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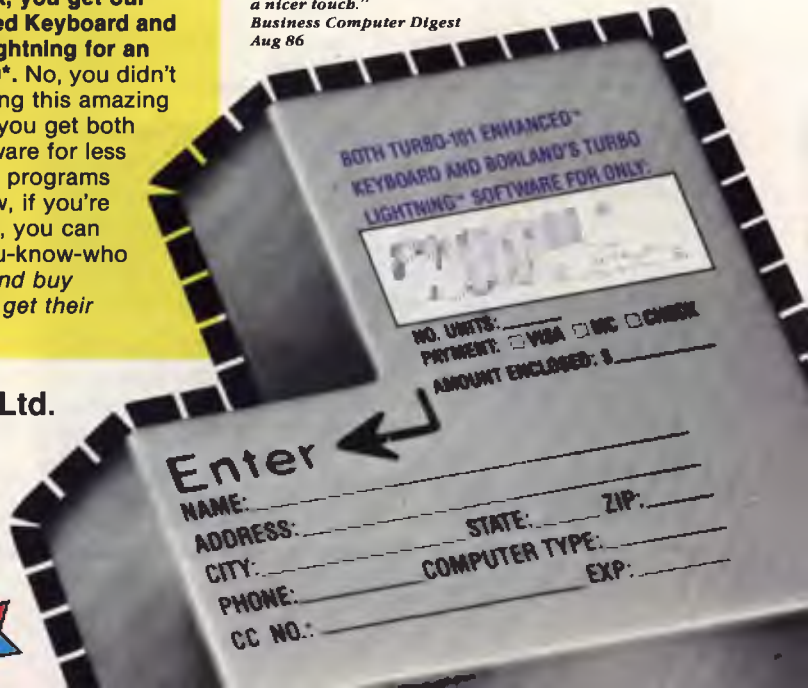

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NEXT MONTH INCLUDES

Our May issue announces the winners in the Sixth Annual Personal Computer of the Year Awards: there's the Software Product of the Year with strong contenders from both the IBM and Apple camps, as well as the Computer of the Year itself. And since we're an all-Aussie computer magazine, there's also Australian Software and Australian Hardware Commendations.

Where do you find speciality packages designed for particular applications like running a pig farm, a solicitor's office or a shirt shop? We've cataloged hundreds of them! Then, John Hepworth advises on choosing a PC, and our reviews include a spreadsheet compiler, the Mace utilities, an entry level word processor, and a Turbo Pascal utilities package.

Printers – Part 2

A printer complements any hardware/software combination. Whatever your requirements, our survey should help you find a printer to suit your needs. And, don't miss our reviews of the Epson LQ 2500+, Star NX-1000 and the Brother Twinriter 6.

FEATURES

Personal Computer of The Year Awards 14
The contenders for our sixth annual Personal Computer of The Year awards are in the ring!

Monitors 18
Are they worth looking into?

Electronic mail and your security 30
No blankets here!

DOS Dirty Tricks 32
... with all those undocumented features.

Artificial Intelligence 36
Tim Hartnell has found a way to hypnotise his computer

Printer Reviews 40
A top-quality 9-pin, a classy 24-pin and a combination dot matrix printer plus a daisy wheel.

Printers – Part 2 40
In Part 2 of our annual printer feature, we survey prices and features of daisy wheel and dot matrix machines.

Nice modems 62
This Nice West Australian company has come a long way in three years

REVIEWS

Microsoft's Word Version 4 22
... has gone straight to the top of John Hepworth's list

The Norton Guides 28
How to take the 'manual labour' out of programming.

The Olivetti M28 AT 64
Dennis Fox takes the M28 through its paces, anticipating the M280.

The Kookaburra Laptop 94
A fair dinkum little Aussie battler.

XENIX FEATURE

Introduction BSI 3
First came CP/M, then MS-Dos, and now Xenix!

The development environment BSI 9
To provide a coherent solution for end users, developers must provide a set of guidelines and tools.

Applications BSI 15
SCO Xenix provides a suite of business applications that give the fundamental requirements of a business solution.

Effective alternative to LANS BSI 21
SCO Xenix System V offers a proven and cost effective alternative to LANS.

Tomorrow has arrived BSI 22
The older computers get, the more powerful they become; as their size shrinks, their value rises

PUBLIC DOMAIN

The Prophet 99
The complete National Pams Listings.

New Products 104
A Helios Toolbox, a couple of Autos, Mahjong, and another(!) OS/2. Plus software to soothe the savage.

Your Mac 124
Hypermedia, HyperCard and the Power House museum.

Your IBM 128
Some heavy reading on communications and the C language.

IBM Underground 133
ARC, PKARC and MARC (amongst others).

Your Amiga 135
Telecomputing and tyrannical Telecom.

Your Atari 140
Winnie the Pooh and some new hardware

Your Amstrad 144
Graphics commands in Basic2

Your C64 148
Putting your money on Punternet.

Microbee File 149
microbee is buzzing again!

Cursory Glance 154
Bicentennial hoopla, the Bermuda Triangle and a printer in a phone booth!

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Apple of the corporate eye

It looks like the jury has finally returned a verdict in the case of Apple's 'toy' computers versus the corporate world – and Apple gets to say 'I told you so'. Despite the toy image, the price and the long-time lack of the 'right' business oriented software, the Macintosh has broken through in the corporate market and looks like soaring to new heights. Big companies – even the ever-so-straight guaranteed IBM accountancy types – are ordering Macs by the thousand. Now that the 'right' software has arrived (in the form of spreadsheets like Excel) they're flocking to the ever-so-easy-to-use graphics based Mac purely because it's quicker and easier to master. Simple economics plays a big part: they know it takes days, weeks (or forever) for their people to start using MS-DOS machines effectively.

In the meantime, the employee is unproductive and perhaps even costs the company dearly in cost intensive training from outside suppliers. Put Macs in and they can be productive within a day. And they'll be happier about the move to new technology, because the Mac is far less threatening. The Mac's new-found 'IBM compatibility' is part of the reason for its final breakthrough – yet I'll bet you haven't heard of anyone using it. The ability to claim compatibility is far more important to Apple than the reality of using it; it's there so the corporate buyers can tick it off the purchase decision checklist.

It's the corporate security blanket Apple needed. But the corporations aren't buying it for its compatibility, because the IBM look is exactly what they are trying to get away from. I can well understand it.

I shrink at the thought of a novice friend entering computing via the IBM path, because it's just too clumsy and difficult. When they ask my advice, I feel like convincing them they don't need a computer at all because I don't need the pleading and confused phone calls. If they ask advice on buying a Mac, however, I encourage them. I can handle the proud, 'look what I've done' phone calls. A typical example occurred recently while I was holidaying and my bulletin board suffered a lightning hit to the modem. My *almost* computer literate brother-in-law went to the house for me, and I had to long distance talk him through checking a few things on the IBM style machine.

I talked for almost an hour, walking him through step-by-step, character-by-character. It was hard work for both of us. Yet after I hung up the phone, he switched my Macintosh on and was able to work it straight away, without any talk-through or even manuals. He had never used one before, yet was able to run applications from the hard disk and even find, insert and use a floppy. Could you imagine anyone who has never seen an IBM-style machine finding the floppy drive, let along knowing what to do to run a program from it?

Recently I've been using the Mac more and more because the graphics and desktop publishing software for it is just so good. After the pain of getting PC software to talk to a Linotron PostScript typesetter, for example, it was a shock to discover the Mac didn't even need to be told what it was printing to – it just handled it all automatically. Graphics programs like Cricket Draw, Adobe Illustrator and the new Aldus Freehand are amazing. Hypercard is a real breakthrough. And 'traditional' software like database packages are coming up better than ever on the Mac. I haven't yet had a serious play with it (where is that man who promised one for review?), but 4th Dimension looked at first glance like a better database development tool than anything I've seen on the PC. Software innovation abounds in the Mac arena, while in the PC marketplace, despite the potentially richer rewards, it's nearly always a game of catch-up. Most new PC software is 'nice', new Mac software is usually at least fascinating and most often exciting. Don't tell my friends, but I'm even starting to think a Mac II with a big, fast drive and a big screen should be my next corporate purchase.

MATT WHELAN

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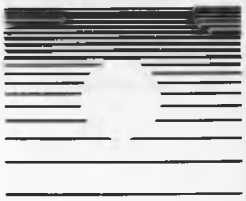

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American Graffiti

A viral infection

The virus is mis- and non-information. This is by no means the first time it's appeared, and it won't be the last. Perhaps we can start to combat it and related viruses, here.

Recently, several publications in the US have carried horror stories about the evils of a 'software virus' allegedly going around. The virus is said to work in the following way: the first thing it does, when activated, is to 'reproduce' itself, either by inserting itself into some portion of the operating system code stored in RAM or by writing a copy of itself into another executable program. Then, it lurks until some specified event has occurred — for example, until a certain date has passed, or until the software of which it is a part has executed a specified number of times. After it's triggered, it goes into what could be called 'virulent' mode, erasing files, perhaps doing even nastier things such as cross-linking files or randomly rewriting sections of files. This is actually not the worst-case scenario. But since there are children in the audience tonight, I don't want to elaborate on the more baroque aspects of virus construction and implementation.)

This scenario is certainly feasable; any moderately competent programmer could do it, and there was an interesting, detailed article about it a few years ago in the respected US academic science publication *Scientific American*. Variations on this prank, in slightly different form, are widely believed to have been carried out several times on mainframes. The famous 'Cookie Monster' that plagued computers at the famed (for its academic excellence, as well as its hackers) Massachusetts Institute of Technology here a few years ago, is an example. Cookie Monster (allegedly) replicated itself throughout memory of the target computer, and randomly flashed the message 'Gimme cookie' upon the system operator's console. Until the operator caught on that he had to reply 'cookie', the thing would replicate and ask with increasing frequency, until it either got a cookie, or brought the system to a halt.

There's only one small problem with the virus scenario for micros. To use a word much favoured by the AI folks, it's extremely difficult to obtain instantiation; that is, to get a real life instance of a victim who can say 'Yes, it happened to me.' I posted notices on several widely accessed bulletin boards here (for example, one operated by the Boston Computer Society, another operated by *Byte* magazine) looking for victims. Although I got a few replies, not one was even able to say 'Contact so-and-so who was a victim.' (This would have been the famous 'friend-of-a-friend' phenomenon common to Urban Myths, such as the Choking Doberman and the Disappearing Child chronicled recently by US writer Jan Brunvand.) Several of those replying took pains to reassure me of the reality of the phenomenon, though.

Cookie Monster . . . randomly flashed the message 'Gimme cookie'

There do seem to be some real life instances of viruses and other nasty episodes. Recently when I interviewed a bloke who probably can legitimately claim to be an expert, I asked him, 'How many cases of viruses have you seen with your own eyes' The answer was four – over a period of four years. (The reason why this story is so beloved by reporters and editors – even the *New York Times* and *Wall Street Journal* carried scare stories about it – is a little too complex to go into here.)

Since capitalism detests a vacuum, it's predictable that software should have appeared claiming to detect and/or neutralise these viruses. Although some of this software may be effective, there is *no* guaranteed way to detect a virus in advance. Let's repeat that: *no* guaranteed way to detect a virus in advance, although there are several commonsense steps everyone can use to virtually eliminate the risk of viruses. First, remember that acquiring software has some similarities to dalliance and to poker — you want to know who you're dealing with. This means that you want to practise, to coin a phrase, Safe Software. There are only two sources for Safe Software: that sold by vendors, complete with shrink-wrap packaging, and from established freeware/shareware distributors dealing with software from established sources (for example, ButtonWare). If a friend offers you a copy of some software, make sure you know where and how he or she got it. The computer virus can't be cured by penicillin.

Any normal human being will find times when it will seem safe to break this rule. (We humans can be quite adept at fooling ourselves.) This leads to Rule 2: when you *do* run software of unknown provenance, *always* run it using duplicate copies of precious data — preferably, files which have been copied to new disks and which are the only files on those disks. And it wouldn't hurt to put a file protect tab on the disk holding the program. (After all, in most cases, it doesn't make much sense that a program should want to write on its own disk.) Rule 2A is *never* run this kind of software on a machine containing a hard disk.

Rule 3 is when you do run questionable software, *always* reboot afterwards. Rule 4 is that there is no way any 'bomb detector' software can be foolproof in detecting lurking viruses or time bombs. (Believe me, I know what I'm talking about. As a mainframe programmer, I did my share of pranks, and I can think of several easy ways to camouflage a virus or bomb.) Finally, for those who really want to practise safe paranoia, it wouldn't hurt, when using potentially questionable software, to boot up with a date far into the future — say, 1/1/95 □

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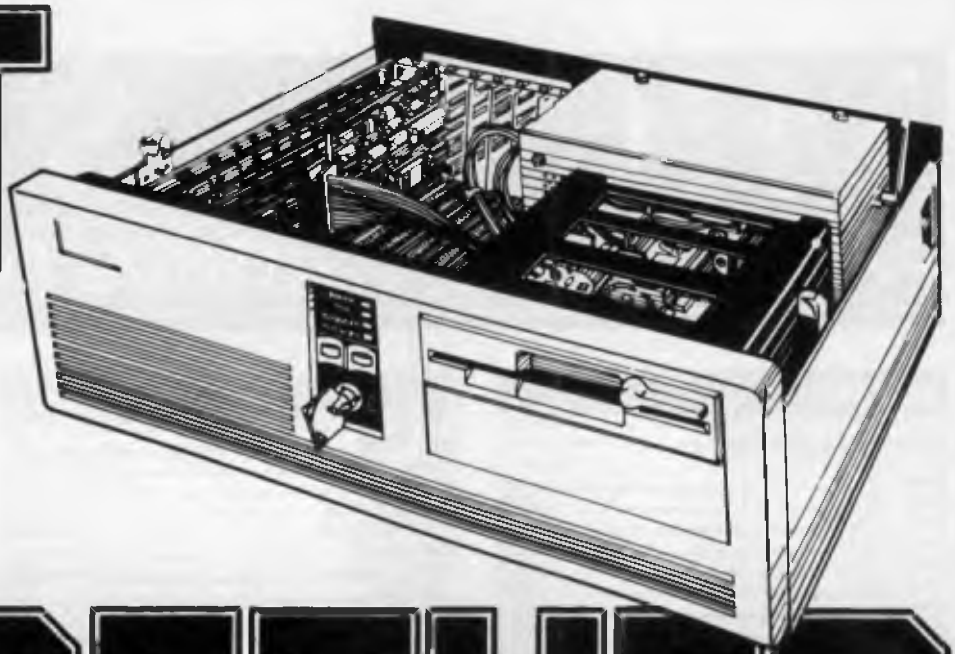

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CANBERRA COMMENT

Expert computer systems

Dave is a ranger in the Kakadu National Park. He often begins his day with a conversation like this —

Dave: G'day.
Screen: G'day Dave, how can I help you?
Dave: What do you reckon the scorch height would be if a fire broke out here today?
Screen: What season are we in?
Dave: Hot season.
Screen: Where are you?
Dave: In the Kay I land system.
Screen: What's the wind strength?
Dave: Moderate.
Screen: Okay. A bushfire now would burn with flames two to three metres high and scorch the vegetation ten to twelve metres high.

Dave is using an expert computer program called Fires to predict likely bushfire behaviour in the park. Fires is one of the expert systems now operating in Australia and described in a new technology report prepared for the Prime Minister, Bob Hawke.

The report, called 'Computerised Assistants: New Tools for Society', urges immediate expansion of Australian research into expert systems. It says that while expert systems are still in their development stages worldwide, Australia has the chance to race ahead capturing valuable overseas contracts.

Just how do expert systems work? Basically they are an offshoot from research into artificial intelligence. The Japanese, in particular, have spent billions on designing artificial intelligence programs, with little success. However, knowledge based systems are one useful result of this research.

Expert programs are divided into two parts. The first part is a knowledge in a specific field — for example, steel making. The second part of the program is called an inference engine and tries to gather accurate conclusions with knowledge from the data base plus information from the user. Many of these systems will help make decisions when, for example, a complex set of rules or specifications is involved. Expert programs can sometimes manage whole systems as with factory production schedules or telephone networks.

The Prime Minister's Technology Report does, however, mention some drawbacks with expert systems.

Because of the many hours needed for design they are expensive to make. Another criticism concerns the narrow uses for expert systems. Far from being really expert they are often found where only low levels of skill are needed.

Also, an expert system cannot always tell if a problem is outside its area of knowledge. It may provide a totally inappropriate answer.

The report, called 'Computerised Assistants: New Tools for Society', urges immediate expansion of Australian research into expert systems.

In discussing marketing, the Technology Report says there are two ways to sell expert systems. Firstly as shells and secondly as problem solving tools.

A shell is a knowledge based system set up without the knowledge. After buying the program the user adds his or her expert knowledge to the shell. A different knowledge system can be built up from a shell designed for another reason.

For example, the CSIRO Fires program was built in stages from a medical expert system called Mycin. CSIRO developed three extra shells from this using two fifth generation languages.

The Americans are keen on using expert systems for problem solving. The artificial intelligence lobby is pushing hard for commercial development.

Applications the Americans see as markets are: medical diagnosis, advice on the law for managers (including precedents in common law), advice on government regulations for clerks, checking specifications and standards, advising on faults and repairs, costing work from plans, monitoring energy used in large buildings and advice on buying and selling stocks and shares.

Saving time is another area for expert systems. For instance, the Architecture Faculty at Sydney University has built an expert building design system This prepares house plans while noting which rooms should go next to each other and their ideal relative sizes.

In the US, Ford has an expert system which monitors robots used on car assembly lines. The system diagnoses any faults in the robots.

The report says an expert system can help eliminate mistakes. For instance, in the building industry engineers often misinterpret the Australian Standards for wind and other loads on structures. The standards, 3,500 in all, are currently being written into an expert system. The CSIRO Division of Building Research is working with the Standards Association of Australia on the project.

The Japanese are experimenting with a medical system called appropriately Doctors. For example, a patient arriving at hospital with a headache gives information to Doctors. The data includes personal details and symptoms. Doctors then tells the patient which doctor to see.

The doctor calls up the information just fed into the program which then presents a preliminary diagnosis. The patient consults with the doctor then answers more detailed questions for the computer. Sometimes Doctors offers alternative diagnoses.

In view of the overseas push into fifth generation computers the report recommends more money for Australian university research into expert systems. Some trial expert systems should also be developed for the Public Service. □

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6TH ANNUAL
PERSONAL
COMPUTER
OF THE YEAR AWARDS
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PERSONAL COMPUTER OF THE YEAR

Fun, fun, fun! Yes, it's Personal Computer of the Year time again at YC – a time when we get to collect together all the nicest hardware and software from the past year and play to our hearts' content.

WHILE WE WERE playing, we nearly forgot the hard bit. We also have to make a decision for you – but you'll just have to wait until we've exhausted ourselves, collapsed from an overdose of enjoyment. How *does* the best game of the year run on a PS/2 Model 80? (We'll get to the business software next, I promise). Can a Mac II with eight megabytes of memory and six giant high-resolution colour monitors attached *really* be used to play six different games at once?

These are the mind-numbing, critical questions we have to ask at this time of year. And we dedicate all our working day to finding the answers, for you

The First Shock

There was something of a panic around the office when we first sat down to analyse the contenders for PC of the Year this time around: while the quality of the potential finalists wasn't in question, the quantity was well down on previous years. Were there really that few top-notch machines launched in the past calendar year?

The answer – no matter how hard we searched for that brilliant design that might have just slipped our minds – was yes, there was only a handful of notable releases. Never mind, we decided, that would leave us more time to play with (or judge, if you must) them.

We turned up five finalists for our short list, the smallest number in the five-year history of the awards: Acorn's Archimedes, Apple's Macintosh II, Compaq's

Figure 1. *The Acorn Archimedes is a fascinating machine that gives a sampling of the possible future path of personal computing.*

Portable 386, IBM's PS/2 series, and Toshiba's T5100.

Software was a little easier, with several products standing out of the crowd. But while getting started on the Software Product of the Year may have been simpler, judging certainly won't be.

Further confirmation of the Apple Macintosh's rising status in the 'real world' comes with the selection of four Mac products as finalists – 50 percent of the field. Hypercard, Excel, Adobe Illustrator and Cricket Draw carry the Apple flag into the finals against the weight of the IBM world.

They're up against some solid competition in the form of the Norton Guides, Norton's Advanced Utilities, Turbo C and Ventura Publisher.

Australia didn't do much last year. Nor did the Australian computer industry. The hardware section of our special commendations is dominated by a rash of modems, split by Hypertec's memory cards for the PS/2 range, while in the software area we're still scratching our heads – we have a couple of products to look at, but are still wondering whether the locals are doing their releases under the Official Secrets Act.

The Contenders

Here's a quick run-down on the contenders for this, our Sixth Annual Personal Computer of the Year awards:

Acorn Archimedes: Still so new it falls into the 'nice, but what can you do with it?' category, the Archimedes is nevertheless a fascinating machine that gives us a sampling of the possible future path of personal computing.

Its major claim to fame is the use of a RISC (Reduced Instruction Set) chip which the benchmarks claim gives it superior performance to the Compaq 386 The fact it runs advanced 3D 'action' graphics – and its window management program – under interpreted BASIC lends real credibility to the performance claims.

Apple Macintosh II: The 'open' Mac arrived at just the right time to help the opening of the floodgates into the business world. The Mac II and the Mac SE's potential IBM compatibility is close to irrelevant in reality (who would want to run that ugly IBM software on such a capable-in-its-own-right machine?) but has made a big difference to the corporate world.

The combination of this capability and a maturing of Mac business software has finally answered the question of whether Apple can be a 'mainstream' supplier as well. The immense power and open architecture of the Mac II has provided a real alternative to the OS/2 world others would have us believe is destined to be our future.

Compaq Portable 386: Could Compaq take it out two years in a row? The reigning champ has combined the technologies of two former PCs of the Year into one exciting little box, packing more power into a take-it-with-you than we would have thought possible when portables first made it to our shortlist three years ago.

A fully kitted-out Portable 386 is a minicomputer in a lunchbox – and the Compaq design is so neatly integrated it puts most machines, regardless of size, to shame.

Toshiba T5100: The Toshiba achieves the same mixing of technologies boasted by the Compaq, but in an even more 'compressed' package. Toshiba's quality and engineering excellence has justly given it dominance in the laptop market, and the T5100 is the ultimate expression of the theme.

Figure 2. *Toshiba's quality and engineering excellence has given it dominance in the laptop market, and the T5100 is the ultimate expression of that theme.*

Figure 3. *The Compaq Portable 386 is a combination of the technologies of two former PCOTY winners.*

Figure 4. *The immense power and open architecture of the Apple Macintosh II has provided a real alternative to the OS/2 world.*

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Soft Sell

The software contenders (broken up into IBM and Mac camps here, but for no significant reason) are:

Ventura Publisher: Last year's Software Product of the Year, PageMaker for the Mac, picked up its title because it created a new market – one that is growing at an incredible rate.

Ventura Publisher did the same for the IBM world and, not content to settle for simply moving the technology to a new hardware environment, created new definitions for desktop publishing along the way. Ventura's powerful new features for handling of long documents, manuscripts, manuals and so on have changed the face of desktop publishing. No new software – even from the pioneer, Aldus – will be considered complete unless it adopts some or all of Ventura 'power features'.

Norton Advanced Utilities: Who doesn't have Norton's to help them out of a jam? (Ah, but how many of you have the manual, too .?). The utilities are an indispensable part of PC computing, and the extensions, improvements and additions to the latest version makes it a solid contender for the title.

Utility software like this often gets overlooked in award considerations – it's just 'part of the furniture'. However, it's a product which 'saves lives' (our own more than once) and really deserves to mix it with the more exciting applications software.

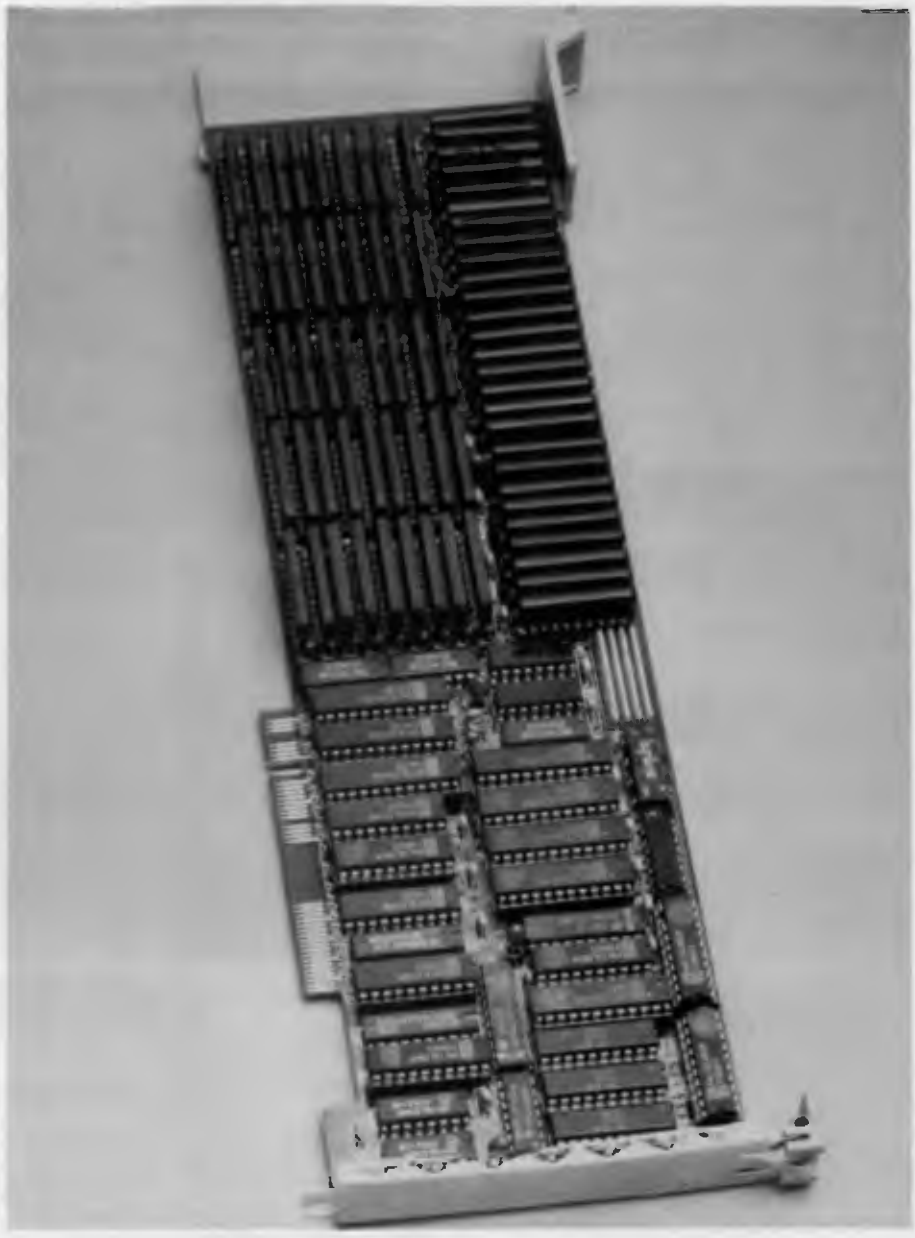


Figure 5. *The field for the Australian Hardware Commendation is dominated by a rash of modems, split by Hypertec's memory expansion cards for the PS/2. Shown here is the Hyperam 50/60 which comes with 2 megabytes of memory, expandable to 8 Mbyte.*

Norton Guides: In reality, the concept of the Norton Guides is little more than an extension of an innovative Australian package – past commendation winner PC Tutorial. The Guides, however, set a high standard in a mass market and provide facilities that give this class of software enormous ongoing potential.

Basically the Norton Guides is a set of memory-resident help databases for popular programming languages. But, further than that, they can be used as a preloader for the software in question so they are only in memory while needed, and they are 'smart' enough to give context-sensitive help.

And the next step is to use the supplied database compiler to design your own help systems, whether it be for your favourite application or for something you have set up for other users.

Turbo C: The magic hand of Borland moves to the C Compiler market, bringing the price within reach of the masses and

What does it take?

WHAT DOES IT TAKE to become Personal Computer of the Year, anyway? Why do super-successful machines sometimes lose out to products which end up selling in very small numbers?

The award criteria introduced in 1983 have not changed, but it's worth reiterating them (and our 'weighting' of the individual items) here.

The major criteria used in judging are:

- ☐ Technical excellence in design, engineering, and provision of advanced features combining in its contribution to the advancement of the state of the art and influence on future trends.
- ☐ Ergonomic design, in terms of both software and hardware.
- ☐ User support, documentation and training.
- ☐ Value for money.
- ☐ Performance.

Now, according to us those items must be considered in quite a different light than they would be if you were making a purchase choice. What we're mainly looking for in a Personal Computer of the Year is covered in the first point: advancement of the state of the art and influence on future trends. The final four points are secondary

The reverse applies to everyday purchasing decisions.

We have to accept in our judging that advances cost money. They require new chips, new components, extra design efforts. The first company to use the latest in processors pays dearly for the privilege – as a low-volume item it costs 10 times as much as it will a year later, and the support components to go with it are in the same boat.

For that reason PC of the Year may not necessarily be the right machine for you to buy at the time – but you can usually bet on buying it – or something based on its innovation – a year or two later.

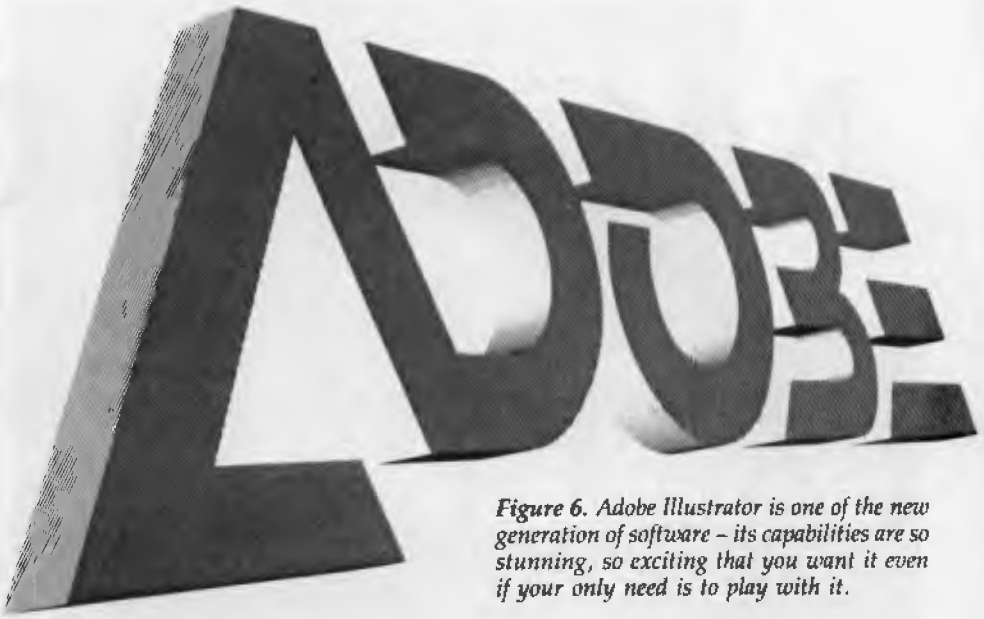


Figure 6. Adobe Illustrator is one of the new generation of software – its capabilities are so stunning, so exciting that you want it even if your only need is to play with it.

the usability within reach of the less-than-gurus. Turbo C has Borland's brilliant integrated environment, real power and speed, compatibility, an open interface to other 'standard' languages, and retails cheaply enough to bring all those 'like to give C a try' programmers out of the woodwork.

Adobe Illustrator: Illustrator is one of those rare 'I gotta have it whether I need it or not' programs – its capabilities are just so stunning, so exciting that you want it even if your only need is to play with it.

At least that's the way it looks to those of us in publishing, because it works such wonders with graphics and type – things that were impossible before, or just so hard you wouldn't bother trying. We see Illustrator (and Cricket Draw) as founders of another new generation of software – not just an ally of desktop publishing, but an extension for it.

Cricket Draw: Cricket Draw was the first of the 'understandable by humans' PostScript interface programs. The PostScript page description language incorporates features and power far beyond traditional typesetting, but taking advantage of it in the past was the domain of the programmers. Finding someone with artistic flair *and* programming expertise was never easy.

Cricket Draw gives direct access to the power of PostScript for anyone who can handle the Mac user interface – which is just about anyone. Again, it's the sort of program even the non-artists have to have just to 'play' with graphics and type generation.

Hypercard: A *perhaps*-revolutionary product for the Apple Macintosh, Hypercard shows computers can be made to work more like the 'normal human' with random access rather than methodical work/thought patterns.

Hypercard is labeled by some as a solution looking for a problem, and by others as the next great breakthrough in personal computing. Whichever way it turns out, it sure is a solid contender for our title.

Microsoft Excel: We journalist types are always at war with 'bean counters' in the publishing industry, so we tend to dislike spreadsheets purely for what they represent. But there's no getting away from the fact that Excel is a powerful and impressive package that has done more than its fair share in turning the corporate tide in Apple's favour

Figure 7. Apple's Hypercard shows computers can be made to work like the 'normal human' with random access rather than methodical work/thought patterns.

Excel's coming move to the PC world is a giant threat for market king Lotus 1-2-3, but it is so good that even today it is winning them over, despite the hardware change that such a move demands.

And the Winner is . . .

Well, now, you're just going to have to wait until the May issue. We still have those mind-numbing, critical questions to finish answering (besides, not all the games have turned up yet). ☐

MONITORS

. . . are they worth looking into?

Monochrome, CGA, EGA or VGA? What's the choice, asks Ewart Stronach?

Figure 1. *The Multisync II comes on a tilt and swivel base with the most used controls behind a flip down door on the panel under the screen. Note Lotus 1-2-3 with 132 columns and 44 rows.*

I RECALL WITH clarity the total *lack* of clarity of my first monitor I bought it as part of a second hand package deal which consisted of a Dick Smith System 80 with a 'massive' 16 Kbytes of memory and cassette storage, for a mere $500, as advertised, 'monitor included'. I still have the monitor; it has been re-converted to the black and white, Woolworths Special TV and appears no worse off for its brief excursion into the ranks of high technology. It's no great shakes as a TV but it did have some great shakes as a monitor So many great shakes in fact that I developed some sort of palsy trying to match my eye movement to the dancing of the screen.

EGA demands a far better monitor and special software, but the result is superb.

I would have killed for a green screen — no need for colour in those heady days when, if a program worked, it was enough — no matter what it looked like I tried coloured plastic over the TV screen but it looked just like a TV screen with green plastic over it. I finally obtained a second hand green screen from a friend and discovered the first law of monitors: some are better than others.

And this was a better one. Why was this green screen not only greener but significantly clearer? The main answer lies in the resolution. While the basic cathode ray

tube technology of a TV is the same as that in a computer monitor, there are a number of other factors which only prove that the right tool makes the job easier. A typical good green screen monitor has the ability to display more dots per inch than a converted TV. The larger the number of dots displayed, and the smaller the dots, the clearer the picture or text display. With monochrome, it is comparatively easy and fairly cheap to display a large number of small dots.

Thus I strode into the new, headache free world of comfortable graphics. Did I learn from my mistakes? No. I graduated from the System 80 to another Dick Smith wonder, the Challenger, and promptly usurped the family portable colour TV. I cut into the video circuits and presto: my first colour monitor. If I had never seen a good monitor I could have gone on with this for some time. Fuzzy, indistinct, subject to every bit of interference in town, but definitely colour. Many of my programs displayed odd hues and a percentage didn't work at all, so finally I bit the bullet and invested in a genuine TVM, switch selectable, green, amber and colour monitor. It has been a faithful friend and is still in daily use on my Lingo XT clone.

EGA

The TVM is a purpose built monitor for IBM CGA (Colour Graphics Adaptor) standard output. There are cheaper monitors available, but most of the cheaper ones have a larger dot pitch, which is how the size of the individual dots of colour is described. The TVM is capable of displaying 640 horizontal and 480 vertical dots, each 0.39 mm across. This dot pitch, when related to the band width capability of the monitor, is what finally decides how good the picture is. The TVM scans a frequency of 14 MHz and the combination described above is capable of displaying anything the standard colour graphics card is capable of producing.

Then came EGA (Enhanced Graphics Adaptor). EGA demands a far better monitor and special software, but the result is superb. EGA cards to drive the monitors have fallen in price dramatically in the past few months and what was the domain of serious commercial users has now fallen into the reach of humble home users. EGA monitors have a dot pitch as fine as 0.31 mm and as a minimum, are capable of scanning a frequency output of up to 18 MHz. This frequency output is generated by the colour card you have chosen and output above that capable of

Figure 2. The Hardware Zoom of the EVA board allows single pixel editing (shown on the Multisync II).

Figure 3. In EGA mode, the Thompson 4470D monitor offers the same resolution as the Multisync, as well as four text colours.

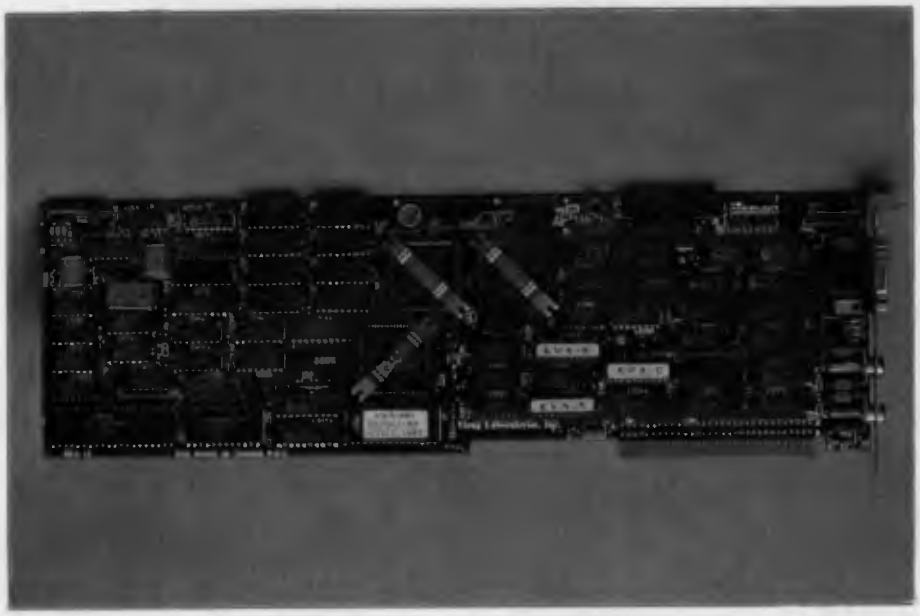


Figure 4. The EVA 480 graphics card comes with software drivers for the new Enhanced Graphics Mode to suit application like Lotus and Autocad.

acceptance by your monitor creates all sorts of problems.

Many serious applications in business call for more than one graphics card in a single machine which necessitated changing monitors when you changed applications, until NEC produced the Multisync. As the name implies, the Multisync is capable of automatically sensing the output of your video card and configuring itself to your needs. I married my new Multisync to a graphics card known as the EVA 480, which came with the necessary software to drive most of my applications such as Lotus or Autocad in the new Enhanced Graphics Mode. The result is stunning. Colour graphics as clear as mono, text fonts selectable from the keyboard and, with the exception of a few games, no compatibility problems. I was able to run exciting software such as The Magician in full colour for the first time and my cup runneth over!

VGA

Then some killjoy mentioned VGA. VGA uses analog signals rather than TTL, and is capable of displaying unlimited colours — compared to the 64 colours of EGA or 16 colours of CGA. It also used to require a separate monitor or one which was switch selectable, with EGA as a minimum capability. The NEC Multisync was switchable and the new Multisync II is auto sensing. I have just fitted a Vega VGA card to my ALR 286 AT clone and the resultant graphic display is magic. I do not intend reviewing the graphic card at this point as I have already found some compatibility problems with my existing software, and am not yet familiar enough with its operation to overcome them, but what it says it does, it does brilliantly.

VGA uses analog signals rather than TTL, and is capable of displaying unlimited colours . . .

But back to the EGA, which is readily affordable and has a fair amount of software available now. The EVA 480 card comes with a graphics drawing program called Dr Halo. Dr Halo allows onscreen design work, much the same as PC Paint or any of the many such programs available for the CGA or mono cards, but allows full use of the EGA capability. Not only are you able to design much finer graphics, but more colours may be displayed on your screen at one time. The EVA board also has a Hardware Zoom capability and editing of your masterpiece at pixel or single dot level becomes very easy. A section of the screen may be enlarged by simply pressing the page down button and magnification steps up each time it is pressed. So you don't want to be a latter day Da Vinci? The practical application of such resolution becomes apparent when the driver programs supplied with the video cards are used in conjunction with many commercial programs.

EGA and Lotus

In normal mode, Lotus is restricted to an 80 column screen width with about 28 lines down the page. Sure, it's easy to scroll through a spreadsheet, but how often would you like to be able to see, and read clearly, a much wider page? With EGA and suitable drivers, Lotus will display up to 132 columns and 44 rows. Different drivers offer the same sort of improvement to Cad packages such as Autocad and desktop publishing programs like Ventura. All the graphics cards I have seen and tried so far have software drivers for most popular applications and concise instructions for setting each application up.

So, which card, which monitor? It's not that easy. Economics play a certain role, although it seems clear that in this area that the more you pay, the more you get. CGA graphics, the lowest end of the colour spectrum, is wasted without an adequate monitor. You can get away with large graphic display programs with a cheap 0.41 mm dot pitch monitor, but prolonged word processing or graphics work becomes very hard on the eyes. Normally, if word processing is your main application, you should stay with monochrome. Even with the switchable text display of a better quality 0.39 mm dot pitch monitor, it is not a patch on good monochrome.

The 0.39 mm colour monitor is fine for most normal applications. I have typed thousands of words using my TVM and by selecting the background and foreground colours, have settled on typing white text on a blue background for clarity and comfort. Such a monitor will handle all possible output from a standard CGA card and is essential if you use a computer at home and want to run games for the kids (big or small).

The move to EGA demands both a new drive card and a new monitor. Your choice of drive card is again dependent on application and finances. The cheapest EGA card I have been offered is about $150 but it's EGA only and won't run programs designed for CGA. The card should be able to handle anything *up* to its capability and the EVA 480 does this superbly. The EVA card is currently available for under $500 retail and offers good value. The benefit of the EGA is first the ability to run programs

designed for this resolution and second a clearer, cleaner display of your normal CGA output by virtue of the smaller dot pitch. Having obtained such a card, I now process my words with the same colours as before but the text is displayed in a mode called Thinfont which displays a text style like a fine typewriter print. The Multisync II offers a text display mode called paper white and I can opt to display my Thinfont as black type on off white background, the closest thing to typing on normal paper I have seen.

The Thompson 4470D

In its EGA mode, the Thompson 4470D monitor offers the same resolution and auto sensing of output as the Multisync but with no VGA capability. It also offers four text colours for normal text output: white, green, amber and blue. The Thompson is a good looking monitor, supplied without a tilt and swivel base but raked backward at a comfortable angle, designed to minimise reflections on the screen. The main operator controls are mounted on a ledge on the side of the monitor and allow adjustment of brightness, background intensity and an on/off button. All other fine adjustments must be carried out through holes in the back panel using small plastic screwdrivers provided. This can be a drawback, as different display boards need adjustments in this area. It's a strong looking unit, weighing in at 10.8 kilograms (about 24 lb) with a fairly standard 14 inch (35.5 cm) diagonal screen size.

The Multisync II comes on a tilt and swivel base and the whole monitor has a rounder look about it than the Thompson. At 16 kgs (35 lb), it is a lot heavier, but it has many more features. The most used controls are behind a flip down door on the front panel, under the screen. The adjustments are small knobs for vertical position, vertical size and horizontal position, plus switches for horizontal size, text mode and text colour display. A large power button with an LED indicator is on the same plane but outside the flip panel. Contrast and brightness re adjusted by turn wheels which protrude under the front panel.

Because of its wide ranging applications, there are many more switches and controls available on the back of the monitor. A Manual switch selects the IBM mode when off and when activated, the Multisync automatically adjusts itself to the scanning frequency, resolution and colour requirements of whatever graphics board you are using. When on, the user must manually select the mode (Grey/Colour) and the number of colours needed by the graphics adaptor. The Mode switch selects either the grey scale or colour when TTL signal is used and the Colour Mode Switch is for colour selection for non-IBM graphic adaptors. The Multisync can obviously be used in many applications other than PCs and derivatives.

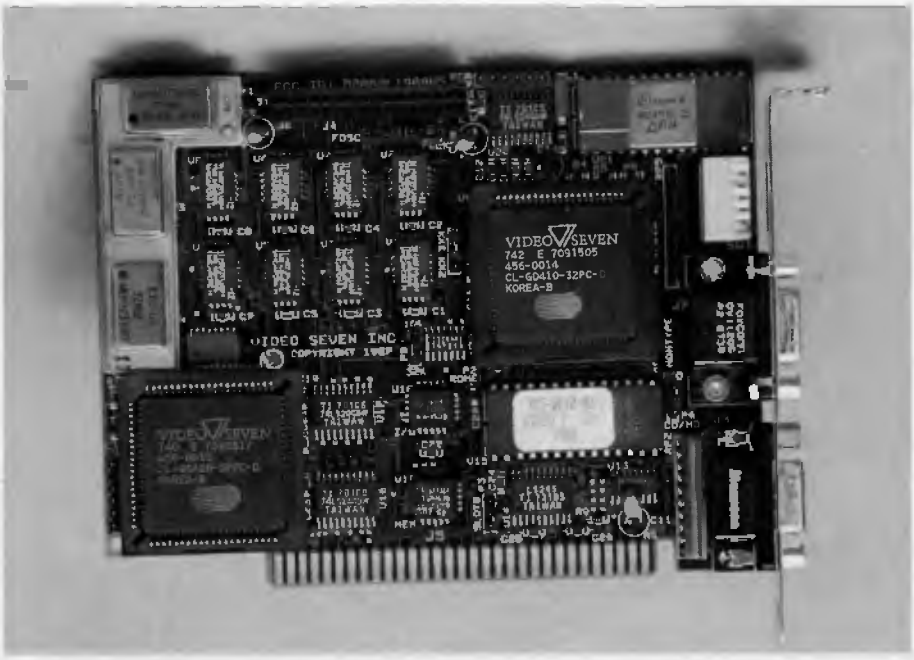


Figure 5. *The Vega VGA board uses analog signals rather than TTL; it's capable of displaying unlimited colours — compared to the 64 colours of EGA or 16 of CGA.*

VGA applications

VGA applications, such as the Vega card and the new IBM PS/2 Multi Colour Graphics Array, output an analog signal rather than TTL. This signal usually has a different plug on the video board and an adaptor is supplied to marry your existing cable to this system. This plug adaptor is supplied standard with the Multisync II.

There are plenty of other monitor and graphics card suppliers out there in consumer land, all keen on selling you their product. This review started out as a look at the Multisync, branched out to the Thompson, and since starting my research, I have been made aware of many other manufacturers. Flexscan offers a range of auto sensing monitors and Genoa Systems offers a range of VGA and EGA graphics boards. Flexscan also offers larger monitors, up to 16 inch (40 cm), and Multisync will soon have up to 23 inch (58 cm) models.

Finally, right now, *which monitor*? There is no doubt in my mind at all. If you hurry and get your hands on the superceded model Multisync, you will not be sorry. As this article goes to press, they are being offered at well under $1000. When you consider that they offer almost all the facilities of the Multisync II without the auto switching for VGA, they represent great value. If you miss out, save for the new Multisync II or settle for the Thompson if you see no future expansion of your needs into VGA. □

Product Details

Product: NEC Multisync
From: NEC Home Electronics Division, 244 Beecroft Rd, Epping 2121 NSW (02) 868 1811
Price: $1395 for Multisync II 14 inch model (previously referred to as the Multisync),
$1995 for the Multisync Plus15 inch model,
$4850 for the Multisync XL20 inch model.
All prices untaxed.

Product: Thompson 4470D
Distributor: Peak Pacific, 93 York St, Sydney 2000 NSW (02) 290 1122
Price: $995 taxed

Microsoft's Word Version 4

This latest release of Microsoft's flagship word processor has gone straight to the top of John Hepworth's list . . .

OVER THE PAST COUPLE of years, Microsoft Word has been high on every list of best selling and/or favourite word processors. If it did not top the list it was usually second, or at worst third. Microsoft Word Version 4 now takes over the baton, and makes major improvements to features, operation and speed.

Microsoft Word has always been a powerful word processor, with stunning printer support and fantastic ability to make complex formatting easy. It is a good program to learn, with a very flat learning curve and an excellent tutorial on disk. New users can get started with only the most limited of basic training, and then add a skill at a time until all is mastered

The package

The Microsoft Word package is a model of completeness. Inside the box come nine 5¼ inch floppies and five 3½ inch floppies, for PS/2s and various laptops. Several well written, well presented and organised manuals are included. The main manual is written in a tutorial style, and has 498 pages in a ring binder. A 100 page spiral bound manual contains printer information, including details of preparation of custom printer definition files by users. The 220 page spiral bound reference manual lists all the possible commands and their parameters, contains a listing of error messages that might be encountered, lists definitions of terminology common to DOS as well as terms exclusive to Word, and gives details of file export and import. As important as these all are, most users will use two other little booklets much more. These are the 22 page *Fast Results with Microsoft Word — a Sampler* and the 42 page *Microsoft Word — Pocket Guide*, a truly essential quick reference guide to the most common operations, keyboard functions and the command tree. Also in the package are keyboard templates for various keyboard layouts, and a three page 'roadmap', which shows how to get Microsoft Word installed and running.

Getting started

Installation is easy, despite the number of disks in the package. On the utilities/setup disk is a program called SETUP.EXE. Running it guides the user through the installation procedure First it interrogates the system and finds out how many hard disks there are, if any, and asks which drive should be used. The user is then asked to specify the subdirectory name on that drive. If it does not already exist, the subdirectory is created. SETUP then guides the user through the installation and prompts for disks to be inserted as required.

Only in the case of the printer menu is it necessary for the user to make a choice, and one or more of the listed 91 printer definition files is installed. The user does not specify which video board is used, as Word is intelligent enough to read display adaptors and find out which one is present. Boards supported include MDA, CGA, EGA, MCGA (PS/2 Model 30), VGA (PS/2 model 50, 60, 80 and so on), various Hercules boards, Olivetti, AT&T, Hewlett-Packard Vectra, Ericsson and Toshiba T3100.

The screen

Word's traditional screen was loved by some, hated by others. Now both can have the screen looking the way they like. The default screen has a 19 line by 78 character text area, with a 3 line menu area beneath it, and a double line border around the text area. It is possible to turn off the menu area and gain 3 extra lines of text, and also to turn off the screen borders and gain 2 more lines of text.

There are many other options for the user who wants Word to be *just so*. Non printable characters, such as spaces, tabs and end of paragraph marks, can be displayed. Beeps occasionally used to attract the user's attention can be disabled. The text on screen can be displayed in text mode or graphics mode, with text using the hardware character generator for speed and graphics drawing all points of the character, allowing bolding, italics and other attributes to be seen. Many other such options are available.

When the user quits Word the options are saved in the file MW.INI, and when Word is started the next time, it looks into the file and uses the previous options.

Menus

Microsoft Word 4 offers a plethora of ways that users can command it. Novices can use the menus, while experienced users can use the function keys and/or speed formatting. The function keys are used alone, with Alt or Ctrl or Shift to give 40 possibilities with keyboards with 10 function keys and 44 for keyboards with 12 function keys. Speed formatting is done by holding down the Alt key and pressing one or two keys in sequence before it is released. Style sheets are the last word in automating formatting and allow many items to be tagged and the formats to be set in one command.

In the past, moving around a menu was

not very intuitive. One used the tab key to move from option to option in a menu (or pressed a leading letter in some cases) and the space bar or cursor keys to select an action. Now the cursor keys can be used to move around the menu, and where a list of possible selections is required (such as a font size) pressing F1 shows a list of possibilities. Word also offers unparalleled support for a mouse. Moving the pointer to the menu area with the mouse and clicking a button selects an option.

Loading and saving

Microsoft Word uses options under the general menu heading of Transfer for all file operations, including loading and saving. While many other packages would use a File menu for these tasks, one gets used to the terminology very quickly. Word normally saves its files with character, paragraph and other formatting included, but it is possible to save the file as ASCII, with no embedded formatting and each paragraph being one long line, ready for another word processor to reformat. A utility program is provided to translate from DCA (as used by DisplayWrite and such like) to Word and from Word to DCA.

Select and do

The basic design philosophy behind Word involves selecting an area of text and then acting on it. The selected text is highlighted, and then can be formatted, deleted, copied or moved. There are a number of ways of selecting text. With a mouse, the pointer is moved onto one end of the area to be selected, the button is held down, the pointer moved to the other end of the block, and the button is released.

With the keyboard, the cursor normally covers one character, and this is the default selection. The highlight can then be expanded in various ways. Pressing F7 selects the previous word, F8 the next, Shift-F7 the previous sentence, Shift-F8 the next. F9 selects the last paragraph, F10 the next. Shift-F10 selects the whole document, and Shift-F9 the current line. Want to select several words, sentences or paragraphs? Press F6 to anchor one end of the block, then drag the other with the cursor or by pressing a function key several times as required.

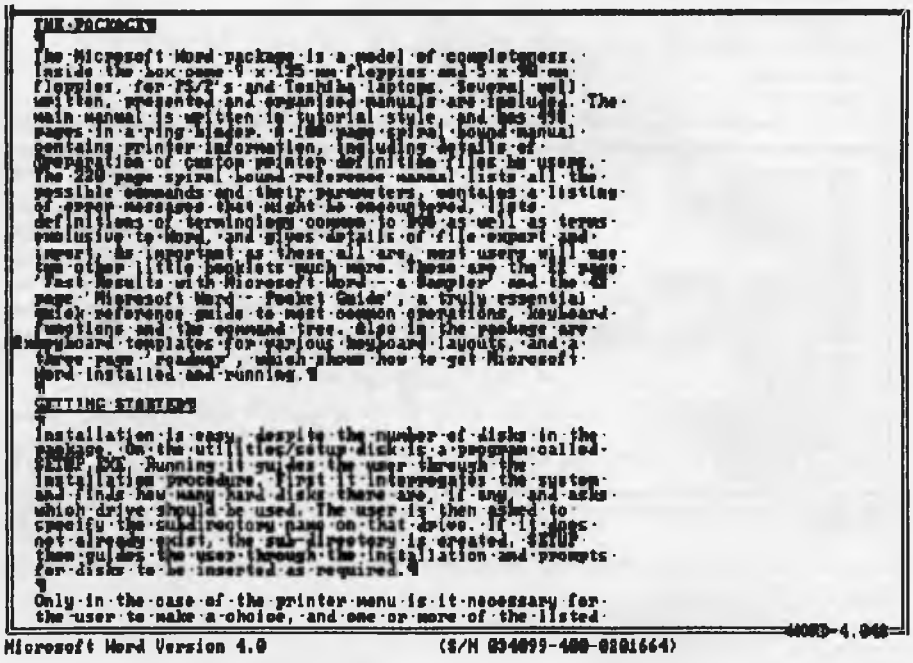


Figure 1. With high resolution video boards, additional lines and columns are displayed. Shown here is Word running under a Hercules board, displaying 43 lines and 90 columns.

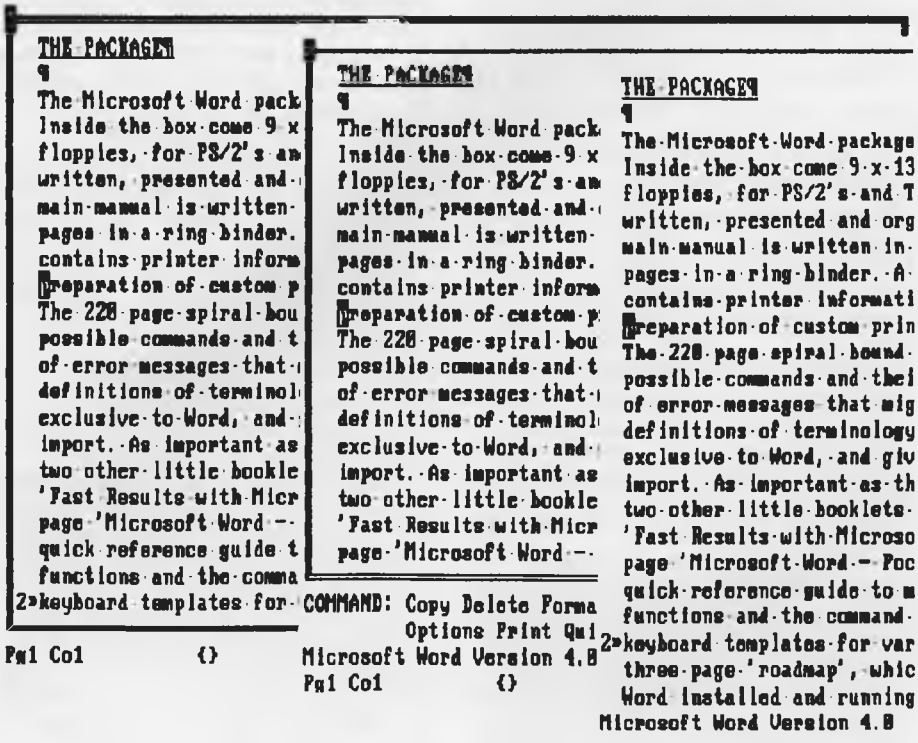


Figure 2. The Word screen can be configured to have a border and no menu, a border and a menu, or no border and no menu.

