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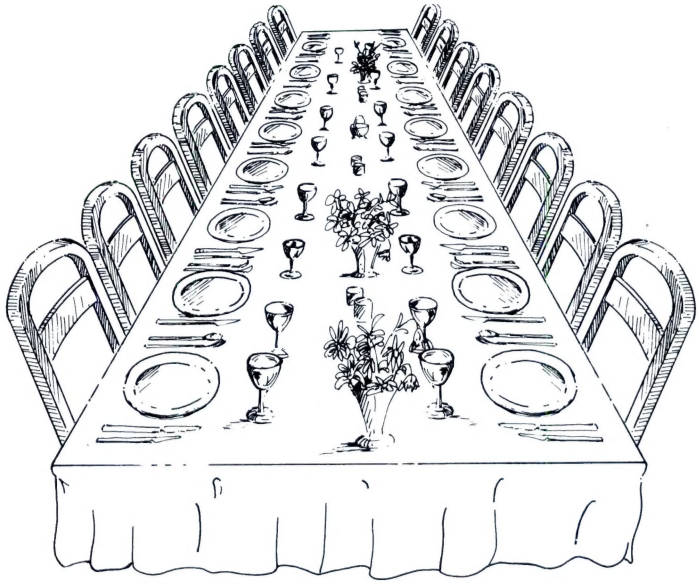

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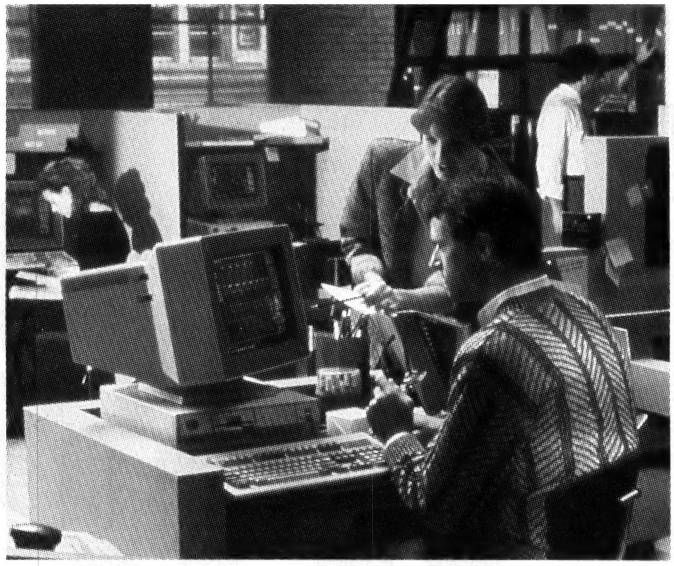
## NEXT MONTH INCLUDES

Graphics and Computer Aided Design are two fields that can make full use of the power of computers: November's main features will show just how far we've advanced from those old banner printing routines. Plus, there's quite a graphic story behind our cover – watch for it! Then to show what the professionals are doing, we've got a story on the Computer Graphics and the Digital Future seminar held in Sydney recently. For us amateurs, Jeff Richards shows how to make graphic use of an EGA monitor using QuickBasic and we review a beaut 24-pin colour printer (even we could afford one!). Once you've read all that, your appetite should be whet for our annual CADalog of CAD and graphics packages.

## Connectivity

– that's this year's computer buzzword. Connecting desktop machines to replace minicomputers (and even mainframes!) is an established trend now that the cost of computers and networks can be justified by small and medium size businesses. But – Matt Whelan has a counter point to that trend: see his article on multi-user systems.

## FEATURES



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MATT WHELAN

# EDITORIAL

# Communicating . . .

THIS ISSUE featuring communications brings back some very special memories for me – especially bad ones, that is. Microcomputer communications has exploded over the past few years, and now we can transfer stories around the telephone network at 14,000 bits/second and faster.

Everyone has a modem, or so it seems to those of us involved. Most PC nuts these days will turn their noses up at anything less than 2400 bits/second, while the real desperates (guilty!) can't live without a Trailblazer.

How different it is to when we started putting *YC* together in those dingy (well, not really dingy – it just sounds appropriate) offices in Mosman. Communications has always been important to us – after all, it's our business, and we have always tried to use the technology we talk about.

We set out to achieve something very advanced in those days (1980/81), when we agreed there was no need for editor Les Bell to work in the office in an era of advanced technology.

So Les stayed in his office, and we stayed in ours, and we communicated electronically. We passed virtually all the magazine's material (around 100 pages a month) backwards and forwards (and then on to the typesetter) at the stunning rate of 300 bits/second. Hi-tech!

And we did it with acoustic couplers, rotten things that dropped characters in the middle of assembler listings and faded away into gobbledegook (or was that Les?) as the granules compacted in the phone speaker.

But even with those problems we were so far ahead of the game it wasn't funny. We could get copy in faster than anyone else in the magazine business – and we could do the same on the turnaround to the typesetter, putting fresh material through right up until the last minute. If only the acoustic coupler didn't drop those characters . . .

The great leap forward was Dick Smith's Dataphone (touchy as it was) because it let us connect directly to the phone lines for the first time. Then, a while later, an impertinent 'little' startup, NetComm, turned up with a 'real' modem, with the Hayes command set and fiery 1200/75 transmission speed. It was such a breakthrough for Australian comms we awarded it Australian Hardware Product of the Year in 1985.

Well, times *have* changed! It's nothing less than 1234 Smart-Modems for most people these days, and Netcomm is a steamrolling 'giant' with a range of modems that takes us from kindergarten comms all the way of the the race-track with its (again Award-winning) radio modem race-car control setup.

I travel with a Trailblazer and pick up mail, articles and the rest more than 30 times faster than we did it in 'the early days' – it costs me less to do it from London than it used to cost me from Melbourne.

I think nothing of sending a megabyte of data across town (as long as it's to another Trailblazer, of course) or even interstate. I have no qualms about dialling the US to grab the latest and greatest piece of Public Domain software, even if it is 300 kilobytes in ARC (compressed) form.

The story not so long ago was that phone lines would never support more than 2400 bps (hell, some people in Telecom still believe it!). Now the story is it will never support more than Trailblazer-style speeds. Are they kidding? Anyone want to bet on how fast I'll be able to send my copy through to the office in five years' time?

*Most PC nuts these days will turn their noses up at anything less than 2400 bits/second, while the real desperates (guilty!) can't live without a Trailblazer.*

Incidentally, I'm writing this just before getting on a plane for the US, where I'll be attending Fidonet's annual convention: if you want to think about growth in communications, this one group is a great example.

