities such as those of the Australian Wheat Board and Reserve Bank. This means that much of the checking and notation on applications will be automatically carried out.

The Exit terminal software, developed in Pascal by OTC, and supplied, complete with printed documentation, is priced at $198; additional costs include a OTC mailbox registration fee of $30 and a monthly service fee of $20. This software is user oriented – it recognises that some users have limited computer awareness; the screens are uncluttered, clearly set out and, in the most part, self explanatory. The system operates with the minimum amount of fuss including the telecommunication dialup facility.

Exit is menu driven; the Main Menu offering nine options. These options are selected with the cursor keys, or by option number. Each option is named after the task it performs rather that the programmed process. For example Main Menu option 2 is 'Create an Export Declaration Replacement Document' as opposed to 'Export Declaration Maintenance', or something similar.

The standard Exit screen allows the user to complete fields at random as information becomes available. A screen can be partially completed, stored, and called back for completion on a later date if required. In situations where two applications are very similar, a copy of the first can be made, renamed, any amendments made and queued for transmission to Canberra.

When the user has created a document,



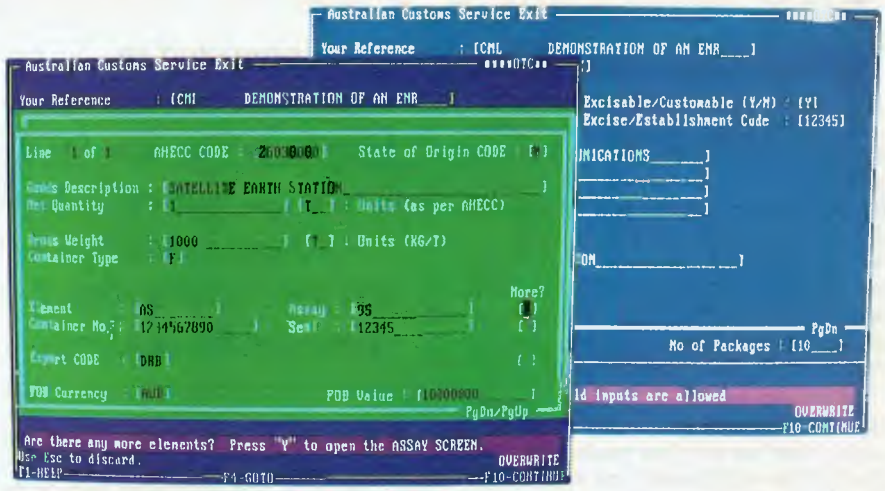

*The Australian Custom Service and the Overseas Telecommunication Commission Australia have developed a computerised exports integration system, Exit, aimed at reducing the red tape and delays involved in papershuffling. It will also gather statistics for use in calculating Australia's balance of payments – the need for more accurate data was one of the major considerations in the development of Exit.*

the system will check it. Any incomplete mandatory field, or incorrect information will cause an error message. All system messages are in plain English and clearly understandable. When errors are detected, the user has the choice of storing the document for correction at a later time, or fixing the problem on the spot. This facility means that the system is not tied up when details are not available.

Completed documents are queued to be transmitted to ACS on the next contact. Exit contains several ACS variable tables, codes and schedules such as Invoice Currency Codes, AHECC Codes and Country Codes. When a user submit documents, these tables and schedules automatically updated to keep user software current. If needs be a user can contact ACS just for this update service.

The system has a two-level user amendable password and a logon ID allocated and maintained by OTC. A feature of the system is that after a document is retrieved from the mailbox, it is not deleted from the system for five days – very handy if a user's data files become corrupted or accidentally deleted.

The Help facility in Exit is three-pronged. The third last line of the standard data input screen format displays an abbreviated help message, relating to the location of the cursor. It is worth noting also that the function key descriptions on the bottom line will vary from prompt to prompt. For a general Help message, F1 is pressed; alternatively, there is a printed User Manual which includes field definitions, demonstrations and screen layouts.




*Users complete fields at random as information becomes available. A screen can be partially completed, stored, and called back for completion on a later date if required. When the document is thought to be complete, the system will check it for incomplete, mandatory fields, or incorrect information.*

## Installation

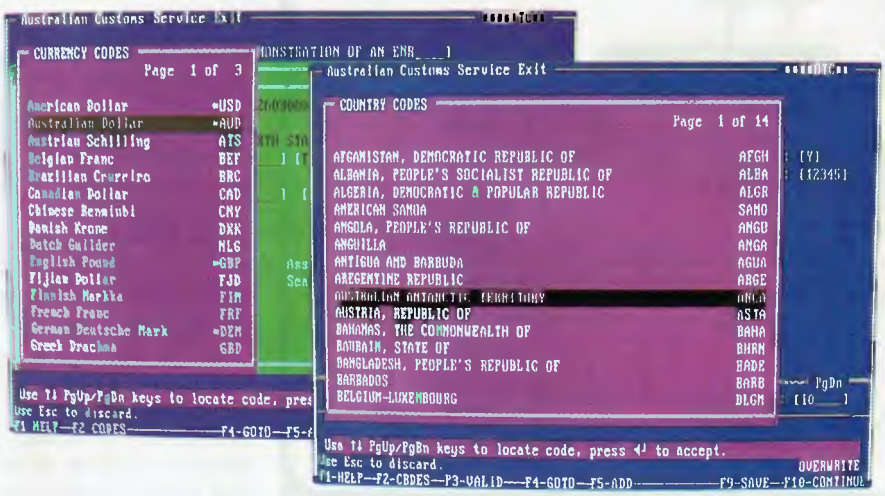
AN AWKWARD job for any programmer, or documentor, is to instruct a user, with very little computer expertise, in installing the system and getting it running. Exit has documented system installation within its user manual. In the case of modifiable user defaults such as disk drives, printers and the like, the OTC programmers have, through documentation, logical screen layout and defaults, simplified things as much as possible. However, the average user is unlikely to know about baud rates, decadic or tone dialing or COM ports, there is an Exit hotline.

The Exit screens initially only display basic field prompts. As these are completed relevant new prompts are then added to the display. By not confronting the user with a multitude of prompts, some of which never used, the programmers have effectively reduced confusion.

The submission of documents to ACS is semiautomatic. With the relevant telephone numbers stored within the system and, after creating a submission queue of documents, the user selects 'Submit Documents to ACS' option, enters Logon ID, Password and presses Return. From then on, the system takes over, constantly displaying messages showing that everything is going as normal and advising what steps should be taken if anything should go wrong.

Hanimex Corp, Goyen Controls and Sharp Australia were the first to connect to Exit. Over 120 others had applied for connection by, or on, the release date. It's expected that over 3500 exporters will join the system. A similar system to Exit covering imported goods is planned.

Exit reduces time delays, helps exporters and agents in completion of their applications, and greatly improves statistical reporting. In the fine tuning of our country's finances accurate knowledge of import and exports are important in calculating the Balance of Payments. □




*For speed and accuracy, standard codes are integrated into Exit; these can be entered into the document by highlighting it and pressing Return. Note the Help message in the third line from the bottom of the screen.*

# Introducing...

# The Maestro Super Executive Modem

Interested in communications? In describing this new 9600 bps modem, Roy Hill offers a 'backgrounder' to modems (and a special price for YC readers)!

THE MAESTRO team has done it again! Regular YC readers will be aware of the highly successful Maestro 2400ZXR modem, which provides full V.21, V.22, V.23 and V.22bis capabilities. Now, as an exclusive introductory offer for our readers, Maestro is offering their brand new, 9600 bps, full duplex modem for $1500 – but that's only half the news. For this price, *Your Computer* readers get *two* Super Executives. (BBS operators should contact Maestro direct for a special pricing arrangement.)

The reason for this is perhaps not apparent, so I'll explain – at speeds as high as this, there are very few modems around (the Trailblazer by Telebit and marketed in Australia by NetComm is one of the few that I am aware of). But, to take advantage of this high speed, you need a Super Executive at each end of the line.

In this and a subsequent article, I shall provide the technical details and operating specifications for this brilliant new modem from Maestro, made possible by a new chip set from the French semiconductor company, Thomson.

Incidentally, the Trailblazer modem is deserving of some praise here – it came along at time when there were no standards (or chip sets) to cover the transmission speeds at which it operates (up to 115,000 bps), so it had to use cunning and continuous line monitoring to adjust the transmission parameters to achieve optimum transfer rates. In the US, because of the absence of a suitable standard, high speed modems have been using the HST protocol which operates in a similar manner to the way Viatel works in Australia – the forward channel operates under the CCITT V.29 standard and the back channel operates at 450 bps (like the 75 bps back channel of Viatel).

However, with the appearance of the CCITT V.32 standard (and chip sets like the Thomson), the US modem manufacturers are also likely to go V.32.

Maestro is one of the few companies that can claim total Australian manufacture. The only non-Australian part of its modems are the chips. The software and hardware are totally Australian in design (Maestro even uses the Australian designed PCB layout product, Protel) and the boards are manufactured and assembled locally.

The Super Executive is the latest in a long line of modems from Maestro and as this very small (four-person) Australian company gains more and more experience, we can expect further items of interest to spring from them.

All of the Maestro modems have been original designs, with Chris Darling doing the software design (in Forth, of course) and some of the hardware design, and brother Dan doing the remainder of the hardware design, design of the PCB and the troubleshooting of the prototypes.

## MNP

THE SUPER Executive is based on the Thomson-SGS modem chip set, and it is totally compatible with the CCITT V.32 specification. This specification (which I shall explain in more detail a little later) allows for 9600 bps, full duplex communication over the standard telephone network. In addition, the CCITT has adopted the MNP standard for data compression/-transfer (goodbye LAPm and LAPd) and Thomson will probably offer this in a later ROM upgrade, which will provide for transfer rates up to 19.2 kbps.

MNP is a proprietary protocol that combines highly efficient data compression (superior to many varieties of ARC routines), as well as a sophisticated error correction protocol. This particular flavour of MNP is known as MNP Mode 5 and has been used in the Maestro 2400XR modem. A fax facility is also possible with this chip set and Maestro are considering implementing it.

The Thomson chip set comprises three digital and three analog chips which have been fabricated using CMOS technology. However, due to the fairly high chip count on the board, so the power supply is on the system board. Prior to the introduction of the Thomson chip set, manufacturers of high speed modems had to rely on expensive microprocessors and Digital Signal Processor (DSP) chip sets. The rest of the modem had to be built using discrete components. With these chips, it is possible to build a 9600 bps modem with as few as 15 support chips.

In fact, the Thomson chip set is the only V.32 implementation able to operate with a frequency offset up to 10 Hz. What this means to the non-technical user is that it should be easy to maintain the top transmission speeds over normal

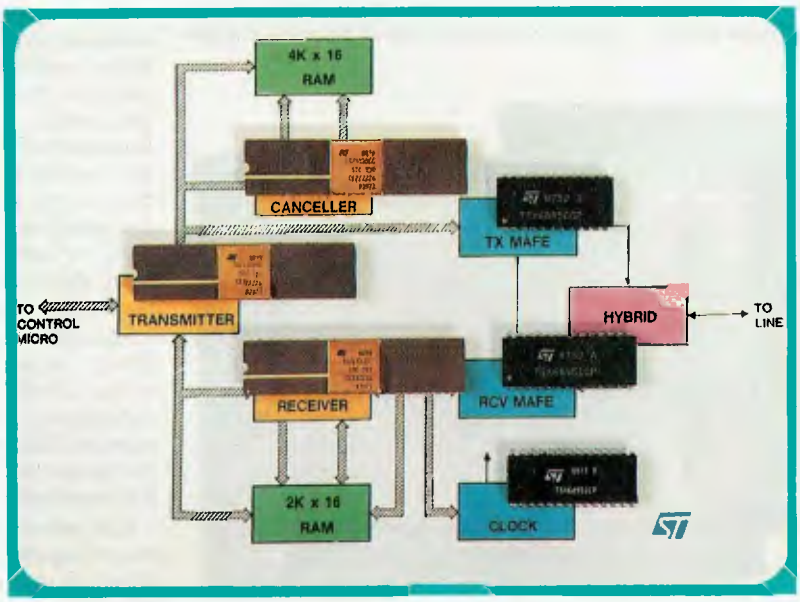



*Figure 1. The architecture of Thomson's six-chip set that provides CCITT V.32 (9600 bps, full duplex) communications in the Super Executive. Details of the chips are given in the text.*

telephone lines. However, don't expect top performance over noisy telephone lines – it's even difficult to hear voice calls over many local lines.

To build its chip set, Thomson has combined its well established Modem Analog Front End (MAFE) chip set with its TS68930 DSP chip set. One of the DSPs handles the received data, another the transmitted data and the third handles the echo cancellation (discussed below). The three chips in the MAFE set handle the analog reception, the analog transmission and the clock generation, which controls transmission speeds.

## SGS-Thomson

SGS-THOMSON was formed by the merger of two of Europe's biggest semiconductor firms. SGS has always been a European leader of the RAM/ROM market and Thomson is the co-manufacturer of the 7910 World Modem Chip, which gave us low cost 300 bps (and 1200/75) modems.

### Product Details

Product: Super Executive modem
From: Maestro Pty Ltd
Calool St, South Kincumber 2256 NSW
(043) 68 2277
Price: $1500 taxed Super Executive

*Note: Maestro is offering two Super Executives for the price of one to YC readers – the offer is limited so be quick! It is also offering a special price to bulletin board sysops; contact Maestro for details.*

The joint company is currently ranked thirteenth in the world, with an annual turnover of $US862 million.

One of the important features of the TS7532 chip set is that the user (and hence the Forth programmer – Chris) does not need to be a complete V.32 expert, as the chip set is controlled by relatively high-level commands. Another of the important features is the implementation of a full 32-bit instruction set, which has been optimised for Telecom applications. The echo canceller DSP chip is capable of handling the complete range of near-end and far-end echo conditions, making it ideal for satellite transmission communications. The Super Executive also uses the Zilog Super8 (the Forth-based microprocessor used in the 2400ZXR) as the controlling microprocessor. This micro has a command set that is specially optimised to handle the Forth language and this fact has helped to make software development for the Maestro modem stable far easier than using conventional processors/languages.

## CCITT's V.32

THE CCITT (*Committee Consultatif Internationale de Telephone et Telegraphie*) is an international organisation whose members countries and companies have an interest in establishing communications standards for international use. All

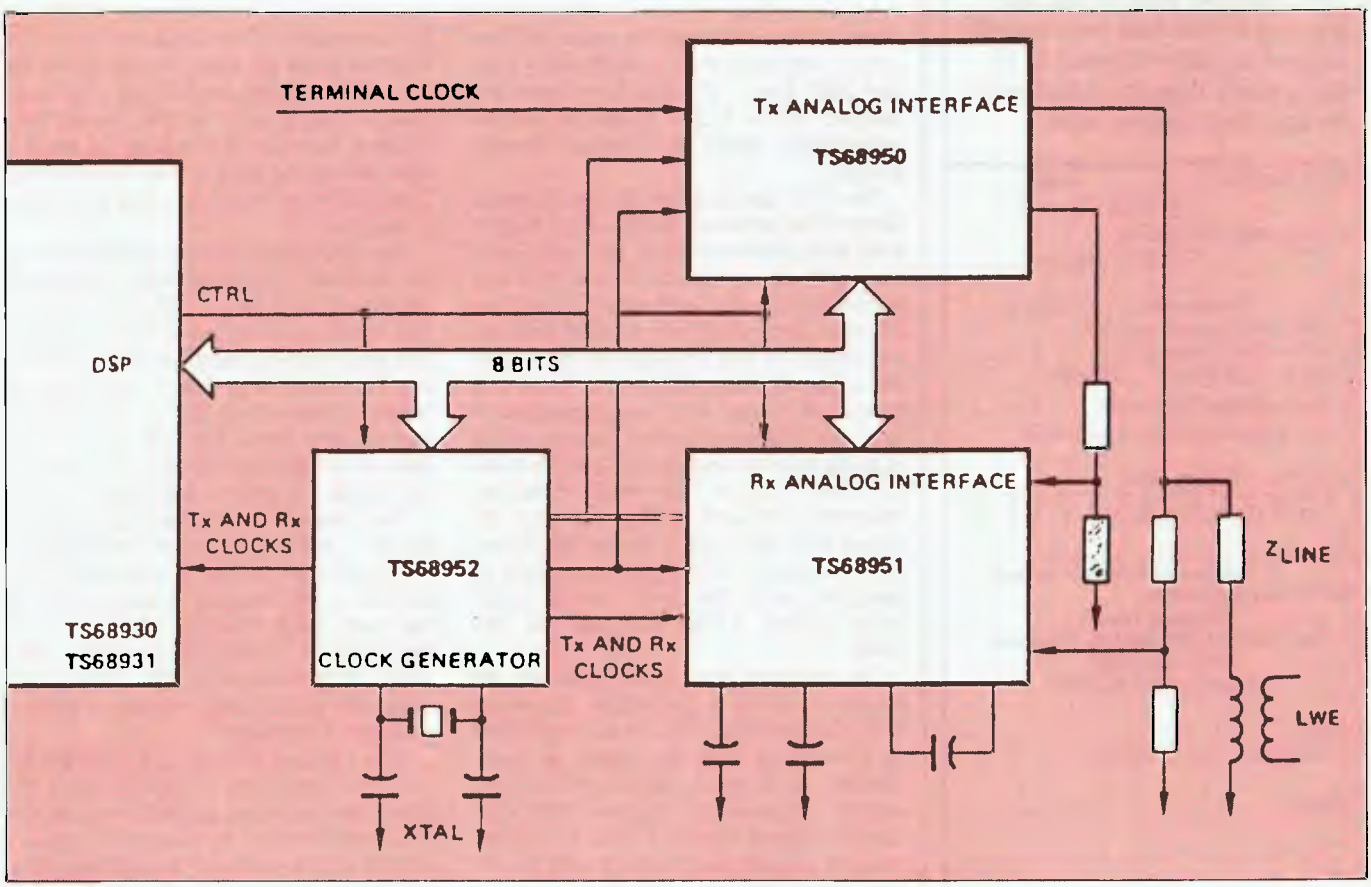
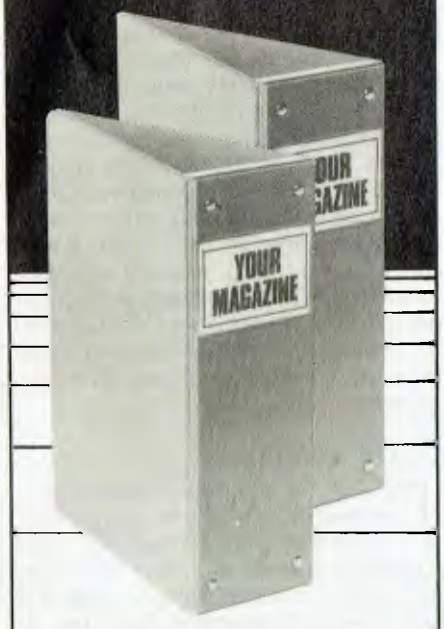



***Figure 2.** Functional diagram of the TS68931/51 Digital Signal Processor chip which provides the connection between the telephone line and the Modem Analog Front End (details are given in the text).*

# Can't Find It? File It! Special Binder Offer

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*Mr/Mrs/Ms/Miss Initial Surname*

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.....

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*Telephone:* ( ) .....




# Specifications

WHILST ENDLESS timing diagrams and specification figures may appeal to electronics technicians and enthusiasts I won't bore you with all the details. However, these are some of the more interesting features of the Maestro Super Executive –

- ☐ Fully compatible with CCITT V.32, V.22bis, V.22, V.23 & V.21 – Bell 103 & 212A;
- ☐ Integrated implementation on 3 DSP and 3 MAFE chips;
- ☐ 2-Wire full duplex operation at 9600, 4800, 2400, 1200, 600, 300, and 75 bps;
- ☐ Full implementation of V.32, V.22 and V.22bis handshakes;
- ☐ Single DSP cancellation of both near end and far end echoes;
- ☐ Two satellite hops and frequency offset capabilities (10 Hz) for the far end echo canceller;
- ☐ Trellis-coded modulation and Viterbi decoder in V.32 mode;
- ☐ High performance passband, fractionally spaced, adaptive equalizer;
- ☐ Signal quality monitoring;
- ☐ Parallel interface to standard microprocessors (although the Super8 is especially suitable);
- ☐ Bit rate data clocks for synchronous data transfer;
- ☐ Full diagnostic capability;
- ☐ DTMF (Tone dialing capability) generation and call progress tone detection;
- ☐ Easily upgradeable to include V.29 and V.27ter modes;
- ☐ DSP program memory size is easily expanded, without the need to perform hardware or software upgrades; and
- ☐ Low power consumption (1.7W typical) for the complete chip set and about 5W for the whole board.

of the current transmission rates (300 bps – V.21; 1200 bps – V.22; 1200/75 bps – V.23, and 2400 bps – V.22bis) have been developed by the CCITT, based on recommendations made by special interest groups.

The V.32 specification is a recommendation that defines a family of full duplex (two way) modems using two wire lines. Until now, those wishing to use 9600 bps transmission rates, generally had to have a leased (dedicated) line. Leased lines are not cheap – in fact, they cost far more than the modems that use them. It is for this reason that the V.32 recommendation (and the Thomson implementation of it) is going to be so popular. V.32 will provide for 9600 bps over the Public Switched Telephone Network (PSTN – or just the phone line with which we are all irritatingly familiar). Full duplex operation is available using the fairly narrow bandwidth (about 3 KHz) available on the PSTN.

The Transmit and Receive channels are separated using a technique known as Echo Cancellation. This is accomplished by subtracting from the signal received, the echo (or returning signal) of the transmitted signal. One complete DSP chip (and a supporting RAM chip to handle variable parameters) is given over to the task of handling this process.

In order to achieve 9600 bps (and even 19.2 kbps) full duplex communication, the full bandwidth of the available telephone channel must be used *in each direction*. Thus, the receiving modem not only hears what is being sent by the transmitting modem, but also the echoes of what it sent during the time it was transmitting. That's why the echo canceling procedure is required.

The information to be transmitted by the modem is encoded with Quadrature Amplitude Modulation (QAM), a modulation technique that combines both phase and amplitude modulation to encode four bits of data with each transmission 'event'. QAM allows for a transmission rate of 2400 Baud, but with four bits of data encoded on each event (or baud), we can obtain $4 \times 2400 = 9600$ bps.

There are two possible modes of modulation – either a 16-point constellation (because of the 'stellar' appearance of the pattern) using 'normal' coding, which is the more noise sensitive of the two; or, the 32-point constellation which uses Trellis Code modulation. The Super Executive uses both of these modes to achieve optimum performance.

Now, I hope I've whet your appetite for the Super Executive. In the May issue, I'll detail the operating procedures and the use of the modem to connect to various service providers around Australia and the US. We'll also have a look at the famous Hayes AT (for ATtention) command set and the infamous S-registers. ☐

# Famous reliability trial winners.

1953. The 192 cars and drivers in the initial Redex Trial had no idea what lay ahead of them. They certainly took no notice of a Peugeot 203, driven by Ken Tubman.

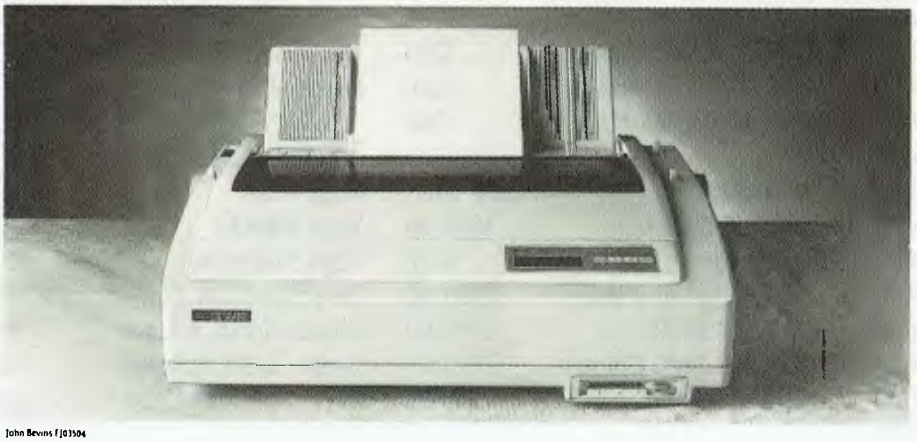
But the Peugeot proved its reliability, and despite minor dirty fuel trouble, four punctures and an accident with a wild pig, Ken Tubman and the funny little French car made their way into the history books.

1954. The hero of this trial, a 1948 Ford V8 Sedan – affectionately known as "The Grey Ghost" – battled along with 245 other cars on roads worse than the previous year.

Though the shock absorbers had to be disconnected half way through, "The Grey Ghost" demonstrated extraordinary reliability through horrendous conditions. This reliability continued over 20 years later, when "The Grey Ghost" ran in yet another trial in 1979.

The 1955 Redex Trial achieved the expressed aim of being a trial of the reliability of the modern car, because only 57 of the 176 starters managed to finish.

One was a strange German car – a Volkswagen Beetle, driven by Laurie Whitehead. Once again, the winner of this trial exhibited reliability that stands to this day – reliability that the toughest conditions in Australia couldn't break.



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# Keyboards and conferences

ALL OF US, at one stage or another, have sat in front of a keyboard and pretended to be 300 word per minute typists. The output is a load of gobbledy-gook, but we look professional. Reverting to the old pick and hunt system slows us down and makes typing a simple sentence sheer agony!

What is it like for children who are similarly unfamiliar with a keyboard? They too have to pick and hunt, and perhaps it is harder for the littlies when their fine motor co-ordination needs more refining, and the letters they are used to – lower case – are nowhere to be found on the typical computer keyboard. To compound the dilemma, the letters aren't even in alphabetical order! Could we make it any harder for them?

Continuing our new series on Computers and Education, Sharon France touches on keyboards for the young and the 5th World Conference on Computers and Education, to be held in Sydney during July, 1990.

The fact is we can make it a lot easier for young children and for those who have physical disabilities. Enter the touch sensitive pad, which is now available with various ranges of software for most of the educational computers in use around Australia.

## Touch sensitive pads

A TOUCH SENSITIVE pad allows the user to get away from the standard keyboard and/or mouse environment. As the name suggests, this input device is a pad – usually A4 or A3 in size – which con-

***Figure 1.*** *The Concept Keyboard being used by this young girl comes with a number of different 'programming tools' or 'editors' which allows the pad to be tailored to particular application. The 128 sensitive areas on the grid can be turned into just two panels (yes/no options, big/little, round/square and so on), or however many are needed.*

nects into one of the computer's ports. The pad is usually of sturdy construction (hard plastic or framed by aluminium) and represents an input grid, which, when touched, activates appropriate parts of the software with which it is being used.

The slightest touch activates the program which is important for users with limited control or movement. It is not surprising that most of the software for these input devices focuses on pre-school, infants and primary children and especially those computer users who have physical disabilities. In most cases, the pad is connected to the computer via a long ribbon, which allows the user to position the keyboard where it is most accessible, on one's lap, for example.

There are two distinct approaches to the touch pads – there is a vast range of commercially available software and overlays, or you can design your own. Both are valid in their application, making the computer more accessible for special needs groups and younger children.

The Muppet Learning Keys and the Touch Window (which doubles as a graphics tablet and a touch screen) are both available for the Apple II range of computers. These two touch pads support quite a bundle of commercial titles for educational use. The Muppet Learning Keys is targeted more at the infants and preschool arena (titles include Balancing Bear, Bounce, Simon Says, Tiger's Tale, and Reader Rabbit), while the Touch Window supports software that could be used with older children in other areas of the curriculum (there are some 60-odd titles for the Touch Window from such notable software producers as Laureate Learning, Ashtron Software and Sunburst – for a detailed list phone Edsoft (03) 878 4899).

## Concept Keyboard

THE CONCEPT Keyboard for the BBC (and now also available for the Apple range of computers) lends itself more to the do-it-yourself style applications, although it does have a number of commercially produced overlays and software packages. These include (for the BBC) Zoo Pack, Ollie Octopus, Sketchpad, Worlds Without Words, and Windows into Literacy. The pad is available in both A4 and A3.

What sets the Concept Keyboard apart is the facility to do-it-yourself, to create your own programs and overlays. Ah, 'do-it-yourself' – three little hyphenated words that often spell frustration and disappointment (as in do-it-yourself motorcar maintenance). However, this is not the case with the Concept Keyboard, which comes with a number of different 'programming tools' or 'editors', which allow you to tailor the pad to your particular application.

*Barson Australia, the distributor of BBC and Apricot micros to schools, homes and businesses has established an education fellowship.*

This is another of those situations where, once you have mastered the editor, you are only restricted by your imagination. You have the ability to turn the 128 sensitive areas on the grid into just two panels (yes/no options, big/little, round/-square and so on), or however many areas you want or need. You, of course, design your own overlay on paper and position it on the pad.

A number of teachers have created their own programs allowing children the chance to reconstruct jumbled sentences using their own vocabulary. This enhances word recognition and sentence construction. Pictures can also be drawn on the overlay for the pad, and when the picture is selected by the user, its corresponding word is flashed on the screen, with a reward (a tone or tune).

Similarly, the pad may be programmed for four options – big, small, bus and car. Selecting big and bus would then draw a big bus on the screen. These are indeed simple examples of what is possible, but it shows how the Concept Keyboard can be tailored to your needs. The applications for this software flexibility in the area of special education, and in particular with people who have disabilities, are enormous!

## Software

PERHAPS because of this versatility, there is a growing amount of software for the Concept Keyboard, which has been written by small software producers (who

***Figure 2.*** *Resource Teacher, Russell Sakey and the overall PRIMUG writing competition winner, Kurt Fienburg, accept the 256TC package from Microbee's Andy Laming.*

# The NEWSDAY Experience

A GLIMPSE AT WHAT IS POSSIBLE USING COMPUTERS, COMMUNICATIONS AND IMAGINATION

## SCHOOL STUDENTS HEADING FOR WAPPING - RUPERT BEWARE!

SCHOOL STUDENTS in NSW are gearing up to become the next multi-media magnates of the 1990s. The utilisation of computers, and in particular, telecommunications, is enabling students across NSW to share and exchange information, to produce student generated newspapers. This is a particularly interesting use of the technology which enhances the learning process and encourages communications between class mates and indeed, across the miles between schools.

Newsday is run once a term and is open to all schools, no matter what sort of computer equipment they have (i.e., it is not hardware specific), however, you must have the basics - a computer system, a modem, word processing and telecommunications software and access to a telephone line.

Newsday is a real time simulation of the production of a newspaper, which uses the Keylink communications facility (the core component of this project) as its wire service. One section on the Keylink remote database has been assigned for use by schools participating in the Newsday project. On a prearranged day, called the Newsday, participating schools post stories which they have written, to the bulletin board. These stories have both local and national content and are usually selected because the students feel the items would be of interest to other schools participating in the project. Interviews with local identities and media celebrities sometimes feature, which adds an interesting touch.

On the Newsday, participating schools access the bulletin board to view the contributions from other schools. Stories which are selected by the news team are downloaded for review. The class then sets to work as a bonafide newspaper team, replete with editors, graphics teams, journalists, collators, finished artists, collators ... and the list goes on. The project is usually run to a deadline - to be completed within the school day. This makes for much excited and sometimes frenzied activity where some of the most reluctant students may be found getting into the thick of things.

By the end of the day, the fruit of the students' efforts, a student designed, written, edited and produced newspaper, is born. The publication contains contributions from all class members.

There is much to be said of the educational value of this sort of exercise. Students are motivated to achieve a task, they develop and exercise their planning skills in preparation of the Newsday, they participate in many levels of communication and they use and expand their keyboard and computer skills (especially telecommunications). Conferencing becomes a major focus for students trying to fit copy, graphics and photos into a set number of pages by the deadline! The project also necessitates the development of logical thinking and planning skills and focuses on the basics - grammar, punctuation, and spelling which all come into play when the students write, compile and edit stories for the publication.

Look out Rupert Murdoch, a new breed of media magnates is coming!

## Primary or Secondary - Newsday is for you!

***Newsday is another of those wonderful open ended activities which can be molded by teachers and students, both in Primary and Secondary schools. There are many ways Newsday can be used to benefit the students and the school.***

***Consider the following curriculum areas and the specialty publications that could result from the Newsday experience:***

***Home Economics / Domestic Science***

*The Galloping Gourmet Gazette - a cookbook by students including ideas for snacks or even specialties made by the school's own canteen!*

***Science***

*The Scientific Searcher - experiments and excursions conducted by your school and their outcomes (the good, the bad and the disastrous).*

have discovered the joy of programming the device) and by Departments of Education. Some of the smaller software houses include Parrot Software (based in Canberra) and Blue File Software, (07) 2075170.

It is also worthwhile, if you have a Concept Keyboard, or if you are thinking of getting one, to get into contact with your State Department of Education to see if there are any pieces of software and overlays in the Public Domain. The NSW and WA Departments of Education and the Catholic Education Office in NSW are good starting points.

Note that, although the Concept Keyboard is now compatible with a growing number of micros (IBM PC compatibles, Apples and Commodores), there may be limitations in the software availability. This includes the do-it-yourself component – the programming and editing tools which make the pad so versatile. Check out what is available for your micro before you proceed.

*The fact is we can make it a lot easier for young children and for those who have physical disabilities.*

Make use of your school and its contacts within the Department (the regional consultants and computer personnel) and your local computer hardware and software distributors. If you live in NSW or Victoria, JPR Software, (02) 891 3688, and Edsoft, (03) 878 4899, are good starting places for any software enquiries.

BARSON Australia, the distributor of BBC and Apricot micros to schools, homes and businesses has established an

# Curran and Austral Primary Schools collaborate to produce Newsday masterpiece!

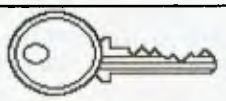
STUDENTS FROM Curran and Austral Primary Schools were brought together to produce a collaborative Newsday publication which they called *Online News*.

The day was an outstanding success. Kate Fraser, a teacher at Austral, commented "I've never seen kids more enthused, wound-up and motivated in my life! They were on task for the whole day from 9 to 2.30. They wouldn't stop for morning tea and had to be shunted out the door at lunch time. They were lined up and ready to go again within nine minutes! Newsday gives all students and in particular, reluctant readers, a realistic task and a realistic audience. There is a lot of forward and backwards referencing and this was the first time I have seen students involved in a fully co-operative learning experience."