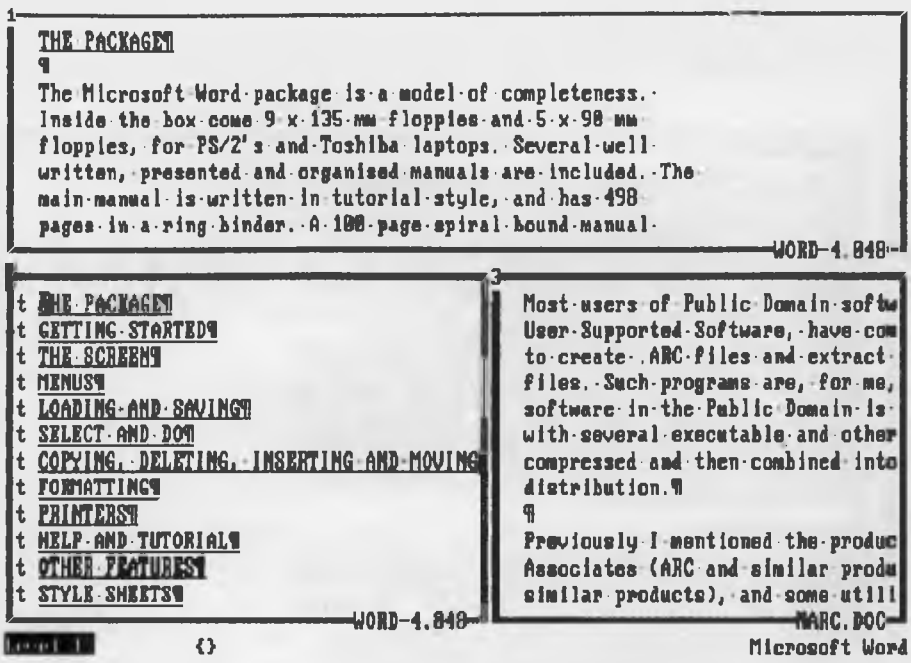


Figure 3. Word can have as many as eight windows on screen at a time. Here a file is in text mode in window 1 and is condensed to an outline in window 2. Window 3 is editing a second file.

Copying, deleting, inserting and moving

All word processors have the ability to act on blocks of text. They can all copy a block, delete it, insert it and move it. Word does all of these, and more. It uses an area of memory called the scrap. Normally, to delete text, it is highlighted and then, by pressing Del, it is cut out and placed in the scrap. Text from the scrap is inserted into the document at the cursor when the Ins key is pressed, and the select/delete/insert sequence is used to move text.

A block of text can be copied into a second location while remaining at the first by highlighting it, pressing Esc to go to the menu and then choosing Copy. The default destination for copy is the scrap, from which Ins is used to insert it at the cursor, but the highlighted text can also be saved to a glossary, allowing standard words, paragraphs and so on to be saved and recreated in a document by typing the brief tag for each one and then pressing F3 to expand it into the full text.

The use of the Ins key to insert text from the scrap at the cursor location is one of the few remaining oddities in Word compared to other packages (which tend to use the Ins key to toggle between overwrite and insert modes). Word, instead, uses the F5 key to toggle between these modes and, while initially a little odd, it is something to which one rapidly becomes accustomed, and very quickly becomes the preferable way of doing things.

Naturally, Word allows the user to search for text through a document, and can also do a global search-and-replace operation with or without operator confirmation. It can search for, or replace, white space, tabs, end of paragraph marks, page breaks and so on, as well as normal text.

Formatting

Word can format characters, paragraphs and one or more major sections of a document; 'divisions' in Word's terminology.

Characters are formatted by highlighting the relevant ones, and then using either the menus, style sheets or a couple of keystrokes in speed formatting. Character formatting available includes font name, font size, bold, italic, underline, strikethrough, uppercase, small caps, double underline, normal/superscript/subscript, font name, font size, and so on. On graphics screens all characteristics except font name and size appear as they would print — a bold italicised letter is thicker and leans to the right.

Paragraphs are formatted by placing the cursor anywhere in the paragraph and using the menus, style sheets or speed formatting. More than one paragraph can be formatted simultaneously by highlighting all of them, and then carrying out the formatting.

Speed formatting now requires an explanation. Placing a cursor anywhere on a paragraph and pressing Alt plus a key does a format operation Alt-J justifies the paragraph, Alt-N indents the left margin by one tab, Alt-M removes the indent from the left margin by one tab Alt-T creates a hanging indent, leaving the first line further left than the other lines in the paragraph. There are many others as well, and they are the key to using Word as a writing tool, allowing the user to easily and quickly get good looking output, with the word processor staying transparent and out of the way.

Margins, column layout, headers, footers, page numbering and so on for whole documents, or chunks of documents, are set with Format Division. Again menus, style sheets or speed formatting can be used.

Other formatting options are Tab (sets tabs in selected paragraphs), Border (allows lines and boxes around paragraphs), Footnote, Running-head and Stylesheet.

Printers

Word's greatest strength is its fantastic printer support. About 100 drivers come on disk with the package and over 60 more are available on request from Microsoft. A utility program is included so that users can either prepare a printer driver from scratch, or can adapt one for a similar printer, to their own. When formatting, the available fonts and their sizes are displayed. A different driver can be selected at any time with a couple of keystrokes. If the driver used to print a document is different to the one used to format it, Word automatically selects the nearest available fonts and uses them

Other Features

As mentioned before, Word comes with a truly excellent tutorial on disk It also has an excellent context sensitive help screen system, and if the details in the help screens are not enough, the user can jump to the appropriate part of the disk tutorial, if desired. The help is accessed either by pressing Alt and H at the same time, or by pressing Esc and then H.

Word has a linedraw function which allows a box to be drawn around paragraphs and for vertical and horizontal rules to be

added to tables. These functions use the IBM Hi-Bit characters and require a printer which uses the IBM Hi-Bit character set, such as the IBM Graphics dot matrix printer.

Word can have as many as eight windows on screen at a time, and these all can be used for different parts of the same document, or have a different document in each. Windows can be zoomed, and the sizes can be adjusted even when they are active. I often use two or three windows, but have rarely found a need for more.

Style sheets

Style sheets allow many characters, paragraphs or divisions to be tagged and tied an entry in a style sheet. Changing the entry in the style sheet then changes all appropriately tagged items in the text.

Imagine that all your second level headings are tagged H2, and the entry in the style sheet sets H2 as Helvetica 14 point. You print the document and decide that Helvetica 12 point would be more appropriate. You could go right through the document and change the formatting for each heading one at a time (quite a job in a 400 page document) or just go to the style sheet and define H2 as Helvetica 12 point, whereupon all such tagged headings are reformatted. Style sheet entries can be created wither from a menu or 'by example', highlighting text with the appropriate character, paragraph or division format and simply recording it to the style sheet.

The glossary function is used to build up a document from standard paragraphs, or insert a few standard phrases in an otherwise unique letter, using only a couple of keystrokes. There are five standard entries, allowing insertion of the date or time that the document was written or printed, or of the page number.

Spreadsheets and graphics

The Library Link command allows the data from a Multiplan, Excel r Lotus spreadsheet to be imported into the document. This actually places the data in the Word files, tagged with the name of the spreadsheet file and the range name or co-ordinates in that file. Subsequent updates are made by selecting the area containing the data from one or more spreadsheets, and again asking for Library Link without specifying a file or range. All spreadsheet data in the selected area is then updated within the Word file.

One of the claims for Word 4 is that of a great speed improvement over Word 3. All

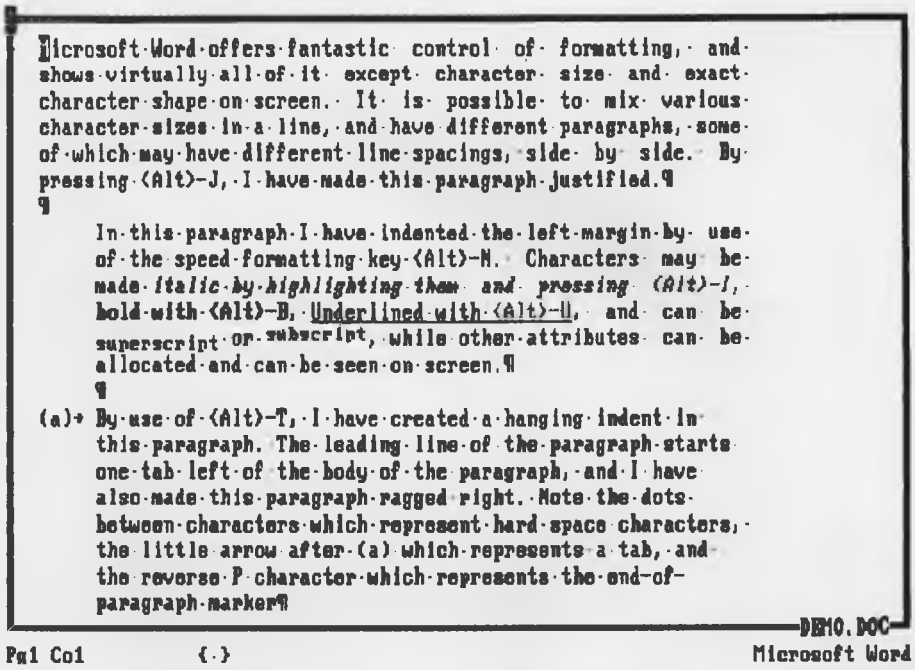


Figure 4. Paragraphs are formatted by placing the cursor anywhere in the paragraph and using the menus, style sheets or speed formatting. This screen shows some sample formatting with Alt key combinations.

functions showed speed improvement, with some showing more than others. Speed improvements for scrolling and cursor movement are dramatic and welcome. In the past, I have found that the task that I most wanted to be faster was saving a file to disk, and Word 4 is nearly twice as fast as Word 3 at this.

Reliability

I had absolutely no problems with Word 4 over the extended review problems, apart from the fact that it is rather sensitive to some of the few TSR programs I tried. SideKick was okay, although the cursor was not visible in the Notepad. Persyst's Waitless Printing spooler worked fine, but Word did not like CtrlAlt at all. PrintQ would not work with Word 4 under DOS 2.1 but was satisfactory under DOS 3.3. DosEdit did not appear to cause any difficulties.

Wish list

Word 4 can print paragraphs side by side, can have snaking columns of text on a page and can mix line spacings on a page and character fonts in a line, but none of these are visible on screen except for character attributes like italics. The one feature I would like is the ability to zoom back and preview the layout of a whole page. Apart from this one item I cannot think of anything that I would like to add.

If you have guessed from the above that I am fascinated by, even fanatical about, Word 4 then you won't be wrong. It offers the best combination of speed, power and flexibility of the many word processors that I have used or reviewed. It is very transparent when writing, staying out of the way and allowing the thoughts to flow straight from the writer through the keyboard to the file. It offers powerful, flexible and easy to use formatting, while the glossary, style sheets and macros make it ideal in the corporate environment. The tutorial on disk is about the best I have ever seen, and the flat learning curve makes adding skills one at a time easy. □

Product Details

Product: Microsoft Word Version 4
From: Microsoft Pty Ltd, PO Box 95, Forestville 2087 NSW
(02) 452 5088
Price: $795 untaxed.
Upgrades are available; contact Microsoft for details.

Same Brain.

On the left is the superb Apple Macintosh, arguably, one of the world's finest business computers.

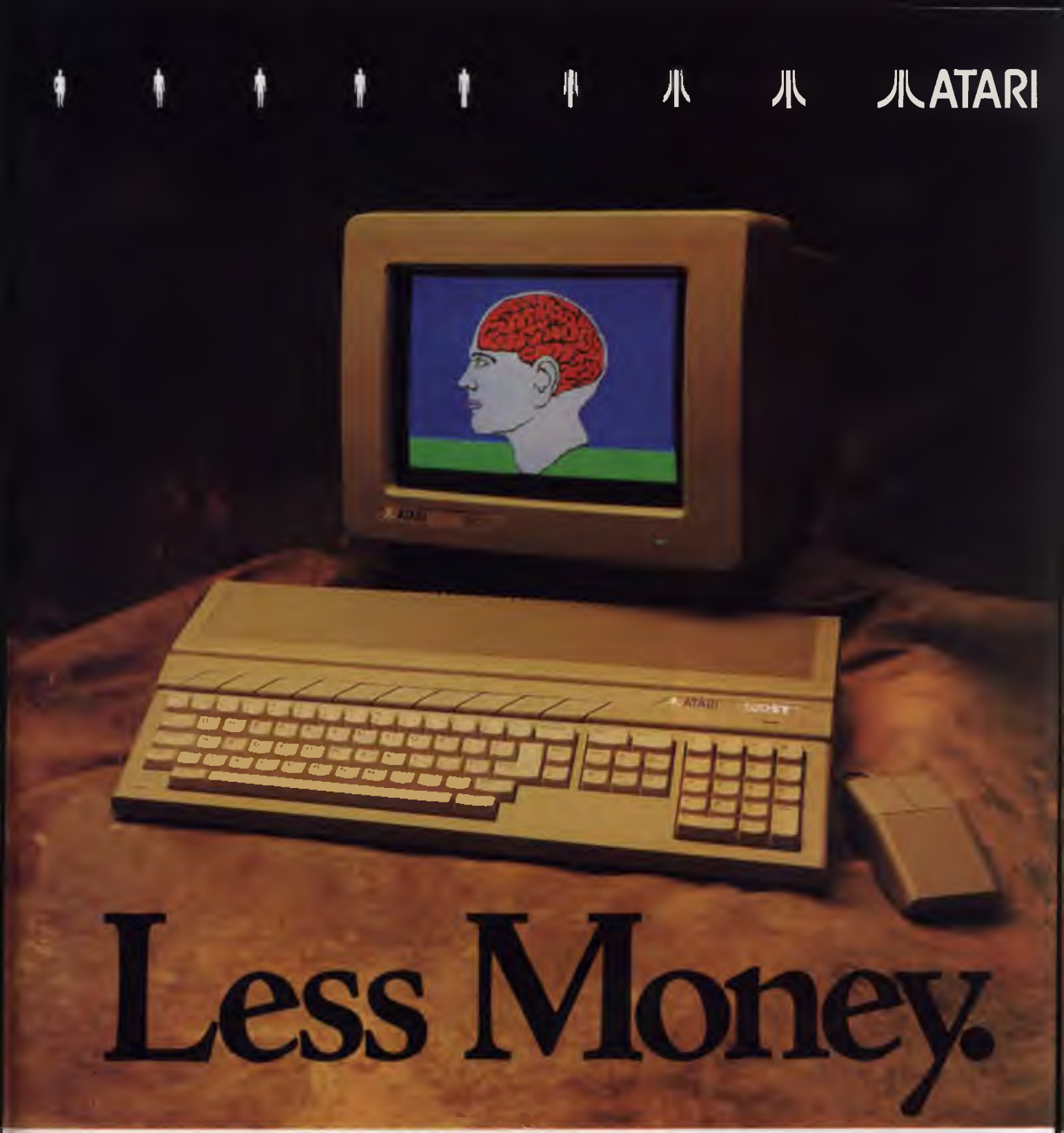
The Apple Macintosh costs over three thousand five hundred dollars.

On the right is the Atari ST Personal Computer.

It has exactly the same brain as the Apple Mac (the Motorola 68000 processor) and, like the Mac, it has its own programs to handle word processing, spreadsheets, music composition (as used by many professionals), graphics, games and more.

IMPORTANT FEATURES OF THE ATARI 520 ST. * LATEST TECHNOLOGY, EASY TO USE * POWERFUL 16/32 BIT MOTOROLA 68000 PROCESSOR. * 512K RAM MEMORY * RF MODULATOR (PLUG INTO TV) * HARD DISK INTERFACE * THREE SOUND CHANNELS. IN BUILT MIDI * GEM MOUSE-BASED SCREEN

ATARI



Less Money.

In fact, the Atari ST can handle hundreds of varied and challenging programs such as Microsoft Write, Word Perfect, Publishing Partner Professional, Flight Simulator II, Superbase and Cyberpaint.

Yet, complete with mouse, the 520 ST starts at only eight ninety nine dollars.* And you can add an Atari mono monitor for just $399* or a high resolution Atari colour monitor for just $679.*

Which makes the Atari ST, arguably, the world's finest personal computer.

MANAGEMENT WITH ICONS, WINDOWS AND DROP-DOWN MENUS. THE ST IS ALSO AVAILABLE AS 1040ST (1 MEG) MEGA 2 (2 MEG) AND MEGA 4 (4 MEG).

*RECOMMENDED RETAIL. PRICES CORRECT AT TIME OF PUBLICATION. APPLE DEVICE & MACINTOSH ARE TRADEMARKS OF APPLE COMPUTER.

Doorley Buchanan ATA 3003.

The Norton Guides
for programmers

John Hepworth has found how to take the 'manual labour' out of programming . . .

I HATE MANUAL labour! Not only bending the back, lifting, sweating and cursing in the garden (or painting the outside of the house as I have just done!), but trying to find vital information in a language manual while writing a program. No more will I have to suffer the search, for now I have online, pop-up manuals in the form of the Norton Guides for all the languages that I use most — Basica, QuickBasic, Turbo Basic, Turbo Pascal, Microsoft C, Turbo C and Microsoft Macro Assembler.

Co-resident data

The Norton Guides consist of a small co-resident program teamed to one or more database files on disk, one for each dialect of each language. Pressing Shift-F1 pops up a window in either the top or bottom half of the screen, depending on the location of the cursor. Very cleverly, it pops up away from the cursor, so that the bit of screen of most interest is left clear. The screen can be zoomed to full size and back at the press of the F9 key.

The default configuration, including the name of the default database, is saved on disk in a NG.INI initialisation file. Later, if details need to be changed (including the active database), just select the options menu with the right/left cursor keys. The new options can be saved to disk as new defaults or just used for current session.

Auto seek

Immediately after the screen is popped up, one sees a list of commands, one per line, with a few words of description. The co-resident program attempts to determine if it can recognise the command under the cursor in the host program (I use the term command rather loosely to include statements, commands, functions, procedures, operators, reserved words and so on) and highlights the line containing that command in the Norton Guides database. Pressing Enter then expands the entry to be anything from one to several screens long. At the top of the expanded screen appears the names of a few commands with some significant relationship to the one selected. Moving a highlight to one of these and pressing Enter moves one to the expanded entry for that command. Escape always takes you back a level, eventually to the host program.

Figure 1. The co-resident Norton Guides are called with Shift-F1. The window pops up either the top or the bottom of the screen, depending on the location of the cursor.

The Norton Guides popped up in all editors and word processors I tried. With Microsoft Word, the host word processor had to be in character and not graphics mode, but this is of no significance. The autoseek feature worked well with all the editors built into the various interpreters and compilers, but could not determine the word under the cursor when working with some third party editors and just highlighted the top command in the list.

Manual searches can be carried out by using the cursor and PgUp and PgDn keys to move the highlight to the command of interest. In addition, the Norton Guides

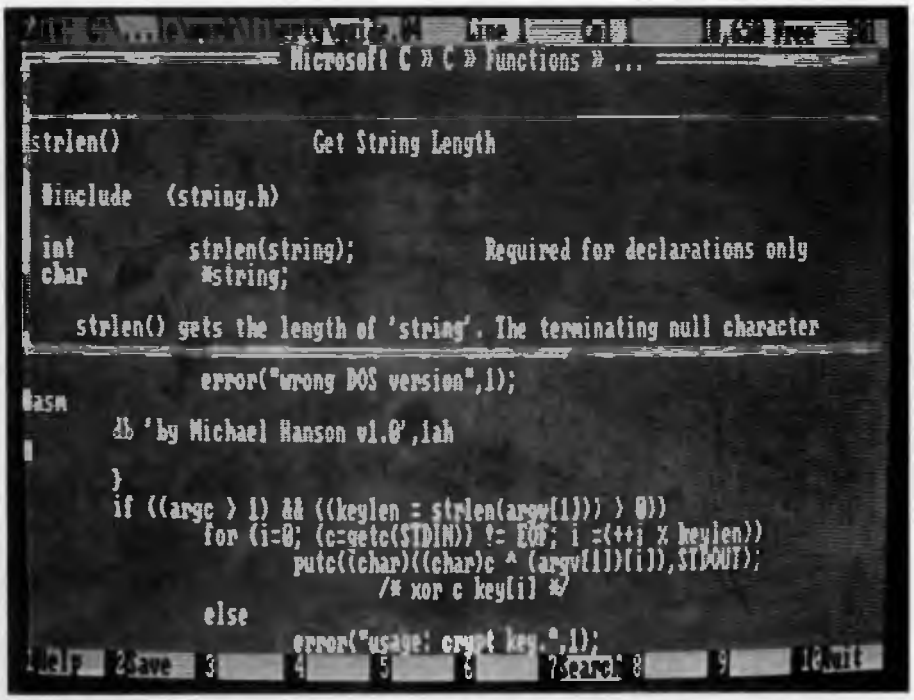


Figure 2. Any of the explanations can be Expanded from the opening screen. The half screen displays can all be expanded to full screen size with F9.

can search for a command Here, the user enters one or more leading characters of the command of interest and the Guides find the first one that matches. As all the listings are alphabetical, this will be either the one of interest or very close to it.

The database

The quality of the database files is what makes an electronic manual worthwhile, and with the Norton Guides they vary from good to excellent. All the databases available at present are of great use to experienced programmers; all are perhaps even more use to the 'middle ranking' programmer. For the novice in a particular language they vary.

The C databases are impressive, with the Turbo C database being a thoughtfully revised version of the reference guide part of the Borland manual. It has excellent sample code and programs to show exactly how a function should be used, and the #include and other directives required. The Pascal database and Masm database are very good.

The Masm database has fantastic amounts of information on mnemonics, interrupts and functions. The databases for Basic are very good and quite useful, but a little more terse than the C databases. They showed concisely and clearly the syntax and parameters for each command, but required a little more thought by the user than did the information in the other databases.

The databases contain an astonishing amount of information. The Assembler database is 597,407 bytes, the Basic databases are from 232,182 bytes to 266,106 bytes, the C databases are 526,775 bytes and 528,186 bytes, while the Turbo Pascal database is 361,913 bytes. Each database comes on a separate disk, and the C and Assembler databases are in the form of self-unpacking archive files using a variant of PKARC, so each fits on a 360 kilobyte floppy disk.

Write your own

The database files are in a compressed form, not in plain language and so modification of them by the user is not possible. Yet, the tools are provided to create appropriate databases of one's own, and compress them (the manual calls it compile, but it is a pseudo compile at best). Just the thing for all those user written functions in C and functions and procedures in Pascal.

The speed of searches through the database is amazing. While the Norton Guides program is resident, the database is on the hard disk. The size of the database files precludes their use on an all floppy system, but most serious programmers using a compiler would find working without a hard disk near impossible. On my 4.77 MHz PC with a hard disk the information flashed up on screen nearly instantaneously. Not only is the program able to search efficiently, but the screen handling is also very fast and effective.

The Guides come with a very clear and concise 60 page manual, 13 pages of which give details on running the program. The remaining pages are a tutorial and reference on writing one's own databases.

Availability

The Norton Guides are packaged with the co-resident program and one or more databases in the package. The Basic package has databases for Basica, QuickBasic 3.0 and Turbo Basic 1.0 — all in the one package. The C package has both Microsoft C 4.0 and Turbo C 1.0. The Assembler pack has Masm 4.0, while the Turbo Pascal pack is for version 3.0. There are two 'bundled' packs, C plus Assembler or Turbo Pascal plus Assembler.

While I was reviewing the packs, new language versions were released for Quickbasic, Masm, Turbo Pascal and OS/2. While no plans for upgrades to the Guides databases have been announced, they are sure to come along with databases for new languages, and in the meantime most of the languages have much in common between their new and older versions.

Conclusion

The fertile brain of Peter Norton, and the gifted team that he has gathered around him, have come up with another winner. I found the Guides indispensable with C, excellent in Pascal and Assembler. Even in Basic where they shine less brightly, they reminded me of commands that otherwise I might have overlooked and which improved my code. □

Product Details

Product: Norton Guides
From: Peter Norton Computing
Distributor: PC Extras, PO Box K9, Haymarket 2000 NSW
(02) 319 2155
Price: $185 for Guides program plus one database — Assembler (Masm 4.0), Basic (Basica, QuickBasic 3.0, Turbo Basic 1.0), C (Microsoft C 4.0, Turbo C 1.0), Turbo Pascal 3.0, OS/2.
$303 for Guides program plus two databases.
All prices taxed.

ELECTRONIC MAIL AND YOUR SECURITY

. . . NO BLANKETS HERE!

IF YOU'RE USING electronic mail or thinking about subscribing to a system, security might not be your first concern, but perhaps it should be You'll soon realise that having your mailbox stored in a large computer in one of our nation's capitals, can be a security worry.

Users of this communications facility will tell you that a casual relationship develops between subscribers; it's similar to the atmosphere on Bulletin Boards. Electronic mail is not a formal medium and letters tend to be open, friendly and often surprisingly frank.

A casual criticism or a personal remark that might once have been made over the phone, is often downloaded on electronic mail. The problem is that an electronic database records the comment; the phone did not.

No wonder, then, that these two employees regularly exchanged gossip and criticised their boss in private. . . at least, they thought their comments were private until they discovered that they had been circulated to every member of the board

Irangate, so we read, was first discovered by electronic mail tapping. Bob Hawke's attempts to assure us that the Australia Card database would somehow be sacrosanct, have failed against the growing voice of civil libertarians. To be realistic, every system has its Achilles' heel.

Here, we'll look at electronic mail, citing examples from the system the two employees were using — Telememo (and its new identity — Keylink — a marriage of Telecom's Telememo and OTC's Minerva) and discuss the security problems with electronic mail in general.

In Sydney last year, a computer company decided to retrench two employees. After the decision had been made (but not implemented), their boss accessed their private electronic mailboxes and read correspondence between them.
What he read upset him so much that he forwarded copies of it to members of the Board of Directors and threatened legal action because of the comments they had made about him.
Later, the boss realised he had over reacted and quickly retracted his threat. He thought that was the end of the story, but he had opened a can of worms and revealed interesting flaws in electronic mail security right here in Australia.

Security measures

Keylink is a fine example of a well planned and implemented electronic mail system. Like many other systems, it is not without security — if an incorrect password is keyed three times a user is thrown out of the system, and each time users log on, their last access time is shown on screen.

All users of Keylink devise their own password and can (and should) change it regularly. This is achieved once the user has logged on, quite simply by keying in the old password and then entering the new one twice (for verification). If you select a password like love, sex, sesame, open, or your spouse's name or car's model then you are inviting someone to break in.

The Sydney pair however, did not have predictable passwords, nor did their boss have to spend hours guessing. As a System Manager, he simply logged onto the system, changed their passwords and then read their mail.

He was confident in doing this without being found out because his next step was to take them off the system. System Managers have special privileges Independently of OTC and Telecom they can add or remove users to their company account; they also have access to the mailboxes of all those using the company account.

Moral and legal questions

The question here revolves not so much around the security of a particular system (there is always a possibility that someone may be able to break into your account, no matter what system), but the integrity of those administering it.

We all take for granted that our mail will

arrive in our letter boxes, in a reasonable condition, and definitely intact. That is because we have legislation covering the conveyers of our mail, which ensures that our privacy is upheld and that our articles are treated with respect.

Seldom do you hear of the local Post Master setting fire to a bag of mail. However, there is no such legislation covering the newer electronic mail. It is very much up to the System Administrator, who, as in the Sydney case, can be any employee appointed by the boss, or in fact the boss. It is a responsible position, which no one would take lightly, but it is open to abuse.

Therefore the system is really only as good as the company, and there was something ever-so-slightly rotten in this 'State of Denmark', as the two employees found out.

Did the boss have the right to read their mail? Because no legal precedent has been set, we cannot theorise how he would stand if sued by the employees for invasion of privacy. However, what he did was no different to opening up the mail box at the front of their homes and running off with the day's mail.

The problem with computer crime of any nature, is that it seldom involves a physical act. Pulling on a mask and carrying out an armed hold-up feels quite different to breaking into a bank's computer system via your PC and transferring funds into your own account. Both acts are equally criminal, but armchair crime doesn't feel quite so criminal.

An argument could be made that the employees were using company time and money to carry out private correspondence and because he was paying for it, the boss had a right to read their correspondence. But it would probably fall down in a court of law. In an ordinary situation, an invasion of privacy case would not be upturned simply because private mail was written on company letterhead or sent through the company internal mail system. (*We would be very interested in comments from those who may be familiar with the legal implications of the incident described here, and from electronic mail users who have had similar experiences.*)

Employees' Rights

Within the company, there was a tacit understanding that internal and external company mail (the type requiring envelopes and stamps) could be read and opened. Phone conversations, however, were not tapped and the Sydney couple argue that they were not informed, when first logged onto the Telememo/Keylink system, that, even under the rather extreme situation cited above, their electronic mail could be read. They believe that it is imperative that employees are told of this, for it seems there is no legal compunction to do so.

We would be very interested in comments from those who may be familiar with the legal implications of the incident described here, and from electronic mail users who have had similar experiences.

Electronic mail is such a new medium that the ground rules are still being thrashed out. It must be pointed out that the onus is not on the service provider to lay down the law as to how the system can be used, and obviously in this case, abused. We have legislation covering us for correspondence conveyed by Australia Post, but not by its 'electronic cousin'.

Another worry by the Sydney couple was that if the boss could read their mail, perhaps he could also edit it without their knowledge. This is in fact not possible. Once a message is sent, it cannot be recalled, edited and sent again, even by the original author.

Many employees are logged on quickly with only a superficial knowledge of the system. The two Sydney employees say they had to learn as they went along. This is a pity, because Keylink includes an added security device which should be used by all subscribers when they want to indulge in a little scandal between themselves or to discuss something of critical import. This is the ability to password protect individual messages. It is strongly recommended and ensures protection from the most ardent hacker (or for a touch of the dramatics — spy!) except again in the case of the System Administrator. It seems, nothing is sacred from him or her.

Purging is also imperative. However, even though you can automatically purge all your mail once read, this does not mean that the person you are sending to is necessarily as thorough. The boss was able to pick up both employees' correspondence from the one mailbox because, as Telememo was defined for these two by the System Administrator, it would automatically copy the sender's own correspondence. (Telememo can be tailored in this way by the System Administrator so that a user may have copies automatically sent to themselves, or not, as the case may be.)

Legal evidence

Finally, there is the question of whether the boss could have sued his employees on the grounds of what he had discovered in their mail.

Again there is no legal precedent yet and so we can only theorise. In the Sydney case the material was 'not particularly significant', but had it been details of a planned murder or terrorist attempt then it might have got to court. Had it done so, could it have been proved that it was actually sent by the employees, given the boss' ability to enter their mailbox and change their passwords?

It is not an easy case to solve. But think on it when your company takes the plunge and joins the increasing number of electronic mail subscribers.

Five Security Tips For Subscribers

1. Change your password regularly,
2. Password protect all your messages,
3. Purge everything immediately,
4. If exchanging sensitive material ensure that the recipient purges all material, too,
5. Include digits and symbols or even a space in your passwords.

A brief note on Telememo, Minerva and Keylink.

Since the incident cited above transpired, Telememo has been joined with Minerva to form one service called Keylink. Telememo, as then administered independently by Telecom, was a public access electronic mail service based on the Telemail software. Minerva, as was administered by OTC, was based on the Dialware communications software. The two systems are very similar and have been merged to create a more effective and all encompassing service — Keylink. □

DOS DIRTY TRICKS

. . . done dirt cheap!

Assembler John Summerfield is looking for undocumented features (or just plain dirty tricks) for MS and PC-DOS — and you could win a box of floppies.

BASED ON an idea I had, Jake has asked me to host a column of 'dirty tricks' for users of PC-DOS and MS-DOS. This column is principally to document otherwise undocumented 'features' of DOS. Little known ideas not well understood are also excellent candidates for publication.

This column will be of interest to technically minded folks, with some familiarity with assembly-language programming. I am quite prepared to publish devious ideas concerning BAT files, or other aspects of using DOS.

A word of warning to those who delight in using undocumented tricks: if you include them in your programs, it's very probable you have reduced its portability. It may prove unwise to use these tricks and ideas in commercial software.

This column will be of interest to technically minded folks, with some familiarity with assembly-language programming. I am quite prepared to publish devious ideas concerning BAT files, or other aspects of using DOS.

However, there are likely to be useful tips for those less technically capable from time to time, so have a look each month. And, if you don't see the kind of material you want being published, send in some ideas of your own. There's every chance someone else will have related ideas following on from yours.

To make it even more rewarding (what could be better than having something published?), published contributions will be paid for at the rate of one box of 10 floppy disks for your own computer. So, when you send in your contributions, make sure we can read it easily (let your computer print it, preferably with a new ribbon), tell us who you are and where to find you (anonymous contributions won't be rewarded), and what kind of computer you have (PC, AT, NEC APC III or whatever).

Of course, to receive these handsome rewards, your contributions must meet some standards of documentation –

Legible — can't read it, can't use it.
Tested — tell us the computer(s) it works on.
Moderately entertaining — YC is read, in part, for entertainment (by at least one reader).
Explain — how it works.
Explain — (if you can) how the trick might be useful.

Clyde Smith-Stubbs from Hitech (you know, Hitech-C and so on) in Queensland have kindly offered the floppies.

Jake would be most pleased if you send your contributions in on the YC Bulletin Board, (02) 669 1385, or on one of the floppy disk formats he can read (see Contributions on disk on the Services page for details). And I won't be very keen on typing the ideas in if they come in on scraps of paper just so I can test them, either.

Speaking of testing, I wish to try these dirty tricks out myself (as far as possible). At present, I can do so if they use standard DOS facilities (BAT files, DEBUG and such), if they use Turbo Pascal, Turbo C, Digital Research's PL/1-86 (anybody left using it?) and Microsoft's MASM. I don't have dBase, Lotus 1-2-3, or Symphony

In my opening paragraph, I intimated I would host the column. That means that I will choose contributions from items submitted by readers which I think meet the criteria for publication. It also means that I won't be making all the contributions. It is essential for the survival of the column that readers contribute. While I know some of the tricks, I certainly don't know them all.

A dirty trick

Some time ago, when I was still resident in Canberra, I was talking about one thing and another with my good friend Clem Clarke, of Melbourne. He mentioned that Dr Dobbs had published a way of executing DOS commands, including DIR and SET and such, from Assembler programs. He couldn't remember exactly how it was done, so I had a look around low memory at the interrupt vector table. The vector for INT 2E seemed to be pointing a little higher than most, so I had a look at what it pointed to. Well, would you believe it: it looked *very* interesting and quite possibly useful.

Many people know that you can use the DOS EXEC function (INT 21h function 4Bh) to run programs. If you pass the program name DIR.COM or DIR.EXE, it does *not* work. However, if you use the call to invoke COMMAND.COM, with the parameter –

```
"/CDIR"
```

The /C switch tells COMMAND to run the one command (DIR) and then terminate. This works well for .EXE, .COM and .BAT commands, and also causes the directories specified with the PATH command to be searched, too. This directory-path search is a function of COMMAND.-COM, not of DOS. My DOS manual is unclear about this matter.

This is quite a neat way of doing the job, is reasonably portable (it may not work if your system does not have COMMAND.-COM, and nobody says you absolutely must have it: you merely require some command shell). If you haven't used this function, look it up in your manual now.

Rather complicated, isn't it? There is a simpler way. Unfortunately, it's less than completely portable. It has been tested on my Toshiba T3100 with MS-DOS 2.11, and with Clem's system running PC-DOS 3.2, and works fine. However, it doesn't work on my system using Toshiba's bundled MS-DOS 3.2.

Listing 1 reveals the source code I submitted to MASM to demonstrate the feat. It's fairly straightforward. Remember, if you want to load and run another program you have to free some memory first, because DOS gives your program all it's got.

The trick is to point SI to a command line containing a 1 byte length, the command itself, followed by a carriage return. You then issue INT 2Eh.

Now, some warnings –

a) Register contents are undefined upon return. It's wise to store your registers (except SS, SP) on the stack before issuing INT 2E, and saving SS and SP in your code segment, too. Restore *everything* after the event. (This applies to the EXEC function, too).

b) This does not work on MS-DOS 3.2 as supplied for my computer, so it's not portable

Running the program

Since the idea is to demonstrate how to use INT 2E, not to provide an inherently useful utility, it's very easy to run. Just enter the command DIRT with any parameters and switches you like: they will all be ignored. This program is logically equivalent to the DIR command, with no operands.

How the idea could be useful

With suitable alterations, this code can be used to do other useful things like set environment variables. You could use the idea in a BAT file. If the procedure is invoked without any parameter, and there is no value in the environment, you could run a program to ask for one. And then use code like this to put it in the environment for the procedure to use later. Like the program ASK.COM that John Hepworth mentioned some time ago, but setting an environment variable rather than ERRORLEVEL. (Just don't expect it to work on a T3100 with MS-DOS 3.2.)

Listing 2 is the BAT file I used to assemble the program and create a COM file.

I called the source code DIRT001.ASM. Drive D is my RAM disk; it gets thrown away when I reboot the system. (MSLINK is the standard Microsoft linker. I renamed it to avoid confusion with others.)

Listing 3 is for those without an assembler It was created by disassembling the file created by EXE2BIN with DEBUG and editing the output. If you create a file called DIRT containing these statements, and enter the command –

```
"DEBUG <DIRT"
```

you will get a file called DIRT.COM containing the program. Don't enter the comments.

If you prefer, you can enter the commands directly into DEBUG. The result will be the same. □

```
code        segment     'code'
            page        120
            assume      cs:code,ds:code
            org         100h
start       label       near

comment 'free some memory'
            mov         bx,(offset eom+15 - offset start) / 16
            mov         ah,4Ah
            int         21h

comment 'here tis'
            mov         si,offset string
            int         2Eh
            mov         ax,4c00h
            int         21h
string      db          3,'dir',13
            db          128  dup  (127)    ;leave  some
                                           spare room
eom         label       byte
code        ends
            end         start
```

Listing 1. The source code submitted to MASM, demonstrating this month's dirty trick.

```
masm dirt001,d:dirt;
mslink d:dirt,d:dirt;
exe2bin d:dirt dirt.com
```

Listing 2. The BAT file used to assemble the program and create a COM file.

```
ndirt.com                 <---- give it a name
a100                      <---- assemble code starting at location 100
MOV     BX,000A
MOV     AH,4A
INT     21
MOV     SI,0111
INT     2E
MOV     AX,4C00
INT     21
                          <---- Blank line
e111 03,64,69,72,0D       <---- Enter bytes starting at location 111
rcx                       <---- Read register CX
15                        <---- Set  register CX (gives  file size)
W                         <---- Write the file
q                         <---- Quit
```

Listing 3. For those without an assembler — the listing was created by disassembling the file created by EXE2BIN with DEBUG and editing the output.

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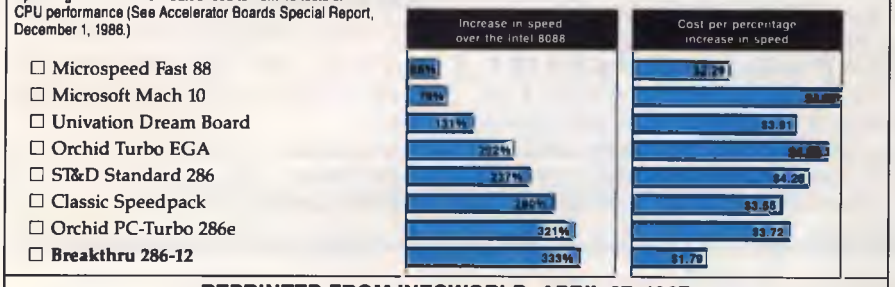

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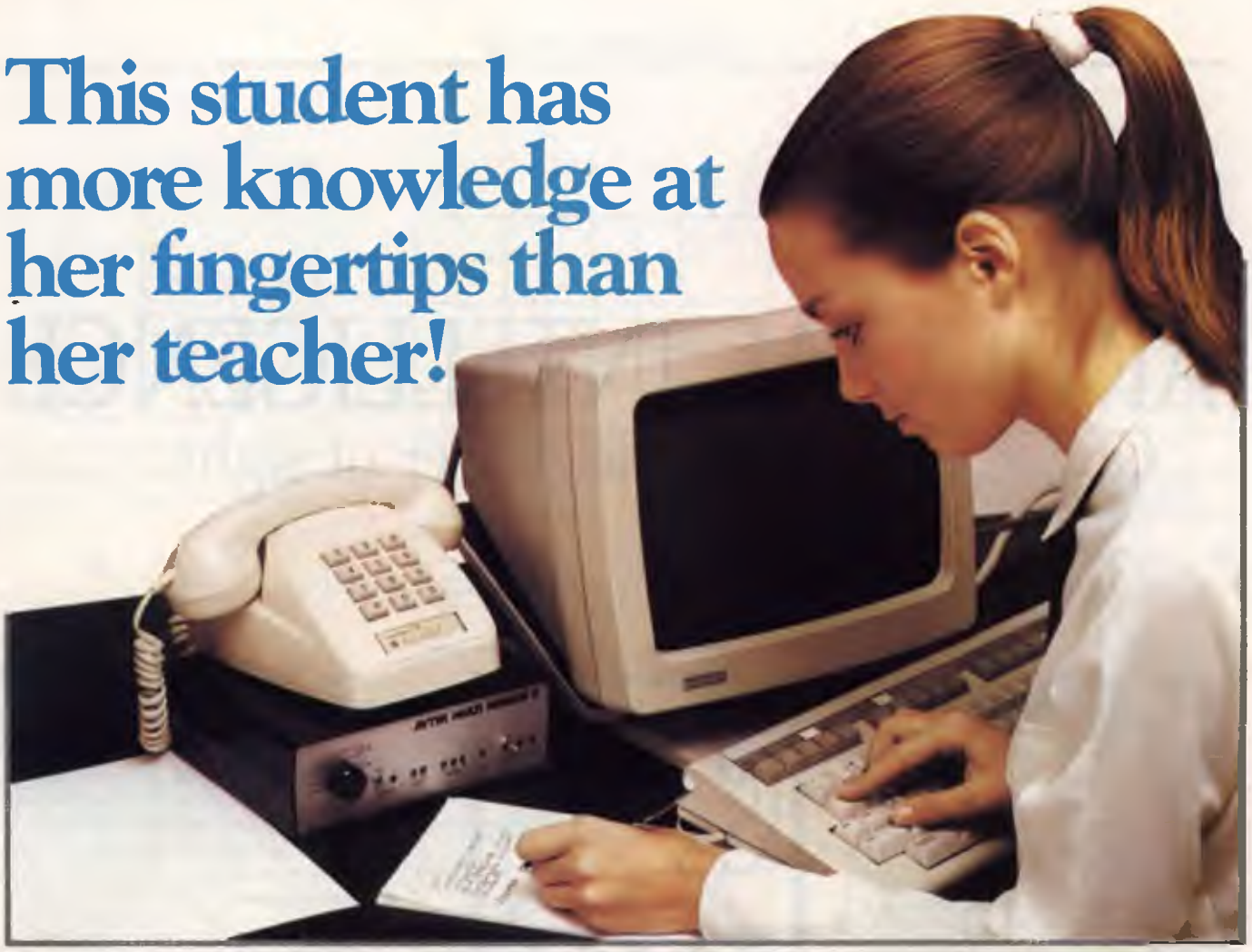

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ARTIFICIAL INTELLIGENCE

Giving a machine the power of sight . . .

Tim Hartnell has been hypnotising his computer . . .

THE MOST EXTREME stage of hypnosis is called 'hyperaesthesias' in which negative visual hallucinations are induced. That is, a subject is told he will be blind — and is.

Machines live most of their lives in a state of near total hyperaesthesias. Although computers generally carry out written instructions (such as programs) pretty well, and have some rudimentary hearing ability, electronic vision is still at the most primitive level.

There are some exceptions. The barcode reader in the supermarket could be said to be a form of vision, but it is so specialised and limited that we can really leave it out of this discussion. Until a machine can see, it will only exist as part of a functioning unit of the world in a strangely limited way, like trying to run a marathon while swathed in thick, black cotton wool.

Just as trying to make a machine 'think' has forced us to look very closely at just what we mean when we say that we think, so the need to give an intelligent machine the power of sight has forced us to look very closely at human perception — it is not as simple as it seems.

To show how extreme are the problems to be solved before we have little "droids scuttling around, negotiating the world in a meaningful way, we'll look at just one example of how human perception acts.

Spatial separation

The subject we'll examine is 'spatial separation' That is, how do we know — when looking at a group of objects, or a drawing of a group of objects — which lines belong to which object, and, if this is solved, which object lies in front of the others?

Machines live most of their lives in a state of near total hyperaesthesias.

To determine how a machine could 'construct' a solid object from a series of lines, we'll look at a very simple image. This is much simpler than the visual material which generally confronts you in life. You and I would have little difficulty in describing the object shown in Figure 1 as a cube, with six sides having straight edges of equal length. And, we make this assumption even though only two of the sides are shown with straight edges. So a machine vision system would have to be able to deduce that although the sides are shown as irregular parallelograms, they are really straight-sided squares.

Even this very simple object has problems. If I ask you to tell me whether side A or side B is at the front of the cube, your own very sophisticated visual system can become confused. (In fact, this cube picture is a classic visual illusion, known as the Necker Cube; psychologists often use illusions like this which 'trick' the visual system, in an attempt to discover how our visual apparatus works in more normal situations.)

Although we may have problems determining which face is at the front, we do not have any trouble in seeing the grid of lines as representing a 'solid' object. Our minds can 'flesh out' a skeletal drawing so we see it as having a third dimension. What happens in our brains to do this, and how could we possibly give that ability to a machine?

One program called See, created by Adolfo Guzman, can do this after a fashion. Instead of trying to perceive an arrangement of lines as a solid cube, See attempts to determine which groups of lines belong together, and therefore are most likely to represent an object. See (the program) concentrates on where lines meet: the corners, or vertices. It is able to recognize most line drawings as representing particular flat-surfaced objects (or 'polyhedrons', as they are called).

The builtin knowledge which See possesses is shown, in part, in Figure 2, in which Guzman's definitions of particular vertices are given Using these, See can examine a picture like that given in Figure 3, and determine how many objects exist in the picture. This is a significant achievement, especially if you try to work out what you do mentally to make the same decisions.

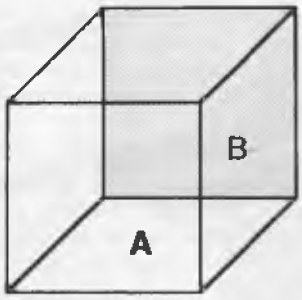

Figure 1. *The Necker Cube is used by psychologists to 'trick' the visual system, in an attempt to discover how our visual apparatus works.*

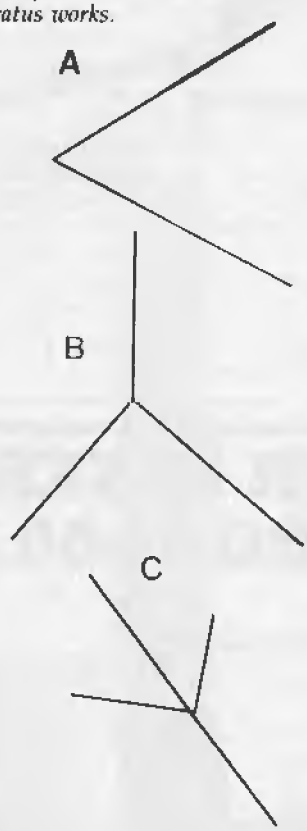

Figure 2. *Guzman's definitions of particular vertices — using these, the program See can examine a picture like that in Figure 4, and determine how many objects exist in the picture.*

A – Vertex where two lines meet.
B – Three lines form angles smaller than 180 degrees.
C – Two lines collinear; other two on opposite sides.

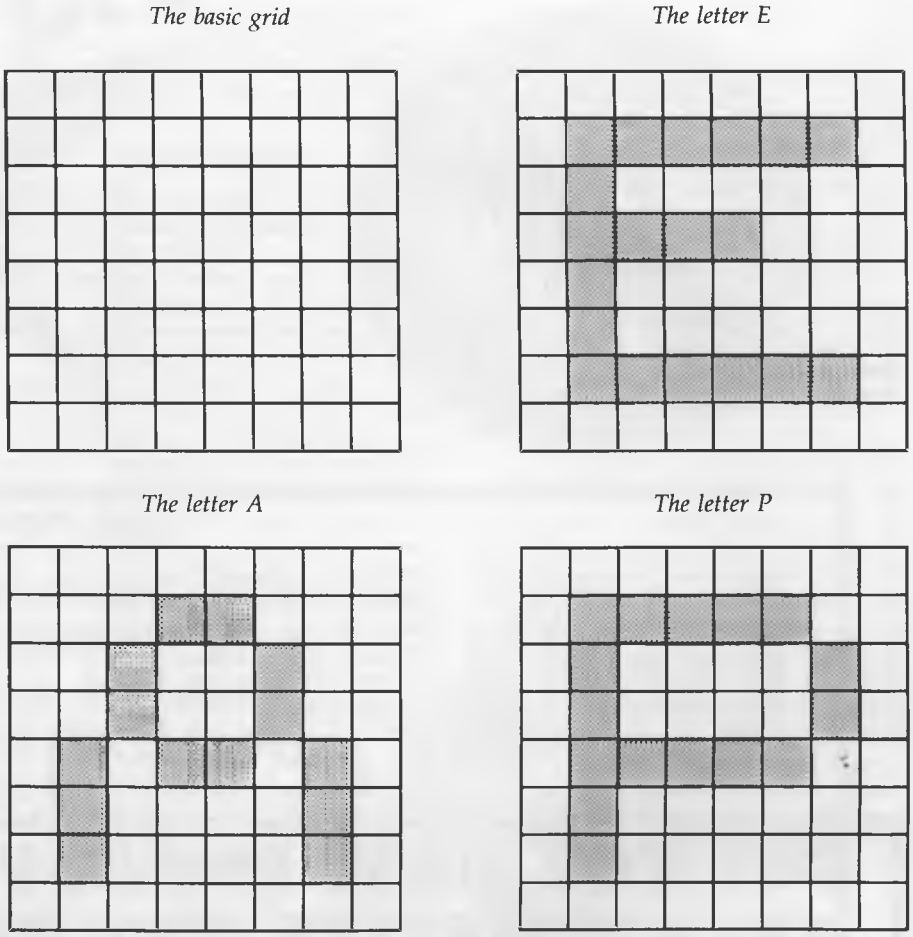

Figure 3. *You might like to write a program which can 'read' written letters given to it on a grid (like that here). The program could be told which squares on the grid are 'filled in' when a particular letter is written on the grid.*

To identify objects, See not only has to recognise where boundaries exist, and how they link up to form 'solid objects', but has to be able to differentiate between the object and its background. To do this, See uses a subsidiary program called Background, which decides what is the foreground (the object) and what is the background (that which is not part of the object).

In *Artificial Intelligence and Natural Man* (Harvester Press, 1977), Margaret Boden points out that 'Background implicitly tends to assume that bodies are convex, that objects do not have bites out of them' As the program often makes mistakes regarding whether a particular region in a picture is part of an object, or the background, it is often told this as part of its initial information. Boden continues: 'See starts off, then, knowing which picture regions are background and what types of vertex are associated with each region Its task is to identify individual bodies it looks at each vertex in turn, asking if it provides evidence for placing links between regions that probably depict surfaces of the same body [then] it groups together regions linked by two or more strong links into 'nuclei' ' (pages 193-195).

Although See goes some of the way to solving the problems of determining which lines belong to which object, it does not help particularly with the problem of determining which object is in front of another

We humans also have these problems. After a distance of around 15 feet, stereoscopic vision in humans (in which the two slightly different images produced by each idea are combined by the brain to give a three-dimensional effect) does not separate close objects spatially. Despite this, we can usually tell where objects stand in relation to one another. Even a one-eyed person can do this with a fair degree of precision.

Psychologists studying perception say, in this case, that we rely on 'monocular cues' There are generally agreed to be

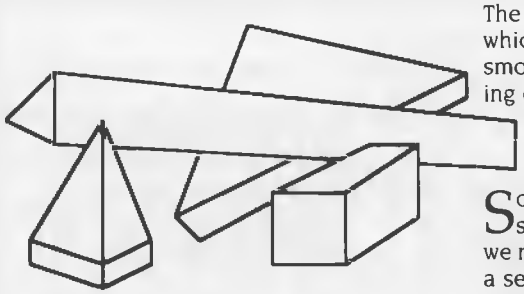

Figure 4. The program See can examine a picture like that shown here and determine how many objects exist in the picture.

four of these. The first is 'superposition'. If part of one object obscures part of another, the object doing the obscuring is assumed to be in front of the obscured one. Then there is 'relative size'; with objects of similar size to each other, the larger ones are closer. 'Height in field' is another monocular clue, when things which are towards the top of what we are looking at (such as mountain ranges when looking at a view) are believed further away than objects lower in the visual field. The final clue is 'gradient of texture', in which the further an object is away, the smoother it looks (such as the sea 'flattening out' as we look towards the horizon).

Algorithms

So, if we are to equip a machine with vision, along with all the other problems we need to solve, we would need to give it a series of 'how can I tell what is in front, and what's behind' algorithms.

And this simple example does not take into account the really fundamental questions such as 'How do we represent a visual field electronically?'. If we decide to get the machine to scan the image in front of it, and then store the results of that scanning as a series of numbers representing, say, relative brightness, how do we turn this series of numbers into the knowledge of the object it represents; and how many such numbers are needed; and how can we process the enormous amounts of data present in even a simple image in a realistic time frame?

When presented like this, the problem seems almost beyond solution. But man will no doubt find the answer in due course. There are many, many other problems, each of which are part of our ability to perceive, and each which must be given to a machine if it too can be taught to see as we do.

From our discussion of the problems involved in some aspects of vision which we carry out, generally, with little or no difficulty, that to give a machine the power of sight is going to be a major, laborious process.

To give you even greater insight into the problems, you might like to write a program which can 'read' written letters given to it on a grid (like that in Figure 4). The program could be told which squares on the grid are 'filled in' when a particular letter is written on the grid. The program should be able to cope with poorly-written letters, and slightly different handwritings. In other words, it should not look for a perfect match between a 'template' held in its data store, and the presented letter. Rather, your program should look for 'best fit' matches, so it can make a guess as to which letter is being represented.

I'll consider further aspects of machine sight in future articles. □

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PRINTERS . . .

Epson's LQ2500+, Star's NX-1000 and Brother's Twinriter

The Epson LQ 2500+ Dot Matrix

Epson's top of the line 24-pin printer.

The 24-pin Epson LQ 2500+. The control panel allows access to many of the printer's settings, and can be used to set macros.

This printer is a redesigned version of the original 2500 with improvements in paper handling and with a lower noise level. At a rated 57 dBA (maximum), it operates without the screaming racket we associate with early model dot matrix printers. It is a 24-pin letter quality printer with five LQ resident fonts, the ability to print graphics, and an optional colour kit which can be installed by the user.

It has both parallel and serial ports, and the serial port can be configured to match the host computer's baud rate and data bit characteristics from the front panel. Optional interface boards can be installed inside the LQ-2500+, either parallel or serial, if the builtin ones don't suit your needs.

Setting up the printer is pretty straightforward, and the manual has step-by-step instructions which are easily followed. The platten is a wide 406 mm (16 inches), and is suitable for spreadsheet printouts. Standard paper handling consists of a builtin push tractor with a rear feed, and a single-sheet feed with edge guides. Both work smoothly and should give years of trouble free operation. Something that is not builtin is the 'paper park' feature which enables swapping between continuous and single-sheet paper without having to un-thread the tractor. Once you've experienced paper park in a printer, it becomes a necessity.