When Tom Jennings first conceived his Fido bulletin board system, which allowed communication between boards, he thought it would be 'nice' for a few sysops to exchange information. He built in the capability to handle 64 linked systems – and didn't bother putting in any error-handling for the unlikely event it exceeded 64.

That was only a few years ago, yet there are now more than 3000 systems connected to this 'network' as full nodes, and many of those are running up to 20 'satellites' (known as points) in private nets. For many people PC communications has not only changed their workday capabilities, it has changed their whole lifestyle.

And remember, this is a field which hasn't really climbed securely onto its growth curve yet . . . □

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JAKE KENNEDY

# YOUR COMPUTER

As reader's of these pages will know, our office was burnt out in late June. Almost half of the floor space in the building we share with Federal Publishing's other titles was lost. For the time being, we – that's Allecia, in the left foreground, Robert, right background, and myself, on the left – have all been crowded together in less than a third of the space we had before.

Allecia and Pam Horsnell, our graphic designer and quality controller, were checking a page layout (which we didn't use) for this issue against the October pagination when Peter Beattie, one of Federal's staff photographers, snapped the picture.

With few exceptions, we receive the copy from contributor's on disk. With the aid of a wondrous product called PC-Alien from FBS in Canberra, we can read *most* strange disk formats, from Access to Zorba. Allecia's first chore with each article is to sub-edit it for grammar and style; at the same time she enters the typesetting commands directly into the file using WordStar 4's Shorthand facility (the command to set that big A at the top of the column looks like this: <el10><cc13.6,62,22,10>A<ix10><cf94,9,10><rv10><xr><ah>; all that takes is two keystrokes. Then, she starts chasing picture material, a task that probably takes about a quarter of her time, what with chasing the products, listening to excuses, and arranging photography.

## *Why not 'desktop publish', you ask?*

From the IBM XT (with the fire-proven hard disk – see the photograph that accompanied this column in the August issue) on Allecia's desk, the files are sent directly to the Harris typesetter through a serial port adapter card over a line we share with *Electronics Australia*.

The interface between the Harris and the IBM is a rather inelegant hunk of code – aside from the software's voracious appetite for RAM, the machine can (now) only take a CGA monitor. But my biggest gripe is that it can't support a second serial port; that dashed my hopes of networking us all together and granting direct access to the Harris from my home. (I do about 40 per cent of my work from there.

The Multitech AT at home is linked to that President AT you can see on the desk behind me via two NetComm 1234SA modems.)

Once we have the typesetting back, the articles go to Pam with whatever illustrations there may be. We give her a rough page length for the article and then she plans where the text and pictures will fall – it's not just coincidence that ensures each article finishes at the end of the page! Pam's also responsible for the design of those great covers you've seen on the last dozen or so issues.

Next, the magazine is passed on to the production team, who handle the mechanics of readying the pages for platemaking and printing (*thanks guys, and Kylie, too!*).

Robert's pretty pleased with himself at the moment: he's just taken delivery of that Accel 500 24-pin dot matrix colour printer you can see on the table in front of that intent young lady. We'll be showing samples of the Accel's colour printing as part of our graphics feature in November. Printers are only one of Robert's 'specialities' – another is computer graphic design. He designed that rather surreal image of the Earth on the cover with his own Amiga 1000 (the chap looking at the screen is David Mitchell, our NSW advertising rep and resident worrier).

That intent young lady I mentioned earlier, is Allison Tait, whose 'secretarial services' we share with *EA*. Allison is the 'voice' of *YC* that the hundreds of you who ring each week will have heard. She is also our price chaser: with the constant flux in the Aussie dollar, most distributors are loathe to quote prices for publication. But – we want you to know the price of the products you read about in order to answer that most basic of questions: 'Is it good value?'

That's the heart of the YC team – I've only presented a very abbreviated version of the reality. Bland as it may sound above, we all find publishing exciting, frustrating and stimulating; and, the fact that we are using and applying the equipment we write about makes it a helluva lot more interesting – I reckon I've got a great job, actually.

Why not 'desktop publish', you ask? It's coming – but the technoloy isn't yet advanced enough to have a complete system without messy bastardisation. For example, much of Pam's monkey work could be done with a DTP package, enabling us to make more efficient use of her talents. However, we would then have to resort to traditional methods for photographs. Within the cost we could justify, digital scanners are limited to 300 dots/inch resolution and we need on the order of 1000 to achieve magazine-quality, particularly with colour pictures. And me? What do I do each month? Well, I write this page . . . □

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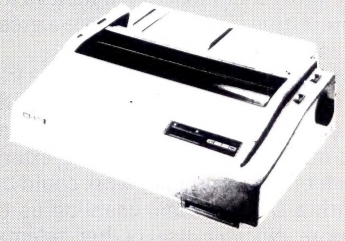

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HOWARD A. KARTEN

# AMERICAN GRAFFITI

## On Modems and networks

In the States, telephone 'phreaking' was the precursor of computer 'hacking.' Beginning around the late Fifties or so, bright, technologically-inclined youths, fascinated by some of the unusual things that could be done with the phone (things that the Telephone Company, oddly enough, never told us about . . . ), began trying out the possibilities. 'Phreaking' became a fascinating activity (when the authorities let you alone) that was also somewhat compulsive. I was part of that cultural phenomenon, although my felonious activities were kept to a minimum, and when those envelopes with the return address of Security Office, AT&T came to the house, I was always able to concoct some explanation that satisfied my old man. (Then, as now, adults were largely technologically illiterate, and could easily be baffled with technospeak.)

## Background data

A little background: although I've lived in the Boston area for 15 years, if asked, I still tend automatically to identify myself as a New Yorker. Now, if you live in a large city for any length of time, you become acutely aware of the value of time. This means that New Yorkers have a high mental velocity. They walk, talk, think, and drive faster than folks anywhere else. Once you've gotten used to it, everyplace else is like – well, probably like Wellington, to use an old Aussie expression.

Although Boston is only 200 miles away, and a reasonably big city, life nevertheless moves more slowly here. So when I must leave my electronic cocoon – to get my daily ration of Vegemite at the supermarket, say – it's stressful. The folks here don't move nearly fast enough to suit my tastes. They drive more slowly, and the driving they do is – well, let's just say that even Italian drivers are more predictable than Boston's.

For several years, I've had an office at home. Some years ago, as US reporter for a British publication, I transmitted my copy by reading it over the phone every Thursday morning – a tedious task, since Brits, being Brits, declined to acquire a tape recorder. So the first thing I did with my modem was to get a Telex store-and-forward account so I could send news copy by wire.