*Online News* included many 10 x 8 photos given to the students after a trip to the local newspaper. Graphics and standard newspaper fare (lotto results, classifieds, stars etc) also featured.

The front page covered a local major car collision and an attempted suicide by a man who jumped off Grace Bros.

*Newsday - a real experience for students!*

# Planning is the  to success...

ALTHOUGH NEWSDAY can be integrated into many areas of the curriculum with varying degrees of time given to the exercise, maximum benefit can be gained from the exercise through careful planning.

The driving force behind the Newsday project - the Miller Computer Education Centre has produced a document called "The Newsday Kit". It is essential reading for those who intend to participate in a Newsday. The booklet has a very handy list of 'countdown activities' to do before the Newsday arrives. An excerpt is produced here with kind permission of the Miller Computer Education Centre. It gives an idea of some of the forward planning necessary, if you are going to participate in Newsday.

***2 weeks before Newsday***

- set writing assignments for articles
- organise interviews with local or other celebrities
- set a library assignment or lesson on who's who in newspapers
- take any special photos to match the stories that are being written

***1 week before Newsday***

- design the Newspaper banner
- prescribe the percentage layout of the paper - sports, news etc
- assign newspaper roles to students

***ESL***

*The Multilingual Manifesto - writings in many languages.*

***Maths***

*Multiple Mathematics - puzzles, conundrums and brain teasers to challenge and to share.*

***Music***

*Maestro Please! - a selection of music and lyrics written by students, ideas for eisteddfods and school musicals, sharing of information about the school's music department and band.*

***Sport***

*The Athlete's Foot - stories and articles, both modern and historical relating to local sporting heroes, Olympic and Commonwealth greats and school stars. There is potential here for exploring photojournalism.*

*The primary objective is of course, the students and what they learn from the experience of using the computers, telecommunications, interacting with classmates and sharing stories with other schools. But, the students' efforts could be turned into profit! Throughout the school year, a range of publications based on the Newsday experience could be reproduced and sold at school fates and school events, perhaps to fund further computer equipment for the school.*

**WANT TO KNOW MORE?**

The next Newsday will be held mid first term, 1989. **For further details** consult the Keylink Education Bulletin Board or contact Greg Bulter or Kate Fraser at the Miller Computer Education Centre on (02) 607 5804.

education fellowship. The concept grew from discussions at its second annual education seminar held in the Hunter Valley, late in 1988.

Senior officers from all state departments of education and representatives from private and independent education authorities attended. They were treated to hands-on activities, demonstrations of software and hardware and discussions of curriculum developments.

At the formal dinner, Julian Barson, Managing Director of Barson Computers, announced the fellowship. Delegates were invited to contribute ideas and set criteria for the selection of a person (most probably a teacher) who will go to the UK for one month (around Christmas, 1989). The visit will enable the representative to see what is happening in UK counterpart schools, visit education authorities and talk with software developers and publishers.

*The slightest touch activates the program which is important for users with limited control or movement.*

The fellowship will be a national concern and will be sponsored by Barson and Acorn (UK). Details of the Barson Education Fellowship will be finalised at Barson's Third Education Seminar which is scheduled for April/May, 1989.

## *5th World Conference on Computers and Education*

IT MAY seem to be a while off yet, but plans are already well underway for Sydney to host the 5th World Conference on Computers and Education in 1990! This

event is *the* international conference for computers and education and is held every five years. The conference comes under the auspices of the International Federation for Information Processing, which held the last conference in Virginia, USA and the 1980 conference in Switzerland.

Due to the dedication and presentation abilities of the Australian committee (and most notably Sandra Wills), Australia was nominated in 1980 for the 1990 conference. In a year's time we will have the spotlight on us for one of the most exciting events for computer education in Australia.

And there should be a few eye openers – delegates are expected from many countries including Bulgaria, Hungary (and other Eastern Block countries), many other European nations, the USA and, hopefully, there will be a strong representation from our neighbours – the South East Asian countries.

According to the organisers, there will be conferences within conferences, in order to cope with the scope and depth of what is happening in computer education on an international scale. There will be planned special activities for students, who will be encouraged to participate in the conference. It is hoped that overseas delegates will be able to experience 'where we are at' with computer education through demonstrations and displays.

And what of the standard issue of addresses and keynote speakers? All I can say is, along with the 100 per cent dyed-in-the-wool computer education experts, there is a possibility of more famous (notorious?) speakers, who are sure to entertain.

So, get out your advanced planner and pencil in July 9 to 13, 1990 for the World Computers and Education conference. In the mean time, you may also like to ponder what you could contribute to this once in a life time event. Would you like to present a paper at the conference? Deadline for papers is October, 1989.) Could your students become involved in some way? There is ample time to consider how you could contribute and how you will benefit. Further bulletins on the conference's progress will be posted in this column, but if you want some more information direct from the organisers, write to: The Secretary, WCCE/90 World Conference on Computers and Education, Australian Computer Society, PO Box 319, Darlinghurst 2010 NSW.

*The fellowship will be a national concern and will be sponsored by Barson and Acorn (UK).*

## Scone slugs 'em!

1988 WAS A good year for Scone Primary School, in the north east corner of NSW. Not only did one of its students win the honor of having her design published as a stamp (Danielle Hush's Nativity scene became the special 32c Christmas stamp), it also won the annual PRIMUG Writing Competition.

This annual event is run by the Primary Microbee Users Group and jointly sponsored by PRIMUG and Microbee. More than 500 schools across Australia entered this year, with PRIMUG awarding cash prizes to the four section winners and runners-up ($100 and $50 respectively), and for the overall winner, a 256TC package (including monitor and software) for the school, donated by Microbee Systems.

There was no set theme for students, which produced a good deal of diversity for the judges to reconcile. The overall winner, Kurt Fienburg, a Year Six student at Scone Primary School, composed an impressive piece of prose in the style of *Lord of the Rings*.

Scone Primary's seven 128K Microbees came in for heavy use by students during the competition for writing, editing and re-editing their entries. The prize of the 256TC system is a welcome addition to its computing needs.

*Figure 3. Scone Primary School student, Danielle Hush, had her Nativity scene become the special 32c Christmas stamp in 1988.*

## Computer education in 1989

IT IS WELL NIGH impossible to get anything out of anyone around the Christmas break (which is when this section was complied). However, contacts have been made far and wide in computer education circles and we will keep you up to date with what is happening around the country. Here is what is in store for 1989 –

***14 – 17 March***
Australian Personal Computer Show, Darling Harbour, Sydney.
Look out for hardware and software companies strutting their stuff at Australia's premiere computing show. (Many thanks to Atari for bringing the show to the attention of the education pages.)

***18 March***
Annual General Meeting of the NSW Computer Education Group,
at the Northern Districts Office, 2.00 pm

***16 to 18 June***
7th Annual NSW Computer Education Group Conference,
Leura Gardens Resort – Deadline for submission of papers is 31 March, 1989.

***6 to 9 July***
Curriculum '89
Held by the Australian Curriculum Studies Association at the Australian National University, Canberra. This year's theme is 'Which Way for the Curriculum?' Contact Jim Cumming, DEET, (062) 89 1333, or Kerry Kennedy, CDC, (062) 89 3524, for more information regarding program details and registration.

***1 to 4 October***
National Computers and Education Conference, Canberra.
Theme: Backup the Future.
For information about attending the conference, preparing a paper and accommodation write to ACEC '89, PO Box 311, Manuka ACT 2603, or phone Eve Shaw on (062) 950 648.

***NSW Computer Education Week***
To be advised.

If your organisation, school or company have something planned for Computers and Education for 1989, please send all relevant information to Sharon France, 'Computers and Education', *Your Computer*, 180 Bourke Road, Alexandria 2015 NSW.

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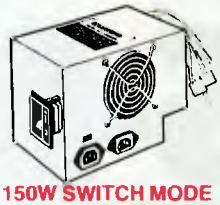

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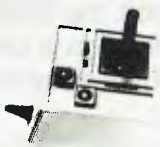

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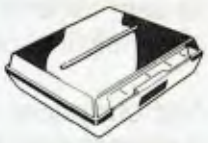

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- All 25 pins wired straight through

Cat.X15650 **Male to Male**
Cat.X15651 **Male to Female**
Cat.X15652 **Female to Female**

Normally $14.95 each
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# DISCOUNT PRICES!

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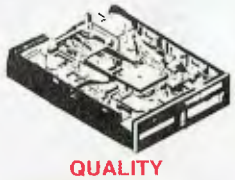
X15646: **Male to Female**
X15647: **Female to Female**

**only $14.95**



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Suitable for IBM, PS/2, Macintosh, Atari, etc.

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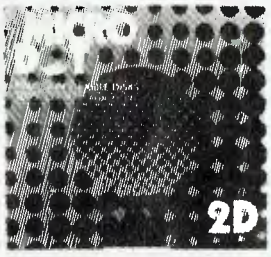


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| 5¼" 2S/2D | $26.00 | $24.00 |
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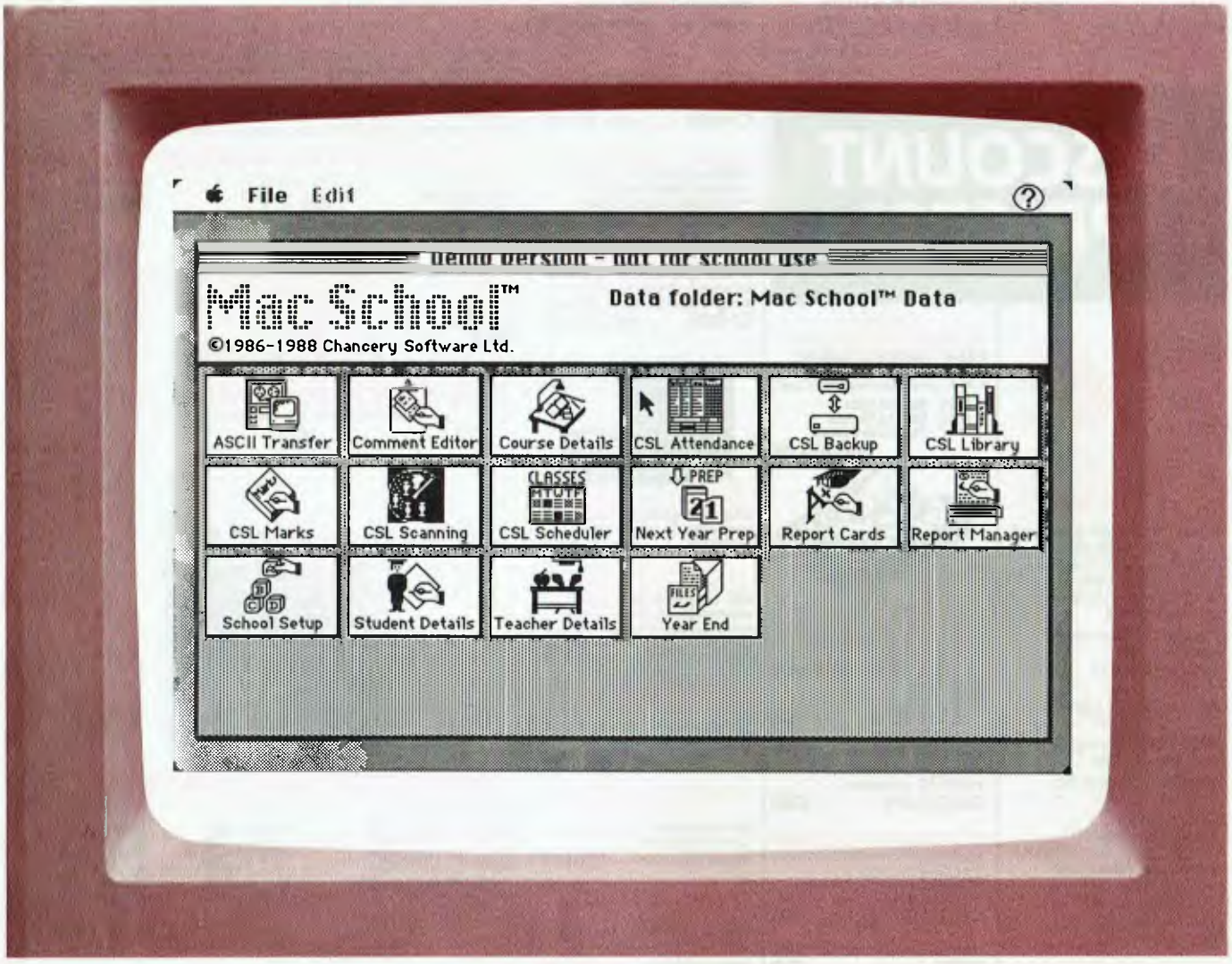
# Mac School Magic!




Not so long ago, the notion that a computer could run a school seemed a fantasy. Now there's a program which will let the Apple Mac do just that – Dof Dickinson reports . . .

A FEW YEARS ago, when computers were as rare as hen's teeth in classrooms, a friend of mine arrived at school to find he had been promoted overnight, without pay, and put in charge of the school computer. The standard in-service training of the day ran something like: 'Here you are, mate, it came with a manual!'.

A resourceful man, he soon had the 8-bit machine figured out, and the Principal arrived along with a gaggle of teachers for a tour of inspection. The first questions on the audience's lips were those that must have rung through many classrooms back in '83.

'Can it predict lotto numbers?' – this was, of course, the Principal.

'I suppose it will be running the school next' – from an anxious teacher.

Running the school was the last thing we thought computers would ever do.

Well, it's 1989 now, and we're talking an Apple Mac SE with a 20 megabyte hard disk in the staff room and our once naive teachers have smartened up. Now they *want* the computer to run the school and woe betide if the software isn't compatible with the other Apples in the classrooms or the IBM in the office!

## Mac School

SOFTWARE developers are in tune with teachers. Mac School, a total school administration package distributed by Dataflow, lets the computer do all the tasks teachers hate and leave them

free to get on with teaching. The most hated tasks are, of course, reports, scheduling, attendance, and recording marks – the day to day running of the school. Mac School will run the library.

Mac School comes as a series of six modules – all of which are compatible so that data from one can be transferred into another, which saves teachers that most precious resource of all – time.

The six modules in Mac School are: Scheduling, Attendance, Marks, Report Card, ASCII Transfer and Library. You need a Mac to run the program, and for those wealthy school readers among you, Mac School will operate over a network of Macs using Tops or AppleShare. For the rest of us, Apple II computers with 128 kilobytes of memory will operate the Marks module either alone (in a Macless school) or in conjunction with the system. All you have to do is purchase a separate Apple II version. That way, individual teachers can collate their marks on Apple II computers and then have that information read into the Mac SE for use with other modules in Mac School.

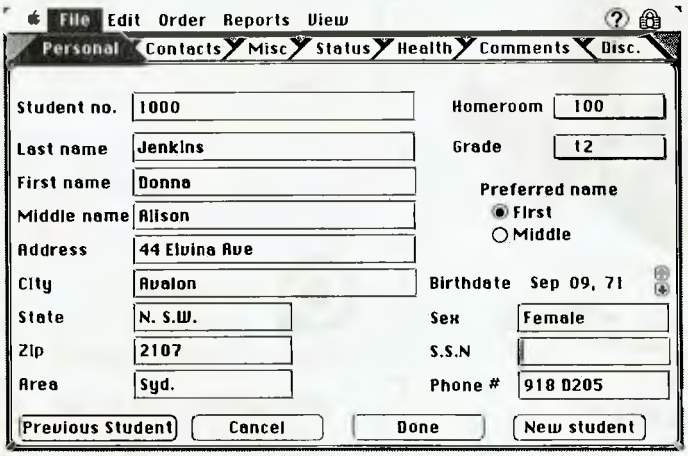
## Scheduling

SCHEDULING is the first module that most administrators and teachers pounce on with interest – the school timetable being such a thrilling annual nightmare. With a little information from you, this module will produce your school timetable. The limits of the program are a maximum of 4000 students in up to 8 terms at one time. This is ideal for planning HSC courses – timetabling two years at once, you can organise up to 500 subjects, 1500 classes and unlimited academic levels.

You then determine your ideal number of sections for each course, and teachers are automatically assigned to the classes. Any changes can be made at this time to tailor the timetable more precisely to the school and the teachers' loads. Then the computer produces the timetable and puts students into the appropriate classes. The program can be overridden at any stage to make adjustments, and new students can be added manually to each course or automatically inserted into the existing timetable.

## Attendance

THIS GOES far beyond the tick for present or a cross for absent in the register. The program will record daily, half-daily and period attendance and will accept up to 120 different codes for absent, present and late. It will also produce attendance reports and highlight attendance trends. There's no limit to the number of students you can record information about and the duration is for a full school year.




*A screen showing a student's personal details as they appear in Mac School. Because the modules are all compatible, once the information is keyed in, it can be easily transferred between applications.*

## Marks

TO USE THIS this program, teachers can either download lists of class names from any other module, or enter them directly themselves. With the list of names, you can set up your own electronic markbook which you can update as you go along over the school year.

*The six modules in Mac School are: Scheduling, Attendance, Marks, Report Card, ASCII Transfer and Library.*

The best thing about this program is that it does calculations for you automatically that once took the best part of an evening. It works out class averages, standard deviations, weights and makes instant comparisons to class average. It will take information for the whole class and print it out as a spreadsheet showing tasks, marks, student names and comments or numeric grades.

When you wish to insert a comment about a student's performance on an individual report card, the program allows for up to 999 standardised versions, or any number of manually entered ones. This means you can resort to the tried and trues: *Micheal's work has been consistent all term* (he never made a single effort!) or can add some more elaborate ones for the kind of situation you do not expect to encounter regularly: *Virginia had a sensational term, culminating in her attempt to burn down the school gym. We wish her well in her new institution.*

The Report Card module is handy when it comes to the usual unpaid overtime expected at report time. (Are you listening, Metherell?) Report Cards draws information from both the Attendance and Marks modules to maintain a complete student history of performance and attendance.

The report cards can look quite dressed up as the Report Manager allows you to import graphics (say, the school logo and motto) so that they appear on the top of each report card to give a professional nourish. You can also throw in a special message to all parents appearing on each report – 'Awfully sorry, but Metherell is closing this school down next term, so bang goes your child's education.'

## ASCII Transfer

YOU MAY or may not need this feature, according to the kind of hotchpotch of computers you've got at school. If, like many, you've got an IBM in the office, a clone in the staffroom, a few different vintage ole faithfuls scattered around the classrooms, then the ASCII Transfer feature will be essential.

Provided your computers can read or write data as a simple ASCII text file, you can use this module to import data into Mac School or export data from Mac School. This means that student information, course requests and so on, can be read and edited

on a host of computers outside the Mac and then imported back into the system where necessary.

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YOU MAY need a 20 megabyte Mac SE or an add-on external hard drive to operate this module. You'll realise why it needs the extra memory when you see what it can do! It provides a complete library system which can track up to 30,000 books and 4000 borrowers.

*That way, individual teachers can collate their marks on Apple II computers and then have that information read into the Mac SE for use with other modules in Mac School.*

When you start the system, you need to enter information about the students and staff who'll be borrowing books. This can be done either directly into the Library module, or to save several hours of work, you can import that information from the main administration system. You can then set borrowing privileges from 0 to 50 for students and staff.

Each book is then listed by titles, author subject, number of copies and Dewey number to aid classification. Once this is done, you have a working library system that will merely need updating with new books and new students as the years go by.

The program will print labels and catalog cards, and will even allow you to use a light pen to check books in and out if they have bar codes; if not, you have to enter the book and student numbers manually. The program will track damaged books, and highlight overdue borrowers with an option to print an overdue notice both by book or borrower. You can also keep an eye on borrowing statistics which are available by 'most checked-out' books, overdue books, teacher and student. The program also provides a statistical summary and year-end inventory of books.

The complete system costs $2995 – that's the lot, everything you ever needed to run the school and more. Otherwise you can pick and choose and buy some of the modules separately. Scheduling costs $1850. Library $1150, Marks $450, Attendance $925 and ASCII Transfer $450 (you can't purchase the Report Card module individually). You can also buy an Apple II version that needs 128 Kbyte for Marks either as a stand-alone at $300 or as an add-on to Mac School package for $150. These are the school prices excluding tax. The program is distributed by Dataflow (02) 331 6153 and can be purchased from authorised Mac School resellers. □


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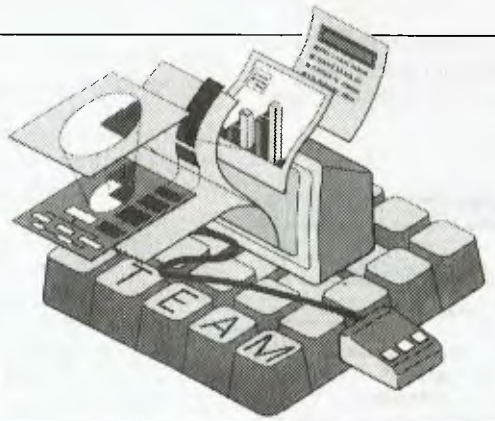


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# Why a computer goes BANG!

THIS ARTICLE should have appeared at the start of the Hardware Hacking series, not in the middle of it! We are going to look at what can go wrong with your computer, why it goes wrong, and what you can do about it, or do to prevent it in the first place. The configurations described below may vary between brands, but generally all clones have the same essential layout.

**If anyone's computer is going to go BANG!, it'll be Tom Moffat's – so, who better to advise on things to watch out for and not to do!**

## The power supply

THIS IS the big silver box at the right rear of the case housing an IBM/compatible computer. At the back it has connectors for mains power input and output; at the right is the the proverbial 'big red switch' that turns the whole computer on and off; in the top is a cooling fan.

The IBM power supply comes in several different wattage ratings, depending on the size and complexity of the computer it serves. Its purpose is to convert the 240 volt AC mains voltage to four DC voltages needed by the computer and the disk drives: -12 volts, -5 volts, +5 volts, and +12 volts. The circuit is generally a very advanced design, using a 'switching regulator' to do the voltage conversion. This is a big improvement over the traditional type of power supply, which uses a large, heavy power transformer to do most of the converting before the voltages are subjected to a linear regulator.

The switching regulator controls the voltages available to the rest of the computer by simply turning the mains on and off at a very fast rate, much as if you quickly turned a room's light switch on and off. Although the light would certainly flicker a bit, its overall average brightness would depend on how much of the time the switch was in the ON position, compared with how long it spent OFF (this is the general idea behind those variable light dimmers you can use to replace a room's normal light switch).

The switching regulator is very efficient compared to the more traditional linear regulator. But since there is no power transformer, the main transistors in a switching power supply must handle the full 240 volt mains voltage, and here's were the trouble can start. Transistors, like most electronic devices, have maximum voltage ratings. Exceed the rated voltage, and the device will surely fail.

If you look on the back of an IBM-type power supply of Asian origin (and most of them are) you will probably see a label stating that its mains voltage rating is 220 VAC (volts AC). Even though it's a pretty poor design practice with little safety margin, many of these power supplies use power transistors rated at 250 volts. Now, consider using one of these in Australia, where the mains voltage is a nominal 240

volts. If the voltage varies upwards by only 4 per cent, well within normal limits, it goes over the 250 volt rating of your transistors and ***BOOM!*** you kiss your power supply goodbye.

It is possible to get switching transistors with a voltage rating of 400 for only a few cents more than the 250 volt versions. But Asian manufacturers, trying to keep costs at rock bottom, choose the cheaper ones. Many of these supplies find their way into Australia, really at no fault of the importers. I have been through two different IBM compatible computers so far, and both of them had their power supplies blow up.

Luckily this generally happens within a short time of purchase, and causes no damage to the computer itself. The computer simply goes dead (messing up any file you may be working on). A technician can easily replace the 250 volt transistors with 400 volt versions, but it means complete disassembly of the power supply to get at them. Your warranty should definitely cover this problem, but if you are purchasing a new IBM compatible machine it would be worth making sure any power supply faults will be fixed free.

Another power supply problem isn't really part of the electronics; it's the fan. I had one of these pack up and it was replaced under warranty without question. The fan seemed to be getting slower and slower, and finally started to make 'flopping' noises, as if someone had stuck a piece of paper into it. Disassembly and inspection revealed nothing other than a slight stiffness as the blades were turned by hand. Shot bearings I guess, but the fan didn't seem to last very long. Something else to make sure is covered by your warranty.

## The main circuit board

YOU WOULDN'T expect this would be a source of trouble, but sometimes it can be . . . it can break in half! The main system board in an IBM style computer is a large, unsupported area of fibreglass sheeting. As the various plug-in cards are inserted or removed from the slots, the board flexes and twists.

In decent-quality clones the system board is made of fairly thick fibreglass with good thick copper tracks bound onto the board. But in some of the cheapies, the manufacturers have saved money by using the thinnest possible fibreglass sheet with the thinnest possible tracks. When you insert or remove a card, the stress can cause the circuit board material to crack, and as it splits it severs the copper tracks near the break. Sometimes the breaks in the tracks are so fine the unaided eye can't see them. The most harmful breaks are intermittent, sometimes conducting and other times not, causing erratic and untracable operation of the computer.

So if the system board breaks, it generally has to be totally written off and replaced. I have a friend in Melbourne who found he could save himself a hundred dollars or so on the already cheap Melbourne shop prices by ordering an IBM compatible direct from Hong Kong. When it arrived he plugged one of his cards into a system board slot and ***CRACK!*** a written-off system board. This had to be replaced by another (thicker) system board bought in Melbourne, for around $200. So it cost him $200 to save $100.

*The moral of the story is look before you buy, and avoid flimsy circuit boards like the plague!*

The moral of the story is look before you buy, and avoid flimsy circuit boards like the plague! Inspect several different computers, and open the bonnet of each one and apply slight hand pressure to the system board. You'll soon see which ones are flimsy and which are robust. Be gentle doing this, don't smash a system board in the shop!

If you already own a computer with a thin system board, just try to interfere with it as little as possible. Remove and replace cards only when absolutely essential, and handle them as if they were made of egg shell.

## The monitor

THIS IS one you keep hearing about . . . don't do this or don't do that, or you'll damage your monitor. Well, there's a certain amount of truth in this, and a certain amount of folklore. Under normal computer operations there's probably not a lot you can do to hurt the monitor, other than possibly running it without the computer turned on. But you like to go beyond 'normal' operations don't you; otherwise you probably wouldn't be reading this series.

A computer monitor has a circuit to make its scanning electron beam move back and forth (the *horizontal* section), and another circuit to make the beam move up and down (the *vertical* section). As well, there is a circuit to brighten and darken the screen as it is scanned by the electron beam (the *video* section). If it is a colour monitor there will be three video sections, one for each of the three primary colours: red, green, and blue; if these signals are taken directly from the computer, it's called an 'RGB' monitor. A *composite* monitor receives all three colour signals, as well as the horizontal and vertical signals, from the computer along one shielded wire. There is internal circuitry to unscramble all the individual signals and send them off to their proper destinations. Now, if you take a composite monitor, and add circuits to receive video and sound signals off air, you have what's known as a 'colour telly'.

In fact, some of the really flash Japanese big-screen televisions sold in hi-fi shops are actually a separate composite monitor and a television tuner, connected together with a coaxial cable. You could probably use the big monitor on your computer if it had composite video output (most do), or you could plug your computer monitor into a television tuner and watch even junkier things than your computer provides. If you're using the composite system you could run the signals into and out of your video recorder and record whatever is going to your computer's screen. In practice this sometimes doesn't work very well, although one computer, the BBC Acorn, will produce truly stunning graphics onto a video recorder. I think this might be because the machine was originally designed to be used by the BBC for television classes on computer science.

Enough dreaming, back to realities. Here's how you can blow up your monitor. Some monitors, mostly of the composite type, have what are known as 'free running' horizontal and vertical circuits. This means they keep scanning the electron beam back and forth, up and down, at approximately the correct speeds, even when no computer is connected. When the computer comes into play it sends synchronizing pulses to the monitor to keep the horizontal and vertical circuits ticking over at exactly the right speeds, instead of approximate rates.

The more 'professional' types of monitors, particularly those meant for use with monochrome (Hercules) graphics adaptors, have 'driven' vertical and horizontal circuits. This means a pulse is required

from the computer for each sweep of the electron beam, and if the pulses are coming at the wrong rate or not at all, the sweep circuits go wild.

The sweep circuits are in fact oscillators, which, because of tuning components within them, want to oscillate at only one correct frequency. It's a bit like blowing across the top of a bottle; for a given bottle size there's only one note the bottle will toot. You can blow all sorts of different ways, but the bottle will only toot one note and only when blown the right way. A 'driven' sweep circuit is similar, if you drive it improperly, it will just stop tooting!

Another characteristic of oscillators is that they draw very little power when tooting correctly, but they draw heaps of power when they're trying to oscillate, but can't. So a driven oscillator that's not getting the drive it expects from the computer will show its anger by drawing lots of power and eventually blowing something.

The drive signals for a driven monitor's horizontal and vertical circuits originate in the CRT Controller chip, which can be programmed to provide all manner of horizontal and vertical drive signals. When the computer boots up, it automatically programs the chip with the right values for the intended type of monitor. Once you know exactly what you're doing you can program your own values into the chip to produce a different number of rows or columns on the screen or whatever. (There are also functions within the BIOS which will do this for you; we'll explore these in detail in a further article in this series.)

Some programs use the BIOS functions, or program the CRT controller chip directly, to do such chores as switching from text to graphics mode and back again. During the short time re-programming is taking place the drive signals may stop briefly, and this explains why some monitors emit a sudden squeak as they switch over – it's the sound of the horizontal oscillator going out of control for only an instant. Allowed to continue, it would probably blow something. If your monitor ever squeaks like this, and keeps it up, turn it off quickly!

As you can imagine, it would be unwise to blindly feed new values into the CRT chip's registers, because you could certainly end up wrecking your monitor. You should also avoid operating the monitor with the computer switched off, or disconnected. Some monitors have special mains cords that can plug into the switched socket on the computer's power supply; this means the monitor is automatically switched off when the computer is switched off.

One more trap I've discovered is the Reset button. If you press it briefly in the normal way to reset a hung computer, no worries – but if you press it and hold it in for several seconds, it will stop the CRT controller sending drive pulses. On my monochrome monitor this causes much squealing as the horizontal circuit gives up altogether. The vertical still seems to work, after a fashion. The result is an extremely bright vertical line which could easily cause a burn in the screen phosphor.

## The disk drives

EVERYONE knows you shouldn't pour a cup of coffee over a disk and then shove it in a disk drive, and everyone knows you should make some attempt to keep the heads clean. But as well as the problems of dirt, damage can be done to disk drives by simply writing the wrong values to the wrong registers.

For instance: there is a chip in any disk-based computer called the 'floppy disk controller', or FDC. Everything to do with the disk drives is channeled through, and controlled by, this chip; the same applies to hard disks. The FDC has a series of control and status registers, just like the CRT controller chip on the video card. One thing you can do is write a number into the 'track' register and then tell the FDC to move the disk drive's read/write head to that track number. This is fine for tracks up to 40 or so, but what happens if you tell the drive to go to track 55 or something? All goes well until the head passes track 40, but then it slams itself against a mechanical stop another 15 times, making an awful noise and probably knocking the whole works out of alignment.

I haven't been game to fiddle with the FDC on an IBM, after the devastation I once caused on a Microbee. I was playing around with an FDC command that reads into memory a whole track, formatting and all. I sent a command to the FDC, telling it to step to track 35. Trouble was, my thinking had slipped into decimal for some reason, while the program being worked on was in hexadecimal. So the number '35' was interpreted as track 53 decimal. The head stepped along to the end of its travel, and then had 13 tries at self-destruction.

Moral of the story: if you're going to attempt to program the FDC directly, make sure you know what you're doing, don't make any silly mistakes, and be prepared for a heavy repair bill. I have been contemplating doing an article of experimenting with the FDC, but as yet I haven't got up the nerve to jeopardize the health and well-being of my drives. Perhaps I shouldn't encourage you to do it either. Anyhow, most functions you would want are available through the BIOS, and that's pretty bombproof.

Now to the matter of hard disks. I have thought the matter out very carefully, and I don't own a hard disk. The use of a hard disk implies that you're going to be storing valuable material on it permanently. And after some of the disasters I've perpetrated on my floppies, I just couldn't trust myself not to wreck it. For 'users', the people who run ready-made software for business purposes or Cad or whatever, a hard disk would be indispensable. But if you're doing software and hardware development, especially down to the individual chip level, a hard disk in its present form is just too vulnerable.

What I would like to see is a hard disk unit with a mechanical switch on the front that could be manually thrown to make the drive physically incapable of writing, no matter what. If I can get my hands on a hard disk unit to fiddle around with, I'll see if there's some way to modify it to make it totally write-proof under any circumstances. If I succeed you'll certainly hear about it through this magazine.

In the meantime, if you're a hacker with a hard disk, just make sure you back up everything on it to nice safe floppies before beginning any hardware project, especially if it's something that hasn't been done before. I still only feel safe when I see my most valuable work safely on floppies, locked away in a plastic box, well out of the reach of an enraged IBM! □

# Assembling QuickBasic - Part 2

Having covered QuickBasic routines in January, Jeff Richards continues with procedures for creating Assembly language function routines – they are very similar to those used to create Subs, but functions can be easier to use in QuickBasic programs.

BEFORE considering FUNCTION procedures and the way they differ from SUB procedures, a comment on the format of the arguments to the routine is in order. When calling such a procedure from a QuickBasic program it is usual to insert a variable as the argument: BITSET A,B. for example. However, any argument of the correct type can be used – in these examples this means anything that is an integer. Therefore the arguments can be variables, literals, constants or expressions. Thus, you could use BITSET A,1, BITSET 0,1 or BITSET 5,B+2.

While each of these forms is legal, they may not all be useful. If a procedure modifies an argument and returns it to the program, then a procedure call that uses a literal, a constant or an expression for the argument will appear to fail. What happens is that when a literal, constant or expression is used QuickBasic creates and initializes a temporary variable for that argument, and it is the address of this temporary that is passed to the procedure. The procedure will then alter this temporary by storing a result in it, but when it terminates and control is passed back to the calling program, the temporary is discarded, and the result cannot be retrieved.

This is obvious in the case of a literal or expression, but it's easy to pass a constant as an argument, and then spend a lot of time wondering why the procedure doesn't seem to alter the argument at all. This is one of several reasons why functions are often preferable to Subs.