The control panel consists of four buttons and a large liquid crystal display. At first it looks like the simple SelecType control found on smaller Epson models. But expanded version supplies all of the usual printer commands such as form feed, line feed, type selection and on-line and adds a menu function which allows access to the default settings and setting up of macros.

A macro is a list of settings, such as character set, font, pitch, margins and so on. Four different macros can be defined, with 14 optional settings within each macro. The macro is retained in memory even when the printer's power is switched off. This means that the printer can be easily altered without having to change DIP switches, if you want to switch from a graphics mode to a text mode, or if you want to print in a different international character set. The menu also allows you to print out the default settings and each macro setting.

Output from the printer is a fast 324 cps (rated) in the draft elite mode. Draft pica runs at 270 cps, LQ elite 108 cps and LQ pica 90 cps. The letters are well formed and quality is up to scratch for a 24-pin printer. The only fault we found was a variation in the print density, with some of the words looking darker than the rest — it's really only noticeable if you look for it.

We had no trouble installing the colour

Figure 1. The macro settings on the LQ2500+ are retained in memory and can be printed out from a SelecType command.

	Current setting
>QUALITY	LQ
>FONT	Roman
>PITCH	10CPI
>CONDENSED	Off
>FORM LENGTH	11.0"
>1" SKIP	Off
>LEFT MARGIN	0
>RIGHT MARGIN	80
>CG TABLE	Italic
>COUNTRY	UK
>PRINT DIR.	Bi-D
>HALF SPEED	Off
>SHEET FEEDER	Off
>DEFAULT BIN	*1

	Macro #1	Macro #2	Macro #3	Macro #4
>QUALITY	Draft	LQ	Draft	LQ
>FONT	Draft	Roman	Draft	Sans Serif
>PITCH	10CPI	10CPI	10CPI	10CPI
>CONDENSED	Off	Off	On	Off
>FORM LENGTH	11.0"	11.0"	11.0"	11.0"

kit — or in printing out the sail boat you see on the cover of this issue. The first test print showed faint at the base of the letters; this was easily fixed by referring to the manual and re-adjusting the position of the ribbon carriage. The bit-mapped full screen sail boat graphic was produced with PC Paint and and printed in density 4 (the highest setting selected from the software) — it took 17 minutes to print. The colours are strong, especially with a new ribbon.

The LQ 2500+ incorporates a new character set, Epson Character Graphics. This allows the printing of IBM character graphics, and you can produce boxes and shaded areas if your word processor includes these characters. The graphics characters are accessible through the SelecType change macro menu.

Options for this model include a plug-in font module, various serial interfaces, and single-bin and double-bin cut sheet feeders. The machine is built to last, and a high level of reliability can be expected. The ribbon cartridge (black) has a life expectancy of 2 million draft characters.

If your needs include high capacity, high quality printouts, this is the printer for you. According to Epson, it has found high level of acceptance in places like solicitors' offices and corporate word processing pools. And then there's the colour option.

Product Details

Product: LQ 2500+ Dot Matrix Printer
From: Epson Australia,
3/17 Rodborough Rd,
Frenchs Forest 2086 NSW
(02) 452 5222
Price: $2250 taxed

The Star NX-1000

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The translucent front cover fits neatly and simply on to the main body to give a clean-cut appearance. Not only does it keep out dust, but its upper edge has been designed so that it can be used as a tear-off bar.

Paper Park is a welcome feature, and it works! All you have to do is press the Print Pitch and the Paper Feed buttons together and the fanfold paper is fed backward until it frees the platten. It then sits there out of the way until you need it again. Single sheets can be loaded either manually or semi-automatically, and when you need to change back to fanfold, it's a simple matter of moving the release lever and the paper bail.

The Star NX-1000 has a good, functional design.

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The print head looks remarkably small, and is moved along its path by a ribbed rubber band. This is presumably designed to keep the noise level at a minimum, and indeed, the printer is very quiet for a dot matrix: none of the clunking and rattling sounds that emanate from printers with metallic drive systems.

On power-up, the printer can be engaged to perform one of two self tests. The fonts are displayed as usual in their various styles. Although it prints fairly slowly in Near Letter Quality (around 36 characters per second), the quality is very good for an inexpensive dot matrix printer. There are plenty of typestyles (another surprising feature in such a low-priced printer): Sanserif, Courier, Orator-1 and 2, in a choice of Pica, Elite, Condensed, and Italic.

One annoying feature when using the printer in single-sheet mode is the high-pitched beep that is emitted as a 'paper-out' signal. The manual describes it as a short beep tone, but it's more insistent than that — at close range it's more like a piercing shriek. This is annoying when you are printing out a long document using single sheets, because it beeps every time you need to change the paper. This is a feature common to many printers, but I think the user should have some control (other than a hammer) over the volume

Once you've experienced paper park in a printer, it becomes a necessity.

The printer has two emulations, with Epson LX-800 as the default, and IBM Proprinter selectable from a DIP switch setting. Both of these settings performed well when tested, and the IBM extended character set is supported.

Documentation is excellent, with a well written manual that includes full instructions on how to get the most out of this printer. The usual tables of escape codes are supplemented by examples of how the user can actually access them through DOS batch files or through programs in Basic. First-time users should have no trouble in setting up the printer, and understanding the computer-printer relationship if they follow the manual step by step.

Dear Orion:	*DEAR ORION:*
At 12:20 this afte and justified by of the world! Ar automatically – it first line of mov and perfectly jus	*AT 12:20 THIS AFTE* *AND JUSTIFIED BY I* *OF THE WORLD! AN* *AUTOMATICALLY – I* *FIRST LINE OF MOV* *AND PERFECTLY JUS*
This was the last so by long odds t ever born of the Livy is downstair	*THIS WAS THE LAST* *SO BY LONG ODDS T* *EVER BORN OF THE* *LIVY IS DOWNSTAIR*
All the witnesses historical birth - movable type by n the minute. Nobo seemed drunk. We	*ALL THE WITNESSES* *HISTORICAL BIRTH -* *MOVABLE TYPE BY M* *THE MINUTE. NOBOL* *SEEMED DRUNK. WEL*
All the other won pretty nearly int mechanical miracle cotton gins, sewir looms, perfecting toys, simplicities.	*ALL THE OTHER WON* *PRETTY NEARLY INT(* *MECHANICAL MIRACLE* *COTTON GINS, SEWIN* *LOOMS, PERFECTING* *TOYS, SIMPLICITIES.*

Figure 2. *The NX-1000's NLQ Courier Proportional and Orator Italic typestyles.*

There is even a program written in Basic that enables the user to download a custom designed character. The example given is of a very small car, in draft and NLQ modes. I suppose there is a motor mechanic somewhere who will make use of this feature; the farmers among us will have to design their own sheep and cattle.

Apart from the usual font-select and paper feed options, other features are accessible from the front control panel. These include top of form, forward and reverse micro-feed, form feed, buffer clear, left and right margin override, panel lock mode, and hex dump. That is an impressive array of commands, and most of them can also be accessed through software.

The only problem (apart from the beeper) was the difficulty I experienced in getting the rear tractor-feed cover to lift off. This may be just a peculiarity of our test machine, and I did manage to get it off without getting violent, so it's only a minor problem.

The Star NX-1000's multitude of features, wide range of fonts, good design (and price!) make this printer a winner.

Product Details

Product: NX-1000 Dot Matrix Printer
Distributor: Star Micronics
7/6 George St, Homebush 2140 NSW
(02) 736 1144
Price: $630 taxed

The Brother Twinriter 6

Dot and daisy, text and graphics . . .

The Twinriter has been around for over twelve months, but we decided to test it because of its unique dual makeup — it's both a daisy wheel and 9-pin dot matrix printer. It's a combination of the best of both worlds: true letter quality text from the daisy wheel, and high speed draft and graphics from the dot matrix. The four modes of operation allow mixtures of these two worlds to give interesting results.

The daisy wheel prints at a maximum rated speed of 36 cps, which is brisk for a daisy, and the dot matrix prints at 200 cps in draft mode, which is not so brisk if you compare it to the 300 to 400 cps that most dot matrix printers in the upper price range can meter out.

We had no trouble installing the colour kit — or in printing out the sail boat you see on the cover of this issue.

The dot matrix head is mounted to the right of the daisy wheel printhead. This makes up a pretty hefty combination, and when the printer is operating, it tends to induce vibrations and wobbles in the desk. I would advise a rigid support for this printer.

For data processing applications, the Twinriter 6 will turn out reports up to 136 columns wide. It can produce the IBM extended character set by combining characters on the daisy wheel and triple-pass letter quality printing by the dot matrix printhead. For letter quality text, the 96 character daisy wheel cannot really be improved upon, and is replaceable with other typestyle wheels.

Paper feeds are options on this model. You could use it with the standard single-sheet friction feed, but it does really require something more sophisticated. This

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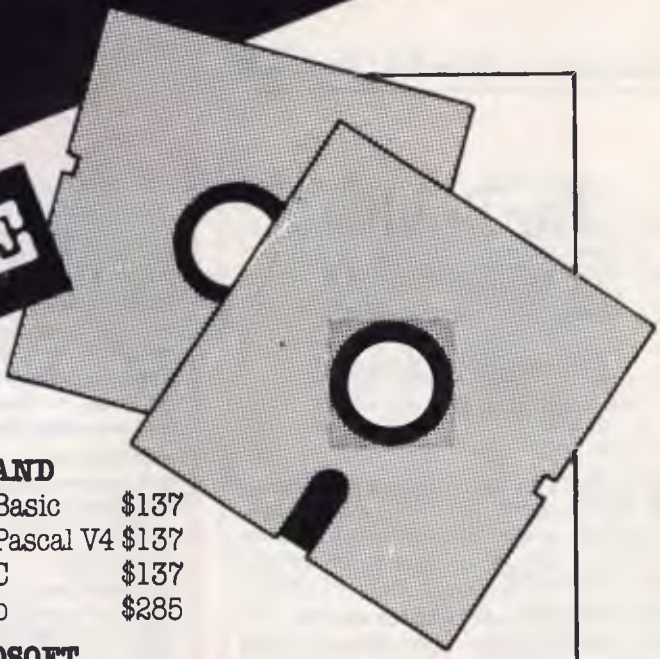

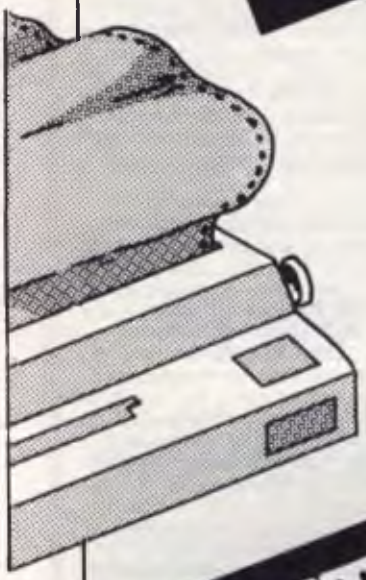

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E & OE

is supplied in the form of a cut-sheet feeder (single or double bin) and a tractor feed. To install either of these the manual gives instructions, but they are, to say the least, a bit difficult to follow. When eventually installed however, they worked as they should.

The manual is lacking in several respects: it's step by step set-up description lacks detail, and important instructions are just not there. For example, the instructions on how to insert a sheet manually neglects to tell you to turn the printer on, and to move the paper release lever. This might seem like common sense to many experienced typists, and not necessary to be spelled out, but many printer users are not experienced, and the time they need guidance the most is when they are learning how to set things up for the first time.

The manual also lacks an index, and the section that describes the operation of the control panel focuses on the individual buttons rather than on describing the functions they perform when pressed alone or in combination.

The printer has three banks of DIP switches at the rear for setting defaults such as print mode on power-up, page length, communications protocols and character sets. There is a parallel port as standard, with the option to add a serial port. At the rear of the printer there is also a DIN connector that accepts a cable from the cut-sheet or tractor feed.

The ribbon and its cassette is as long as the full width of the platten. Cassettes have replacement instructions printed on them, and installation is a little more tricky than with the normal dot matrix cartridge. Two types of ribbon are available, a long-life nylon ribbon and a high quality multistrike carbon ribbon.

Once installed, the printer works with no problems to produce a high quality printout It is more suited to applications which require true letter quality mixed with graphics, rather than a data-processing draft printer. □

Brother's Twinriter 6 — the best of both worlds!

Product Details

Product: Twinriter 6
From: Brother Industries, 7 Khartoum Rd, Nth Ryde 2113 NSW
(02) 888 4344
Price: $2495 taxed

Printworks

If you were thinking about throwing away your old dot matrix printer and upgrading to a more recent model, think again. For just $170 you may be able to get what you want in the way of extra fonts, more sizes, more characters, and even sideways printouts.

Printworks is a software package for IBM compatibles and the Macintosh. There is a version for dot matrix printers, and one for laser printers It comes on two disks with a well written manual, and an update file which you can read for the latest tips and developments Further updates are available for registered users.

The list of feats that this small package can accomplish is quite impressive. It includes the ability to print scientific symbols and foreign languages. Spreadsheets and text can be printed sideways using the 'pivot printing' feature. This could be useful if your resources do not include a wide platten printer, or if your spreadsheet is really, really wide. Superscript and subscript printing, proportional, overstrike, condensed, wide, emphasized, variable line spacing and italic modes are all accessible through two simple Printworks menus.

The problems involved in getting the right sort of output from computer to printer vary according to the type of printer, the type of computer, and the software being used. All are different to the extent that the only standard you can safely assume is firmly in place is that of incompatibility. For this reason, the Printworks package is hardware specific, and I strongly advise anyone contemplating purchase to check that their printer and computer are supported in the current version.

I tried out Printworks on a Star NX-1000 9-pin dot matrix. This printer can be used with either Epson LX-800 or IBM Proprinter II emulations. As it is a new model, there is no mention of it in the list of supported printers, although there are other Star models, and a fairly wide range in total The Tips file that comes with Printworks recommends selecting the Epson EX set-up for the LX range This was chosen, and the Print-

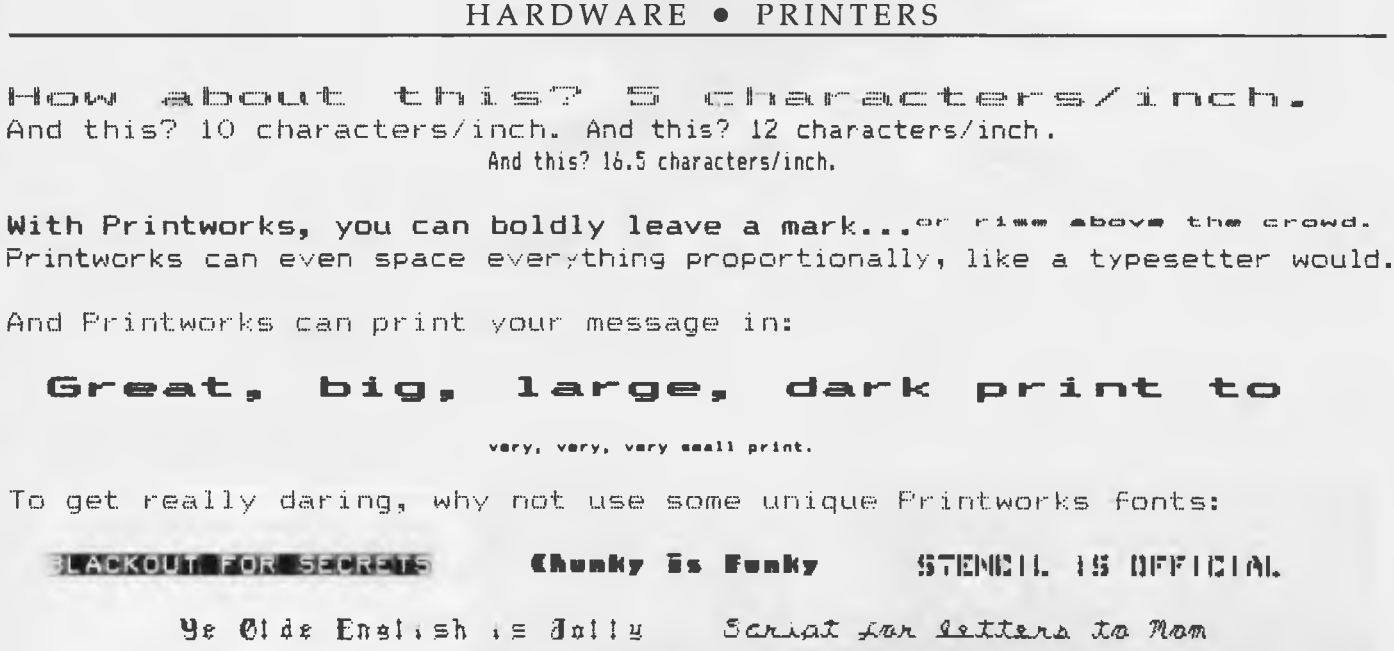

Figure 3. Samples showing the versatility of Printworks — these were printed on a 9-pin dot matrix printer, the Star NX-1000.

works demonstration program printed out without a hitch.

Once installed, the Printworks menu arrives on screen, and the idea is that you select the font, size and other special characteristics you require, then exit and go on to your word processor and carry on as normal. When it comes time to print, your printer will output text in the style you have chosen. There is a test option you can quickly run before you exit the menu to check on your selection.

Both the standard menu and the advanced menu have selections that may not be available for your particular printer. The available options depend on whether your printer supports them, and whether Printworks supports your printer fully or only partially in an emulation mode. With the Star NX-1000, all of the features tested worked. The menu, however did not have the selection for near letter quality printing activated, and this option could not be selected from Printworks.

Perhaps the best features are the fonts. There are some interesting looking ones such as Blackout, which is a sort of reverse mode, and Chunky, Broadway, and Fat City. If the font or character you need is not there you can easily make your own with the font editor.

Printworks will not turn your 9-pin into a letter quality printer, but you can get a reasonable NLQ by selecting doublestrike and the Roman font. Many of the features are those that can be accessed with your printer's Esc codes, but if you find the process of looking up tables tedious and time consuming, Printworks can do it for you conveniently.

Product Details

Product: Printworks Print Enhancer
Distributor: PC Extras, PO Box K9, Haymarket 2000 NSW
(02) 319 2155
Price: $170 Dot matrix version, $279 laser version (tax inclusive).

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Part 2

PRINTERS

Dot Matrix and Daisy Wheels

The piece of equipment needed for getting the most out of your computer is a printer. It is the complementary part to any hardware/software combination for word processing and data processing. Whatever your requirements, from simple draft quality listings to true letter quality output, our survey should help you find a printer that suits.

How many times, dot matrix users, have you cursed and thrown things about when the time comes to change from continuous paper to single sheets? If you are using multipart forms and spreadsheets, interspersed with higher quality letters, or if you are experimenting with the layout on cheap continuous paper, then switching to single sheets for the final product, paper parking may save you from frustration

With non-parking paper feeds, the switch involves turning off the printer, winding the tractor-feed backwards, catching the continuous paper before it slips to the floor and taping it down to some immovable object. Then you have to turn the printer back on, load the single sheet using friction feed, print the letter, and if you want to print out something on continuous paper next, then you have to repeat the whole process backwards.

If you need to carry out this process more than once a day, it can lead to a rise in blood pressure, loud swearing, and acts of a violent nature. But we have at last been saved from this destructive behavior by one of those simple ideas that make life suddenly easier and more productive — the Paper Park has arrived.

Dot Matrix Printers

The dot matrix printer still reigns supreme as the most cost effective solution to most printer requirements. From the humble draft quality 9-pin used in many home set-ups right through to high volume workhorses, the range is wide and varied. The 24-pin Letter Quality (LQ) printer is making inroads into the lower end of the market, and it is now possible to buy a 24-pin printer for a 9-pin price.

If your requirements for a printer includes output of spreadsheets, then you will most likely be looking for the ones that can handle wide computer batch paper. There are several wide platten models that you can choose from here, and in many cases a narrow platten model will have a wide platten cousin.

One feature that has made an entrance lately is the Paper Park, mentioned above. This means that you can switch easily from single sheet feed to tractor feed with the flick of a switch. If you are printing out draft quality, high speed listings on continuous feed paper, interspersed with letter quality printouts on single sheets, this is the feature which may save you a lot of downtime.

Tandy DMP 106

From: Tandy Australi
(02) 675 1222 $399

This budget priced model prints up to 80 cps, is IBM compatible, and can handle bit-image graphics. The tractor feed takes paper 10.2 to 24 cm wide, and friction feed for single sheets is built in as well
Print Speed: Up to 80 cps
Compatibility: IBM compatible
Print Styles: Elongated and condensed modes.
Front Panel: Simple one button selection
Dimensions: 391 *x* 240 *x* 79 mm
Weight: 3.9 kg

Amstrad DMP 3160

From: Mitsubishi Electric AWA,
(02) 638 8444 $499

This 9-pin printer has a draft print speed of 160 cps It is IBM PC compatible and has fold-away legs so that it can straddle a wad of fanfold paper. There is a wide carriage version, the DMP 4000, which sells for $826.
Print Speed: Draft 160 cps NLQ 40 cps
Compatibility: IBM PC compatible Centronics parallel interface.
Print Styles: One font in seven pitches Large range of special characters. Superscript, subscript, underline and more.
Front Panel: Simple three-button control panel
Dimensions: 400 *x* 250 *x* 100 mm
Weight: 4 2 kg

Tandy DMP 130

From: Tandy Australia
(02) 675 1222 $599

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Brother's M-1209 comes with two serial and two parallel ports.

graphics modes. Draft and correspondence modes, bi-directional logic-seeking print head (unidirectional in correspondence and graphics modes). Built-in tractor feed.
Print Speed: Draft 50 to 100 cps. Correspondence Quality 20 to 24 cps.
Compatibility: IBM PC compatible Parallel and Colour Computer compatible serial interfaces.
Print Styles: Standard or italic cursive styles in draft and correspondence modes. Supports super/subscripts, double- width, bold, double-strike.
Dimensions: 391 *x* 267 *x* 120 mm
Weight: 4.9 kg

Star NX-1000

From: Star Micronics,
(02) 736 1144 $630

Paper parking, quiet operation, and attractive clean-cut design make this 9 pin printer suitable for home or office use. See our review of this machine for further details
Print Speed: Draft 144 cps, NLQ 36 cps
Compatibility: Epson, IBM
Print Styles: Four styles in four sizes, with italic printing available in all print modes.
Front Panel: Four control buttons which can be operated in combinations to give extra functions such as forward and reverse micro-feed, paper park, margin set, hex dump, panel lock. Led indicators on primary controls.
Dimensions: 384 *x* 287 *x* 108 mm
Weight: 4.7 kg

Seikosha SP-180AI

From: AWA Technology
(02) 888 9000 $503

This printer is compact and reasonably quiet. It has been designed with the home user in mind, and is not too expensive. It has tractor and friction feed as standard and is available in a version to suit Commodore 64/128 computers.
Print Speed: Draft 100 cps, NLQ 19 cps.
Compatibility: Epson FX and IBM 5152. Parallel Centronics interface.
Print Styles: Standard, NLQ, italic in three sizes
Front Panel: Standard and NLQ button.
Dimensions: 407 *x* 300 *x* 107 mm
Weight: 4.2 kg

Epson LX-800

From: Epson,
(02) 452 5222 $650

This 9-pin model is from the lower end of Epson's range of dot matrix printers. It has a choice of two NLQ fonts, has a small footprint, and prints at a maximum of 180 cps in draft mode.
Print Speed: Draft 180 cps, NLQ 25 cps.
Compatibility: IBM compatible, including the IBM graphics character set. Epson ESC/P standard
Print Styles: Draft, NLQ Roman, NLQ Sans Serif. Four sizes. Superscript, subscript, italics.
Front Panel: Simple "SelecType" three-button mode selection.
Dimensions: 377 *x* 308 *x* 91 mm
Weight: 5.1 kg

Brother M-1209

From: Brother Industries,
(02) 887 4344 $699

Here is a compact 9-pin printer with dual parallel and serial interfaces, 168 cps draft printing, and a quiet 55 dBA operating noise level.
Print Speed: Draft 168 cps. NLQ 35 cps.
Compatibility: Epson EX/FX series, IBM Proprinter XL.
Print Styles: Three NLQ fonts, three sizes.
Front Panel: Simple three-button function selection
Dimensions: 352 *x* 234 *x* 78 mm
Weight: 5 kg

Epson LQ-500

From: Epson,
(02) 452 5222 $828 ($900 from 1/5/88)

This is the latest from Epson, a letter quality 24-pin printer at a low 9-pin price. It has an auto load button which brings single sheets into position ready for printing. The plug-in font cartridges are the same as those used by other Epson LQ printers. There is an additional software command to the normal ESC/P commands which allows the user to print in outline and shadows. A pull tractor is provided as standard equipment
Print Speed: Draft 180 cps maximum. LQ 60 cps maximum.
Compatibility: Epson ESC/P standard Centronics Parallel interface, with optional serial interfaces.
Print Styles: Three fonts standard (Draft, Roman, Sans Serif). Optional plug in font cartridges.
Front Panel: Three-button selection including Selectype font selection
Options: Serial interfaces, cartridge fonts, cut sheet feeder.
Dimensions: 390 *x* 320 *x* 139 mm
Weight: 7 kg

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Print Speed: Draft 200cps. NLQ 40cps
Compatibility: Epson, IBM
Print Styles: Two styles, three sizes
Front Panel: Five button operator key pad
Dimensions: 435 *x* 345 *x* 112 mm
Weight: 8kg

NEC P2200 Pinwriter

From: NEC Information Systems,
(02) 438 3544 $942

Here is a 24-pin dot matrix printer with a 9-pin price. It is also loaded with features, such as the built-in paper handling capability. This allows continuous paper to be fed in from the rear or the front. The front feed allows single sheets or envelopes to be fed in without having to remove continuous paper from the tractor. This amounts to a paper park facility. There is also a tear bar for easy removal of receipts and invoices. With a resolution of 360 x 360 dots per inch, graphics and charts can be printed with clarity.
Print Speed: Draft 168 cps maximum. LQ 60 cps maximum
Compatibility: Emulates NEC Pinwriter P5, P6, P7, Epson LQ
Print Styles: Five resident fonts in various sizes. Total of 24 typestyle combinations including italics. Extra typefaces available in plug-in cartridges.
Front Panel: Four button selection, including letter quality or draft, quiet mode or font pitch.
Dimensions: 390 *x* 280 *x* 140 mm
Weight: 5.5 kg

Fujitsu DX 2100

From: Fujitsu,
(02) 959 6555 $948

Fujitsu have a range of 9 and 24-pin printers, and there is a narrow and wide carriage version of each model to suit most needs. This one is a 9-pin dot matrix with quiet operation, the option to add colour to your printouts, and paper parking. The rear-feed tractor unit makes it possible to insert a cut sheet at anytime without removing the fanfold paper.
Print Speed: Draft 220 cps at 10 cpi, 176 cps at 12 cpi. NLQ 44 cps.
Compatibility: Epson FX-80, IBM Graphics and Proprinter emulations. Centronics parallel or RS232C serial interfaces.
Print Styles: Courier 10 and Italic NLQ fonts.
Front Panel: Smooth lines, with a four-button selection panel.
Options: Colour option kit user-installable.
Dimensions: 438 *x* 345 *x* 120 mm
Weight: 9.2 kg

OKI Microline 192

From: IPL Datron,
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This 9-pin printer has several paper feeding options including front-loading, bottom or top feed, bidirectional tractor feed, and cut-sheet feed. It has the ability to save over 20 print function settings as

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The Epson LQ-850 has a top-mounted lever to switch between tractor and friction feed (both standard).

"standard values" even after the printer has been turned off, without altering internal DIP switches.
Print Speed: Super Draft 240 cps. High speed draft 200 cps. Utility 160 cps. NLQ 40 cps.
Compatibility: Microline standard I/E.
Print Styles: One font in up to 40 modes.
Front Panel: Four-button selection
Options: Sheet insertion guide for front feed, cut sheet feeder, bidirectional precision tractor.
Dimensions: 360 *x* 275 *x* 80 mm
Weight: 4.5 kg

Epson EX-800

From: Epson,
(02) 452 5222 $1120

This printer has been around for a while and has proven itself to be reliable. It is an upgrade from the FX-models, with more speed and the ability to print bi-directionally with both text and bit-image graphics. The front panel is also an upgrade from the FX models, with extra functions There is a wide carriage version, the EX-1000
Print Speed: Draft pica 250 cps, draft elite 300 cps, NLQ 50 cps.
Compatibility: Epson ESC/P sequence commands. IBM Character graphics print out in Epson mode, generally without the need to set DIP switches. Centronics Parallel and RS 232C Serial ports.
Print Styles: NLQ Roman and Sans Serif. Draft, Pica/Elite/Proportional. Normal and condensed.
Front Panel: Eight soft touch SelecType buttons for font selection. Three paper control button with LEDs
Options: Colour Kit, Other interfaces.
Dimensions: 420 *x* 378 *x* 119 mm
Weight: 10 kg

Seikosha SL-80AI

From: AWA Technology Group
(02) 888 9000 $973

The SL-80AI is a low cost 24-pin printer with all of the basic features. It prints in draft, letter quality and high resolution dot addressable graphics modes. It has a big brother with a wide carriage and more features called the SL-130AI. (The 130AI has paper parking, 8 fonts, a good-looking front panel and a higher price).
Print Speed: Draft 135 cps, LQ 45 cps.
Compatibility: Epson LQ-1500 and IBM graphic printer emulation.
Print Styles: One font, in four sizes
Front Panel: Four-button, basic functions.
Dimensions: 419 *x* 325 *x* 139 mm
Weight: 7.3 kg

Brother M-1709

From: Brother Industries
(02) 887 4344 $1195

Paper parking, dual interfaces, quiet operation, and a brisk printing rate are some of the features of this one from Brother.
Print Speed: Draft 240 maximum. NLQ 50 cps maximum.
Compatibility: Epson FX series, IBM Proprinter. Parallel and serial interfaces.
Print Styles: Two NLQ fonts, normal, enlarged, condensed, emphasized, double strike, triple strike, italic, underline.
Front Panel: Six button control with LED's on a flat, stylish panel.
Options: Cut sheet feeder, NLQ font/RAM boards.
Dimensions: 490 *x* 304 *x* 99 mm
Weight: 7.5 kg

Commodore MPS 2020

From: Commodore Business Machines,
(02) 427 4888 $1299

This printer is designed to meet the needs of both Commodore Amiga and PC users. It is a 9-pin machine with the ability to handle bit-image graphics, and has a colour option.
Print Speed: 'Superdraft' 300 cps, Draft 200 cps, NLQ 100 cps.
Compatibility: IBM parallel centronics interface, cables to suit Amiga range.
Print Styles: One font in several styles and spacings.
Front Panel: Simple four-button panel
Options: Tractor feed, cut sheet feeder.
Dimensions: 367 *x* 305 *x* 97 mm

Epson LQ-850

From: Epson,
(02) 452 5222 $1350

24 pins means better quality printouts, and that is what you get with this model, which is Epson's recent addition to the printer market. This printer is suitable for letter quality correspondence, point of purchase invoicing, barcode printing, graphics, and desktop publishing. There is a wide carriage model and both versions have the paper park feature.
Print Speed: Draft elite 264 cps, pica 220 cps. LQ elite 88 cps, LQ pica 73 cps.
Compatibility: Epson ESC/P standard. IBM compatible Parallel and serial interfaces.
Print Styles: Roman or Sans Serif, draft and LQ. Four sizes and condensed. Extra fonts through plug-in font cartridges.
Front Panel: SelecType with LED's Load/eject button for paper park function

Options: Pull tractor, cut-sheet feeder. Font cartridges.
Dimensions: 430 *x* 360 *x* 142 mm
Weight: 9 kg

NEC CP6 Pinwriter

From: NEC Information Systems, (02) 438 3544 $1372

The colour version of the P6 Pinwriter prints seven colours (plus black) in a high 24-pin resolution. It comes standard with parallel interface, ribbon and an acoustic mat.
Print Speed: High Speed 216 cps. Draft 180 cps. LQ 72 cps.
Compatibility: Epson LQ series
Print Styles: High-speed, draft and letter quality with italic. five sizes and proportional. Total combinations: 22 type styles.
Front Panel: Clean cut lines with a four button function selection
Options: Cut sheet feeder, pin feed tractor, bidirectional tractor.
Dimensions: 410 *x* 335 *x* 125 mm
Weight: 8 5 kg

Star NR-15

From: Star Micronics, (02) 736 1144 $1434

High speed 240 cps draft and near letter quality printing at 60 cps. This is the top of the range wide carriage 9-pin dot matrix printer from Star. All functions are accessed through the front panel, including micro-feed, margin set, and italic mode.
Print Speed: Draft 240 cps, NLQ 60 cps.
Compatibility: IBM Proprinter, IBM Graphics printer, Epson FX series.
Print Styles: Four sizes, draft, nlq or italics. A wide range of character sets.
Front Panel: Five button function selection, extra functions accessed through pressing buttons in combination.
Options: 16Kb buffer board, serial interface, automatic sheet feeder
Dimensions: 582 *x* 360 *x* 105 mm
Weight: 11.9 kg

Dataproducts 9034

From: Dataproducts Printers, (02) 451 3533 $1770

This is a stylish 32 pin member of the 9000 series. It is designed for high volume 300 cps draft output, as well for high quality text. It comes complete with serial and parallel interfaces. Other models have a wider 15 inch carriage and colour options. It has a semi-automatic cut-sheet feeder and paper park features.
Print Speed: Draft 300 cps, LQ 83 cps
Compatibility: Epson LQ 800/1000, Diablo 630.
Print Styles: Two resident fonts plus italics. Optional font cards.
Front Panel: Touch-sensitive control panel with five buttons, and shift function.
Dimensions: 431 *x* 330 *x* 127 mm
Weight: 9.9 kg

Facit B3100

From: Elmeasco Instruments, (02) 736 2888 $1908

Four different paper paths are available as standard These include bottom-feed and rear-feed fanfold, and auto park/load of fanfold paper. There is a low-noise mode which brings the

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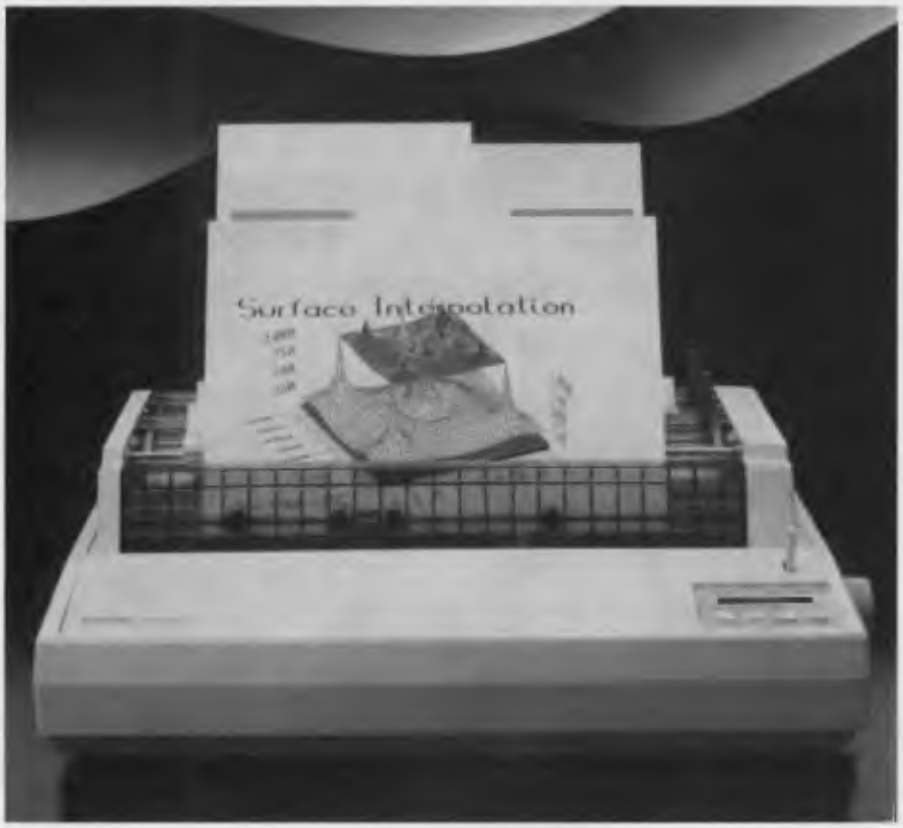

Epson's top-of-the-line 24-pin LQ-2500+.

level down to 50 dBA. This is a 9 pin printer with the option to add colour capability and single or double-bin sheetfeeders.
Print Speed: Draft 250 cps, NLQ 60 cps
Compatibility: Epson FX/JX, IBM Proprinter.
Print Styles: Use of plug-in cards to load fonts.
Front Panel: Four control keys and five program keys. Includes a low-noise key.
Dimensions: 494 *x* 400 *x* 144 mm
Weight: 11 kg

Star NB-15

From: Star Micronics,
(02) 736 1144 $2158

This is a 24 pin printer that gives letter quality at 100 cps. Extra typefaces can be accessed through optional cartridges. Two of these cartridges can be plugged in at the one time, and the typestyles selected from the front panel. It has a wide carriage, and an expandable 16Kb print buffer.
Print Speed: Draft 300 cps at 12 cpi, 250 cps at 10 cpi. LQ 100 cps at 12 cpi, 83 cps at 10 cpi.
Compatibility: IBM-PC compatible. With the optional emulation kit, emulates Epson LQ 1500, Toshiba P351, Qume Sprint 11.
Print Styles: Prestige font as standard. Other typefaces via cartridges. Two font cartridge slots.
Front Panel: Six-button selection panel.
Dimensions: 580 *x* 383 *x* 121 mm
Weight: 14.8 kg

Epson LQ-2500+

From: Epson,
(02) 452 5222 $2388

This model is 5 dBA quieter than its predecessor. It runs at 324 cps in the draft elite mode, has an 8 Kb input buffer, and custom preset configurations can be stored in memory. It has several optional additions, including a pull tractor, an image scanner, colour kit, font modules, and cut sheet feeders.
Print Speed: Draft elite 324 cps, pica 270 cps. LQ elite 108 cps, pica 90 cps.
Compatibility: Epson ESC/P standard. IBM compatible. Includes the IBM graphic character set. Parallel and Serial ports.
Print Styles: Five fonts, four sizes. Extra fonts from plug-in font modules.
Front Panel: Four-button plus alphanumeric liquid crystal function status display.
Options: Single/double cut sheet feeder, font modules, seven-colour printer kit, image scanner, pull tractor.
Dimensions: 591 *x* 375 *x* 170 mm
Weight: 12.5 kg

Toshiba P351SX

From: Toshiba Computer Products Division,
(02) 887 3322 $2634

The latest in Toshiba's slimline range, this 24 pin machine runs at a fast 360 cps in draft mode. It is also quiet, operating at 51 dBA in quiet mode. It has a 32K memory, upgradeable to 64K, and high resolution 360 dpi graphics.
Print Speed: Draft 360 cps. LQ 120 cps.
Compatibility: Toshiba/Qume, IBM Proprinter. Optional Epson LQ emulation card
Print Styles: Five fonts. Fourteen optional type font cards.
Front Panel: Touch panel with 32-character alphanumeric display. All functions accessible through the front panel.
Dimensions: 580 *x* 140 *x* 395 mm
Weight: 15 kg

Fujitsu DL2600

From: Fujitsu,
(02) 959 6555 $2940

This 24-pin printer has three letter quality fonts, optional font cartridges to expand the range, a 16 character LCD readout on the front panel, paper parking.
Print Speed Draft 240 to 288 cps Report quality 160 to 190 cps. Letter Quality 80 to 96 cps.
Compatibility: IBM Graphics Printer and Diablo 630 API. With the colour model, the 2600 Colour, Epson JX-80 emulation as well.
Print Styles: Three letter quality fonts built in. Optional plug-in font cartridges.
Front Panel: Four button selection and a 16 character LCD status display.
Options: Colour model offers seven colours. One-inch tear-off feature. Font Cartridges.
Dimensions: 570 *x* 390 *x* 195 mm
Weight: 20 kg

Brother M4018

From: Brother Industries,
(02) 887 4344 $3099

Designed for high volume quality printing, this 18-pin model has a super-fast draft mode, paper parking, convenient paper feeding and an option to add colour.
Print Speed: Draft elite 480 cps, Pica 400 cps. NLQ 100 cps. LQ 67 cps.
Compatibility: IBM Proprinter and Epson FX series.
Print Styles: Three resident fonts, Extra fonts stored on optional font cards.
Front Panel: Nine button selection with two numeric status indicators.
Options: Font cards, pull-up tractor feed, auto cut-sheet feeder.
Dimensions: 595 *x* 402 *x* 175 mm
Weight: 16 kg

RuggedWriter 480

From: Hewlett Packard,
(02) 888 4444 $3412

A hard working and durable 24-pin printer that is designed for many hours of use, with a high speed 480 cps draft and 240 cps letter quality printouts. There are three paper paths (fan-fold, cut-sheet and hand-fed).

Print Speed: Draft 480 cps. LQ 240 cps.
Compatibility: HP and Epson printer modes. IBM PC compatible. Dual parallel and serial ports.
Print Styles: One font, nine print pitches. Extra font styles with optional character cartridge.
Front Panel: Key-selectable print modes, paper movement, and paper paths.
Options: Sheet feeder Font cartridge with 16K RAM, interfaces.
Dimensions: 600 *x* 350 *x* 209 mm
Weight: 15.9 kg

OKI Microline 393

From: IPL-Datron Pty Ltd,
(02) 699 4824 $3958

This fast 24-pin printer gives you the choice of four print speeds, paper parking, letter quality printing, 360 dpi graphics, and the option of including your own symbols and graphic patterns in the printout.
Print Speed: High speed 450 cps, data processing 360 cps, NLQ 180 cps, LQ 120 cps
Compatibility: Epson LQ series.
Print Styles: Two styles and five sizes, with spacing, boldface, custom symbols, expanded printing options. Other fonts are available with optional font cartridges.
Front Panel: Eight button control panel with LED's.
Dimensions: 570 *x* 417 *x* 180 mm
Weight: 18 kg

Seikosha SBP-10

From: AWA Technology Group,
(02) 888 9000 $6797

18-Pin dot matrix with a blinding speed of 800 cps for real heavy duty volume output situations. This printer looks like a laser printer, with a large control panel that has every conceivable function selection you could ever want. And yes, it even has paper park.
Print Speed: Draft 800 cps. Correspondence 400 cps. NLQ 200 cps.
Compatibility: Epson ESC/P, IBM Proprinter emulation. Parallel and serial interfaces.
Print Styles: 2 Resident fonts, 256 downloadable characters. Three cartridge slots giving up to 6 font styles

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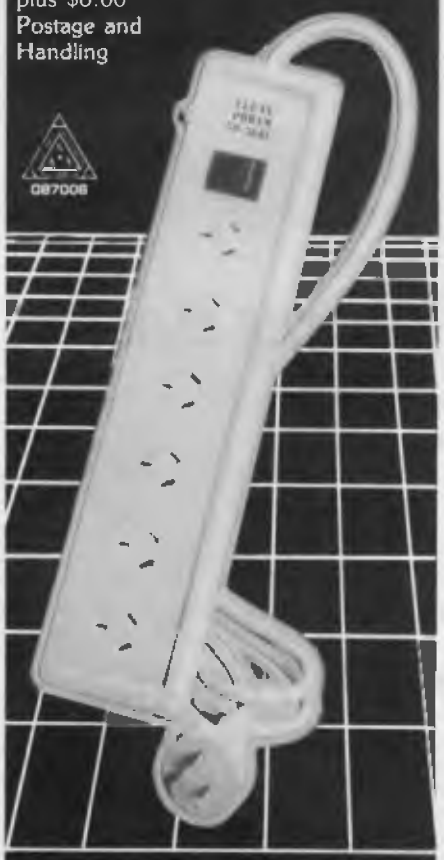

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The entry level Elf Spinwriter from NEC is designed for home and small business use.

available at the one time. Eight categories of graphics printing.
Front Panel: Integrated control panel with LCD status readout. Multiple function buttons.
Dimensions: 670 *x* 485 *x* 271 mm
Weight: 33 kg

Daisy Wheel Printers

Daisy Wheels are still in the market, despite the recent inroads by laser printers. Here is a selection that includes most of the popular brands.

Elf Spinwriter

From: NEC,
(02) 438 3544 $900

This is the entry level spinwriter from NEC. The Spinwriters are like daisy wheels, except they use thimbles instead of wheels. The Elf is designed for small business and home use, or as a second printer for larger businesses. It comes standard with both serial and parallel ports, cut-sheet guide, and tractor feed.
Print Speed: 16 to 19 cps
Compatibility: NEC, Diablo, IBM configurations depending on the model.
Print Styles: Interchangeable thimbles. Over 90 different type styles.
Front Panel: Four button section with status LED displays.
Dimensions: 490 *x* 330 *x* 147 mm
Weight: 9.5 kg

Brother HR-20

From: Brother Industries,
(02) 887 4344 $999

This is a less expensive version than the Brother HR-40, mentioned below. Friction feed is standard, and you will have to pay extra for tractor feed or a cut sheet feeder. Both models have dual Centronics and RS232 serial ports. The optional addition of a keyboard turns the printer into an office typewriter.
Print Speed: 22 cps max.
Print Styles: Interchangeable cassette 96 character daisy wheels. Three pitches, proportional spacing.
Front Panel: Six-button selection panel
Options: Forms tractor, cut sheet feeder. Keyboard.
Dimensions: 470 *x* 344 *x* 132 mm

The Toshiba P351SX features 32 Kbyte of memory (upgradable to 64) and 360 dpi resolution.

Brother HR-40

From: Brother Industries,
(02) 887 4344 $1695

This printer is designed to cater for heavy volume word processing, with built-in cut sheet feeder, tractor feed and letter quality text. For re-printing documents, a copy function can be used to retrieve the document from the printer's memory. This means that it is not necessary to tie up the computer to reprint documents. Two-colour printing can be used, and interchangeable cassette daisy wheels are available in a wide variety of typestyles. An optional keyboard can be plugged in to give a full featured electronic office typewriter.

Print Speed: 40cps max.
Compatibility: Diablo 630 emulation
Print Styles: Daisy wheels. Includes the IBM extended character set
Front Panel: Select, line feed, top of form, pitch, load, copy
Options: Sheet/envelope feeder, keyboard.
Dimensions: 588 *x* 340 *x* 196 mm

Olympia ESW 2000 C

From: Silicon Valley,
(02) 428 0756 $1734

An extremely stylish design makes this printer an attractive addition to the office furniture. Daisywheel printer with letter quality printing up to 25cps. Bi-directional print and path-seeking logic. Wide 15 inch print line for spreadsheets. 2000 character (2 kbyte) print buffer. Other options include bi-directional tractor feed, single or twin bin sheet feeder. Interchangeable 100 character daisywheels can be changed without removing the ribbon cassettes.

Print Speed: 25cps maximum
Compatibility: Diablo 630 Emulation. Choice of interfaces.
Print Styles: Daisywheel, interchangeable 100 characters. Three pitches, proportional spacing.
Front Panel: Operator keypad includes error condition indicators, line space selector, impression control.
Options: Bi-directional tractor feed, single, twin bin sheet feeders.
Dimensions: 608 *x* 406 *x* x190 mm
Weight: 14.6 kilos

3500 Spinwriter

From: NEC,
(02) 438 3544 $2220

NEC's workhorse can run an average of up to five years before it's first repair. It has a range of paper options, and has all the advantages of NEC's thimble

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The new Hewlett-Packard RuggedWriter 480 was designed for multi-user applications.

technology. These include large character sets, high reliability, and a wide choice of type styles.

Print Speed: 35 cps maximum

Compatibility: NEC, Diablo, IBM with parallel or serial interfaces depending on the model configuration

Print Styles: Wide choice of styles including super-scripts, sub-scripts, bold, underlining and shadow printing.

Front Panel: Four button control panel with DIP switches.

Options: Unidirectional tractor, bidirectional tractor, bottom feed, cut sheet guide, sheet feeder, dual bin adaptor.

Dimensions: 610 *x* 395 *x* 208 mm

Weight: 17 g

Brother Twinriter 6

From: Brother Industries, (02) 887 4344 $2495

This printer is one of a kind. It can perform both letter quality word processing tasks with its daisy wheel print head, and bit image graphics tasks with its 9-pin dot print head. There are four different print tasks that can be selected depending on the application. So you can choose between DP dot (data processing dot), DP Daisy (letter quality printouts of data processing text), WP Dot (rough drafts of text printouts), and WP Daisy (for final drafts of letters and text.)

As well as this it can reproduce the IBM extended character set by combining the characters on the daisy wheel, and triple passing the dot matrix printhead over the top

Print Speed: Daisy wheel mode 36cps max. Dot matrix mode 200cps max.

Compatibility: In the DP modes, Epson or IBM compatible. In the WP modes, Brother HR or Diablo compatible. Interface: Centronics parallel and optional RS-232C Serial

Print Styles: Daisy wheel interchangeable print styles.

Front Panel: Six button selection.

Dimensions: 590 *x* 200 *x* 381 mm

Weight: 17 kg

Options: Forms tractor, sheet feeder, sheet/envelope feeder. □

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Less than three years ago, this West Australian company was only an idea — now, as John McLean found, it has a fast growing range of products (and a Nice reputation!).

THE NICE COMPUTER Company of Western Australia began in 1985, when Andrew Warenczak made a modem for a friend who couldn't buy what he wanted. The unit worked so well Warenczak received orders from a number of other enthusiasts and the demand made him think very hard about the future.

He soon realised he couldn't remain as acting state manager for the computer section of a large retailer *and* make modems — he chose to make modems.

He was just 20 then: 'but I feel a lot older than 24 now,' he says, 'with long hours and a constant battle to expand faster than the ever increasing demand'.

The first unit off the production line was the First Nice Modem. It sold well — and is still selling. The First Nice Modem was popular because it was simple and it worked, and the manual could be understood by first time computer users. The modem has long since become a part of a growing family of external and internal budget priced modems.

The company now has a Sydney branch office, distributors in all states and is exporting its products to New Zealand. Warenczak recently organised new staff in Perth to boost the technical and sales divisions. Most of them have come out of universities and other learning institutions — a group of highly skilled and qualified people.

'But here we think we can teach people more skills than they could learn in an equivalent time in university,' says Warenczak.

Sixteen people work for the WA branch, all aged in their early twenties. They are involved in research and development, production, testing, sales and customer support. Despite the lighthearted banter from staff, which appears to be designed to keep the boss humble, their dedication is something which cannot be bought.

The manufacture of modems is handled by associated company Diverse Electronics Australia Pty Ltd. Diverse was formed as a result of Warenczak and Phil Hewitt, a local entrepreneur with a technical background, having a mutual groan about the lack of decent manufacturing companies in WA late in 1985.

Although Diverse now manufactures circuit boards and other high-tech products, including security and bus ticketing sys-

tems, the backbone of its growing business is still the modems.

These are manufactured by trained technicians in a 'flow through' assembly system in anti-static conditions. Part of its commitment to quality is the recent purchase of a Kirsten Jet Wave Soldering System capable of soldering boards up to 330 mm wide in a single pass.

Infotalk allows customers and staff to 'speak' directly to PCs.

External modems

The First Nice Modem is designed for home use and features 300 baud full duplex and 1200/75 baud for Viatel. The Modem 2 is a Hayes compatible intelligent modem suited to business or the advanced home user; it operates at 300, 1200/75 and full duplex 1200/1200. It can take instructions from another computer and has autodial. It can be left unattended to originate or answer calls and has ring back security. The Modem 2 featured in 'Modems for home users', *Your Computer*, Oct '87.

The Nice Modem 3 is based on the Modem 2, retaining all its features except the 1200 full duplex facility. Other Nice units include the Hayes-compatible Nice 4, an external 2400 full duplex modem, with optional MNP (Microcom Network Protocol) error correction for applications which require accurate data transfer. It has password security and data encryption.

Under development is a new range of low cost external modems designed for those who require a 'simple' autodial, autoanswer modem, which should be available about the time you read this.

Internal modems

With the slogan 'Is yours Nice inside?' the Nice Inside Modem 2400 is claimed to be the world's smallest card modem and suits the PC, XT, AT, PS/2, close compatibles and even many transportables.

The Inside Modem is self-diagnostic, multi-speed, Hayes AT-commandable, autoanswer, autodial, auto disconnect, autoranging, asynchronous, audible, and speed converting. (There is a rumor of an offer for its own stage show — its said to sing and dance, too!)

The communications package, Supercom II, received the *Your Computer* Australian Software Commendation in 1987 — and it's optionally bundled with a Nice modem.

Under development is the an internal modem for the IBM PS/2; the first PS/2s to be supported will be Models 50 and 60.

Other brand manufacturing

The company is now manufacturing units for a number of Australian companies which sell them as house brands. This side of the business is growing fast and next year will make up a large proportion of the total production line.

Another growing section of business is the customisation of existing products for specific applications and the design of custom products.

An example of this are the Infotalk 2 voice response systems which were designed for a customer who 'walked in off the street' and wanted his idea turned into a product. Infotalk allows customers and staff to 'speak' directly to PCs for information or to place orders 24 hours a day basis on up to four *unattended* telephone lines!

That name!

The name Nice which has been the butt of endless jokes. But — huge sums could have been paid to marketing agencies to come up with a name that sticks in the memory as well as that one does. As Warenczak says, he's is doing very *Nice*-ly, thank you. □

Product Details

Product: Nice Modems
From: The Nice Computer Company
112/396 Scarborough Beach Rd,
Osborne Park 6017 WA
(09) 242 2422
Price: $279 First Nice Modem
$749 Modem 2
$549 Modem 3
$1099 Modem 4
$519 Inside Modem I
$599 Inside Modem I with Supercom II
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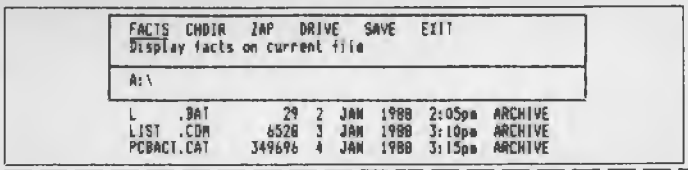

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The Olivetti M28 AT . . . no ICs!

Dennis Fox takes the M28 through its paces – and anticipates the new M280 . . .

IT IS NORMAL TO read reviews of computers proclaiming that they are the fastest or have the biggest capacity hard disk drive or an 80386 microprocessor or a super display. Instead, I'll tell of an end-of-model machine from a very reputable computer company, namely Olivetti, and try to anticipate how the new offering will differ

The Olivetti M28 AT compatible is a successor to the M24 XT which was very well received. It comes in various configurations of which the review computer was top of the range with an NEC 40 megabyte hard disk, 1 Mbyte of onboard RAM and an Olivetti Enhanced Colour Display.

The first time I removed the top cover from the computer (by undoing 3 screws at the rear), I was surprised to find a motherboard with 7 expansion slots, 2 in use, but alas *no* integrated circuits whatsoever. I was also surprised at the small footprint of the Olivetti — 38 cm *x* 41 cm *x* 18 4 cm high. The M28 Installation and Operations Guide directed me to the two screws at the lower rear of the unit which allow the bottom cover to be removed. I turned the unit upside down to reveal a large motherboard.

The computer motherboard and the expansion slot motherboard are separated by a metal plate, which acts as a mounting plate and earth shield to reduce noise. Unlike my Powermate I, no use is made of ASICs (Application Specific Integrated Circuits or custom VLSI). Olivetti obviously was prepared to go to the extra expense of another motherboard as a stop-gap to building a computer using ASIC chips. This attention to packaging is typical of Olivetti's approach to making computers. Other computer manufacturers produce computers which take up a lot of desk space, although the Epson PC model AX, reviewed in *Your Computer*, December 1987, adopts a similar packaging approach to Olivetti.

Reducing the chip count

An article in *Byte* magazine in Oct. '87 shows very convincingly the extent to which present day technology can reduce the chip count. Steve Ciarca, who writes about hardware projects for *Byte*, teamed up with Zymos Corporation to design and produce a chipset of four 84-pin CMOS ASIC ICs which allow a fully IBM AT compatible computer with 512 Kbytes of RAM to be built on a board the size of an AT expansion board — using a mere 23 ICs plus two single-in-line memory modules.

You may find that the new Olivetti M280 AT makes extensive use of ASICs for the following reasons: Reduced size of the computer motherboard; reduced component count (and therefore cost); improved reliability; reduced power consumption by up to 5 times.

Features

On the front of the M28 is a handy square reset button and a keyboard lock with indicating LED. A speaker volume control knob is mounted flush with front of unit. There are LEDs indicating power-on, floppy disk access and hard disk access. There is room for an additional 40 Mbyte streaming tape or 5¼ inch drive directly below the hard disk drive. The ribbon cable and connector are already included.