Some time later, I was asked to do a story on electronic databases, so I took out a subscription to Dialog, a California-based company that provides access to a wide range of databases. Dialog is a kind of retailer – almost a department store of databases.

Some of my work had required occasional trips to the local library to do various forms of research, like compiling bibliographies. The experience with Dialog helped me realize that I could now do a good deal of my research by modem. Given the value of my time, compared to Dialog's fees, and the fact that I could do more comprehensive work with Dialog, I cut way back on library trips. I also began sending some mail and articles via computerised bulletin boards.

A little later, I discovered the joys of remote computerised phototypesetting. I'd occasionally made trips to the typesetter to indulge various fancies and put some things into type – birthday greetings for my little nieces and nephews, and so on. I discovered a local outfit that would indulge my whims for a modest fee, and started using its services remotely.

That sufficed for a while. Now, my occasional visits to the outside world were limited to trips to the supermarket to replenish the hamburger meat in the larder, trips to the post office to mail cheques (paying bills electronically was counterproductive – it only got rid of the money faster, and the banks had the gall to charge you for it as well!), and so on. Of course, fewer trips to the post office meant I missed out on some of the important gossip in town, but it seemed a small price to pay.

## Facsimile option

One of the few chores I could not accomplish was to send fax messages. Fax machines were expensive, and I was not about to spend big bucks for one. So I still had one reason for venturing into the real world.

Then, a US company called MCI Communications had begun an email service. It had some very neat features: you could specify that your message be routed into the US postal system, which meant it would be printed out somewhere and dropped into a mailbox. You could also send it to one of the overnight courier services for guaranteed overnight delivery. There was even an option for delivery within 4 hours! I became a subscriber, and it was a wonderful system. It probably helped eliminate one trip to Realityland a week.

Recently, MCI announced that it was adding a facsimile option. Until that announcement, there was only one way of directly linking fax machines and computers, and that was a special PC board costing in the neighborhood of $US1000. The fax option will make it possible for me to send computer-originated material to a fax by supplying the number of the fax. So I'll have even less reason to go out.

## Modem madness

I was pleased that I'd reduced the amount of time I spent 'outside' dealing with time-wasting, stressful errands and things. Having fewer of those distractions was a delight.

But then I noticed that those instances requiring a trip to the outside world – to replenish the beer supply, for instance – seemed in some instances to actually be *more* stressful! I mentioned this to Ms Computer Writer, who suggested that perhaps I was getting out of practise in dealing with the real world. Friends hazarded the same guess.

Reverting to old-fashioned ways of doing things, now that I'd perfected the Modem Method, was unappealing, and I wasn't about to give up the modem. Instead, I took another look at what I was doing, and it was clear what had happened: I'd become hooked. The Modem Method had turned into Modem Madness; I was a Modemaniac, a Modemaholic.

The thought was about as arresting as the sudden loss of a carrier on my modem. Truly, I'd become hooked. Somehow, I had to break my addiction. I did the first thing that came to mind: I cranked up my modem and Dialog to look for any research that had been done on the best way of dealing with addictions, non-life-threatening.

To cut to the chase, as they say in Hollywood, I'm about to start a society called Telecommunicators Anonymous. It will be dedicated to helping others whose hearts, minds, souls, or other giblets, have been unwittingly captured by Modem Madness. I'm just now beginning to get it organized and set up the databases and other administrative details. Let's see: we can send out notices of meetings via email, and . . . □

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WILLIAM OLSON

# CANBERRA COMMENT

## Three men in a garage

Australia has its own version of the Apple story. Here it began in Brisbane then moved to Canberra with the New Parliament House. The development of Cleveland Computers (no, they are not built in the USA) started a few years ago with three men, Steve McDermott, Ian Bennetts and Geoff Bradfin. Bennett's garage in the Brisbane suburb of Cleveland was where they assembled PCs from overseas components.

Bennetts then decided to have a case built locally for his Cleveland. He then got Aussie software man Graeme Eistead to write the first Australian BIOS for a PC in XT form. Today the Cleveland is the most made-in-Australia PC. The main board, the power supply, the interface cards, the bios and casing are all made in Brisbane where Cleveland has an automated factory.

However, while making Australian computers is difficult, selling them to governments is an additional problem. Canberra is Cleveland's success story. Darryl Bowling, senior director of Auslogic in Canberra (formerly Tomorrowland, ACT) has been selling Clevelands since the beginning. Bowling says he hired the best technical support people he could find when he took on the Cleveland. This allowed the Clevelands to fall over on the bench, not in government offices.

Bowling says in his first year selling Clevelands the company lost $70,000, however the reports coming back from government departments showed Clevelands were reliable and compatible. Compatibility is a big plus or minus for any PC – just ask some of the MICA users around Canberra's government.

Things really took off for Cleveland about eighteen months ago when it sold 30 XT hard disk PCs to the Customs department for use in offices around Australia. Bowling says not one of those machines has faulted. Customs told others about Cleveland's reliability.

The next big contract was 235 machines for MP's electoral offices. These are AT versions with 44 megabyte hard drives. Bowling said the factory was worried about maintenance costs on such a widespread order. However the machines, once again, were reliable.

Since then Bowling says his company has sold over 2000 Clevelands, despite intense competition from overseas companies. The latest contract for over 1000 PCs is with the Army. Auslogic's turnover last financial year nudged six million dollars, nearly five times its turnover for the previous year. Bowling says 70 per cent of all Clevelands sold come through Auslogic in Canberra. If necessary, Auslogic flies its maintenance technicians anywhere in Australia.

*Cleveland is also planning a PS/50 model of the Sprint, having just signed an agreement with IBM for using IBM micro channel architecture.*

The latest news for Cleveland is the Sprint, a PS/30 style PC. Bowling says he thought the PS/30 was a dead-end machine. However the sales IBM are making with the PS/30 are remarkable. The Sprint is aimed at the private market as well as business, with a base price of around $1100. The Sprint has some extra features over the PS/30 such as a security touch pad for a PIN number.

Cleveland is also planning a PS/50 model of the Sprint, having just signed an agreement with IBM for using IBM micro channel architecture.

Cleveland now also makes the board for the Intel 80386 recently released in the US. Bowling says while this runs officially at 25 MHz, the Auslogic technicians have clocked it at 31.4 MHz.

Cleveland has also signed an agreement to make the main board for Ricoh laser printers. The Ricoh will be the only laser printer with Australian content. This arrangement is through Mitsui which now has a 15 per cent interest in both CCA, makers of Cleveland, and Auslogic.