The structure of a function is identical to that of a Sub, except for the way the result is returned. For a function, the result of the procedure is left in the AX register when the procedure returns. If it has been defined correctly, QuickBasic knows that the AX register contains the result, and it is presented to the calling program as the value of the function.

Functions aren't prevented from returning results in their arguments, and this technique is often used for complex procedures that return multiple results. One result – an error code perhaps – is returned as the value of the function, while the others are returned in the arguments. However, this technique is rare in Basic – functions usually return a single result as the function value, and statements (which are equivalent to a Sub) don't usually modify their arguments (although Swap is an exception to this).

For an example of a function we will extend the BITSET and BITCLR examples from Part I (Feb '89) to include a test function, BITTST. This function will return 'true' if the nominated bit in the integer is set, otherwise it will return false. The full routine is presented in Listing I.

```
D:\)masm bits;
Microsoft (R) Macro Assembler Version 5.00
Copyright (C) Microsoft Corp 1981-1985, 1987. All rights
reserved.

  51560 + 271796 Bytes symbol space free

       0 Warning Errors
       0 Severe Errors
D:\)link /q bits
Microsoft (R) Overlay Linker  Version 3.61
Copyright (C) Microsoft Corp 1983-1987. All rights reserved.

Run File [BITS.QLB]: mylib.qlb
List File [NUL.MAP]:
Libraries [.LIB]: bqlb40.lib

D:\)
```

***Figure 1.*** *This is the actual display of the compile/link process to turn BITS.ASM into MYLIB.QLB.*

```
TITLE BITS.ASM - QuickBasic Library Routine
DOSSEG
PUBLIC  BitSet, BitClr, BitTst

;************************************************
;* FUNCTION BITSET (I%, N%)                     *
;* FORCE BIT NUMBER N% IN INTEGER I% TO 1.      *
;************************************************
BitSet  PROC                    ;Procedure starts here.
        push    bp              ;1  Save BP register.
        mov     bp,sp           ;2  Make BP into frame pointer.
        mov     bx,[bp+6]       ;3  Use frame pointer to get the
        mov     cx,[bx]         ;4   second parameter into CX.
        mov     ax,1            ;5  Load 1 into register AX
        shl     ax,cl           ;6   and shift it left N% places.
        mov     bx,[bp+8]       ;7  Get the first parameter
        mov     cx,[bx]         ;8   into CX.
        or      cx,ax           ;9  Force the bit on.
        mov     [bx],cx         ;10 Replace the parameter.
        pop     bp              ;11 Retrieve BP and
        ret     4               ;12 return past two arguments.
BitSet  ENDP                    ;Procedure ends here.

;************************************************
;* FUNCTION BITCLR (I%, N%)                     *
;* FORCE BIT NUMBER N% IN INTEGER I% TO 0.      *
;************************************************
```

```
BitClr  PROC                    ;Procedure starts here.
        push    bp              ;1  Save BP register.
        mov     bp,sp           ;2  Make BP into frame pointer.
        mov     bx,[bp+6]       ;3  Use frame pointer to get the
        mov     cx,[bx]         ;4   second parameter into CX.
        mov     ax,1            ;5  Load 1 into register AX
        shl     ax,cl           ;6   and shift it left N% places.
        mov     bx,[bp+8]       ;7  Get the first parameter
        mov     cx,[bx]         ;8   into CX.
        not     ax              ;9  Invert the mask bits.
        and     cx,ax           ;10  and force the bit off.
        mov     [bx],cx         ;11 Replace the parameter.
        pop     bp              ;12 Retrieve BP and
        ret     4               ;13 return past two arguments.

BitClr  ENDP                    ;Procedure ends here.

;************************************************
;* FUNCTION BITTST (I%, N%)                     *
;* RETURN TRUE IF BIT N% IN INTEGER I% IS SET,  *
;*    ELSE RETURN FALSE.                        *
;************************************************

BitTst  PROC                    ;Procedure starts here.
        push    bp              ;1  Save BP register.
        mov     bp,sp           ;2  Make BP into frame pointer.
        mov     bx,[bp+6]       ;3  Use frame pointer to get the
        mov     cx,[bx]         ;4   second parameter into CX.
        mov     ax,1            ;5  Put a 1 in the low bit
        shl     ax,cl           ;6   and shift left N% places.
        mov     bx,[bp+8]       ;7  Get the first parameter
        mov     cx,[bx]         ;8   into CX.
        and     ax,cx           ;9  Test the bit and set flags.
        jz      TstEnd          ;10 Skip if zero flag set
        mov     ax,-1           ;11  else load -1 into result.
TstEnd: pop     bp              ;12 Retrieve BP and
        ret     4               ;13 return past two arguments.

BitTst  ENDP                    ;Procedure ends here.
        END                     ;Module ends here.
```

***Listing 1.*** *An example function – it extends the BITSET and BITCLR examples given in February to include a test function, BITTST. This function will return 'true' if the nominated bit in the integer is set, otherwise it will return false. This listing includes the Bit-Clear version of the bit-set program presented in February; it follows the same structure as the first program, but differs in the way the result is calculated. Since the 80x86 CPU does not support a NAND operation, it must be done in two steps. Firstly, the mask is inverted with the NOT instruction, then it is ANDed with the supplied number. The result is to clear the indicated bit, rather than setting it. If in doubt, try it with pencil and paper.*

*As an exercise, try rewriting BITSET and BITCLR so that they are functions as well as Subs: that is, the argument is modified, but is also returned in AX. What advantages does this give for using the function/SUB in a program?*

The first thing to note is that this function is almost identical to the BITSET procedure. The AX register is set up as a bit mask, with the nominated bit set and all others cleared. It is then ANDed with the integer argument, but this time the AX register is the destination. This means that the result of the AND will be a zero value in the AX register if the bit was not set, and an unchanged value if it was. More importantly, however, the Zero flag in the CPU flags register will be set if the result in AX is zero, and this flag can be used to control a conditional jump that will insert the True or False condition into AX, ready for the return.

Actually, only a False value has to be inserted. If the Zero flag is set, then the result in AX is zero and the bit was not set. A result of zero corresponds to False (as far as QuickBasic understands true and false) so no further action is needed. However, if the Zero flag is not set, and the result of the bit test is true, then we need to load a value of -1, which is True to QuickBasic, into AX.

```
DEFINT A-Z
DECLARE FUNCTION BITTST%(I%, N%)
WHILE  A () -1
    INPUT "Number = ",A
    FOR I = 15 TO 0 STEP -1
        IF BITTST%(A, I) THEN PRINT"1";ELSE PRINT"0";
    NEXT I
    PRINT
WEND
```

***Listing 2.*** *A demonstration of the BITTST function – it displays the number entered in binary.*

Having tested the Zero flag and loaded AX accordingly, the routine is nearly finished. All that is needed is to retrieve BP from the stack and execute a RETurn with a parameter of 4, indicating that the function was called with 2 arguments.

Of course, using a function is different from using a Sub. Firstly, functions must be DECLAREd (this is optional, though recommended, for Subs). Secondly, functions cannot be used as standalone statements, but must be part of an expression. Thirdly, functions have a type, just as any other variable does. A program to demonstrate the BITTST function is presented in Listing 2 – this displays the number entered as binary. □

## *A note on style*

THE PRESENTATION of a program can make a significant contribution to its clarity, and most programmers follow some sort of rule about style to help minimize the need for additional comments. The standard used here is –

**Assembler directives** – all upper case;

**Labels and Varlable names** – capitalized, with embedded capitals to give a clue to their construction;

**Mnemonics and registers** – all lower case.

Names are kept short, and do not use any special characters. Some programmers prefer longer, more descriptive names, but often typing and spelling errors mean that long names cause more trouble than they are worth.

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- ☐ Space Applications
- ☐ Bionics

**SUPPORTED PROCESSOR FAMILIES**

8086/186/286
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68000/010/020
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8051/8031
6800/6801/68HC11/6301/6303
6809

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ATARI ST
APPLIX 1616

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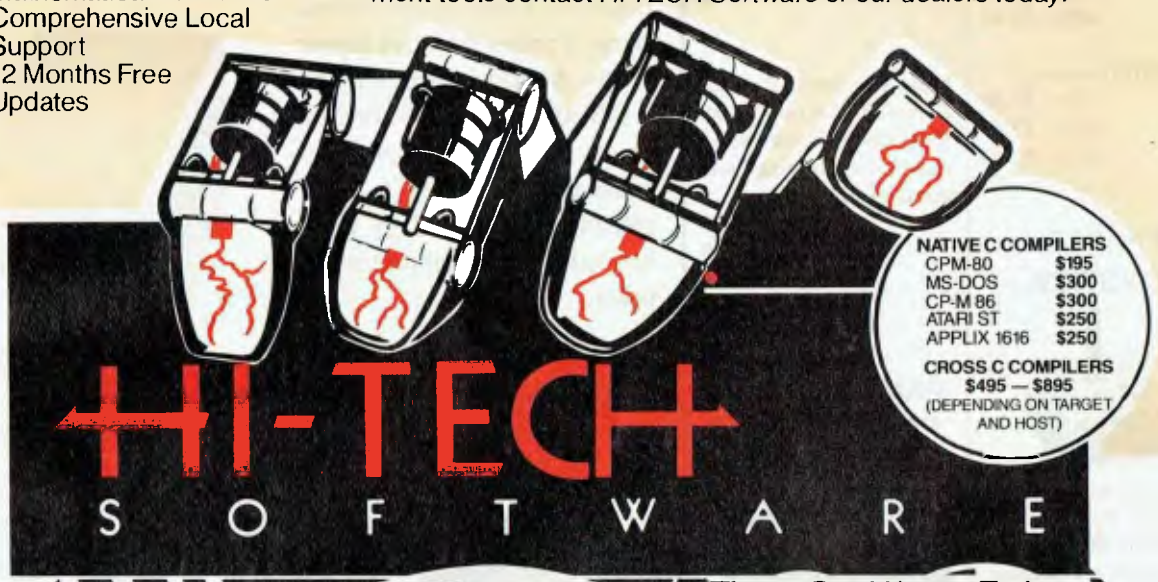


All prices are in Australian dollars and exclude sales tax and delivery.

HI-TECH Software, P.O. Box 103, Alderley, Qld, 4051.
Ph: (07) 300 5011 Fax: (07) 300 5246 BBS: (07) 300 5235

**AUTHORIZED DEALERS**

**AUSTRALIA:**

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|---|---|
| Baltec Systems | (07) 369 5900 |
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# MICRO-EDUCATIONAL PTY LTD

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## TOOL/ CLEANING KIT

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## UNINTERRUPTABLE POWER SUPPLY

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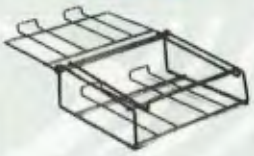
From the world's leading manufacturer of printers. Fast, highly reliable, IBM compatible. Top speed 180cps in draft, 24cps in NLQ.
$525.00

## WIRE PRINTER STANDS



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15" version **$45.00**

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Our top selling modem. Supports 300, 1200, 1200/75 and 2400 baud. Auto-answer, auto-dial, disconnect. Hayes AT compatible. Over 14,000 sold. Telecom approved.

**$399.00**

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Similar to ZXR, but doesn't support 300 and 1200/75 baud rates.

**$369.00**

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Again Maestro have broken the price barrier, with the release of a 9600 baud modem for under $2000. Way under. Also supports 300, 1200, 1200/75 and 2400 baud. Absolute latest in technology.

**$1500.00**

## MAESTRO 2400 DATA OPTIMIZER

A MNP Mode 5 data compression, 2400, 1200 baud modem. Auto everything with error correction. Capable of quadrupling the data flow, depending on the file, transmission can reach 9600bps - error free.

**$499.00**

## SERIAL/PARALLEL CONVERTERS

These devices do what the name says. Converts parallel signals to serial and vice versa.

Parallel to Serial **$120.00**
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## ANKO APPLE MOUSE

Mouse for Apple IIc, Mac 512, and Mac Plus. 200 DPI resolution. One button. Cheaper than Apple equivalent.

**$69.00**

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For IBM PCs and compatibles. Fully Microsoft compatible. Includes full suite of driver software.

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## MONITOR MOVER

A monitor arm, allows full 360° rotation of monitor. Keyboard tray.

**$199.00**

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A desk based monitor swivel. Allows tilting of monitor.

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2m IBM AT serial cab **$30**
2m male-male centron **$30**

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You can share peripherals between various computers.

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One parallel to two **$60**
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Four serial to one **$110**
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## MAIL ORDER FORM

Dear George,
Please send me the following: _____

_____

_____ _____

_____

By Post ❑ (min. $4), or Courier ❑ (min. $10)

Enclosed please find Cheque/Money Order/Bankcard/Mastercard/Visa no.

_____

Expiry date: ___ / ___

Name: _____

Address: _____

_____

Phone: _____ _____

*Postage Rates:* Allow the above rates for orders up to 5Kg. Rates increase after this. If unsure, please ring us.

# Are you safe?

WELCOME to another edition of Twilight Bytes, in this episode will Martha find out that Bob has been cheating on her and using another BBS, will the phantom password hacker destroy the credibility of some System Operators? Don't touch that dial!

As I write this a number of BBS systems in Sydney, Melbourne and Brisbane are being struck by break ins. Someone (or a group) is attacking the software that runs BBSs in an attempt to gain access to system information.

Now most systems (like Prophet) require that you register, submit your address, telephone number(s) and other information that allows the system operator to validate your credentials. Sometimes this information is stored on the same computer as the bulletin board, others print the information for review and some simply check and delete it.

Under normal circumstances you would have nothing to worry about, if someone knows your name they can generally find you pretty quickly (assuming you are reasonably honest).

So what is the threat? Let us have a little think. The break-in person was attacking systems and using some lesser known features to program the bulletin board to send privileged files to the cracker (notice I am not calling this person a hacker). In general, the file stolen was the system user data file which generally contains names, suburb, terminal settings and some system related information (like the number of files downloaded).

Pretty safe you say, well the other thing that is stored in the file is your logon password. This is the biggest threat to you from most of these break-in type operations, and only if you let it. If you use a number of boards (and most people do) it is quick and simple to use the same password on all of them. But, and here is the catch, if any one of the systems that you use reveals your password to someone you are really at risk!

Imagine that you are using a couple of systems and that you are having ongoing conversations with people, which is about normal for most users. Your password is stolen and this cracker type gets on and start posting all sorts of messages with your name and password. The other users of the board and the system operator are going to take a great deal of convincing that it really was not you!

How do you protect yourself? The simplest and most effective way is to use a different password on every system you call. Yes, it is a pain, yes it does mean remembering a number of passwords, but you will be a lot safer. The other thing to do is change your password every so often and do not use obvious passwords, like your name or suburb.

*Using an idea he got from train conductors of the time, Hermann Hollerith devised a machine that could tabulate census data automatically. An operator simply placed the card with punch holes representing data, into the reader slot; when the cover was closed, pins were pressed against the card. Where there were holes, the pin would fall through into a trough of mercury, trip an electric circuit, and the counter clocks would be advanced. Using this device a single operator could process in excess of 50,000 census forms in a day.*

## Hermann – you have a lot to answer for!

Hermann Hollerith has a lot to answer for: he is personally responsible for causing the computer industry. If your wife is a computer widow and threatens to 'shoot the guy' tell her she is too late, by about 60 years! Hermann worked for the US Census Bureau during the late 1890s in the section that correlated census into statistics.

Just imagine that you had to compile a report of all the people in your street. You'd want their ages, sex, marital status and salary entered on a form.

Assuming everyone gives you that information, you'd have to collate it to provide statistics that you see used every day. If your street had more than 10 houses and you actually just thought about the amount of work it would take manually, you'd probably just forget it.

If you thought that was bad, back in 1880 there was a census in the USA and six years later they were still trying to collate the information. And – they had to start preparing for the 1890 census! Now our friend Hermann was involved in all of this and decided there just had to be a better way of doing all of this. One of his initial ideas was to use paper rolls like a pianola (you go find out what a pianola is, you young whipper snappers).

Using an idea he got from train conductors of the time, Hermann devised a machine that could process all of the census and tabulate it automatically. When you presented your ticket on a train the conductor would use a punch on the ticket to record where you got on and where you should get off. Hermann decided that this was the way to go (after considering continuous tape).

The machine looked like a wall of clocks and 'read' the holes punched in the card with census data and recorded which settings were on (guess where binary comes into play); it also counted the number of times that setting was on. An operator simply placed the card into the reader slot; when the cover was closed, pins were pressed against the card. Where there were holes, the pin would fall through into a trough of mercury and trip an electric circuit. Depending on the setting in the machine, the counter clocks would be advanced. Using this device a single operator could process in excess of 50,000 census forms in a day.

This 'tabulating machine' was programmed by wiring up switches to a tabulator (or sort chute); as the switches were tripped, the current advanced the clocks) or did other work). This method of programming is where the term 'hardwired programs' came into being! The device was eventually modified to process other types of data, like business records – and the computer (albeit mechanical) industry was born. The company Hermann formed was called Tabulating Machine Company (TMC); after merging with a number of companies, it finally became known as International Business Machines (IBM).

IBM soon mastered card reader technology, so other 'information processing' companies – particularly NCR, which was by far the biggest in the industry then – were forced to install IBM card readers (and punches) for their customers to provide a reliable processing system.

What happened at the census bureau? Well, they found Hermann's machines too expensive and built their own. □

## Australian PAMS Listing

## Release: 8901 1 Jan 1989

New systems: 13
Online: 2
Unknown: 6
Offline: 19
Name Change: 10
Amended: 55
TOTAL Systems: 306

## Primary electronic collection points

The last full listing was given in the October 1988 issue; refer to the Services page on how to obtain Back issues.

***ACT*** – PC Exchange RIBM (062) 58-1406

***NSW*** – Prophet TBBS (02) 628-5222

***Vic.*** – Brainstorm OZ! (03) 758-7086

***Qld.*** – AMPAK Opus/PRBBS (07) 263-7070

***SA*** – Oracle PC-Network (08) 260-6222

***WA*** – Nemo Multiple BBS RAPL (09) 370-1855

## ACT

*** ***NEW System*** ***
***MICSIG Fido***
*Phone*: (066) 85-1026
*Baud*: V21 V22 V22bis V23
*Access*: Public
*BBSoftware*: Fido

*** ***Offline*** ***
***Pharmacy BBS***

## NEW SOUTH WALES

*** ***Amended*** ***
***ABBSNET***
*Sysop*: Michael Pigram
*Phone*: (02) 630-3693
*Baud*: V21
*Access*: Public
*Hours*: Weekdays: 1830 – 0600
Weekends: 24 Hours
*Computer*: C-64
*BBSoftware*: SynTech

*** ***Amended*** ***
***AUGUR TBBS***
*Sysop*: Mark James
*Phone*: (02) 311-3052
*FIDOnet*: 712/302
*Baud*: V22 V22bis V23
*Access*: Reg VA
*Computer*: IBM XT Clone
DOS: PC DOS
*BBSoftware*: TBBS

*** ***NEW System*** ***
***Coastal Communications***
*Sysop*: Chris Patten
*Phone*: (02) 977-6869
*FIDOnet*: 714/906
*Baud*: V21 V22 V22bis V23
*BBSoftware*: QuickBBS

*** ***Amended*** ***
***Coastal Opus BBS***
*Sysop*: Kevin Mann
*Phone*: (043) 23-2275
*FIDOnet*: 711/430
*Baud*: V22 V22bis V23 PEP
*Access*: Reg VA
*Computer*: IBM AT Clone
DOS: MS DOS
*BBSoftware*: Opus

*** ***Amended*** ***
***Commodore Pursuit TBBS***
*Sysop*: Warren Hillsdon
*Phone*: (02) 522-9507
*Baud*: V21 V22 V22bis V23
*Access*: Mem VA
*Computer*: IBM AT Clone
DOS: MS DOS
*BBSoftware*: TBBS

*** ***Amended*** ***
***Computrol***
*Sysop*: Robert Spence
*Phone*: (02) 489-6848
*Baud*: V21 V22 V22bis V23 B103 B212
*Access*: Reg
*Computer*: IBM XT Clone
DOS: MS DOS
*BBSoftware*: GTPower

*** ***Amended*** ***
***Cybersoft Opus***
*Sysop*: Heath Rogers
*Phone*: (02) 212-2261
*FIDOnet*: 712/202
*Baud*: V21 V22 V22bis V23
*Access*: Reg LVA
*Computer*: IBM XT
DOS: PC DOS
*BBSoftware*: Opus

*** ***Amended*** ***
***Delta Net***
*Sysop*: Geoff Arthur
*Phone*: (02) 457-8281
*FIDOnet*: 711/415
*Baud*: V21 V22 V22bis V23
*Access*: Reg
*BBSoftware*: QuickBBS

*** ***Offline*** ***
***Disaster Area***

*** ***NEW System*** ***
***K.K.K BBS***
*Sysop*: Jim Lynch
*Phone*: (02) 418-6005
*Baud*: V21 V22 V22bis V23
*Access*: Reg
*BBSoftware*: TBBS

*** ***Amended*** ***
***Konektion Business Link***
*Sysop*: Robert Earle
*Phone*: (02) 906-1354
*FIDOnet*: 711/410
*Baud*: V22 V22bis
*Access*: Reg VA
*Computer*: IBM XT Clone
DOS: PC DOS
*BBSoftware*: Opus

*** ***Unknown*** ***
***Nebula RAPL***

*** ***NEW System*** ***
***Outdoors Education***
*Sysop*: Mel Lee
*Phone*: (046) 66-9881
*Baud*: V21 V22 V22bis
*Access*: Reg VA
*Computer*: IBM AT Clone
DOS: MS DOS
*BBSoftware*: GTPower

*** ***Amended*** ***
***Prophet TBBS***
*Sysop*: Larry Lewis
*Phone*: (02) 628-5222
*FIDOnet*: 713/600
*Baud*: V21 V22 V22bis V23
*Access*: Mem Reg VA
*Computer*: IBM AT Clone
DOS: PC DOS
*BBSoftware*: TBBS

*** ***Online*** ***
***Small Business***
*Sysop*: Geoff Bilborough
*Phone*: (049) 50-4211
*Baud*: V21 V22 V22bis V23
*Computer*: IBM XT Clone
DOS: MS DOS
*BBSoftware*: QuickBBS

*** ***Amended*** ***
***SMUG Opus***
*Sysop*: Stephen Thompson
*Phone*: (02) 476-6396
*FIDOnet*: 711/417
*Baud*: V21 V22 V22bis V23
*Access*: Mem Reg VA
*Computer*: IBM XT Clone
DOS: MS DOS
*BBSoftware*: Opus

*** ***Amended*** ***
***Tech Exchange***
*Sysop*: Chris Moran
*Phone*: (02) 712-2282
*FIDOnet*: 712/708
*Baud*: V21 V22 V22bis V23
*Access*: Reg LVA
*Computer*: IBM AT Clone
DOS: MS DOS
*BBSoftware*: Opus

*** ***Online*** ***
***The Ivory Tower***
*Sysop*: Colin Leslie
*Phone*: (02) 668-8021
*FIDOnet*: 712/624
*Baud*: V21 V22 V22bis V23 B103 B212
*Access*: Public
*Computer*: IBM XT Clone
DOS: MS DOS
*BBSoftware*: Opus

*** ***Name Changed*** ***
***The Pig Pen BBS***
*Note*: Now Called ABBSNET

*** ***Amended*** ***
***The Twilight Zone***
*Sysop*: The Mystic Machine
*Phone*: (065) 72-3970
*Baud*: V21 V22 V23
*Access*: Reg LVA
*Hours*: Weekdays: 2100 – 0600
Weekends: 24 Hours
*Computer*: Apple //e
DOS: PRODOS
*BBSoftware*: GBBS

*** ***NEW System*** ***
***Ultimate-10***
*Sysop*: Ben Woo
*Phone*: (02) 484-4004
*FIDOnet*: 711/802
*Baud*: V21 V22 V22bis B103 B212
*Access*: Reg LVA
*Computer*: Super-10 XT
DOS: MS DOS
*BBSoftware*: Opus

## VICTORIA

*** ***Amended*** ***
***ABE Opus***

Sysop: Nick Mleczko
Phone: (03) 288-3599
Baud: V21 V22 V23
Access: Public

*** Unknown ***
**Alloy Opus BBS**

*** Amended ***
**AmigaLink**
Sysop: Bohdan Ferens
Phone: (03) 792-3918
Baud: V21 V22 V22bis V23

*** NEW System ***
**AmigaLink II**
Sysop: Gary Gajic
Phone: (03) 376-6385
Baud: V21 V22 V23
Access: Mem LVA
Computer: IBM XT
DOS: MS DOS
BBSoftware: Opus

*** Amended ***
**Antartic Crystal Symphony**
Sysop: Greg Jones
Phone: (03) 874-4176
Baud: V22 V22bis
Access: Mem VA
Hours: Nightly: 2200 – 0700
Computer: IBM XT Clone
DOS: PC DOS
BBSoftware: Opus

*** Amended ***
**Anzugs CBCS**
Sysop: Gordon Castle
Phone: (03) 563-2496
Baud: V22bis PEP
Access: Mem Public
Computer: IBM Model 80
DOS: PC DOS
BBSoftware: Opus

*** NEW System ***
**Arcadia Opus**
Sysop: Andrew Newbury
Phone: (03) 267-8793
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: Opus

*** Offline ***
**Atlantis RBBS-PC**

*** Amended ***
**Brainstorm Oz!**
Sysop: Rowan Stevens
Phone: (03) 758-7086
FIDOnet: 632/322
Baud: V21 V22 V22bis V23 B103 B212
Computer: IBM XT
DOS: MS DOS
BBSoftware: Opus

*** Offline ***
**Bubble n' Squeak Opus**

*** Amended ***
**Custom Programming OPUS**
Sysop: Allan Williamson
Phone: (03) 848-3331
Baud: V22 V22bis B103 B212
Access: Mem VA
Computer: IBM PC Clone
DOS: PC Dos
BBSoftware: Opus

*** Amended ***
**DECUS**
Sysop: Peter Hill
Phone: (03) 62-5806
Baud: V21 V22 V22bis V23
Access: Mem VA
Note: Press SPACEBAR for connection

*** Unknown ***
**Devils Playground BBS**

*** Amended ***
**Doodz Domain**
Sysop: Scott Rigby
Phone: (03) 646-5861
Baud: V21 V22 V22bis V23
Access: Public
BBSoftware: QuickBBS

*** Amended ***
**East Suburb Eighty User Group**
Sysop: Martin Axford
Phone: (03) 819-5179
FIDOnet: 632/347
Baud: V21 V22 V22bis V23
BBSoftware: Opus

*** Name Changed ***
**Electric Dreams Opus BBS**
Note: Now Called
Truth BBS

*** Amended ***
**Engbase CBCS**
Sysop: Greg Furlong
Phone: (03) 29-6336
Baud: V21 V22 V22bis
BBSoftware: Opus

*** Name Changed ***
**EXCALIBUR-64 RCP/M**
Note: Now Called
The CP/M Connection

*** Name Changed ***
**Further Regions QuickBBS**
Note: Now Called
The Further Regions QuickBBS

*** Unknown ***
**Island BBS**

*** Name Changed ***
**MACE-ATARI BBS**
Note: Now Called
Melbourne Atari BBS

*** Unknown ***
**MacLink BBS**

*** NEW System ***
**MainframeZ BBS**
Sysop: Andrew Whittle
Phone: (03) 466-2006
Baud: V21 V22 V22bis
Hours: Weekdays: 1800 – 0830
Weekends: 24 Hours
BBSoftware: QuickBBS

*** Amended ***
**Melbourne Atari BBS**
Sysop: Stuart Szabo & John Burgess
Phone: (03) 899-6203
Baud: V21 V22 V23
Access: Mem VA
BBSoftware: FoReM

*** Amended ***
**MESA RBBS**
Sysop: David Woodberry
Phone: (03) 563-9102
FIDOnet: 632/349
Baud: V21 V22 V23
Access: Mem Reg VA
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: Opus

*** Amended ***
**Microscience Computers BBS**
Sysop: Stephen Rivenell
Phone: (03) 786-7187
FIDOnet: 635/361
Baud: V21 V22 V22bis
Access: Mem Reg
Computer: FireStar 286
DOS: MS DOS
BBSoftware: Opus

*** Amended ***
**Midnight Frog BBS**
Sysop: Scott Enwright
Phone: (03) 596-1589
Baud: V21 V22 V22bis V23
Access: Public

*** Offline ***
**Silicon Valley**

*** Amended ***
**Software Mail Centre**
Sysop: Maurie Halkier
Phone: (03) 725-1621
Baud: V22 V22bis
Access: Public
Computer: Eastcomm PC/XT
DOS: PC DOS
BBSoftware: Opus

*** Offline ***
**Sotec BBS**

*** Name Changed ***
**Southern Mail**
Note: Now Called
Software Mail Centre

*** NEW System ***
**The Bridge**

*How do you protect yourself? The simplest and most effective way is to use a different password on every system you call.*

BBSoftware: Opus

*** Name Changed ***
**Miki's Opus CBCS**
Note: Now Called
The Macro Shed

*** Offline ***
**MouseText**

*** Offline ***
**Nostromo**

*** Offline ***
**Omegatex Videotex Service**

*** Amended ***
**PC Connection IBBS**
Sysop: Lloyd Borrett
Phone: (03) 388-0909
Baud: V21 V22 V22bis V23
Computer: IBM XT
DOS: MS DOS
BBSoftware: IBBS

*** Offline ***
**Pegasus**

*** Offline ***
**PHYSI-CHALL**

*** Name Changed ***
**Premier Systems**
Note: Now Called
USUFRUCT BBS

*** Amended ***
**Sam's Opus BBS**
Sysop: Alan Haslar
Phone: (03) 563-1117
Baud: V21 V22 V22bis V23
Access: Public
BBSoftware: Opus

*** Offline ***
**Sendata**
Sysop: David Beckwith
Phone: (03) 563-8070
Baud: V22 V22bis
Access: Public
Computer: Sharp PC 7100
DOS: MS DOS
BBSoftware: Opus

*** Amended ***
**The CadPhone**
Sysop: Stuart Szabo
Phone: (03) 890-0091
FIDOnet: 633/367
Baud: V21 V22 V23
Access: LVA
Computer: HP Vectra 286
DOS: PC DOS
BBSoftware: Opus

*** Unknown ***
**The Comedy Company**

*** Amended ***
**The CP/M Connection**
Sysop: Maurice Copeland
Phone: (057) 83-1040
Baud: V21 V22 V22bis V23
Access: Public
Hours: Weekdays: 1800 – 0800
Weekends: 24 Hours

*** Amended ***
**The Crossover**
Sysop: Stephen Paddon
Phone: (03) 367-5816
Baud: V21 V22 V22bis V23
Computer: IBM AT
BBSoftware: QuickBBS

*** Amended ***
**The Domestic Engineer**
Sysop: Rob Roder

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**CM141 Trilogy** — Note storing and retrieving utilities for writers and others.

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**CM143 Styled** — Writing analysis program.

**CM144 Card Track** — Credit card statement analysis program.

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*Phone*: (03) 720-6356
*Baud*: V21 V22 V22bis V23
*Hours*: Daily: 2130 – 0800
BBS*oftware*: QuickBBS

*** Offline ***
***The Dreamscape BBS***

*** Amended ***
***The Fruit Shop***
*Sysop*: Greg Broadley
*Phone*: (03) 859-1246
*Baud*: V21 V22 V22bis V23
*Access*: Reg VA
*Hours*: Weekdays: 1800 – 0900
Weekends: 24 Hours
*Computer*: IBM XT Clone
DOS: MS DOS
BBS*oftware*: Opus

*** Amended ***
***The Further Regions QuickBBS***
*Sysop*: Chris Brunton
*Phone*: (03) 725-1923
*Baud*: V21 V22 V22bis V23
BBS*oftware*: QuickBBS

*** Offline ***
***The Graveyard BBS***

*** Amended ***
***The Hot-Line***
*Sysop*: Mark Firus & Darren King
*Phone*: (03) 547-5117
*Baud*: V22 V22bis B103 B212
*Access*: Reg LVA
*Computer*: IBM XT Clone
DOS: MS DOS
BBS*oftware*: Opus

*** Offline ***
***The Info-Source BBS***

*** Offline ***
***The Krime Philes CBCS***

*** Amended ***
***The Labyrinth BBS***
*Sysop*: Stephen Jones
*Phone*: (03) 318-6562
*Baud*: V21 V22 V22bis V23
*Access*: Reg VA
*Computer*: IBM XT Clone
DOS: MS DOS
BBS*oftware*: Opus

*** Amended ***
***The Macro Shed***
*Sysop*: Miklos Bolvary
*Phone*: (03) 887-1756
FIDO*net*: 633/374
*Baud*: V22 V22bis B103 B212
*Access*: Reg VA
*Hours*: Daily: 2100 – 0900
*Computer*: ELT 286 Baby AT
DOS: PC DOS
BBS*oftware*: Opus

*** Amended ***
***The NATIONAL CBCS***
*Sysop*: John Blackett-Smith
*Phone*: (03) 25-6904
*Baud*: V22 V22bis PEP
*Access*: Public
*Computer*: IBM AT
DOS: MS DOS
BBS*oftware*: Opus

*** Name Changed ***
***The ODBS & Sensible Solution BBS***
*Note*: Now Called The Hot-Line

*** Amended ***
***The Real Connection***
*Sysop*: The Real Article & Deep Image
*Phone*: (03) 288-0810
*Baud*: V21 V22 V22bis V23
*Access*: Public
*Computer*: IBM XT Clone
DOS: DoubleDOS
BBS*oftware*: Opus

*** NEW System ***
***The Ultimate 64***
*Sysop*: Mike Kobiolke
*Phone*: (03) 735-5551
*Baud*: V21 V22 V22bis V23
BBS*oftware*: Punter

*** Amended ***
***Truth BBS***
*Sysop*: Peter Studley
*Phone*: (03) 813-1663
*Baud*: V21 V22
BBS*oftware*: Opus

*** Amended ***
***USUFRUCT BBS***
*Sysop*: Jason Soberblom
*Phone*: (03) 743-7671
*Baud*: V21 V22 V22bis V23
*Access*: Public
*Computer*: Vax 11/780
DOS: VMS
BBS*oftware*: Spitfire

*** Amended ***
***Valicomm Opus/QuickBBS***
*Sysop*: Bill Walker
*Phone*: (051) 27-2572
FIDO*net*: 633/365
*Baud*: V21 V22 V22bis V23 B103 B212
*Access*: Reg VA
*Computer*: IBM XT Clone
DOS: PC DOS
BBS*oftware*: Opus & QuickBBS

*** Amended ***
***Wesley College/Starfleet Command BBS***
*Sysop*: Grand Admiral
*Phone*: (03) 522-7275
*Baud*: V21 V22 V22bis V23
*Access*: Public
*Computer*: IBM XT Clone
BBS*oftware*: QuickBBS

## QUEENSLAND

*** Offline ***
***Binary Barrels System BBS***

*** Name Changed ***
***Coelurus BBS***
*Note*: Now Called Gumtree?BBS

*** NEW System ***
***Grammar BBS***
*Sysop*: Barry Taylor
*Phone*: (077) 72-6052
FIDO*net*: 640/702
*Baud*: V21 V22 V22bis V23
*Access*: Reg LVA
*Computer*: IBM XT Clone
DOS: MS DOS
BBS*oftware*: Opus

*** Amended ***
***Gumtree?BBS***
*Sysop*: Peter Brewer
*Phone*: (075) 63-2621
FIDO*net*: 640/601
*Baud*: V22 V22bis
*Access*: Mem Reg
*Hours*: Weekdays: 2100 – 0800
Weekends: 24 Hours
*Computer*: IBM XT Clone
DOS: MS DOS
BBS*oftware*: Opus

*** Offline ***
***Ozforum***

## SOUTH AUSTRALIA

*** NEW System ***
***Coffee Time BBS***
*Sysop*: Terry Mulvaney
*Phone*: (08) 254-9423
FIDO*net*: 681/860
*Baud*: V21 V22 V22bis V23
*Access*: Reg LVA
*Computer*: IBM XT Clone
DOS: MS DOS
BBS*oftware*: Opus

*** Amended ***
***Elite BBS***
*Sysop*: Andrew Gleave
*Phone*: (08) 337-6115
*Baud*: V21 V22 V22bis V23
*Access*: VA
*Hours*: Daily: 2230 – 0730
*Computer*: Amiga 500
DOS: AmigaDOS
BBS*oftware*: BBS-PC!