The 40 Mbyte NEC hard disk is quiet in operation. If 40 Mbytes is not enough then you may purchase an external expansion box for a 70 Mbyte hard disk drive using an external power supply. Connection to the M28 is via a connector on the motherboard.

Of the four 16-bit slots, one is already used for the disk controller. Of the three 8-bit slots, one is already used for the Olivetti Enhanced Graphic Controller. This leaves five slots spare.

The unit tested contained 1 Mbyte of RAM on the computer board, comprising 512 Kbyte soldered direct and 512 Kbyte in sockets. This model uses 256 Kbit dynamic memories while IBM uses 1 Mbit dynamic memory chips in its current models, so one can expect the clones to follow suit within the next 12 months as the cost of the chips decreases.

The cooling fan is quiet and sucks in air through a row of vertical slots all the way across the front of the unit just above desk level (which cools the computer motherboard) and also through a series of round holes below the disk drives (which cools the expansion boards and disk drives). The 80286 has a heatsink. A socket is provided for an 80287 co-processor.

A Lithium battery for the real time clock is attached by Velcro to the side of the metal plate to which the disk drives are attached and is very accessible.

The keyboard

The keyboard is the original IBM AT style (without separate cursor control keys) having 93 white keys with blue lettering and grey surrounds with mottled grey at the rear — very attractive. The keys are sculptured and have a positive touch. Two feet for the keyboard are provided which can be fixed at two different angles to the table. A plastic cover at the rear right of the keyboard may be easily removed to expose the edge of a printed circuit board onto which a mouse cable can be plugged. There are five yellow LEDs on the keyboard for Caps Lock, Num Lock, Scroll Lock and SYS1 key. The new model can be expected to have the 101 key extended AT keyboard.

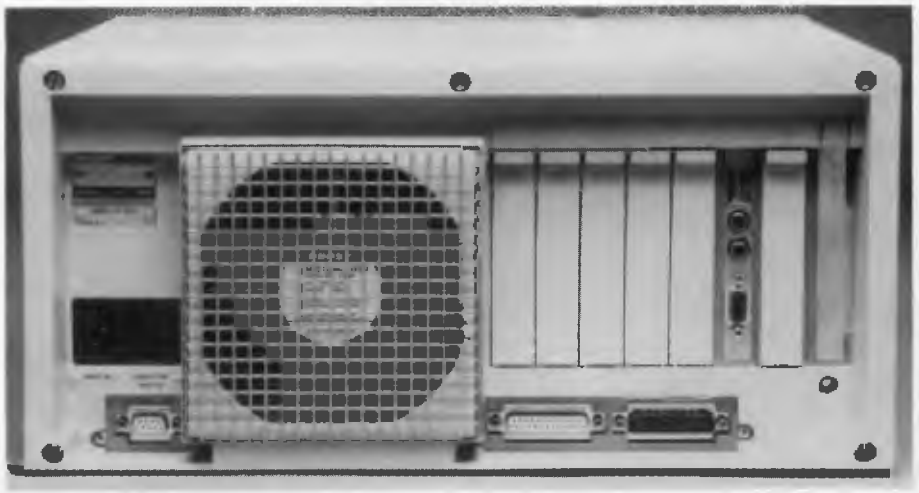

Figure 1. *The Olivetti M28 has 7 expansion slots; three of the 16-bit and two of the 8-bit slots are free.*

The monitor is manufactured by Olivetti in Italy. It is a 14 inch RGB monitor capable of EGA and CGA graphics, plus emulation of the Olivetti 640 by 400 Graphics mode at the bios level. GW Basic is provided on a disk with 16 graphics commands supported by the Olivetti Enhanced Graphics Card. It connects to the computer by a 9-pin D type connector. AC power is provided via a 3-pin female connector at rear RHS. It has a swivel base, and a crisp, bright display which is easy on the eyes. The two controls, namely contrast and brightness, are easily accessible underneath at the front using an index finger. I/O provided consists of one parallel connector and one serial connector.

Software included

There are a number of software programs included with the M28. The first one is the Customer Test Diskette which includes —

a) A complete system checkout which

```
DEF FNelapsed(t1$, t2$)
'Calculates the number of seconds between times t1$ and t2$.
't1 is expressed in the form HH:MM:SS

 hrs1 = Val( Left$(t1$, 3 ) )
 hrs2 = Val( Left$(t2$, 3 ) )
 mins1 = Val( Mid$(t1$, 5, 2) )
 mins2 = Val( Mid$(t2$, 5, 2) )
 secs1 = Val( Right$(t1$, 2) )
 secs2 = Val( Right$(t2$, 2) )

 FNelapsed = 3600 * (hrs2-hrs1) + 60 * (mins2 - mins1) + secs2 - secs1
END DEF

'   ****************
'   * MAIN PROGRAM *
'   ****************
'Integer numbers benchmark test to discover the first 1000 prime
'numbers

time1$ = Time$
Print "Starting ";time1$

 INSERT BRIAN WEBSTER'S SIEVE PROGRAM (YC Dec.'87, Page 63)

time2$ = Time$
Print "Finishing ";time2$
Print "ELAPSED TIME ="; FNelapsed(time1$, time2$)
End
```

Listing 1. *A version of the Quick Sieve program (YC Dec '87, Epson PC AX) modified to show the number of seconds taken by the benchtest.*

tests serial and parallel I/O, the hard disk drive, floppy disk drive, memory and EGA monitor.

b) A menu driven setup utility to define the type of disk drives, the amount of memory and the type of monitor used.
c) A useful utility to park the heads of the disk drives when the computer is to be moved.

There is a 'Getting to Know the M28 Diskette,' which is a menu driven program written in GWBasic. The function keys are used to choose between 10 items including The M28, Keyboard, Displays, Diskette, Hard Disk, Tape, Printers, Software, Options and Auto Demonstration. Information provided is at a very basic level. This program gives details of how to expand memory from 512 Kbyte to 1 Mbyte. It shows where to insert the co-processor by displaying a sketch of the motherboard on the screen. Also shown is where the two 128 Kbyte EPROM bios chips, I/O chips and so on are located.

Keyboard Drivers plus utilities for the M28 are also included. The keyboard drivers are of interest for European languages where umlauts, acutes, ogeneks and so on are used. GWBasic for the Olivetti Enhanced Graphics display is provided.

Speed

The Norton Computing Performance Index relative to the IBM PC was 7.7 which is identical to my NEC Powermate I (8 MHz).

The time taken to copy the formula and calculate 625 entries in a 25 *x* 25 spreadsheet, using Framework II (each entry is 1.001 times the previous one and results are displayed to 6 decimal places), was 7.5 seconds. Brian Webster's Quick Sieve (YC Dec '87, Epson PC AX) takes 6 seconds which is the same as the Powermate's or the Epson PC AX (with speed set to 8 MHz).

I have modified his program so that the number of seconds taken by the Sieve is displayed on the screen. This was done by adding a Function to his Microsoft QuickBasic program as shown in Listing 1. The function is called FNelapsed and has two parameters t1$ and t2$ passed to it in brackets corresponding to the start and finish times obtained from the QuickBasic inbuilt function TIME$. □

Product Details

Note: The M28 AT has been superceded by the M280 and Olivetti has maintained its innovative approach in the new machine The essential differences between the two are: 1 Mbyte of RAM in the M280 (versus 512 Kbyte in the M28); 101 key enhanced keyboard (versus 86 keys); a 3½ inch 1 44 Mbyte floppy option (not available on the M28); 12 MHz clock speed (versus 8); a RAM chip speed of 100 ns (versus 150); and EGA compatibility, with VGA being offered later this year (versus video builtin video controller).
Product: Olivetti M280 AT
From: Olivetti, 140 William St, Sydney 2000 (02) 358 2655
Price: $7065 20 Mbyte hard disk, monochrome monitor
$8035 20 Mbyte hard disk, colour monitor
$7725 40 Mbyte hard disk, monochrome monitor
$8695 40 Mbyte hard disk, colour monitor *All prices taxed.*

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from *"XENIX RISING: The Ascent of Shared Information Computing from 1979 to 1999"*

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Introduction to Xenix
Why Multiuser Micros?

XENIX IS the only one of the three milestone operating systems for Intel microprocessors that is a multiuser, multitasking system. Blue Sky Industries has had extensive experience in all these operating systems, having been involved with microprocessor systems since 1978.

Although available since 1980, Xenix had to wait for IBM to release the PC AT in 1984 to gain recognition as an emerging star of the microcomputer marketplace. Blue Sky Industries has been actively selling and supporting Xenix in Australia since 1982, firstly on the DEC PDP-11 minicomputers, then when the IBM PC XT version became available, on PCs.

Based on the Intel 80286 microprocessor, the IBM PC AT provided the power necessary for a microcomputer to support serious multiuser applications. And, of course, the IBM stamp of approval didn't hurt either. IBM offered its customers an optional three-user Xenix operating system (called IBM Personal Computer Xenix 1.0). Other OEMs soon followed suit, including Compaq Computer Corporation, which offered Xenix on its AT-compatible Deskpro 286. In Australia, Blue Sky Systems was inundated with enquiries (and orders) for this powerful computer solution by VARs who wanted to develop software for this new system.

The recent release of Intel 80386 microprocessor-based computers by several vendors, including IBM, has provided additional momentum to the multiuser Xenix marketplace. The 80386 microprocessor, a full 32-bit chip rated at 4 mips (million instructions per second), supports virtual memory and demand paging — features that enable it to provide minicomputer performance in a desktop computer.

The demand for Xenix continues to increase as more and more people discover that a microcomputer running Xenix is the most cost-effective platform for multiuser computing. With addon I/O processor boards included, a single IBM PC AT compatible 80386 microcomputer can effectively support up to 32 users in many applications. New developments in multiprocessor technology will enable 386-based PCs to support up to 128 users.

Running Xenix, these users cannot only process their own data and communicate with each other, but also share files and other resources simultaneously.

First came CP/M, then MS-Dos, and now Xenix — three milestone operating systems in the history of microcomputers. CP/M led the 8-bit market, MS-Dos led the 16-bit market, and now Xenix has emerged as the industry-standard multiuser operating system for microcomputers based on both 16-bit and 32-bit Intel microprocessors.

A number of factors have contributed to the increased demand for multiuser microcomputers. These include:

a) *Their increased power as a result of advanced microprocessor technology.*

b) *Their standardization around Intel-based microprocessors (led by IBM's endorsement of Intel microprocessors on its own PC series).*

c) *Their declining cost.*

d) *The low price per incremental user on a microcomputer-based multiuser system*

e) *The availability of an industry-standard Unix operating system: Xenix System V.*

f) *The wide range of multiuser applications available to run on them.*

These factors have catapulted the previously isolated PC to the center of the multiuser stage, rivalling the minicomputer as the basic multiuser, departmental computer. The Xenix market has grown accordingly, and continues to do so.

Xenix Feature

THIS XENIX Feature was produced by *Your Computer* magazine for Blue Sky Industries; it was originally published with the April 1988 issue of *Your Computer*. All editorial material was supplied by Blue Sky Industries.

The interest has snowballed, with a large number of manufacturers now offering SCO Xenix with their systems. In this country, Blue Sky Industries supplies almost all of the computer manufacturers and their dealer chains with the SCO range of products. These brands include: Hewlett-Packard, Olivetti, STC-Alcatel, Compaq, IBM, NEC, Apricot, Unisys, Wyse, NCR, and hosts of clones.

What is Xenix?

Xenix System V is a commercially enhanced, fully licensed version of AT&T's Unix System V Operating System, conforming to the SVID and POSIX standards. Designed by Microsoft Corporation in 1980 to provide the microcomputer marketplace with multiuser, multitasking capability, Xenix is available for more different microcomputer configurations than any other Unix System.

It is a complete implementation of Unix System V that fully conforms to AT&T's System V Interface Definition (SVID), a widely respected set of specifications for ensuring Unix-based applications compatibility. Xenix-based applications can be ported across machines from different vendors.

Above and beyond its SVID conformance, Xenix includes value-added features that make it specifically suitable to multiuser, multitasking business applications. These include record and file locking, system administration, graphics support, networking support, builtin memory management (enhancing its portability), easy installation and maintenance, Dos/Xenix cross-development facilities and backward compatibility with earlier Xenix releases.

Xenix has become the most popular Unix System worldwide, with an installed base of approximately 300,000 machines, more than all other Unix Systems combined. On Intel microprocessor-based computers, Xenix is installed on over 90 per cent of all systems running any Unix System version.

What is SCO Xenix?

SCO Xenix System V is a packaged Xenix product available from The Santa Cruz Operation Incorporated (SCO) and distributed in Australia through a wide network of dealers. SCO is Microsoft's exclusive "second source" for packaged Xenix through OEM,

VAR and other reseller channels. The two companies have had an ongoing Xenix technology exchange, development and marketing agreement since 1982.

Added Value — In its SCO Xenix System V packaged product, SCO adds significant value to Xenix by including drivers that support a wide range of peripherals, an exclusive MultiScreen feature that enhances multitasking operation, a system administration shell that assists non-technical users, and custom facilities to make simplify installation. Maintaining the largest team of Xenix specialists in the business, SCO provides support and training that is respected around the world for its quality and timeliness.

A Full Range of Products — Blue Sky has been shipping SCO Xenix for PCs for over three years. SCO's current line includes SCO Xenix 86 for the IBM PC XT and compatibles; SCO Xenix 286 for the IBM PC AT and compatibles, the AT&T PC 6300 Plus and the HP Vectra; and SCO Xenix 386 for the 386-based, AT compatible machines, such as those manufactured by Compaq, Hewlett-Packard, TI, XTRA Business Systems (STC), Zenith and Olivetti.

SCO has also released SCO Xenix System V for IBM's PS/2 line of computers. Blue Sky is currently shipping SCO Xenix 286 System V for PS/2 Models 50 and 60, and SCO Xenix 386 System V for the PS/2Model 80.

Other Unix Products

Aside from Xenix, three other versions of the Unix System are commonly used today: Unix System V Release 2, Unix System V Release 3 and BSD Unix V4.x.

Until recently, Unix System V Release 2 was AT&T's standard implementation of the Unix technology. Unix System V Release 3, however, introduced several new features such as streams, the standard method of communicating with I/O subsystems, and Remote File Sharing (RFS), for networking systems. Release 3 is more strict than Release 2 in its SVID requirements, but those systems which do qualify enable their users to develop applications that are portable at the source level.

The third Unix implementation — BSD Unix Version 4.x (often referred to as Berkeley 4.x) — differs in key areas from the System V implementations. First, many say it is faster because it uses flexible file sizes. Second, it provides networking capabilities that were unavailable on AT&T's Unix System V until Release 3. Third, it uses job control signals, which allow users to work interactively on one job while running one or more jobs in background mode.

Although Xenix most closely relates to Unix System V Release 2, it differs from all three of these implementations in its optimization for the Intel 32-bit chip. Because Xenix was developed with Microsoft's optimizing C compiler, it is also both smaller and faster than the other Unix implementations. This year Xenix is being upgraded to Unix System V Release 3 functionality.

The System V implementations are used most commonly by the Federal Government (with commercial use secondary), the Berkeley implementation is used by technical and educational organizations, and Xenix V dominates commercial environments, although it has also begun to appear frequently in bids and contracts with the federal government. IBM and EDS recently incorporated SCO Xenix in a bid to the US Army that netted a $US343-million contract. Zenith Data Systems included SCO Xenix in another successful bid for a multi-million dollar contract with the US Navy.

Another factor which differentiates Xenix from its Unix siblings is the number of applications based on it. The number currently exceeds 1000 — more than are available on any other Unix implementation.

The Relationship of Xenix to MS-Dos

The essential difference between MS-Dos and Xenix is that MS-Dos is a single user, single-tasking operating system, whereas Xenix is primarily a multiuser, multitasking operating system (although it does serve well as a single-user, multitasking operating system).

> A number of factors have contributed to the increased demand for multiuser microcomputers.

MS-Dos primarily supports personal productivity applications that run on desktop PCs and require less than 640 kilobytes of memory — for example, word processing, spreadsheets and small database applications — and it runs only on Intel-based microcomputers.

Xenix is a full-fledged multiuser, multitasking operating system that enables a number of users to access, via terminals, a single integrated software package (such as a database or accounting package), to share resources and to read and write to the same files while maintaining data integrity and system security. Multiuser Xenix systems have competed successfully against machines such as the IBM System/36 and the DEC VAX series. Although optimized for Intel-based systems, Xenix conforms to international standards (such as Posix and X-Open), which means Xenix-based applications can be ported across different microprocessor architectures.

Although MS-Dos systems can be networked together using Microsoft Networks, allowing Dos users to share resources such as files, printers and modems, they still lack the features essential to a true multiuser, multitasking system like Xenix. For example, a user on a Dos-based network cannot simultaneously query a database and work interactively on another application. Because these Dos-based networks lack user-level file and record-locking capabilities, they cannot provide different security levels for different users. Thus, there is no way to prevent users from reading or writing to other users' files.

In short, business professionals who want a multiuser computing system should make sure they get a legitimate, reliable, robust multiuser operating system.

Here's what industry analyst William Zachman had to say on this subject in the September 21, 1987 edition of *Computerworld*: "As a person dealing with computers in an organisation, it won't be long before you are confronted with Unix, if you haven't already . . . Given that this meeting is almost inevitable, Santa Cruz Operation's (SCO) Xenix 286 System V, as well as a 386 version, may be a manager's first look at today's new breed of Unix . . . SCO Xenix has proved to be a reliable operating system. It offers an excellent low-cost opportunity to get back up to speed on the current state of Unix. Even more important, it offers an immediate solution for people who want to turn 286- and 386-based PCs into multiuser work horses for practical applications. There's little wonder why many value added resellers targetting small business and departmental applications on PC platforms have turned to SCO Xenix."

Dos-Xenix Co-existence

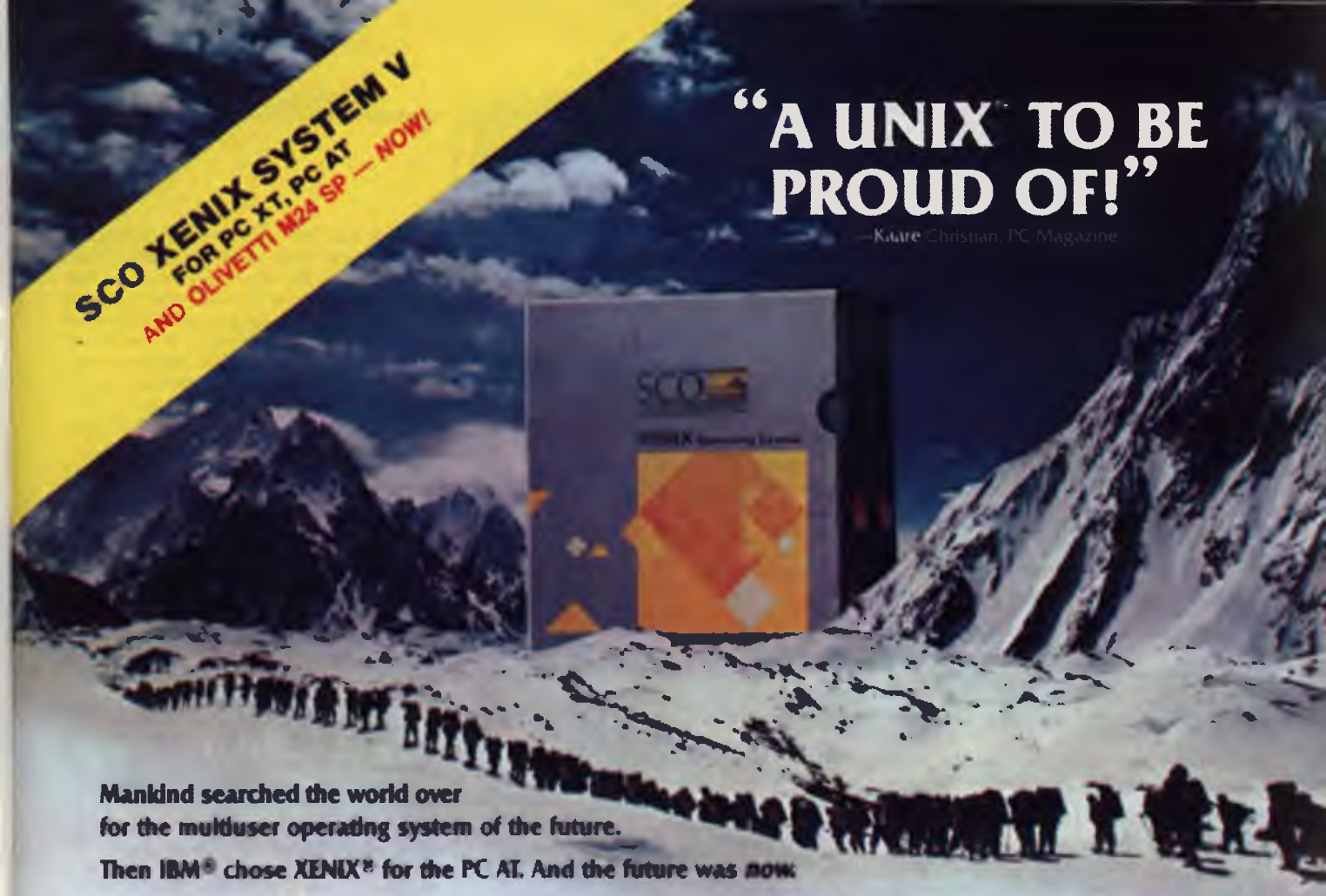
Although Dos is a single-user system that lacks the features essential to a multiuser system, it has a strong installation base and many people are reluctant to give it up. For these reasons, SCO has provided several ways to accommodate both Dos and Xenix in the same system.

Partitioned Disk — On a PC, the hard disk can be partitioned to accommodate both Dos and Xenix. This enables the user to access both single-user Dos applications and multiuser Xenix applications, though not at the same time.

Local Area Network — A separate product, SCO Xenix-NET permits the integration of Dos and Xenix systems across a single local area network. When used as a Dos server, SCO Xenix-NET can even enhance the Dos networks performance.

Dos as a Task under Xenix — 386-based microprocessors running SCO Xenix 386 are able to run Dos as a task under Xenix by using the Xenix operating system extension, VP/ix. VP/ix permits multiple Dos and Unix/Xenix applications to run concurrently from the system console under control of the virtual screen manager. In multiuser systems, PC compatible terminals can run concurrently multiple Dos and Unix/Xenix applications via a serial port connection, under the control of the enhanced virtual screen manager. With VP/ix, users of 386-based computers will be able to run IBM PC compatible applications software "off the shelf" as a task under Xenix.

Dos/Xenix Cross-Development — For software developers who want to write applications



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ACI Computer Services

for both the Dos and Xenix environments, SCO Xenix provides an added benefit. Developers can use the Dos/Xenix cross-development environment of the Microsoft C compiler in SCO Xenix to write a single program and then compile it to run in either Dos or Xenix. With SCO Xenix they no longer need write two separate programs to do the same task.

Dos Workalike Applications — Upon moving to SCO Xenix, Dos users needn't worry about losing their familiar user-friendly interfaces. SCO offers "workalikes" of popular Dos applications which allow Dos users to read and write to their existing Dos files on Xenix machines. These SCO applications include SCO Professional, a Lotus 1-2-3 workalike, as well as SCO Foxbase, Foxbase+, dBASE II and dBASE III+ workalikes. Each of these applications offers enhanced functionality.

In addition to these workalikes, more and more Dos applications are being ported to Xenix by software developers who see the potential of the multiuser marketplace.

Examples include Multiplan, Informix database, Microsoft Word and Dataflex as well as compilers such as Basic, Fortran, Pascal, C, and Cobol. Many other applications developers are joining the migration.

What About OS/2?

MS OS/2 is Microsoft's announced, but partially released, single-user, multitasking operating system. According to Microsoft, it offers a logical upgrade path for users who have standardized on MS-Dos, but need more power.

Some people have come to believe, incorrectly, that OS/2 is a Dos-based multiuser system that will compete against SCO Xenix. This is a misconception. First of all, OS/2 is a single-user system, whereas SCO Xenix is both a single-user and a multiuser system. Furthermore, the version of OS/2 scheduled for release in 1988 is a 286-based operating system which, in contrast to SCO Xenix 386, is not optimized to take advantage of the 386 chip. In addition, no applications for OS/2 currently exist. More than 1000 are available for SCO Xenix.

SCO and Microsoft are currently working on a bridge to OS/2 for software developers. It will consist of compatibility libraries that map system calls between OS/2 and Xenix. It will also provide compatibility between the OS/2 LAN manager and Xenix-NET.

System V.3 Release Schedule

SCO will release the AT&T/Microsoft(R) merged Unix/Xenix(R) porting base in two steps: Release 2.3 and Release 3.0. Currently, Release 2.2 is licensed under AT&T's Unix System V.3 licensing. SCO Xenix 2.2, which supports an unlimited number of users, contains a number of V.3 enhancements, and has many important Xenix extensions.

Release 2.3, scheduled for June 1988, will conform to and be compatible with AT&T's Unix 386 System V.3. This means that SCO

Xenix System V 2.3 will conform to the full AT&T SVID, the IEEE Posix and the FIPS Posix standards, including all extensions. Binary compatibility will be implemented for Unix 386 executables, including shared libraries, streams and Weitek floating point co-processor support. The Unix V.3 technology being implemented in the SCO Xenix 2.3 release will be from the AT&T/Microsoft merged porting base source code.

SCO plans a Xenix 3.0 Release for early 1989. This release will be based on the AT&T/Microsoft merged Unix/Xenix source baseline. SCO will add value to this porting base in the form of its enhanced high-performance drivers and the use of Microsoft's optimising C compiler throughout, as well as SCO's installation, system administration and documentation enhancements. SCO will make available local versions for the international market, with translated documentation. In addition, SCO will make available all of its add-ons, such as SCO VP/ix(TM), SCO Xenix-NET, SCO uniPATH(TM) SNA-3270 and its enhanced DOS workalike applications.

The Multiuser Market

The multiuser market is based on the emergence of standard multiuser operating environment software (Xenix/Unix) and related networking, communications and horizontal applications. These products are integratble building blocks designed for developers, OEMs, and the growing number of VARs and in-house systems integrators who design computer solutions for both small businesses and large corporations — especially those which want to expand their micro-to-mainframe communications and distribute their departmental computing across many departments, divisions and geographic locations.

The availability of SCO Xenix as a standardized product for microcomputers, generally available in multiple channels, is helping to accelerate the emigration of minicomputer-class computing to 286- and 386-based microcomputers. Until very recently, hardware and software developers faced a fragmented world of proprietary technology. InfoCorp reports that in 1980 95 per cent of all multiuser systems were proprietary. In 1985, that figure fell to 73 per cent. It is estimated that by 1990 59 per cent of all multiuser operating systems will be non-proprietary, and over 60per cent of those will be Xenix/Unix.

Software developers recognize that SCO Xenix running on these more powerful, cost-effective, industry-standard PCs provides an extremely competitive processing platform. As a result, SCO Xenix's market share is expected to increase dramatically, especially now that SCO has released SCO Xenix 386 — the first Unix System brought to market for 386-based microcomputers.

The multitude of applications available on Xenix have also contributed to its popularity. Some have migrated up from the Dos environment, providing a Dos-like interface that is familiar to those who have worked only with single-user PCs. Other applications which were originally designed for larger minicomputers and mainframes can now be ported down to the new 386-based microcomputers which offer mainframe capabilities such as 32-bit, 4 gigabyte addressing and demand-paged virtual memory.

Developers and VARs are also taking advantage of the price performance value of these new microcomputers to address the rapidly growing small business computer market for database, accounting, and office automation applications. Most Xenix users run specialized, or vertical, applications which have been designed specifically for their types of business, whether they be accounting, real estate, car repair, resort management, transportation, law enforcement, education or a variety of other enterprises.

> In short, business professionals who want a multiuser computing system should make sure they get a legitimate, reliable, robust multiuser operating system.

The affordability of these microcomputer-based multiuser systems has also fueled their rapid growth. According to InfoCorp, the demand for Unix-based systems priced under $18,000 has increased by a factor of six over the last four years.

SCO's Market Strategy

For the past four years, SCO has concentrated on developing or acquiring the central technological components necessary to create the Unix/Xenix software platform that companies need to build multiuser business solutions.

These components include an industry standard multiuser operating system, applications to extend the functionality of that operating system, a full range of products to provide a viable and sophisticated working environment for end users, an advanced technical engineering team to develop these and the next generation of products, a responsive team to support those products, an informed training capability to show users and developers how they can gain the greatest benefit from their multiuser systems, partnerships with OEMs to continually improve the performance of the hardware, partnerships with software developers to create innovative new applications and partnerships with VARs to create custom packages that serve the specific needs of particular end users.

SCO has moved quickly over the past four years to implement this strategy. By introducing increasingly more powerful versions of the SCO Xenix operating system, SCO has helped establish Xenix as the standard operating system for 286- and 386-based multiuser systems. Today, Xenix is clearly the principal implementation of the Unix system on microcomputers. Major OEMs who support the Xenix operating system include IBM, STC, Altos, Zenith, NCR, Tandy, NEC, TI, Compaq, Olivetti, Apricot, Unisys, Mitsubishi, AT&T, Hewlett-Packard, Intel and Convergent Technology.

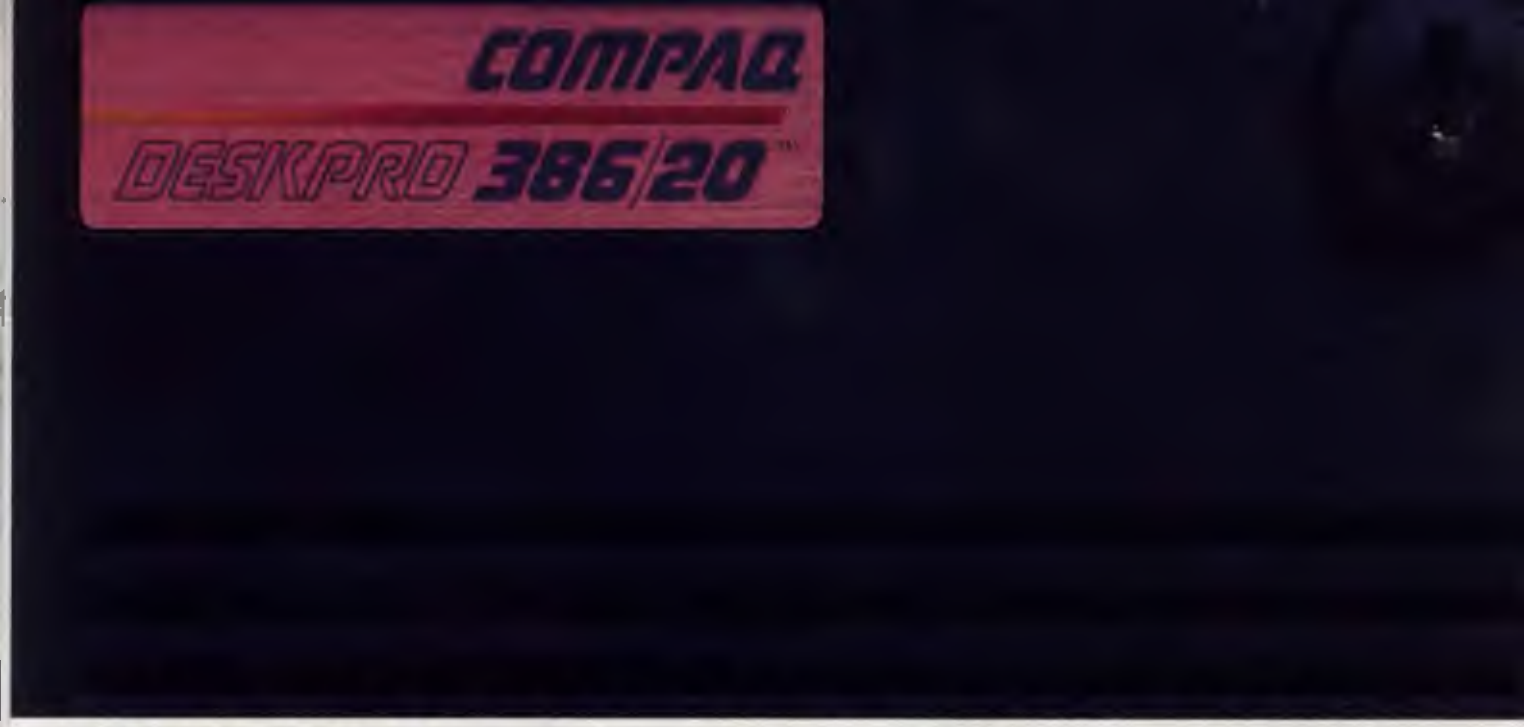
The recent announcements by AT&T, Microsoft, Interactive Systems Corporation and SCO on the merger of Unix System V Release 3 and Xenix technology ensure that SCO has access to the latest standard technology and participates in its continued evolution.

SCO's early delivery of a standard multiuser operating system for 386-based microcomputers has set the stage for not only increasing the presence of these computers in the multiuser marketplace, but also for developing new applications that take full advantage of the 386 chip's advanced technology and for packaging full turnkey systems that exploit both the hardware and software to better serve the needs of end users. Thus, key developers and VARs have greeted the arrival of SCO Xenix 386 System V with great enthusiasm.

Another key factor that strengthens SCO's presence in the market, and the market itself, is the broad product range that SCO offers. SCO Xenix System V is the cornerstone of the "SCO Xenix Solution", a unified Xenix-based environment which includes networking and communications packages, productivity software, database management products, languages and development tools, and learning aids. SCO backs its products with one of the largest and most highly trained staffs available in engineering, support, training, sales and marketing.

SCO's management is committed to the multiuser market. They founded SCO to nurture and support multiuser computing on PCs, not only in the US, but worldwide. SCO has already acquired the Xenix Software Products Group of Logica (UK) Limited, formerly Microsoft's second source for Xenix in the UK, in order to extend its dedicated sales, marketing, support and engineering resources to better serve a distribution network that includes the Americas, Europe, Australia, New Zealand and Asia.

SCO's marketing strategy has clearly succeeded. According to a recent study by PC industry analyst Soft-Letter (Published in *PC Week*, April 7, 1987), SCO emerged in 1986 as the tenth largest independent vendor of business software — and the number one vendor of multiuser business software for PCs. These rankings tell a story: SCO is not only the number one vendor of multiuser business software for PCs, but also the first dedicated multiuser PC business software company to reach the "top ten" of overall PC business software companies. □



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The Development Environment

Operating System, Extensions, and Development Tools

TOOLS that software developers need to develop coherent solutions fall into a number of levels. The Base operating system is needed to provide I/O to terminals, printers, files on disk and so on; extensions to the operating system include the CGI graphics system, SUN NeWS, X-Windows, the VP/ix MS-Dos environment, Multiview windows and shell layers. The Xenix Development system provides programmer productivity tools. C, Basic, Cobol, Fortran, PL/1, RPG, Pascal and the like provide languages and runtime environments, while application development languages include Foxbase, Foxbase+, Integra, and Accel.

For product brochures or detailed Abstracts on any of these products, contact your nearest SCO distributor. Contact names and details are on the back cover of this liftout.

To provide a coherent solution for end users, software developers must have a set of guidelines and tools. These include the base operating system and extensions, the Xenix development system, language and runtime environments, applications development languages, and various third party products.

Base Operating System

SCO's Xenix is the most important part of any development environment. Xenix 386 has backward compatibility with Xenix 286, which has backward compatibility with Xenix V 86 and the obsolete Xenix System III. Any application compiled with the compatibility option will work in all the versions of Xenix without recompiling; this is called binary compatibility. Xenix 386 will, in the next few months, also be able to run all COFF binaries from the AT&T Unix-386 V.3 porting base. Xenix, with its shell language and utilities, provides a portable base which is used by many languages and applications to provide multitasking features.

The Xenix operating system provides the system calls to enable an application to function. Xenix provides the full System V set of system calls, plus all the Posix extensions, the older System III calls and even a set of Level 7 Unix system calls, to ensure the widest possible compatibility.

SCO will be implementing the following features in the June 1988 Xenix V.2.3 release — full System V.3 functionality; able to run COFF Binaries; shared libraries; streams; TLI — Transport Level Interface; Weitek Floating Processor support; full VGA support as well as MDA, CGA, EGA, and HERC, serial and bus mouse support; tools for OS/2 cross-development; support for SCSI drives as well as ST506, RLL, and ESDI; and support for QIC02, QIC40, as well as Irwin, Archive, Wangtek and the like.

Operating System Extensions

SCO MultiView is a combined multitasking windowing environment and user friendly interface for 286- and 386-based personal computers running SCO Xenix System V. SCO MultiView is the only windowing software for Unix systems that works on character-based terminals.

"SCO Xenix users who want multiple windows aren't forced to buy a graphics terminal or costly workstation," according to Doreen Hamamura, SCO product manager. "SCO MultiView also provides Dos users with a smooth transition to the multiuser SCO Xenix environment," she said. "The menu interface, Xenix Manager, enables users to work in a multiuser environment without knowing Xenix commands."

SCO MultiView's user friendly interface includes a series of pull-down menus that contain builtin functions and applications, such as the supplied pop-up Phone Book, Address Book, Card File and Clipboard.

"In addition to the Dos-like features, users can also zoom in and out of a full screen window," said Hamamura, "shrinking the size of one application and expanding the size of another, and change the order of the windows on the screen."

Those who have local printers attached to remote terminals will enjoy SCO MultiView's "print screen" function, which allows a user to send the contents of any window directly to any spooler or local printer.

SCO MultiView is available in packages for both the SCO Xenix 286 Operating System and the SCO Xenix 386 Operating System.

VP/ix

SCO VP/ix, is a multiuser, multitasking systems software extension to the SCO Xenix 386 Operating system which provides users with the ability to run both MS-Dos and Xenix applications at the same time.

SCO is supplying SCO VP/ix systems software under a distribution agreement with the joint developers, Phoenix Technologies Ltd, and Interactive Systems Corporation. The SCO VP/ix package will enable users of SCO Xenix 386 to run IBM PC-compatible applications software as a task under Xenix on Intel 80386-based computers. Included with SCO VP/ix is a customised version of Microsoft's MS-Dos 3.2 operating system, optimised for use with SCO VP/ix and the standard Microsoft GW-Basic interpreter.

SCO VP/ix includes a pop-up, menu-driven user friendly interface, complete with help screens. Multiple Xenix and Dos sessions are possible on the system console through the MultiScreen(TM) virtual screen manager.

VP/ix is also fully compatible with SCO MultiView(TM), SCO's multitasking windowing environment. The combination of SCO MultiView and SCO VP/ix allows terminals to run concurrent Dos and Xenix applications in overlapping windows, and provides Dos users with a smooth transition to the multiuser SCO Xenix environment.

SCO VP/ix can run multiple copies of Dos simultaneously, but supports Dos graphics applications in full-screen mode on the 386 console only. Using SCO VP/ix, character mode Dos applications can be executed from serial terminals. SCO VP/ix also supports popular

"illbehaved" Dos applications such as Lotus 1-2-3 by providing three levels of emulation: Dos, BIOS, and direct-to-hardware control registers or screen memory.

VP/ix is also well-suited as an alternative to LAN configurations that include up to 8 Dos machines plus server. For larger configurations, multiple Xenix and MS-Dos machines can be combined using SCO Xenix-NET, creating large integrated multiuser systems and providing an open-ended growth path for users. SCO VP/ix is available with licences for either 1 to 2 or 3 or more users.

This agreement with Sun reinforces SCO's ongoing commitment to bring the benefits of workstation technology to PC application developers and end users.

It is now possible to use MS-Dos applications under SCO Xenix, with the release of the new SCO VP/ix6TM0 operating system extension. SCO VP/ix runs IBM PC-compatible applications software under SCO Xenix on Intel 80386-based computers. It supports MS-Dos graphics software as well as "illbehaved" MS-Dos applications such as Lotus 1-2-3 and Microsoft Flight Simulator on the 386 console, and also allows the use of MS-Dos applications on remote character-based terminals and bit-mapped stations.

SCO CGI

CGI provides a graphics extension to the Xenix environment, allowing developers to produce packages, such as SCO Professional's graphics display, and the new SCO ImageBuilder, with the capability to import and export graphic data between different products.

CGI supports raster, bitmap and vector devices and supports multiple fonts, line styles and display formats. A large range of devices can be supported, including Image scanners, mice, graphic tablets, Bitmap displays, printers, plotters, laser printers and so on.

CGI is consistent with the ANSI Computer Graphics Virtual Device Interface standard.

Sun Microsystem NeWS

In the engineering and scientific marketplace, SCO is actively positioning the SCO Xenix-based microcomputer as a viable platform for running applications, such as CAD, CAE and CAM, that were formerly limited to dedicated workstations. SCO announced that it has reached an agreement with Sun Microsystems by which SCO will license Sun's X/NeWS window technology in a product to be offered later this year.

The X11/NeWS product combines support for Version 11 of the X Window System (X11) from the Massachusetts Institute of Technology (MIT) with the PostScript language-based Network/extensible Window System (NeWS) from Sun Microsystems. SCO will offer its customers a unified window system that merges the popular X11 with NeWS. Sun and SCO will be co-operating to bring advanced technology to the Xenix community including toolkits, user interfaces and a variety of frame buffers.

The X Window System, developed at MIT by Robert Scheifler of the Computer Science Research Group, has become a standard graphical window interface for technical Unix system workstations. Sun's NeWS, based on a subset of the PostScript page description language, provides advanced features such as display resolution independence, graphics applications portability, high interactive performance, and a flexible architecture.

This agreement with Sun reinforces SCO's ongoing commitment to bring the benefits of workstation technology to PC application developers and end users. As a full 32-bit operating system, SCO Xenix 386's four gigabyte virtual address space already can accommodate large CAD/CAE applications that were once applicable only to 32-bit dedicated workstations, minicomputers, and mainframes. Now, by adopting the leading window technology for technical Unix system workstations, SCO has taken another step toward making the industry-standard PC an even more viable low-cost workstation platform for both applications developers and end users.

Dr Eric Schmidt, vice president and general manager of Sun's Software Products Division, said, "Sun is extremely pleased to have SCO join us in bringing this technology to a new market. As a leader in supplying the Unix operating system to Intel-based systems, SCO is a key participant in Sun's strategy to hasten the acceptance of this technology for the benefit of application developers and end users. We are very excited about the obvious synergies of our two companies."

Languages and Runtime Environments

The Xenix Development provides a highly optimized C language development, along with the plethora of tools which have given the Unix systems their reputation as a software developer's dream. However, in the world of commercial realities, there is a massive base of software written in languages such as Cobol, Fortran, Basic, RPG and PL/1. SCO has addressed these by working with software companies to ensure a rich development environment.

SCO has had a long association with Microfocus and its Level-II Cobol. With the introduction of the new VS Cobol, a high performance mainframe style Cobol is available, together with the screen generators, source level debuggers and other development tools from Microfocus.

SCO has reached an agreement with Microsoft to port their compilers and interpreters to Xenix. Under the agreement, SCO will port certain languages to Xenix System V and to Unix System V/386 Release 3.2, the forthcoming "merged" Unix System. The products for Xenix/Unix Systems will maintain version and feature compatibility with the Microsoft products available for the Dos and OS/2 environments.

Programming languages covered under the agreement include Microsoft C/286 Optimizing Compiler, Microsoft QuickBasic, a threaded p-code interpreter that combines the best features of an interpreter and a compiler-debugger, Microsoft C/286 Optimizing Compiler, an advanced compiler targetted for high-performance 80286-based systems and Microsoft Codeview, a visual source-code debugging tool.

Xenix provides the full System V set of system calls, plus all the Posix extensions, the older System III calls and even a set of Level 7 Unix system calls, to ensure the widest possible compatibility.

The SCO product line already includes several products originally developed for the Dos and OS/2 markets by Microsoft and subsequently ported to Xenix/Unix Systems, including Basic, Fortran, Cobol, Pascal and C.

SCO is also working closely with Language Processor Incorporated, to bring the LPI range of 386 compilers to the market. These compilers are specifically aimed at the 386 environment, where they allow the full four gigabyte address space of Xenix-386 to be utilized. The languages covered by this agreement are: LPI-Fortran, LPI-Basic, LPI-Pascal, LPI-PL/1, LPI-Cobol, and LPI-RPG II. Together with these, LPI-Debug provides source level debugging for all these languages.

Application Development Languages

Foxbase and Foxbase+ — SCO Foxbase and Foxbase+ are, respectively, dBase II and dBase III+ workalikes. Foxbase+ is a multiuser relational database management system featuring source language and data file compatibility with Ashton-Tate's dBase III Plus, as well as dBase III Plus record and file locking syntax, while providing significant enhancements over the dBase family of products. The state-of-the-

art B+ tree algorithm greatly speeds queries, the compiles-as-you run feature gives the developer the convenience of an interpreter and the security of compiled code, and gives the end user the speed of compiled code.

Integra — SCO Integra is a relational database management system (RDBMS) designed specifically for the Xenix/Unix multiuser environment. Integra provides features that are critical for reliable multiuser information management and decision support. Integra will be available in the third quarter, 1988.

> Now our developers can create and maintain serious applications in a fraction of the time.

Integra was designed to be used proficiently either by office workers wanting an easy-to-use tool for tracking and reporting data or programmers creating serious applications. It includes online help facilities, which are always readily accessible, and creates default forms and reports, which can be easily modified. Its menus can be customized without writing a single line of code. Additionally, nested queries on the results of other queries provide exceptional decision-making support.

SCO Integra uses the command language SQL (Structured Query Language), the industry standard on-procedural query facility for database management. SQL's commands operate on entire sets of data at a time, rather than following the procedural, record-at-a-time approach of network and hierarchical databases. Optional embedded SQL routines enable programs written in C or Cobol to access and manipulate Integra databases. Additionally, a powerful procedural facility, the Application Development Library (ADL), can be used to manipulate databases, perform queries, and execute transactions.

"SCO Integra is fast and easy to use," said Tim Shelton, SCO product marketing manager. "Its menu-driven interface serves a dual function, enabling users to learn the product more quickly than other database products, and providing faster data access as well. Integra also incorporates SCO ISAM, its underlying X/OPEN-compatible data access method, which has been finely tuned to optimize Integra's performance even further."

Sophisticated recovery methods ensure complete multiuser data integrity at all times. The optional transaction journaling feature provides complete audit trails by logging all changes into journal files. These files can be used to "roll back" incompletely posted transactions or "roll forward" transactions into a backup in the event of a system failure.

Data can be exported or imported to and from other applications, such as spreadsheets and other database management systems. Integra can also be tightly coupled with SCO's recently announced integrated office automation system Office Portfolio. For example, data from Integra can be exported to ImageBuilder, a presentation graphics package, for use in creating charts, graphs, or slides.

Unify Corporation and The Santa Cruz Operation, announced a strategic technology partnership that joins Unify's fourth generation language (4GL) development tools with SCO's Xenix System V multiuser database management system.

Under the agreement, Unify and SCO are entering into a joint engineering project to integrate Unify's Accell Integrated Development System into SCO's new multiuser RDBMS, Integra. Accell was selected by SCO as the 4GL of choice for Integra.

The Unify/SCO RDBMS solution answers workgroup or departmental computing demands for the essential operational needs of a corporation. Together, Unify and SCO will deliver Unix/Xenix-based RDBMS technology solutions — or mission critical systems — that address a department's production, operation and transaction needs. Examples of mission critical systems include on-line reservation systems for airline or hotel chains, hospital check-in systems or student registry systems for major universities. To develop these applications quickly and cost-effectively, Unify's Accell delivers fully integrated, high-level programming tools — application generator, fourth generation language and window management system — to SCO's structured query language database. The Accell 4GL tools dramatically reduce application development time and maximize database entry and extraction capabilities.

According to Doug Michels, SCO cofounder and vice president of marketing and development, the selection of Accell followed an exhaustive evaluation of of all available 4GL environments.

"Accell provides the missing piece in our database offering. Now our developers can create and maintain serious applications in a fraction of the time. Also, Accell gives the programmer excellent control over the user's environment including windowing and context-sensitive help facilities."

SCO will distribute the Accell product through national and international OEMs, VARs, distributors, as well as directly to end users. According to Saykally, the SCO deal offers Unify an entry into the Xenix marketplace and extends Unify's market presence. □

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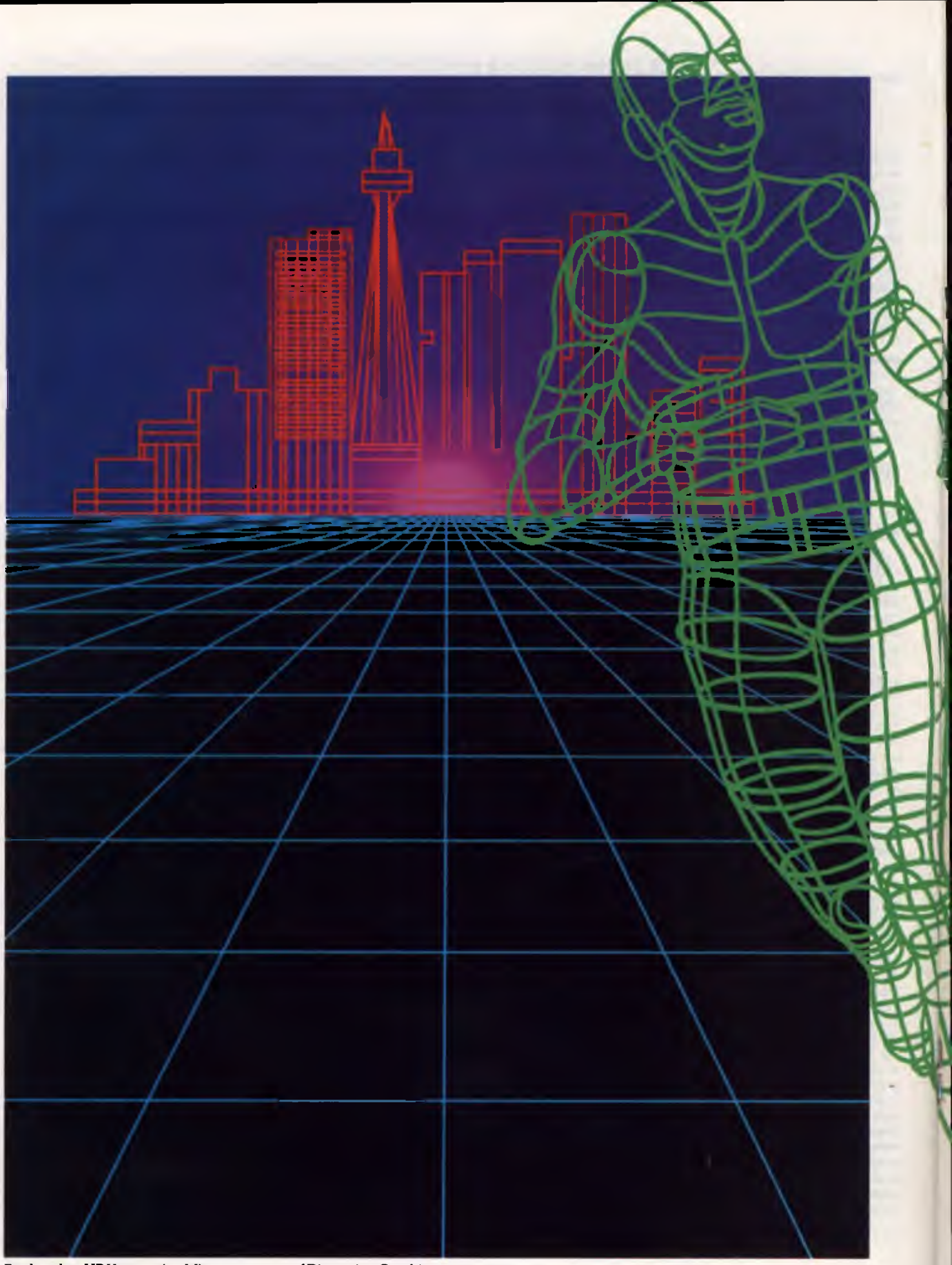

Produced on HP Vectra using Mirage, courtesy of Dimension Graphics.

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© 1987 The Santa Cruz Operation, Inc., 400 Encinal Street, P.O. Box 1900, Santa Cruz, CA 95061. The Santa Cruz Operation, Ltd., P.O. Box 4YN, 18 Noel Street, London W1A 4YN United Kingdom, +44 1 439 2911, FAX: +44 1 637 9381, TELEX: 917372 SCO LON

Applications

Applications are the crux of any computing solution. SCO provides a suite of Business applications which provide the fundamental requirements of a business solution.

BUSINESS applications from SCO include wordprocessing, document typesetting, spreadsheet, business graphics, project management, statistics, development tools and environment, and integrated mainframe/microcomputer computing. This core of applications, together with well over 1000 third party packages, gives Xenix an unbeatable list of multiuser applications. The major third party packages include horizontal packages, for example: accounting packages such as Focus, and a huge range of specialized vertical market packages, for example: Telemarketing packages, such as Brock.

For a brochure, or a detailed product Abstract, describing these products, contact your SCO distributor – names and addresses are given on the outside back cover of this liftout.

SCO Office Portfolio

SCO's office automation system highlights the company's commitment to providing powerful business applications in the multiuser PC environment.

The modular system allows users to add only those applications they need, when they need them. Office Portfolio lets users "copy and paste" information between applications and even run multiple applications at the same time. The desktop utilities include electronic mail, a calendar and meeting scheduler, and a user directory.

The president Larry Michels said, "We've put a great deal of effort into making our products and those of other vendors work together in ways that are best suitable for the office environment. Office Portfolio delivers the benefits of that endeavor. Our customers can now enjoy a single interface that connects them to an incredibly wide range of applications and utilities."

With the growing acceptance of departmental Xenix systems in the office, has recognized the need for integration of full-featured applications. By providing a standard user interface for all the applications along with important desktop utilities and an open architecture for third party products, will provide the foundation for many new products over the next several years.

Office Portfolio integrates full-featured business applications with time-saving desktop utilities, such as electronic mail, a calendar and meeting scheduler, and a user directory. Multiuser business applications that can be integrated with Office Portfolio included Lyrix, a full-featured, word processing system; Professional, an enhanced Lotus 1-2-3 workalike; Integra, an SQL-based relational database management system; ImageBuilder, a presentation graphics system; Statistician, an statistical analysis package and MasterPlan, an interactive project management system. In addition, third party applications can be added.

Office Portfolio delivers to Xenix Systems the integrated office automation system that business professionals have been asking for. Unlike most other OA systems, Office Portfolio integrates full-featured, time tested business applications without compromising their functionality. In addition, the user can add other applications of his or her own choice. Customers customize the desktop system to suit the needs of the individual or the organization. And because the system is modular, customers purchase only those applications they need, when they need them.

Because Office Portfolio is a multiuser system, it's easy for office personnel to share ideas and information. Office Portfolio is also easy to learn because all applications share a standard interface, as well as many similar commands.

SCO Office Portfolio's electronic clipboard enables the user to "copy and paste" information between applications. Users can run multiple applications at the same time, moving between them with a single keystroke. Context sensitive help is also only a single keystroke away at all times.

Office Portfolio is expected to be available late in the third quarter of 1988. Individual applications with a common user interface are being released throughout this year. Office Portfolio is the answer to integrating a total office software solution in a multiuser environment. Key business software applications and multiuser desktop tools are united in a flexible system that you can customize for each individual user, department or organization.

Office Portfolio is the first product to combine the multiuser power of Xenix with the ease of use found in popular standalone products.

With Office Portfolio you cancreate documents, manage numbers and data, and access all that information from a single terminal. The integrated software products share a common user interface ? it is easy for a user to become familiar with and use all the supported applications. And, Office Portfolio provides an easy way to communicate and transfer information to other system users.

Choose the Application You Need

Wordprocessing, spreadsheets, database, business graphics, project management and statistics are all available for Office Portfolio. You choose the applications you need, when you need them. For instance, you might decide you want wordprocessing and spreadsheet capabilities now, and later decide to add a data base.

All supported applications have a common menu interface. Menus prompt you through application features and make infrequently used features easy to remember. Experienced users can type through the menus.

Applications use the same keystrokes for help, to reach the desktop, to save a file and many other common commands. The escape and arrow keys work the same in all the applications. All applications are available from the Office Portfolio menu system and each application is reached quickly with a dedicated function key.

Key Features

SCO Mail – Mail lets users easily communicate and transfer information. It is fully integrated into the SCO Office Portfolio menu system and uses the same user interface as other Office Portfolio applications. Users are notified of new mail when working in the mailer, the wordprocessor and from the desktop menu.