## Wang speaks

Wang is contributing to a speech recognition project at the Canberra College of Advanced Education. The project leader, Dr Mary O'Kane, says her team is working on speaker independent speech. This means small variations in pronunciation will not puzzle the computer. The project is based on Australian English, which has few differences in pronunciation.

The team is concentrating on recognition of 80 to 90 per cent of words. This contrasts with US IBM research which is concentrating on 100 per cent recognition but with special training needed for users.

Dr O'Kane believes it is simpler to aim for a ten per cent drop out in speech recognition if the speaker needs no special training. The mistaken words can then be slipped in with word processing.

The researchers are working in four stages. Stage one begins with the research team making a phonetic string for speech input. The string has no gaps being encoded with each sound on its own line.

The second stage is for predicting words using a smart computer to guess short words such as 'the', 'and' and 'so', which fall between longer ones. The third stage involves developing computer searching algorithms.

The team is also looking at how users will approach a speech recognition system. For example: how fast or slow do most people dictate and how to help users who feel uncomfortable dictating.

## Computer lists

The government, through the Tax Office, is playing down the introduction of new tax file numbers. However, some observers see the tax file number as a Claytons version of the Australia Card.

Government departments are already helping anyone who is willing to pay to obtain personal information about their fellow citizens. For example the Bureau of Statistics stores information from each Census Collection District (CCD) on a computer disk. These CCDs are for sale at around $4000. Because the size of each CCD is only about 200 households, pinpointing individuals with a computer cross check becomes relatively easy.

The Australian Council for Civil Liberties recently warned that the tax file number would assist listmakers even more. Banks will know the tax file numbers of all their customers, both individuals and companies. They will be able to build up databases using the tax file number. There are no laws to outlaw computer cross-checking with other lists. □

# Entry Level Communications

**Once you've got a computer and a modem, all you need to talk to the world is communications software. John Hepworth reviews six packages for novices (and enthusiasts!).**

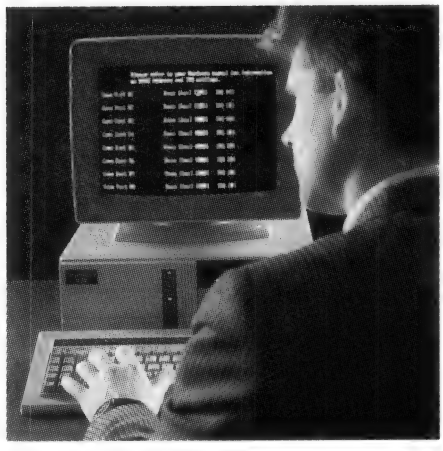
COMMUNICATION IS probably the most human of all functions. From the moment we are born, and some say even before that, we constantly send and receive information. At first it is between ourselves as babies and our parents, but before long most of our communication is between peers, groups of people of similar ages, interests and with other common characteristics.

So it is with computers. Alone a computer is nothing. Information is essential, for a computer is only an information manipulation device. In the olden days, mainframes typically communicated with many terminals. It was a case of the powerful and intelligent mainframe sending information to, and controlling, the far less powerful terminal.

With the coming of the personal computer the need to transfer information from peer to peer became far more important. Sure, it is possible to send a floppy disk from one machine to another, but far better is to connect two machines together electronically and transfer information at the speed of light.

Two things are needed for this task, apart from the computers themselves. First is a connection between two computers. It might be just a short cable from the serial port of one computer to the serial port of another in the same room. It might be a connection via a telephone line from one computer to another on the other side of the world, with a phone line and a modem at each end joining the two. Which it is does not matter, for the computer will see either the direct cable or the modem link as just a piece of wire, with different speeds of transmission.

The second thing needed is some specialised software to allow the machines to send information from one to the other, display it on screen, save it to disk and to send and receive disk files. As modems became less expensive, more powerful and faster, so did communications between microcomputers become more popular. In response, a plethora of communications programs appeared, with the very best being written by enthusiastic users of PC to PC communications.



Two of the programs discussed here are commercial and were written in Australia, with special solutions to Australian needs, and sold at very competitive prices. One is an American commercial program, derived from an earlier shareware program and enhanced for commercial release. Finally come three shareware programs, with fantastic power. These allow users to try them without initially paying a cent, and only pay a registration fee if usage continues.

The commercial Australian programs are the NetComm Program V3, also sold as GateWay, and SuperCom version 3. The American program is Procomm+, and is a commercial program derived from shareware predecessors. The shareware packages are Telix 3, QModem 3.1 and Boyan D3.

In all six cases the authors are enthusiastic users of PC to PC communications, and as a result the problems faced by users have been consistently been addressed and solved, albeit in different ways according to the temperament and features of the package.

Any communications package has a number of requirements. At the very simplest, it must be able to take characters from the keyboard and send them out the PC serial port, receive characters from the port and display them on screen. In this guise it is just a dumb terminal, like many attached to mainframes.

Simple enhancements make big improvements to plain vanilla terminal mode. A chat mode in some packages divides the screen, and outgoing characters are displayed in one half while incoming characters are displayed in the other. Another enhancement could be emulation of the extra features of common mainframe terminals. In particular the ability to respond to the escape sequences used by many bulletin boards to display colour on screen and to send the cursor to specific screen locations is valuable. Simple character transfer is often called ASCII emulation. Ability to respond to bulletin board escape sequences is called ANSI-BBS or ANSI graphics. Emulation of mainframe terminals is common.

## Speed

Communications software must be able to transfer characters at various standard speeds. Each character has eight binary digits or 'bits' of information, plus a couple of control bits. Speed of communication is in bits per second (often called 'baud', which is a misnomer). Typical PC communications speeds are 300

bps, 1200, 2400 and on up to 115,200 bps. Not all packages can get anywhere near that top speed. Viatel has its own standard, with 1200 bps from the host to the PC and 75 bps from the PC to the host, and also operates in only 40 column mode. Only two of the packages in this overview offer Viatel.

## Auto-dial and auto-answer

Many modems can automatically dial outgoing telephone calls, and automatically answer incoming calls. Software should be able to use the command set made popular by Hayes to operate modems, and should also have a directory of the phone numbers most often called, with the speeds and other characteristics of each service so that the computer and software take care of all the details. A host mode will allow the computer to receive calls while unattended and allow uploads and downloads of files to be controlled from remote locations. All the programs in this overview offer auto-dial, auto-answer and dialing directories.

## Error correcting protocols

Transferring files from one machine to another without error is vital, particularly in the case of programs. Even one wrong byte could fatally flaw an executable file. Preventing error is done by a range of error correcting protocols. These basically send blocks of characters.