*** Amended ***
***Phone Box BBS***
*Sysop*: Darryl Merritt
*Phone*: (08) 380-5505
FIDO*net*: 681/854
*Baud*: V21 V22 V22bis V23
*Access*: Public
*Computer*: Mitec
DOS: MS DOS
BBS*oftware*: Opus

*** Amended ***
***The Bureau BBS***
*Sysop*: Patrick Browne
*Phone*: (08) 258-1466
FIDO*net*: 681/855
*Baud*: V21 V22 V22bis V23
*Access*: VA
*Computer*: Kaypro XT
DOS: MS DOS
BBS*oftware*: Opus

*** Amended ***
***Trivia BBS***
*Sysop*: Daron Ryan
*Phone*: (08) 377-0049
*Baud*: V21 V22 V22bis V23
*Hours*: Weekdays: 1800 – 0800
Weekends: 24 Hours
DOS: MS DOS
BBS*oftware*: QBBS

*** NEW System ***
***Void BBS***
*Sysop*: Plembardian
*Phone*: (08) 388-5497
*Baud*: V21
*Access*: Public
*Hours*: Daily: 1700 – 0900
*Computer*: Amstrad PC1640
DOS: MS DOS
BBS*oftware*: Wildcat

## WESTERN AUSTRALIA

*** Amended ***
***Bit-Board***
*Sysop*: John Hamill
*Phone*: (09) 417-3706
FIDO*net*: 690/620
*Baud*: V21 V22 V22bis V23
*Access*: Public
*Computer*: Everex AT
DOS: MS DOS
BBS*oftware*: Opus

*** Amended ***
***Gamma Istari***
*Sysop*: Richard Dale
*Phone*: (09) 493-1534
FIDO*net*: 690/626
*Baud*: V21 V22 V22bis V23 B103 B212
*Access*: Mem LVA
*Computer*: IBM AT
DOS: MS DOS
BBS*oftware*: Opus

*** Amended ***
***Kardinya Turbo BBS***
*Sysop*: Tony Salmeri
*Phone*: (09) 331-1695
*Baud*: V21 V22 V22bis V23 B103 B212
*Access*: Reg LVA
*Computer*: IBM XT Clone
DOS: PC DOS
BBS*oftware*: Turbo BBS

*** Amended ***
***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
BBS*oftware*: Michtron

*** Amended ***
***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
BBS*oftware*: Michtron

*** Amended ***
***Pegasus RBBS***
*Sysop*: Michael Russell & John Chin
*Phone*: (09) 344-8025
FIDO*net*: 690/621
*Baud*: V21 V22 V22bis V23
*Access*: Reg VA
*Computer*: Epson AX
DOS: MS DOS
BBS*oftware*: RBBS

*** Offline ***
***West Coast BBS*** □

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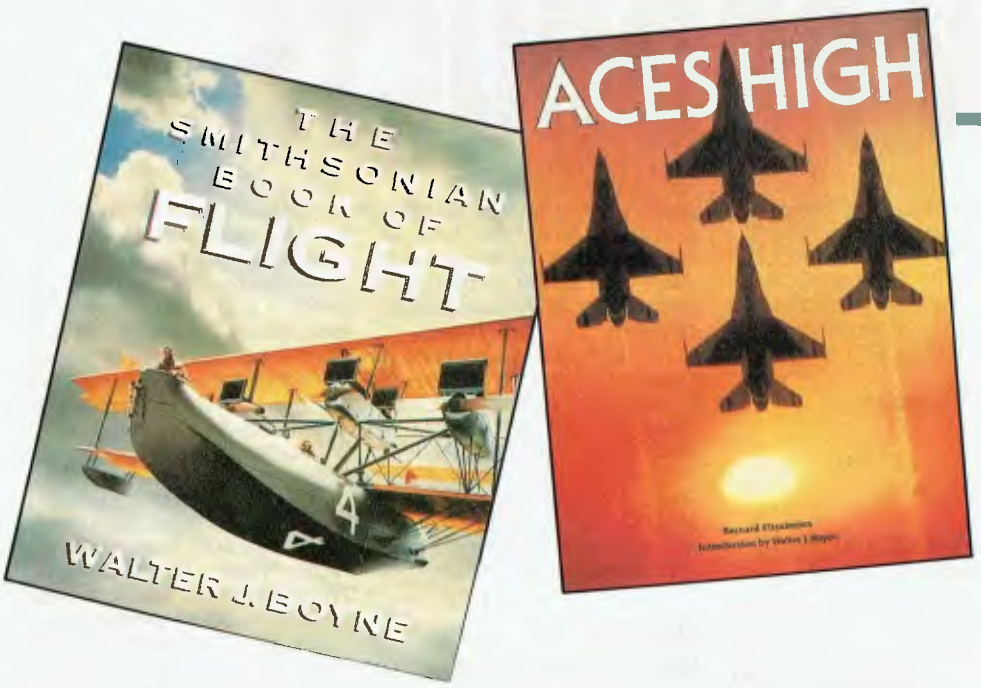


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# NEW PRODUCTS

## Software

### CRAFT
Tycomp
Phone: (02) 600 8666
Price: See below

The Contractor's Reporting, Accounting and Financial tools, CRAFT, is part of Tycomp's Open Systems range of accounting software for small to medium businesses. It provides contractors with immediate access to detailed or summarised job costs over a range of jobs.

Users can track all sub-contractor, payroll, materials, equipment and overhead costs for all jobs in progress. CRAFT configures the basic software to match the normal processing and reporting needs of the construction and contracting industries. It is designed to operate in single-user, multi-user and networked environments. CRAFT caters for any size of installation from 1 to 30 terminals. All the most popular operating environments (PC-DOS, Xenix, Unix and so on) are supported. The price for CRAFT is dependent on user requirements and Open Systems modules purchased.

### dBase IV Developers Edition
Ashton-Tate
Phone: (02) 868 3600
Price: See below

ASHTON·TATE

Ashton-Tate has announced the availability of the dBase IV Developers Edition ($2230) and upgrades from all previous versions to dBase IV and the Developers Edition.

Existing dBase III+ users who purchased between February 17 and October 31, '88, can upgrade for $40. Users of dBase II, III, or III+ who purchased before this date can upgrade for $220. The upgrade for the Developers Edition is $610. To upgrade, users should return system disks and a cheque to Imagineering, or phone (02) 663 8755.

### Lotus Magellan
Lotus
Phone: (02) 287 1900
Price: See below

Lotus

Lotus Magellan is a software utility that provides users with unprecedented access to, and control over, all information stored on their DOS-based computers. Its text-search technology allows users to instantly find information anywhere on their hard disks by specifying concepts, phrases or even precise words.

Once a file has been located it can be easily copied, moved deleted and/or printed. Magellan also allows bits of files from different applications to be put in one file, as well as being able to launch directly into another application.

The applications supported in Magellan's viewing mode, by file-format readers include: Lotus 1-2-3, Lotus Symphony, Manuscript, Agenda, WordPerfect, IBM Display Write dBase, Word, WordStar, Multimate and all ASCII files. A hard disk of 512 Kbyte of memory is required, as is DOS Version 2.1 or higher.

### MacBlast
Mini Computer Systems
Phone: (03) 528 2711
Price: Not supplied

MacBlast is not a Macintosh zipping around hyperspace, but a data communications package for the Mac II, SE and MacPlus. It is the latest addition to the Blast (BLocked ASynchronous Transmission) software for computer-to-computer communications.

MacBlast offers fast, error-free asynchronous data transfer between a Mac and more than 30 mainframes, minis and PCs. Blast sends and receives data simultaneously and resumes transfer at point of interruption rather than the beginning of file, if disconnections occur.

Systems supported by Blast include the full Data General and DEC ranges, Burroughs/Unisys, AT&T Unix, SCO Xenix, Wang VS, NCR Tower, Hewlett-Packard, Prime and Harris Lanier, as well as PCs, PS/2s and compatibles.

This latest version of MacBlast conforms to the Mac screen format and includes data compression, auto call to remote locations and password protection.

### MainLan
Personal Computer Software
Phone: (02) 923 2899
Price: See below

MainLan is network package that includes software, adapters, cable and instructions. The system can connect up to 63 computers over distances to 300 metres. Each station in the network can transfer files between each other, send and receive electronic mail, and output through any printer.

MainLan consists of a circuit board, which plugs easily into an expansion slot of in each PC to be connected, appropriate cabling and the operating software. The networking program loads automatically into memory and remains RAM resident, until called into action by just two keys when the user wants to connects into the network. Full security is an inbuilt feature; MainLan complies with the Net BIOS standard and also has PC LAN facilities as an integral part of the network operating system.

It provides a true networking

## Fantasy for the New Year

Hail, Hail, It's the New Year!
What kind of things
Would bring me good cheer?

Let's see announcements galore -
Flood from vendors like a river
Describing wondrous new products
That they actually deliver!

And software, yes, software
In colour and glory,
Available on time,
No delay and no story.

Give me brand new hardware,
Open architecture each one,
That plug into my net,
Between my clone and my Sun.

Let's have hard drives with knowledge
That come from small cash
But that back themselves up
Just before the system crash.

What else can I use?
How 'bout a new printer
That prints with a laser
And runs like a sprinter?

Or maybe an upgrade
With lots of great tricks
That makes my old PC jr
Run like a '386?

And finally, a user interface
That has the right bent
Because it knows what I typed
Was not what I meant!

So let's toast the New Year
From a glass with a stem
And hope all these things
Come labeled 'IBM'.

*– Andrew M. Einspruch*

environment which allows the use of such programs as dBase III+, WordPerfect, Lotus 1-2-3 and Paradox. The starter pack is priced at $1499, the extension at $749 (both prices include tax).

### Tandy OS/2

Intertan Australia
Phone: (02) 675 1222
Price: $699

Tandy has announced that its OS/2 implementation for the 3000, 4000 and 5000 PC series. OS/2 is a single user, multi-tasking operating system, which offers the customer several enhancements over MS-DOS 3.xxx, while still maintaining compatibility with most existing programs. Using the 80286 protected mode on either an 80286 or 80386 computer, OS/2 breaks the 640 kilobyte memory barrier and allows 16 Mbytes of addressable memory. It is available from Tandy Computer Centres, selected Tandy Electronics stores and participating dealers nationwide.

### NetManager

Com Tech
Phone: (02) 290 3477
Price: $2350

NetManager is a user support system for networks running under Novell Netware, 3Com, Banyan Vines and IBM's PC Lan. It allows users to link the screens and keyboards on any two workstations, and provides a centralised Help Desk for PC and network support.

NetManager also provides full access to a user's keyboard and screen. The product can generate various reports to identify the support activity on an network and to highlight training and evaluate users' productivity. It requires MS/PC-DOS 3.1 or higher and 9 to 31 Kbyte of RAM, depending on the type of network used and the level of graphics desired.

### PC-MOS/386

Software Product Support
Phone: (02) 419 5366
Price: See below

PC-MOS/386 is a DOS-compatible multi-user, multi-tasking operating system designed for the enhanced capabilities of the 80386 processor.

Standard DOS applications such as Lotus 1-2-3, dBase, WordPerfect, SuperCalc and so on, can be accessed, with full multi-tasking on the main CPU and all the terminals. Each user can run several programs concurrently, enabling sharing of peripherals. No retraining is required as PC-MOS uses familiar commands like 'dir' and 'copy'. PC-MOS/386 is priced at $372 (single user), $1260 (5-user version) and $1740 (25-user version).

### pcEMU-50

MPA
Phone: (03) 894 1500
Price: $120

The pcEMU-50 is terminal emulator software package that can be run as a standalone program, or installed as a memory resident program to allow hot key access to the host computer – from within a DOS application. The program can be run as a background task and can be activated at any time to allow access to a remote computer.
empcEMU-50 allows the PC to emulate a Wyse 50 terminal. A key feature is that a user does not have to exit from their PC application to access the Unix or Pick-based minicomputer system. The product requires 64 Kbyte of memory.

### Perform

AYR Electronics Australia
Phone: (02) 684 2244
Price on application

Perform is a time/attendance software package that operates with any IBM XT, AT or compatible. Designed as a front-end to virtually any payroll system, Perform processes 'in and out' punches (ASCII time and attendance records) according to user company policies, and from this raw data calculates hours worked per employee and department.

Perform provides screen prompts during set-up. Employee information, schedules and company policies are entered quickly and changed easily when necessary. Each employee can be provided with an individual schedule and the number of hours that the employee is allowed to work can be pre-authorised. Overtime can be accrued on a weekly or daily basis or a combination of both. Perform is a comprehensive time and attendance package that can be supplied as a comprehensive start-to-finish 'turnkey' installation, complete with all back-up and support services.

### Personal REXX 2.0

Bryte Software
Phone: (02) 220 6702
Price: $295

Personal REXX, the PC implementation of IBM's strategic SAA language, includes a compile option as the major feature of Release 2.0. In this instance, the term compile means the ability to generate and store the internal pseudo-code that the REXX interpreter uses during the execution of a REXX program or macro. When executing a compiled version of a program, the loading of source code into memory becomes optional. Other enhancements are support for enhanced keyboards and DOS 4.0, and on line help.

### QMAP

Ernst & Whinney
Phone: (02) 230 9999
Price: Not supplied

QMAP has been developed by a committee of business people and government representatives to assist management to look comprehensively at their organisations and strengthen an orientation towards the customer and their requirements.

It is a software-based group facilitation tool which helps executives to clarify objectives; identify key processes; specify key users/customers; define customer expectations; select the right performance measures and provide a streamlined databases for gathering, analysing and reporting of performance measurement data.

### SmartForm Designer

Claris
Phone: (02) 697 8577
Price: $496

SmartForm Designer allows Mac users to quickly create professional looking forms for their personal or business use. Forms can be printed out and filled manually with a typewriter, or completed electronically with SmartForm Assistant.

The forms-specific graphics tools in Designer include fields with labels, combs (boxes that accept individual letters or numbers), lists and checkboxes. Users control the size and shape of objects that make up the form by mouse or keyboard.

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### Vaccinate Plus
PC On
Phone: (02) 899 2166
Price: $89.95

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Pty. Ltd.

Vaccinate Plus is an anti-viral software package that finds and traps computer viruses before they replicate. It incorporates 10 programs for security against all forms of virus attack. The package includes proprietary vaccines for all MS-DOS programs, data backup programs, plus a boot track vaccine. This provides protection against infection in the invisible sectors where software control begins.

Vaccinate Plus does not require operator intervention and takes less than 1 Kbyte of RAM.

### WordPerfect 4.2 for SCO Xenix
WordPerfect
Phone: (02) 498 7155
Price: $1795

WordPerfect PACIFIC

A Xenix version of WordPerfect, WordPerfect 4.2 for SCO Xenix, is also the first for Intel based 80386 machines. The version was ported specifically for the 80386. The Xenix version is identical to the PC 4.2 single user version and supports a wide range of terminals and printers.

WordPerfect includes up to 24 snaking or parallel on-screen columns, table of authorities, line numbering, block/move feature and a document comments feature. It can be used on 80386 machines running SCO Xenix System V, Release 2.2.2.

### WordStar Professional 5
WordStar Australia
Phone: (02) 411 7255
Price: $625

WordStar Professional Release 5 is an update of the original WordStar word processing program for IBM PCs and compatibles that includes over 300 new features. The Advanced Page Preview feature allows users to see an entire document, including font styles and sizes on screen, prior to printing. Optional pull-down menus help the new user to be more productive.

Release 5 includes new productivity enhancing features like newspaper-style columns, advanced footnoting, windows for comparing and editing two documents, both a speller and thesaurus complete with definitions, automatic reformatting, macros, undo and automatic save. New builtin functions include telecommunications login, outlining and mail list management. Printer support is greatly expanded with proportional spacing and drivers for all popular laser and PostScript printers.

## New Machines

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Price: $1299

The KX-W1500 is personal word processor designed for home and small office use. It has an 80 character x 25 line CRT screen, 3½ inch floppy disk drive and 12 inch platen.

The KX-W1500 has a 56,000 character internal memory, which allows the user to create large files or load them into memory for later revision. The word processor has a separate 20-phrase memory to store used blocks of data such as names. It also features builtin mail merge and mail list software, as well as word processing functions.

### PC 381 and PC 382

Wang
Phone: (02) 925 5678
Price: See below

WANG

AUSTRALIA

Wang has extended its PC 200/300 series with the introduction of the PC 381 and PC 382. Based on the powerful Intel 80386 microprocessor, the machines provide IBM PC, AT compatibility. The 381 is designed to meet basic customer requirements in the business market, while the 382 is suited to sophisticated graphic and communications applications.

The 381 and 382 are offered in nearly a dozen different configurations, providing customers with a broad range of memory, disk controller, fixed and removable disk storage, and monitor support options.

The PC 381 offers 16 MHz, while the 382 is a 20 MHz machine. Pricing starts at around $4700 for the 381 and at $5100 for the 382. Typical mid-range configurations, including 2 Mbyte memory, a 1.2 Mbyte 5¼ inch disk drive, VGA controller, 42 Mbyte hard disk (381), 68 Mbyte hard disk (382), are listed at around $8100 and $10,000 respectively. Both feature a chassis with 8 slots for peripherals and one to accommodate a 32-bit memory card.

## Peripherals and Extensions

### ClassicRAM

IPL Datron
Phone: (02) 698 8211
Price: Not supplied

The ClassicRAM 16-bit memory board provides up to 8 Mbytes of memory using Single-In-Line Memory Modules (SIMMs). It is for the IBM PC, AT and compatibles using Micro Channel features. The board is user field upgradeable in 512 Kbyte or 2 Mbyte increments, using 256 Kbyte or 1 Mbyte SIMMs.

Designed-in hardware support for multi-tasking makes the full 8 Mbytes of memory available under LIMS EMS 4.0.

### Facit A1600

Elmeasco
Phone: (02) 736 2888
Price: See below

The Facit A1600 display terminal combines a crisp 14-inch black on white overscanned monitor, many interface options and the choice of three different keyboards. The A1600 is a family of three terminals: the A1610, a basic IBM PC terminal plus Wyse 50/50+ and Televideo 910-950 emulations; the A1620, which emulates DEC VT220, VT100, VT52 and Data General D200-11, and the A1660, the enhanced version featuring Wyse-60, Televideo 910-960, H1500 Esprit II, ADM31, ADM3A/5, Adds VP A2 and IBM PC terminal emulation. The A1610 is priced at $950, the A1620 at $1005 and the A1660 at $1073; all prices taxed.

### Facit B1400

Elmeasco
Phone: (02) 736 2888
Price: See below

Facit has expanded its B-line series of matrix printers with the

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release of the Model B1400. The B1400 is an 80 column 24-pin printer intended for low volume applications.

It comes complete with pull tractor, Centronics style parallel interface, 12 Kbyte buffer, IBM ProPrinter X24 command set and facilities for automatic loading of single sheets. Print speed in draft is 135 cps and 45 in letter quality. You can select either 10, 12, 15, 17 and 20 characters per inch in a variety of character styles. The parallel version of the B1400 costs $926, while the serial version costs $995.

### Infinity 40 Turbo

Mitsui

Phone: (02) 452 0452

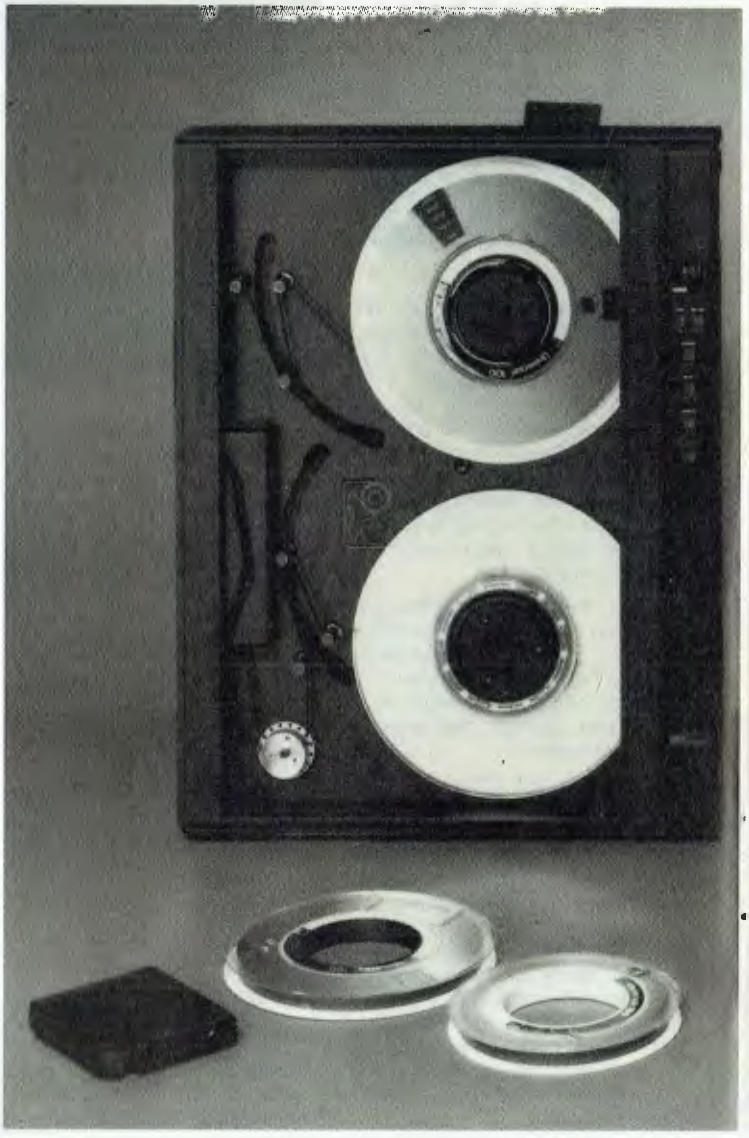
Price: $3355 taxed

The Infinity 40 Turbo from PLI is a removable cartridge Winchester drive that boosts the performance of any Macintosh. It uses a 5¼ inch cartridge that can accommodate 44.5 Mbyte of data when formatted.

The Infinity 40 comes standard with TurboOptimizer software, which eliminates unnecessary drive-head movement and speeds up disk access. The package also includes a spooler and TurboCache , drive-accelerator software. The Infinity 40 Turbo also works with the IBM PC, XT, AT, PS/2 or compatibles.

### Link MC27

MPA



Phone: (03) 894 1500
Price: $2000 taxed

MPA has released the Link MC27 terminal for Burroughs host Poll/Select computer systems. With Burroughs T27 emulation, it is also compatible with the ET1100 terminals. The MC27 incorporates concatenation. Features include choice of amber, green or soft white screen text, 14-inch display, three R232 ports (modem, printer, concatenation), large 8 x 13 characters on an 80/132 column display, 4 levels of security and ergonomic design.

## M4-9914 and M4-8924
ATL Systems

Phone: (02) 807 0711
Price: Not supplied

ATL Systems has released two high performance GCR tape drives, the M4-9914 and the M4-8924. Features include 9-track IBM compatible open reel drives; universal data storage interchange for different computer systems; totally modular design concept, and Pertec/Cipher or embedded SCSI interface.

The M4-9914 is a low profile, auto loader in desk top or vertical configurations with speeds of 125 ips (inches per second) or 42 ips. Fast reposition of any non-buffer tape drive is featured. Three densities are offered – 800, 600 or 6250 bpi.

## MacinStor
CPA

Phone: (02) 476 6400
Price: Not supplied

The MacinStor range of three zero footprint external SCSI hard disk subsystems is designed fit neatly under the Mac Plus. The 45ZFP, 90ZFP and 180ZFP feature 18 and 29 millisecond average seek times; up to 15 Mbits/sec data transfer rates; high speed software driver; 40,000 hours MTBF; automatic head parking and extensive burn in procedures.

They are also effective storage solutions for the Mac II or Mac IIx. All subsystems come with a comprehensive easy to use and install package of disk management software.

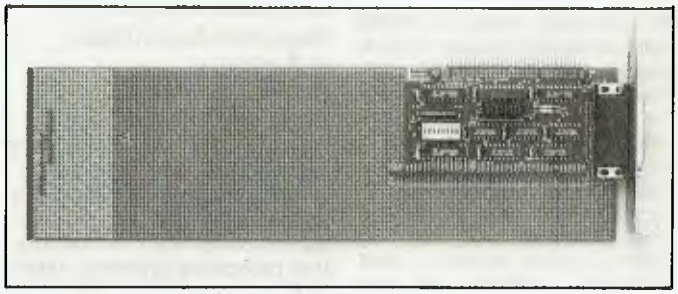
## Orchid Designer VGA Series
Porchester Computers

Phone: (03) 537 2722
Price: Not supplied

Porchester Computers has released the Orchid Designer VGA series of graphic enhancement boards, the ProDesigner Plus, ProDesigner and Designer 800 support; they support 256 colours and shades of grey in a wide range of resolutions. All three cards are register and BIOS level compatible to allow the user to create graphics in the most applications.

The ProDesigner Plus is the most powerful in the series. It features Auto-Bus sense which 'senses' the host system bus interface and automatically switches for either 8-bit or 16-bit operation. It supports 17 VGA modes and has 9 extended modes. The Auto-Mode switch automatically determines the software graphics and application and switches to that mode.

The ProDesigner offers many of the features of the ProDesigner Plus and can be upgraded to meet all the Plus capabilities. The Designer 800 is a full featured 8-bit card that is ideal for use with VGA single frequency analog and multi-frequency monitors. It can be upgraded to offer extended modes.



## PC Experimenter Card
Electronic Solutions

Phone: (02) 427 4422
Price: $125 taxed

Electronics Solutions has released a wirewrap card for engineers and others developing hardware add-ons for the IBM PC, XT, AT, '386 or compatibles.

The card provides a complete builtin data bus, address bus and I/O buffer circuit. It incorporates a universal address decoding chip and a DB25 female connector. Buffering of the inputs and outputs makes damage to the PC's bus from faults on the card impossible. The wirewrap area is 400 holes which are plated through for easy prototyping work.

## PC-IO-DK
Procon Technology

Phone: (03) 336 4956
Price: $325 taxed

The PC-IO-DK is an IBM PC 'real world' digital I/O board. It provides eight SPST relay outputs capable of switching 10 amps at 250 VAC or 30 VDC. The externally mounted board can be used for OEM applications, with up to 15 boards capable of being connected via computer ribbon cable to the parallel printer port on any IBM PC or compatible, providing a total of 120 inputs and 120 outputs. It may be mounted up to 30 metres from the computer and powered form a 5 VDC or 9-12 colt AC or DC source. Supplied with each board are IBM PC software driver rou-

tines for use with GWBasic, QuickBasic, TurboBasic, QuickC and all Microsoft languages. Other I/O options are available.

### TX-14M6E monitor

Thomas Electronics of Australia
Phone: (02) 53 0721
Price: $925 untaxed

The Panasonic model TX-14M6E high resolution colour 14-inch monitor is available through Thomas Electronics of Australia. The monitor is designed to work with EGA standard video cards. It delivers brilliant colours and low distortion, making it ideal for applications in CAM and industrial process control.

The monitor features 16/64 displayable colours, 0.6 mm maximum convergence at centre and 0.8 mm maximum at the corner. It is fitted with a dark tint anti-glare screen. Available in chassis form.

## Miscellaneous

### Flippit

Pactronics
Phone: (02) 407 0261
Price: $39.95

Flippit is a puzzle game for the Amiga 500, 100 or 2000, Atari ST, C64 and IBM PC or compatible. The screen display is divided into two sections, the larger shows a 4 *x* 4 grid covered by squares with 2 different colours of patterns. The smaller also has a 4 *x* 4 grid, but the coloured squares are arranged in a different pattern. The object is to get patterns matching on both sides of the screen. This is done by clicking on a square in the larger grid to flip it to the opposite pattern. The trick is that when you click, it will flip two squares.

### Pioneer Plague

Pactronics
Phone: (02) 407 0261
Price: $59.95

Pioneer Plague is a Hold and Modify (HAM) game for the Amiga 500, 100 or 2000 computer. In the future, man's most valuable resource is space. Earth's population is rapidly exceeding its capacity to support human life in the manner to which it has become accustomed. To overcome the increasing space shortage, unnamed scientists built the Pioneer Probe which finds planets and replicates Earth as well as itself, but with devastating results. It is your job to destroy the planets with the probes on them.

### Computer standards

Standards Association of Australia
Phone: (02) 963 4111
Price: See below

The Standards Association of Australia has published a number of new standards relating to the computer and data processing industries. AS 3594, Information processing systems – interface connector and contact assignments for ISDN basic access interface located at reference points S and T (ISO 887) is technically identical with ISO 877.

This standard specifies the 8-pole connector and the assignments of poles/contacts for use in physical interfaces of ISDN basic arrangements. These physical interfaces, where they exist, will be located at reference points S and T between TEs and NTs and between NT1s and NT2s and shall conform to CCITT recommendation I.430. Copies of AS 3594 cost $10.80 plus $2.50 postage and handling.

AS 3591, Information processing systems – Open Systems Interconnection – Basic connection oriented session service definition (ISO 8326) is technically identical with ISO 8326. This standard is one of the OSI series and defines, in an abstract way, the externally visible service provided by the OSI Session Layer in terms of the primitive actions and events of the service, the parameter data associated with each primitive action and event, and the relationship between, and the valid sequence of these actions and events.

Standard AS 3591 costs $22.80 plus $2.50 postage. All standards are available from ASA offices. A 25 per cent discount is available to subscribing members.

### Tutorials

Micro Management Services
Phone: (02) 452 5966
Price: See below

Micro Management Services has released a number of new tutorial video products for dBase IV, Microsoft Word, and Lotus Agenda, as well as disk-based tutorials for the Novell system and dBase IV CBT.

The dBase IV video learning system is a 2-course video set comprising introduction and advanced instruction. By watching the video and using the practice disk, along with the hands-on training guide, the trainee will be able to utilize the database capabilities; priced at $745. The tutorial for Microsoft Word is an introduction to Version 5.0 and is also useful for 4.0. It is priced at $440.

The Lotus Agenda tutorial is a 2-course set comprising an introduction to the Personal Information manager and Lotus Agenda advanced features ($745). All prices taxed.

## Macintosh with DOS!

Apple Australia has added the new Macintosh SE/30, released at MacWorld in San Francisco in late January, to the local product line (prices are yet to be announced). The new Mac is the first of the company's small-footprint transportable system range to incorporate Motorola's 32-bit 68030 microprocessor; a 68882 maths co-processor is also standard. According to Apple Marketing Director Tony Fraser, 'The SE/30 offers the performance of the Mac IIx in an SE box.'

The new 'compact' Mac has a slightly re-designed chassis which accommodates 1 megabyte of RAM on the motherboard (expandable to 8). Communications, additional memory, or an external colour or grey-scale monitor can be added through a new '030 direct slot', which is designed especially to take advantage of the speed potential of the new machine. While the new slot does not support existing SE add-ons, Apple will supply an upgrade kit for SE owners that includes a redesigned chassis with an 030 direct slot and a new motherboard with 1 Mb of memory.

A key feature of the SE/30 is the long-rumoured 1.44 megabyte Apple FDHD (Floppy Drive High Density) – an internal floppy drive that can read, write and format ProDOS, Macintosh, MS-DOS and OS/2 3½ inch disks. It will work with 400 and 800 Kbyte Apple II disks; 400 Kbyte, 800 Kbyte and 1.44 Mbyte Macintosh disks; and 360 Kbyte, 720 Kbyte and 1.44 Mbyte MS-DOS and OS/2 standard density disks.

Also at MacWorld, Apple released Macintosh System Software 6.0.3. While the new system is 'optimised' for the SE/30, it can be used in all Macs (but it doesn't offer 'increased functionality to users in the installed base').

For the new version, changes were made to the Time Manager, AppleTalk Driver, and the Apple File Exchange facility has also been rewritten.