Mail can be sent to a single user, multiple users, or a distribution list, including the entire system. The mail facility provides both local and remote mail delivery services transparent to the user.

The mailer supports cross-domain routing and can use uucp, Xenix-NET and other SMTP compatible delivery agents. Mailing to users on a remote system is as easy as mailing to the host system. Users are prompted with a header asking who the message is to, the subject, and who are to receive copies. The date and the user's name are included automatically. Registered mail can be requested to ensure receipt of the message.

SCO Calendar – The Calendar allows you to make the best use of your time by managing daily activities electronically. You can interrupt work on any application or other desktop function to check something in the calendar.

Calendars, configured by day, week or month, list scheduled meetings and appointments. Users can print any of their calendar entries. "To Do" lists are shown with your daily calendar. These reminders are for work that needs to be done, but that doesn't have a particular meeting time attached to it.

Meeting scheduling is a calendar timesaver. To request a meeting, specify attendees, acceptable dates to meet and the length of the meeting. The system checks all the participants' calendars for the first mutually available time.

After a meeting time is established, electronic mail notifies participants of the meeting. The meeting is marked in everybody's personal datebook. You may ask for reminder messages to be sent automatically.

Task Manager – The Task Manager helps prevent missed deadlines by managing future activities. Assign an action item by attaching a To Do tag to an existing mail message or document, or tag a mail message as you distribute it. You can also use the Task Manager to send reminders to yourself.

The To Do tag is filed in the recipient's and the originator's Task Manager account, sorted by date. Mail is sent notifying the recipient that they have a new To Do item in their Task Manager file.

The To Do item may be reassigned and transferred to other system users. Recipients can mark the item complete. Only the originator of the task can change the due date or delete the task. Check the status of the To Do item at any point by selecting History. To Do items due that day will show in your Calendar.

SCO User Directory – User Directory provides a quick way to check information about system users. The User Directory includes the users login name, department, title, mail address and phone extension. A notes area allows you to add other information. You can search the User Directory on any of the fields.

Information from the User Directory can be selected and pasted into Mail Lists and other applications.

SCO Spell – Spell provides a way of checking spelling on mail messages and other desktop applications. An 80,000 word system dictionary is provided; words can also be added to a local dictionary. Medical and legal dictionary supplements are also available.

If a misspelt word is found, you are prompted with a list fsuggested corrections or are asked to provide a correction. The misspelled word will automatically be replaced within the text. You can choose to skip the identified word, add it to a local dictionary, or globally correct it throughout the file.

SCO Filer – The Filer provides an archiving system for historical documents. Any file on the system is eligible to be placed in the file.

Archived records will be held on line for a period of time determined by the system administrator and then removed to another storage media.

The use of keywords submitted with the file, allow for easy retrieval of a document. The system will provide an audit trail for all versions of the record. It is also possible to search by record number, date, subject of the document, author and addressee(s). Records are retired according to pre-assigned dates.

The Authenticator – With the Authenticator users can verify they are cleared to read or edit a file by typing a password. Authentication passwords are different from the login password and can be changed at will. Any file generated by the system can be authenticated. All authenticated documents will automatically placed in central file.

SCO Office Portfolio Manager – The Menu Generator provides developers and system administrators with screen based forms to easily customize menus and modify the Office Portfolio menu system. The Xenix operating system uses the same point and pick user interface.

The system administrator can create a custom user interface as a user's default environment. The forms based, structured menu design is utilized to create levels of user interface and pointers to prompt and help files.

SCO Office Portfolio Developer's Toolkit – The toolkit, containing data integration libraries, allows developers to integrate their products into the portfolio clipboard system.

SCO Lyrix

The Santa Cruz Operation Ltd. (SCO) has released an international version of Lyrix(R), a fully user-configurable, menu-driven wordprocessing system. Lyrix Release 6.0 is available in French and German, as well as English.

The French and German versions of Lyrix 6.0 feature translated menus, messages, help screens, user documentation and spelling correction. The English version of SCO Lyrix is available with a dictionary for English spellings. Special purpose Dictionaries, for example: legal and medical, are also available.

Designed to be simple and intuitive for new users, Lyrix also provides a full range of state-of-the-art features for advanced users including mail merge, automatic footnotes and section/-paragraph numbering, and table of contents generation.

Designed specifically for multiuser Xenix-systems, Lyrix provides full file-locking data protection. It supports 8-bit extended ASCII characters and a variety of terminals and printers, both domestic and international. Lyrix menus are easily configured to include other applications. The inclusion of two spelling dictionaries – an 80,000 word dictionary in the particular language of the version of Lyrix, and a second 80,000 word American/English dictionary – provides a distinct advantage to companies which produce documents in more than one language.

Microsoft Word – This package is a port of the popular MS-Dos word processor.

Xenix Text Processing – This package comprises the extremely powerful Unix document processing tools and photo-typesetting packages.

SCO Professional – SCO Professional provides full compatibility with Lotus 1-2-3 program and data files in the Xenix environment. Professional provides not only the spreadsheet, but the full manager functions, similar to Lotus Access. This allows users to run Professional, print graphs, transfer/translate files from SYLK, DBF, and DIF formats of other packages, to directly read and write Dos floppies, and to configure the package. Professional is compatible even in the support of function keys, macros, database functions and with enhancements in spreadsheet size and memory management.

Microsoft Mulitplan – Multiplan is a popular spreadsheet in the MS-Dos environment and this port is compatible in user interface and functionality. SYLK files may be exchanged between the Dos and Xenix implementations of Microsoft Multiplan.

SCO ImageBuilder – SCO ImageBuilder is a new Xenix graphics package designed with business people in mind. ImageBuilder can be run from the console of a PC-type system or from any SCO CGI supported graphics terminal, or from Dos running graphic terminal emulators such as GSS Grafterm or GrafPoint Tgraph-05.

SCO ImageBuilder's menu interface was designed to enable even the novice user to quickly and easily create professional-looking graphs, charts, diagrams or slides that are well-suited for the boardroom, sales meetings, or desktop document. Because ImageBuilder was developed with SCO CGI (Computer Graphics Interface), it supports a wide range of graphics devices, such as plotters, printers, terminals and graphics boards, and also includes support for creating 35 mm slides.

SCO MasterPlan – MasterPlan is an interactive project management system from Quality Software Products, based on the critical path method. To facilitate the input and tracking of interactive data, MasterPlan provides several different views of a project. It includes screens that depict project activities, networks, calendars, resources, and forecasts. MasterPlan offers context sensitive help screens, a full tutorial, reference manual and a quick reference guide. MasterPlan uses the termcap/terminfo terminal information databases to run properly on almost every imaginable terminal, and an optional graphics package is also available.

SCO Statistician – Statistician is an extremely flexible statistical package developed by Quant Systems specifically for the Xenix/Unix(R) environment.

Statistician is intended to give professionals in business, government, administration, clinical research, engineering, education and science the ability to do statistical analysis without needing to be statistical programmers. Unlike the typical statistical package with its hundreds of cryptic commands, Statistician offers a friendly interface that includes pull-down menus, context-sensitive help screens, dialog boxes, and a unique output manager. Users simply "see and select" the variables, files, directories, parameters, and menus they prefer. □

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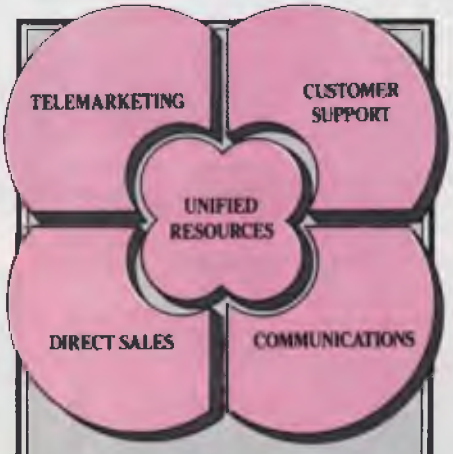

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The President 386VS™ (Vertical Server™) is the most powerful computer yet produced by the President stable. Almost mini computer size in performance and capacity the 386 VS™ is attractive and yet compact in its self contained vertical casing. The 386 VS™ is upmarket, fast and feature packed, suitable for any stand alone use or perhaps more appropriately as a file server for any approved network system.

The President 386 VS™ would be an ideal element in any Desktop publishing situation as its high speed 32 bit 80386 microprocessor would be apt for this application. The 386 VS™ has 4MB of RAM expandable to 16 megabytes with hardware support opening great opportunities for this system in the multi-user environment. Choose your operating system as dual drives 5.25" and 3.5" allow the old and new PS2™ formats to be used; MS-DOS, UNIX or the OS/2 option when available in 1988.

Eight standard serial ports plus two parallel ports are ready for expansion and terminals. The 386 VS comes with a EGA graphics card plus EGA/CGA dual high resolution colour monitor with tilt and swivel base stand, nothing has been over looked. The President monitor features EGA lock control and colour shade select control.

With processing speeds of 16 or 20 MHz, a slot provided for an optional 80387 co-processor chip, you can start to imagine the performance which is assured. The cost of maintenance --- forget it --- with a FULL THREE YEAR parts and labour warranty President's technical department are keeping your maintenance worries and costs at bay. The price --- well that also is a pleasant surprise with this remarkable package. Check the specifications and call in for a demonstration, then you will appreciate why this machine is a President.

Specifications

CPU

- 32-bit 80386 microprocessor;
- 16 or 20 MHz speeds, 0 wait state
- 80387 math co-processor, optional

MAINBOARD

- 32K ROM BIOS
- 4MB RAM (standard)
- expands up to 16MB with hardware support
- Eight expansion slots;
- Two 32-bit slots
- Four 16-bit slots
- Two 8 -bit slots
- One I/O port
- Programmable speaker
- Real-time clock/calendar, with battery back-up

EXPANSION CARDS

- Floppy and hard disk controller 360k, 1.2MB, 720k or 1.44 mini drives
- EGA colour video card
- Facilitates network functions, optional
- Eight serial ports RS-232
- Two parallel ports

This brochures was produced and art set using the President DTP System.

FLOPPY DISK DRIVES

- Supports 1.2MB & 1.44 mini disk drives

HARD DISK DRIVES

- 71 MB Voice coil standard, optional 150+
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- EGA/CGA dual mode standard

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- One simple serial port
- Upgradable to support SNA, Statistical Multiplexing, X-25
- Synchronous capability on all eight serial channels
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Effective alternative to LANs

Alcatel-STC and Xenix

Processing power, administration, security and growth are all enhanced through a multiuser system.

A PROVEN and cost effective alternative to local area networks (LANs) is being offered to the Australian business community through Alcatel-STC and Blue Sky Industries. The product, SCO Xenix System V, is a multiuser operating system for PCs, based on the Intel 80286 and 80386 processors such as the XTRA 286/XL and 386/XL marketed in Australia by Alcatel-STC.

"We have long recognised the growing importance of the multiuser PC market," said Pat Duffy, marketing manager of the Business Communication Systems group at Alcatel-STC. "We released our first multiuser PC, the XTRA X, in 1986 and it was rated the top overall performer by *Your Computer*. And we've been providing multiuser systems ever since."

"Mainframes are an expensive and often unnecessary alternative, particularly when a version of Unix like SCO Xenix can be made available to our customers," she elaborated.

"This association with Blue Sky is a logical step for Alcatel-STC. With our System V-based Computer Consoles Incorporated (CCI) range of superminicomputers, we have been actively involved in the Australian Unix scene and have been watching Unix increase in acceptance and popularity for some time.

"In fact, Alcatel-STC is committed to the development of Unix in Australia and was recently involved as a sponsor in supporting the Australian Unix User Group's Annual Conference functions."

Xenix System V is a commercially enhanced, fully licensed version of AT&AT's multiuser, multitasking Unix System V operating system, originally developed for microprocessor-based computers by Microsoft.

SCO Xenix System V was co-operatively developed specifically for the microcomputer environment by Microsoft and The Santa Cruz Operation (SCO) in the USA. Blue Sky Industries is the local agent for SCO. The SCO Xenix System V is an AT&T System V.3 licensed, SVID-conforming Unix.

"To the PC user, this means that Xenix on a PC looks and operates like Unix on a mainframe, so the one operating system can be used throughout departments, divisions or entire organisations with less training costs and time," Duffy said.

"With our focus on the multiuser market, we are very enthusiastic about this association," she continued. "A standard multiuser operating system for 286- and 386-based micros sets the stage not only for increasing the presence of these computers in the multiuser marketplace, but also for developing new applications that take full advantage of the chips' advanced technology and software to better serve the needs of end users."

Another factor that both Alcatel-STC and Blue Sky feel will contribute to a strong SCO Xenix presence in Australia is that the SCO Xenix System V solution includes networking and communications packages, database management products, languages and development products, and learning aids.

Available packages

Among the available packages are SCO MultiView, the multitasking windowing environment and user interface; SCO Xenix-NET, a local area network for computers running Xenix that allows MS-Dos, PC-Dos and multiuser, multitasking Xenix PCs to reside together and share files, electronic mail and printers; SCO umoPATH SNA-3270, which provides communications between Xenix systems and IBM mainframes; SCO Lyrix, a multiuser word processor; SCO Professional, a multiuser Lotus 1-2-3 workalike; Multiplan electronic worksheet; SCO Foxbase and SCO Foxbase+, enhanced multiuser dBase II and dBase III Plus workalikes; programming languages including Micro Focus VS Cobol, Microsoft C and other Microsoft languages; and the SCO Xenix Tutor learning package. □

NEW - 110 MEGA BYTE LOW COST DRIVE

MiniScribe Model 6128

Xenix is a great operating system but all its features require large capacity storage. The MiniScribe 6128 gives you that capacity. And being an RLL drive, it does it economically. The MiniScribe 6128 offers you:

- Performance: 28ms avg access, 7.5 Mbit transfer rate.
- Reliability: rugged construction protects the HDA from shock. A linear voice coil actuator eliminates head skew problems common with other positioning mechanisms.
- Proven: The 6128 is part of the MiniScribe 6000 series of which there are hundreds of thousands in use throughout the world. The 6128 is currently running in Xenix systems in Australia.

Ask your dealer about the MiniScribe 6128 drive or contact Allaw Sales, the Authorised MiniScribe distributor, for your nearest MiniScribe dealer.

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Tomorrow has arrived!
Hewlett-Packard and Xenix

THE COMPUTER is an intriguing creation. The older it gets, the more powerful it becomes; at the same time it shrinks in size and as its value rises, its cost fails. All this happens exponentially. Only 20 years ago, we had CPUs which occupied a whole room filled with circuit boards containing discrete components, ten components per circuit board — no chips.

These dinosaurs stored data on reel-to-reel tape drives, with file access times measured in minutes, and required specialised power supplies which could deliver hundreds of kilowatts. The purchase price was measured in millions of dollars.

Only 15 years ago we had CPUs the size of large television sets, which had a massive 32 kilobytes of (core) memory and hard disk drives with platters measuring 12 inches in diameter that could store an incredible 2 megabytes. They were booted up by typing in a loader program in binary code on the illuminated front panel bit switches. (Why do you think the old Science Fiction movies always showed computer rooms full of flashing lights?)

The loader program would put enough intelligence into the animal to allow it to read in another loader — from paper tape. This, in turn, would give it enough intelligence to access the magnetic tape drive, which would finally let it communicate with the disk drive. This was a minicomputer and its cost was measured in hundreds of thousands of dollars.

In the last few months of the 1970s a new breed of computers appeared. At its introduction, the PC was expected to have a profound impact on man's lifestyle, because the average person could at last afford a computer. And indeed it did. The PC appeared in the form of a Tandy TRS-80 and the Apple, boasting 12 Kbyte of RAM and 150 Kbyte floppy disks. When Commodore released the Commodore 64, people could not imagine why anyone would need 64 Kbyte of RAM.

Only a few years ago, a good minicomputer featured 1 MIP (million instructions per second) of processing power. It could be optioned up, at great expense, to have 8 Mbyte of RAM and, for what was considered to be virtually infinite storage space, 400 Mbyte disk drives with average file access times of 100 ms.These disk drives cost around $30,000 alone, and were the size of the Whirlpool sitting in your laundry (some of them even sounded similar!).

When Compaq introduced the Compaq 386 in 1986, it had taken the first step to placing a minicomputer on the desktop. (Desktop mini-computing?). The second generation of 80386 machine which appeared in 1988 are just that — minicomputers. Take MS-Dos away, replace it with Xenix, fit a couple of intelligent multiport communications cards, add terminals and you have a multiuser system capable of supporting up to 30 users.

Take a look at Hewlett-Packard's second generation 80386 machine the Vectra RS/20, and compare it to the specifications of even today's minicomputers:

a) *A 32-bit processor running at 20MHz, delivering up to 4 MIPS of processing power.*

b) *16 Mbyte of 32-bit, 80 ns RAM on the motherboard.*

c) *620 Mbyte of internal hard disk storage space with average access time of 17 ms.*

d) *32-bit data buses.*

This is what we still, inadequately, call a PC!

You may argue that a true minicomputer has more than just a powerful processor and large disks. However, consider that with intelligent multiport cards, such as Blue Sky's Unicorn card, it is possible to have a dedicated I/O processor servicing 10 serial ports, each running at 34 Kbaud. With the addition of an 80387 or Wietek floating processor accelerator board, it becomes a system with a 4 MIP main processor, 32-bit co-processor, numerous I/C processors and massive, fast disk storage space. A $60,000, 20 terminal desktop minicomputer system has the performance of a $300,000 traditional minicomputer system!

What has led to this quantum leap in performance and price reduction? It is a combination of high-tech and growing user independence. In the past, hardware manufacturers had the luxury of telling the user what he wanted. Today, the user tells the hardware manufacturer what he wants. The days of hardware vendors locking their clients into proprietary operating systems are numbered. The user is demanding adherence to standards. Whether it's IBM, MS-Dos or Unix compatibility, the user wants his equipment to be 'compatible', because he then has a choice of the software he can run, the accessories and peripherals he can add, and the price he can pay.

In the PC market there are 2 standards — the IBM hardware standard, and the MS-Dos operating system standard.

In the minicomputer and mainframe markets Unix is the operating system standard. With the adherence to these standards, growth and communication are made easy.

The user no longer wants just to be able to communicate, he wants to be able to migrate. Migrate from the PC level to the mainframe level. The only existing medium for this is Xenix.

Hardware manufacturers are responding to this call. For example, in the case of HP's product line, a branch office of a firm could have a Vectra RS/20 running Xenix and supporting 20 users locally, which is linked to the head office HP9000 mainframe, running HP-UX, which could also be linked to a worldwide network, connecting tens of thousands of users. Not only could a terminal user on the Vectra transfer data between himself, the HP9000 and the rest of the network, he could also run the HP9000's programs on the Vectra and vice-versa.

From the migration point of view, a businessman could begin automating his business by running an accounting system on a Vectra RS/20 — Xenix system and then migrate, some years later, to an HP9000 mainframe without the loss of his investment in software and data, which had accumulated over the years. Xenix 386 would even enable him to continue using the library of MS-Dos software which he had bought for his IBM PC all those years ago. Now, that is compatibility!

An 80386 machine running Xenix is such an attractive proposition, that it threatens the position of low end minicomputers. Users are moving towards IBM compatible machines running Xenix, because they can have a powerful multiuser system and continue using their MS-Dos applications and industry standard hardware accessories without the need for staff retraining.

What does this combination of a leap in technology and responsiveness to user needs mean? It means that tomorrow has arrived. All those years that users spent waiting for the day when small, fast, powerful and inexpensive computers, which could communicate and share programs with a spectrum of other computers, as well as having a huge library of software and hardware accessories would arrive, have finally been rewarded.

At no other time has the user has such a choice of hardware and software from so many manufacturers at such an attractive price. At no other point in time has there been such a powerful medium which allows the user to communicate and grow. □

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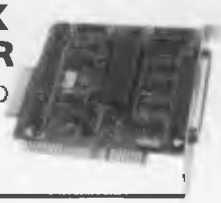

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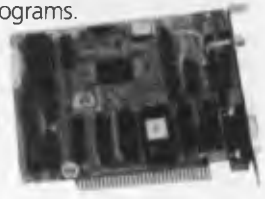
This amazing new card drives RGB colour, composite colour or a TTL monochrome monitor. And it fits in a short slot. Full CGA support. Can be used as a colour graphics card with a monochrome display and still run all the colour programs. The card even cures the dread colour graphics "flicker and snow".



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Colour Graphics Video Card

- Suits RGB and composite colour monitors
- Light pen interface
- Fully CGA compatible
- 40 x 25 & 80 x 25 (text), 640 x 200 (mono) and 320 x 200 (colour)

$115

Colour Graphics/ Printer Adaptor

Attaches to IBM-compatible RGB monitor; provides complete compatibility with IBM Colour Graphics Adaptor. Equivalent to the IBM colour/graphics adaptor with additional printer port to replace the video port originally supplied by IBM.

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Parallel Printer Card

- Standard TTL level
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Turbo Mono Graphics/ Printer – Short Slot

If you want fast, flicker free scrolling and full Hercules compatability, this is it! Perfect enhancement for slow scrolling programs like Microsoft Word etc. The ultimate monochrome graphics card.

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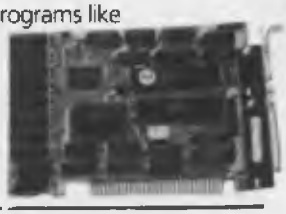

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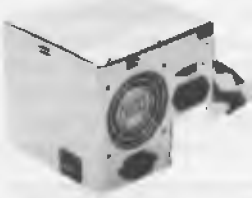

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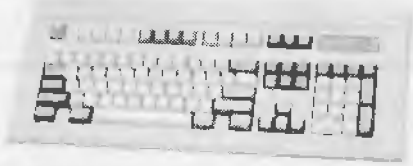

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THE KOOKABURRA LAP COMPUTER

A LITTLE AUSSIE BATTLER

If you're fair dinkum about 'buying Australian' and don't want to spend a packet on a portable, then read what Sandgroper John McLean has to say about this laptop with a difference.

LAPTOP COMPUTERS are quite successfully competing with desktop computers because of their great versatility, ample power and small size. The battery-driven laptop is a flexible unit because, unlike the stationary computer attached to the wall by its permanent umbilical power cord, it can be used while travelling, visiting building sites, and attending conferences and yet still interact with other computers back at the office.

Among the established names in laptops is the Australian made Kookaburra which could be described as a desktop in a tiny box or, alternately, an electronic briefcase.

The Kookaburra is capable of interacting with standalone computers, or as a replacement. Indeed, its small footprint means little desk clutter, and no further need for a desk return. The ability to work from battery or mains power, and yet be light and compact is particularly well emphasised in the Kookaburra.

The Kookaburra's combination of help screens and menus make all the software easy to master.

Configuration

The Kookaburra weighs in at a a low 4 kg. Its overall size of 325 mm width by 285 mm deep by 58 mm closed height, means that it will snuggle nicely into your briefcase, with plenty of room for other papers — and the weight will not stretch your arm. (Note that it doesn't have its own handle.)

As there is an excellent array of programs occupying 128 Kbyte of ROM it is unlikely that the disk drive would be missed in the field.

Figure 1. *The 73 keys include 12 function keys (which can be shifted), a large Help key, Reset, Line Feed, Return, Tab, Control, Backspace, Escape, Shift and Shift Lock.*

The machine has a true 16-bit data path, and uses DOS 2.11 as its operating system, allowing access to a huge library of software. It does not have a builtin disk drive which, the developer claims, makes it more robust because disk drive heads would be damaged by jarring, and the builtin chips process information substantially faster than floppy disk based software.

The standard unit has 96 kilobytes of RAM, which can be expanded to 256 Kbyte, providing some 96,000 characters of workspace. A builtin communications program facilitates data transfer direct to a stand alone computer or a modem. A separate disk drive for the office is another possibility and an optional double disk drive is also available. A 3½ inch single drive is at present under development.

As there is an excellent array of programs occupying 128 Kbyte of ROM it is unlikely that the disk drive would be missed in the field.

Processor

The Kookaburra uses an Intel 80186 microprocessor, running at 6 MHz. Many laptops use a CMOS chip but the Kookaburra uses the NMOS system, because of its superior speed. The relative slowness of the CMOS chip is particularly noticeable when a spreadsheet requiring numerous mathematical calculations is in operation. NMOS is claimed to be up to eight times faster in processing speed compared to other laptops using 8086 or 8088 chips. The 80186 chip will even outperform 8086 or 8088 chips commonly used in IBM clones by four to six times. It is not claimed that the Kookaburra has graphics capabilities bu' it is in the chip although graphics is not supported in the console driver.

NMOS uses a less energy efficient chip which affects battery power, but the Kookaburra claims up to four hours of use between charges of its Nicad batteries. A battery warning light indicates when battery life is low and automatically shuts down operations three minutes after the light shows.

Optional hardware

A sixty-pin bus expansion slot supports disk drives or a RAM disk, which has been developed but is not offered to the buying public. A double disk drive carrying an extra 128 Kbyte RAM is offered. There are two serial ports and one parallel port provided as standard. An RS232 outlet enables modem operation; speeds from 150 to 9600 baud are supported.

Two plug in ROM modules of up to 128 Kbyte can be used if special application software is required. A supporting library of programs includes a typing tutorial and a spell checker.

An owner with access to a ROM burner can buy ROM pack software provided by the distributor, and permanently store special purpose software.

LCD screen

The Kookaburra has either an 8 line by 80 character liquid crystal display (LCD) screen, or a 16 line by 80 character option. As the Kookaburra is able to connect to a 24 line by 80 character monitor, 8 or 16 lines should be sufficient in the field. The matt finish LCD screen is generally easy to read as long as you are directly in front of it and the black letters on an olive green background are restful and quite readable outdoors.

There is a lack of descenders in the character set which may be temporarily strange but the eye adjusts quickly. There is no backlight for the screen, although there is keyboard control to provide degrees of contrast and this is usually sufficient to adjust for various lighting conditions; the adjustable angle of the screen helps, too.

Thoughtful keyboard layout

The keyboard is generally the most noticeable difference between a laptop and a desktop computer. To maintain the small width, manufacturers generally offer fewer keys or non-standard arrangements (or a combination of the two). The Kookaburra does well with the small space allocated.

The 73 keys include 12 function keys (which can be shifted), a large Help key, Reset, Line Feed, Return, Tab, Control, Backspace, Escape, Shift and Shift Lock. There is a keyboard 'click' which is rather more of a squeak than a click, when delivered from the factory, but this can be adjusted. Alternatively, the click can be

HRC Technologies

A TAKEOVER of HRC Technologies has occurred. Quasar Data Systems, which took over the assets of the company, will now be manufacturing the Kookaburra. If you have any queries about the product or any under development, give Quasar a call.

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HS100 disk storage box for 5.25" disks. 100 capacity, dividers, clear perspex removable lid. Lockable.

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10) DD80L

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11) Apple Slim-Line Drive

Our top-selling Taiwanese slimline drive for the Apple II, IIe, IIGS and IIc. Now in stock. 12 mths wty!

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Our top-selling parallel dot matrix printer. 180 cps, two NLQ fonts, graphics, friction & tractor, single sheet feeder, 12 mths wty. Normally $675. Hurry. Limited stock Our price:

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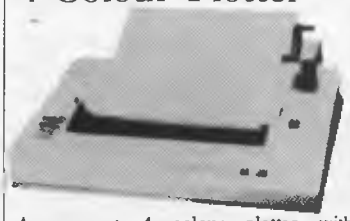
19) COMX PL80 4 Colour Plotter



A compact 4 colour plotter with Centronics parallel port suitable for use with Apple, IBM, etc. Plots at 92 mm/sec in 0.2 mm increments. Emulates Roland DXY800 for AutoCad, Amdek Amplot for Lotus and Symphony. Works with A4 cut sheet or roll paper supplied. The PL-80 is suitable for school, hobbyist and professional use.

$499

20) The Button

Spike filter and lightning arrestor. Low cost protection for your valuable computer equipment. Works in parallel with any equipment on the same circuit. No installation required. The perfect Christmas gift for the computer enthusiast who has everything. You maybe?

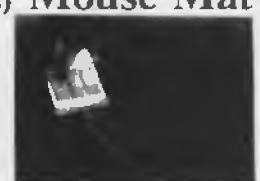
$35

21) Logimouse

Microsoft compatible mouse for your IBM or compatible. Comes complete with software. Connects to mouse port. Card version also available for $259 which comes with its own driver card.

$259 elsewhere. Our price: **$199**

22) Mouse Mat



If your mouse scratches your desk you need this neoprene mat. Keeps your mouse clean and working properly.

$19.95

ACCESSORIES

23) Printer Stand

Clear perspex printer stand. Stylish. Rigid. Holds 1000 shts comfortably. Suits most 10" dot matrix printers.

10" version **$35**

15" version **$45**

24) Paper

2000 sheet continuous stationery. Laser cut detachable tractor. 70 gsm, 66 line (American standard) printer paper. White bond. Allow $6 to $9 postage as it weighs 10Kg. Compare elsewhere at $52. Our price:

$38

25) Cables

We supply virtually every cable imaginable. Cables to link computers to printers, modems etc. Most cables are available for :

$30

26) Ribbons

We supply most popular makes of ribbons including DT80, SP80, BX80, all Epson ribbons, Logitec, Super 5, Imagewriter, C.Itoh etc. Most ribbons are:

(Panasonic, EX800, LQ ribbons etc range from $15 to $25. Call$)

$12

Apple Bits

27) RF Mod IIe

If you need (or just want) colour on your Apple IIe but don't want to blow $700 on a colour monitor then invest $40 in a Mclagan Wright RFMod and hook up to VHF channel 11. Just the thing for the kids' games.

$40

28) Z80 Card

Microsoft compatible Z80 card for IIe or II+. Gives you access to CP/M for such programs as Wordstar or dBase. A bargain at

$90

29) Ext 80 Card

If you still haven't upgraded your IIe to 128K and 80 columns then now is the time to buy the Auto-Ice Extended 80 col card. Allows Apple IIe owners to make full use of their machines.

$90

30) Auto-Ice Printer Card

A fully-featured Apple Firmware compatible printer card which includes graphics dumps to most printers. Price includes cable. Works with all the latest software including Printshop. Normally $110. Our price:

$90

ACCESSORIES

31) Samsung Monitor

The best in Korean technology, Samsung is rapidly gaining a reputation for quality, reliability and excellent performance. Available in TTL or composite video, green or amber, and standard or swivel mounted. Prices:

Standard: **$199**

Swivel Mounted: **$220**

32) Viaterm

Viatel software package for Apple users wishing to connect by modem to Viatel. Written by Paul Zabrs who writes most of Telecom's software. Normally $140, our price:

$99

33) Terminapple

Apple communications software from the same author. Everything you would expect in a complete comms package. Elsewhere $145. Half price:

$79

34) Disk Cleaning Kits

5KIT: 5" cleaning kit with 2 cleaning disks: **$13**

5REF: Ten replacement cleaning disks: **$25**

3KIT: 3.5" cleaning kit with 10 cleaning disks: **$30**

Figure 2. The Kookaburra offers one parallel and two serial ports plus an RS232 plug and connection for an external monitor.

disabled from the keyboard using the Control key.

The keys are sculptured, with white lettering, and have a good feel. They are grouped in light grey, dark grey, black and green to distinguish between groups of keys. Coupled with the military green external case, the effect is unlikely to excite interior decorators, but it is certainly a change from the usual pastel colours of the competitors.

Builtin software

Tailor written software by Cybernetics Research, Microsoft and Persoft is available; builtin, there is a choice of a diary/planner, address and phone files, the Magwriter wordprocessor, Magcalc spreadsheet, Magterm communication software, MS-DOS plus space for your own menu option.

These are all menu driven and use the function keys to execute commands. The Kookaburra's combination of help screens and menus make all the software easy to master.

Magcalc, which integrate with Magwriter, has 11 columns by 100 rows in and supports naming of columns and rows as well as cells. Formulae can be copied from cell to cell. Novices will master Magcalc easily — particularly as the program is integrated with the keys.

Some of the functions available with Magwriter are search and replace, block moving, deletion, mailmerge, headers, footers, forced page breaks, right and left justification, variable spacing and column widths, and tabs. As well as the standard function key control, there is the alternative of using the WordStar command set. (WordStar devotees should note that Magwriter is faster.)

The planner offers time, day, month, and year information for a selection of countries, as well as a calendar up to 1999. Greenwich mean time is displayed for up to 32 time zones, plus their relationship to the city of your choice. The program includes a diary with unlimited page size for each day plus search, delete, view and edit functions.

Phone Book allows up to 250 different numbers and addresses with the ability to select with a string and edit the entries. Selection takes literally a second — compare that to your Teledex!

Magterm is a communication program suited to multiple file operations with another Kookaburra or single file manipulation with other computers or modems.

The Microsoft command interpreter and chkdsk commands are supported.

Documentation

The manual is large and comprehensive with detailed information on the software, including system utilities, technical specifications and disk expansion units. There are appendices for ANSI escape sequences, block diagrams, disk errors and key code.

Criticisms

The Kookaburra has been handled by Time computers who sold it to HRC Technologies and will by the time this article appears be in yet another company's hands.

When Time Office was the distributor, user groups across Australia asked it to provide true IBM compatibility and graphics facilities. The answer given by Time as to why they were unprepared is that the Kookaburra BIOS would need to be rewritten as it is not IBM compatible — software written to access the IBM BIOS such as dBase III will not operate, but older dBase II will as it accesses DOS rather than the BIOS. Other programs that will run include Multiplan, Turbo Pascal and WordStar.

And, to rewrite the BIOS to give compatibility would have meant rewriting the builtin software, and that would mean that some of the hardware would have to be changed This all meant expensive redevelopment which was beyond the small company's financial ability

In any case, users and third parties were happily writing their own software and burning the programs into the two optional ROM modules.

Other criticisms are minor — a handle may be a slight convenience, as would some method of raising the rear of the keyboard for a good typing angle. There is no support for a colour monitor.

Unusual Uses

Some of the diverse uses of the Kookaburra are in civil engineering, genealogy, library research, writing memoirs and library reserve tracking. The Water Resources Commission of NSW monitors fifteen dams for silt deposits, water level and dam wall movement with Kookaburras using the Commission's own Basic programs burnt into ROM

The Kookaburra is part of a fully automated weather station in NSW, measuring data and storing it on a 32 Kbyte chip, which is collected monthly Nuclear radiation is measured by an offshoot of the Department of Resources and Energy, and reports are made to the International Atomic Commission, in Vienna, which also uses a Kookaburra. □

Product Details

Product: Kookaburra
From: Quasar Data Systems,
17 Stanton Rd, Seven Hills 2147 NSW
(02) 624 8488
Price: $2146 for basic system with 96 kilobytes of memory as standard and 16 line by 80 character screen
$1914 for system with 8 line by 80 character screen
$340 256 Kbyte RAM expansion
$1548 optional double disk drive.
(*Quasar Data Systems has now taken over HRC Technologies and as such will continue the production of the Kookaburra. The machine will be selling at these prices from Quasar. All prices taxed.*).

LARRY LEWIS

THE PROPHET

I am always amazed at the number of people who leave me messages (or talk to me on the phone) and say 'Gee, I really like your articles'. Why? Because I think I am writing a whole load of drivel — at the very least you know it's original (even Matt Whelan wouldn't pinch my stuff!).

A full listing follows, so no news file. To try and save a few bad listings we have changed the Registry programs to only publish system details in the magazine if the system has been listed for more than 90 days. Please note that this only applies to the published lists; the electronic listings always have all systems included.

Make sure you have the latest listings before you use them. Each release has a special release code on the top in the form YYMM, which is the year and month of publication; for example, 8804 is the April (04) listing for 1988 (88). Listings are released monthly and are created as early as possible, generally by the first weekend of the month.

The lists are transferred all over Australia via FidoNet. if your local SysOp doesn't carry the listings ask him or her to contact one of the Registry points since a lot of systems already carry the lists.

The data file format already has caused some interesting developments. I have heard there is a project in Melbourne to develop a program to create a Telix dialing directory. Can't wait to see the critter — maybe it will get added to the distribution files. □

AUSTRALIAN CAPITAL TERRITORY

*** Offline ***
Canberra KBBS
Commodore Users Group BBS
Sysop: James Hacker
Phone: (062) 81-0847

*** Offline ***
Datalink

*** Offline ***
MICSIG
PC Exchange RIBM
Sysop: Phil Harding
Phone: (062) 58-1406
FIDO*net*: 626/220
Baud: V21 V22 V22bis V23
Access: Mem LVA
PCUG Bulletin Board
Sysop: Alan Salmon
Phone: (062) 59-1244
FIDO*net*: 626/229
Baud: V21 V22 V22bis V23
Access: Mem LVA
Computer: IBM PC-AT
DOS: PCDOS 3.1
BBS*oftware*: Opus
Info: Access free to members of PCUG
$15pa incl monthly newsletter
Pharmacy BBS
Sysop: Michael Pye
Phone: (062) 92-3875
FIDO*net*: 626/223
Baud: V21 V22 V22bis V23 B103 B212
Access: Reg Public
Computer: Kaypro 16
DOS: MSDOS
BBS*oftware*: Opus

NEW SOUTH WALES

ABCOM
Sysop: Ben Sharif
Phone: (047) 36-4165
FIDO*net*: 713/304
Baud: V21 V22 V22bis V23
Access: Mem VA
Computer: IBM XT
DOS: PCDOS
BBS*oftware*: Fido

ACE (NSW) BBS
Sysop: Larry O'Keefe
Phone: (02) 529-2059
Baud: V21
Access: Mem Reg LVA
Computer: Atari
DOS: Atari
BB SOFTWARE: Michtron

Alpha Juno BBS
Sysop: Kevin Withnall
Phone: (02) 774-1543
FIDO*net*: 620/701
Baud: V22 V22bis
Access: Reg VA
Computer: IBM XT
DOS: PC-DOS 3.2

Amstrad ABBS
Sysop: Riccay Schmahl
Phone: (02) 981-2966
FIDO*net*: 711/903
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: Amstrad PC1512
DOS: MSDOS 3.2
BBS*oftware*: Opus

Apple Users Group BBS
Sysop: Matthew Barnes & Andrew Riley
Phone: (02) 498-7084
Baud: V21
Access: Mem VA

Arco-Tel BBS
Sysop: Alex Sardo
Phone: (02) 683-3956
FIDO*net*: 713/601
Baud: V21 V22 V22bis V23
Access: Mem
Computer: XT Clone
DOS: DOS
BBS*oftware*: Opus

*** Online ***
Arknet
Sysop: Andrew Khoo
Phone: (02) 868-4836
Baud: V22 V22bis B103
Access: Reg
Hours: 0000 — 1600
Computer: IBM AT
DOS: Xenix
Info: Logon as guest and mail user admin
for access

*** Amended ***
AUGUR TBBS
Sysop: Mark James
Phone: (02) 661-4739
FIDO*net*: 712/302
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: PC Clone
DOS: PC
BBS*oftware*: TBBS 2 0m
Info: Additional line
(02) 311-3052 V21

Ausborne (Osborne) RCPM
Info: Now Called
Moebius Trip

Australian Pick User's BBS
Sysop: Kurt Johannessen
Phone: (02) 631-8603
Baud: V21 V22 V22bis V23
Access: Reg VA

*** Unknown ***
Bert BBS (Videotext)
Blackboard BBS
Sysop: Will Black
Phone: (02) 526-1343
Baud: V21
Access: Reg VA

Club Amiga BBS
Sysop: Ross Kellaway
Phone: (02) 521-6338
Baud: V21 V22 B103 B212
Access: Mem LVA
Computer: Amiga 1000
BBS*oftware*: BBS-PC

Club Mac BBS
Info: Now Called
Club Mac Remote Maccess System

Club Mac Remote Maccess System
Sysop: Jason Haines
Phone: (02) 73-1992
Baud: V21 V22 V22bis V23
Access: Mem LVA
Computer: Macintosh
DOS: HFS
BBS*oftware*: Red Ryder

*** Amended ***
Club-80 RTRS
Sysop: Michael Cooper
Phone: (02) 332-2494
Baud: V21 V22 V22bis V23 B103 B212
Access: Mem VA
Computer: TRS80 Model 4
DOS: LDOS

Co-Co Connection
Sysop: Barry Darnton
Phone: (02) 618-3591
Baud: V21 V22 V22bis
Access: Reg LVA

Comet C-64 BBS
Sysop: Eric Davis
Phone: (02) 599-7342
Access: Mem VA
Info: Requires RTERM

*** Amended ***
CommLink BBS
Sysop: Jeff Campbell
Phone: (043) 41-3135
Baud: V21 V22
Access: Mem Reg VA
Computer: Commodore
DOS: Basic IEEE
BBS*oftware*: Punter

*** Amended ***
Commodore C-64 BBS
Sysop: Graham Lee
Phone: (02) 664-2334
Baud: V21 V22 V23
Access: Mem VA
Computer: C64
BBS*oftware*: KBBS

Commodore Pursuit KBBS
Sysop: Warren Hillsdon
Phone: (02) 522-9507
Baud: V21 V22 V23
Access: Mem VA
Computer: C64
BBS*oftware*: KBBS

*** Unknown ***
Computer Connection
Contact BBS
Sysop: Peter Hall
Phone: (02) 798-6368
Baud: V21 V22 V23 B103 B212
Access: Mem LVA

CSACE BBS
Sysop: Larry O'Keefe
Phone: (02) 529-8249
Baud: V21
Access: Mem LVA
Computer: Atari 800
DOS: Atari
BBS*oftware*: AMIS V 36
Info: Atari protocol only, logon delay answering machine for 30 seconds then BBS

Delta Net
Sysop: Geoff Arthur
Phone: (02) 457-8281
Baud: V21 V22 V23
Access: Public
BBS*oftware*: Opus

Dick Smiths RIBM
Sysop: Mark Grimmond
Phone: (02) 887-2276
Access: Public

Dingo's Den BBS
Sysop: David Harvey
Phone: (02) 88-2203
FIDO*net*: 711/802
Baud: V21 V22 V22bis V23
Access: Reg LVA
Computer: XT Clone
DOS: MSDOS
BBS*oftware*: Opus

Down Under KBBS
Sysop: Glen Myles
Phone: (02) 674-6647
Baud: V21
Access: Mem VA
Computer: Commodore 64
BBS*oftware*: KBBS

*** Amended ***
Dream Time FRP
Sysop: Chriss Geddes
Phone: (02) 93-5225
Access: Reg VA
Hours: 2100 — 0700 Daily
Computer: C-64
BBS*oftware*: FRP BBS

*** Offline ***
Dymock's Computer Bookline

Eagle's Nest C-64 BBS
Sysop: Philip Dean
Phone: (02) 451-0535
Baud: V21
Access: Mem VA
Computer: C64
BBS*oftware*: KBBS

EasyComm Opus
Sysop: Michael Aldiholic
Phone: (02) 558-9620
FIDO*net*: 712/505
Baud: V21 V22 V22bis
Access: Mem Reg LVA
Computer: AT Clone
DOS: MSDOS
BBS*oftware*: Opus

*** Name Changed ***
Fantasy C-64
Info: Now Called
Dream Time FRP

Fido Australia
Sysop: B & L Gatenby & R Morgan
Phone: (02) 959-3712
FIDO*net*: 620/901
Baud: V21 V22 V22bis
BBS*oftware*: fido

*** Online ***
First Nice MIDILine
Sysop: Andrew Khoo
Phone: (02) 868-4347
FIDO*net*: 711/805
Baud: V22 V22bis B103 PEP
Access: Public
Computer: IBM XT
DOS: PCDOS 3.2
BBS*oftware*: Opus

Galactic Federation
Sysop: Kevin Gladwin
Phone: (02) 233-5040
Baud: V22 V22bis
BBS*oftware*: Opus

Galaxy RAPL
Sysop: Chris Nelligan
Phone: (02) 875-3943
Baud: V21
Access: Mem LVA

GCS
Sysop: Mark Ivanhoe
Phone: (02) 570-9861
Baud: V21 V22

*** Offline ***
Griffith Computer Association HighTech
Sysop: Ross Wheeler
Phone: (060) 25-1813
FIDO*net*: 712/201
Baud: V21 V22 V22bis V23 B103 B212
Access: Reg LVA
Computer: XT Clone
DOS: MSDOS 3.1
BBS*oftware*: Opus
Info: 147.575 Mhz VK2DGY (Radio) 1200 bps Amateur Packet Radio

Idiom
Sysop: Stephen Beeby
Phone: (02) 438-4060
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: XT-Clone
DOS: PC-DOS
BBS*oftware*: RBBS

Illawarra C-64 BBS
Sysop: John Simon
Phone: (042) 61-8230
Access: Reg VA
Computer: C64
BBS*oftware*: KBBS

Info-Centre BBS
Sysop: Paris Radio
Phone: (02) 344-9511
Access: Mem VA

Lodestone BBS
Sysop: Ian McWhirter
Phone: (02) 456-3264
FIDO*net*: 711/407
Baud: V22 V22bis B103
BB SOFTWARE: Opus

Manly BBS
Sysop: Chris Patten
Phone: (02) 977-6820
Access: Reg VA
Info: C-64 Needs Rterm or Ultraterm

Matrix (Maitland) BBS
Sysop: Andrew Pike
Phone: (049) 38-5057
Baud: V21 V22
Access: Mem Reg LVA
Computer: C-64
BBS*oftware*: BBS-64

Micro Design Lab
Sysop: Kevin Lowton & Lindsay Gorrie
Phone: (02) 663-0151
Access: Reg VA

Micro Mart C Users
Sysop: Rick Polito
Phone: (02) 560-3607
FIDO*net*: 712/501
Baud: V21 V22 V22bis V23
Access: Reg LVA
Computer: DECA AT
DOS: MSDOS 3.1
BbS*oftware*: Opus
Info: C & dBase User System

*** Offline ***
Microlink BBS

Moebius Trip
Sysop: David Butler
Phone: (02) 439-7072
FIDO*net*: 711/408
Access: Mem VA

Mudgee Connection
Sysop: George Rhedey
Phone: (063) 72-1898
FIDO*net*: 711/630
Baud: V21 V22 V22bis V23
Access: Public
Hours: 2100 — 0700
Computer: XT Clone
DOS: PC-DOS
BBS*oftware*: Opus

*** Name Changed ***
Nebula BBS
Info: Now Called
The Trashcan RAPL

*** Amended ***
Newcastle Micro Club RCPM
Sysop: Tony Nicholson
Phone: (049) 68-5289
Baud: V21 V22 V22bis V23
Access: Mem VA
Hours: Weekdays: 1700 — 0830
Weekends: 24 Hours
Computer: Ferguson Big Board
DOS: CP/M80+
BB SOFTWARE: ROS
Info: Phone number change effective
16 February 1988

Omega Line
Info: Now Called
Delta Net

*** Offline ***
Omen RTRS

*** Amended ***
Palantir C-64 BBS
Sysop: Steve Sharp
Phone: (02) 451-6576
Baud: V21 V22 V22bis V23 B103 B212
Access: Reg VA
BBS*oftware*: Punter

Paragon Bulletin Board
Sysop: Jennifer Allen
Phone: (02) 597-7477
FIDO*net*: 712/502
Baud: V21 V22 V22bis V23
Access: Reg VA
BBS*oftware*: TBBS

*** Amended ***
Phantomland
Sysop: Bob James
Phone: (02) 399-7716
Baud: V21 V22 V23
Access: Reg VA
Computer: C64
BBS*oftware*: KBBS

Playground BeeBS
Sysop: Brett Selwood
Phone: (02) 53-9688
FIDO*net*: 712/504
Baud: V21 V22 V23
Access: Mem Reg LVA
Computer: AT Compatible
DOS: MSDOS
BBS*oftware*: Opus

Prophet TBBS
Sysop: Larry Lewis
Phone: (02) 628-5222
FIDO*net*: 713/600
Baud: V21 V22 V22bis V23
Access: Public
Computer: XT Clone
DOS: PCDOS 3.2
BBS*oftware*: TBBS 2.0m

RCOM C-64 BBS
Sysop: Simon Finch
Phone: (02) 667-1930
Baud: V21 V22 V23 V23ORG B103 B212
Access: Reg VA
Computer: C-64
BBS*oftware*: RCOM
Info: Needs Ultraterm on C-64

RUNX
Sysop: Mark Webster
Phone: (02) 487-2533
Baud: V21
Access: Mem LVA
Computer: PDP11/73
DOS: Xenix
Info: 3 Lines

Sci-Fi BBS
Sysop: Greg Hope
Phone: (02) 646-4865
Baud: V21 V22 V23
Access: Public

Sentry
Sysop: Trev Roydhouse
Phone: (02) 428-4687
FIDO*net*: 711/401
Baud: V21 V22 V22bis V23
Access: Mem VA
Computer: XT-Clone
BBS*oftware*: Opus

Shore BBS
Sysop: David Gill & Jason Shar
Phone: (02) 959-3936
Baud: V21
Access: Reg VA
Hours: Weekdays: 1800 — 0730
Weekends: 24 Hours
Computer: Macintosh
DOS: HFS
BBS*oftware*: Red Ryder Host

SMUG Bee RCP/M
Sysop: Paul Pinches
Phone: (02) 520-5181
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: Microbee
DOS: CP/M80
BBS*oftware*: TBBS (PD)

*** Amended ***
Software Connection

Sysop: Graeme Nichols
Phone: (02) 451-2954
FIDO*net*: 711/404
Baud: V21 V22 V22bis V23 B103 B212
Access: Reg VA
Computer: PC/XT
DOS: PC DOS
BBS*oftware*: Opus

Software Tools
Sysop: Bill Bolton
Phone: (02) 449-2618
FIDO*net*: 711/403
Baud: V22bis PEP
Access: Reg VA
Computer: Sharp 7501 AT
DOS: PC-DOS
BBS*oftware*: Opus

*** Offline ***
Sorcerer Users Group

*** Online ***
Sorcim microS
Sysop: John Caine
Phone: (065) 59-8854
FIDO*net*: 711/405
Baud: V22 V22bis PEP
Access: Reg
Hours: 2100 — 0800 Daily
BBS*oftware*: Opus

Sydney PC Users RIBM
Sysop: Geoff May
Phone: (02) 221-5520
Baud: V21 V22 V23
Access: Mem VA
Computer: IBM PC
DOS: PC-DOS
BBS*oftware*: Fido

*** Amended ***
Tachyonics
Sysop: Richard Lenz
Phone: (02) 438-2682
FIDO*net*: 620/402
Baud: V21 V22
Access: Reg VA
BBS*oftware*: Fido

Tesseract RCPM+
Sysop: Noel Levy
Phone: (02) 558-0129
Baud: V21 V22 V22bis V23
Access: Reg VA

Texpac Electronic Magazine
Phone: (02) 319-1009
Access: Mem LVA

The Galactic Federation
Sysop: Kevin Gladwin
Phone: (02) 233-5040
Baud: V21 V22 V22bis V23
Hours: Weekdays: 1700 — 0900
Weekends: 24 Hours
Computer: IBM Compat

The Guild FRP BBS
Sysop: Stafford Hewitt
Phone: (047) 21-8625
Baud: V21
Access: Mem VA
Hours: 2100 — 0800 Daily

*** Amended ***
The Trashcan RAPL
Sysop: Sean Craig
Phone: (02) 407-2729
Baud: V21 V22 V22bis V23
Access: Mem VA

TNT Shuttle
Sysop: Paul Birch
Phone: (02) 319-3112
Baud: V21 V22 V22bis V23 B103 B212
Access: Reg LVA
Computer: IBM System/2
DOS: OS2 (???)
BBS*oftware*: RBBS V151a

Your Computer
Sysop: Andy Farkas
Phone: (02) 669-1385
FIDO*net*: 712/622
Baud: V21 V22 V22bis V23
Access: Mem VA
BBS*oftware*: Opus

Zeta RTRS
Sysop: Nick Andrew
Phone: (02) 627-4177
FIDO*net*: 713/602
Baud: V21 V22 V22bis V23 B103 B212
Access: Mem VA
Info: C, Unix & Minix Users

NORTHERN TERRITORY

Outback RCPM
Sysop: Phil Sampson
Phone: (089) 27-7111
Baud: V21 V23
Access: Public
Computer: Bigboard II
DOS: CP/M80
BBS*oftware*: Minirbbs

PAPUA NEW GUINEA

PNG One
Sysop: Daltron
Phone: (675) 25-6984
FIDO*net*: 710/11
Baud: V21 V22 V22bis V23 B103 B212

QUEENSLAND

AMPAK PBBS/RCPM
Sysop: Brian Wendt & John Bews
Phone: (07) 263-7070
Baud: V21 V22 V22bis V23 B103 B212
Access: Mem Reg
Computer: AMPRO
DOS: CP/M80
BB SOFTWARE: PBBS
Info: 147.600 Mhz VK4KJB-1 (Radio) 1200 bps Amateur Packet Radio

Apple-Q Node 1
Sysop: Graham Black & Vince Crosdale
Phone: (07) 284-6145
Baud: V21 V22 V22bis V23
Access: Mem
Computer: Apple //e
BBS*oftware*: GBBS PRO

Brisbane Commodore User Group
Sysop: Colin Canfield
Phone: (07) 395-6725
Baud: V21 V22 V23
Access: Mem VA

Brisbane MicroBee User Group
Sysop: Graham Scott
Phone: (07) 366-4833
Access: Mem VA
Info: User Works Node 2

Cairns & District IBBS
Sysop: Neil Barker
Phone: (070) 51-1360

COM ONE
Phone: (057) 62-5150
Baud: V21
Access: Public

*** Amended ***
Comtel BBS
Sysop: Warren Mason
Phone: (077) 75-3636
Baud: V21 V22 V23
Access: Mem VA
Computer: Commodore
DOS: Basic IEEE
BBS*oftware*: Comtel

Concomp
Sysop: Viv Brunner
Phone: (07) 857-6000
Baud: V21 V22 V22bis V23

CORPLEX
Sysop: Scott Pierce, Lloyd Ernst
Phone: (07) 350-1300
Hours: Weekdays: 1800 — 0600
Weekends: 24 Hours

Educational RBBS
Sysop: Andrew Waddell
Phone: (07) 266-3369
Baud: V21 V22 V22bis V23
Access: Mem VA
Computer: IBM XT clone
BBS*oftware*: Mailbox
Info: USERWORKS Node 1

Electric Dreams BBS
Sysop: Joe Altoff
Phone: (07) 399-1322
Baud: V21 V23
Access: Mem VA
Info: User Works Node 5

Fix BBS
Sysop: Geoff Ryan
Phone: (07) 285-5814
Baud: V21 V23
DOS: PC-Dos
BBS*oftware*: Focus

Focus BBS
Info: Now Called Fix BBS

Futex C-64
Sysop: Paul Salanitri
Phone: (07) 283-2034

*** Offline ***
Hi-Tech CBBS

Kangaroo Point TAFE
Sysop: Troy O'Malley
Phone: (07) 393-1763
Hours: Weekdays: 0900 — 2200
Weekends: 24 Hours

Mackay High School BBS
Sysop: Bob Chalmers
Phone: (079) 51-4815
Access: Public
Hours: Weekdays: 1600 — 0730
Weekends: 24 Hours

Marlin-Coast BBS
Sysop: Ray Chalmers
Phone: (070) 51-7220
FIDO*net*: 640/501
Baud: V21 V22 V22bis PEP
Access: Reg VA
Computer: Cleveland 286
BBS*oftware*: Opus

Ozforum
Sysop: Greg Noonan & Dirk Vanbruggen
Phone: (07) 209-4294
Baud: V21
Access: Reg
Hours: Weekdays: 1700 — 0700
Weekends: 24 Hours

Redcliffe Library
Sysop: Andrew Osborne
Phone: (07) 283-0315
FIDO*net*: 640/203
Baud: V21 V22 V22bis V23
Access: Reg VA
Hours: Weekdays: After Hours
Weekends: 24 Hours
Computer: IBM Compatible
BBS*oftware*: Fido

Rock Cave BBS
Sysop: Rick Dalley
Phone: (07) 395-1809
Access: Mem VA
Info: ser Works Node 4

Sidecar Express BBS
Sysop: Brendan Pratt
Phone: (075) 46-3252
Baud: V21 V22 V22bis V23 B103 B212
Access: Mem Reg
Computer: Amiga Sidecar
DOS: MS-DOS
BBS*oftware*: Focus
Info: User works node 7

*** Offline ***
Soft-Tech

Software 80 BBS
Sysop: Tony Melius
Phone: (07) 369-7103
Baud: V21
Access: Reg VA
Hours: Weekdays: 1930 — 0800
Sat 1430 — Mon 0800

Sun City Opus
Sysop: Tony Smith
Phone: (077) 74-1552
FIDO*net*: 640/702
Baud: V21 V22 V22bis V23
Access: Mem LVA
Computer: IBM Clone
DOS: MSDOS
BBS*oftware*: Opus