After each block, the sending and receiving end each calculate a number based on the characters in the block, and compare what was sent with what was received. If the block was not correctly received, it is sent again and again until it arrives in one piece. Error correcting protocols range from the pioneering XModem, to the later and much faster YModem, Zmodem and Sealink. Kermit is yet another, often used for communication with mainframes.

Error correcting protocols may be internal or external. If the communications program includes a protocol within its own executable file it is called internal. If the communications program runs another program for the file transfer with error correction, it is an external protocol. Many programs, but not all, have ZModem as an internal protocol. If ZModem is required with a program that does not have it internally, the main program might run the well-known program DSZ to transfer files with the ZModem protocol – here, an external protocol.

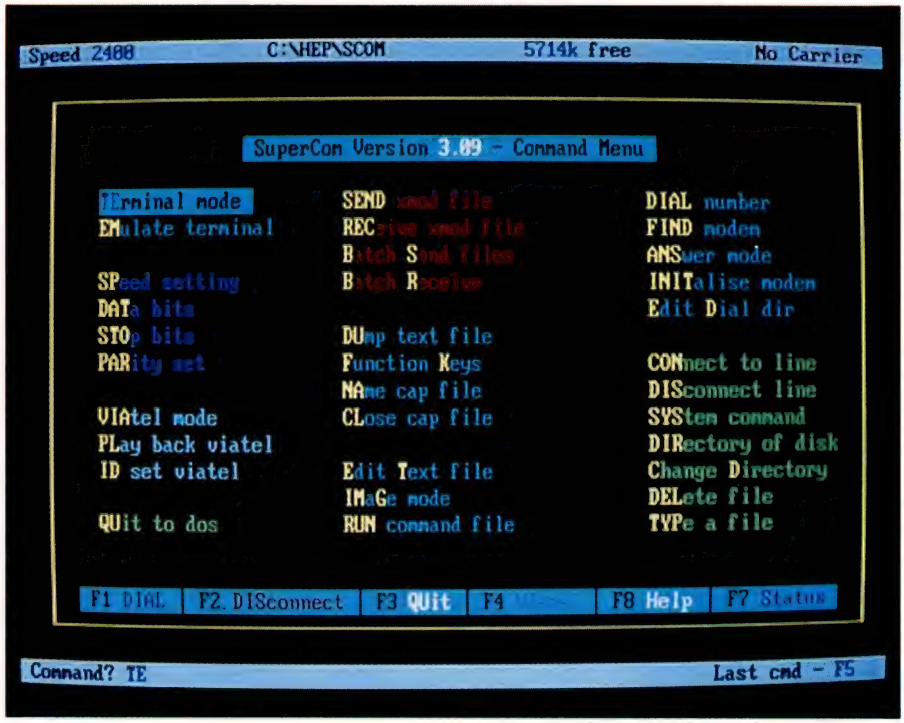



***Figure 1.** While earlier versions of SuperCom had a reputation for fragility, there seems to be no such problem with version 3. Unique amongst the programs in this overview, SuperCom offers a SnapShot mode.*


***Figure 2.** The C2L script language in the NetComm Program V3 (and GateWay) allows the user to automate communications sessions. While the C2L manual is 'optional at extra cost' from CyberSoft, a number of 'modules' are available from its bulletin board.*

### Script languages

Script languages are included in any useful communications program. These allow the user to automate many functions. They range from simple batch languages allowing the user to list a simple string of commands, right through to powerful languages customised for communications with all the power and syntax of a regular language like C. In some cases a learn mode is included. The program can learn the log-on procedure for a host, create its own script file, and then later execute it automatically when desired.

### Documentation

No program is usable without a manual, and naturally all the packages in this overview have one. They do take different forms, with the commercial packages having a printed and bound manual, and the shareware packages having manuals on the disk, ready to be printed out by the user.

## SuperCom Version 3

SuperCom is a well known, and well respected, Australian communications product, written by Barrie Hall of Operating Systems Research Pty Ltd. While some earlier versions had a reputation for fragility, there seems to be no such problem with version 3. Unique amongst the programs in this overview, SuperCom offers SnapShot mode.

Here two machines are linked via modem, with SuperCom's snapshot program running on each. Now an ordinary program, like a word processor, is run on one. The screens of both machines show identical output from the application program, and both keyboards are active. Great for software support staff with clients at remote locations!

SuperCom's features are legion. It can emulate a good range of terminals, starting with simple ASCII (called TTY for teletype here) and ANSI for those bulletin board graphics. The other emulated terminals are IBM 3101, Dec VT-100, Vip7300, Televideo 950, Televideo 925, ADM-3A, ADM-31, Televideo 910, Televideo 920, Hazeltine 1500, ADDS Viewpoint and DataPoint 8600. Viatel is supported.

Internal file transfer protocols include ASCII, XModem, YModem, Modem7, YModem batch, YModem-G, Telink, ZModem, ZModem-LZ, SeaLink, SeaLink-Plus, SeaLink Overdrive, SeaDog Mail Receive and File Attach and OSR MailNet. Some of these are unique to SuperCom, and require SuperCom at each end of the link. Others are generic and can be used to talk to computers running different communications programs. Again, some of the SuperCom specific protocols include data compression, so that effective throughput exceeds the nominal speed of the data link, with the files being compressed at the sending end and expanded at the receiving end. Maximum speed is 115,200 bps.

The dialing directory is extensive, and entries for dozens of services are already entered. Each entry allows plenty of room for international numbers. Capture files and log files are available. Capture saves to disk all incoming and outgoing characters (except for those in files being transferred using protocol transfers), allowing the user to log off a host, and read at leisure all that happened. The log lists all calls, the time commenced and finished.

When SuperCom is run, an initial menu appears. On it are a number of options, each with some letters capitalised. An option can be selected by moving a reverse video cursor bar over the desired option and pressing Enter, or alternatively the highlighted letters may be typed in. SuperCom's design is based around the manual entry of commands rather than menus, though these are usually available as a help for novices. Its script language is adequate, but basically creates an ASCII file of commands which is read and executed as required.

SuperCom comes on one 5¼ inch floppy with a nicely type-set 66-page manual in an A5 ring binder. About my only complaint on the manual is that it lacks an index, but the layout is logical and the table of contents very complete so finding information is not a chore.

## NetComm V3 and GateWay

Another fine Australian communications program is the NetComm Program V3. It is written by CyberSoft who also sell it as GateWay. The two programs offer Viatel and general purpose communications at speeds up to 19,200 baud, depending on the computer used.