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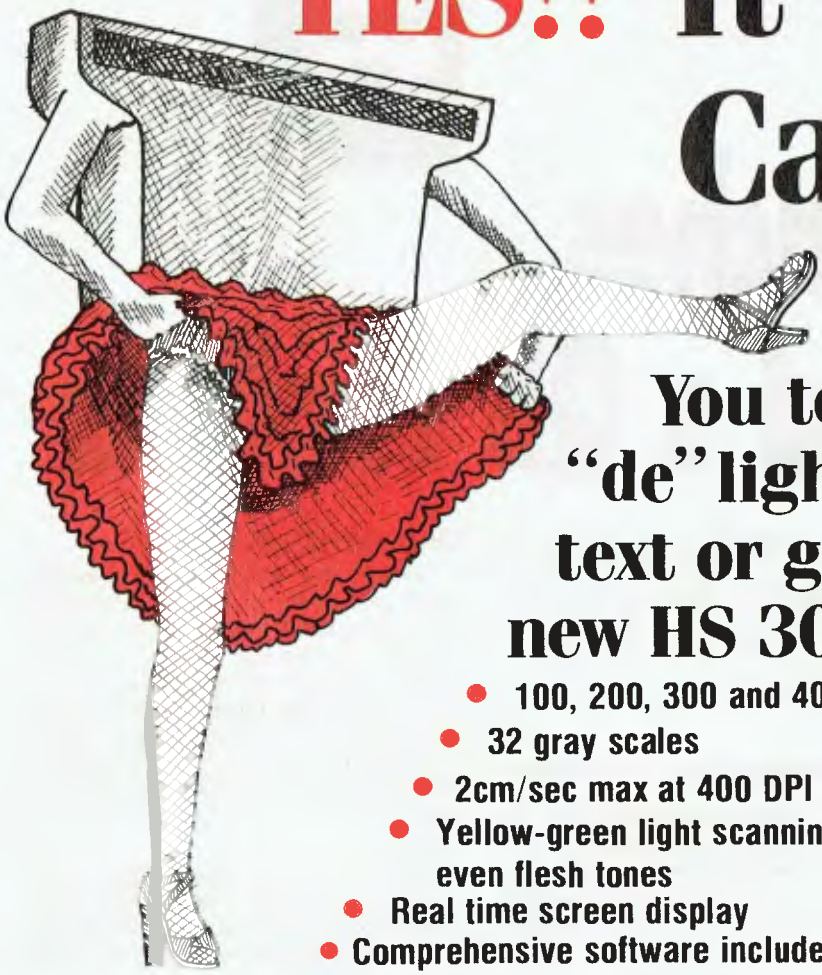

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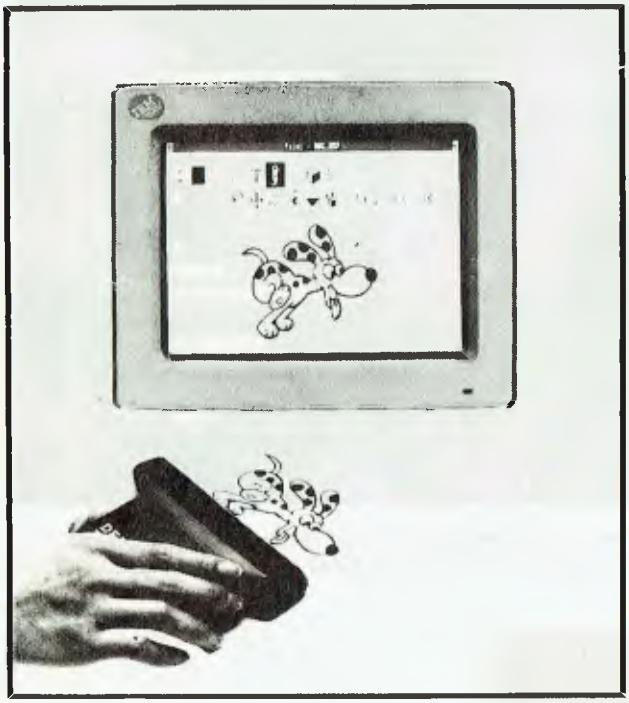

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JOHN HEPWORTH

# Caches, SeeTree and a QB Toolbox

TALK OF PC performance, and many users immediately think of 80386 processors, the rumoured 80486 and high clock speeds starting at 25 MHz and ending in the stratosphere. Having bought a PC with a fast processor, far too many then settle for a slow hard disk. It's a bit like buying a race horse, tying it to a plough and expecting it to win races.

Hard disks have got faster. Those that use voice coils for head positioning typically are four times faster in average access time and track-to-track seek time, than those that use stepper motors to locate the heads. With typical speeds of the faster machines now approaching 25 times faster than an original PC (and sometimes even faster), a mere four to one speed increase on the disk is the limiting factor on performance, specially on networks and other disk intensive tasks.

The more sophisticated dumb controllers give additional throughput, mainly through use of small hardware caches, allowing more information to be read from a disk at a time, and doled out to the computer as required. Software caches also allow many sectors to be read from disk at a time, and again doled out to the machine as required. Most significantly, when a sector in cache is needed again, there is no need for a mechanical read – the data is read at the speed of light.

The problem with small caches on dumb controllers comes primarily from their size. Software caches suffer because they use up valuable system RAM, and consume valuable processor time.

Recently a new breed of cache has emerged. This takes the form of an intelligent hard disk controller with huge onboard cache memory, its own CPU and firmware for cache control. No longer are system resources eroded by cache control, and no longer is there a problem with cache size chewing up system RAM. The use of the caching disk controller bypasses the speed limitations inherent in the electro-mechanical hard disk, and the time it takes for a head to flap around all over a hard disk.

*It's a bit like buying a race horse, tying it to a plough and expecting it to win races.*

## Distributed processing

I recently took a look at a fascinating range of intelligent caching controllers from Distributed Processing Technology of Maitland, Florida. Its range includes many controllers and associated devices. The one of most immediate use to the owners of ATs, clones and typical '386s is the PM3011A Caching Disk Controller. When the first EISA bus machines are available, it should be suitable for them too.

The DPC range has a vast range of other caching controllers and SCSI host adapter/controller/drive combinations for all sorts of machines from ATs through the

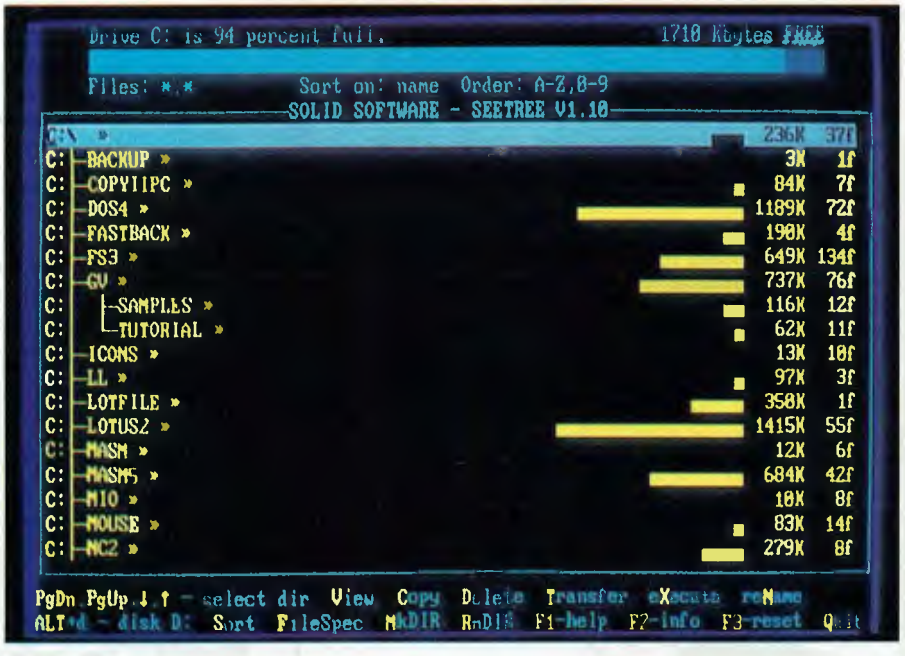



*Figure 1. The main screen of SeeTree – all the directories are shown, starting at the root directory, with the subdirectories at each level being connected to their parent directories by a line.*

PS/2 range and Macs to some of the more common minicomputer busses. In this column I will mainly talk about the PM3011a, and refer you to the distributor, Micro General, on (02) 439 8400 for other applications.

The PM3011a is a full-length board to fit a typical AT. It has 512 kilobytes of cache RAM, and uses a 68000 CPU at 8 MHz along with on-board firmware to manage the cache. The memory is completely divorced from system RAM, and uses none of the 640 Kbyte needed by DOS, nor memory used by LIM 4.0. Additional boards can be plugged into adjacent slots and connected with ribbon cable to increase cache RAM in 2 megabyte or 4 Mbyte increments to a limit around 16 Mbyte.

A small daughter board can be plugged into the PM3011a near the rear, adjacent to the bracket that attaches any AT expansion board to the rear panel of the machine. The daughter board is around 90 mm square and can be either a floppy disk controller or a SCSI adapter.

Also found on the main board is an interesting ROM socket. It is designed to take the ROM from a Golden Bow DUB-14 'hardware bios table expander' board. When setting up a hard disk, a range of possible head/platter/cylinder configurations is defined in BIOS.

While additional types could be defined in software, it is a great advantage to be able to expand the BIOS table for new drive types, particularly if different operating systems are to be used and the device driver that comes with a new drive is DOS specific.

The DUB-14 board normally is plugged into a spare slot and extends the BIOS information, but at the cost of a slot. The ROM socket on the PM3011a does not save buying a DUB-14, but does save a slot. The user removes the ROM from their DUB-14, and installs it in the spare socket in the PM3011a. The DUB-14 manual and disk of utility software are then used with the PM3011a. The DUB-14 is not essential, but is an advantage with some drives and any controller.

## Installation

Installation of the PM3011a in an AT is a snack. Open up the AT, disconnect the ribbon cables from the hard disk at the controller end, remove the existing controller, insert the PM3011a, and attach the cables.

The PM3011a can control MFM or RLL drives, and emulates the well known Western Digital controller, as seen from both the PC and the hard disk side. It is recommended that a low level format be done after replacing a conventional controller with a DPT controller, but this is far from essential and often one can be removed and the other installed without any problems. A low level format ensures that there won't be drive alignment problems as temperatures rise, particularly in networking situations with a heap of cache RAM and a high workload. The performance improvement is quite amazing – see Table 1 for the Coretest results.

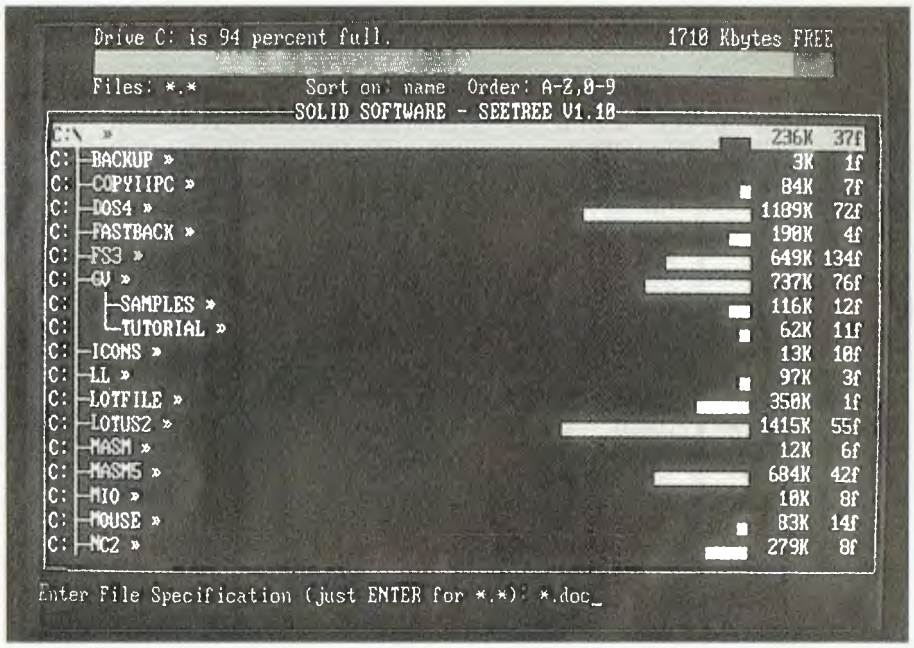



*Figure 4. To change the FileSpec press F (for FileSpec), which allows selection of a pattern for the filenames to be displayed. Selecting *.* will show all files, while *.DOC will show all files with a .DOC extension, and all other files will be invisible, and any other pattern can be specified by the user.*

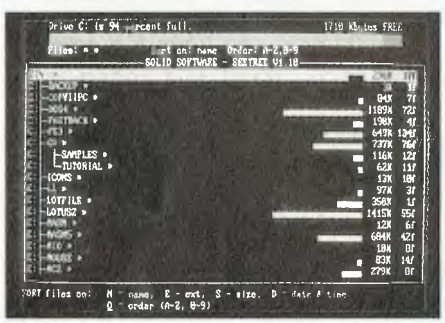


*Figure 3. Pressing S for Sort allows the user to decide in which order the file lists are to be sorted before display. The available options include name, extension, creation date/time or size.*

## Data integrity

One of the concerns that many people have when faced with a cache is data integrity. Losing data in a cache before the physical write to disk commences is not the problem because the original data is still intact. The concern is that, once the physical write starts, a power failure or any other reason that might interrupt the write, will result in a corrupted file.

It is the exposure time, the length of time that a physical write takes, that is the worry. The typical software cache actually extends the exposure time, and holds data in memory for a significant time. If it didn't, the demands on the processor to transfer data to disk would cause the rest of the application to slow down.

The use of intelligent caching controllers overcomes the problem by reducing the exposure time. The application starts to send data to the controller. After a brief delay, usually due to the application needing to read data, it starts writing to the disk. The writes are done very intelligently and with 'elevator seeking'. Sectors are written in an order that minimises the head travel, rather than the sequence in which they arrive at the controller.

The result is an increased data transfer rate, and a write that actually finishes earlier than a conventional write. The period

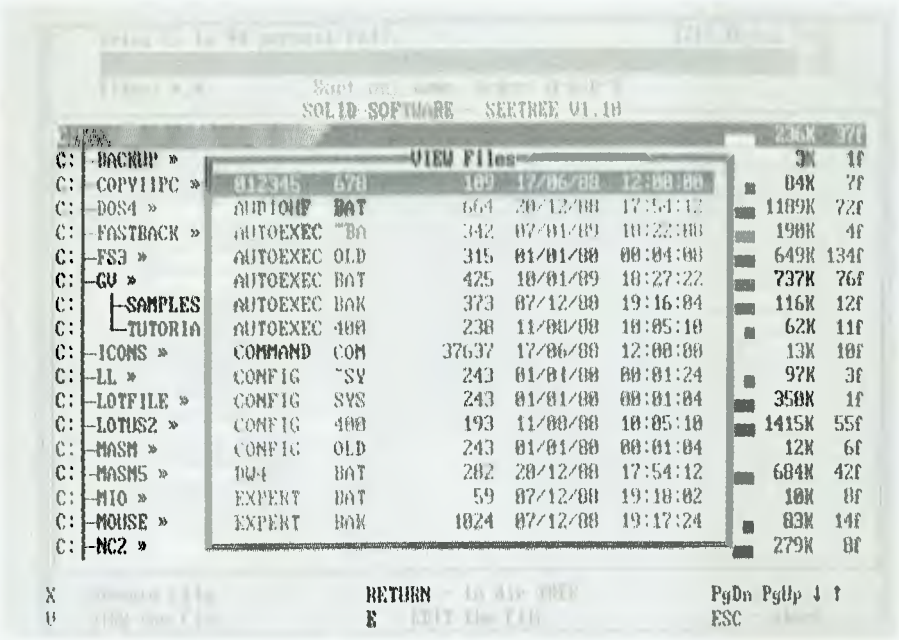



***Figure 2.*** *To undertake most tasks, a second level window is required. Move the cursor to the desired directory and press V for the View menu (shown above), C for the Copy menu, D for Delete, T for Transfer, X for eXecute or N for reName. The second level window appears, with a list of files in the directory. Files can be selected by moving a highlight with the cursor keys over the file name. Files can be selected by themselves or in groups, and actions like reName can be carried out using wildcards.*

from starting a physical write to finishing is far less than for a conventional write with the head jumping all over the disk, and the exposure time is far less with the fast, intelligent caching controller.

The DPT range includes a board for the PS/2 range, giving all the disk speed and access benefits available on the AT. In addition, there are a range of SCSI systems. These can be a SCSI drive that mounts internally in an AT and is connected to a SCSI host adapter on the PM3011A. It could also be a caching controller and hard disks mounted in one or more 'tower' type PC casings, and connected to a SCSI host adapter in an AT or mini, or connected to some Macs with appropriate drives.

The towers are the sort normally used for a vertical AT standing next to the desk. Opening them up sees just a power supply, one or more hard disks, and a caching disk controller with SCSI input, but no motherboard or expansion boards. A cable runs from a SCSI host adapter in the AT, mini, and so on, to the first tower, and other towers are daisy-chained to the first tower. The potential maximum capacity with towers, and the appropriate drives, is over 10 gigabytes!

Such fast disk capacity offers a growth path for a network suffering from disk contention, and could avoid having to go to a mini with the associated data processing department, the need to rewrite custom software and the loss of the ability to use DOS applications.

*No longer are system resources eroded by cache control, and no longer is there a problem with cache size chewing up system RAM.*

Each board comes with a manual around 2 cm thick and a host of software drivers and utilities for DOS, SCO Xenix and Novell 2.1. With OS/2, no device drivers are needed as the controller exactly emulates a Western Digital controller.

These days, with 25 MHz '386s becoming common, the limit to performance is the hard disk, and even the fastest drive is a bottleneck. Caching is essential, but caches that use up system memory and system processor time are of little advantage. The use of an intelligent hard disk controller with on-board processor, memory and firmware could be the solution to a data storage problem for many users.

## SeeTree

Before hard disks came along it was possible to run a system from the DOS prompt. Now that most systems have a 20 Mbyte (or larger) hard disk, it's just too hard to remember all the names of the various directories on a disk. This is the simple sort of thing that computers are supposed to automate for us, and programmers the world over have seen this problem. As a result, there are a vast range of DOS shells and utilities to allow us to navigate more easily around a disk.

The most useful of these utilities display a visual image of the directory tree on the screen. All the directories are shown, starting at the root directory, with the subdirectories at each level being connected to their parent directories by a line. Finding out what files are in a given directory is easy, and most of these utilities allow for easy copying, renaming, viewing, editing and deleting of files. They also allow for creation and removal of sub-directories and can manipulate the disk in other ways.

There are just two problems with most of these utilities. Most of them are imported, and most cost a couple of hundred dollars per copy. As a result, few companies buy one for every machine, and few home users will have a legitimate copy! An answer has appeared in the form of a bargain-priced Australian product, SeeTree.

## Running SeeTree

Make sure that the name of the directory containing SeeTree is mentioned in your PATH. Now, from the DOS prompt, type SEETREE to start the program. As it loads, SeeTree looks through the directories in your path for a file called CONFIG.SEE. This contains four lines, which specify various external editors or word processors to be run by the press of a single key from within SeeTree.

First, SeeTree reads the default disk, taking a few seconds to do so. Then the

main screen appears. At the top is the name of the current drive, and the free space in bytes and as a percentage. At the bottom are reminders of the available functions and the keys required to invoke them.

In between is a window, and in it the 'tree' of the drive is displayed. A bar graph indicates visually the amount of disk space consumed by the files in each directory, and the actual number of bytes per directory is displayed numerically. The number of files per directory is also displayed. Where the tree doesn't fit within the window, the cursor keys and PgUp and PgDn keys can be used to scroll to the desired place.

To log another disk, merely press Alt and the letter for the other drive. To re-log the existing drive the same procedure is used. If the same drive is being re-logged, its tree is replaced. If an additional drive is to be logged, its tree will be added to the display.

It is possible to have all drives on a system simultaneously logged, and to go from the tree for one, to the tree for another merely by using those cursor keys! Little use is made of function keys, with F1 offering minimal help, F2 giving basic information about the program, and F3 resetting the program by re-reading the logged drives.

To undertake most tasks, a second level window is required. Move the cursor to the desired directory and press V for the View menu, C for the Copy menu, D for Delete, T for Transfer, X for eXecute or N for reName. The second level window appears, with a list of files in the directory. Files can be selected by moving a highlight with the cursor keys over the file name. Files can be selected by themselves or in groups, and actions like reName can be carried out using wildcards.

With the cursor over the name of a file in any of the second level windows, pressing V invokes an external program to scroll up and down through the file to view its contents. Similarly, pressing E invokes an external editor program, which the user defines in the first line of the CONFIG.SEE file mentioned earlier.

In addition, three other external programs can be assigned to the keys F5, F6 and F7, and these commonly will be word processors or editors but could be other applications programs. Pressing one of those function keys starts the word processor, and loads into it the file under the cursor.

Returning to the main screen, there are other commands available. Pressing S for Sort allows the user to decide in which order the file lists are to be sorted before display. The available options include name, extension, creation date/time or size. Pressing F for FileSpec allows selection of a pattern for the filenames to be displayed.

Selecting * * will show all files, while *.DOC will show all files with a .DOC extension, and all other files will be invisible, and any other pattern can be specified by the user. Pressing M for MkDir or R for RmDir make and remove directories, with MkDir making a directory which is the

```
                    SEETREE  HELP  SCREEN
Seetree has the following primary functions:
- Displaying the directory tree structure and used capacity of your disks.
- Selection of a CURRENT DIRECTORY from the tree diagram, menu fashion.
- Copying or Transfering bulk files from one directory to another.
- Deleting or reNameing bulk files from a directory.
- Viewing or Editing the contents of a file (uses your chosen editor).
- New directories can be made (MD), and empty ones can be removed (RD).
- As an interface to DOS: you can execute programs or DOS commands.
Pressing the RETURN/ENTER key will always LEAVE the most current window,
except the main window containing the Directory TREE, from which you leave
the program by entering Q - for Quit. This will select the directory that
is highlighted as the CURRENT DIRECTORY on return to DOS.
MULTIPLE DISK DRIVES: To look at another drive, you hold down the ALT key
and press the drive-key (ie. D key for drive D, A key for drive A etc.
That disk has now been treed.) The tree diagram for each drive gets added
onto the list. Thus the PGUP and PGDN keys can be used to access all disks
currently treed; or you can quickly jump to the top of a disks tree by
again pressing the ALT + drive-key (Note: the drive doesnt get re-treed
unless it is drive A or B). SCALES for the bar charts are different for
for each disk, using the full screen width. An EDITOR does not come with
SEETREE (but a Public Domain LIST program is included on disk). You
specify the editor (or Wordprocessor) of your choice to which you are
most accustomed, and SEETREE uses it from within. You may pass the name
of the editor after you type SEETREE, or place it in the CONFIG.SEE file._
```

***Figure 5.*** *The Help screen from SeeTree.*

21.4 Mbyte Miniscribe 8425 10 MHz 0 wait state clone.

| Test | CONTROLLER | |
|---|---|---|
| | 3011a | DTC 5280 |
| Data transfer rate | 774.3 kBytes/s | 241 kBytes per sec |
| Average seek | 0.8 ms | 73.1 ms |
| Track to track | 0.8 ms | 14.8 ms |
| Performance Index | 76.410 | 2.187 |

***Table 1.*** *To test the PM3011A Caching Disk Controller, I used an AT clone, running at 10 MHz with 0 wait states, and a Miniscribe 8425 hard disk, a typical stepper motor unit and the well known hard-disk benchmark program Coretest. In a practical test, all files in a directory were repeatedly copied into another file, all joined together in the target file. As the copy procedure progressed, all the file names appeared on screen in the normal fashion – well, not quite normal: for while the messages themselves were completely normal, the speed at which they appeared was quite extraordinary. In fact, the file names scrolled past faster than the listing from a typical DIR, and far, far faster than any 'copy' that I had ever seen before.*

## QuickBasic Toolboxes

THERE ARE 38 main toolboxes, plus others for mixed language programming including calls to C and assembly language in the *Microsoft QuickBasic Programmers Toolbox* –

- ATTRIB manipulates screen and text attributes;
- BIN2HEX converts binary files to HEX equivalents; BIOSCALL accesses the ROM BIOS. BITS performs bit manipulation;
- CALENDAR has 20 time/date routines;
- CARTESIA has cartesian co-ordinate routines;
- CIPHER covers file security;
- COLORS selects VGA colors;
- COMPLEX has 14 complex numbers routines;
- CTOOLS1 and CTOOLS2 have between them 22 functions written in Quick C;
- DOLLARS has currency formatting routines;
- DOSCALLS makes MS-DOS system calls;
- EDIT carries out line and screen editing of strings;
- ERROR covers error handling;
- FIGETPUT gives fast access to binary files up to 3 Kbyte;
- FILEINFO has file and directory listing routines;
- FRACTION has 10 fractions functions;
- GAMES has some elementary functions for developers of games programs;
- HEX2BIN converts a HEX file to binary;
- JUSTIFY will pad out lines with space till they a predetermined length;
- KEYS gives enhanced keyboard input functions;
- LOOK has file viewing functions;
- MOUSGCRS, MOUSTCRS and MOUSSUBS have routines for a mouse;
- OBJECT allows interactive creation of graphics objects;
- PARSE will parse lines and words;
- PROBSTAT has some probability and statistics functions;
- QBFMT is a utility to consistently format QuickBasic source code;
- QBTREE creates a directory tree;
- QCAL creates a reverse polish notation calculator accessed from the command line;
- RANDOMS has a range of random number routines;
- STDOUT sends output to the MS-DOS standard output, allowing access to ANSI.SYS and so on;
- STRINGS has a vast range of string routines, including ASCII/EBCDIC conversion, and other filtering and padding routines;
- TRIANGLE has a collection of routines for calculating parts of triangles;
- WINDOWS gives pull down and other menu routines; and
- WORDCOUN is a simple program to count words in a file.

child of the directory under the cursor, and RmDir removing the directory under the cursor.

## Conclusion

SeeTree has almost all the functions of the market leaders, except perhaps for the ability to rename existing directories and to see a list of files in all directories at the same time. I liked SeeTree's use of external editors and word processors rather than internal editors; I did not have to learn another editor for use within the tree program, but had the full power of my favourite product. I also liked the simple screens and self-explanatory commands.

While there is some room for improvement, this is mostly only cosmetic things like improving the layout and language of the manual and help screen. Speed of disk logging is typical of many tree programs and, while not as fast as some, it is acceptable. The actual speed of writing to the screen is a little slow, but again, this is really only a cosmetic thing as the program actually runs at quite an acceptable speed, even on a 4.77 MHz PC.

SeeTree is a reliable product at an amazingly low price, and is a worthy competitor to many imported products three to five times the price. It is a product of Solid SoftWare, PO Box 218, Belgrave 3160 Victoria. At only $49 it is hard to go past it to a far more expensive imported product, and it is cheap enough to have a copy on every machine.

## QuickBasic Toolbox

For the last few years it has been quite unfashionable to admit that you still program in Basic. The coming of structured languages at a reasonable price, including Turbo C, Turbo Pascal and Quick C, made it easy to write programs made up of reusable modules. Basic seemed to be languishing, but with the latest versions of QuickBasic all the advantages of structured languages have come to the language. At the same time, the strengths of Basic remain. While some other languages can 'talk' directly to the hardware more easily, and may be faster than Basic, it still is the easiest language in which to write file I/O or string manipulation routines.

The best way to learn a language is to read programs written by experts, and modify them for use in one's own programs. Unfortunately, the reference and tutorial books available to programmers tend to follow fashion, and at the moment C is in, Pascal is fading, and there are very few Basic textbooks on the typical shop shelves.

Even worse is that most of the books tend to be written for the older Basics and don't make full use of the features of the newer versions of QuickBasic. A solution is at hand in the form of a new reference book from Microsoft Press. Entitled *Microsoft QuickBasic Programmers Toolbox*, it is a treasure trove of code.

The book is no less than 500 pages long, and all but the first few pages are taken up with QuickBasic code. It consists of over 38 main toolboxes, each with many subprograms or functions, and each toolbox has a demonstration module using its routines. The code is meticulously commented and laid out, with each function or subprogram having a clear and extensive set of comments in a header which describes it, its usage and its parameters and variables. There are a vast number of subprograms and functions, and a simple list of their names (one per line) takes eight-and-a-half pages of the book!

All the code in the *Toolbox* is beautifully written. It solves real problems facing every programmer, amateur or professional. All the routines I tried ran perfectly and their value was obvious. It would take a long while to type in all the code, but all the source code is available on two disks direct from the USA. After reading the book, and typing in a few toolboxes, I ordered the disks and am eagerly awaiting them.

*Microsoft QuickBasic Programmers Toolbox*, by John Clark Craig, $34.95 is published by Microsoft Press. My copy came from Hotline Books, George St, Sydney. Particular thanks are due to the people at Microsoft who, at very short notice, made a copy of Quick C available so that I could test the mixed language functions in the book. □

# An Artic voice for blind users!

THE ROYAL Blind Society (RBS) has recently introduced a six week computer skills training course as part of a newly developed system for teaching the blind and partially sighted to use PCs and commercial software packages.

The system works by adding an Artic voice card to a personal computer. Guided by a synthesised voice, students select the program they want to run from the main menu. The voice then lets them know where they are in the program, and which commands or functions are available.

Ashton-Tate's Multimate Advantage II word processor program was the first software package chosen to start the training program. The Society has since added a broad range of programs, including WordStar, Open Access, IMS Accounting, WordPerfect and TypeQuick.

The RBS uses standard model PCs and laptops and adds an Artic business vision board and speaker for the unsighted user. Those who have partial sight can also use a large print reader in conjunction with the screen.

'Students are first taught about the voice component of the system using the board to interpret DOS commands and screen output,' explained Ms Griet Hesse, Computer Skills Instructor for the course.

'Then we teach them how to use specific products used in the business sector,' she said. 'While we already have a number of packages that are used with the course, we are currently evaluating different classes of software packages such as spreadsheets, financial packages and databases, that will expand the opportunities for our people. Of course, these need to be compatible with the Artic vision board. The board will work with almost any non-graphics package. We chose Multimate as a standard word processing package because it is widely used in industry and it's very easy to learn.'

The centre is equipped with nine PCs including Epson, IBM and Canon machines operating as standalones. Six students per six week course are catered for.

'The beauty of this course is that we use commercial products and modify them instead of specially made products; no specialist equipment needs to be supplied by the employer,' said Hesse.

**The Royal Blind Society's new training course is offering blind users more employment opportunities. Robert Thirlwell reports . . .**

When the students complete the course, they can buy either a standard Artic voice card ($1300) or an Artic Crystal card (from $2700) which gives a clearer 'voice' – both cards fit standard DOS-based PCs. If you'd like to know more about the cards and their applications, contact Pulse Data, 1/22A Hunter St, Parramatta 2150 NSW. For more information on the course, contact the Royal Blind Society, (02) 747 6622. □

*'The aim of our training program is to expand the employment opportunities of the visually impaired away from switchboards and special typewriters and away from high cost, specially built equipment. We are very pleased with the course and hold high hopes for the future'* – ***Ms Griet Hesse, Computer Skills Instructor at the RBS.***

# dLETTER

MATT WHELAN

## dMac way!

Until December, 1988, our dBase newsletter, dLetter, was published as a separate 8-page insert for subscribers only. It's now included as part of the magazine as a regular column. Here we present an index of listings, bug fixes, tips and technical notes from dLetter – copies are available by sending $4 per issue to: dLetter, PO Box 227, Waterloo 2017 NSW.

CONVERT AN existing dBase application to run on the Macintosh? It had to be my unlucky day, I thought, as I told an old friend – grudgingly – that I'd 'give it a go'.

My reservations had nothing to do with the Mac, which I really enjoy these days, but were based on the uneasy marriage of an 'old-style' dBase application to the new-and-stylish WIMP environment.

dBase and the Mac just don't seem to get along. Not only did Ashton-Tate spoil things by releasing an awful/incompatible dBase Mac, but other venturers like Fox and Nantucket have found the market tough going.

It seems a faithful representation of dBase isn't welcome in the Mac world because it is too obviously not a Mac application – the user interface just isn't up to standard.

### Easy going

Despite my reservations and the marketing problems, this conversion was so easy I couldn't believe it. It was the ideal problem to throw at Nantucket's McMax: a successful existing application the users were happy with, the change was required purely to suit the company's hardware needs.

A publishing house, it had switched to Macs to do its typesetting and design and had installed several machines. Now the company wanted to get rid of the last remaining non-Apple, which was retained for subscriptions processing.

The worst part of the whole conversion was the fact the 'non-Apple' was an old Morrow CP/M machine, and the subscriptions software was written in dBase II (remember dBase II?). Converting from dBase II code syntax and file formats to dBase III represented more than 90 per cent of the work.

I spent days on the attempt to bring this application out of its 'time warp'; once I had a dBase III version running on the PC, developing a Mac version of the code was almost instantaneous.

This wasn't a particularly tough compatibility test – dBase III code can be a lot more advanced than dBase II code – but it seems there is very little McMax baulks at in the dBase command set: the differences are mostly related to hardware variations (like different keyboards and filename/path conventions). Of almost 30 commands listed as 'not supported', I considered only two – LOAD/CALL and RUN – significant, and they aren't used in the majority of applications anyway.

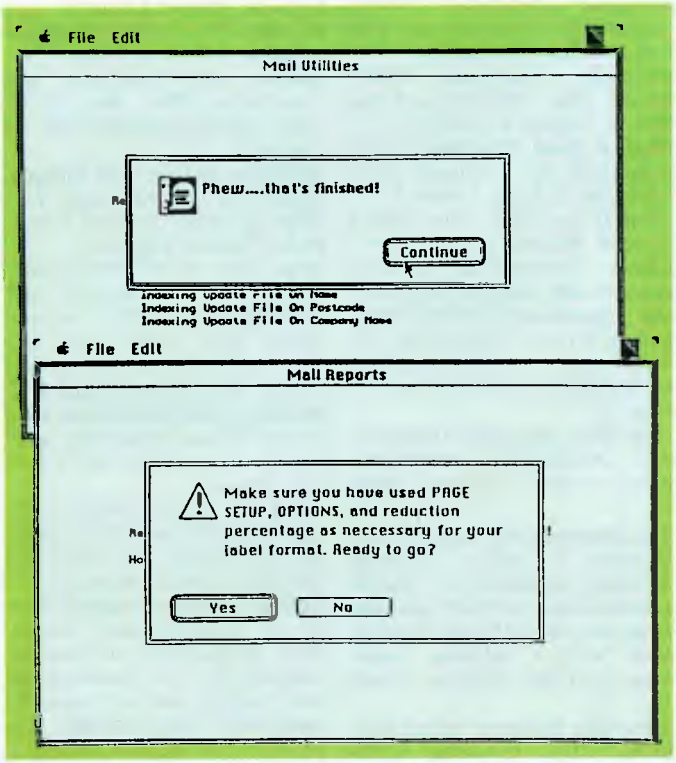
## Change for the better

The changes I made to port the subscriptions program to the Mac were *all* unnecessary – they took advantage of the extras in McMax to make the system a little friendlier, but could have been left out. For example, the 'non-standard' code included lines like –

```
SET title TO "Subscriptions"
SET procedure self
```

The first is quite different to the dBase SET TITLE command. In McMax, it allows you to define your own text for the window's title bar, which is a useful place to put headings for application modules and so on. The SET procedure command lets you include all routines in the same program file. McMax also includes limited access to the Mac's user interface –

```
f_root=getfile("GimmeDat!","Select working database","MDBF")
```




*A selection of Alert boxes is available to the McMax programmer, providing limited access to the Mac user interface.*

This brings up a standard Mac file-selection dialog box, with 'GimmeDat!' replacing the usual 'Open' on the selection button, a help message ('Select working database'), and a filetype (McMax databases) to narrow the selection of files shown to the user.