Tommorrowland RMSD
Sysop: Dave Drummond
Phone: (07) 371-0944
Baud: V21 V22 V23

SOUTH AUSTRALIA

*** Offline ***
Adelaide Micro User Group BBS

Adelaide MicroBee BBS
Sysop: Ron Carson & Mark Hammond
Phone: (08) 212-6569
Baud: V21
Access: Reg LVA
Computer: Microbee 128K

Cadzow Fido
Sysop: Scott Cadzow
Phone: (08) 79-3091
Baud: V21 V23
Access: Public
Computer: Epson
DOS: MSDOS

BBS*oftware*: Fido
Multiple System BBS
Sysop: Danny Vozzo
Phone: (08) 255-5116
Baud: V21 V22 V22bis V23
Access: Reg LVA
Computer: Apple //+
BBS*oftware*: GBBS
Nexus Education Dept BBS
Phone: (08) 243-2477
Baud: V21
Access: Mem
*** Offline ***
Omen V
*** Amended ***
Oracle PC-Network
Sysop: Don Crago & Grayham Smith
Phone: (08) 260-6222
FIDO*net*: 680/804
Baud: V21 V22 V22bis V23
Access: Mem LVA
Computer: AT Clone
DOS: PC-DOS
BBS*oftware*: TBBS
S A C BBS
Sysop: Austen Evans
Phone: (08) 387-0249
Baud: V21 V22 V23 V23ORG B103 B212
Access: Mem LVA
Computer: C-128
BBS*oftware*: Blue Board
*** Name Changed ***
The Electronic Oracle TBBS
Info: Now Called
Oracle PC-Network
The IDN Board
Sysop: Dave Winfield
Phone: (08) 352-2252
Baud: V21 V22
Access: Reg LVA
Hours: Weekdays: 1730 — 0900
Weekends: 24 Hours
The Olympic Board
Sysop: Greg Sanderson
Phone: (08) 265-4232
FIDO*net*: 680/801
Access: Public
Computer: XT Clone
DOS: PCDOS 3.1
BBS*oftware*: Opus
Trivia BBS
Sysop: Daron Ryan
Phone: (08) 377-0049
Baud: V21
Hours: Weekdays: 1800 — 0800
Sat 1400 — Mon 0800

TASMANIA

Tassie Bread Board System
Sysop: Ian Campbell
Phone: (003) 26-4248
FIDO*net*: 631/330
Baud: V21 V22 V22bis V23
Access: Mem LVA
Computer: Kaypro PC
DOS: MSDOS 3.2
BBS*oftware*: TBBS

VICTORIA

ABE
Sysop: Richard Gardiner
Phone: (03) 288-3599
Baud: V21 V22
Access: Public
ACES High
Sysop: D Harvey
Phone: (03) 878-2918
Baud: V22 B103
Access: Public
AM-NET RTDOS
Sysop: Peter Hallgarten
Phone: (03) 366-7055
Baud: V21 V23
Access: Mem VA
Computer: Pulsar 8000
DOS: TurboDos
BBS*oftware*: RBBS4
Info: 147.600 Mhz VK3RPA (Radio) 1200 bps Amateur Packet Radio
AmigaLink
Sysop: Bohdan Ferens
Phone:(03) 792-3918
FIDO*net*: 631/324
Baud: V21 V22 V23
Angler's Den
Sysop: Greg Naylor
Phone: (03) 876-4118
Baud: V21 V22 V23
Hours: Weekdays: 0900 — 2300
Weekends: 24 Hours
BBS*oftware*: Opus
Anzugs OPUS
Sysop: Miklos Bolvary & Gordon Castle
Phone: (03) 887-0678
FIDO*net*: 631/326
Baud: V22 V22bis B103 B212
Access: Public
Computer: XT Clone
DOS: PC-DOS 3.2
BBS*oftware*: Opus
Apple Hackers BB
Sysop: John Forbes
Phone: (03) 762-1582
Atlantis RBBS-PC
Sysop: John Edwards
Phone: (03) 277-6824
Access: Public
AUSOM System I
Sysop: Grahame Willis
Phone: (03) 877-1990
Access: Public
Bayside
Sysop: Paddy Plebanowicz
Phone: (052) 53-1110
FIDO*net*: 630/313
Baud: V21 V22 V23
Access: Reg Public
Computer: IBM Clone
BBS*oftware*: Opus
Big Tedd's Fido BBS
Sysop: Big Tedd
Phone: (03) 509-6067
Baud: V21
Hours: 2100 — 1800 Daily
BBS*oftware*: Fido
Brainstorm BBS
Sysop: Rowan Stevens
Phone: (03) 758-7086
FIDO*net*: 631/322
Baud: V22
C-64 BBS
Sysop: Alan Miles
Phone: (03) 489-4555
Access: Public
*** Offline ***
Commodore Board
Compusoft BBS
Sysop: George Tsoukas
Phone: (03) 386-6019
Baud: V22
BBS*oftware*: Opus
Custom Programming OPUS
Sysop: Allan Williamson
Phone: (03) 848-3331
FIDO*net*: 632/340
Baud: V21 V22 V23 B103 B212
Access: Mem VA
Computer: PC-Clone
DOS: PC-Dos
BBS*oftware*: Opus
*** Offline ***
Cycom
DECUS
Sysop: Peter Hill
Phone: (03) 62-5806
Baud: V21 V22 V22bis V23
Access: Mem VA
Down Under Software Amiga/IBM
Sysop: Greg Hudson
Phone. (03) 429-8079
FIDO*net*: 630/306
Baud: V21 V22 V22bis V23
Access: Public
Computer: Compaq 386
DOS: PC-Dos
BBS*oftware*: Opus
Info: Additional line
(03) 429 5819
Eastcomm BBS
Sysop: Maurice Halkier
Phone: (03) 288-0775
FIDO*net*: 630/312
Baud: V21 V22 V23 V23ORG
Access: Reg VA
Computer: PC-AT Clone
DOS: PCDOS 3.1
BBS*oftware*: Opus
Eastwood R/ZSYS & PBBS
Sysop: Mick Stock
Phone: (03) 870-4623
FIDO*net*: 632/343
Baud: V22 V23
Access: Reg VA
DOS: ZR-DOS
BBS*oftware*: PBBS
*** Amended ***
Electronic Cross-Over BBS
Sysop: Stephen Paddo
Phone: (03) 367-5816
Baud: V21 V22 V22bis V23
BBS*oftware*: Opus
Engbase CBCS
Sysop: Greg Furlong
Phone: (03) 29-6336
FIDO*net*: 631/325
Baud: V21 V22
BBS*oftware*: Opus
EXCALIBUR-64 RCP/M
Sysop: Maurice Copeland
Phone: (057) 83-1964
Baud: V21 V22 V23 V23ORG
Access: Public
Hours: Weekdays: 08-12 16-23
Weekends: 24 Hours
Gippsland Mail-Bus
Sysop: Max Moore
Phone: (051) 27-7245
*** Offline ***
Harbourd-64
*** Amended ***
Maxitel BBS
Sysop: Jos Van Der Sman
Phone: (03) 882-6188
Baud: V21
Access: Public
Computer: C-64
MBUG Australia Inc
Sysop: Mike Thompson
Phone: (03) 882-1571
Baud: V21 V23
Access: Mem
Melbourne Atari BBS
Phone: (03) 391-5927
Hours: Weekends ONLY
Melbourne Data Exchange
Sysop: Robert Broomhead
Phone: (03) 561-6556
FIDO*net*: 631/321
Baud: V21 V22 V22bis V23
Access: Reg VA
BBS*oftware*: Opus
Micom BBS
Sysop: Peter Jetson
Phone: (03) 762-5088
*** Offline ***
MICROLINK
Midnight Frog BBS
Sysop: Scott Enwright
Phone: (03) 596-1589
FIDO*net*: 630/303
Baud: V21 V22 V22bis V23
Access: Public
*** Offline ***
Mike's Bullboard
MIN-NET BBS
Sysop: Max Fields
Phone: (054) 41-3013
Access: Public
*** Online ***
Motel International
Sysop: Kim Gration
Phone: (03) 509-9611
Baud: V21 V22 V22bis V23
Access: Public
Computer: Apple 2GS
BBS*oftware*: TProBBS
MouseText
Sysop: Glen McBride
Phone: (059) 42-5528
Baud: V23
Hours: 1000 — 2200
BBS*oftware*: Videotext
Info: Videotext Compatible ONLY
Omegatex Videotex Service
Sysop: Mark Gregson
Phone: (052) 22-1670
Baud: V23
Computer: IBM AT Clone
Osborne Australian BB
Sysop: Craig Orr
Phone: (03) 890-4096
Access: Reg LVA
*** Amended ***
Outer L ilts BBS
Sysop: Peter Dorell
Phone: (03) 725-6650
Baud: V21 V22 V23
Pacific Island
Sysop: Craig Bowen
Phone: (03) 890-2174
PC Connection IBBS

Sysop: Lloyd Barrett
Phone: (03) 528-3750
Baud: V21 V22 V22bis V23
PC User BBS
Sysop: Charles Sandercock
Phone: (03) 819-5392
FIDO*net*: 631/323
Access: Public
DOS: MSDOS
BBS*oftware*: Opus
*** Offline ***
PC-Oasis Ssystem

*** Name Changed ***
Prodergy
Info: Now Called
The Dreamscape BBS
Public Resource 1
Info: Now Called ACES High
Sams
Sysop: Alan Haslar
Phone: (03) 563-1117
FIDO*net*: 630/305
Baud: V21 V22 V22bis V23
Access: Public
Sorcerer & CPM Users RBBS
Sysop: David Woodberry
Phone: (03) 754-5081
Baud: V21 V22 V23
Access: Mem Reg VA
Computer: Executive 816
DOS: CP/M
BBS*oftware*: Ros

*** Amended ***
Tardis BBS
Sysop: Malcolm Miles
Phone: (03) 859-3109
Baud: V21 V22 V22bis V23
Access: Public
Computer: PC
DOS: Concurrent DOS
BBS*oftware*: CALLME/GOLIATH
Telegraph Road BBS-PC
Sysop: Craig Wilson
Phone: (03) 743-6173
Baud: V21
Access: Reg LVA
Teletex Connection
Sysop: Darren Sapwell
Phone: (03) 470-6827
Baud: V23
Hours: 0600 — 2200
BBS*oftware*: Videotext
Info: Videotext Compatible ONLY

*** Offline ***
TERMICOMNET

*** Offline ***
The Deepseas BBS

*** Amended ***
The Dreamscape BBS
Sysop: Michael White
Phone: (03) 562-0489
Baud: V21 V22 V22bis V23
Hours: 0700 — 2359 Daily
Computer: IBM XT
DOS: Double Dos
BBS*oftware*: Opus
The Info-Source BBS
Sysop: Clement Maloney
Phone: (03) 397-1165
Baud: V21 V22 V22bis V23 B103 B212
Access: Mem VA

*** Offline ***
The Inner Sanctum BBS
The MACBOARD
Phone: (03) 435-9152
Baud: V21 V22 V22bis V23
Access: Public
The Magic Pudding
Info: Now called The Village Idiot
The NATIONAL CBCS
Sysop: John Blackett-Smith
Phone: (03) 25-6904
FIDO*net*: 630/301
Access: Public
Info: FIDOnet Region 50 Coordinator
The Real Connection
Sysop: Carla Miller & Andrew Moore
Phone: (03) 288-0331
Access: Public
The Ultimate C-64
Sysop: Mike Kabiolke
Phone: (03) 735-5551
Baud: V21 V22 V22bis V23

*** Offline ***
The Village Idiot

*** Offline ***
Thunder-Net Amiga
VIDEOTEXT/4000
Sysop: Luke Groeveneld
Phone: (03) 741-3295
Baud: V23
Hours: 0600 — 2300
BBS*oftware*: Videotext
Info: Videotext Compatible ONLY
Zoist
Sysop: Bob Fletcher
Phone: (03) 467-2871
Baud: V21

WESTERN AUSTRALIA

*** Offline ***
Apple BBS
Computex BBS
Sysop: Russell Stokes
Phone: (09) 447-0522
Access: Reg VA
Kalgoorlie College RCP/M
Sysop: Graham Clark
Phone: (090) 21-7755
Baud: V21 V22 V22bis V23
Access: Reg VA
Lightning BBS
Sysop: Simon Blears
Phone: (09) 275-7900
FIDO*net*: 690/903
Baud: V21 V22 V22bis V23
Access: Reg LVA
Computer: IBM XT Clone
DOS: MSDOS 3.1
BBS*oftware*: Opus
Mouse Exchange BBS
Sysop: Leonard Hollings
Phone: (09) 339-6890
FIDO*net*: 690/902
Baud: V21 V23
Access: Public
Murdoch University ES-BBS1
Sysop: Roger Atkinson
Phone: (09) 332-2604
Baud: V21
Access: Mem VA
Computer: Commodore 128D
DOS: CP/M 3.0
BBS*oftware*: Turbo BBS
Nemo 3
Sysop: Graeme Platt
Phone: (09) 370-3333
Baud: V21 V22 V22bis V23
Access: Mem
Nemo Games Machine
Sysop: Graeme Platt
Phone: (09) 370-2666
Baud: V21 V22 V22bis V23
Access: Mem LVA
Nemo Multiple BBS RAPL
Sysop: Graeme Platt
Phone: (09) 370-1855
Baud: V21 V22 V22bis V23
Oasis ST BBS
Sysop: Lou Schillaci
Phone: (09) 383-1480
Baud: V21 V22
Access: Mem VA
Computer: Atari
Omen III RTRS
Sysop: Greg Watkins & Mark Dignam
Phone: (09) 276-2777
Baud: V21 V23
Access: Reg LVA
BBS*oftware*: Omen
Omen Mini BBS
Sysop: Greg Watkins
Phone: (09) 279-8555
Pegasus BBS
Sysop: Michael Russell
Phone: (09) 242-2099
FIDO*net*: 690/907
Baud: V21 V22 V22bis V23
Access: Public
Hours: Weekdays: 1700 — 0900
Weekends: 24 Hours
Computer: Epson AX
DOS: MS-Dos
BBS*oftware*: Opus
Perth PC Users BBS
Phone: (09) 227-9229
Student Access Message Service
Sysop: Peter Walton & John Bramley
Phone: (09) 321-9721
Baud: V21 V22 V23
Access: Reg VA
The Gathering BBS
Sysop: Ken Peters
Phone: (09) 272-4711
FIDO*net*: 690/904
Baud: V21 V22 V23
The Turing Circus
Sysop: Phil Sutherland
Phone: (09) 385-2100
FIDO*net*: 690/905
Baud: V21 V22 V23 B103 B212
Access: Public
Computer: PC/XT Clone
DOS: MS-DOS
BBS*oftware*: Opus

*** Amended ***
WA Atari BBS
Sysop: Graham Basden
Phone: (09) 306-2134
Baud: V21 V22
Access: Mem LVA
Computer: Atari ST
DOS: Atari
BBS*oftware*: Michtron BBS
West Coast BBS
Sysop: Mark Gaynor
Phone: (09) 445-3080
Access: Reg VA
Z-Node 62
Sysop: Lindsay Allen
Phone: (09) 450-0200

NEW PRODUCTS

Software

Accounting Software 4.0

AIS
Phone: (03) 579 0244
Price: See below

AIS Accounting Software is a fully integrated multi user package that provides financial and management information. The latest version, 4.0, has been released to run on the AIS 286P and 386 computers. Modules include general ledger, banking system, accounts receivable and payable, stock control, asset register and sales order.

The software costs $690 per module (untaxed). There are 12 modules in all.

Autoease templates

Minicomp
Phone: (02) 957 6800
Price: Available on request

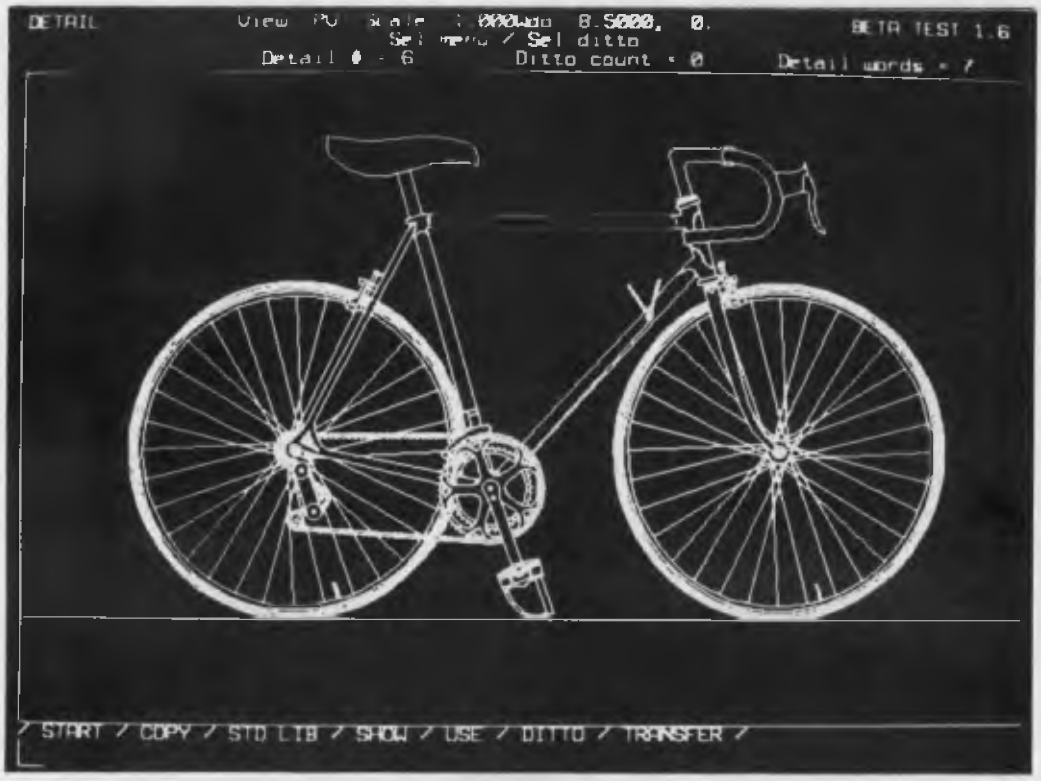
Autoease, through Australian distributor Minicomp, offers a range of products which enhance and facilitate the operation of a range of Cad Desktop Publishing programs.

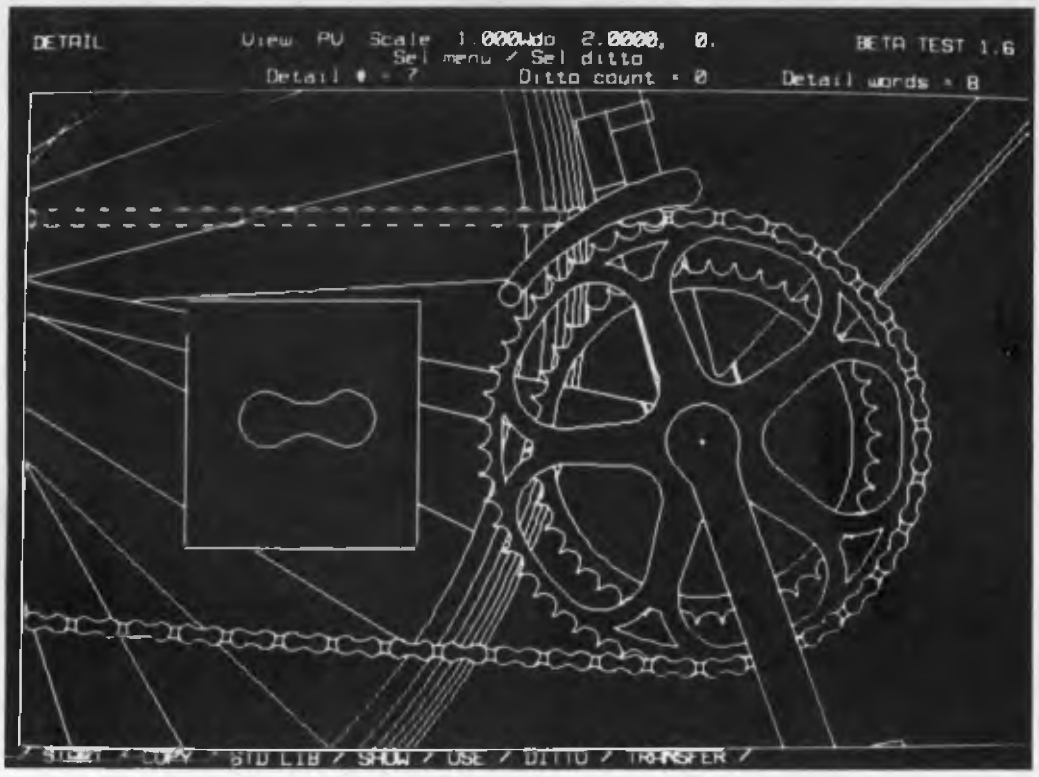
The range features templates which are attached to the digitising tablet. Packages for which templates have been designed include AutoCad, VersaCad, CadKey, Pagemaker and Ventura. Soon to be released will be a range of template capabilities for the Apple Macintosh and the IBM PS/2.

AutoFlix

Autodesk Australia
Phone: (03) 429 9888
Price: Not supplied

The latest offering from Autodesk is a software package called Autoflix which will be released mid-year. It enables the user to make computer movies by taking multiple pictures and then presenting them to the eye rapidly enough to create the illusion of motion. Each frame is simply a still picture which in AutoFlix is generated by AutoShade as a rendering of slide file.





Boeing Calc Version 4

Business Model Systems
Phone: (07) 358 4800
Price: $984.50 taxed

Version 4 of this three dimensional spreadsheet package has been released. Enhancements include full support for Local Area Networks with multi level security, macro language compatible with Lotus 1-2-3 Version 2.01 as well as the Boeing Calc external macro library. There is also a seamless link to the Boeing Graph three dimensional graphics package from any spreadsheet. The manual has been expanded and updated.

Cadkey ▶

Minicomp
Phone: (02) 957 6800
Price: $1613

Cadkey, through Australian distributor Minicomp, has announced an Educational Grant Program open to all educational institutions.

The grant recipients will receive one master copy of Cadkey Version 3.0 and one master copy of Cadkey Version 3.0 User Reference manual. (The normal price of Cadkey is $5495). Version 3.0 has fully integrated two dimensional drafting and three dimensional design features, including a fully programmable 3D design language, wireframe and surface modelling and editing, user definable macros, on-line calculator, customisable tablet templates, translator, FEA and multi axis NC integration. It's claimed to be compatible with all popular hardware.

Cadam ◀

IAS
Phone: (03) 584 8088
Price: $5560 untaxed

A microcomputer based version of the Cadam Cadcam system is now available. The system requires an AT computer; it can also run on the IBM PS/2 range.

The Micro Cadam system includes the software, Function key box with interface card, three button mouse and digitizing pad. Features of the system include the ability to add several colours and mix line types on drawings, automatic location of design elements, user defined symbols and sketching capabilities.

Classroom Pack

Microsoft
Phone: (02) 452 5088
Price: Available on request

Microsoft has launched a new packaging concept aimed at educational institutions.

The Classroom Pack offers selected Microsoft products as a package of 10 sets of software and one set of manuals for a discounted price. For example, Microsoft QuickC is sold in the Pack at an individual price of $16.50 or $165 for 10 copies and a set of manuals. This is a continuous offer from Microsoft. To order, institutions should send in an official purchase order (available from Microsoft) and a sales tax exemption certificate.

Clipper

Imagineering
Phone: (02) 697 8666
Price: $1175 taxed

The latest version of Clipper, the dBase compiler, is now available with new and enhanced features. The new version supports DOS 3.1 calls for networking functions, allowing users to run compiled applications on most networks. It supports expanded memory for indexing and offers record and file locking capabilities. The product also enhances dBase with user defined functions for expanded programmability and full debugging capabilities.

Digi Print

CVA
Phone: (02) 476 6400
Price: Not supplied

CVA has released Digi Print, a new feature with the Digiboard COM/xi series intelligent multi channel boards, that allows terminals and printers to share the same port and operate simultaneously.

The terminal has an electronic switch that will send data either to the screen or the printer port. Digi Print moves the switch back and forth rapidly so the printer and screen appear to work simultaneously. Digi Print is compatible with Xenix, Unix and PC-MOS. The Digiboard series is compatible with the IBM PS/2 series.

ELMEASCO

Fluke Helios Toolbox

Elmeasco Instruments
Phone: (02) 736 2888
Price: Not supplied

The Fluke Helios Toolbox (written in QuickBasic) is a software package for creating the data acquisition and control system software of the Helios I computer front end. Helios I makes real world measurements, and Helios Toolbox is intended for measure-

ment applications requiring custom software.

The Helios Toolbox expedites the development of powerful data acquisition software by providing routines that handle communications with Helios I.

Mahjong

Pro Con Software
Phone: PO Box 43
Essendon 3040
Price: Shareware

On the latest Shareware release of Pro Con's Mahjong game is a special memory resident program which allows many CGA graphics programs to run on the Hercules graphics card.

The program maps the CGA's graphics information onto the Hercules display screen, producing a slightly smaller display. Now, programs that were unable to run on Hercules can be run without modification, including PC-Paint, Pictures and Printmaster. The program is memory resident and is called HERCULES.COM.

Microsoft C 5.0

Microsoft
Phone: (02) 452 5088
Price: See below

The latest version of Microsoft's C compiler (which also includes QuickC), C 5.0 is now available in Australia. C 5.0 offers the C programmer fast execution speed and more sophisticated debugging.

It speeds up compilation by around 30 per cent. The new version has an enhanced CodeView debugger and over 100 new library functions, including a full graphics library and BIOS and DOS calls. Documentation has also been enhanced. C 5.0 costs $775 untaxed. Existing users who purchased C 4.0 after August 1, 1987 are entitled to a free upgrade. Those who purchased before that date can upgrade for $175 untaxed. QuickC is available for $135 untaxed.

Multi PC and Multi AT

Digital Creations
Phone: (02) 913 8606
Price: Not supplied

Digital Creations and Mace Software have released Anex Technology's Multi PC and Multi AT, a proven enhancement tool that expands an IBM PC, XT, AT or compatible into a true multi user, multi tasking system running under PC-DOS.

The system easily attaches to an existing PC and allows the addition of workstations. It also permits the use of your current software and existing data and resources. The Multi PC provides 4-user capability and the Multi AT provides for up to 8 users.

ZENITH | ELECTRONICS PTY. LIMITED
Incorporated in N.S.W.

Operating System/2

Zenith Electronics
Phone: (02) 417 7999
Price: $599 taxed

Zenith Electronics has announced the release of Microsoft Operating System/2, which it co-developed with Microsoft in the US.

OS/2 is an advanced, single user, multi-tasking operating system. It allows software applications to access features of the '286 and '386 microprocessors' protected mode, which could not be tapped by MS-DOS. It supports 16 megabytes of RAM and 1 gigabyte of virtual memory.

I.P. Sharp Associates

PC Magic

IP Sharp
Phone: (02) 232 6366
Price: See below

PC Magic is a fully integrated PC/mainframe spreadsheet environment developed by the Canberra office of IP Sharp.

PC Magic analyses IP Sharp's numeric time-series data. It was built specifically for accessing and downloading data to spreadsheets. Locally stored data can now be integrated with IP Sharp data. Graphics and a variety of reporting facilities come with the package. A yearly subscription basis costs $1800.

Periscope III

BJE Enterprises
Phone: (02) 858 5611
Price: $1499

Periscope III is a powerful new hardware assisted symbolic debugger for use in the IBM PC, XT, and AT machines. Periscope III consists of a full length board with 64 kilobytes of write-protected RAM, hardware breakpoints, real time trace buffer, a breakout switch, software and manual.

The Periscope III board monitors the system bus, waiting for user-defined breakpoints to occur while the test program is running. When the board detects that a breakpoint has been reached, it then activates the resident Periscope software, of which full control is given. Periscope III is available in 8 MHz and 10 MHz models.

Repertoire

BJE Enterprises
Phone: (02) 858 5611
Price: $150 taxed

A collection of high level tools for Modula-2 programmers has been released. Known as Repertoire, the package contains a colour and/or monochrome screen design system for data entry, forms creation, display formatting and so on.

A multi line data entry editor and natural language analysis system, plus facilities to provide context-sensitive help, are also included. About 250 low-level routines are available to programmers, including routines for DOS file and directory services, screen and printer outputs.

Sage

Personal Computer Software
Phone: (02) 923 2899
Price: See below

The Sage multi user accounting software has been released by Personal Computer Software. It was designed specifically for small businesses.

The system allows several people to work on the accounting files at once. The multi user software costs $900 and includes debtors, creditors and general ledger. Multi-User Accountant Plus costs $1200 and also includes invoicing and stock control. Multi-User Financial Controller costs $2500 and adds company consolidation, order entry and bill of materials.

Sage Accounts Version 3

Personal Computer Software
Phone: (02) 923 2899
Price: See below

Version 3 of Sage Accounts includes many new features requested by users. A complete list of debtors, creditors, general ledger or stock codes with their names can be called up on the screen at any time in a window.

Prior to backup, data files are scanned to check that all transactions have been posted to correct accounts and no corruption has occurred. It also checks dates and the trial balance. Sage Accounts now handles up to five bank accounts for cash allocation.

The Accountant module costs $449, Bookkeeper costs $299 and the Account/Invoicing costs $599

Supersap

Minicomp
Phone: (02) 957 6800
Price: See below

Supersap is a fully comprehensive finite element analysis system, offering complete compatibility with Cadkey. Supersap features a graphics display, interactive model generation data management and a full array of tools for pre- and post-processing.

It provides full capability for solving large problems on the

NEW

HOT™ VERSION 4

is hotter than Hot!

HOT is a complete set of advanced tools for creating, maintaining and distributing powerful, professional turnkey systems — a MUST for every VAR, VAD, System Integrator, or MIS Director.

HOT Help Provides Context-sensitive Help for All HOT Functions

CRT Saver Protects Your Screen

With HOT, you can produce versatile, customized environments for individual clients or corporate departments.

Included with HOT — 2 FREE HOT RUNTIME MODULES!

HOT is Totally Flexible

- Set up a single menu or a chain of menus and submenus
- Link together an unlimited number of programs or menus
- Develop menus to run with a specific application program
- Create context-sensitive help screens for any application
- Create tutorials or simple interactive program simulations
- Select from a dazzling array of colour and graphic capabilities
- Choose from over 40 directives in HOT's extensive command language

HOT Perfects DOS and Increases User Efficiency

With HOT, you can make it simple for users to:

- Execute, complicated DOS commands at the touch of a single keystroke
- Run macros to automate repetitive tasks within applications
- Load programs or run batch files

HOT Provides Complete Control

- **Enhance MIS control of workstation processing**
- **Password-protect every facet of operation**
- **Maintain a log of programs run during the day/time spent**

HOT Benefits Your Clients

- Increased computer productivity
- Increased user confidence and satisfaction
- Simpler program operation
- Reduced keyboard entry errors

"HOT's menu management capability is the most thorough we've seen, letting you design menus with both substance and style." *INFOWORLD*

"A superlative menu-management system" *— John Walkenbach, INFOWORLD*

CHEF includes an easy-to-use HOT & DOS Command Editor

You can build menus that:

- Invoke any DOS command
- Feed keystrings into applications
- Call up other menus
- Display help text
- Test to see if a file is present
- Send commands to a printer
- Set, test, and edit 28 variables

HOT's Command Shell gives fast access to a DOS-like Command Line.
Provides the DOS prompt while working within the menu environment.

1Word™ is a powerful, easy-to-use Text Editor.
Design, edit and recompile new files, re-use menus for multiple clients.

File Finder™ is an amazing timesaver.
Display a graphic tree of all directories and files on all disks.

Hot's DOS & System Utilities make it easy to execute DOS commands.

- Enjoy instant access to all DOS functions
- Eliminate the need to remember dozens of lengthy commands.
- Reduce errors in the use of common DOS Utilities.

HOT BUILD is a built-in alternative to cooking up menus from scratch.

Pop-Up Calculator is an electronic calculator for performing simple numerical tasks.

Pop-Up Datebook is an electronic scheduler.

Pop-Up Calendar lets you scroll around in time.

GET HOT FOR ONLY

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Address _____

Company _____

IBM PC, AT, 286 or 386 computers. The module Superlink integrates Cadkey into the finite element process by making Cadkey an integral part of modelling. Pricing starts at $2995

TK Solver

Imagineering
Phone: (02) 697 8666
Price: $539

TK Solver is an equation solver from United Technical Systems that is capable of devising fast solutions to complex problems in finance, engineering, statistics, science, manufacturing or pure maths.

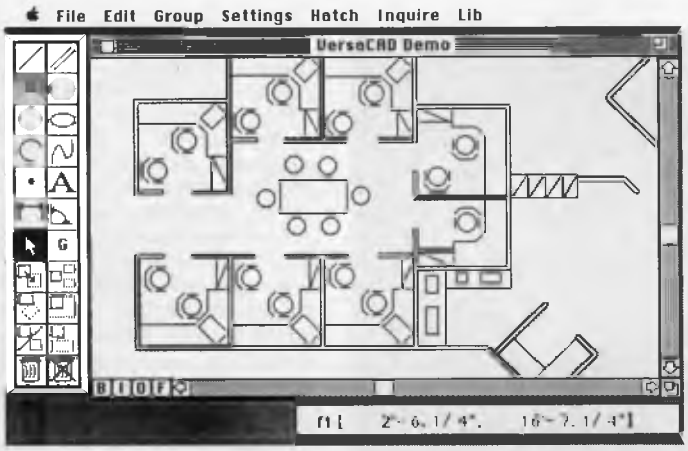
It comes with more than 100 ready to use applications. TK Solver provides spreadsheet and graphics functions, equation solving, statistical analysis, complex numbers, Boolean logic, user defined procedures and formats, and an on-line help system. TK Solver has a disk library and more than 200 functions.

VersaCad Mac ▶

Imagineering
Phone: (02) 697 8666
Price: $3199

VersaCad Corporation, through Imagineering, has released the VersaCad Macintosh Edition. It is a powerful design and drafting software, carefully configured to take full advantage of the Macintosh environment.

Builtin drawing objects include lines, walls, multiple parallel lines, arcs, rectangles, ellipses, polygons and points. Objects can be grouped together or edited in a number of ways. Drawing parts can be collected into a library for future designs.



New Machines

AIS 386

AIS
Phone: (03) 574 0244
Price: $6990 taxed

The AIS 386 is capable of speeds up to 26 MHz using the Landmark CPU speed test. Some of the key features include 80386-20 MHz CPU 0 wait state high speed performance, interleave and page mode operation, independently programmable CPU and AT BUS clock rates, 1 to 16 megabytes of DRAM memory supported, fast I/O recovery time, additional 64 bytes of CMOS RAM and 32-bit addressing and 32-bit data path capabilities.

AIS 286P

AIS
Phone: (03) 574 0244
Price: $2469 taxed

The AIS 286P is a 16 MHz computer using the 80286-12 CPU. Speed may be selected and changed using hardware or software switch without processor failure, even during running of programs.

0 wait state or 1 wait state is selectable. The system comes standard with 1 megabyte of RAM. A Phoenix BIOS is used to give full compatibility. A high speed hard disk controller is used to take full advantage of the 16 MHz speed for voice coil type hard disks.

Novatech PC ▼

Novatech Controls
Phone: (03) 645 2377
Price: Not supplied

Novatech Controls has released a range of PCs suited to harsh environments. The AT Turbo comes with an 80286 processor running at 8 MHz, switchable to 12 MHz. A range of monitors, memory and input/output options are available, including the Novatech range of digital and analog I/O cards, counter inputs and communications boards.

Peripherals and Extensions

AM-312OP Pocket Size Modem

Advanced Components
Phone: (03) 739 1198
Price: $2570 untaxed

Advanced Components has released the AM-312OP Pocket Size Modem. It measures 3 7/8 inches x 2 7/8 x 15/16, fitting easily into your pocket.

The modem supports Bell 103/212A and CCITT V.21/V.22 protocols for communications at 0-300 and 1200 bits per second using ordinary dial-up phone lines. It also supports the extended AT modem command set. The modem features auto dialling of numbers and a builtin speaker permitting phone line monitering. It will auto answer. The modem plugs into an RS232 serial port.

DISCTRONICS LIMITED

CD-ROM

Disctronics
Phone: (03) 62 2775
Price: See below

Disctronics' first CD-ROM (Read Only Memory) product is a multi media disc containing text, graphics, images and audio.

The disc includes a telephone/business directory containing details from the yellow and white pages, a parts catalog, computer based interactive training, financial procedure manual and a sample database of the St James Bible showing search/retrieval capabilities on a large database.

A disk costs between $20 and $50 dollars. A minimum number must be purchased.

CDM

Masatek
Phone: (03) 233 6677
Price: See below

A range of colour display monitors, CDMs, with analog RGB inputs to suit a wide range of graphics controllers, are available from Masatek.

The monitors are ergonomically designed and are available in 15 inch and 19 inch series while rack mount is confined to 19 inch. Various scan rates are available from 15 MHz up to 60 KHz interlaced and non-interlaced.

Prices for the monitors range from $5900 to $11,000.

Colorado internal and external backup systems

Tech Pacific
Phone: (03) 690 9055
Price: See below

Tech Pacific is now distributing for Colorado Memory Systems of the US. The first products to be released in Australia are the range of 44 megabyte and 125 Mbyte internal and external tape back up systems.

The Colorado systems support the full range of IBM PCs, including PS/2 models, and compatibles, as well as operating under PC-DOS, MS-DOS, OS/2 and Xenix. The Colorado 44 Mbyte internal costs $770, while the external costs $999. The 125 Mbyte internal costs $1897 and the external is $2235. Prices untaxed.

Intel Inboard

Tech Pacific
Phone: (03) 690 9055
Price: $2907 untaxed

The new enhanced Intel Inboard 386/AT has been released by Tech Pacific. It allows up to 2 megabytes of expanded memory, as well as providing all the power of '386 based system to existing '286 based computer users.

The new product maintains full compatibility with software and applications written for 80286 based systems. It also includes software utilities for disk cache, Lotus/Intel/Microsoft Expanded Memory Specification 4.0 support and video display improvement.

Logitech Graphics Subsystem

BJE Enterprises
Phone: (02) 858 5611
Price: $1750 untaxed

The Logitech Graphics Subsystem is a PC, XT, AT graphics upgrade system. The system com-

prises the Logitech Mouse, the Logitech EGA board, AutoSync Monitor and the Logitech Plus and Paintshow software packages.

The mouse supplied plugs directly into the EGA board, leaving the system's serial port free for other peripherals. The AutoSync monitor is a high resolution variable scan rate colour display monitor, which is compatible with IBM CGA, EGA, PGA or VGA

Macromodem ▶
Sendata

Phone: (03) 568 6299
Price: Not supplied

Sendata has released a 4 speed miniature portable modem, known as the Macromodem. It is small enough to fit into the palm of a hand.

The modem is fully Hayes compatible and includes full auto speed sensing of remote modems. It supports CCITT V.22bis, V.22, V.23, V.21 and Bell 2400, 212A and 103. The Macromodem will automatically select

the corresponding mode. It also features automatic detection, auto dial and auto answer.

The security control within the modem allows it to store 4 programmable dialback authorised users to control access to your system. The data encryption/decryption option is the DEA and is fast enough to allow the modem to operate with a 9600 bits per second DTE link. Error protection protocols are included.

Master Designer PCB
Quest International Computers

Phone: (03) 277 7444
Price: Not supplied

The new Master Designer Cadcae Design System handles printed circuit board designs. Master Designer is targeted to run on the new '386 based hardware as well as AT type 286 machines.

It includes multi-layer routing for high completion rates, an ECO processor for handling engineering changes and many other features generally found only on workstation based systems

Borland speaks your lan

Turbo Pascal Version 4.0 ($188*)

Available in versions for the IBM PC and compatible range and Apple Macintosh, TURBO PASCAL 4.0 compiles fast...more than 27,000 lines-per-minute fast yet it costs only $188.*

And it has a host of other features, such as support for programs larger than 64K; a built-in editor and pull-down menus; interactive error detection; a MicroCalc spreadsheet; and graph features.

TURBO PASCAL's smart linking allows the removal of un-used code from your programs; separate compilation units; and MAP files for use with standard debuggers. And, there are numerous Toolbox additions available.

Turbo Basic ($188*)

For BASIC programmers, TURBO BASIC roars along at a speed of up to 12,000 lines- per-minute with the IBM PC and compatibles range, and the new PS/2 systems.

The easy-to-use windowed development environment, context-sensitive Help facility, large program support and full 8087 math support, gives programmers a lot of

flexi... BAS... Micro...

Sub... expert... permit... sacrifi... experie...

of the world's ... languages for ... ranges, has a ... waiting for - TU...

Mstep 5

Novatech Controls
Phone: (03) 645 2377
Price: $1465 untaxed

A two axis stepper motor control board, the Mstep 5, has been released for the IBM PC, XT, AT or compatibles. The Mstep 5 provides two channels of incremental shaft encoder interface.

An optional stepper motor driver board provides the high current capabilities required to actually drive the stepper motor and shaft encoder. However, the system can easily be used to control almost any stepper motor or encoder. The Mstep 5 comes complete with software that allows the user to control motors.

Omnicron CT500 ▶

Letraset
Phone: (02) 975 1033
Price: $1495 untaxed

Letraset has released the Omnicron CT500, the latest addition to its system of adding colour to

guage and compiles it fast

ility. Compatible with both Advanced C and GW BASIC, it includes a Calc spreadsheet with source code.

ble for the novice programmer and TURBO BASIC's integrated design quick program turnaround without ng the powerful features ced programmers demand.

Turbo C ($188*)

Now, one ost popular programming e IBM PC and compatibles mpiler everybody's been 30 C.

Capable of compiling more than 7,000 lines-per-minute, TURBO C provides optimized code generation; automatic error tracking; an easy-to-use full-screen editor; fully integrated Linker and Make utilities; and it is ANSI C compatible.

Users can select the right memory configuration for their program from six distinct memory models, and a mixed-language programming function allows the selection of alternate calling conventions (Pascal or C) for specified functions or whole files.

To find out more about the extensive range of Borland Compiler products and Toolbox's, simply call one of our 1,000 dealers, Australia-wide or fill out the coupon and we'll send you more information.

*Price includes Sales Tax

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TP942A

black and white laser print out material or photocopies.

The CT500 is a small, compact portable version of the Omnicron 2000 and is designed to provide maximum portability. The machine also has the capacity to laminate and thermally bind documents.

STC

Qume ScripTen printer

STC
Phone: (02) 699 0044
Price: $11,300 taxed

STC has announced a new laser printer, the 10 page per minute Qume ScripTen. It has 3 megabytes of RAM memory, 35 resident fonts and the PostScript page description language across the full range of Apple Macintosh, IBM PCs and compatibles.

ScripTen works with most desktop publishing software packages. It also allows for output from non-PostScript software applications through a second operating mode that uses the Hewlett-Packard LaserJet Plus command set. An interactive mode is available.

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PC-SIG is the world's largest distributor of User Supported Software. Great efforts are put into testing and cataloging the software culminating in our 400 page directory and 60 page bi-monthly magazines. These publications are available in selected computer stores at $28 for the directory and $3 per copy of the magazine or available as part of membership of our library. Not only do we include a description of the software but the equipment required to run it, some user comments, and the author's requested donation.

Our library now contains over 1000 disks. You need NOT be a member of the library to purchase disks but if you do become a member you will receive our 400+ page Directory, disk discounts and our bi-monthly magazine "SHAREWARE" with descriptions of the latest additions and reviews of the more popular disks. Our magazine is not just a few photocopied pages but a bound professionally produced publication.

The following is a small selection from the library...

❑ **#5 & #730 PC-FILE + (two disk set)**
Jim Button's very popular database filing system now easier to install and use and it runs faster. Reports can be prepared or set up for your word processor.

❑ **#90 & #594 GENEOLOGY ON DISPLAY (two disk set)** Written with concern for the novice Geneologist. As well as expected features eg printing family trees, family group sheets, and descendents charts the program creates parent/child indexes and prints ID numbers.

❑ **#105 PC PROFESSOR**
A tutorial on the BASIC programming language which increases in complexity as the user progresses.

❑ **#199 PC-CALC**
Complete with tutorial and many advanced features. Similar to Visicalc. Able to import data from PC-FILE.

❑ **#254 PC-DOS HELP**
Just type help for an on-line help on DOS commands - very convenient for hard disk users.

❑ **#320 TOUCHTYPE**
Colourful way to improve your typing - new version with enhanced and PC keyboard.

❑ **#403 PC-TUTOR**
Ideal for new users to gain a basic understanding of their PC and how to use it. An interactive introduction to the IBM PC and DOS.

❑ **#457 ARCADE GAMES**
An assortment of arcade games including Flightmare and Spacewar.

❑ **#476 PATRICK'S BEST GAMES**
An assortment of five games which will run on the Mono monitor.

❑ **#480 PC OUTLINE**
Can outline and organise documents point by point - ideal for typing essays and ads like this. From Brown Bag Software.

❑ **#505 PC STYLE**
Analyses text files for readability, - considers number of words per sentence, % of words of specific length, personal words, action words. Make your writing read better!

❑ **#523 SIDEWRITER**
Your spreadsheet too wide to print? This program turns your printout 90 degrees and prints down the page

❑ **#528 NEW YORK WORD**
A full function word processor even including automatic hyphenation (and de-hyphenation). Unlike some WP it can edit large documents. Has become a leading WP since being converted from Unix.

❑ **#618 MAKE MY DAY**
A complete time management system with appointment calendar, job scheduler, time log and expense manager. All that is needed to organise your business and personal schedule.

❑ **#641 MAHJONG**
A fascinating game with extraordinary graphics. Excellent documentation for beginners with play levels from beginners to excellent.

❑ **#646 AMY'S FIRST PRIMER**
Six games to teach basic reading skills to a pre-reading child - positive reinforcement promotes "learning is fun" attitude.

❑ **#669 & #670 GRAPHTIME II (two disk set)**
Business presentation graphics with line, column, and pie charts. Works with dBASE Multiplan and Lotus. Has help key.

❑ **#683 BUTTONWARE ADVENTURES**
Two text adventure games - be a Castaway or travel to South America on a spy mission. Runs on Mono.

❑ **#705 CHILDREN'S GAMES**
A straight forward approach to making fun educational with graphics. Geared for 2 to 10 year olds.

❑ **#708 BACKGAMMON**
At last Backgammon for your PC - keeps track of points, games, gammons and backgammons. An instant opponent.

❑ **#718 LQ PRINTER UTILITY**
Enables your Epson printer to print a variety of fonts in near letter quality. You can even create your own fonts plus print large letter banners.

❑ **#727 POWERMENU**
Brown Bag Software's menu system with up to 10,000 selections. All your applications can be just a keystroke away.

❑ **#728 & #729 HOMEBASE (two disk set)**
A second generation memory resident desktop organiser from Brown Bag Software. PC Magazine said "it delivers the most bang for the buck among desktop organisers."

❑ **#765 GALAXY**
A fast RAM based WP. Very easy to use with choice of menus or keyboard commands.

❑ **#780 BRIDGEPAL**
Looking for up to three partners with whom you can play Bridge? A great way to practice.

❑ **#800 THE BAKER'S DOZEN**
A collection of more than 13 useful utilities from Buttonware.

❑ **#806 & #807 THE REMARKABLE GENERAL LEDGER (two disk set)** This Australasian written system not only includes a full general ledger but it has various reports on your entries, a bank reconciliation and trial balance.

❑ **#811 INTELLI-TRIEVE**
A weighted retrieval utility to use with dBASE III to extract information not considered in the original design.

❑ **#812 & #813 SOAR (two disk set)**
Service Orientated Accounts Receivable for businesses that provide services as well as products. Menu driven and easy to operate.

❑ **#816 & #817 TURBO C TUTORIAL (two disk set)** Programmers who complete this tutorial will then be very familiar with TURBO C.

❑ **#855 FASTBUCKS**
A home finanacing program to not only record transactions but to help with budgetting. Also has loan calculator.

❑ **#866 & #867 DEEP SPACE**
Plots star maps for a given latitude where you select projection and scale. ALso plots orbits of the planets.

❑ **#870 HGCIBM**
Provides owners of Hercules Graphics cards a means to run software written for IBM Colour Graphics Card.

❑ **#878 TEACHERS DATABASE 1000**
Holds data on up to 250 students with up to 60 records per student. Test results may be weighted, averaged, statistically analysed, changed to a percentage or changed to a letter grade and graphed.

❑ **#879 BIORYTHM SCHEDULE**
Not only calculates Biorythms but can compare Biorythms of two people for compatibility for each of the three cycles.

❑ **#893 PRIVATE LINE & WEAK LINK**
A full encryption/decryption system even supporting double encryption plus the ability to allow two PC's to send data to each other via serial ports. Great where machines have different floppy drives.

❑ **#912 & #913 FLODRAW (two disk set)**
Handles symbols quickly and easily and is ideal for flowcharts, organisational charts, system diagrams, and other symbols oriented diagrams.

❑ **#918 CAMBRIDGE THOROUGHBRED HANDICAPPER** Attempts to predict a horse's performance in a future race by analysing past runs. Also includes a betting strategy.

❑ **#929 LOTTO FEVER**
Shows your Astrologically lucky numbers, gives you an Astrological forecast and a description of your personality characteristics.

❑ **#997 OPUS 1 BRAIN TEASERS**
Charade type game with various categories. For example "The Graduate" has a clue of GRADUUUUUUUU.

❑ **#1000 NETHACK**
A huge game with 28 levels 150 rooms and countless corridors. A huge inventory of monsters and traps plus some hazardous treasures and Keystone Kops which throw cream pies!

MEMBERS STARTER PACK
Get off to a flying start with Membership and select six disks for just $85 (plus $5 freight) - that's a saving of $31 from our already low prices. Plus we'll give you a FREE educational disk. This offer is available for a short time only.

The PC-SIG Library is not only growing but it is regularly updated - many alternate sources of User Supported Software have very old versions. Beware of the apparent bargains!

802

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Drafix 3-D Introducing Drafix 3-D Modeler, the first low-cost, high performance 3-D CAD software package for your PC.

Drafix 3-D Modeler is a new product from MEGACADD, the creators of Design Board Professional, the #1 rated 3-D/PC CADD software and Foresight Resources, creators of Drafix 1 and Drafix 1 Plus.

Powerful, Easy-to-Use. Drafix 3-D Modeler is a powerful but easy to use software package for true three dimensional computer-aided design on your PC, XT or AT.

Unlimited Perspective Views. Its true 3-D database allows you to create a three-dimensional computer model and generate unlimited perspective views. By setting your eye location and viewing target, you can view the model from any angle. You can even walk inside the model and look out!

Simple Screen Menuing. Drafix 3-D Modeler features a straightforward on-screen menuing system and "helps prompts" so you'll be creating dimensionally accurate 3-D drawings soon after installing the program.

Automatic Hidden Line Removal. Drafix 3-D Modeler actually removes obstructed lines from the view, not just masking them with solid fill. This allows you to generate clear, accurate perspective plots or prints from the model.

Fully Drafix Compatible. Drafix 3-D Modeler was specially designed to work smoothly and efficiently with the Drafix 2-D programs. It is compatible with all Drafix 1 and Drafix 1 Plus-supported hardware configurations. Any view of your 3-D model can be easily transferred to Drafix 1 or Drafix 1 Plus for further drafting enhancement. Once the drawing is complete it can be printed out or plotted through Drafix 1 or Drafix 1 Plus. DRAFIX 3-D MODELER HAS THE SAME FEATURES FOUND IN THE PRODUCT RATES AS THE #1 3-D CADD IN THE JANUARY 1986 AIA CADD REVIEW

ONLY $695.

SPECIAL NOTE: Drafix 3-D Modeler must be used with Drafix 1 or Drafix 1 Plus for plotter or printer output. A Math Coprocessor, which can increase product speed by up to 6 times, is highly recommended but not required. Supports all Drafix 1 & 1 Plus supported hardware

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WELCOME TO THE INNER WORLD OF HARD DISKS: WHERE MICROSCOPIC PROBLEMS CAUSE MAJOR CATASTROPHIES.

A typical 20-megabyte hard disk contains over *200,000,000 bits.* If *only one bit* changes or fails, you can lose *everything* on your disk. Hard disks are subject to so many inherent, uncontrollable conditions that random failures occur with alarming frequency. You already may have been tortured by one of these hard disk error messages: **DATA ERROR, GENERAL FAILURE, ERROR READING, WRITE FAULT, BAD SECTOR, SECTOR NOT FOUND, FILE ALLOCATION TABLE BAD, DISK ERROR READING FAT, DISK NOT READY, INVALID DRIVE SPECIFICATION, NON-SYSTEM DISK OR DISK ERROR, READ FAULT, BAD DATA, ABORT-RETRY-IGNORE** — plus hundreds more that we simply don't have space to mention. Here is why:

PROBLEM ONE: OUT OF ALIGNMENT. There are hundreds of circular tracks packed into every inch of your hard disk's magnetic recording media. They are *extremely* thin, about as thick as a single strand of hair. Perfectly aligned tracks on a new, out-of-the-carton hard disk look like those in **figure 1**. Your programs read, but *never* write, to any of the special Track and Sector ID areas shown in black.

When your system has been off and is cold — in the morning, for instance — head positioning mechanics shrink, causing heads to read and write towards the inside. As the unit warms they expand and tend to read and write towards the outside. Add friction, wear-and-tear, play, torquing, repeatability, vibration, irregular platter and surface expansion, etc. — and within a very short time your data, program and system sectors can go out of alignment like those shown in **figure 2**. This is a continual, serious problem: valuable data may be written so far off current head tracking that it is no longer readable, resulting in devastating errors and lost data.

Disk Technician[tm] Automatic AI Software System's early warning detection *must be used daily* to keep data, program and system sectors in perfect alignment. When even the slightest change is detected, Disk Technician safely removes any data and stores it in your computer's RAM, then restores perfect alignment by rewriting the *entire* track, *including* the "read only" Track and Sector ID areas, using Disk Technician's own *factory low-level, Real format.* This new track is then thoroughly retested, *and only if has been perfectly repaired,* will Disk Technician allow your valuable programs and data to use it again. If retesting reveals that any bit is not perfect, data is relocated to a good area and the bad area is safely blocked from future DOS use. When Disk Technician repairs an area, it *specially monitors* that spot on all subsequent tests to make certain it *stays* repaired. *This is a totally automatic, unattended process.*

PROBLEM TWO: MEDIA AND DISTANCE. The typical distance between the head and the media is about 25 millionths of an inch. By comparison, a smoke particle is about 10 times greater and a human hair is over 100 times greater! Expansion and contraction caused by normal heating and cooling, wear-and-tear, media degradation, vibration, humidity, platter wobble and aging all cause this distance to vary (see **figure 3**). *Read and write quality varies directly with these distance changes.*

No matter how carefully the hard disk media was manufactured, there still will be variations in coating thickness, smoothness and magnetic density (see **figure 3**). Add aging and magnetic retentivity changes, and some spots may change from "good" to "unreliable" *overnight.* Magnetic hard disks act just like old photos: they fade away — along with *your* data! *Disk Technician is the only total solution to these problems.*

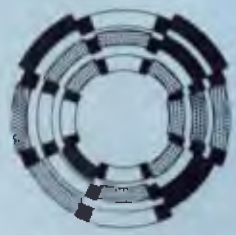
Disk Technician *reads, writes* and *tests every single bit on the hard disk, occupied or not,* using special proprietary testing and repair algorithms to check for soft error rate, magnetic retentivity, and the ability to read and write *perfectly.* If even the smallest marginality or error is found, Disk Technician will automatically proceed with its complete repair and restoration process. DOS and other programs can only tell you after 10 to 30 errors have been made. Our testing reveals that once a spot makes more than 3 to 5 soft errors, total failure is imminent. *Disk Technician's daily preventive testing, repair and recovery is the only real cure.*

PROBLEM THREE: POWER. Static electricity, turning power on-and-off, brownouts, surges, spikes and static electricity all can cause the heads to write meaningless "garbage" into whatever tracks they happen to be located over. Although hard disks and computers are designed to minimize accidental head writes, they *still* occur and cause devastating damage — often wiping out an entire disk. *Disk Technician takes a new approach to cure these problems.*

When Disk Technician is run, it automatically installs SafePark[tm] memory resident software program and creates a "safe zone" on your hard disk, safely relocating any data in this area. Then, whenever you boot from your hard disk, SafePark becomes memory resident and operates with all of your programs all of the time. When there is no disk activity for approximately 7 seconds (user adjustable), SafePark automatically moves the heads to the safe zone. Once the heads have been moved — which will almost *always* be the case — and there is static electricity or a power glitch, any damage will be confined to the safe zone: *protecting your valuable data and programs.*

WHY SUFFER AND TORTURE YOURSELF WITH HARD DISK GRIEF? Disk Technician virtually eliminates *all* your problems! It is so easy to use — *absolutely no technical skill is needed — and takes less than 60 seconds of operator time daily.* ***BUY NOW! HEAD-OFF HARD DISK DISASTERS BEFORE THEY COST YOU TIME AND MONEY!***

Figure 1* Perfectly aligned tracks. The black areas are "read only." These store *critical* track and sector ID information. The white areas are data sectors and store your system, programs and data.