Several popular error correcting protocols, including XModem, YModem, ZModem and SeaLink are included, while ASCII transfers are also supported. Other features are a chat mode, with separate windows on the screen for transmitted and received text, a learn mode which can watch a log-in, record it, and then automate subsequent calls to the same host, a WordStar compatible editor and a powerful script language. Mouse support is included. Video cards supported include MDA, CGA, EGA, VGA and Hercules. Log and capture files are supported

The NetComm Program can be run on a two floppy disk system, but a hard disk is preferred. NetComm goes straight to the offline terminal screen, with a status bar at the bottom and the titles of several menus at the top. Calling a Viatel host or a Bulletin Board is easy. From the Offline screen, pressing C pops down a Connect menu. Pressing C again shows a list of the five hosts that the user has nominated as the most frequently called. One of these can be selected either by pressing a numeric key from 1 to 5, or by moving a cursor bar and pressing Enter, while pressing F2 displays all other entries in the dialing directory. At all times context sensitive help is available by pressing F1, and the actions the user could take are listed across the bottom of the window.

*Why not get all the user supported packages and try them out?*

At any time the user can tell the NetComm Program to watch a session as the user logs onto a host, read the prompts coming down and the user's responses, and store the details is a file. The next time this same host is called, the log-on is automatic.

After calling a host, connecting, and automatically logging-in if desired, the screen goes to on-line mode. The screen appears similar to the off-line screen, but there are some subtle differences. The status bar now shows the word ONLINE at the left side instead of OFFLINE, and the time display at the right shows the time elapsed for the call, and not the time of day. The menu options have disappeared from the top of the screen and, of course, the user's keystrokes are sent to the serial port and not acted on by the program.

A 240-page manual is included, and while it's very complete and well presented, finding information can be a challenge as again an index is not included.

Regrettably, next to no details for writing scripts are included, and the manual for the script language is 'optional at extra cost'.

## The PC-Talk interface

As mentioned above, neither The NetComm Program V3 nor SuperCom 3 go straight to terminal mode. Supercom shows a screen and waits for choices to be entered on a command line. The NetComm Program V3 uses a menu structure. All the others, Procomm+, Telix 3, QModem 3.1 and Boyan D3, use an interface loosely modeled on the classic PC-Talk, a pioneering program since outclassed by its disciples. These programs go into terminal mode immediately they are run. Pressing Alt plus a key brings up a menu or carries out an action. Typically Alt-D enters the dialing directory, Alt-H hangs up the modem, and other combinations have other functions. In all of them a single screen of help information is available, and is displayed when Home is pressed in some, and other keys in other programs.

Pressing PgUp initiates an uploads from the local PC to a remote host. PgDn initiates downloads from the host to the PC.

I did find that the user interface of Telix 3 was just a little more attractive and consistent than the interfaces of Procomm+ and QModem 3.1. Boyan also has an elegant and consistent interface.

## Procomm+

Procomm started life as shareware, with users being encouraged to copy it, evaluate it and give copies freely to friends. As with all shareware, this gave a free evaluation period with the user being required to register and pay for the program if usage continued beyond the evaluation period. The newest version of Procomm is no longer shareware, and is now called Procomm+. Log files and capture files are supported as is a powerful script language. Speeds range up to 115,200 bps.

Procomm+ offers a vast range of protocols, plus ASCII file transfers. It has Modem7, YModem, Telink, XModem, YModem Batch, Kermit, ASCII, CIS B, WXModem, YModem-G, YModem-G Batch, IModem, SeaLink and has hooks for up to three external protocols. Terminals emulated are VT52, VT102, ANSI, HEATH 19, IBM 3101, ADDS VP, ADM 5, TVI 910, TVI 920, TVI 925, TVI 950, TVI 955, WYSE 50, WYSE 100, 3270/950 and TTY.

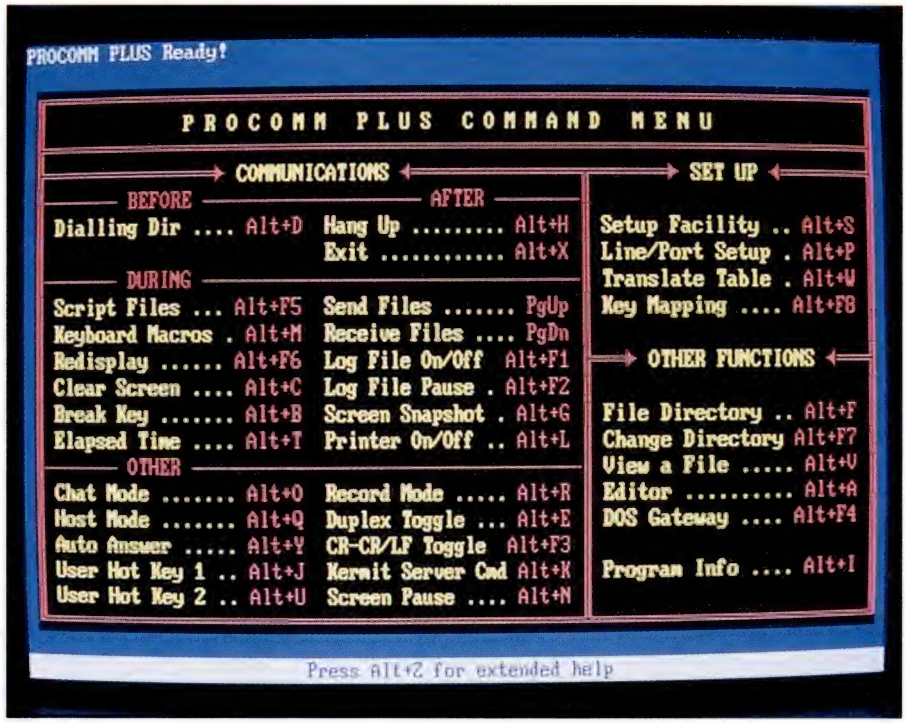



***Figure 3.*** *The shareware roots of Procomm+ are evident in the vast number of protocols and terminals it supports – unfortunately, the screen displays are often cluttered and take longer to read than they should.*