Getfile() returns a fully qualified path/filename combination, so the following code was needed to separate the components for display purposes –

```
do while at(":",f_root))0
   f_root = substr(f_root,at(":",f_root)+1)
enddo
```

Other user-interface access includes a set of Alert boxes. You pick the box with appropriate 'buttons', and supply a message and a default response –

```
retn=notealert(1,msg)
badnews=stopalert(1,'There are some incorrect deadmail codes in the
                     file.', ;
                  '-- please check and correct if necessary . . .')
x=cautionalert(9,ESCAPE,"Make sure you have used PAGE SETUP, ", ;
                        "OPTIONS, and reduction percentage ",  ;
                        "as necessary for your label format. ",;
                        "Ready to go?")
```

Finally, McMax provides some of the printer control not found in dBase –

```
if .not. laser
   * Imagewriter, set font size etc...
   PRINTER CPI 18
endif
```

## Plain and boring

The subscriptions program is plain and boring – even ugly – when compared to your average Mac program. Nothing written in everyday dBase could look good on the Mac.

But that's not the point. This subscriptions program does exactly what is needed, in a way the users are comfortable with because they mastered it years ago.

It creates labels and does reports – including sub-selections from the subscriber base – on laser or dot-matrix printers, offers full enquiry and update facilities, takes care of which issues have been sent and when renewals are due, and provides management statistics. Take out an alert box or two, and they could even run it on a PC if their hardware needs changing . . .

If you were wondering about converting a dBase application to the Mac, it isn't your unlucky day – it can be done, relatively easily. Your biggest problem might be finding a dClone: McMax isn't available here, and whoever is importing FoxBase/Mac is certainly keeping quiet about it. If all else fails, both are available mail order from the US.

From what I've heard and read, Foxbase is probably the better choice, although a more advanced McMax has been released since I did the conversion. If I can get the two newer products together, I'll report back with a comparison. □

## Listings

### Program Listings

***Procedure file for dBase III:*** David Hortin. Volume 1 Issue 5.

***Swapping Printer Ports on the IBM PC:*** Robert Boies. Volume 1 Issue 6.

***Yet Another Printer Status Checker:*** Ralph Davis. Volume 1 Issue 6.

***INSERT.CMD:*** Rose dVines. Inserts a group of records in a non-indexed database. Volume 1 Issue 6.

***Manipulating names:*** Les Bell. Volume 1 Issue 7.

***Music.CMD*** Stephen Heusz and ***Music2.CMD*** Rose dVines: Finds and displays records by artist. Volume 1 Issue 8.

***Showdate.CMD:*** Grahame Davis. Retrieves CP/M-3 system date and time and reformats into strings. Volume 1 Issue 9.

***Report Spooling for dBase III Plus:*** Tom Retting. Volume 1 Issue 9.

***dCoder:*** Luis Castro. Performs a simple JOIN. Also an alternate UPDATE. Volume 1 Issue 10.

***Bar Graphs from dBase II:*** Brian Evans. Volume 1 Issue 10.

***Error History:*** Jeffrey Bersin and Nicole Hannes. Traps errors as they occur in dBase III, then lists them. Volume 1 Issue 11.

***Backup.PRG:*** Ray Love. Backs up large files from dBase III to floppies. Volume 1 Issue 11.

***Memo Field Reporting:*** Christopher White. Program to print formatted memo fields. Volume 1 Issue 12.

***Reporting Your Relations:*** Karen A Robinson. Report.PRG creates a report using two databases linked together. Volume 2 Issue 1.

***Printer Status:*** David Jitts. Checks printer status before attempting to print from dBase III Plus. Volume 2 Issue 2.

***Word Wrapping:*** Tom Rettig. Volume 2 Issue 3.

***Easy Print Control From dBase:*** Kenneth Getz, Larry Abare, Karen Robinson. Volume 2 Issue 6.

***Dear Dele:*** Geoff May. DATECHEK.PRG is a program segment for validating the date. Discusses date fields in dBase II and dBase III. Volume 2 Issue 7.

***File Handle Status:*** Kenneth G Getz and Brenda Johnson-Grau. .BIN file to print out the number of file handles available for debugging purposes. Volume 2 Issue 8.

***dCoder:*** Christopher White. Demonstrates the use of multiple input screens for each record, using any version of dBase III. Volume 2 Issue 9.

***Open Twenty Files:*** James Troutman. Volume 3 Issue 1.

***Disk Detective:*** Kenneth N Getz. Checks if there is a disk in the disk drive before attempting to write to it. Volume 3 Issue 1.

***DELDUP.PRG:*** Paul Ferrera. A program to look for duplicate entries in your database, and either delete or print them, according to your choice. Volume 3 Issue 3.

***Reader.BAS:*** Michael Rychter. A program to read a dBase file off disk, and print the records in three columns. Turbo BASIC. Volume 3 Issue 5.

***Clipper Browse:*** HM Van Tassell. A dBase III BROWSE emulation for Clipper. Volume 3 Issue 6.

***What Key Was That?*** David Morgan, Kevin Shepherd, Phil Kimble. Returns output generated from the IBM PC keyboard and from Clipper's INKEY(). Volume 3 Issue 7.

***Summer Fun: Using the New Goodies*** A program that demonstrates Clipper goodies. May 1988.

***Disk Exploration in dBase III Plus:*** Jeffrey McCrimon. Getdrive.asm and Chdir.asm. May 1988.

***Clipper Rules, Okay?*** Craig Yellick. The YC?RULER utility that helps you to quickly determine cursor locations and rule columns. June 1988

***Advanced String Searching:*** Chuck Litzell. If you are finding AT() too limiting, try this variation of a BASIC program, called POS() for string searches. Includes Pos.BIN program listing. July 1988.

***Retrieving Drives and Changing Directories:*** Jeffrey McCrimon. Getdrive.BIN and Chdir.BIN assembly level program listings for retrieving the currently logged drive and changing directories from dBase III PLUS. August 1988.

***dBase Calendar:*** Chuck Litzell. Calendar.PRG displays a calendar for a given month on the screen. It can be used from the dot prompt, or could be called from your program's main menu as a convenience item. August 1988.

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STEWART FIST

# Databases for the Macintosh

ABOUT ONCE a year, I seem to get caught up in some project that requires the selection of a database management program for the Macintosh. And, because the software changes so rapidly these days, the selection necessitates a pretty thorough review of the programs available.

So I've had my nose down in a number of Mac database management programs for the last couple of months, and I've come to the conclusion that most of them are pretty good, but some are better. It's the old problem of horses-for-courses; you can't put your finger on any one program and say, 'This is the best!'

For instance, I've been very reluctant to spend any time with McMax from Nantucket Corporation, because some of the early reports I read about this program said that it was virtually a straight translation of dBase III+, which hadn't taken advantage of the Mac toolbox. In other words, it had the look-and-feel of Ashton-Tate's DBMS program for the IBM PC.

When you see how many database management programs there are around that do take advantage of the Mac toolbox, there appears to be little point in examining one that doesn't. If I'd wanted the look-and-feel of an IBM PC I would have bought one!

The trouble with this attitude is that it's too simplistic. There are many good reasons why you would want a translation of dBase III to a Macintosh. In fact I've got a whole lot of old CP/M dBase II files and command programs that I wouldn't mind porting over to the Mac.

So I've now spent some time with McMax and I'm impressed. From what I can see, it is an extremely good clone of dBase III, and you should be able to port both files and procedural language programs over to the Mac and use them without any problems.

*There are many good reasons why you would want a translation of dBase III to a Macintosh.*

## Commands

There are a couple of IBM PC-specific commands that won't work, but these are pretty obvious and generally the program just ignores them. If you do have problems, then you've got a very good debug/trace system to let you find the idiosyncrasies anyway, so anyone with more than a passing knowledge of dBase programming will be able to straighten the program out in a couple of hours at the most.

For some reason Nantucket haven't bothered to put out a multi-user version of McMax, and this is its main limitation. It would be an ideal program for small work-groups linked by LocalTalk to an AppleShare file server, but you would need a multi-user version with record-locking and so on. However, it does allow Mac users to access shared database files over TOPS with IBM PCs.

McMax is very fast in virtually every aspect, but you've got to see it simply as a version of dBase III ported to the Macintosh with virtually no consideration being paid to the special features of the Mac. It ignores the Mac interface for custom-built applications, and it has no icons, graphic capabilities and so on. But it is dBase III, and this is a big plus.

If you are simply setting up a couple of lists – customers, products, invoices, orders, or whatever – and you want to perform only simple calculations (say, to keep customer accounts or tax records) and your report requirements are fairly basic, then a simple 'related' flat-file program like FileMaker II (which used to be called FileMaker 4) will do everything that you want. FileMaker II isn't a true relational database manager, but it has the ability to look up information in another file, and so it is damned close to being relational.

## OverVUE

At this lower level also, you should look at OverVUE which I haven't seen advertised recently, or you might try to adapt HyperCard to your needs. OverVUE has some nice grouping features and an excellent array of 'attributes' which make it simple to use and relatively fool-proof, but it is very basic, although excellent at what it does.

OverVUE is memory-based which means that it stores everything in RAM. This greatly limits its file size, but at the same time it means that OverVUE zips along at a pretty fast pace.

HyperCard is also pretty fast, but it can't do much at the present moment (especially with its lack of reports). However, it is about to be used as the front-end to a number of major database management programs (Oracle, Omnis 3, 4th Dimension), and so there are avenues for expansion. So, if you can get by using HyperCard now, then you will certainly be able to expand your capabilities later.

All of these programs are easy to use and very powerful, even though they are at a basic level when it comes to automated functions. However, before you leap to the conclusion that you want procedural programming to automate your databases, take into consideration the processes that these Mac programs do make available in checking and confirming data at the time of entry; this is the most important aspect of a database. If garbage gets in, you-know-what will come out.

The idea of 'attributes' attached to each fields seems to be the simplest way to police the data being entered. At the basic level these attributes simply consist of a choice of field types; dBase gives you Date, Text, Numeric, Logical and Memo, for instance, and it will only accept data that fits these categories. But more automated programs will allow you to set limits, or define things like CAPS ONLY, and so on.

The point is that a non-automated database nowadays will often do just as much, twice as quickly, and with ten-times the confidence, of a fully programmed dBase III of a couple of years ago. Don't imagine that you necessarily will get benefit from procedural language automation unless you have substantial sorting, calculation and updating requirements.

FileMaker II has one other important characteristic which could be an advantage for a small business and deserves special consideration. You can run it, as is, either as a standalone program or as a shared database on a small LocalTalk network. At the basic level your only addi-

tional cost is for the cables and the LocalTalk boxes, but if you expand, it can also run on a larger network with a fileserver.

## Helix

At the middle level, you should look at Odesta's Helix, which doesn't have a procedural language, but is extremely powerful and easy to use, and also at Reflex Plus which has now been upgraded to have relational capability. At an application size of only 350 kilobytes, Reflex Plus is especially good for the smaller Macs around, but it's not programmable and it is not multi-user, so it is fairly limited.

At the higher level, where you want a database management program to churn through thousands of records, up-date complex inventory files, re-price the stock in a large warehouse, calculate different tax and margin rates, implement an automated ordering or invoicing system, and so on, you will probably need something with procedural language and relational capabilities.

ACIUS's 4th Dimension has been touted around as the solution to these problems, but it isn't relational and so, to a degree, you end up putting all your eggs in one basket – one enormous monolithic data file. With large databases (and you wouldn't bother to use 4D with small), the idea terrifies me!

At present we've only got Version 1.0 of 4th Dimension in Australia, but 2.0 is being beta-tested in the States and it is supposed to have sped things up and added a lot of features sadly missing from the first version. I think eventually 4th Dimension will be a great program, but it worries me more than a little at present!

It was designed to build big, sophisticated applications with elegant interfaces, but it is notoriously slow. If you do a lot of sorting, searching, or replacing, even with files of only, say, 3 to 4000 records, you'll find that you need to do a lot of waiting. At the present moment it needs a hard disk Mac II to get it close to reasonable speed. This shouldn't be necessary.

I spent a couple of weeks early last year trying to learn to use the program at a professional level, but it was all solid going through the manuals and tutorials. Perhaps I'm just getting old, but I found programming in 4D much less logical than with the old dBase. And since I stopped learning I've forgotten everything, and I can't face the thought of getting back in.

However, 4th Dimension is relatively easy to use at the basic level, but at the same time I wouldn't feel happy recommending it for anything other than a major development project at the present moment – and then with an experienced programmer – mainly because it is unnecessarily complex, unless you've got a major problem. It is a program for professional database programmers who need a powerful development environment.

4th Dimension is also ideal for network use (you don't need a special version), and it's getting links into some of the mainframe systems through Network Innovation's CL/I linking language (Apple are putting money into this area), and then there's a new front-end connections to HyperCard to be considered. A lot of people are betting a lot of money on this program and its extensions.

## Omnis 3

Omnis 3 from Blyth is a pretty standard standby; it has been around for quite a few years and is very popular. Quite a while ago Blyth upgraded it to Omnis 3+ and added a front-end package called Express. The new version, 3.3, is supposedly on its way, but I haven't seen any beta reviews.

The old Omnis 3 wasn't always easy to use and often irritating in some aspects. Express attempts to get over some of these problems by helping to build data entry layouts, report formats and so on, but the program is beginning to show its age. Express feels to me a bit like a band-aid stuck on to the program to hide some basic defects, but I must admit that it seems to work okay. I still wouldn't make this my program of choice, however, a lot of people would differ with me on this one, so you can't cancel it out.

Ashton-Tate's dBasè Mac was a program that Macintosh users and reviewers waited a long time for, and then were universally disappointed. Generally it is a bit of a dog's breakfast; it bears no relationship to the old dBase CP/M or MS-DOS programs except that it can import files from dBase III. But it can't import the dBase procedural language programs that automate the process so, at best, you've only got part-compatibility.

I also think that the data-entry process is very badly written and the whole program is very shoddy. I don't like it, and I don't know anyone who does.

There are a couple of real dBase clones that are much better. McMax, which I've already mentioned, appears to be excellent and you can import both files and command programs, but its a single-user program only. In case you're wondering, it was originally called dMac III from Format Software GmbH (German).

dBman-Mac from Versasoft is another one that I haven't had experience with, but it's up to Version 5.0 so it should be around somewhere. For some unknown

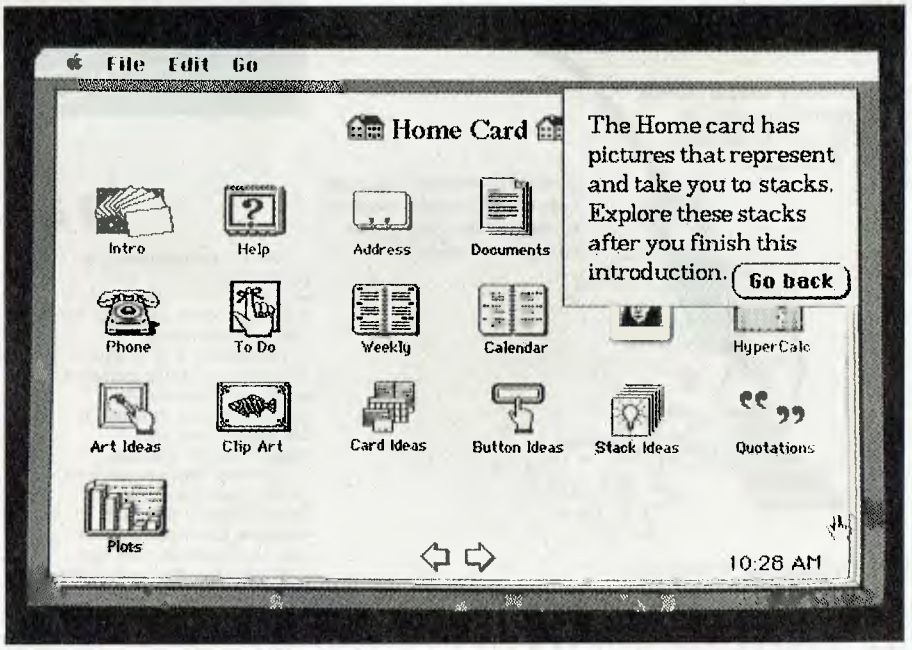



***Figure 1.*** *HyperCard is to be used as the front-end to a number of major database management programs, including Oracle, Omnis 3 and 4th Dimension.*

reason, Versasoft claims that it will run on 13 operating systems including several versions of Unix – this, I've got to see!

And then there's the long-promised-but-not-yet-seen FoxBase+/Mac version 1.1 which is supposed to be as compatible with dBase III as McMax and equally as fast, but with new multi-user and run-time versions also available this year.

At this high-end of program complexity most organisations probably need a multi-user version, otherwise there's a lot of power going to waste; you don't use programs like this just to keep your phone list.

Everyone seems to be waiting for this program; the programmers must be having some troubles with FoxBase+/Mac because I've been seeing beta versions tested in the States for over a year now. This doesn't augur well for the future, but the tests say that it is fast, and dBase needs speed. One speed comparison of all major Mac databases (although McMax wasn't available) had FoxBase+/Mac as the clear leader in 70 per cent of all tests and at least twice as fast as the next best in about 60 per cent.

*All of these programs are easy to use and very powerful, even though they are at a basic level when it comes to automated functions.*

If you've got a mixture of IBM PCs and Macs in the work group, and you already have (or need) a large database with complex automation requirements, then you'll probably be using dBase. The original FoxBase was an MS-DOS relational database program that could run dBase III programs and files directly, so FoxBase+/Mac will do you nicely from all accounts.

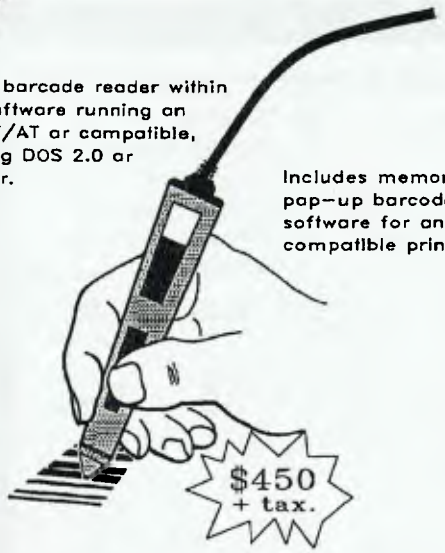
However, if you are starting from scratch in a totally-Macintosh environment, then this is quite another matter. The dBase language is reasonably hard to learn, and many of the functions that require procedural language programming in dBase III can easily be done by a non-programmer in something like Helix, Omnis 3+ or 4th Dimension.

At the even-more-powerful end of the scale, we will shortly be seeing Oracle on the Mac, with a network version out shortly after. IBM's Structured Query Language (SQL) has been built into the program, and it is integrated with HyperCard (as a front-end) by means of the external HyperTalk commands.

The significance of all this is that it gives you the simplicity of a HyperCard interface with the power to interconnect and query large mainframe databases, all within one package. This could well be the most significant development in this area for a long time, although the new version of 4th Dimension will have many of these capabilities too.

SQL is a database language which is now being widely accepted as *the* industry standard. It is powerful, terse, and easy to use, and it is constantly being extended into new areas like expert systems and artificial intelligence. □


BARCODE READER

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# A perfect batch!

## Matching singles with a fourth generation language and a PC – 'Why not?' asks Merv Beamish.

THE COMPUTER allows us to play the devil's advocate,' said Marianne Dodds, psychologist and Sydney branch office manager of Yvonne Allen and Associates, recognised as one of Australia's most professional (and certainly one of the busiest) introduction services. Established in 1976, it now has over 800 clients on its books and offices in four states and Canberra.

A considerable and diverse range of data is gathered on each of its clients and stored on computer. 'At present, the computer works with objective criteria to give a list of names of possible matches for a client. It might come up with ten or twenty names; at the moment that is probably eight or eighteen too many,' Dodds continued.

'It was a brave step for a personal service of this nature to move into computers. The stigma of man-dates-monkey computer dating rip-offs is still with us and indeed, based on some advertisements in the daily press and singles magazines, one suspects such services are still with us.'

'People will say that we lose the personal aspect with computerisation. Yvonne Allen herself was quite worried about this when we first started, however the computer has made a huge difference for the consultants by giving them more time with the clients. In ten years this client group is going to be 'gi-normous:' We won't be able to offer professional face to face consultant servicing without the computer to mechanically sort and cross reference.' said Deirdre Stewart, a consultant, as the three of us sat in a neat little interviewing room at the agency.

Through advertisements in the popular press, telephone directory listings, or via recommendation, interested people contact the agency and are invited to one of the offices for a free initial interview. On the surface this is a low pressure marketing and sales exercise, but it is more. The consultant the client meets will be one of the two, minimum, directly involved in the matching process.

*We are looking to use computers to do a lot more research analysis for us. Asking, for example, what percentage of women under 35 live in postcode area 2026. This would help us identify those areas from which we are likely to get the most clients and tell us how efficient we are in contacting them. We do an enquiry listing every day, as people ring up; amongst other information, this tells us where they heard about the service and what area they live in. That statistical analysis is going on all the time to help us with our marketing.*

*The statistics have been recognised as valuable research material by organisations such as the Institute of Family Studies in Melbourne, which is interested in human balance statistics. A number of magazines, such as the* Bulletin, *have also utilized the statistics* – ***Marianne Dodds, Sydney manager for Yvonne Allen and Associates.***

'After the first interview the consultant will write out a report that includes basic objective criteria: height, weight, smoker, non-smoker and so on, but we also go a little bit further into our own reaction to the person, did they appear to be relaxed, open, shy – subjective information.'

'At this interview, if clients wish to proceed, they pay a deposit and are given an eight to twelve page questionnaire.

The questions are open but searching, and encourage clients to analyse their personality and preferences. It takes about one evening to complete, and it can be quite exhausting. In general, the questions cover occupation, education standards, politics and religious leaning, height, weight, children and the like. Added to this is a section where the client outlines personal preferences in nationalities, physical appearance, sexual and personal interests. The client questionnaire also has a series of questions about performance under certain situations. Then there is a personality test from which the professionals at the agency gather more information.'

The questionnaire demonstrates the thoroughness of the service and the degree of information needed on a client to carry out the match making process. After the questionnaire is returned to the agency, and a second interview is arranged with a second consultant.

### Being objective

RESPONDANTS are asked to a second interview to clarify any answers that seem a little hazy. Accepting the written word only could lead to misinterpretation, particularly in rating scales. 'In a one to ten scale we could perceive that a rating of seven isn't very important, but the client might disagree,' Dodds pointed out.

During the second interview, the

client's actual needs are established. Most clients are not really sure what they are looking for: is it to form a long term relationship, or, perhaps, build up a circle of friends after being separated or divorced? The self analysis nature of the questionnaire and the assistance of the consultant at the second interview establish goals for both the client and the agency.

'As you can see the amount of information gathered on any one client makes the initial sifting task, if carried out manually, a very laborious and time consuming job; a job to which the computer is better equipped to handle where objective data is involved,' continued Dodds.

'Objective information such as whether a person smokes or not, is not an emotional issue – it is a case of either you like smoking or you don't. The same applies to things like education: some indicate that they are only likely to get on with someone with a college education or up. These are all things a computer can sift through and say, yes, these two people cross reference and look okay on paper.'

In fact, all that some clients require is an objectives-only computer service. The agency does offer such a service with no human intervention in the matching process after the first interview. Naturally this is a less expensive alternative to the program described above, which includes the second interview and covers subjective data.

'However, with the objectives-only option, if someone makes a mistake, for instance a wrong age group decision, there is nothing we can do. But if they were in our other program, we can say, point out that specifying a certain age will rule out 90 per cent of possible matches. I will often transverse these barriers if I believe there is someone suitable, say, who happens to be a year or two out of the specified age group.'

With the full service, the system includes what the agency refers to as 'consultant sensitive monitors'. These are few in number, contain some subjective information and are generally based on a one to ten grading scale. For example, the subjective data gathered is used to grade a client's 'style'. The consultant can play devil's advocate by amending this grading up or down, or change its relationship to various other items of data to observe the cross reference variations between clients.

Whilst the agency would like to include more of these monitors within their system, they admit it is a bit on the 'hazy' side and are looking for alternative ways to represent subjective scales of measurement. One possibility is through the use of colour scales. The psychology of colour (red for anger, blue for coldness and all the shades in between) may be able to be adapted to scaling a person's personality using a computer.

*Sculpture's long period of evolution, claim MPD, has lead to a stable product which combines speed with very fine data handling capacity.*

*People say that we lose the personal aspect with computerisation. Yvonne Allen herself was quite worried about this when we first started, however the computer has made a huge difference for the consultants by giving them more time with the clients. In ten years this client group is going to be 'gi-normous'. We won't be able to offer a professional, face to face consultant servicing without the computer to mechanically sort and cross reference.' –Deirdre Stewart, Yvonne Allen consultant.*

## Sculpture

THE ACTUAL computer system software was developed in Basic on Sculpture, a 4GL compiling language which can work with twenty interrelated master files, by Brad McMaster, then with British company Innovative Software in 1981. By 1982, the software, called Genesis, had been rewritten in C, renamed Sage and implemented under Unix. Since its development, there have been a number of enhancements; the current version is 1.16.

Kieth Ashman, who conceived the language, founded his own company, Microprocessor Development Ltd (MPD), to market and support the product. MPD has offices in London, Sydney and New York. McMaster is now the managing director of MPD in Australia.

At present, the system installed at Yvonne Allen and Associates runs under DOS on IBM compatible equipment, but the portability of Sculpture will allow it to move across machines and operating systems to keep abreast with the expansion of the agency. It will also allow an upgrade from single to multi-user systems without altering the software. As we go to press, the agency is installing a mini computer.

Sculpture's long period of evolution, claim MPD, has lead to a stable product which combines speed with very fine data handling capacity. The language uses powerful command verbs to obtain shorter than average periods for both coding and debugging.

The accumulated client base offers the agency a very powerful marketing and research database. 'We have a population of people who are normal whereas many studies, for example the Hyatt report, use clinical or very limited samples. Our sample is made up of singles who voluntarily joined our group. We would actually like someone to come in here and do a PhD utilizing our twelve years of statistics based on thousands and thousands of questionnaires. The information has varied as we've developed over the years, but certainly for the last five years – since we've introduced the computer – it has been very consistent and comprehensive.'

Yvonne Allen and Associates is a practical business that deals in very personal dreams – dreams both of their clients and those who make up the agency. Already they have franchised the agency under a strict, annually reviewed, licensing scheme and the agency sees itself developing as an umbrella organisation covering such things as singles travel, lifestyle seminars and counseling. □

ROY HILL

# A typical Forth application

LAST MONTH, I started a discussion of the Thomson chip set and promised to provide further details and specifications this month. As most readers will probably be aware, the project is now alive and a full description is provided in 'Introducing the Maestro Super Executive modem' in this month's issue.

I also promised to discuss the way Forth handles its dictionary and I will continue with that now. Compiled Forth has a structure that is totally unlike any other compiled language. The reason for this is in the nature of Forth itself – the 'threaded subroutine' concept. Figure 1 shows the manner in which a typical Forth application is built. It makes no difference whether the words are those defined by the user, or whether they are part of the main dictionary. This is another beauty of Forth – it does not distinguish between its own 'system' words and those that are user defined.

Let us examine Figure 1 in some detail, bearing in mind that whilst this describes a typical Forth application, it is by no means a definitive exposition of any single Forth implementation. All definitions (that is, new words) start with a '1' in bit 7 of the first memory location devoted to the new 'word'. This location is called the Name Field Address – NFA in Figure 1. Bit 6 (labeled 'P') is the Precedence Bit.

This is an extremely important bit as it enables a special class of Forth words to be identified – IMMEDIATE words, which are always executed (rather than compiled), even within a new colon definition. When new words are defined that need to be identified as IMMEDIATE words they are always followed by the word IMMEDIATE. This sets bit 6 of the new word to a '1'. An example of this would be the word BEGIN, whose definition is –

```
: BEGIN ?COMP HERE 1 ; IMMEDIATE
```

I do not intend to discuss the above construction until a later column, sufficient to say that all words such as BEGIN, AGAIN, DO, LOOP and so on are all IMMEDIATE words.

Bit 5 of the NFA is called the SMUDGE Bit. This bit has a multitude of uses, but its main use is to prevent error messages from fouling up a re-definition of a pre-existing word. Setting the 'Smudge Bit' to a '1' (rather than a '0') will prevent the new word being found in a dictionary search. The remaining five bits of the NFA are used to store the length of the word's name.

*Is there anyone out there who has any routines for solving differential equations?*

For this particular implementation we can have words with name lengths up to 31 characters. Note that not all 31 characters may be stored – cmForth only stores the first 2. Newcomers should acquaint themselves with the manner in which their particular version operates (do an ASCII DUMP on the dictionary). In the case of cmForth for example, the words THIS and THAT would be considered identical – both are 4 characters long and the 2 letters stored are the same – TH.

Immediately following the last stored character of the name, is the Link Field Address (LFA). The sole purpose of this location is to store the address of the NFA of the previous word. It is the LFA that provides the thread used by Forth to perform its dictionary searches and calls to previous definitions. I have shown this threading in Figure 1, by a series of 'arrowed lines', linking each of the definitions.

Following the LFA comes an area containing the Code Field Addresses (CFAs) appropriate to the type of word being defined. In the supplied example, the CFAs point to the routines for : and ; – indicating that the words that would have been defined here are colon definition words. CONSTANTs, VARIABLEs and so on, would have CFAs pointing to appropriate run time routines for each of their differing types.

In the case of colon definitions, the final section of the word's definition is the Parameter Field Address (PFA). This section contains the CFAs of all of the words (in the order they were defined) as well as any other CFAs of such words as . – used to print out messages on the monitor.

F88 (or F-PC as it is also known) does not follow the above procedure – the NFA, CFA and PFA for each word are stored separately, in order to allow for more efficient use of the much larger memory space available on IBM PCs and clones.

For those who wish to examine the construction of their particular version of Forth, try the following –

```
: AA ." This is a test" ;

0 VARIABLE TEST1

10 CONSTANT TEST2

: BB ." This is a test too" ;

' AA DUP . 120 DUMP (RET)
```

The first four lines provide us with several new definitions to examine – ' (called Tick) finds the address of the first word (AA), which is then DUPlicated and . (printed). We then DUMP 120 consecutive memory locations to the output device, in order to examine them. In the case of F88 we can use DUMP, XDUMP and YDUMP to examine the areas mentioned above.

## Forth in action

One of the long time supporters of Forth in Australia has been Ken Curry, the managing director of Energy Control in Queensland. Ken is negotiating with several Forth organisations in the US to obtain local reprint rights for appropriate articles.

One of these is especially interesting – a Forth controlled floppy disk certification machine which complies with ANSI specifications. Quoting from the introductory section of the paper –

*Forth offers special advantages in an interactive environment. Even an interpretive language, such as Basic, does not run at full speed interactively. Therefore, such applications as timing loops or controlling high speed A/D converters are impossible to implement interactively.*

*Forth is the only language that runs interpretively at full speed because it uses an interpretive compiler . . . Programmers who have tried Forth find that it can cut their development time by a factor of ten for equivalent assembly language programming, and by a factor of two for equivalent high-level language coding. The increase in productivity becomes even more apparent in sec-*

*ond and third generation models of the same product.*

## Letters

I received a letter from Dr Chris French, who is interested in some Forth routines for text sorting, numerical routines and a simple method of solving differential equations. The first two of these are fairly simply catered for by the examples provided with F-PC (F88). The third is not so easy. Is there anyone out there who has any routines for solving differential equations? I seem to remember from my tertiary days that there was a thing called the Runge-Kutta Method for integrating DEs, but the exact mechanism eludes me.

One of the most productive SuperComputer users is David Doupe, from up near Dorrigo in NSW. David does lots of exciting things with the SuperComputer (must be that clean country air). He has provided me with the source code screens for connecting a keyboard directly to the SuperComputer. He also gave me some routines to save dictionaries to the EPROMs. I will put these on the *YC* Bulletin Board as soon as it is resurrected.