Good Bad Marginal Clash!

Figure 2* Sectors out of alignment with the track. The most frequent cause of lost or unreadable data. See *Problem One.*

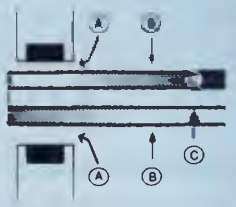


Figure 3* Heads, media and platter. A: The distance from the heads to the media continually changes. **B:** The magnetic coating varies in thickness and smoothness. **C:** Magnetic retentivity varies and decays. See *Problem Two.*

*Magnified and simplified for clarity.

Disk Technician[tm]

Automated AI Software System

TECHNICAL SPECIFICATIONS

- Works on a *single system* of any IBM PC, XT, AT, derivative COMPAQ or true IBM clone
- Works on both physical C and D hard disk drives up to 32 megabytes and A and B floppy drives that conform to the IBM standard On drives larger than 32 megabytes, it will work on the first DOS partition only Disk Technician 2.0 will work on drives greater than 32 megabytes and on multiple DOS partitions provided the drive is partitioned using the IBM-DOS 3.3 standard.
- Can selectively test and repair any and all cylinders, heads and sectors in the DOS partition
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Speed enhancement products

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Phone: (02) 439 8400
Price: Not supplied

A range of speed enhancement products is available from Micro General. There are a number of 8087 and 80287 maths co-processors which run from 4.77 MHz to 10 MHz and can speed up functions up to 7 times.

For 80286 and 80386 machines there is the AT8 Intelligent Serial Controller that lets you run up to 8 stations from your PC. A number of PC accelerators are offered, including 9 MHz and 12 MHz versions. All products include testing and setup software, where necessary, with full instructions.

NOVATECH CONTROLS

RIM-1000 ▼

Novatech Controls
Phone: (03) 645 2377
Price: $550 untaxed

Novatech Controls has released a realtime interface module, the RIM-1000. The module connects any computer with an RS232C serial port to the real world.

The RIM-1000 boxes can be connected together in a network to provide hundreds of inputs and outputs. Each box has 17 analog inputs, 2 analog outputs and 14 digital outputs or inputs. Up to 8 of the digital inputs can be used as counters or accumulators. Inputs can be from temperature sensors, load cells, DH meters, power meters or position transducers.

Miscellaneous

Mini Super Cleaner

Sylex
Phone: (02) 647 2888
Price: $29 taxed

Sylex has released the Mini Super Cleaner, a device which helps clean the dust from hard to reach places on computers.

An obvious place would be between the keys on the keyboard. The Mini Super Cleaner comes with a range of attachments to get at dust trap areas including two extension arms, a nozzle and a reusable dust collection bag. It is powered by two AA size batteries. It can also be used on reverse cycle to blow a tiny jet of air.

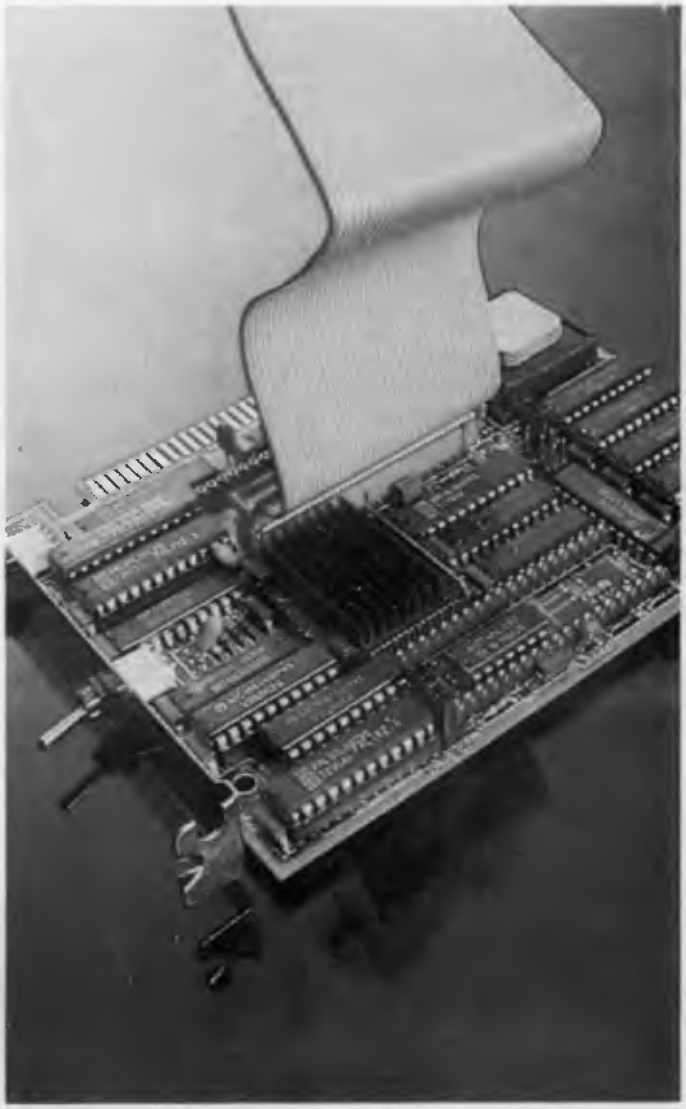
The Electronic Mall

Software Club

Viatel/Electronic Mall
Phone: (09) 293 3091
Price: $4.99 per year

The Software Club is a service to Viatel users provided by the Electronic Mall. The club provides a 'meeting place' on Viatel for those with an interest in computers and software.

Members can place and read messages, ask for help with a programming or game problem, read and submit software reviews (the club pays $10 for each of these displayed). The Software Club also provides software at lower than usual prices and Public Domain software. Contact above phone number or Viatel Mailbox No: 069000160.



Games

It seems to be the season for software to soothe the savage: almost every publisher has released a series of new games — from fantasy history games, flight simulators, to chess and even X-rated romantic encounters. Here's a selection of new games from Questor, (02) 662 9744 . . .

Airborne Ranger

Price: See below

You are one of the elite, parachuting alone behind enemy lines. The enemy controls the terrain and is hidden in bunkers and machine gun nests — you may be surrounded.

The action is fierce as you control one soldier's battle against overwhelming odds. You'll need skill and strategy to out manoeuvre your enemy. Airborne Ranger is an exciting simulation game, with 12 desperate missions in three different regions of the world. $39 cassette; $49 disk (taxed).

Games

GeeBee Air Rally
Price: $61 taxed

Features a swarm of planes to out manoeuvre — or collide with. This three dimensional game has 16 challenging courses, including four special slalom and balloon popping events. There are 256 levels of difficulty. Also featured are authentic sights and sounds. GeeBee Air Rally is available for the Amiga. Published by Activision.

Grid Start
Price: $39 taxed

Drive your six gear Formula One car over six world famous courses. You are advised to do several practice laps before you enter the Grand Prix competition against six cars, each with individual performance. There are three skill levels and the route to the top is tough and arduous. Available for the Amiga.

Predator
Price: See below

Nothing like it has ever been seen on Earth before. It came for the thrill of the hunt. It picked the wrong person to hunt — *You*. From Activision; $29 cassette; $39 disk (taxed)

Knightmare
Price: See below

Knightmare combines the best elements of traditional adventures with arcade action. It provides puzzles and riddles of a varying nature. Available for the C64; published by Activision. $29 cassette; $39 disk (taxed).

Project Stealth Fighter
Price: See below

This challenging new flight simulation from MicroProse puts you in the pilot's seat of America's latest, top secret aircraft, the F-15. Your jet fighter is armed with lasers, missiles, rockets and cannon, but concealment is the most effective weapon as you go on missions to troublespots around the world. $39 disk; $29 cassette (taxed).

Super Bike Challenge
Price: $49 taxed

In Super Bike Challenge you'll race at heart pounding speeds up to 200 miles per hour as you battle to take and hold the lead against superb riders. Challenge a friend — you'll each have your own bikes, or race against the computer. Uses either joystick or keyboard controls. There are three levels of challenge. Available for the Atari ST; published by Broderbund.

Romantic Encounters at the Dome
Price: $49 taxed

Enter the world of the Dome, a futuristic hi-tech single's club complete with parties, people, dancing, love testing and many hours of interesting situations to get yourself into. The game was written by a famous screenwriter and a psychologist. Note that the product has a warning stating that it has some explicit adult situations (*That* won't change in the future) and should not be sold to minors.

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The Art of Chess

Price: $69 taxed

Play against the computer, against a human opponent (with the Art of Chess as referee) or watch the Art of Chess play against itself. You can change sides or players at any point of the game. Skill levels can be adjusted, as can play style, using simple slider controls. Games can be loaded or saved. You can even select one of the standard chess tournaments and play under strict international conditions. Available for the Amiga; published by SPA.

ThunderChopper

Price: $59 taxed

Climb into the pilot's seat of a high performance light attack helicopter. ThunderChopper's three dimensional graphics offer superb out-the-windshield views in both day and night flight modes, from simple landing practise to exploration, rescue or combat missions. Available for the C64; published by Action-Soft.

The Seven Spirits of Ra

Price: $89 taxed

The Seven Spirits of Ra challenges you to an adventure from

3000 years ago. Experience the authentic drama of an ancient Egyptian myth. Fight through tombs, pyramids, caverns and swaps. Test your mind against complex, multi level passages, overcome sudden perils and surprises from evil forces, guardian demons and villains. Published by Sir Tech; for the IBM PC and compatibles.

Winter Olympiad 88

Price: See below

You don't have to freeze your behind off skiing in sub-zero temperatures, or spending big on accommodation and ski gear hire. Tynesoft has released the Winter Olympiad 88 winter sports simulation. It features the classic Winter Olympic events of ski slalom, two-man bob, ski jump, biathalon and speed skating. A great way to keep warm in the snow! For the C64: $39 cassette; $49 disk. For the Atari ST: $59 (all prices taxed).

Wizardry III

Price: $89 taxed

'Legacy of Llylgamyn' is the third scenario in the Wizardry series, the fantasy roleplaying history game. It features a full screen, three dimensional maze display, window graphics, improved combat sequence and six levels of hires mazes. For one to six players aged 10 to adult. Runs on IBM and compatibles; from Sir Tech.

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Events

Computer Pals Across The World will be held from April 7 to 8 at the Sheraton, Alice Springs. Papers are being sought on the theme Sharing in a Global Classroom Contact Ralph Czerniejewski on (089) 525 044.

ATUG 88 will be held at the Royal Exhibition Building in Melbourne from April 19 to 21 For exhibition enquiries contact David Esler on (03) 429 6088 and for conference enquiries contact Wally Rothwell on (02) 957 1333.

The EDP Auditors Association will be holding an international conference at Jupiters Hotel from April 27 to 29. Contact Lex Page or Tony Muston on (02) 250 0500.

Fourth Australian Conference on Applications of Engineering. Papers are being called for this conference by the Sydney Expert Systems Group. The conference will be held in Sydney from 11 to 13 May. Contact Marie Thill on (02) 218 9427.

The Australian Software Engineering Conference is to be held at the Australian Defence Force academy in Canberra from May 11 to 13. It is organised by the ACS. Contact Frank Poole on (062) 88 2884.

Forth Symposium. A two day seminar on the Forth language will be held on May 19 and 20 at the NSW Institute of Technology. Keynote speaker will by Charles Moore who invented the language. Contact Jose Alfonso or Paul Walker on (02) 20 930 or Roy Hill on (02) 217 3828

Commercial opportunities arising from space transport and related industries is the subject of a conference to be held at the Sheraton Hotel, Brisbane from April 26 to 28. Contact The Conference Secretariat, Uni Quest Ltd, University of Queensland, St Lucia 4067

Ausgraph '88 organisers are calling for unpublished papers on Cadcam, animation, image processing and scene simulation. The exhibition and conference will be held in Melbourne from July 4 to 8 at the Hyatt on Collins. Enquiries (03) 387 9955.

The Fourth National Space Engineering Symposium will be held in Adelaide July 12 to 14. Papers dealing with any space engineering are invited. Contact (062) 73 3633.

Papers are being called for Forum '88, organized by the Honeywell Bull Users' Association. It will be held at the Sydney Hilton Hotel from July 21 to 23. Contact (02) 218 9578

Comdex Australia '88 will be held at the Darling Harbour Conference and Exhibition Centre in Sydney from July 26 to 28 Contact (02) 959 5555.

Infotex '88 is a computer and communications show especially for government It will be held from November 8 to 10 at the National Exhibition Centre, Canberra. Contact (02) 959 5555.

CLUES, the C Language Users and Enthusiasts Society, is now holding regular meetings at Microsoft, 1/17 Rodborough Road, Frenchs Forest on the first Tuesday of every month

Special Interest Groups for PC Users: CONSIG meets on the first Wednesday of each month in Sydney; contact (02) 290 2655. The DTP Graphics SIG meets on the first Tuesday of the month in Sydney; contact Mark Richards on (02) 929 5855. PCWEST meets on the first Monday of the month in Sydney; phone Bill McEwen (02) 627 2488.

A President Users Group has been formed in Sydney. It meets on the last Tuesday of each month at the Hornsby Inn. Contact Raymond Toms on (02) 212 5277.

Overseas Exhibitions

The EDP Auditors Foundation Conference is to be held in Atlanta, Georgia USA from 10 to 15 April. Write to The Program Chairman, The EDP Auditors Foundation, Box 88180, Carol Stream, IL 60188-0180 or telephone (312) 653 0950.

The Hong Kong Computer Expo '88 will be held from April 12 to 15 at the Hong Kong Exhibition Centre. Incorporates Cadcam '88. Contact Richard May from ATEK on (062) 91 7801

The Enterprising Network Event '88 International conference is to be conducted from June 5 to 9, with the exposition running from June 6 to 8 Both events will be held at the Baltimore Maryland Convention Centre USA The conference with be focusing on an OSI communications solution for anything from automation protocol through to banking, education and federal and state government sectors. □

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"If your primary need for a wordprocessor is letter writing, then Letter Magic is worth your attention, regardless of the word processor you are currently using." Ewart Stronach, Your Computer, December 1987.

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CROSS-CHEQUE helps you run your business by keeping track of income and expenditure.

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HURRY! Offer closes July 1988, for Your Computer.

CONDITIONS OF ENTRY

1. The competition is open only to Australian Residents authorising a new/renewal subscription before last mail September 30, 1988. Entries received after closing date will not be included. Employees of the Federal Publishing Company, Sony Australia and their families are not eligible to enter. To be valid for drawing, subscription must be signed against a nominated valid credit card, or, if paid by cheque, cleared for payment.
2. South Australian residents need not complete the coupon but may enter only once by submitting their name, address, and a hand-drawn facsimile of the coupon.
3. Prizes are not transferable or exchangeable and may not be converted to cash.
4. The judges decision is final and no correspondence will be entered in to.
5. Description of the competition and instructions on how to enter form a part of the competition conditions.
6. The competition commences on April 1, 1988 and closes with last mail on September 30, 1988. The draw will take place in Sydney on October 12, 1988 and the winner will be notified by telephone and letter. The winner will also be announced in the Australian on October 17, 1988 and a later issue of the magazine.
7. The first prize is: a Sony Trinitron Remote Control colour TV ($1,200). 2nd prize: 5 inch portable Black & White TV set ($159 each), plus 10 consolation prizes of AM/FM all weather radios (approx $10 each).
8. The promoter is The Federal Publishing Company, 180 Bourke Road, Alexandria NSW 2015. Permit No. TC88/675 issued under the Lotteries and Art Unions Act, 1901; Raffles and Bingo Permits Board Permit No. 88/357 issue on 8/3/88; ACT Permit No. TP88/202 issue under the Lotteries Ordinance, 1964.

YOUR MAC

Hypermedia

A few months ago I wrote a quick review of HyperCard for the Macintosh. At that time I was reasonably enthusiastic, but the article concluded with the statement that while HyperCard was extremely clever, I couldn't think of any situation where I would need to use it. I said it was a brilliant solution, looking for a problem to solve.

I don't seem to be the only commentator to have taken this line. There have been plenty of enthusiastic reviews, but to date, no practical examples of HyperCard in use as a user-programmed database above the level of phone listings and so on.

There are plenty of commercial and Public Domain stacks on the way and this, I feel, is where HyperCard has distinct uses. There's an opening here for information collectors and collators who want to get into the StackWare Publishing industry — but my comments were intended to point out that generally the time and trouble taken to link HyperCard cards for your own use will probably not be justified through any later saving.

In my own office I've already junked many of the old electronic databases and bought a good set of school exercise books — for much the same reason — the time taken to set up and store the material is not returned by quick automated access. I've come to the conclusion that for a lot of simple record keeping, the computer is an unjustifiable complication. It's like using your car to drive to the mail box; if you live on a farm the car makes sense... but not when you live in suburbia.

However I now have to report that I have found a valid use for HyperCard, and I can see a couple of others on the horizon. So I'm approaching HyperCard with renewed interest.

Infowindow

At the present moment I am 'authoring' an audio visual program on an IBM Infowindow system for ICOM and the Sydney Power House Museum. Infowindow is not yet officially released in Australia so you probably haven't yet seen one, unless you're just back from Disneyland in the States.

Infowindow is a computer control system that links an IBM PS/2 (with a 20 megabyte hard disk) and two Pioneer video laser disk units together with an intelligent touch screen colour video/computer monitor. It is the latest in interactive video/multimedia techniques. Touch the screen to ask a question, and the video disks leap into action and shows you the appropriate chunk of film... or a video still frame... or computer text or graphics ... or it may even play you synthesised speech. It is very flexible.

So I'm approaching HyperCard with renewed interest. At first glance the Power House chart looks like a cubist's interpretation of the Tree of Life...

Infowindow was designed as either an interactive learning tool or a public information display. The units will eventually go into shopping malls, public places like museums, libraries and universities and colleges. Interactive programs involve optional multiple branching pathways. By touching the screen you can see unique combinations of motion video segments (each disk with two sound tracks), still frames and so on. The units have standard computer functions as well — so you can type in your name and the program will incorporate this within questions, or you may be asked to supply numerical information and the computer will calculate certain consequences.

Authoring involves selecting the frames of motion video that will be used for each 'event' from the video disk (specified by frame number), choosing which of the four audio tracks to be played, creating and adding special graphics (held on hard disk), and selecting or writing short synthesised voice phrases. Then putting it all together so it works every time.

The control program is structured as a series of modules called 'events'. Usually at the beginning of any InfoWindow program there will be a main menu with a screen divided into, say, six to ten areas. Touch any of these areas and you branch immediately to the appropriate first event in the sequence you selected.

The menu event will probably require the programmer simply to place a graphic up on the screen, instruct the computer to wait until the screen is touched, define the touch areas, and then provide the branching mechanism to the appropriate next event.

The second event in the chosen sequence might involve a series of 'elements' — motion video, audio narration (perhaps in either of two languages), an overlay graphic, a video freeze frame and the definition of other touch areas — which will further branch the user to other events.

Modular programming is essential with such complex programs. Modularity has the advantage that each event can be written and tested quite independently of the rest. When you consider that 60 different touch areas (and therefore 60 different branches) can be defined on any one screen, you can understand how complex programming can get.

'Authoring' is just the A/V industry's term for 'programming', and the complexity of these multiple branching pathways is the major problem. The starting point is in designing a flow chart.

At first glance the Power House chart looks like a cubist's interpretation of the Tree of Life — or a taxonomist's guide to botanical species. There are branches, and branches on branches, and branches on branches on branches and they incorporate problems like 'IF area ?3 Event 32 is touched, but NOT if Question 16 was Right, GOTO Event 35, ELSE GOTO Event 36a'. You get the picture!

The draft workpapers I received with the video disks were about two inches thick with hand-scrawled notes from the original designer and scriptwriter, and subsequent notes from the video disk producer — and anyone else who felt they should make changes or add comment. It was almost impossible to decypher these workpapers accurately.

HyperCard was the answer. I set up a special Home stack and five functional stacks for the major divisions of the video disk. Then taking the outline a page at a time, I created a card for each event.

My HyperCard simulation now contains all necessary programming details, such as the frame number where the video should start to play, and where it would finish or hold in a freeze frame. Each card also tells me which page of the script it refers to, and holds details like which audio track to use and where we need computer generated overlays.

Onto each page, I then pasted HyperCard buttons to represent the touch screen selections that the user would be forced to make, and labelled them just as they would appear on the video screen. The 'Link To' Option was then used to create the correct branches to new events.

It took me the best part of a day to program Hypercard, and it will take me the best part of a month to complete the final IBM program — yet the HyperCard version is no less sophisticated than Infowindow. It is just a damn sight easier to program.

Of course HyperCard doesn't have a touch screen yet, so it is not a substitute for Infowindow in this type of presentation — but HyperCard can control a video disk player so it is getting close.

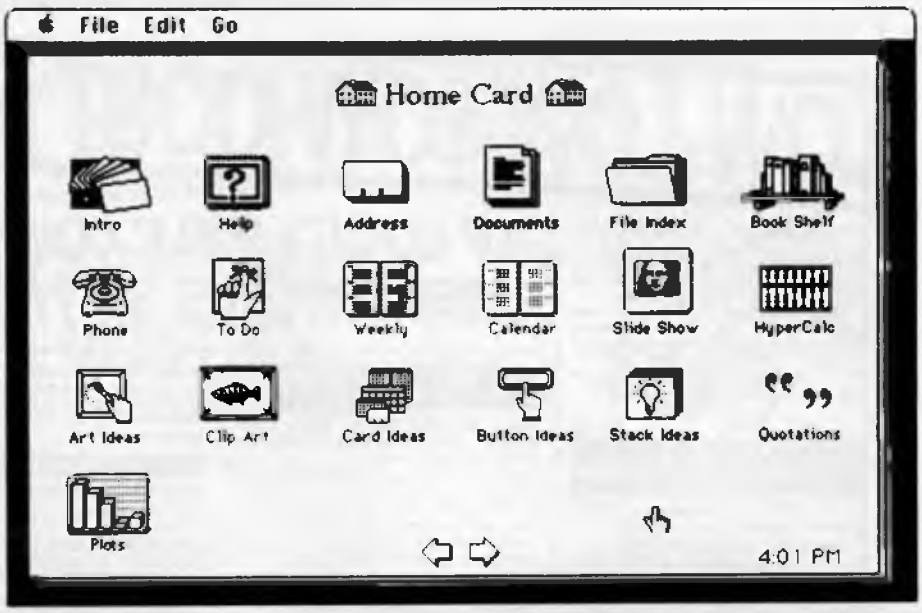
What we are seeing here is the development of a new type of hardware/software system designed to handle large amounts of diverse information in a very flexible way. These systems are going to be important in the future: to find information in large electronic encyclopedias; as directories for shopping complexes, museums or expos; as direct marketing tools; and as self-packed educational and training units.

And remember, this is an entirely funcdon't have to use the touch screen — there's a keyboard as well, so it can combine the functions of a home computer, a video games unit and an interactive teaching machine, together with being a spare TV set with a range of prerecorded movies on disk.

A prediction

If you want a prediction for the coming year, I'd be willing to stake a fair amount on the likelihood of Apple (or a closely associated third party vendor) producing a high quality colour touch screen monitor for the Mac. Just as Apple needed the LaserPrinter to take the Macintosh into desktop publishing, so the touch screen is essential to give the Mac a solid toe hold in the interactive audio visual market. And the potential here is enormous.

With Infowindow the capital cost of replay equipment is well over the $15,000 mark, and before you go to the trouble of producing educational or informational video disks, you need quite a few outlets to justify the production and programming costs.



Hypercard – not just a brilliant solution looking for a problem.

. . . so it can combine the functions of a home computer, a video games unit and an interactive teaching machine, together with being a spare TV set with a range of prerecorded movies on disk.

It's hard to see how IBM's Infowindow could ever be cheap enough for schools, libraries or even households. Yet it is only when the equipment gets down to the $3 to $5,000 mark that the use will extend enough to boost the production of 'program' material. Once that happens interactive audio visual should take off - and it looks like it could only happen on the Macintosh.

HyperCard on the Macintosh coupled with CD-ROM disks using the RCA-GE DVI (Digital Video Interactive) process should do the trick. DVI is basically a video compression/decompression system that lets you store one hour of fair-to-good quality motion video on a standard 12 cm compact disk. It requires a two chip set within the computer to decompress the images and handle the video data stream at the required 25 frames a second.

DVI and CD-ROM go together like sausages and spuds; CD-ROM has the enormous storage capacity necessary for video, and the ability to simultaneously handle computer graphics, text, programs, synthesised and recorded speech, music and so on. DVI provides the means of manipulating this data stream. It decompresses the video at motion picture speeds and mixes these images on the screen with the other forms of information.

CD-ROM also has a strong affinity with HyperCard. HyperCard supplies the interface which allows the use to find data and access links across the normal boundaries of database fields and files. It is a quick, easy, and intuitive information retrieval system.

So these three go together... but with one essential component missing. Some people will use the keyboard and the mouse, but to really catch on, these systems need high quality colour video/-computer monitor with a touch screen. If Apple aren't working on this then they ought to be, because this could well be one of the main avenues in the future of computing. □

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IC1006 a

JOHN HEPWORTH

YOUR IBM

Last month I delved into the black art of sending output to different devices from within a program, and gave some simplistic (but working) examples in Basic, Turbo Pascal and Turbo C.

The Turbo C example, while workable, would require considerable refinement in a finished program. In the space available, more detail was not possible, but there are a few further comments to be made and a few sources of more detailed information to be mentioned.

The program used high level output via a stream for the logical devices, as well as for the disk file. This is rather slow and inefficient, and in many programs a move to low level routines to write direct to a port would give useful performance improvements. Adding a serial communications option would also prove valuable. Last month, I noted that the library in typical C compilers does not contain communications functions and that third party libraries often have to be used for this task. There are ways to write your own communications routines, and one of the books I discuss this month covers this very aspect, at least in part.

In this column, I will discuss some books on communications and/or C which have been of great use to me. Three of the books relate specifically to communications. The other four books are valuable references for the C programmer. One is the definitive book on the C language, another contains the answers (usually programs) to the exercises in the definitive book, while a third is a text book in tutorial format for the novice learning Turbo C and the last is a general purpose reference to the C language.

Communications

The first book touches briefly and adequately on interfacing a limited range of computers and peripheral devices, but its main thrust is on other matters. *Mastering Serial Communications* by Peter W. Gofton (Sybex, around $44) is a 290 page book with a wide range of topics, including a detailed discussion on many of the protocols like Xmodem and Kermit which are in common use. Much of its contents is of interest to all computer users, but it does emphasise very strongly with hardware and software for the IBM PC.

Over 100 pages is aimed at the programmer seeking solutions when writing communications software, and covers a discussion of the IBM PC at a systems level, communications in Basic, Assembler and C, and the writing of communications interrupt handlers in assembler for the PC. Direct programming of the UART (Universal Asynchronous Receiver Transmitter chip in the serial board) is covered, and sample programs are included. Sample communications programs in C are included using DOS functions. ROM-BIOS functions and interrupt driven I/O using the interrupt handler are shown in the book. The example programs were written for Microsoft C, but the ones I typed in compiled error free with Turbo C after the most trivial of adjustments. A number of C functions are shown, including one to set communications parameters such as baud rate, word length and parity.

Campbell takes the view that the RS232 'standard' is easily misunderstood, and that, as a result, the documentation from many manufacturers concerning the serial ports on their systems is very suspect.

The first half of the book covers other topics. Listing the chapter headings will give a good idea of the contents: Hardware Interfacing, Character Transmission, Handshaking and Buffers, Modems, Telecommunications methods, Micro-Mainframe Communications, File Transfer, Xmodem, Kermit and Programming Topics. At times, the book moves onto another topic just as it is getting down to details, but it is a very good overall look at communications on the IBM PC, and an excellent introduction to some of the concepts behind the programming of communications software for the PC.

Interfacing

Books on communications usually concentrate heavily on the hardware interfacing of two devices that use the allegedly standard RS232 interface. As almost all readers will know to their sorrow, there are few 'standards' more flexible and less observed than RS232. Interfacing two devices can be a frustrating and difficult task, but once connected there are other aspects of communications which may be of interest. You can connect the serial ports on two devices using one of two methodologies.

Or you can look up a 'cook book' listing the connections of each and giving details of a cable to suit, or you can analyse the devices with a tester and personally work out the connections for two unknown devices.

The RS232 Solution (Joe Campbell, Sybex, around $40) describes a very simple and easy to build device to test communications ports (it should only take a few minutes and a couple of dollars to build) and then lays out a logical and simple method of determining the way to interconnect two dissimilar devices.

Campbell takes the view that the RS232 'standard' is easily misunderstood, and that, as a result, the documentation from many manufacturers concerning the serial ports on their systems is very suspect. He details some examples where trusting the manufacturer's documentation resulted in a cable that did not work, and could never work. His method of interconnection ignores all printed documentation on the ports, and tests the voltages available at each pin to determine which connections should be made. After detailing out the theory behind his technique, a number of case studies illustrate the technique. In practice the method is simple, works well, and can be recommended.

RS232 Made Easy (Martin D.Seyer, Prentice-Hall, around $34) takes the cook book approach. After a rather childish description of the concepts of serial communications, it lists the pin connections of the serial ports on 230 devices, classifies them into groups, and then defines cables to connect them. The cook book approach will often find a connection for two devices, but as the copy I have was printed in 1984, there may be many devices not mentioned and which have connections which don't match any of those 230 examples in the book.

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Anyone who ever may need to build a cable to connect a couple of serial ports should have both of these books. The first step is to knock up a cable using the cook book approach in *RS232 Made Easy*, and test it. If it does not work, then the techniques in *The RS232 Solution* will fix the problem forever. Both are essential components of the toolkit if you are involved in serial communications.

C textbooks

If you have been playing with C for more than a minute or two, you will be aware that the C language was defined by Kernighan and Ritchie in their book *The C Language* (Prentice-Hall, around $35). It is an essential book for the C programmer, defining both the 'standard' C and giving some excellent exercises for the student to try.

It has two problems. It is based upon explaining a concept briefly, and then setting an exercise for the student, many of which require a simple program to be written in C. As it does not include any answers to any of the exercises, it can be intimidating to the novice. Self-study of C from this book without aid is difficult. The answer (literally) is the *C Answer Book* (Tondo and Gimpel, Prentice Hall, around $38) which provides carefully written sample programs for all the examples in *The C Language*.

Two other books of great interest to novice and intermediate C programmers are *Using Turbo C* (Herbert Schildt, Borland/Osborne/McGraw-Hill, around $42) and *C — The Complete Reference* (same publisher, around $55). *Using Turbo C* covers much the same territory as Borland's user guide, but is better written and often has more detail. It takes the user by the hand, sets up the system and then plunges into programming, with a wealth of examples. The book is clearly written, logical and as easy to follow and understand as any textbook on C could ever hope to be, and is specifically written around Turbo C.

C — The Complete Reference is a mammoth 780 page tome. I have found it to be extremely useful as a source of that vital snippet of information or programming concept. It gives details of the standard functions found in most compilers, a multitude of algorithms and applications, and also gives details and sample programs to solve many problems.

Again, a listing of the chapter headings will give you an idea of the areas covered. These are: An Overview of C, Variables, Constants, Operators and Expressions, Program Control Statements, Functions, Arrays, Pointers, Structures, Unions and User Defined Variables, Input, Output and Disk Files, The C Preprocessor and Comments, Linking, Libraries and Header Files, I/O Functions, String and Character Functions, Mathematical Functions, Time, Date and Other System Related Functions, Dynamic Allocation, Screen and Graphics Functions, Miscellaneous Functions, Searching and Sorting, Queues, Stacks, Linked Lists and Trees, Sparse Arrays, Expression Parsing and Evaluation, AI-Based Problem Solving, Using System Resources, Graphics, Interfacing to Assembly Language Routines, Software Engineering Using C, Efficiency, Porting and Debugging, C++, Differences Between Unix C and ANSI-standard C. There is a lot in there that can be essential at 2 am one night, halfway through an urgent project.

The book is clearly written, logical and as easy to follow and understand as any textbook on C could ever hope to be, and is specifically written around Turbo C.

In a separate review I have covered the Norton Guides, a pop up database system with databases for several dialects of a number of programming languages. The C databases rate as essential for all serious C programmers, and I have come to rely on them at least as often as I do any manual or textbook.

Availability

In Sydney I haunt three bookshops for computer and other technical books: The Co-op Bookshop at 80 Bay Street, Ultimo, NSW, with branches at most colleges and universities in NSW, Dymocks at 424 George Street, Sydney and Hotline Books at 693 George Street, Sydney. All have extensive sections for computer books, and similar shops are certain to exist in other major towns and cities. □

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JOHN HEPWORTH

IBM UNDERGROUND

Most users of Public Domain software, including Shareware and User Supported Software, have come to rely on various programs to create .ARC files and extract the component files from .ARC files. Such programs are, for me, quite essential as much software in the Public Domain is distributed as .ARC files, with several executable and other files being individually compressed and then combined into one .ARC file for distribution.

In previous columns I have mentioned the products of System Enhancement Associates (ARC and similar products) and Phil Katz (PKARC and similar products), and some utility programs from others designed to work with files created with products from either or both of these. System Enhancement Associates devised the ARC concept and defined a group of compression methods, while Phil Katz added speed and devised one additional compression method called squashing.

Every user of ARC and PKARC has a wish list of little features they would like to see added to the main programs or utilities to make working with .ARC files more easy. Two that I have long wanted were a utility to browse through .ARC files, select a component file and then scroll through that file. Another I needed was one to merge two or more .ARC files. The ones I found and use are NARC14.ARC and MARC.ARC, which are a menu driven ARCing program with file browse capabilities, and a utility to merge .ARC files respectively. NARC14 can read and process .ARC files with 'squashed' components, while MARC can only process files which fully comply with the original .ARC standard of System Enhancement Associates.

NARC

The latest version of NARC is 1.4, and is distributed as NARC14.ARC, containing eight files. When started, it reads the current directory and searches for any files with an .ARC extension. If none are found, the user is prompted to change the drive and/or directory, otherwise a list of the available .ARC files is displayed. Placing the cursor over the name of an .ARC file and pressing Enter causes NARC to read through the .ARC file, determine which files are in it, and list. A typical list (in this case for NARC14.ARC itself) is shown in Figure 1.

At the top of the screen is shown the version of NARC, and the drive, directory and file name of the .ARC file being processed. Beneath it is a list of the component files found within the .ARC file, with their size in bytes, the amount of disk space they will take (not the same as a file must use whole clusters and always takes a little more space than its nominal length), the compression method, its size within the .ARC file, the amount by which the file was compressed, its original date and time and the CRC, a Cyclic Redundancy Check calculation of the file contents which allows the integrity of the .ARC file to be confirmed.

At the bottom of the screen are six options. Three of them (ARC-wind, DRV-wind and SUB-wind) merely pop up windows which allow the user to change the .ARC file, the drive or the subdirectory. The other three options are Extract, View and Print.

Extract removes either the single file under the cursor, or several tagged files from the .ARC file, expands them and writes them to the disk. View allows the user to browse through a file without having to extract it to disk, and can scroll up and down through the file. Print allows the user to print the file under the cursor, with control of format and pitch; 10, 12 or 17 characters per inch can be selected, as can formatted output and optional stripping of hi-bit characters or control characters.

NARC supports all the compression methods of ARC, plus the squashing method added by Phil Katz in the PKARC series. It is about as fast as ARC (which means quite a bit slower that PKARC) but is invaluable for users wishing to browse through an .ARC file. NARC does not create .ARC files — it is simply a file extractor and reader, but at that task it is invaluable. I have only one gripe about NARC. When each menu is first displayed, NARC issues a sort of siren beep, a short tone which starts on one note and slides over about an octave. It is quite unnecessary, and worse, I have yet to find a way to turn it off!

NARC14.ARC is a product of Infinity Design Concepts of 1052 Parkway Drive, Louisville, Kentucky 40217 USA. Registration costs vary, with the latest version on disk with the manual on disk being $US20, the printed manual being $US15 and the site license for business users being $US50. Registered users can obtain update disks for $5.

MARC

At times you may have two .ARC files and would like to take one or more files from one .ARC file and add them to the other .ARC file. You could extract the relevant

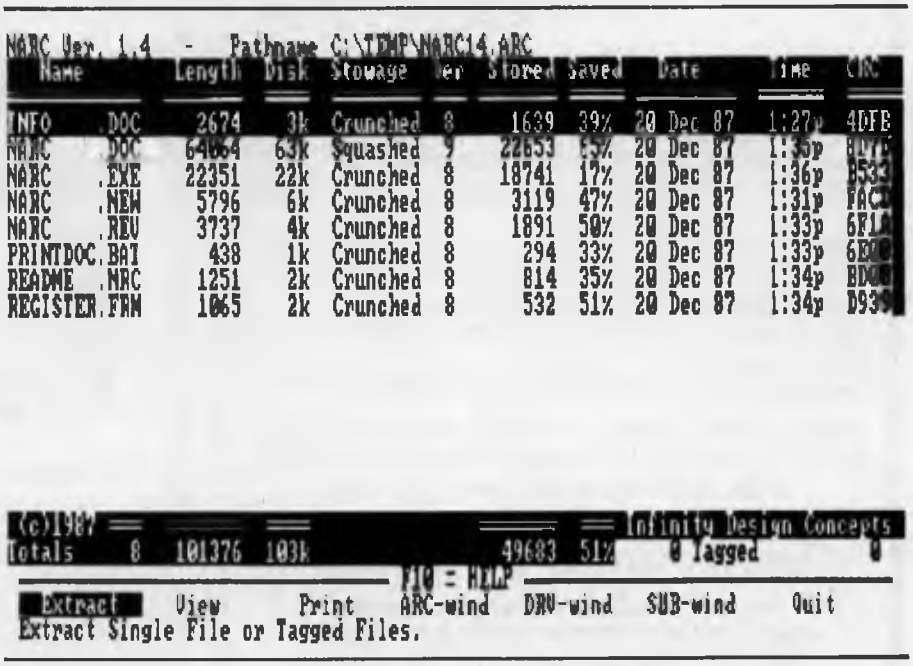

Figure 1. A typical list from NARC14.ARC.

files from one .ARC file and then add them to the other. This is a tedious process, prone to error and requiring free disk space enough to hold the expanded files after they have been removed from one .ARC file and before they are added to the other. MARC is the solution. It is a simple program which takes one or more files from one .ARC file and adds them to another .ARC file. As an example, the command –

```
A> MARC TARGET SOURCE filename
```

would copy the files specified in 'filename' from the SOURCE .ARC file and add them to the .ARC file named TARGET. When specifying the files to be transferred, MARC allows the use of the usual wildcards, though the .ARC files must be specified precisely. MARC has no other functions or fancy menus, and is merely driven from the DOS prompt. It is a useful addition to your armoury of ARC utilities. Its main limitation is that it does not support the squashing method of file compression added by Phil Katz.

MARC is a product of System Enhancement Associates, 21 New Street, Wayne, New Jersey 07470 USA. It is true Public Domain, and can be distributed freely to private users without any mandatory registration fee being requested provided that no fee is charged for such copying and distribution, and it is distributed *only* in its original, unmodified state. Commercial and governmental organisations must pay a license fee of $US35.

PC MACPAINT

With the Macintosh and MacPaint, users of that system have been creating interesting line and continuous tone graphics, particularly if a scanner is used. Now it is possible to read the image files created with MacPaint on a PC. Four separate Public Domain packages are now doing the rounds for CGA, Hercules, EGA and VGA. READMAC will display MacPaint images on a CGA screen and HERCMAC on a Hercules. EGAMAC and VGAMAC are said to do the same for EGA and VGA. I can attest that READMAC and HERCMAC really do a great job, though they scroll rather slowly on a 4.77 MHz PC. If SIMCGA is active on your Hercules equipped PC, READMAC will also display images on the Hercules. Without EGA or VGA on my system, I haven't tested VGAMAC or EGAMAC, but they may be worth a try if you are lucky enough to have EGA or VGA.

My only reservation relates more to the images being distributed on the bulletin boards, rather than to the programs themselves. Many are quite funny, or very artistic, but far too many seem to be scanned pages from magazines like *Penthouse*, and for anyone except males under 16 they quickly become tedious.

Availability

NARC14, MARC, READMAC, HERCMAC, VGAMAC and EGAMAC are all available on the *Your Computer* Bulletin Board. Where a registration donation is requested you should, if you continue to use the product after a reasonable evaluation period, make sure you send off the suggested amount. It is only if we all make a financial contribution to the Shareware authors that we have any chance of keeping the supply of Public Domain and Shareware software available. □

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GREGG FAULKNER

YOUR AMIGA

A few months ago I reviewed a communications package called Diga! At that time I promised to provide an introduction to telecomputing in a future article. Well, here it is. Those of you who are already running riot on the bulletin boards of the country can skip the next 10 or so paragraphs; beginners read on.

There is nothing particularly new about the concept of telecomputing. For many years, large mainframe computers have been connected by leased telephone lines to widely scattered online terminals, such as those in banks, department stores and so on. What is new is the decrease in price of the required hardware, making it possible now for *anyone* to get in on the act.

Modems have dropped in price greatly over the past couple of years. A 1200 baud modem can now be obtained for under $500 and I would recommend 1200 baud as the minimum for efficient home use. By the way, 1200 baud means that the modem can translate approximately 150 characters per second into tone bursts and transmit them down the telephone line. Generally, the modem is simply connected to your existing phone socket by using a special double adapter to allow the phone and the modem to be simultaneously connected. It is not necessary to have both connected, but it saves having to continually change plugs.

The third requirement is a communications program to run on your computer. Diga! is my favourite of the commercial programs. There are also several others, such as Starterm, A-term and more, available both commercially and in the Public Domain. These 'comms' programs, as they are generically called, perform the job of providing the user with an easy interface to the communication process. A good comms program makes it very easy for the user to set up things like terminal emulation, data transfer protocol, logon procedures and so on, so much so that after a short time it becomes just about second nature.

If Tyrannical Telecom has its way, the fourth requirement will be a fat bank account. At present a comms call to the local bulletin board only costs a local call fee, but wait until the bureaucrats finish their games. Using interstate bulletin boards is already a game only suitable for the very wealthy or those with the know-how to shift the charges onto other subscribers bills (and you'd better believe that can happen!).

The last element of the jigsaw is the bulletin board. This is a special program running on a microcomputer which is attached full-time to a modem and phone line. On receipt of a call the modem automatically answers and the program sends a startup message back to the calling modem/computer. A bulletin board program, the better ones at least, will ask the caller to identify himself (or herself, the Cook reminds me) by name and password.

If Tyrannical Telecom has its way, the fourth requirement will be a fat bank account.

Having established the identity of the caller, the bulletin board will make available a range of options to the caller. Typical options are a message database, a files database and an electronic mail facility. The caller, if he (or she) has the appropriate access/clearance can read messages, leave messages, copy files from the bulletin board (called downloading), send files for storage on the bulletin board (called uploading), or even send electronic mail to another bulletin board here or overseas.

Running a bulletin board obviously costs money. Most boards are sponsored by computer retailers or financed by user groups, and often a membership fee is asked before full access is permitted to the board; the only requirement for membership to the YC Board is a subscription to the magazine. For the (usually small) fee a whole new world is opened up to the computer hobbyist. All the Public Domain programs you've been reading about are out there on bulletin boards. So are hundreds of helpful hints, messages, games, and all sorts of other things. Boards are often inhabited by people called DAC or ZIGGY who wage endless arguments over technical trivialities. They are also inhabited by computer specialists, engineers, technicians and software experts who can solve your worst problems for you.

Alright, all you comms wizards can come back now. It's okay, I didn't give away any of our little secrets like bulletin board phone numbers or useful passwords or anything. I'll save them for a possible feature article.

It might be timely to mention that the *Your Computer* Bulletin Board is up and running, complete with the smallest collection of Amiga software you could possibly imagine. The best way for the collection to grow would probably be for some of you comms freaks out there to logon and upload some of your favourite Public Domain goodies. Then some of our less fortunate brethren, or new owners of comms facilities, or both, could download such Public Domain goodies and be greatly pleased. Telecom would be helped on its way to yet another $500 million profit, and the Earth could proceed happily in its orbit.

Celestial mechanics aside, I can only enthuse about the joys of telecomputing. It adds another dimension to the enjoyment of your computer, and can add an enormous amount of software and utilities to your collection.

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The saga continues . . .

Those of you who read in last month's column of my tribulations in getting, or rather not getting, two Amiga 2000s complete with 2 megabytes of RAM expansion, Bridgeboard and Hard Disk, will be delighted to hear that I have taken delivery of one of the two machines ordered.

The saga developed into a comedy of errors involving faulty Bridgeboards, missing hard disk controller cards, and holidaying cognoscente. Had I not had my trusty 1000 for support I'm sure my psyche could not have handled the strain. Did you cleverly pick up the fact that I have taken delivery of *one* of the two machines ordered? The second machine is still somewhere off in the never-never.

Though I hate to have to admit it, the glorious Commodore organisation could take a real marketing lesson from that blue suited mob with three initials. I've bravely resisted the temptation to phone up Tony Cuffe (the Amiga product manager with Commodore Australia) to ask him if he knew who he was inconveniencing, mainly because I didn't want to hear him say 'Gregg who?'.

After those friendly brickbats I really must hasten to add that the 2000 I have received is absolutely sensational. Until you have used an Amiga with 3 Mbyte of RAM you really can't appreciate just how good the multi-tasking operating system is. The hard disk speeds up access to software and you can just go on opening window after window without a care about memory.

The 2000 keyboard is nice to use, with a different feel to the 1000. The keys seem slightly better spaced and the spring rate is different. The 1084 monitor has an earplug socket which could save the life of the odd games fanatic who keeps the family awake with screams and explosions.

I'm currently running Word Perfect while a copy of DirUtil III is printing the Diga! buffer I saved last night, and Lotus 1-2-3 is running on the IBM window — all at the same time. Now all I need is a multi-tasking brain.

I've just received a copy of the AC/Basic compiler which allows ordinary Amiga-Basic programs to be translated into machine language executable files. The machine language files run from two to fifty or more times the speed of ordinary (interpreted) Basic, and they can be run from an icon without loading Basic at all.

Next month I'll have a full review of AC/Basic and an introduction to the world of compiled programs for you. Cheers for now. □

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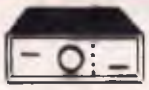

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A simple way of monitoring RS232 interface lead activity. Interface powered, pocket size for circuit testing, monitoring and patching. 10 signal powered LED's and 2 spares. 24 switches enables you to break out circuits or reconfigure and patch any or all the 24 active positions

SPECIFICATIONS:
Connectors: DB25 plug on 80mm ribbon cable and DB25 socket
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Enclosure: Black, high impact plastic
Dimensions: 85 x 95 x 30mm

X15700 ..... **$94.95**

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3½" DISK DRIVE

- 1 M/Byte unformatted, (640K formatted),
- Double sided, double density,
- Access Time 3m/sec

Cat **$255**

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  1.2 M/Byte to 720K formatted
- Double sided, double density,
- AT compatible

Cat. C11906 ..... **$269**

8" SLIMLINE

- Double sided, double density,
- 1.6 M/Byte unformatted.

Cat. C11908 ..... **$785**

20 M/BYTE HARD DISK

Tandon drive with controller card IBM* compatible Warranty
Cat X20010 **ONLY $595**

40 M/BYTE HARD DISK

Seagate drive, IBM* compatible. 12 month warranty.
Cat X20020 **ONLY $795**

80 M/BYTE HARD DISK

Seagate drive, IBM* compatible 12 month warranty.
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SCHMIDT 123AT MULTI STANDARD MODEM

- V21, V22, V23 Multi standard modem (300/300, 1200/1200, 1200/75)
- Auto dial "AT" command set (Hayes* compatible)
- Auto answer/auto disconnect
- Auto answerback (Similar to Telex)
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- Dial-up or leased line operation
- Pulse or Tone Dialing
- Automatic speed ranging
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- Baud-rate converter with 48 character buffer (V23)
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- Telecom Authorised (C87/37/65)

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CENTRONICS GENDER CHANGERS

- Female to Female
- Saves modifying or replacing non-mating Centronics cables.
- All 36 pins wired straight through

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Normally $33.95.
Only $24.95

RS232 GENDER CHANGERS

- Saves modifying or replacing non-mating RS232 cables
- All 25 pins wired straight through

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Cat X15652 **Female to Female**

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3½" DISK STORAGE (DD80-L)

- Holds up to 80 x 3½" diskettes
- Smoked plastic hinged lid
- Lockable (2 keys supplied)
- High impact plastic base
- Contemporary design

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- All 15 pins wired straight through

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X15646: Male to Female
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3½" EXTERNAL DRIVE

- 720K formatted capacity
- 37 way D type connector fits directly onto drive controller card
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- Requires DOS 3.2 or greater
- Size 266(D) x 104(W) x 75(H)mm

..... **only $395**

DB9 GENDER CHANGERS

- Saves modifying or replacing non mating DB9 connections
- All 9 pins straight through

X15640: Male to male
X15641: Male to Female
X15642: Female to Female
..... **only $14.95**

CANON A-50 PRINTER

- Serial Impact Dot Matrix
- 180 C.P.S.
- Near Letter Quality Mode
- 1.4K Buffer

Cat C20045 **$595**

PRINTER STANDS

- Restores order to your work area
- Conveniently stacks paper printout in document tray automatically
- Made of black plastic coated steel
- Suitable for most printers
- Excellent value at these prices!

C21054 (80 column) **$26.95**
C21056 (132 column) **$36.95**

PANASONIC KX-P1081 DOT MATRIX PRINTER

- 120 C.P.S.
- Pica or Elite character set
- Print Modes: NLQ, Dot Graphics, Proportional Font, Draft.
- Proportional Printing
- Reliable and Compact
- Proportional Printing
- Logic Seeking
- 1K Printer Buffer

Cat C20035 **only $595**

DELUXE PRINTER STAND

- Restores order to your work area without occupying extra space
- Feeds and refolds paper under the printer automatically
- Adjustable paper deflectors ensure smooth flow of paper
- Made of moulded plastic
- Suitable for most printers

C21058 (80 column) **$69.95**

CPF CONTINUOUS POWER FILTER SPIKE ARRESTOR

The Fortron CPF Filtered Electronic Spike Protector provides a protective electronic barrier for microcomputers, printers, telephone systems and modems electronic typewriters audio and stereo systems and other sensitive electronic equipment

The CPF provides protection from dangerous electrical spikes that can cause anything from obvious damage (like immediate equipment failure) to less obvious harm that can drastically shorten a system's life

CPF's superior circuitry design and semi conductor technology responds instantly to any potentially damaging over-voltage, ensuring safe trouble free operation

Additionally, CPF's filtering capability helps eliminate troublesome and annoying interference, general hash created by small motors, fluorescent lamps, and the like that threaten the performance and shorten equipment life of unprotected electronic components

SPECIFICATIONS:
Electrical rating: 220-260 volts (AC) 50Hz 10 Amp
Spike/RFI Protection: 4,500 amps for 20m/second pulses
Maximum clamping voltage: 275V differential mode

Cat.X10088 ..... **$69.95**

COPY HOLDER (YU-H33)

- Copy area 9½" x 11"
- Sliding line guide
- Flat metal base

C21060 ..... **$39.95**

RS232 WIRING ADAPTOR BOX

- Male to female
- 25 Detachable plug on leads
- 2 mini jumpers
- Ideal for experimenting or temporary connections

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

JOYSTICK FOR IBM

Features Selectable "Spring centering" or "free floating" Electrical trim adjustments on both axis 360 degree cursor control

Cat C14205 **$39.95**

THE BUTTON SPIKE PROTECTOR

Surges and spikes are caused not only by lightning strikes and load switching but also by other equipment being switched on and off, such as fluorescent lights, electric motors, fridge freezers, air conditioners, etc

For effective protection such spikes must be stopped before they reach your equipment. Simply plug The Button into an outlet and it will protect all equipment plugged into adjacent outlets on the same branch circuit. The Button employs unique metal oxide varister technology and will dissipate 150 joules of electrical energy (nearly twice that of comparable surge arresters!)

SPECIFICATIONS:
Voltage 240V Nominal
Total Energy Rating: 150 joules
Response Time 10ns
Protection Level 350V peak

..... **$34.95**

COPY HOLDER (YU-H32)

- Adjustable arms allows easy positioning
- Copy area 9½" x 11"
- Sliding line guide
- Clamp mounting

C21062 ..... **$39.95**

APPLE* COMPATIBLE SLIMLINE DISK DRIVE

Compatible with Apple 2+
Cat X19901 Normally $225
SPECIAL $179

APPLE* IIC COMPATIBLE DISK DRIVE

Including cable **only $199**

RS232 MINI TESTER

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

T.D. Transmit Data
D.S.R. Data Set Ready
R.D. Receive Data
C.D. Carrier Detect
R.T.S. Request to Send
D.T.R. Data Terminal Ready
C.T.S. Clear to Send

Cat. X15656 **Normally $39.95**
SPECIAL, ONLY $32.95

GET MORE FOR YOUR DOLLAR WITH ROD IRVING ELECTRONICS!

CHEAP DISKS

SAMSUNG 12" FLAT SCREEN COMPOSITE MONITOR ONLY $149

FEATURES....
- Flat, high contrast, non-glare screen
- High resolution, 80 or 40 character display
- Tilt/swivel base
- Compatible with Apple* and IBM* colour composite signal

SPECIFICATIONS....
Picture tube: 12" diagonal and 90° deflection
Phosphor: Available in Green or Amber
Video input signal: Composite Signal
Polarity: Negative Sync
Level: 0·5-2·0Vp-p
Impedance: 75ohm
Scanning frequency:
Horizontal: 15.734 KHz + 0·1%
Vertical: 50-60Hz
Video bandwidth: 20MHz
Active display area: 216(H) x 160(V)mm
Display character: 80 character x 24 rows
Input terminal: RCA Phono Jack
Controls:
Outside: Power Switch, Contrast, Brightness, H-Shift, V-Size
Inside: H-Width, H/V hold, H/V linearity, Focus
Power supply: 110/120V 60Hz 220/240V 50Hz
Dimensions: 310(W) x 307(H) x 300(L)mm
Weight: 8·1 Kg
Shipping weight: 9·6 Kg

Cat No	Description	Price
X14510	GREEN	only $149
X14512	AMBER	only $149

RITRON 2 MONITORS

Stylish monitors available in green or amber displays and featuring swivel base that tilts forward and back 30 degrees and swivels right to left 60 degrees!

SPECIFICATIONS:
CRT DISPLAY SIZE: 12 inches non-glare 90 degree deflection.
INPUT SIGNAL: 1 0 - 2 5V p-p composite video signal.
INPUT INPEDANCE: Normal 75 ohm, high approx 50K ohm.
INPUT TERMINALS: RCA phone jack.
RISE AND FALL TIME: Less than 25 us
VIDEO BANDWIDTH: 20MHz
Corner; 800 lines
Geometric distortion; 2% or less
Linearity; less than 2%
CONTROLS: Front; Power On/Off, brightness, contrast
Rear; Vertical hold, Horizontal hold, Vertical line, Vertical size

Green Cat X14506 **Normally $235**
Amber Cat X14508 **Normally $239**
NOW ONLY $169

THOMSON EGA MONITOR

Top quality high resolution EGA monitors with a space-age design

SPECIFICATIONS:
CRT: 14 inch (360mm) diagonal, 90 degree deflection
Display Size: 245(H) x 180(V)mm
Phosphor: P22, non glare, tinted screen
Dot Pitch: 0·31mm
Video Bandwidth: 18 MHz
Resolution: 15·75KHz - 640 x 200
21·85KHz 640 x 350
Input Signals:
1 RGBI - positive, H(+), V(+)
2 RrGgBbI - positive, H(+), V(−)
Input Impedance: TTL Level (330 ohms)
Dual Scanning Frequency:
Horizontal 15·75 KHz or 21·85 KHz +−10Hz
Vertical 50 - 60 Hz
Connector: 9 pin, D-type
Size: 312(H) x 363(L) x 380(W)mm
Weight: 10·8 Kg (Net)

X14525 ..... **$895**

VERBATIM DISK SPECIALS!

All prices 10 disk boxes!