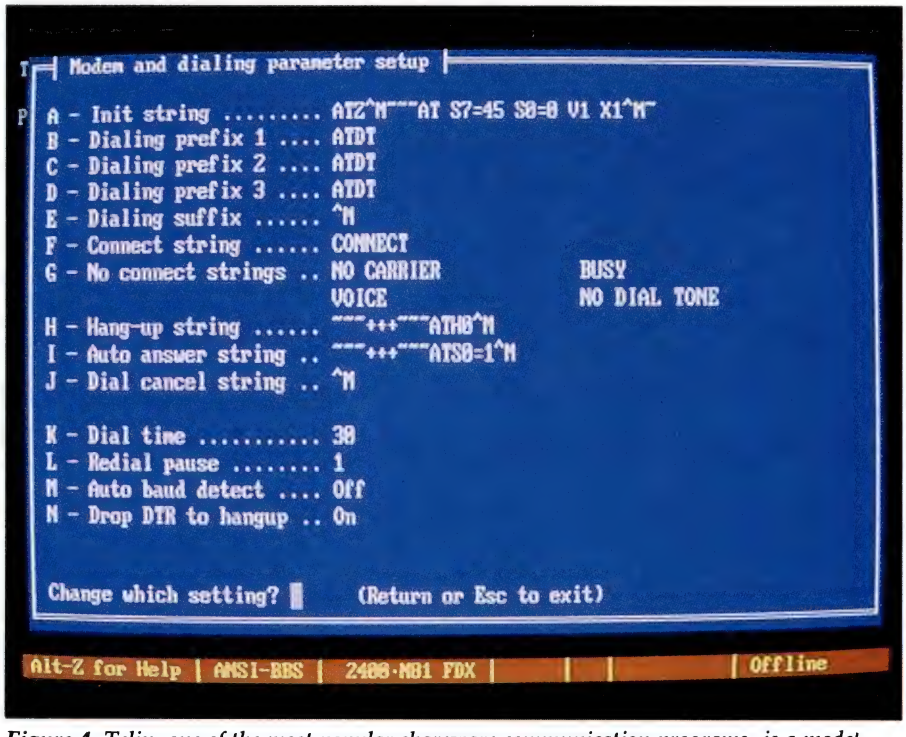



***Figure 4.*** *Telix, one of the most popular shareware communication programs, is a model for achieving a good user interface – the menus and setup screens have logical combinations of options.*

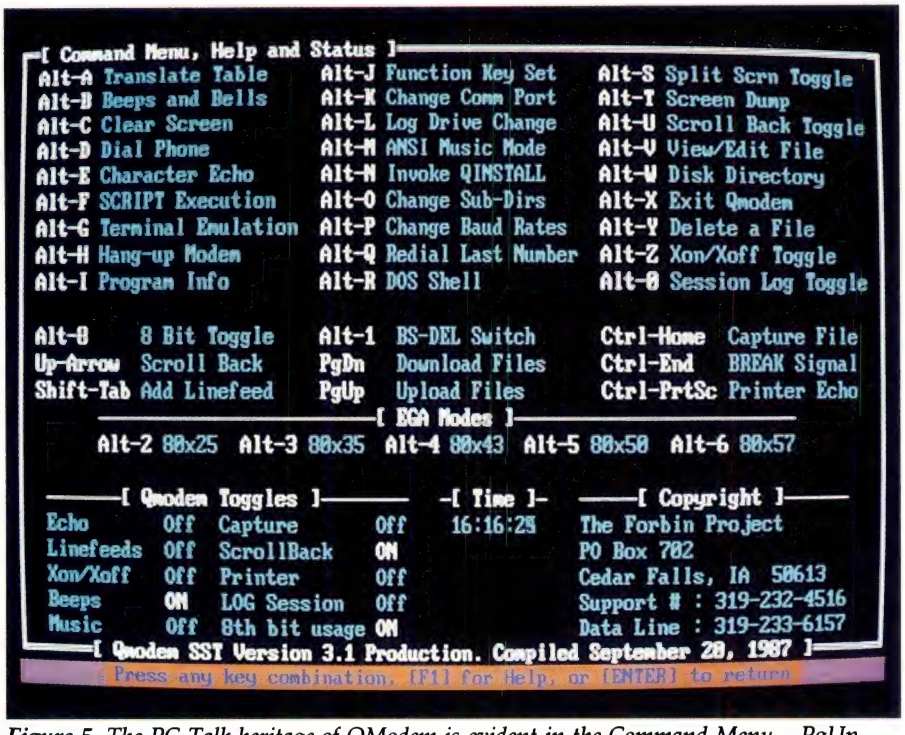



*Figure 5. The PC-Talk heritage of QModem is evident in the Command Menu – PgUp and PgDn initiate file transfers, Ctrl-Home opens a capture file and various Alt key combinations access the menus.*

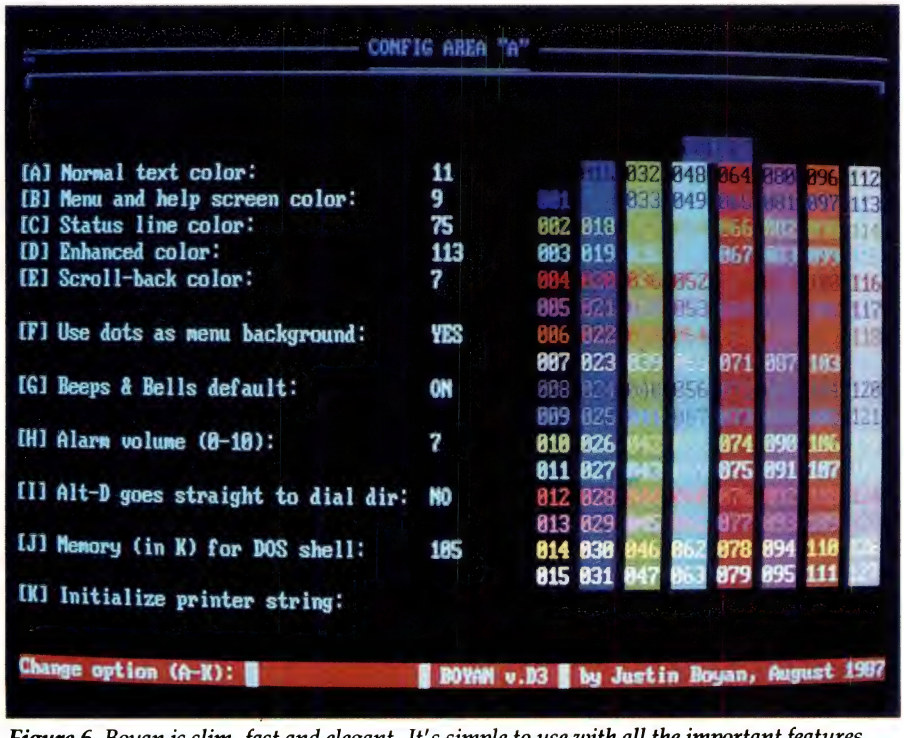



*Figure 6. Boyan is slim, fast and elegant. It's simple to use with all the important features for PC to PC and bulletin board communications – for novice users, it's an excellent starting point.*

This is a powerful and versatile program, with the only room for improvement being in the area of cosmetics. Some screen displays are very cluttered, and messages tend to have all letters capitalised. The result is that reading a screen can take longer than it should.