Many thanks to those of you who have taken the time to write and let me know your views of the column. It appears that everyone wants something different – beginners want more of the beginners info, experts want something more challenging and those in the middle want something in between. I shall attempt to cater to all of these requests, although not necessarily in each column. For those advanced programmers, how about sharing some of your special interest routines with others? I would be glad to include them in the column. □

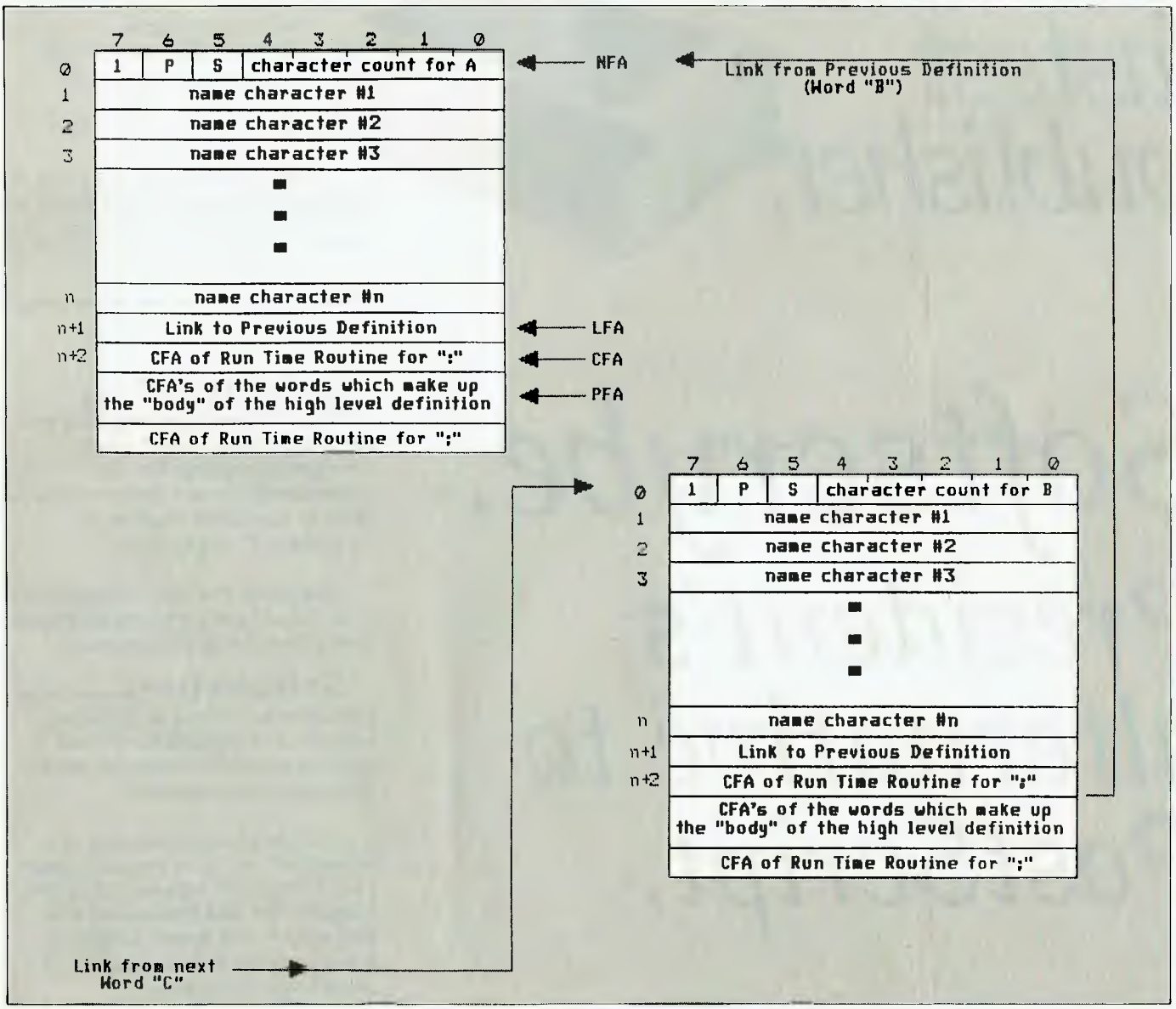


***Figure 1.*** *Construction of a typical Forth application – see text for definition of symbols used.*

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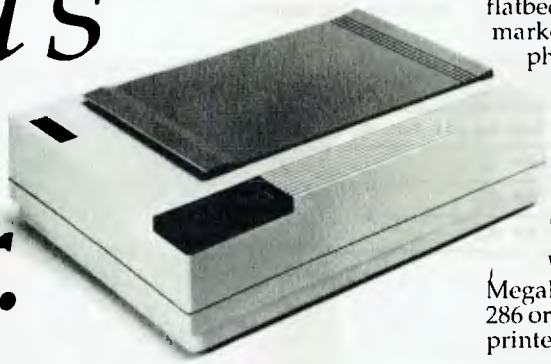

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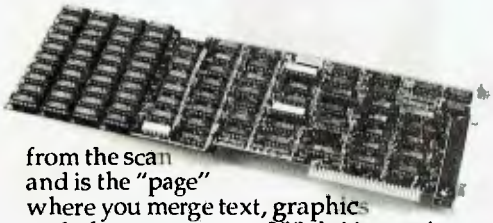

from the scan
and is the "page"
where you merge text, graphics
and photos to create a 300 dpi image in true WYSIWYG..

And with the full page in the Mega-Buffer, zooming, scrolling and pixel-editing are real-time operations.

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PETER PHILLIPS

# The news is not all good...

APPLEWORKS GS has arrived in Australia – the one all GS owners have been waiting for. After having spent more time than I intended with a review copy of the program, I have good news and bad news. First the bad . .

Initially I thought my copy might be faulty, but after talking to my colleagues, and even trying a second review copy, I'm convinced the software is faulty. The ironical part is that on the very day I'm writing this rather perturbing news, Dataflow, the Australian distributor, is releasing it. It was my rather unhappy task to alert Dataflow to the problems – the company has promised to follow up my comments.

I have also informed Apple Australia, which admitted to receiving similar comments from other reviewers. Normally, software bugs don't really rate as news; the bugs are either fixed or the software dies. But this package is the big one – so finding serious bugs is news.

The problems I have had range from the program actually hanging (this happened fairly regularly), to idiosyncratic behaviour. However, after substituting my GS/OS system disk for that supplied by Claris, things settled down a bit. There were still a few nasties, like graphics returning with some colours missing after saving the file, or slow operation when the function being performed was fairly basic, but at least it didn't hang. Unfortunately, my copy of GS/OS isn't configured to access the 5¼ inch drive in slot 6, so I was back to single disk operation, which created other problems.

Like any responsible writer, I am obliged to really test out software before commenting on its merits or faults. Credibility is the name of the game, and it requires a lot of time and effort. In this case, it paid off by highlighting problems that only tend to show up when files get large.

But what about the US? I've read several reviews from the American press, none of which refer to any problems. My only conclusion is that there is some subtle difference in GS computers shipped to Australia compared to those sold in the US. I have no idea what the differences, if any, might be. Maybe a ROM difference, or a hardware change that has only been implemented in recent times. My GS is one of the originals – a Woz limited edition in fact, although I have had the ROMs updated since then. Whatever the reason,

*Credibility is the name of the game, and it requires a lot of time and effort.*

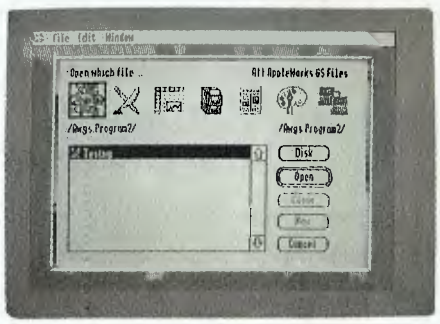
Appleworks GS doesn't work on my GS. And nobody is more disappointed than I am . . .

Okay – that's the state of play at the moment I'm afraid. But behind these problems is a fabulous program – and that's the good news. The system disk needs an overhaul and the program needs some fine tuning. If all this is done then Claris have a winner. If not – a bomb.

## Overview

Appleworks GS is actually a renamed version of GS Works; a program developed by Styleware. Claris bought Styleware before GS Works was ever released, then set about putting the program through 'extensive quality assurance' testing.

Basically, Appleworks GS (I'll shorten this to AW GS) is a six-application, fully integrated software package that uses the popular Mac-like interface (mouse driven and full colour) for the Apple IIGS. It comes on three 3½ inch disks, one disk containing the GS/OS system (modified by Claris), another the AW GS program, and the third (the utilities disk), an 80,000 word spell checker and a 470,000 synonym thesaurus.




*Appleworks GS is a renamed version of GS Works, developed by Styleware. It is a six-application, fully integrated package that comes on three 3½ inch disks, one disk containing the GS/OS system (modified by Claris), another the program, and the third (the utilities disk), an 80,000 word spell checker and a 470,000 synonym thesaurus.*

The program requires a minimum of 1 Mbyte of memory (make sure the RAM disk is set to zero) and, ideally, two 3½ inch drives. A hard disk is really the best way to go, as this is a large program – beyond the capabilities of a single drive machine. It also needs a colour monitor, and, so far, only supports the Imagewriter or Apple Laser printers.

It comprises a word processor, data base, spreadsheet, page layout, graphics designer and a communications module. The program is compatible with Appleworks, although the extra features of AW GS mean the compatibility is one way only.

Everything is mouse operated, in colour and is based on the concept of complete integration between the six applications. Appleworks always boasted this feature for its three applications, but it was really a bit awkward at times. With AW GS, sections of files can be easily transferred from one application to another using the clipboard, or by 'dragging' between windows. There are some limitations, but it is generally excellent.

I don't intend to review the package fully, due to space limitations. Also, I would be duplicating effort being expended by other writers for *Your Computer*. So, just a quick rundown.

## The main three

Users of Multiscribe or MacWrite will notice some similarity to the word processor in AW GS. In fact, Multiscribe files are compatible with AW GS, as are ASCII files and Appleworks files. Text formatting is done with 'rulers', which display the margins, tab settings, and hanging indents with pointers on a scale marked in inches. Icons for centering, justifying and line spacing are also on the ruler. To format a section of text, you simply 'select' it by dragging the cursor over the text, then adjust pointers on the ruler, and/or click the appropriate icon. Because the processor is a WYSIWYG, you can't go wrong.

Spelling and synonym checks are built in, although I got a bit lost with all the disk changing. In fact, the whole spelling and synonym section of the program needs some fixing. For example, when spelling is requested, it asked for disk '/',

which I figured, by trial and error to be the AW GS Program disk. Sometimes I had no problem, other times it misbehaved sumpin' awful. A nice feature is 'statistics', which gives a character, word, line, paragraph and page count of the document.

I have always been a great fan of the Appleworks database so I applied the test of loading in an Appleworks data base file with some 800 entries. The first time round I was told there wasn't enough memory (this never happened in Appleworks), even after emptying the desktop. I figured I had too many application programs in memory and decided to reboot. This time, after a bit of fiddling around, I was successful.

Most of the original Appleworks functions are incorporated, enhanced now by mouse operation. I soon learnt how to edit, add data, arrange categories, search, delete and do all the things that previously required the pressing of two keys (if I could remember them).

What I particularly liked was the ease of taking data from the data base to the word processor. All you need do is select the desired text and paste it to the clipboard for later retrieval in the word processor document.

I applied a similar test to the spreadsheet, by loading in a fairly large file. There were no problems this time and the usual easy transfer of text to the word processor was again a great feature.

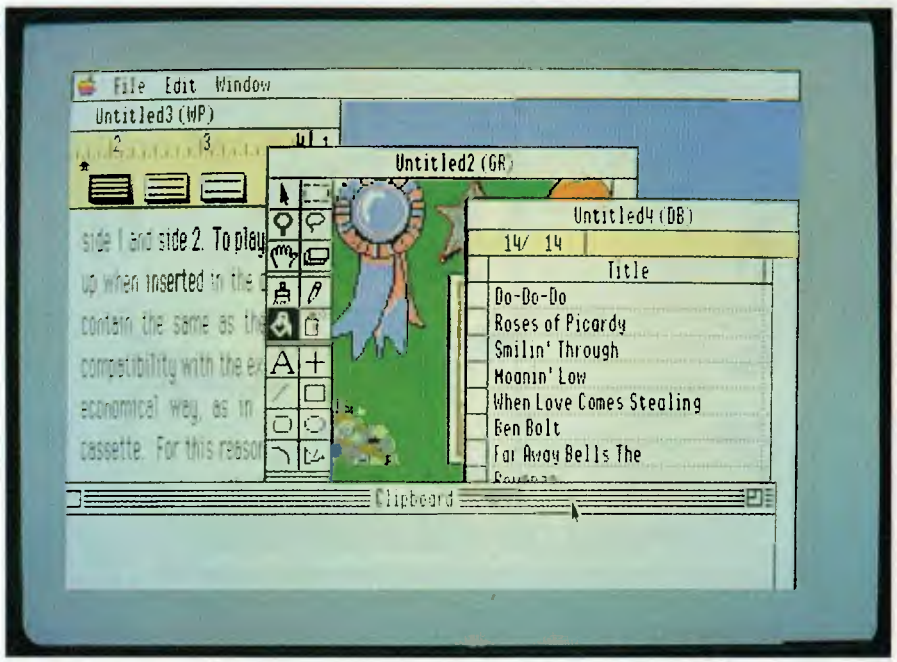
Although I didn't try it out, it is possible, according to the manual, to type data into the word processor for use in either the data base or the spreadsheet. All you do is space each cell or field with a tab space, then copy the text to the clipboard for subsequent retrieval in the other applications.

Additional features compared to the Appleworks spreadsheet include trigonometric maths functions and chart generation, which allows you to generate a pie chart, bar graph or line graph from the spreadsheet data.

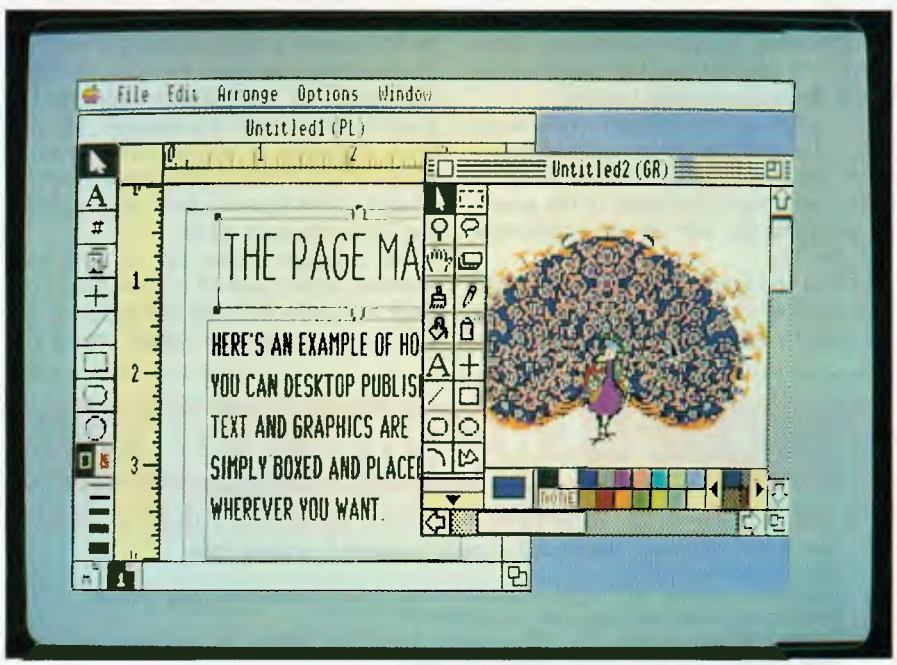
Large spreadsheet documents can be printed either by using the sideways print orientation, or by splitting the document into 'pages' that can be printed separately then joined together afterwards.

## The graphics

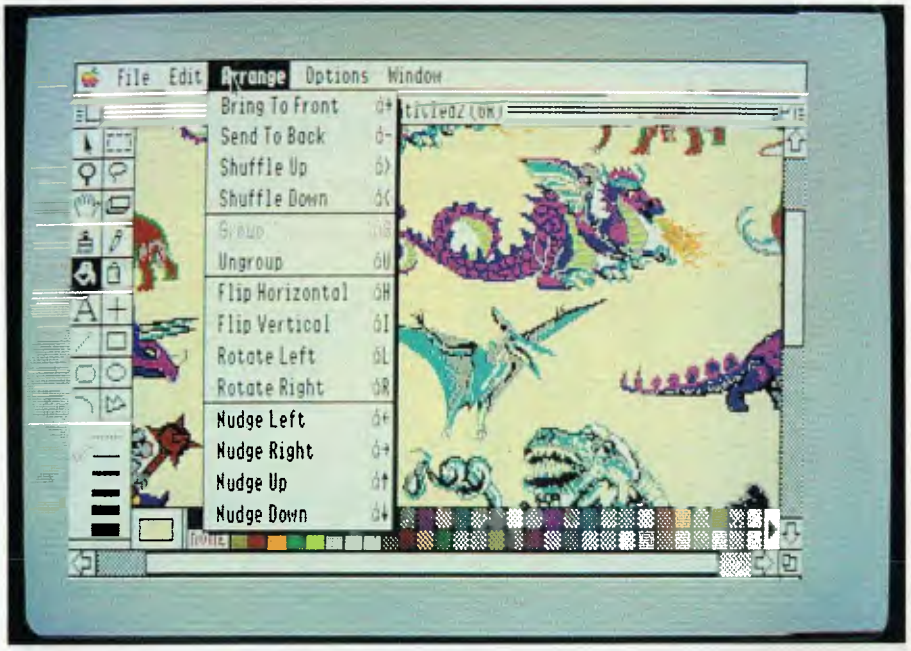
I'm lumping the page layout application and the graphics module together here, although they are separate modules. Most GS graphics packages are similar in operation – almost a case of seen one, seen 'em all. The graphics application in AW GS is




*Up to 14 files (windows) can be present on the desktop, and selection is made with the mouse and a pull down menu. You can have several windows (reduced in size) on the screen at once, and can 'drag' text or graphics between them. It is therefore theoretically possible to be simultaneously involved in any or all of these applications; integrate nicely into the page layout module, which is virtually a desktop publisher.*




*Appleworks desktop publishing module is amazingly versatile, because, in effect, the entire package supports the page layout module. For example, you can draw a picture in the graphics module, prepare text in the word processor, set up a table in the spread sheet, and combine the lot in the page maker. The program allows you to work with sections of the page, or to view the whole page in a reduced form.*




*The graphics module was the worst behaved of the six, in that it hung the most, or took forever to fulfill the function.*

no exception, although the colour palette editor takes some getting used to.

The usual tools are available, such as a pen, brush, eraser, spray can and a magnifier. A lasso and a 'select' rectangle are used to delete, copy or cut sections of the picture. In general, all the features you would expect, and some besides.

I imported a picture done in Paintworks Plus, although the colour palette didn't come with it, giving rise to rather weird colours. Claris state that most of the graphics programs for the GS are compatible with AW GS.

I found the graphics package the worst behaved of all the modules, in that it hung the most, or took forever to fulfill the function. However, if Claris attend to this, the graphics section should prove to be most versatile and useful.

Desktop publishing is very popular these days, and having this application in AW GS seems almost too good to be true. It is amazingly versatile, because, in effect, the entire AW GS package supports the page layout module. For example, you can draw a picture in the graphics module, prepare text in the word processor, set up a table in the spread sheet, and combine the lot in the page maker.

The program allows you to work with sections of the page, or to view the whole page in a reduced form. The program decided to visit the never-never land a few times, but was better behaved when I used my own system disk. Despite this, I am very impressed with this module.

## Communications

None of my old communications programs seem to work with the GS, even with an original card in place of the in-built GS serial port, so the communications application was actually the first one I tried.

I hooked up a null modem connection between my GS and IBM computers, and soon had them talking to each other. I was then able to transfer Appleworks files and any ASCII file using various baud rates without any problems.

The communications package seems quite powerful, and supports various protocols. Auto dial and redial is supported, as are Hayes and Apple modems. Xmodem, Ymodem, Binary II and ASCII file transfer formats are also available.

## Summarising

I will leave it to other reviewers to expand on my summary of this mammoth program as there will undoubtedly be a lot said in coming months. I believe the program is fantastic, despite the problems that I have had. It has so much potential and is so bloomin' easy to use.

The program is being distributed in Australia by Dataflow, which supplied the review copies and support information. The recommended retail price is $396, and $299.95 for schools. However, you can upgrade your old Appleworks or Multiscribe disks to AW GS for $249.95 ($159.95 for schools).

What ever the problems are, they must, and no doubt will be fixed (Dataflow has advised me that Version 2.0 is now available). My advice is wait – give Claris a chance to get it right. □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A PCW8256 owner, J. Bell, from Engadine, NSW, says that Grace Brothers, in Sydney and Roselands, have a limited range of OCW software. This includes Computer One Spelling Checker, a dictionary with over 63,000 words, and the ability to add more; Iankey, a 'crash-course' in typing, and a two-cassette product called Reel Time, which is designed to teach a beginner to use the Locoscript word processing program.

Strategy Software, PO Box 11, Blackman's Bay 7052 Tasmania, sells a wide range of Amstrad software CPC and PCW software. Write and ask for its latest catalog.

## Automatic Basic

From Condobolin in NSW, Bob Abel, writes that after five years of using his Microbee, he finally decided to invest in a PC1512. 'Until recently I had programmed mostly in Basic,' writes Bob, adding that he has purchased GWBasic for his computer. 'The bookkeeping program I have written for my own use is as old as my Microbee.

'At present, under MS-DOS and GWBasic, my program is much more sophisticated than it used to be, and the following idea was developed in order to speed up access from one part of the system to the other.

'Briefly, I put a line in the CONFIG.SYS file, DEVICE=RAMDRIVE.SYS 128; when executed on bootup, this installs a 128 K ramdrive, which will be known as drive C: if you don't have a hard disk, and as drive D: if you do.

```
10 REM FLIPPER
20 DIM A(10),F(4)
30 M = -1:Q = 42:X = 88:P = 0
40 FOR C = 1 TO 9
50 A(C) = Q
60 IF INT(RND(1) + .5) = 0 THEN A(C) = X
70 NEXT C
80 GOSUB 260
90 M = M + 1
100 N = 0
110 FOR C = 1 TO 9
120 IF A(C) = X THEN N = N + 1
130 NEXT C
140 IF N = 1 AND A(5) = X THEN 340
150 IF M ) 0 THEN PRINT:PRINT "That was move"M
160 PRINT:PRINT "Number of X is"N
170 PRINT:PRINT "You only need one - in
    the middle square"
180 PRINT:PRINT "Which one do you want to flip?"
190 IF INKEY$ () "" THEN 190
200 A$ = INKEY$
210 N = VAL(A$):IF N(1 OR N)9 THEN 200
220 P = N
230 GOSUB 370
240 GOTO 80
250 END
260 CLS:PRINT:PRINT
270 IF P () 0 THEN PRINT "You flipped"P
280 PRINT:PRINT:PRINT "1  2  3",CHR$(A(1));"
    ";CHR$(A(2));" ";CHR$(
290 PRINT
300 PRINT "4  5  6",CHR$(A(4));" ";CHR$(A(5));"
    ";CHR$(A(6))
310 PRINT
320 PRINT "7  8  9",CHR$(A(7));" ";CHR$(A(8));"
    ";CHR$(A(9))
330 RETURN
340 PRINT:PRINT
350 PRINT "You solved it in just"M"moves"
360 END
370 IF A(N) = X THEN RETURN
380 IF N = 1 THEN F(1)=2:F(2)=4:F(3)=5:F(4)=10
390 IF N = 2 THEN F(1)=1:F(2)=3:F(3)=10:F(4)=10
400 IF N = 3 THEN F(1)=2:F(2)=5:F(3)=6:F(4)=10
410 IF N = 4 THEN F(1)=1:F(2)=7:F(3)=10:F(4)=10
420 IF N = 5 THEN F(1)=2:F(2)=4:F(3)=8:F(4)=6
430 IF N = 6 THEN F(1)=3:F(2)=9:F(3)=10:F(4)=10
440 IF N = 7 THEN F(1)=4:F(2)=5:F(3)=8:F(4)=10
450 IF N = 8 THEN F(1)=7:F(2)=9:F(3)=10:F(4)=10
460 IF N = 9 THEN F(1)=8:F(2)=5:F(3)=6:F(4)=10
470 FOR G = 1 TO 4
480 F = 0
490 IF A(F(G)) = X THEN F = 1
500 IF F = 1 THEN A(F(G)) = Q
510 IF F = 0 AND A(F(G)) = Q THEN A(F(G)) = X
520 NEXT G
530 A(N) = X
540 RETURN
```

***Listing 1.*** *Flipper is a rather intriguing game which can provide you with a considerable degree of mental stretching. When you run the program, you'll see a mix of X and * on a three by three grid. You have to end up with an X in the middle, and eight * surrounding it. Enter the number of the place you want to 'hit' with your flipper. Flipping a corner piece causes those adjoining it to change into their opposites (that is, an X becomes an *, and an * becomes an X). Hitting the middle piece on a side with your flipper causes the two on either side of it to change, and hitting the middle piece changes the middle pieces on each of the sides. The piece you hit always changes in each case. This listing is for CPC machines.*

*You enter the number of the place you want to 'hit' with your flipper.*

'My AUTOEXEC.BAT file then orders the copying of GWBasic and the menu of the book-keeping system (all of which is also on the disk) into the new drive 'C:', then changes the default drive to C: and issues the command GWBasic MENU.'

Bob points out that any Basic program can be used instead of the MENU.BAS he uses, so long as its size permits it to co-exist in the ramdrive along with GWBasic. He concludes with the advice: 'If you do use a menu in this way, make sure the programs on the menu know where to find MENU.BAS themselves when they are finished. They should all exit with the line RUN C:MENU.'

If you have expanded memory, and you put the whole system in ramdrive, the speed increase is phenomenal.

```
'FLIPPER- Amstrad PC
DIM a(10),f(4)
m = -1:q = 42:x = 88:p = 0
FOR c = 1 TO 9
  a(c) = q
  IF INT(2*RND) = 1 THEN a(c) = x
NEXT c

LABEL start_here
GOSUB print_out
m = m + 1
n = 0
FOR c = 1 TO 9
  IF a(c) = x THEN n = n + 1
NEXT c
IF n = 1 AND a(5) = x THEN GOTO solved_it
IF m ) 0 THEN PRINT:PRINT " That was move"m
PRINT:PRINT " Number of X is"n:
PRINT:PRINT " You only need one - in the
      middle square"
```

```
PRINT:PRINT " Which one do you want to flip?"
LABEL get_input
IF INKEY$ <> "" THEN GOTO get_input
LABEL read_it
a$ = INKEY$
n = VAL(a$):IF n<1 OR n>9 THEN GOTO read_it
p = n
GOSUB make_move

GOTO start_here
END

LABEL print_out
CLS:PRINT:PRINT
IF p <> 0 THEN PRINT " You flipped"p
PRINT:PRINT:PRINT " 1  2  3",CHR$(a(1));"
      ";CHR$(a(2));" ";CHR$(a(3))
PRINT
PRINT " 4  5  6",CHR$(a(4));" ";CHR$(a(5));"
      ";CHR$(a(6))
PRINT
PRINT " 7  8  9",CHR$(a(7));" ";CHR$(a(8));"
      ";CHR$(a(9))
RETURN

LABEL solved_it
PRINT:PRINT
PRINT " You solved it in just"m"moves"
END

LABEL make_move
IF a(n) = x THEN RETURN
IF n = 1 THEN f(1)=2:f(2)=4:f(3)=5:f(4)=10
IF n = 2 THEN f(1)=1:f(2)=3:f(3)=10:f(4)=10
IF n = 3 THEN f(1)=2:f(2)=5:f(3)=6:f(4)=10
IF n = 4 THEN f(1)=1:f(2)=7:f(3)=10:f(4)=10
IF n = 5 THEN f(1)=2:f(2)=4:f(3)=8:f(4)=6
IF n = 6 THEN f(1)=3:f(2)=9:f(3)=10:f(4)=10
IF n = 7 THEN f(1)=4:f(2)=5:f(3)=8:f(4)=10
IF n = 8 THEN f(1)=7:f(2)=9:f(3)=10:f(4)=10
IF n = 9 THEN f(1)=8:f(2)=5:f(3)=6:f(4)=10
FOR g = 1 TO 4
  f = 0
  IF a(f(g)) = x THEN f = 1
  IF f = 1 THEN a(f(g)) = q
  IF f = 0 AND a(f(g)) = q THEN a(f(g)) = x
NEXT g
a(n) = x
RETURN
```

***Listing 2.*** *Flipper for PCs running Basic2.*

## Re-inking ribbons

Allan Barry in Yellow Rock, NSW, has discovered a low-cost way of getting around the fast-fading print from a used ribbon on the Amstrad DPM2000 printer.

Allan writes: 'After the excitement of having the first printout from your computer on the DPM 2000 has worn off comes the realisation that the print quality from that skimpy band of ink ribbon on the printer also soon begins to fade, and its time to pay another $15-$20 for a new ribbon.

'I think, however, I have now found an economical solution – re-inking. I found a source of 'lubricant ink for the dot matrix' in Aussoft, Cleveland in Queensland. The company informed me that the re-inking devices which it had were unsuitable for the DPM 2000, and suggested how to go about re-inking the ribbon myself. For under $10, the helpful staff posted me a small plastic bottle of ink.

'To actually apply the ink to the ribbon, proceed as follows. First, set the computer to get the printer busy for a while. Load the printer with several pages of scrap computer paper, then boot up the computer, type <graphics/r>, and then with a suitable graphics program loaded to a < Shift Prt Sc> screen dump.

'Once this is underway, and the ribbon is moving in the printer, comes the time to actually apply the ink! The ink comes with a special top which, when twisted carefully, allows a small amount of ink to be applied directly to the ribbon. I decided that the best spot was on the right hand side of the print head.

'So you apply the ink directly to the moving ribbon, smoothing out any of the bigger blobs with a match. Keep at it until it looks fairly even around the entire ribbon. The print out looks pretty messy, but once the ink has been absorbed by the ribbon, it evens up very well.

After all this marathon work, Allan reports that his current ribbon is still working well after five complete 're-inks', and shows no sign of wearing out.

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 also 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. □

```
10 REM MULTIPRECISION FACTORIALS
20 REM FACTOR.BAS
30 CLS
40 DIM Z(3000),M(3000)
50 INPUT "WHICH NUMBER";A
60 B=1:Z(1)=1
70 PRINT:PRINT "Please stand by..."
80 FOR C=1 TO A
90 D=0
100 FOR E=1 TO B
110 Z(E)=Z(E)*C+D
120 D=INT(Z(E)/10):Z(E)=Z(E)-10*D
130 NEXT E
140 IF D=0 THEN 170
150 B=B+1:Z(B)=D:D=INT(Z(B)/10)
160 Z(B)=Z(B)-10*D:GOTO 140
170 NEXT C
180 PRINT:PRINT "Please stand by..."
190 T$=""
200 K=0:M=-1
210 FOR J=1 TO B
220 K=K+1
230 M=M+1:IF M=3 THEN M(K)=44:M=-1:GOTO 220
240 P=Z(J)+48
250 M(K)=P
260 NEXT J
270 PRINT STR$(A);"! IS ";
280 FOR J=K TO 1 STEP-1
290 PRINT CHR$(M(J));
300 NEXT J
```

***Listing 3.*** *The exclamatory factorial – I have previously pointed out how calculations of virtually any degree of precision could be carried out if they were done one digit at a time, and each digit was saved in its own element in an array. As a further development of that idea, this listing (which runs on both the CPC and PC models) can be used to calculate factorials. As you probably know, a factorial number is shown by following the number with an exclamation mark, so 5! is factorial 5, and 27! is factorial 27. To work out a factorial number, you calculate the product of all the numbers starting at 1 up and including the number itself. Factorial numbers grow at a distressing rate. While 5! (which is 1 x 2 x 3 x 4 x 5) is just 120, 9! is 362,880. And 99! is 156 digits long, with 768! some 1882 digits long (and taking several hours of computer time to calculate). You can prove this with our program.*

# DICK SMITH ELECTRONICS

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GREGG FAULKNER

# SCSI, transputers and the 500!

*A 68030/68882 board for the Amiga 2000 (and upwards) which supports a megabyte or two of 32 bit memory will produce performance comparable to a VAX minicomputer.*

AS I PROMISED last month, I'll start this month with a report on the meeting I enjoyed with Tony Cuffe, Commodore's Amiga Product Manager for Australia. To my delight I discovered that Cuffe is not merely a 'marketing type' but is a real computer (read Amiga) enthusiast. He speaks proudly of the 'super Amiga' which lives on his desk, with its multiple hard drives, massive memory, flicker-fixer card.

The keynote of the discussions with Cuffe was the restructuring of the Commodore organisation in this country. Commodore will continue to market the C64, C128 and Amiga 500 through its established dealers as well as through mass outlets such as K-Mart and Grace Brothers. In Cuffe's words, these machines will be sold 'the same way as a box of chocolates or a pair of socks'. The huge sales volumes anticipated should enable the Amiga 500 price to remain stable or even drop in the forcible future.

The Amiga 2000, 2500 and forthcoming Amigas and Commodore's IBM compatible machines will be distributed by Commodore Business Machines, and will be retailed only through carefully selected specialist outlets. Commodore Business Machines (hereafter called CBM) are very serious about attacking the business and Government markets. Its strategy is quite straightforward.

The Commodore 80286 and 80386 powered IBM compatibles will spearhead the business thrust. Amigas will be introduced into market niches where their graphics, desktop publishing and animation capabilities are best suited. CBM is confident that once business users are exposed to the Amiga's multi-tasking operating system and friendly workbench interface, they will become hooked.

The Amiga 2500 in a form known to the Australian Public Service as the CBM A2020 is one powerhouse machine. Based on the Amiga 2000, it uses the 68020 chip running at 20 MHz on the Amiga side and a 80286 chip to power the PC/AT bridgeboard. This machine is now available on the Public Service's PE 30 Panel Period Contract (listed at $7373 complete – makes you weep!) and is selling like hotcakes to various Departments.

I, for one, hope it succeeds. After a year or so of using the 2000 in my day to day work I would be totally lost without it. In fact I became so keen on the 2000 that I recently sold my old faithful 1000 and moved up to the 2000.

## Ripped-off (almost)!

I had lodged an advertisement in my local fishwrapper for my 1000. The advertisement was due to be published on Saturday and I planned to go about shopping for my 2000 during the following week. At lunchtime Friday, my mate George phoned me and, in the course of conversation, asked what I thought about the price increase for the 2000: 'What are you talking about, George?'

George informed me that he had been talking that morning to X (a Commodore staffer who shall remain unnamed) who had told him about the price rise scheduled to take effect from the following Monday: old price $2995, new price $4995. What to do? A quick phone call to my (then) favourite dealer: 'Do you have an Amiga 2000 B model in stock and how much is it, please?'

The gentleman on the other end of the phone informed me that the price was $4995. 'What!!' said I. 'Isn't the 2000 about $3,000 ?' 'Oh, no,' said he. 'There was a price increase *last* Monday.' I

It's blatant lies like that which convert favourite dealers to ex-favourite dealers in double quick time! When I pursued the matter, he offered to check whether they might have one machine left at 'the old price'. After five minutes or so he returned to the phone to tell me that I could buy one at the 'old price' if I hurried in and bought it that very day. (I won't bore you with the details of my begging and crawling on the floor of the loans department at Commonwealth Bank Woden. Suffice it to say that I scraped together the necessary and rushed to Fyshwick *tout de suite*.)