Description	1-9 boxes	10+ boxes
3½" 1S/2D	$44.95	$42.95
3½" 2S/2D	$46.95	$43.95
5¼" 1S/2D	$22.00	$21.00
5¼" 2S/2D	$26.00	$24.00
5¼" 2S/4D	$75.00	$70.00
5¼" 2S/HD	$42.95	$41.00

5¼" DISK STORAGE (DD50-L)

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

Features...
- 50 x 5¼" disk capacity
- Smoked plastic hinged lid
- Lockable (2 keys supplied)
- Contemporary Design

Cat C16025 **only $14.95**

5¼" DISK STORAGE (DD100-L)

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

Features...
- 100 x 5¼" disk capacity
- Smoked plastic hinged lid
- Lockable (2 keys supplied)
- High impact ABS plastic base
- Contemporary design

C16020 **only $17.95**

JUMBO 5¼" DISK STORAGE (DD120-L)

If you have lots of disks you'll appreciate the extra capacity of this disk storage unit when it comes to locating a particular disk

Features...
- 120 x 5¼" disk capacity
- Smoked plastic hinged lid
- Lockable (2 keys supplied)
- High impact plastic base

C16028 **only $22.95**

MONITORS $129

SAMSUNG TTL 12" MONITOR

- High contrast, non-glare screen
- Excellent value for money!

SPECIFICATIONS:
Picture tube: 12" diagonal 90° deflection
Mode: TTL
TTL Input signal:
Polarity: TTL Positive
Level: 4V p-p +−1·5V
Impedance: 75ohm
Video bandwidth: 16MHz (−3dB)
Scanning frequency:
Horizontal: 18 432 +−0·1KHz
Vertical: 50HZ +−0·5%
Active display area: 216(H) x 160(V)mm
Display characters: 80 characters x 25 lines
Input connector: 9 pin connector
Controls:
Front; Power ON/OFF, Contrast
Rear; V-Hold, V-Size, Brightness
Internal; Vertical Linearity, Horizontal Linearity, Horizontal Width, Focus
Power supply: 110/120V 60Hz, 220/240V 50 Hz
Dimensions: 308(W) x 297(H) x 307(L)mm
Weight: 7·3Kg
Shipping weight: 8·3Kg

Cat No	Description	Price
X14500	(GREEN)	$189
X14502	(AMBER)	$189

HEAD CLEANER DISKS

It only takes a minute amount of dust, dirt or magnetic oxide particles on your drive heads to cause problems: errors, downtime or an expensive service call. Regular use of a head cleaner will keep your drive free of trouble causing dirt and help keep your system up and running. These disk cleaners are simple to use, and include cleaning solution and instructions.

CAT.No.	SIZE	PRICE
C12560	3½"	$6.95
C12555	5¼"	$6.95

SAMSUNG 12" 20MHz COMPOSITE MONITOR ONLY $129

FEATURES....
- High contrast, non-glare screen
- High resolution, 80 or 40 character display

SPECIFICATIONS..
Picture tube: 12" diagonal and 90° deflection
Phosphor: Available in Green (P39) or Amber
Video input signal: Composite Signal
Polarity: Negative Sync
Level: 0·5V-2·0Vp-p
Scanning frequency:
Horizontal: 15.734 KHz + −0·1%
Vertical: 60Hz
Video bandwidth: 20MHz
Active display area: 216(H) x 160(V)mm
Display character: 80 characters x 25 rows
Input terminal: RCA Phono Jack
Controls:
Outside: Power Switch, Contrast, Brightness, H-Shift, V-Size
Inside: H-Width, H/V hold, H/V linearity, Focus
Power supply: 110/120V 60Hz, 220/240V 50Hz
Dimensions: 308(W) x 307(H) x 297(L)mm
Weight: 7·3 Kg
Shipping weight: 8·3 Kg

Cat.No	Description	Price
X14514	(GREEN)	$129
X14516	(AMBER)	$129

10 OR MORE ONLY $119ea

SAKATA 13" RGB COLOUR MONITOR

High quality IBM* compatible monitors, great with VCR's too!

SPECIFICATIONS:
CRT: 13", 90° deflection colour
Input Signal:
Video Signal: Separate video signal
Video: Positive
Sync. Positive
Input Level: TTL Level
Scanning Frequency:
Horizontal: 15·7KHz
Vertical: 60Hz
Display Size: 245(H) x 182(V)mm
Resolution:
Horizontal: 640 dots
Vertical: 200 lines
Size: 343(H) x 362(W) x 421(D)mm
Weight: 11·6kg

Cat X14530 ..... **$695**

SAMSUNG 12" TTL/COMPOSITE MONITOR ONLY $179

FEATURES....
- At last a monitor with both TTL and Composite modes!
- High contrast, non-glare screen
- High resolution, 80 or 40 character display
- Swivel/Tilt base

SPECIFICATIONS....
Picture tube: 12" diagonal and 90° deflection
Phosphor: Green (P42)
Video input signal: Composite/TTL Switchable
Polarity: Negative/Positive
Level: 0·5 - 2·0Vp-p/4·0 + 1·5Vp-p
Impedance: 75ohm, more than 6·8K ohm
Scanning frequency:
Horizontal: 15·75 KHz +−0·1%/18·432KHz +−0·1%
Vertical: 47-63Hz
Video bandwidth: 20MHz
Active display area: Composite 206(H) x 160(V)mm TTL: 216(H) x 160(V)mm
Display character: 80 characters x 25 rows
Input terminal: Phono Pin Jack, 9 pin D-Sub Connector
Controls:
Outside: Power Switch, Contrast, Brightness, Signal Select, V-Hold, V-Size
Inside: H-Width, H/V linearity, Focus, H/V-Shift
Power supply: 110/120V 60Hz, 220/240V 50Hz
Dimensions: 308(W) x 297(H) x 307(L)mm
Weight: 7·3 Kg
Shipping weight: 8·3 Kg

Cat.No	Description	Price
X14509	(GREEN)	$179

ANTI GLARE SCREEN

Half the price of other brands!!
Relieve eye strain and headaches and increase productivity with these Anti Glare Screens. Suitable for 12" monochrome

Cat X99995 **$24.95**

"NO BRAND" DISKS!!

Now you can buy absolute top quality disks that are also the cheapest in Australia! They even come with a 5 year guarantee, which indicates the quality of these disks. So why pay 2-3 times the price for the same quality?

Packs of 10, D/S D/D without boxes, or brand name, just their white paper jacket, and index labels. (5¼" disks includes write protects).

5¼" D/S "NO BRAND" DISKS FROM $0.80 EACH!!

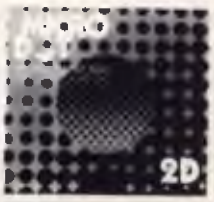
10+ DISKS	100+ DISKS	1,000+ DISKS
$9·00ea	$8·50ea	$8·00ea

(ALL PRICES PER 10 DISKS. TAX EXEMPT PRICES LESS $1)

3½" D/S D/D "NO BRAND" DISKS!

10+ DISKS	100+ DISKS	1,000+ DISKS
$27	$26	$24

(ALL PRICES PER 10 DISKS. TAX EXEMPT PRICES LESS $2)



MICRODOT DISKS!

DESCRIPTION	1-9 BOXES	10+ BOXES
3½" 2S/2D	$29.95	$28.95
5¼" 1S/2D	$12.95	$11.95
5¼" 2S/2D	$13.95	$12.95

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YOUR ATARI

The Adventures of Sinbad is an educational 'classroom tested' program from Unicorn Software. The program features three stories from the Sinbad legend, each followed by a question and answer session. Apart from these stories, there is a game which requires the matching of pairs of pictures, and finally a mini word processor which allows the user to write his/her own stories or set up his/her own question and answer sessions.

Each of the stories is illustrated with well executed pictures which have a Neochrome look about them. A couple of frames feature some rudimentary animation. The bottom section of the screen is reserved for the text, which is in large clear characters.

If the student has trouble with any of the words in a story, he/she can call up a glossary for brief explanations. The questions comprise a comprehension test based on each story and are of the multiple choice variety.

The do-it-yourself questions must be entered according to a rigid specification — two lines for the question and three answers, with the correct answer listed first and two wrong answers for the multiple choice.

The question file is a continuous file that is twenty questions long. There is no character to mark the end of one question and the beginning of the next — the program simply counts lines. This can result in the questions and answers becoming scrambled if the wrong number of lines is devoted to any particular question.

The wordprocessor is pretty basic, being not much more than a means of typing strings (each one line long) into a text file. There is no word wrap, and it is not possible to insert characters into a line — you have to backspace all the way back, then retype the balance of the line. This is really the weakest part of the whole package, which is a shame, because it is the one part which could guarantee the continuing interest of youngsters.

I had the distinct impression while using The Adventures of Sinbad that it had been written in a fairly basic dialect of Basic. This is not in itself a bad thing, but perhaps has led to the wordprocessor and question writing modules not being quite as polished as they could be.

In summary, The Adventures of Sinbad is an excellent program for upper primary students, teaching reading and comprehension skills, allowing the student to write his/her own stories on the wordprocessor module, and allowing the teacher to set his/her own questions.

The Adventures of Sinbad is produced by Unicorn Software. The review copy was from Computer Oasis in Perth, and the recommended retail price is $89.99.

Winnie the Pooh

Winnie the Pooh in the Hundred Acre Wood (hereafter called Winnie) is another kids' program from the Disney studios, produced by Sierra On-Line. The program bears a family resemblance to Donald Duck's Playground, which is from the same stable, although unlike Donald, Winnie is not animated.

The basic concept of the game is that the blustery wind has blown all night long, scattering the goods and chattels of the inhabitants all over the Hundred Acre Wood. The object of the game is to collect all the missing goods and return them to their rightful owners.

Each scene is rendered in full colour (low resolution, 16 colours) and has a small text area at the bottom of the screen where the various options are presented. These usually consist of a series such as that shown in Figure 1.

Only one object can be carried at a time, and you can't drop an object if there is already one in the frame. You must go to the next frame, drop your object, go back, get the other object, take it where it has to go, go back and pick up your first object, then take it to the frame you started. Clear?

A map of the wood is provided to help you navigate, but there are a couple of hazards — firstly Tigger will bounce you to a random destination and cause you to drop whatever you're carrying, the mysterious mist will get you lost, and the blustery wind can come up and rescatter the lost objects.

Once you have found all 10 objects and returned them to their owners, Christopher Robin will throw a Hero Party for you, complete with much singing of the Winnie the Pooh Song.

This game has an addictive quality for the four to seven year age group, while older kids (and parents) will find that the novelty wears off after a couple of games. Unlike Donald Duck, there is no manual skill required to play Winnie, as the entire game play is carried out by highlighting options with the mouse.

In addition to the simple task of finding and retrieving the lost property, the program has a certain amount of entertainment value in the gentle humour sprinkled throughout, and the slightly righteous attitude of some of the characters. For example, Kanga won't let you enter her house with dirty feet, and you can't play with Christopher Robin's toys without asking first.

Winnie the Pooh in the Hundred Acre Wood is manufactured by Disney Studios and Sierra On-Line, and is distributed in Australia by Ozi Soft. The review copy was from Computer Oasis, at a retail price of $49.00. Highly recommended.

New hardware

Some little while ago I mentioned the 5¼ inch disk drive which is manufactured by Tech Soft and bundled with its IBM emulator PC-Ditto. The drive can act as either an MS-Dos 360 kilobyte floppy or a 720 Kbyte in Atari mode.

Tech Soft has now released preliminary details of its new Light Speed hard disk for the Atari ST. This is a Miniscribe 5¼ inch 10 megabyte hard drive in a casing of similar dimensions to the Atari SH-205 hard disk. The choice of casing is significant — it fits neatly under most monitors, and has an identical footprint to the Mega ST, allowing it to sit on top of the Mega, under the monitor.

There is room in the casing for a second 5¼ inch device — either a second hard

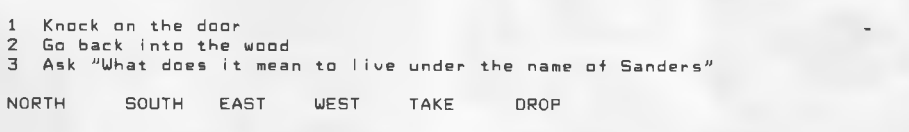

Figure 1. In Winnie the Pooh in the Hundred Acre Wood, each scene is rendered in full colour and has a small text area at the bottom of the screen where the various options are presented.

drive or floppy (including the MS-DOS floppy mentioned above). It will probably also be possible to mount your existing 3½ inch floppy drive (such as the Atari SF-354) in the box as the second device.

The drive will have both the Atari DMA interface and a SCSI port. Although the SCSI is primarily intended as a tape backup port, Tech Soft is also examining the possibility of running the thing off a fruit machine. (You know, those over-priced little black and white computers with illusions of grandeur and a Scottish name).

The Light Speed hard drive will be supplied with auto booting and formatting software, and the retail price is expected to be $799, depending on currency fluctuations. It should be available by the time you read this.

A further piece of interesting hardware from Tech Soft is the Mouse Trap. This is a smoked acrylic bracket which attaches to the side of a monitor or computer desk and provides a secure resting place for your mouse. The Mouse Trap attaches using double-sided tape, and the mouse simply snuggles down inside. The device has been tested and declared compatible with the Atari, Microsoft, Amiga and Macintosh mice. Cost is a very reasonable $9.99.

Polymarkers

I promised to talk about polymarkers, and said that they are almost as useful as a felt-tipped pen. Well, you can judge for yourselves after reading all about polymarkers and polylines.

Polylines are an important concept in the design of object-oriented drafting programs, such as First Cadd. In these programs, a line is a complete entity, and can be moved or erased as a whole, whereas a bit-mapped graphics program like Neochrome or Degas sees a line as simply a collection of pixels, any of which can be changed.

Not many of us end up writing with First Cadd, but the polylines and polymarkers can be very useful in more mundane applications such as graphing data for statistical purposes or business applications. Combined with the pie and circle routines published in December 1987, these routines give you the basis for a very powerful two dimensional business graphics program.

The Virtual Device Interface (VDI) of the ST gives us the ability to define and plot polylines (such as line entities) and polymarkers. Polylines may vary in thickness and line style, while the markers may be of various configurations and sizes. Both lines and markers can be of any currently selected colour.

As usual, ST Basic allows us to access these facilities by a series of pokes to the various control arrays and a call to VDISYS.

As an aside — I have been asked why I persist in producing these functions in ST Basic, when there are much better languages available with the facilities built in. I guess the answer is twofold. Firstly, everyone who buys an ST gets ST Basic, and may not have the need, desire or cash to move on to Pascal, Modula-2 or C (all of which have these functions builtin). Secondly, I guess there is a latent hacker in there, who loves to see his computer do the impossible. Producing some of the effects possible through VDI and AES with ST Basic is really making a silk purse out of the old sow's ear.

Back to work . . .

Listing 1 gives a short program which calls up the various polyline and polymarker routines, as well as the routines themselves The routines from line 50900 onwards can be merged with the subroutine library published in *Your Computer* in August and December 1987. You may wish to rearrange the subroutines into a more logical sequence, although the execution of the program is not affected by the sequence of the subroutines in the listing.

Subroutine Polymarker is the code to place a marker at co-ordinates x1,y1. It is possible to place more than one polymarker by assigning the variable –

```
"number"
```

to the total number of polymarkers, then poking the co-ordinates (x2,y2), (x3,y3) and so on in the ptsin array at ptsin+4 and following. This is analogous to the general method used in the subroutine Polyline2 which is discussed below.

Polymtype sets the type of polymarker. The variable –

```
"type"
```

can take a value from 1 to 6, giving the following polymarker types –

1. Dot
2. Cross
3. Asterisk
4. Square
5. X
6. Diamond

This ability to set the form of the polymarker makes them ideal for use in scatter diagram graphics where up to six different variables can each be represented by a unique symbol.

Polymheight simply sets the size of the polymarker. Experiment with numbers in the range 10 to 200 to see which best suits your application and the screen resolution you are using

Polymcol sets the colour of the polymarker, and uses the normal ST Basic colour convention (0 = white, 1 = black, 2 = red, and so on). Similarly, Polycol sets the polyline colour.

Polystyle sets the line style for the polyline, as either solid, dotted, dashed, or some combination. There is, theoretically, a means of producing user defined lines, but I haven't been able to work out how — any suggestions?

Polyw sets the linewidth to the value specified in the variable –

```
"lwidth"
```

Now we come to the big guns. Polyline and Polyline2 actually plot the polyline on the screen. In the first example shown, the Polyline routine is called from lines 130 and 270. The subroutine is set up for a two-legged polyline joining three points. This configuration is called from line 130, where numpts = 3 and (x1,y1), (x2,y2) and (x3,y3) are all defined. However, if more than three points were involved, it would involve further code to assign the values of (x3,y3) to (x1,y1), get new values for the other points, and recall the subroutine.

This is obviously an inefficient means of operation, so a second subroutine Polyline2 will keep on looping through for the next loop between lines 52000 and 52040 until the value of numpts is reached. In this case the co-ordinate data is read in from a data statement at line 370, although any one of several methods could have been used to get the data in.

It is important to ensure that you have enough data pairs to fully define the number of points specified in –

```
"------"
```

As with all these VDI routines, the old maxim of 'garbage in = garbage out' does not apply. Rather it is 'garbage in = crash!'

Anyhow, have fun with these subroutines. If you have written or come across any interesting code or programming tips, please let me know so that I can pass on the good word.

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Listing 1. A short program which calls up the various polyline and polymarker routines, as well as the routines themselves.

```
10    ' Demonstration of polymarkers and polylines.
20    ' P.D. Fisher     9 January 1988
30    '
40    fullw 2: clearw 2 : color 1,1,1,20,2
50    '
60    'Place green cross polymarker at 100,100; 50 units high
70    colindex = 3: height = 50: type = 2: x1 = 100: y1 = 100: number = 1
80    gosub POLYMCOL: gosub POLYMHT: gosub POLYMTYPE: gosub POLYMARKER
85    gosub DELAY: clearw 2
90    '
100   'Plot a red dashed line, 2 units wide from 50,50 to 200,180 to 500,150
110   style = 5: lwidth = 2: colindex = 2: numpts = 3
120   x1 = 50: y1 = 50: x2 = 100: y2 = 180: x3 = 500: y3 = 150
130   gosub POLYSTYLE: gosub POLYCOL: gosub POLYW: gosub POLYLINE
135   gosub DELAY: clearw 2
140   '
150   'various polymarkers
170   for type = 1 to 6
180   x1 = type * 50: y1 = 75
190   gosub POLYMTYPE: gosub POLYMARKER
200   next type
205   gosub DELAY: clearw 2
210   '
220   ' various polyline types
230   lwidth = 1: gosub POLYW: colindex = 1: gosub POLYCOL
240   x1 = 100: x2 = x1 + 300: numpts = 2
250   for style = 1 to 6
260   y1 = style * 25: y2 = y1
270   gosub POLYSTYLE: gosub POLYLINE
280   next style
290   gosub DELAY: clearw 2
300   '
310   ' Alternative form of polyline definition
320   numpts = 5: dim x(numpts), y(numpts)
330   for count = 1 to numpts
340   read x(count), y(count)
350   next count
360   gosub POLYLINE2
370   data 50,50,300,50,300,200,75,150,100,100
380   gosub DELAY
385   end
390   '
400   DELAY:
410   for count = 1 to 5000: next count
420   return
50900 '
50910 ' *********************************
50920 '
50930 POLYMARKER:
50940 poke contrl, 7
50950 poke contrl + 2, number
50960 poke contrl + 6, 0
50970 poke contrl + 12, 2
50980 poke ptsin, x1
50990 poke ptsin + 2, y1
51000 ' continue as necessary with total number
51010 ' stored in "number" in line 50560
51020 vdisys(0)
51030 return
51040 '
51050 ' ************************************
51060 '
51070 POLYMTYPE:
51080 poke contrl, 18
51090 poke contrl + 2, 0
51100 poke contrl + 6, 1
51110 poke contrl + 12, 2
51120 poke intin, type
51130 ' 1 = dot; 2 = cross; 3 = asterisk; 4 = square
51140 ' 5 = X; 6 = diamond
51150 vdisys(0)
51160 return
51170 '
51180 ' ************************************
51190 '
51200 POLYMHT:
51210 poke contrl, 19
51220 poke contrl + 2, 1
51230 poke contrl + 6, 0
51240 poke contrl + 12, 2
51250 poke ptsin, 0
```

```
51260 poke ptsin + 2, height
51265 vdisys(0)
51270 return
51275 '

51280 ' ***********************************
51290 '
51300 POLYSTYLE:
51310 poke contrl, 15
51320 poke contrl + 2, 0
51330 poke contrl + 6, 1
51340 poke contrl + 12, 2
51350 poke intin, style
51360 ' 1 = solid; 2 = long dash; 3 = dot
51370 ' 4 = dash dot; 5 = dash
51380 ' 6 = dash dot dot; 7 = user defined
51390 vdisys(0)
51400 return

51410 '
51420 '***********************************
51430 '
51440 POLYW:
51450 poke contrl, 16
51460 poke contrl + 2, 1
51470 poke contrl + 6,0
51480 poke contrl + 12, 2
51490 poke ptsin, lwidth
51500 poke ptsin + 2, 0
51510 vdisys(0)
51520 return
51530 '

51540 ' ***********************************
51550 '
51560 POLYCOL:
51570 poke contrl, 17
51580 poke contrl + 2, 0
51590 poke contrl + 6, 1
51600 poke contrl + 12, 2
51610 poke intin, colindex
51620 vdisys(0)
51630 return
51640 '

51650 '***********************************
51660 '
51670 POLYMCOL:
51680 poke contrl, 20
51690 poke contrl + 2, 0
51700 poke contrl + 6, 1
51710 poke contrl + 12, 2
51720 poke intin, colindex
51730 vdisys(0)
51740 return
51750 '

51760 ' ***************************************
51770 '
51780 POLYLINE:
51790 poke contrl, 6
51800 poke contrl + 2, numpts
51810 poke contrl + 6, 0
51820 poke contrl + 12, 2
51830 poke ptsin, x1
51840 poke ptsin + 2, y1
51850 poke ptsin + 4, x2
51860 poke ptsin + 6, y2
51870 poke ptsin + 8, x3
51880 poke ptsin + 10, y3
51890 vdisys(0)
51900 return

51910 '
51920 ' ************************************
51930 '
51940 POLYLINE2: ' a more general version of POLYLINE
51950 poke contrl, 6
51960 poke contrl + 2, numpts
51970 poke contrl + 6, 0
51980 poke contrl + 12, 2
51990 index = 0
52000 for n = 1 to numpts
52010 poke ptsin + index, x(n)
52020 poke ptsin + index + 2, y(n)
52030 index = index + 4
52040 next n
52050 vdisys(0)
52060 return
```


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TIM HARTNELL

YOUR AMSTRAD

This month we're going to concentrate on the graphics commands provided in Basic2 on the Amstrad PC. These commands are given very little space or explanation in the manuals, and several people have asked me how they can be used.

I thought the simplest way would be to present a number of short programs, which show the major commands in action. Once you've typed in the listings given here, run them to see what result they have, and after you've modified the listings a few times, you should have a pretty good idea of how they work.

Before you type in and run the programs, get Basic2 running, then draw down the File menu. Select 'Angles in . . . ' from that menu, then click on 'Degrees'. If you don't do this, the program will think the angles are being given in radians, and won't work.

Squares and Circles

The two basic shapes, the square and the circle, are given their own commands. The square command is BOX, which has the syntax BOX x;y,width,height,[FILL] where the bottom left hand corner of the square or box is at the co-ordinates x and y. Our first program draws a series of boxes, with a common bottom left hand corner:

```
' Box
CLS
FOR j=1 TO 45
BOX 400;400,100*j,250*j/3
NEXT j
END
```

If you change the line beginning with the word BOX to —

```
BOX 400;400,100*j,250*(RND*j)/3
```

you'll get an effect which I call 'city buildings'. You'll understand the name once you've run it.

The circle command has a simpler syntax than BOX. It is CIRCLE x;y,radius [FILL] in which the center of the circle is at the co-ordinates x and y. Here are 10 concentric circles:

```
' Circle
CLS
FOR j=1 TO 10
CIRCLE 2500;2500,200*j
NEXT j
END
```

The ellipse is very similar to the circle, except that it includes an additional parameter, the aspect, before the [FILL] as in the following program:

```
' Ellipse
CLS
FOR j=1 TO 10
ELLIPSE 2500;2500,200*j,j/10
NEXT j
END
```

Getting Hungry

The PIE command draws a slice of a pie chart, and has the syntax: PIE x;y,radius,start-angle,end-angle [FILL]. It is very effective, as this program demonstrates:

```
' Pie
CLS
FOR j=1 TO 50
PIE 10;10,200*j,20,30+j
NEXT j
END
```

The LINE command draws a series of straight lines through a list of points, and has the syntax: line x;y[,x;y . . .]. Here it is in action, producing some interesting moire patterns in the lower left hand corner of the Results-1 screen:

```
' Line One
CLS
FOR j=1 TO 30
LINE 10;10,200*j,200*j
NEXT j
END
```

A variation on this —

```
' Line Two
CLS
FOR j=1 TO 30
LINE 10;10,200*j,200*j
LINE 600;600,100*j,130*j
NEXT j
END
```

SHAPE draws a polygon with corners (you need at least three of these) at the points x;y, in the following form: SHAPE x1;y1,x2;y2,x3;y3 . . [FILL]. By the way, you've probably noticed a similar syntax within these commands. The x;y, which are joined by a semi-colon, are the 'anchor point' of the graphic, the starting point, lower corner, center of a curve or whatever, while the following parameters determine how the command will act from this designated point. Listing 1 shows SHAPE in action.

Once you've had SHAPE running, change the third line to those in Figure 1, one by one (that is, use one of the lines in each new run of the program).

Note in the last version I've changed the final semi-colon into a comma. This is an undocumented feature (translation: I discovered it simply because I typed the line in wrongly) which brings in an interesting variation on LINE, as you'll discover.

Turning Turtle

As you know, Basic2 is provided with a number of Logo-like turtle graphics commands Instead of using the BOX command, you can get all complicated and create your own, using these turtle commands:

```
' Draw a Square
CLS
POINT 0
MOVE FORWARD 1000
FORWARD 1000
RT 90
FORWARD 1000
RT 90
FORWARD 1000
RT 90
FORWARD 1000
```

POINT sets the turtle to point in the given direction (0 is the angle, meaning to the right in this case, with 90 being straight down the screen). MOVE FORWARD moves the turtle on the screen, without leaving a line. FORWARD, by contrast, leaves a trail as it goes. RT is an accepted abbreviation for RIGHT TURN.

Once you've run this, you can modify it so it reads as follows, to create pleasant mayhem with squares:

```
' Rotate Square
CLS
POINT 0
MOVE FORWARD 2500
RT 90
MOVE FORWARD 1000
FOR j=1 TO 10
FORWARD 2000
RT 90+10*j
FORWARD 2000
RT 90+10*j
FORWARD 2000
RT 90+10*j
FORWARD 2000
RT 90+10*j
FOR q=1 TO 50:NEXT q
NEXT j
```

And just as we created a square with turtle graphics, we can create a circle. Why do things the easy way?

```
' Draw Circle
CLS
POINT 0
MOVE FORWARD 2500
RT 90
MOVE FORWARD 2500
FOR j=1 TO 359
POINT j
FORWARD 10
NEXT j
```

A series of overlapping circles can be created with the following:

```
' Draw Circle
CLS
POINT 0
MOVE FORWARD 2500
RT 90
MOVE FORWARD 2500
FOR q=100 TO 2000 STEP 10
MOVE FORWARD q
FOR j=1 TO 359 STEP 10
POINT j
FORWARD 100
NEXT j
NEXT q
```

Finally, we can use a variation of the above program to draw a 'bracelet' on the screen:

```
' Bracelet
CLS
POINT 0
MOVE FORWARD 1000
RT 90
MOVE FORWARD 500
FOR q=100 TO 200 STEP 10
MOVE FORWARD q
FOR j=1 TO 359 STEP 30
POINT j
FORWARD (10+j/5)
NEXT j
NEXT q
```

This article has briefly covered the major graphics commands on the Amstrad PC running Basic2 You now have the raw ingredients with which to create graphics effects and incorporate them into your own Basic2 programs. □

```
' Shape
CLS
FOR j=1 TO 30
SHAPE 40+10*j;40+20*j,100*j;250*j/3,200*j;200*j
FOR q=1 to 500:NEXT q
NEXT j
END
```

Listing 1. SHAPE draws a polygon with corners.

```
SHAPE 40+100*j;40*j,100;250*j/3,200*j;200*j

SHAPE 40+100*j;40*j,100;250*j/3,200*j;200*j  (for this, cut the j
loop down to 20, so the second line reads FOR j=1 to 20)

SHAPE 40+100*j;40*j,100;250*j/3,200*j;200*j,50+75*j,50+75*j
```

Listing 2. Once you've got SHAPE running, change the third line to one of those shown here (that is, a different third line in each new run of the program).

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YOUR C64

Punternet

If you are into Telecomputing, you're probably familiar with the concept of networking. It's basically a means of connecting bulletin board systems (BBS), allowing users on one system to postmail to users on another.

There are several networking systems about, the best known being Fidonet and Seadog. Both of these systems are designed to run on the IBM or one of its clones. Even so, that doesn't prevent Commodore users from accessing them; they both use standard ASCII, and plenty of CBM users quite happily use these nets. I use them myself, but it's pretty obvious that their software libraries and the sorts of discussions happening in their message bases are heavily IBM biased. I guess that's only to be expected when even the Sysop is an IBMer.

Fortunately for Commodore Users, there now exists an alternative networking system which runs quite happily on the 64 or 128. It's called Punternet, and it's taken the local CBM BBS scene by storm Six months ago there was just one solitary Punter BBS in Australia – Steve Sharps' original Palintir in Sydney – but now there are ten others and more are joining the net every month. That's a remarkable growth rate, especially given that there are now only about thirty Commodore specific BBS in the country.

It's not hard to see why Punter has taken off. From a Sysop's point of view Punter BBS software has a lot to offer. For starters it's bug free and reliable, and that's a major plus. It also has ample room for customisation, allowing Sysops to modify display screens and menus to suit personal taste, and the software supports Hayes Protocol smart modems. When it comes to file transfers, you use both Punter's C1 protocol and Xmodem, although the C1 protocol is clearly superior to Xmodem.

C1 Features

Its main features are the ease of initiating a transfer and it's variable block size If the line is good you can stick to the default of 255 byte blocks, but on a really bad line you can scale down to blocks as small as 40 bytes The smaller blocks make a big difference on a bad line because the chances of glitch striking are smaller, and when you do strike a bad block the time to re-send is shorter.

We all know that STD calls cost money, so Punternet operates on a user pays basis, but a very efficient one.

All of these features are very nice, but what makes the Punter system stand out is the way it provides full support for networking. It really makes life easy for a Sysop. Once it's set up, the software does virtually everything automatically. It takes care of ringing other nodes in the net while you're asleep, and even takes care of the cost accounting side of the exercise.

We all know that STD calls cost money, so Punternet operates on a user pays basis, but a very efficient one. If users want to send messages to STD nodes on the net they have to maintain a punter account at their local punter node. Messages to other nodes within the local area are free, but messages to remote are charged for at the rate of one cent per line or 30 cents minimum. That's not a bad price compared to what it would cost you if you dialed the remote node directly via STD The system has a lot of checks and balances so you always know what you're up for before you post the completed message, and it's impossible to run your account into the red because the system *won't* allow you to send Puntermail unless you have at least $2 in your account.

The real joy is that for the first time CBM users throughout Australia now have a fast and cost efficient means of communicating with each other. If you've found helpful advice and hints on your local BBS, just think how much better things would be if we had a way to plug into an Australia wide Commodore knowledge base Now we have, well almost! So far the net is confined to the eastern states There are nodes from Townsville to Melbourne, but to date no links in South Australia, Western Australia or Tasmania. There is no limit to the number of nodes the system can support and the more the merrier for everyone

If you are in a User Group that is thinking of establishing its own BBS, or if you already run a CBM based BBS it's well worth a look. The minimum hardware you need to run a Punternode is a C64, an IEEE interface, a 1001 or 8250 drive or a hard disk, and of course an Hayes compatible smart modem, preferably one that supports 2400 baud, but 1200 is acceptable. The Punter BBS software is the least expensive part, costing only $US100. The networking kit is an additional $US25.00.

By the way, terminal software supporting Punter protocol is widely available in the Public Domain. You can use Thirdterm, Goodterm or Ultraterm Palette (supports 1200/75). You will find these programs on most nodes of the Punternet. Alternatively you can opt for Bobsterm 64 or 128 if you feel more comfortable with commercial software.

Palintir and other BBSs

Steve Sharp, the founder of the original Palintir node, and the man to whom all credit is due for pioneering Punternet in Australia, is a fireman and has been posted to Albury. He's taken Palintir there as well. If you want further info on the net or want to know how to go about becoming part of it, he is the person to contact. You can reach him by writing to: *Steve Sharp, c/o Fire Station, Mate St, Albury 2640 NSW*; or by leaving messages to the Sysops of any of the Punter nodes listed below. This list was compiled in February so there may be more nodes by the time you are reading it –

Palintir BBS64, Albury NSW. Sysop: Steve Sharp. Phone: Palintir (060) 40 1284

Canberra Comm. dore Users Group BBS, Canberra ACT. Sysop: James Hacker. Phone: (062) 81 0847.

Matrix BBS, Newcastle NSW. Sysop: Alex – Sysop 2. Phone: (049) 29 5279

C64 Bulletin Board System, Waverley, NSW. Sysops: Graham Lee and Shadowlord. Phone: (02) 664 2334.

Phantomland Connection, Randwick NSW. Sysop: Bob James. Phone: (02) 399 7716.

Brisbane CBM Users Group, Brisbane Qld. Sysop: Greg Shea. Phone: (07) 344 1833.

Missing Link BBS, Kingston, Brisbane, Qld Sysops: Mike Barber and Gernot Rosche. Phone: (07) 808 3094.

Com-Tel BBS, Townsville Qld. Sysop: Warren Mason. Phone: (077) 75 3636.

Comm-Link, (043) 41 3135

Dharruk, (02) 625 3246. □

SHARON FRANCE

MICROBEE FILE

Microbee and DTP

Just when I thought it was safe to put the keyboard aside and my feet up to contemplate my navel and the fate of this column, I happened upon renewed enthusiasm in the Microbee ranks. The place is literally abuzz (all puns intended) with excitement over new software and hardware that will bring Microbee users closer to the current cult of all computing buffs – desktop publishing (DTP).

Simply put, DTP turns your micro into a publishing/printing house literally on your desktop. The DTP revolution hit Australia with full force about two years ago, with a flurry of seminars and a burst of product releases by two main streams: Apple (Macintosh) and IBM PC clone (MS-DOS) based packages. In the interim, these packages have been revised or superseded by more powerful software and we have seen DTP take its place alongside word processing

What Microbee has come up with is a product that interlinks several of its established software titles, and also taps into third party graphics packages. The new product is called Digiscan.

Yes, for those of you with minds like steel traps, the Digiscan was previewed at the PC Show in 1986 along with Electric Paintbrush. It was unfortunate but funds precluded the simultaneous development of these products, and logically the drawing package was first cab off the rank. It has turned out for the best as Electric Paintbrush has benefited from user feedback and revision, as much as the Digiscan has blossomed from behind the scenes research and development.

What is the Digiscan?

The Digiscan, in technical terms, is a line based image scanner – a mechanism which is used to transfer images on paper to the computer screen. Here they can be saved, edited and manipulated. The process is almost the inverse of that of a printer; cleverly enough, Microbee has used a printer to carry the requisite equipment to make the Digiscan work. People familiar with the Apple Thunderscanner will not think this so amazing, until of course I mention that it does not alter the function of the printer. It would not be beyond reason, with the Apple equivalent, to dedicate a printer to become a scanner and use another printer to reproduce the end results (be it dot-matrix or laser). With the Digiscan, the function of the printer is not eclipsed by the scanning component. Software selection makes it possible to be printing at one moment and scanning at the next using the one Digiscan upgraded dot matrix printer.

The hardware component of the Digiscan includes a printed circuit board, an optical scanner and a cable. When your DP-80 (100 or 130) printer is submitted for a graphics super-surgery upgrade (for example, to get the Digiscan fitted), the nimble fingered medicos at West Gosford will delicately implant the printed circuit board underneath the printer ribbon and perform minor brain surgery by attaching an optical sensor to the patient's head (the print head). The circuit board has wires going into the printer's circuitry itself and connectors for the sensor and cable going back to the Microbee. Your printer will be returned (along with documentation and software) ready to demonstrate its new lease on life – the ability to pull images from paper and plant them onto the screen.

The Software

Although it would not be possible to scan pictures without the hardware upgrade, the real heart of the Digiscan set-up is the software. It has the same front end as the Teleterm and Simply Write software, a pull down window environment that is both friendly and informative. The windows to the options are activated (on a Premium Microbee at least) by pressing a Ctrl Number combination – a Clayton's function key arrangement.

Once you have selected a menu, a window containing options is pulled down. It is now a matter of moving to the option you wish, by means of the arrow keys, and selecting that option by pressing Return. There are eight menus in all, with the four situated to the left of the screen dealing with the scanner and its status, while the other options deal with disk and file management and manipulation.

The Digiscan front screen displays a bar graph arrangement – the control panel – which represents the status of the Digiscan system. One graph depicts the status of the file buffers while the other takes care of the current and stored contrast settings.

To scan an image, it is a matter of positioning the artwork to line up with the optical scanner and selecting the Commence Scan option from the Command menu. The printhead will move from side to side picking up the image as it is scrolled past the optical scanner. The sensor that is used can detect up to 32 different levels of grey scales, however, these will not be translated as such through the scanning process. The scanner has a threshold that will indicate to the computer which degree of grey will be black and which will be white. (This can be set by the operator in real time, which is rather fun in itself.) The Digiscan will therefore faithfully reproduce line drawings, but will give as somewhat stilted image of photographs, or what they call in the business, halftones.

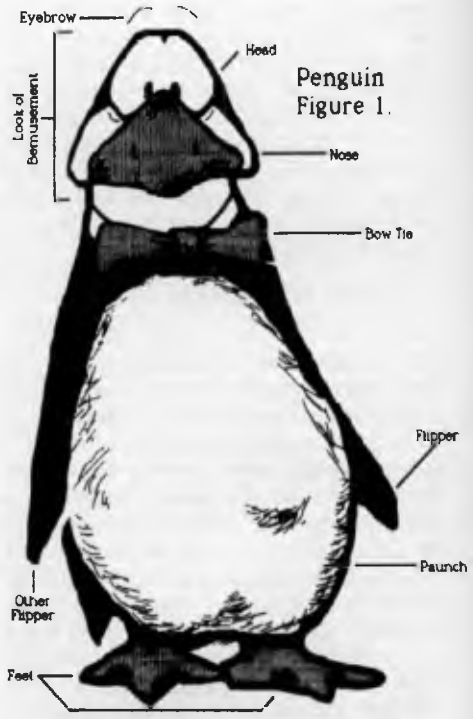

Figure 1. Cute graphics such as this can be read in, edited and then printed out again using Microbee's Digiscan, a line based image scanner.

Digiscan Partnerships

The Digiscan has been designed so that it is compatible not only with Microbee's two other graphics oriented packages (Simply Write and Electric Paintbrush), but so it can also be used with Basic and Telcom. Let's have a brief look at each of these combinations.

Digiscan with Electric Paintbrush – the logical leap

There is an obvious link between the two programs. Once a picture has been imported using the scanning process, it can be customised using Electric Paintbrush. There is not only scope here for artists to display their creative flair, but think of the implications for those who want to copy a standard format, for example an order form or a price list. It could be read in and then revamped to carry your company's logo and name.

Digiscan with Simply Write – towards DTP?

All Digiscan files are saved as .EP files. It is therefore possible to read them into a Simply Write document. You need to cut or copy the picture you want to incorporate into your document and this will be saved as a suite of Simply Write font files (this is how Simply Write deals with this situation). There is a bit of a catch and that is if the picture is particularly large, then the program will need to generate more font files. At this stage, Simply Write will only allow you to use only six font files in any one document. This is not a serious limitation if you are sensible about your use of text and graphics.

Digiscan and Basic – programmer's delight

The Digiscan software allows a graphics page to be saved in a format that can be recalled by Microworld Basic's GR command. For example, you scan an A4 page which has a number of components you wish to use. The whole A4 page can be called up in a miniature form on screen, with a rectangle delineating the 512 *x* 256 bit boundary used by Microworld Basic. This rectangle can be positioned over the item(s) you wish to use and this area is then saved as a graphics file compatible with Microworld Basic. All it takes is a two line Microworld Basic program to recall this graphics page on a Microworld Basic screen.

There is a second mode of saving which is a little more convoluted, but, at grass roots level, will be more useful for programmers in particular. The operation is called Microworld Basic Mask and it allows you to delineate a portion or icon on a page which you are already addressing. It allows you to save that small portion and, as if by magic, it writes a Microworld Basic file for that image, complete with peeks and pokes and gotos. It converts the picture into lines of Basic! The program

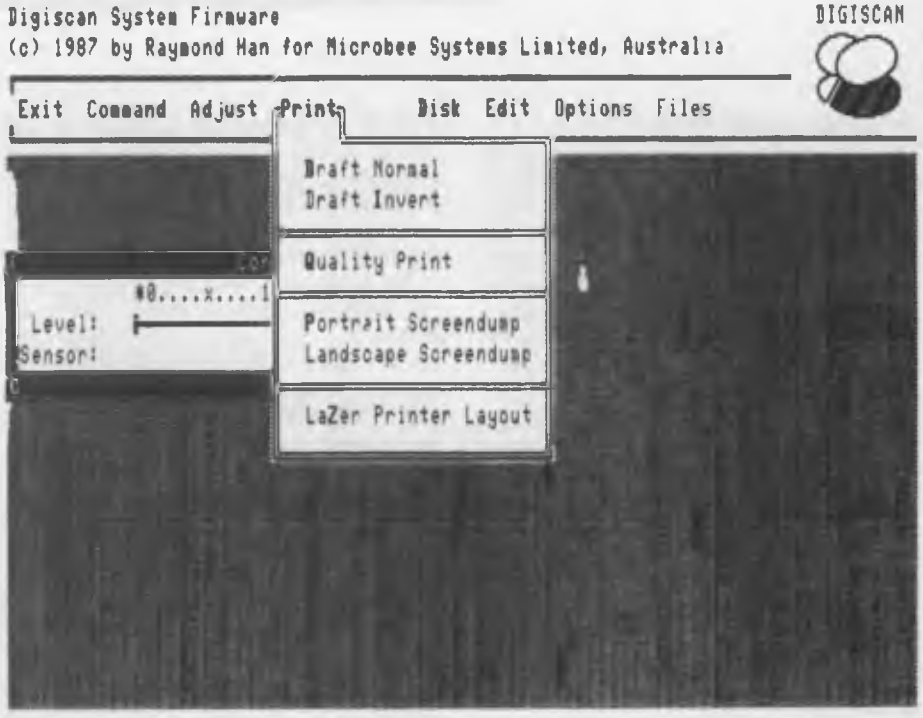

Figure 2. *Digiscan has a pull down menu environemnt. This menu shows the Print menu options. Note the number of options, including portrait and landscape dumps.*

can be called up using one line of Basic and then can be used in a bigger program. Graphics games on the Microbee will never be the same. The mind boggles!

Digiscan and Telcom – facsimile capabilities?

Digiscan files and Telcom are not compatible as such, but the Digiscan software does allow the user to exit directly to Telcom. This provides an avenue for experimentation with facsimile transmission. As the Digiscan .EP files are in compressed graphics format, they may be transmitted using Telcom. If the person you are transmitting to also has a Digiscan set up, they can capture the files and, using the Quality Print option, will be able to generate a hard copy of your file 'at the other end'. I have not seen this in action, but it sounds exciting and has great potential.

Digiscan and Third Party

At time of writing, plans were on the drawing board to have the Digiscan set-up talk to two well respected, third party, graphics programs, Storymaker (Ashtron) and Printmaster (Dataflow). When this happens, these programs and their existing applications will only be enhanced. No longer is the user bound to the limited imaginations of the clip art gurus. This is particularly encouraging in the primary school arena, where children will be able to read in their free hand drawings and create insignias that will give their stories and reports even more individuality.

How close to DTP is it really?

We are much than ever before, but not quite there. However, full marks to the persistence of the Microbee people (particularly Raymond Han, Digiscan's author) for continuing to squeeze every ounce of ability out of the 8-bit Microbee. Perhaps one day we might see true DTP on the Microbee with multiple columns, kerning, soft hyphenation, justification and picture wrap around. A very big wish list, but we have come so far, the rest would be icing on the cake!

Prices, prices, prices

For just $295 (to schools) or $325 (retail) you get the Digiscan hardware upgrade, the software, the requisite cabling, a software developers' toolkit (for Pascal, BASIC, C and Assembler boffins to write their own) and documentation for the Digiscan and instructions and block diagrams for the toolkit. This is excellent value for money considering other such devices on the market retail for almost twice the price.

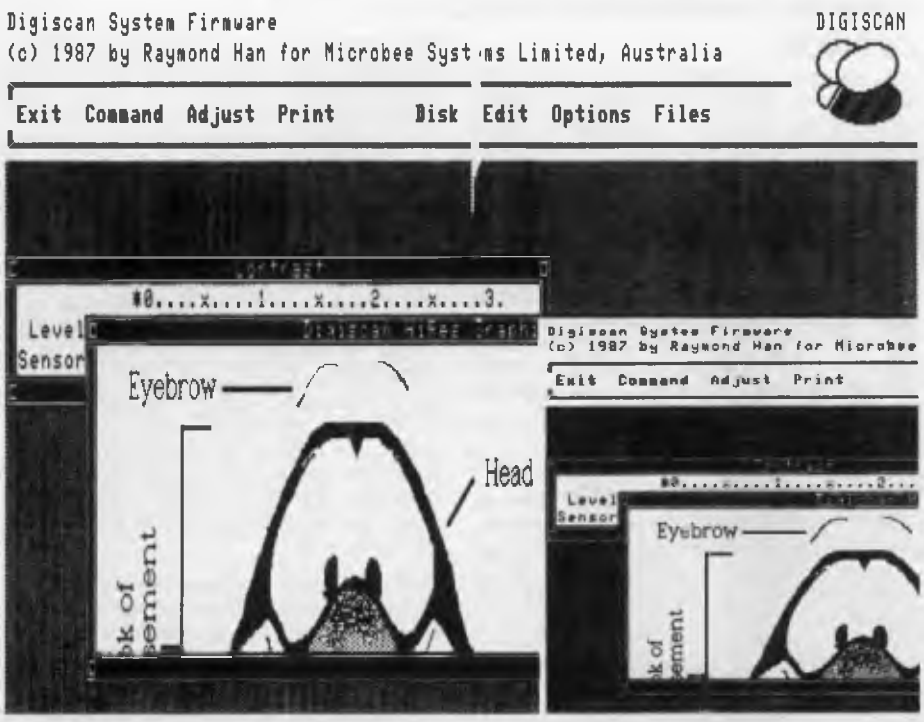

Figure 3. The aspect ratio is not lost no matter which way you dump it – portrait or landscape.

The DOSBOX

This is probably the most amazing thing to come out of Microbee for the last year. The Bookshelf Computer is Microbee's homegrown answer to the growing interest in MS-DOS in the education market. It has everything that the Microbee 640PC has, and it is physically smaller to boot! The prototype measured only 260 *x* 260 *x* 80 mm (the dimensions of one of the popular Computer-In-A-Book drives).

Its specifications are as follows. It operates at 10 MHz which can be switched to 4.77 MHz making it 100 per cent compatible with the IBM PC/XT. It can be installed with an optional 8087-1 floating point maths co-processor and it has 640k of system RAM. Interfacing is handled by two serial ports (RS232) and one centronics parallel port. It has a multi-mode video controller which is capable of operating in both IBM CGA and HGA modes.

And there is more! It is fitted with a self rechargeable battery backed real time clock, 8 Kbyte of ROM (where the BIOS resides), a floppy disk controller (capable of handling up to four floppy disks) and an expansion slot of half cards. It will be possible to get the Bookshelf computer in three configurations – single,
dual and single drive with a 20 megabyte hard disk. All disk drives are the popular 3.5 inch standard, which, when you think of it, is the way to go in the education market. To soften the impact an MS-DOS computer may have in what has been essentially a CP/M world, Microbee has compiled a list of preferred software titles for schools. Many of these will be available from Microbee at 'educational preferred prices' (for example, WordStar version 3.3 for $110 vs. $650 elsewhere).

The system comes complete with many items which are considered options on other computers, ensuring that the minimum system requirements demanded by most software titles are met. Last but not least, the Bookshelf Computer is in a way, compatible with the Microbee 128K Overdrive and the 256TC 8-bit machines. Simply plug the Microbee keyboard into the DOSBOX, and ensuring that you are indeed running the proper software, you are up and away into the world of MS-DOS computing.

Price was an item not discussed, but a quick telephone call to your nearest Microbee Centre or their 008 number (008 024910) should set you straight.

The 128K Overdrive

This is a rather neat solution to what was once a nightmare for schools coping with the classroom transmigratory habits of computers. Moving disk based machines from one room to another always meant a lot of cable unplugging and replugging The Overdrive, which houses either one or two 3.5 inch floppies on top of the keyboard console, does away with a separate drive unit. The portability of just two components to the computer system will be seen as a boom for schools with limited resources. It almost goes without saying that all of the standard software comes with this 'new configuration' Simply Write, Basic, Viatel and Telcom, and of course existing software compatibility is assured.

Microbee Lines

Anyone for Lego? Microbee has linked in with that all time favourite manufacturer of children's building blocks, to bring us into the world of computer controlled buggies and conveyor belts. I know, when I was a child, Lego came in only two or three different shapes and sizes and about the same number of colours. The colours, I believe have not changed so much, but the components of the contemporary Lego set may include optical scanners, miniature lights and stepper motors.

And what better way to keep all ofthis technology under control than with a Microbee? In fact, here Microbee is following in the footsteps of BBC and Apple who have already developed software packages for the Lego interface. Microbee's software, however, (according to Microbee personnel) is better. A cursory look at the prototype program does display clarity and uses graphics and colour to best advantage. It is menu driven, which, if my memory serves me correctly, is not a feature of the other two.

The MS-DOS Range

Microbee are moving more strongly into the MS-DOS arena with support being offered to the education section, in particular. The latest Microbee catalog carries a picture of three very distinct variations on the MS-DOS theme. However, specifications are offered for only one of the machines – the 640PC (or is that 640XT?) The specs and the detailed article in the same issue disagree as to its name). Whatever the case, these machines are quite acceptable specimens of their type and the 640PC comes in at a competitive retail price at just over $2000 for a single 3.5 inch model with 20M hard drive. If Microbee intends to compete in the real worlds of DTP and Cadcam, it will have to release more information on the 640PC AT. Maybe more about this next month? □

SERVICES PAGE

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AD INDEX

Abacus 153
ACI Computer Services X6
Advance Peripherals 146,147
Allaw ..... Xenix 11,21,23
Ann Court 134
Atari 26.27
Auto Int'l 42
Avtek 116
Babani Books 61
Blue Sky ..... Xenix 1,2,5,14,20,24
Co-Cam ..... Xenix 17
Compaq ..... Xenix 8
Computec Pty Ltd 3
Computer Trader 108,120
CTC 35
Custom Made Software 121
Denon Disks 132
Dick Smith Electronics 12,47
Discware 58,59,114,115
dLetter 145
Electronic Solutions 92,93
Freesoft Int'l 43
Hewlett-Packard ..... Xenix 12,13
Interface Publications 134
Kodak 66
Mace ..... IBC
Maestro 143
Manaccom 113
Microdos 91
Micro Educational 96,97
Micromart (NSW) 142
Micromart (Vic.) 44
Microsales 10,11,129
Microsoft ..... OBC
Microworld 63
Netcomm Australia ..... IFC
Perfect Interface 107,131
Peripheral Systems 34
President 6,39,137
President ..... Xenix 18,19
Programs Plus 8
Ritronics 138,139
Select Software 126,127
Silver Ball Enterprises 46
Sonics Magazine 136,153
Strobex 130
Subscriptions 122,123
Tech Pacific 51,53,55
Tech Pacific 110,111,118,118
Viva 38
Wagner Electronics 56
Wilbroprint 50

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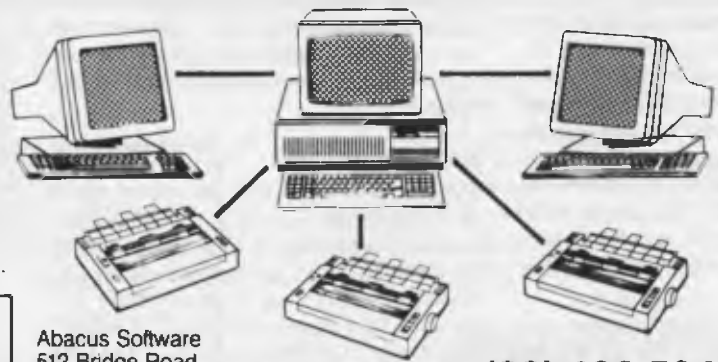

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MICHAEL BURLACE

CURSORY GLANCE

All this bicentennial hoopla means we get to look at some products which were significant or trivial in days of yore or yawn. It is interesting to note how many of those used names such as 'scientific' to legitimise the product. Today, 'high tech' is used as a business name often for the same reasons and with about the same level of credibility

■ The clocks on a set of AT compatibles which I use need to be reset about three times on consecutive days to accept the correct time. But they won't accept daylight saving, even several months down the track. Must be the last of Joh's revenge.

■ We have international standards for length, weight and all the rest and from these we develop standards for paper, nuts, bolts and the like. International cooperation on a grand scale. It's commonly known as Metric, but is in fact ISO — International Standards Organisation to English speakers. From it we get A4 paper — 210 by 297 mm. So what do the wonderful folks who brought you Coca Cola do? The United States is setting out to have American A4 which is a different size — 11 by 9.5 inches in one version I've seen. Watch out if your software or printer is set up with American A4 — it won't work well with Real A4.

■ Recently I walked past an office and saw a printer inside in an old phone booth. It didn't seem to have been vandalised. I figure printers are enough trouble without adding to it by having them vandalised. Besides, the service contract on public phones isn't all that effective, or maybe the vandalism contract is more effective.

■ One of my clients has just discovered the Bermuda Triangle which surrounds some Public Domain programs. He came to me after he had put heaps of effort into a series of computer programs which do separate tasks and cost nothing or virtually so Unlike most of the Public Domain software I use, none of what he got will do the task for which it was designed, let alone the one for which he hoped to modify it. Still, he learnt a lot about what he wanted and we were able to choose a bunch of conventional software which will do it.

■ One of the things which amazes me about the computer industry is its ability to move forward while focusing on the past. What am I on about? That stupid Caps Lock key (or Alpha Lock on the Macintosh). Why doesn't the industry come into line with business and the typewriter industry and revert to the Shift Lock? Only programmers and a few others have a use for a Caps Lock key. And these days, most programming languages accept upper and lower case.

■ Phrases such as 'iron horse' and 'horseless carriage' seem quaint today and rather caught up in the past — not just our past but the past of the era when the phrases came into use, just after the motor car and steam engine appeared. No doubt future generations (or even our own) will look back on such phrases as 'electronic mail' and 'bulletin board' in the same way.

Bootstrap

Went out for a spin in one of these fancy new cars with a talking computer the other day. It didn't take long to sort me out. The opening expression was 'Welcome aboard, as soon as you're settled and have your seat belt on I'll let you start me up.' On went the belt, in went the key, on went the ignition with a rundown on what I could see before me on the digigages until 'I need no more warming up, so when it is safe, we can move off'.

By the time I had been told 'Your XYZ Super Supreme (I'm not permitted to reveal the brand but it was big, luxurious and Japanese) is in motion' I had had enough. A few kilometres down the road I realised that they had done a very good job of Australianising the computer.

All the way it called abuse at other drivers, pedestrians plus random breath testers, motorcycle cops and so on. Several tickets for abusive language later I handed it back to the distributor

A sample from its Oz phrase book follows: 'I told you you'd get booked,' 'Bloody women drivers, wogs, aggressive men, sloppy Australians, Mexicans.' It said this last one to a car with Victorian plates in downtown Sydney. Never again for me, particularly after the stuff it yelled at other brands of cars which came too close to its infra-red distance sensors. □

□ *Michael Burlace is an independent computer consultant operating from the Sydney Information Technology Centre (Itec). He may be contacted by writing to PO Box 57, Broadway 2007 or by phoning (02) 281 2111.*

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