The moral of the story involves the timing of the price rise. According to my reliable sources, CBM raised the price of the A2000 effective Monday the 19th. The salesman tried to convince me that the price rise was effective Monday the 12th. I wonder how many less well informed purchasers were ripped off by the same sort of sales ploy. This sort of practice doesn't do the industry any good at all and it may be some time before I do any further purchasing from that store.

As for the price rise itself, CBM inform me that, due to the very high price of Dynamic RAM chips for the Amiga 2000's megabyte of memory, they have been operating on a very slender margin for some time and a price rise was way overdue. The higher priced machines are also supplied with two internal floppy drives instead of the original one.

(Another whisper I heard has it that CBM became aware that a 2000 at $2995 could be upgraded to the same specs as an Amiga 2500 for rather less than the cost of a 2500.)

I have my own theory about the new pricing. As CBM move into more aggressive marketing of the 2000s it intends to retail the machines in direct competition with the Apple Macs and the IBM PS/2s. At $4995 the Amiga 2000 still represents pretty good value compared to these other machines, and at that price CBM can offer the retailer a fat enough commission to make it well worth their while to push the Amigas. There might even be enough left over for CBM to make some more of those atrocious and grossly overpriced ads unnecessarily featuring J. Laws Esq.

If I could be so bold as to make a suggestion about advertising, Messers CBM. How about a nice simple ad showing an Amiga 2000 doing what it does best – running multiple tasks simultaneously. Show its fantastic graphics and animation. Show it producing brilliant full-colour desktop published documents. Show how an IBM PC/AT compatible computer can be run as just one of several simultaneous tasks under AmigaDOS. Let the damned thing sell itself and forget the idea that you need a 'credibility' figure like John Laws. With the money you save (and we're talking seven digits here!) invest in improved customer support and maybe even a remodeled Club Amiga.

Give me a minute to climb down off my soapbox and I'll continue with the news about my meeting with Tony Cuffe. There was some interesting news for Amiga 500 owners. A couple of exciting peripherals to add speed and power to your machine when you're ready to move up from playing games. One device is a box which will plug onto the expansion port on the left end of your 500. The box will contain an extra megabyte of RAM and a controller for SCSI devices.

## SCSI

SCSI (pronounced 'scuzzy') is an abbreviation for Small Computer Systems Interface and it has become the most popular way of connecting such things as hard disks, optical disks and exotic tape drives to a microcomputer. A SCSI interface opens up a whole world of available (and reasonably priced) peripherals. SCSI peripherals can be daisy-chained so that up to eight devices can be strung off one controller.

*It's blatant lies like that which convert favourite dealers to ex-favourite dealers in double quick time!*

If Commodore can release the device at a competitive price it should make a killing and a whole lot of happy customers at the same time.

Other soon to be released peripherals include a large screen non-interlaced hires monochrome monitor – just the thing for desktop publishing specialists. The large screen should permit full-page or even double page display *a la* the large screen Macintosh display.

A 68030/68882 board for the Amiga 2000 (and upwards) which supports a megabyte or two of 32 bit memory will produce performance comparable to a VAX minicomputer. Commercial animators and video production facilities will appreciate the incredible graphics handling power of this combination. Complex ray-traced images will be produced in a small fraction of the time required by the standard 68000 powered machines.

For those whose need is for speed, a Transputer card is soon to be available for the 2000 range. Forget about minicomputer speeds. The world of transputers takes micros well into the realm of mainframe crunching capability. Of course it all comes at a price and I doubt we'll see too many home Amigas sporting Transputer cards – well not those of us who have to work for a crust anyway.

The importance of all this exotic carryon is related to the ever increasing number and range of uses to which Amigas are being put. Every time someone finds a new application for the Amiga, all Amiga owners benefit from the increased range and choice of software which becomes available.

Obviously, some software developed for use on an Amiga 2500 with a Transputer card will not be usable on a 500 with standard 512 Kbyte memory, but some will be. And the sort of people who will be developing software for such a machine are likely to be involved in some pretty interesting fields. The prospect for some very exciting new software looks good.

## Comic Setter

Back to earth, Gregg. This month's images were produced by a rather neat package called Comic Setter from Gold Disk, the makers of Page Setter and more recently Professional Page (reviewed by Robert Thirlwell in the January issue).

Comic Setter allows the production of traditional style comics using the familiar frame and speech bubble presentation. As you would expect from Gold Disk, the quality is good. The package does what it does very well, without drama, and the manual is easily readable and understandable.

As is obvious from the images, colour is well supported and, of course, the package talks IFF graphics format. Lots of fun for those of us who have always wanted to create comic style presentations but were not blessed with Da Vinci's ability.

Cheers for now. □

*Comic Setter allows the production of traditional style comics using the familiar frame and speech bubble presentation. The package talks IFF graphics format and does what it does very well, without drama, and the manual is easily readable and understandable.*

RITA PLUKSS

# Faster STs!

THE ATARI ST has an inbuilt accessible palette of 512 colours. There are various art programs on the market that increase the colour range even further, but unless your colour monitor is set to distinguish between each one of these colours you do not have access to the full range of colours possible, regardless of the number of colours the computer can generate. There is no point having the colours available if your monitor cannot or does not show them.

Most colour monitors (regardless of make or model) have been set too high, that is, they do not show the bottom end of the colour range. You can check this yourself by loading in a paint program and setting the RGB values (red, green, blue) for eight colours as follows – 000, 111, 222, 333, 444, 555, 666, 777. This gives you six shades of grey, plus black and white.

Draw a large rectangle, divide it into eight areas and fill each area in the sequence shown above. You should be able to distinguish each shade from its neighbour. If you can't, then adjust your colour settings (brightness, value and so on) until you can.

For real accuracy check the four bottom values. Set another three palette spots to RGB values of 100, 010, 001. (The darkest red, the darkest green, the darkest blue). Draw another rectangle or box and divide it into four. Fill these boxes with black, dark red, dark green and dark blue. It may be difficult to see the differences in the colours, but they should be there. You should not have a solid black area but differing shades of very deep dark colours. If you cannot tell the difference between these colours, then your monitor is not giving you access to all the colours available on your standard ST.

This problem, together with the horizontal vertical aspect ratio mentioned in the January column, is not specific to Ataris. You will find, if you check, that most monitors, regardless of the computer they are hooked up, to have not been adjusted correctly. It is usually a case of near enough is good enough when they leave the factory, and very few people bother to check and adjust the original settings.

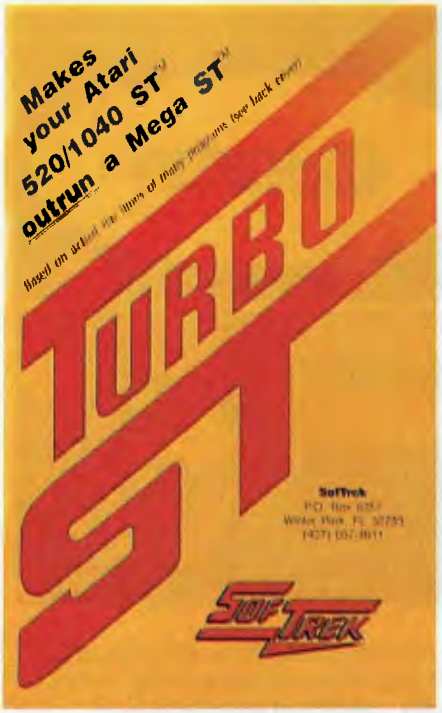
## The soft blitter and the blitter chip

We have been hearing about the fantastic blitter chip for some years now. I have yet to fully appreciate the powers of this wonderful chip, but I doubt that I will ever have one installed in my 1040ST. It's not that I am a doubting Thomas (I know the Megas have the blitter installed these days), it's just that for my purposes I found an alternative.

*I have yet to fully appreciate the powers of this wonderful chip, but I doubt that I will ever have one installed in my 1040ST.*

Turbo ST (by SofTrek) is a piece of software that gives you the speed of the blitter chip without having to go to the expense or the trouble of having it and the new ROMs to access the chip, installed.

*Turbo ST speeds up the display of characters, which means that any program that puts text on the screen without bypassing the operating system will run faster. This is very noticeable when flipping through pages of text.*




Turbo ST speeds up the display of characters, which means that any program that puts text on the screen without bypassing the operating system will run faster. This is very noticeable when flipping through pages of text. ST Writer's paging and scrolling speed is increased by 100 per cent (but there is no difference in the speed of graphics handling).

The reason Turbo ST increases the speed of text operation is that it optimizes GEM (the operating system of the Atari ST). The GEM environment is written in C, and although it is a powerful and user friendly interface, it is not as fast as it could have been. Turbo ST is written in 68000 Assembly language and intercepts some of the slower C-written GEM routines and reroutes them to the assembly code, thereby speeding up the process. And it works – I can see the difference (with my naked eye) between a Turbo power up and a non-Turbo power up.

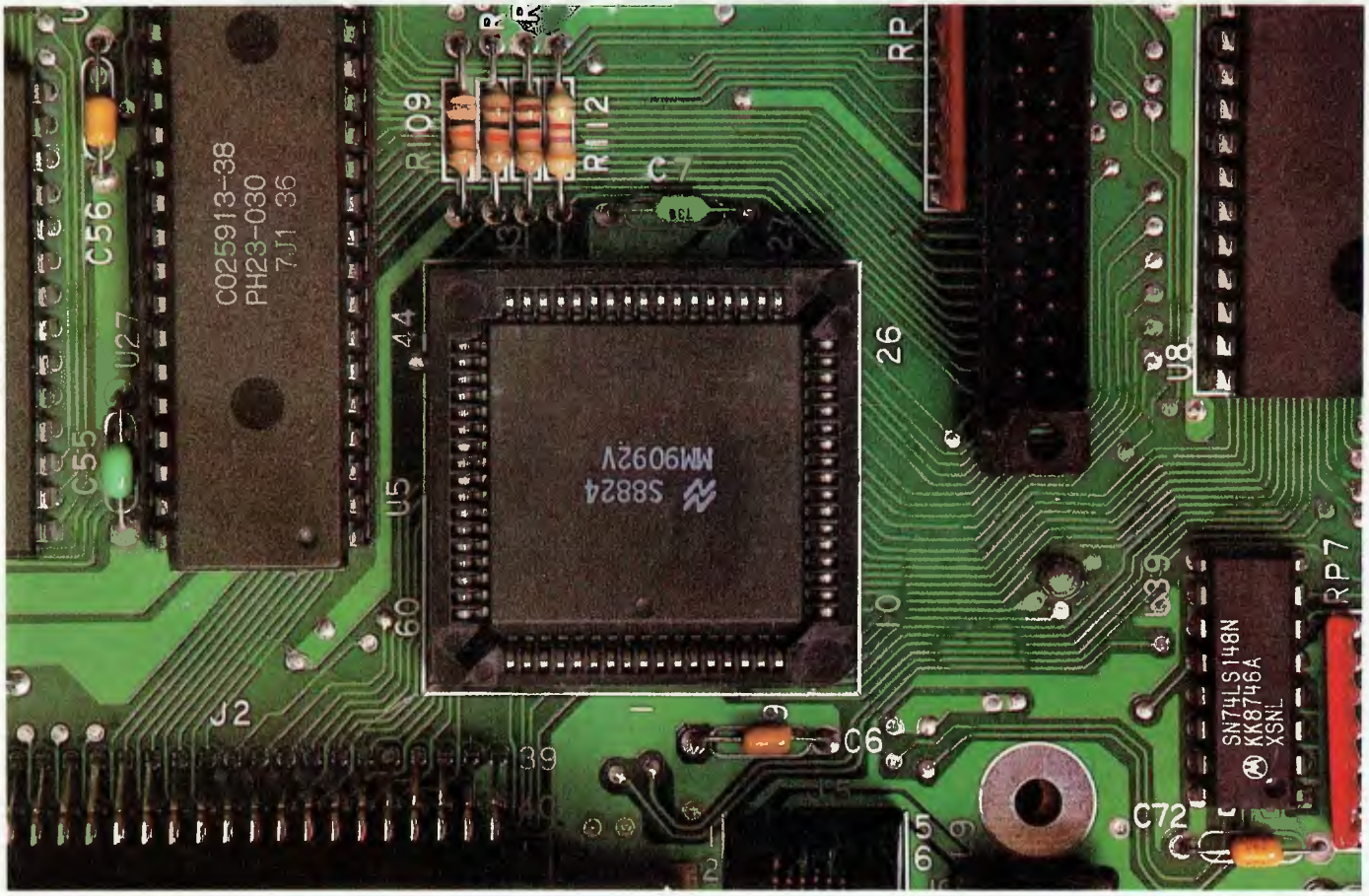
This nice piece of programming sits on the desktop as a desk accessory and is loaded in at bootup. Which means if you power up with Turbo ST and then find you don't want it around, just access the desk accessory and turn it off.

The blitter chip itself, once installed, also sits on the desktop and can be turned on or off as required (this option is provided as it is reported that some packages will not run with the blitter installed). The chip's main function seems to be graphics oriented in as much as it increases the speed (up to 25 per cent) of the GEM functions associated with line and box drawing. It takes over the block graphics manipulation tasks from the CPU. This, in turn, speeds up the block cut and paste operations, and allows faster work on programs such as Cad, drafting and art packages.

On reflection, perhaps one needs both the soft blitter (Turbo ST) for text manipulation and the hard blitter (blitter chip) for graphics manipulation. The only way to be sure about this is to test both and then decide what your main areas of use are and whether the associated costs of increased speed of operation will be cost effective.

## How to get faster, cheaper

If you are not into spending money but still want the speed, try running your programs from a RAM disk. This is a good al-




*The main function of the blitter chip (labeled S8824 in the photo) seems to be graphics oriented in as much as it increases the speed (up to 25 per cent) of the GEM functions associated with line and box drawing. It takes over the block graphics manipulation tasks from the CPU.*

ternative for those who cannot afford the luxury of a hard disk drive. There are a number of Public Domain and commercial RAM disks available.

Set up your RAM disk allow sufficient room to load in your application program (word processor, art package, database, whatever, plus enough room for your own files) and then start working. The speed of the program won't change, but every time you access the drive for reading or writing to disk it will be done with incredible speed.

Using a RAM disk is also an extremely good idea if your application program constantly reads or writes to disk (some data base programs are notorious for this). Not only does it save you time, but also wear and tear on your drive. The only problem is that you have to remember to save everything off the RAM disk back to your floppy disk before turning off the computer.

## Hard drives

If you are into spending real money for speed and storage, then keep reading. The SH205 20MB hard drive has been superseded by the Megafile 30 ($1415) and the Megafile 60 ($1695). These units replace the original Chinon drive with a Miniscribe mechanism. Apart from giving you more storage capacity the speed of operation has also increased – 40 ms against 65 ms. □

## New product lines

March 1989 at the Sydney PC89 show has been designated as the official Australian release for a variety of new product hardware lines. These include an Atari pocket PC, the Atari ST laptop, a 32-bit Unix workstation based on the Motorola MC68030 (TT68030 Unix Workstation) and the ATW Workstation.

The ATW (Atari Transputer Workstation) using the Inmos T800-20 processor and the Helios operating system with an estimated price tag of under $10,000 (no, that is not a misprint!) is designed for applications requiring accelerated high resolution graphics lots of memory, fast storage and networking capabilities. The main areas of use seem to be Cadd, animation, 3-D modelling, desktop publishing and artificial intelligence, but as the workstation's strengths and limitations are tested through usage, I'm sure this list will expand to encompass many more areas.

If all does go to plan and these products do make it to these shores in time for the Sydney PC89 show, go take a look at them. With this type of extension to the Atari line it looks as if someone up there is really serious about getting into the commercial and upper education markets. If Atari can pull this off, then watch them fly!

STEWART FIST

# SPLITTING THE II?

I'VE JUST SPENT a lot of time reviewing the new AppleWorks GS and, to put it mildly, I'm not impressed. There will be a lot of people who will think that I'm being overly harsh. 'You've got to expect a few bugs with a program that complex,' is what they will say.

But I think this is missing the point entirely. The program is too complex, not only for the programmers, but also for the computer and the users. And, to add to the problems, I could also make a case for saying that the computer is also getting too complex for the user – it is getting to the point where you need a couple of megabytes of memory and a 40 Mbyte hard disk!

## Imitating the Mac

If the Apple II series was the company's only product line, then you could accept and comprehend the direction that Apple has been taking with the GS. But with the Macintosh now a substantial player in the corporate market, and a raging success even from the company accountant's point of view, it is hard to see why Apple are trying so hard to imitate the Mac.

It is almost as if they see the GS as a junior-Mac-with-training-wheels, and this is a mistake: the Apple II series has always had a character of its own.

*The program is too complex, not only for the programmers, but also for the computer and the users.*

Not every car has to look like a Holden Commodore, and the unisex fashion is no longer *de rigueur* among the trendies, so why do Apples and Macs need to look and function alike. Why not just say *Vive la difference* and recognise the II series for what it is?

It seems to me that the Apple IIe, IIc and IIGS fit into a market range which broadly extends from the home hacker (in the original sense of the word) to the small business, with general-purpose home and educational use in between.

There are some isolated pockets of Apple II use in the wider computer market as well. For instance, the IIe is a favourite in universities and scientific research establishments because it is easy to design and make specialised plug-in boards for it, and so it is widely used for data capture in scientific experiments.

There is a similar application in electronic communications, and to a degree for machine control: it is an easy machine to adapt to a wide variety of specialised applications and, what is more, it is *reliable*. Telecom, for instance, use them for clocking up long-distance telephone charges because, as one technician put it, 'you can tap dance on the lid and they still keep running.'

And Apple IIs are reliable because they are relatively simple. I'm not talking just about the number of components, although this is a factor, but about the use of tried and tested, old-fashioned 8-bit technology – until the GS came along.

## Reliability . . .

Reliability isn't only in the hardware either. As a consequence of the limited addressable memory (theoretically 64 kilobytes, although this was partly overcome by bank-switching), Apple II programmers generally take the simple and straight-for-

ward way out. They use character-based screens rather than the memory-hogging graphic-based ones, and they keep applications small so that it is no big deal that the processing chip churns along at only 1 MHz.

And, so far, we've had no real hassles with the operating system. The old DOS 3.3 was reliable but antiquated, and the new ProDOS 8 chugs along pretty well. Personally, I think the present IIe with perhaps a bit more memory (512 Kbyte would be ideal) and at least one 3½ inch drive is pretty much all that's needed for a ideal general-purpose home, education or small-business computer.

I don't go along with the need for colour (although its nice to have for game-playing), and I think swinging hard disks on this machine is crazy – especially nowadays when you can put 1.4 Mbytes on a 3½ inch floppy. Also: mice are nice – sometimes – but, generally, keyboards are better.

I've never yet found a Macintosh program that is as simple and easy to use as AppleWorks. Even MacWrite, the most basic of all Mac programs does little more of substance than the W/P module in AppleWorks, but it needs an application size of 80 Kbyte, plus a big Finder, an enormous System, and 256 Kbyte of ROM to do it.

At present, there are strong rumours around that Apple are working now on a Super IIGS machine based around Western Design's new 65832 processing chip. The present IIGS uses the 65816 chip which gives it the hybrid 8/16-bit functions, and the new chip is said to extend this up to the 32-bit range.

What is more, the 65832 (which won't be in production until 1990) is said to be capable of running 8-bit, 16-bit and 32-bit programs, and have an addressable memory space in the multi-gigabyte range. So, finally, the Apple II line will be stretched to the level of the Mac.

But think about it! Any machine that has 8, 16 and 32-bit capability is necessarily going to be much more complex 'hardware-wise' than a straight 32-bit machine. And think about the necessary complexity of the operating system; or perhaps the term 'systems' is more appropriate. What is this going to do to the legendary reliability?

I think the designers and philosophers (at Apple and at many computer companies) get carried away with the idea of the 'universal machine', and with the need to constantly upgrade speed and memory size. They often can't leave well enough alone, and they think that it is far better to jam two functions into one machine, rather than have two machines each specialising in the one function.

## Fax boards

You can see this with facsimile at the present moment. Any reasonable plug-in fax board is going to cost you more than a cheap standalone fax machine, and it will only ever have half the functions – and even less functionality. One of the values of fax is that it is capable of transmitting handwritten notes, annotated copy, plans, drawings and so on; you can only get this with your PC if you have an optical scanner attached.

On the output side you've only got fax quality if you are feeding a laser printer. And then in terms of availability you will need to leave your computer linked permanently to its own phone line, ready to take incoming messages at any time. And you will only get this if you dedicate the machine or do all your work on a multi-megabyte PC with a Intel 386, or a Mac II with the Motorola 030 chip.

You need this level of machine to run a true multi-tasking operating system like OS/2 or the coming versions of the Mac's Multifinder. What you've had to do is quadruple your processing power to gain 10 per cent functionality for 1 per cent of your working time.

And remember. You are doing all this to avoid buying a standalone unit for about $2000 – which, incidentally, would also double as an multi-memory automatic dialer, second telephone, and (with some) a phone answering machine.

This 'universal machine' cult has gone too far already. I am quite happy to have

# Update

I RECENTLY obtained another copy (still supposedly version 1.0) of AppleWorks GS, and I've looked at it again. A number of people, whose opinions I respect, have used the program and don't think it's as bad as I do.

The second copy works much better than the first. It certainly doesn't hang consistently, but it exhibits a couple of other minor (but worrying) faults that I didn't see the first time.

On carefully comparing the two sets of disks, it appears that the system disk has been modified: the Last Modification dates don't match on a number of system files. Also note that the AppleWorks GS system disk has been greatly modified from the original GS/OX, which is the reason why phantom files appear (or disappear) depending on which system you've loaded. There are a whole mass of special files in the system-setup folder on the AppleWorks system disk that don't exist on the standard one.

My problems with the communications module seem to stem from the program not liking the NetComm Pocket Modem (although all my other programs do), and a couple of other 'hangs' may have been due to the program looking for a data disk and not finding one; but these are still genuine faults – the program shouldn't hang.

AppleWorks GS is a very complex program with all these modules and there are literally thousands of permutations, combinations and sequences of use, so no two systems (or one system used twice) will act the same. You'll find variations depending on how the startup was configured, how much RAM you've got and so on. It also doesn't work well with some third party RAM expansion cards, I hear.

I think some of my other problems came from loading four modules at start-up, and not leaving enough RAM space – but still, it shouldn't hang. Others were undoubtedly caused by the original system disk and/or the alignment of the planets that week!

This new version, I stress, is much more reliable that the first, especially when you give it space to work. But it still doesn't alter my overall impression of the program.

Peter Beard, manager of Claris Australia, advises that Version 1.1 was to be released in late February. Free upgrades will be available to those who have purchased AppleWorks GS Version 1.0.

my telephone as a standalone unit; I don't need it built-in to a Super IIGS. I would only buy a fax board if it were a fraction of the price of a comparable stand-alone unit. And I'm quite happy now to have my CD Audio player (at $199) as a separate unit to my CD ROM, and to feed my music through a standard amplifier, rather than through some multi-mega MIDI computer program which requires Multifinder to play music while I work.

I'm not objecting to all these programs and toys existing as add-ons to any computer, but they are novelties for hackers to play with, or status-symbols for businessmen, rather than serious applications or peripherals for workers.

So frankly, I'm quite happy to see Apple working on a Super GS with 32-bit capability, with total graphic/desktop screens in 16 million shades of colour and builtin MIDI quadraphonic sound with both hot and cold running water, but let's break it away from the Apple II line and not allow it to destroy what we've already got – a good, simple, fairly basic workhorse.

Instead of concentrating on deluxe refinements, I'd much rather see them looking at modular programming that will let me customise programs like AppleWorks – dispensing with features that I don't use, and adding things like simple macros and communications, that I do. We are still a long way from getting the IIe up to its full potential in a simple way, so why make life more complicated?

*What is the use of Multifinder when three-quarters of your programs need different system version numbers?*

## System and Finder

Next year Apple will finally come to the crunch with the Macintosh operating system. It's tried desperately to hold the Mac range together by additions and clever modifications to their System and Finder, but the present Version 6.0 for the Mac II seems to be as far as it can go. It has reached the stage where hardly any of the old programs work on the new system any more. What is the use of Multifinder when three-quarters of your programs need different system version numbers?

Apple now need to strike too many compromises to keep the old and the new Macs with the same system, and this is seriously limiting the way the Macintosh II can develop. Apple can't get the machine to anywhere near its full potential without discarding compatibility with the old Macs, so this year the operating system must undergo fission into two distinct entities. From here on, the Mac will effectively be run as two distinct computer lines.

It could be that we've reached this stage of development with the Apple II line as well, with the old 8-bit Apple IIs remaining behind while the 16/32-bit GS goes its own way. If this is so, then the quicker the Siamese Twins are separated, the better. □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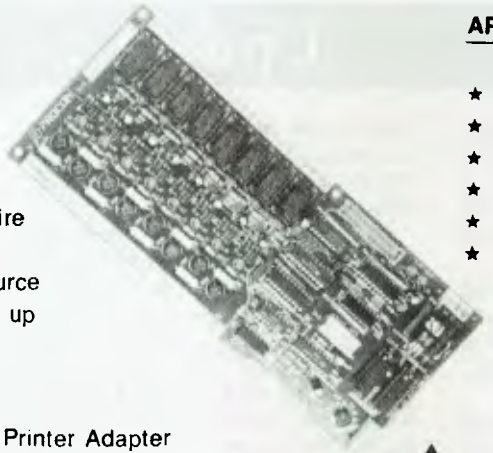

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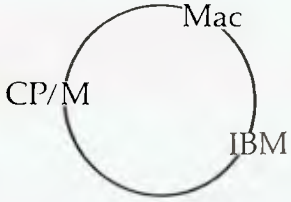


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**Listings:** Unless it is absolutely impossible, we want listings produced on the computer. This reduces the risk of error – if the computer typed it, the computer probably accepted it. Print listings with a dark – preferably new – ribbon on white paper, and try to format the output to a narrow (40 characters) width. If they can't be produced on a printer, borrow a good typewriter – hand-written material is likely to sit around the office for a year before someone can find time to type it all out for you! Please provide an account of what the program does, how it works and so on. Any comments on the program should refer to the address, line number or label rather than to a page number. Any comments on modifying the program to work on other machines will be appreciated. Try to include a printout of at least part of a sample run if possible.

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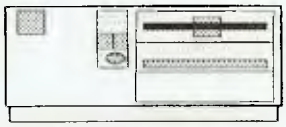

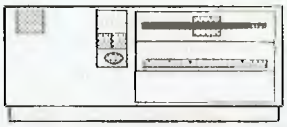

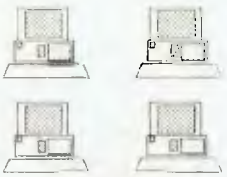

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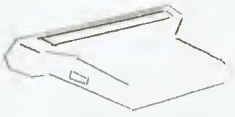

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MICHAEL BURLACE

# Cursory Glance

I WAS FLIPPING through a tech store's catalog the other day and spotted a radio with memory. Does that mean it plays only songs from the 60s?

■ The tutor for a course 'More about DOS' at Sydney Uni is Colin Mackintosh.

■ Will all this talk of viruses and worms lead to a new sort of warfare? While chemical warfare was in the news and biological warfare hid behind better-known forms of war, the computer germs were getting ready. Could Russia, China, Libya or any other country known to scare George Bush invade the commodity markets and wreak havoc? How long before insider trading is replaced by insider programming with the big investors using a run-time leverage to move the market their way? Could the money market be attacked by computer-generated trends fed in by financial or political foes? Sounds likely to me. Invest in gold bars and hide them under the bed, I say. Then again, send them to me for safekeeping. If nothing else they will go to a worthy cause.

■ The USA government is saving money on lighting office blocks by using a device which turns off all lights automatically. You have 12 minutes after all motion ceases in the office. If you fall asleep or leave, you will return to find that all is in darkness. Assuming you wake that is. Could be just the thing in some parts of our own government and some large moribund businesses — the ones which can't remember what the second part of Private Enterprise means.

■ A London TV shop owner had a problem with his display sets. He complained to a young beauty consultant who walked past his shop every day and apparently caused the interference. It turned out not to be her, but her bra. It was from a batch of 10,000 made with surplus electronic wire. This discovery solved thousands of Britons' problems with the Telly and their computer monitors. The combination of heat and movement of the wire's covering caused a static discharge sending things haywire.

■ A man phoned the San Diego Gas and Electric Co and asked that his electricity be cut off. As he was talking to the company, the area was blacked out. 'Not now!' he shouted.

■ Thurnham Hall, a stately 13th-century mansion near Lancaster in Britain has a modern touch. A two-metre robot dressed as an Elizabethan knight has replaced two human guides. Presumably the humans were more than a metre tall, otherwise it would have been a measure for measure. The owner, Stanley Crabtree, says kids used to get restless listening to humans and now they are attentive.

■ A Chinese appliance factory got sick of mice which were not being gobbled up by ordinary cats and solved the problem in an appropriate way. They invented the electric cat which zaps mice with a lethal jolt and then says 'Meow, Meow', or however that is written in Chinese.

■ Got your portable phone? Taken it to the beach yet? No? Boring, it's just the thing. And, if you have a pool, you can take calls in it with a new underwater swimming pool phone being sold in New York. You can take calls underwater, too. Great! Lots of people have difficulty communicating clearly at the best of times. Underwater, they wouldn't have a chance.

■ They renamed it before anyone noticed. AI 88 was once called the Australian Joint Artificial Intelligence Conference. Conjures up images of smoking illegal substances or of ASIO or . . . Take your pick, there are plenty of possibilities.

■ Silicon Graphics is offering a new series of workstations including 3-D ones. The entry-level 3-D version costs just $96,000. Start saving, by the time you have the money, you will be able to buy it for a song.

BOOTSTRAP: The latest service available from the computer chip is online at Rookwood, Sydney's historic and beautiful cemetery. You can now say goodbye to your loved one at the service, have the clods hit the box and the gravestone in place all in one day. This means your fellow mourners don't have to wait to see what you're saying about the old lag. There it is in finely-chiseled marble, sandstone and so on. Of course there are the imitation stones made from the latest plastics, too. Just phone the agents for these computer-cut gravestones on the morning of the funeral, pick the size and shape of stone, the type of material, the wording and the typeface and have your credit card ready. On your arrival for the departure you will find the stone delivered to the graveside for no extra charge. The company to call is Deathtop Publishing. □

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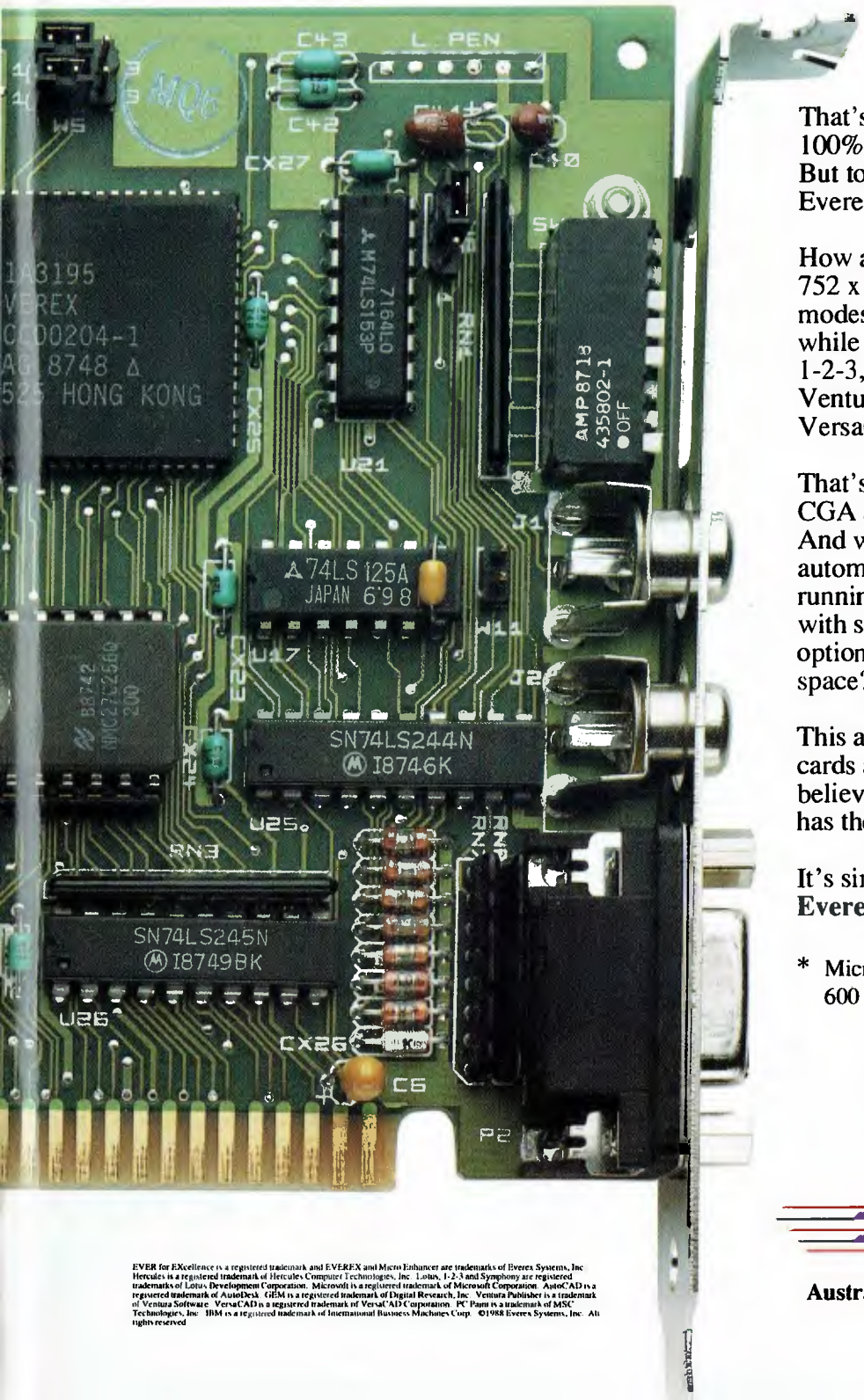


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