Procomm+ comes with a 210-page paperback manual. It is very complete, and has a comprehensive index and table of contents. Procomm+ is a product of DataStorm Technologies Inc, of the USA.

## Telix 3

One of the most popular and best known shareware communications packages is Telix. For 18 months, users been eagerly awaiting version 3, and it was released on July 1, 1988. Telix is again loosely modeled on PC-Talk, going straight to terminal mode when executed, accessing menus from combinations of Alt and other keys, and using PgUp and PgDn to initiate uploads and downloads.

Telix is a model program as far as achieving a good user interface is concerned. The menus and set-up screens have logical combinations of options, which can be selected either by moving a menu bar and pressing Enter or by pressing the leading letter. Colours can be easily changed to suit individual preferences, and as they are changed can be seen on the setup screen.

Telix 3 has a great range of internal protocols, and can access external protocols. ASCII, CIS Quick B, Kermit, Modem7, SEAlink, Telink, XModem, 1k-XModem, G-1k-XModem, YModem (Batch), YModem-g and ZModem. Telix can also access external protocols. A limited range of terminals are emulated, including the very important ANSI-BBS. Other terminals emulated are TTY, ANSI-BBS, VT102, VT52 and AVATAR

Telix offers one of the most powerful script languages available. Far more than a mere batch language, it includes full flow control, looping, and conditional branching. Called SALT (Script Applications Language for Telix), it uses a C-like syntax but without the hazards that language offers the novice. Sample scripts are included for automatic log-on to bulletin boards running Opus and other BBS software. After a script file is created in ASCII form it is 'compiled' into a more compact file that Telix can more quickly execute. The Telix host mode is written in the script language and is a testament to its power

The dialing directory includes a vast

range of information, including a different password for each entry. One script file can thus be used for all Opus systems, and looks up the password for a system as required. Maximum speed is 115,200 bps, though 4.77 MHz PCs may not be able to go so fast.

The manual is a whopper. It comes on disk, or in the file downloaded from a bulletin board, and is in fact two manuals. The main Telix manual, giving detail for operation of the program, is 55 pages. Telix's script language has its own manual, and this is 117 pages long.

## QModem

Yet another program which shows its PC-Talk heritage, QModem 3.1 is shareware from the US. The latest version I have seen is 3.1, and it has creation dates of September 1987. QModem appears to have been written in Turbo Pascal, and uses one .COM file and several overlays. Like all the other derivatives of PC-Talk, PgUp and PgDn initiate file transfers, and Alt key combinations bring up menus. Home brings up an abbreviated help screen, Ctrl-Home opens a capture file, and the various Alt key combinations access various menus.

Terminals emulated include TTY, ANSI, VT100 and TVI 925. File transfer protocols are ASCII, XModem CRC, IModem, YModem-G, XModem, Relaxed XModem, YModem and None. Maximum file transfer speed is 38,400bps.

QModem has a comprehensive manual on disk, or in the .ARC file on a bulletin board. At 136 pages, it is well laid out and has quite a good index and table of contents. Naturally, a comprehensive script language is provided. QModem 3.1 had more features than Telix 2.12, and while it had a very good user interface, that of Telix 2.12 was even better. Against Telix 2.12, QModem 3.1 stacked up very well, but Telix 3 has overtaken it, and now leads it in both features and the user interface.

## Boyan D3

Yet another communications program with a user interface inspired by PC-Talk, Boyan is slim, fast and elegant, but with a few restrictions. Maximum speed is 9600 bps, which is a limit only for communications with two machines directly wired together. Over a modem link it is of very little consequence.

Running Boyan takes the user straight into terminal mode after an initial copyright screen, and at any time pressing Ctrl-Home brings up a help screen. As always, Alt plus various keys brings up menus which are attractive in appearance, and logical in layout. Capture files and log files are supported. Boyan can access up to five external protocols, and has several internal protocols including XModem, XModem-CRC, Relaxed-XModem, YModem, YModem-G and ASCII. Boyan has a manual on disk, which prints out as 60 pages. Well written and logically sequenced, it is easy to read. Boyan calls its script language a macro language (it does well at creating automatic systems).

Boyan is a simple to use program, with all the important features for PC to PC and bulletin board communications. It is easy to recommend as an initial program for the novice to intermediate user.

## Preferences

How can you choose from the six? All are fine packages, all can do almost any PC to PC communications tasks one could ever require. All have auto-dial and -answer, dialing directories and script languages. All handle a great range of file transfer protocols, either internally or by making it easy to drive and external protocol. The greatest variation is in the terminal emulations. Only SuperCom 3 and the NetComm Program V3 have Viatel. Other terminals supported vary from one to another, and if one in particular is required then a program chooses itself. Only SuperCom has the ability to fully remote control another PC via its snapshot mode.

The choice? For general purpose bulletin board access and file transfer, any will do the job but Telix 3 is a nose in front with elegant screens and logical menus, plus what appears to be the most powerful script language and the best overall consistency of design. QModem 3.1 and Procomm+ are not far behind, with features close to Telix 3, but in each case with less elegant displays and less logical menus.

Boyan or the NetComm Program V3 are the choice for the novice, with The NetComm Program continuing to score as experience improves. SuperCom or NetComm are essential for Viatel, and SuperCom for remote control.

Why not get all the user supported packages and try them out? It won't cost you an arm and a leg. At the end of it you should be able to write your own wish list and know if a commercial package is the prescription for your communications ills. I liked, and could use, all the packages in this overview. □

### Product Details

**Product:** SuperCom 3
**Distributor:** PC Extras, 82 George St, Redfern 2016 NSW
(02) 319 2155
**Price:** $199 taxed

### Product Details

**Product:** NetComm Program V3
**Distributor:** NetComm Australia, Unit B, Centre Court, 25 Paul St Nth, North Ryde 2113 NSW
(02) 888 5533
**Price:** Bundled with NetComm modems;
$144 if bought separately;
$57 Version 2 upgrade

### Product Details

**Product:** Procomm+
**Distributor:** Manacomm Pty Ltd, PO Box 509 Kenmore 4069 Qld.
(07) 374 1311
**Price:** $120 taxed

### Product Details

**Product:** Telix 3
**Distributor:** PTel, PO Box 130 West Hill, Ontario M1E 4R4, Canada
**Price:** Telix is shareware. The requested contribution is $US35 plus postage, for which one receives the program on two disks. No printed manual is available. Telix is also available on many Australian bulletin boards, or from user groups.

### Product Details

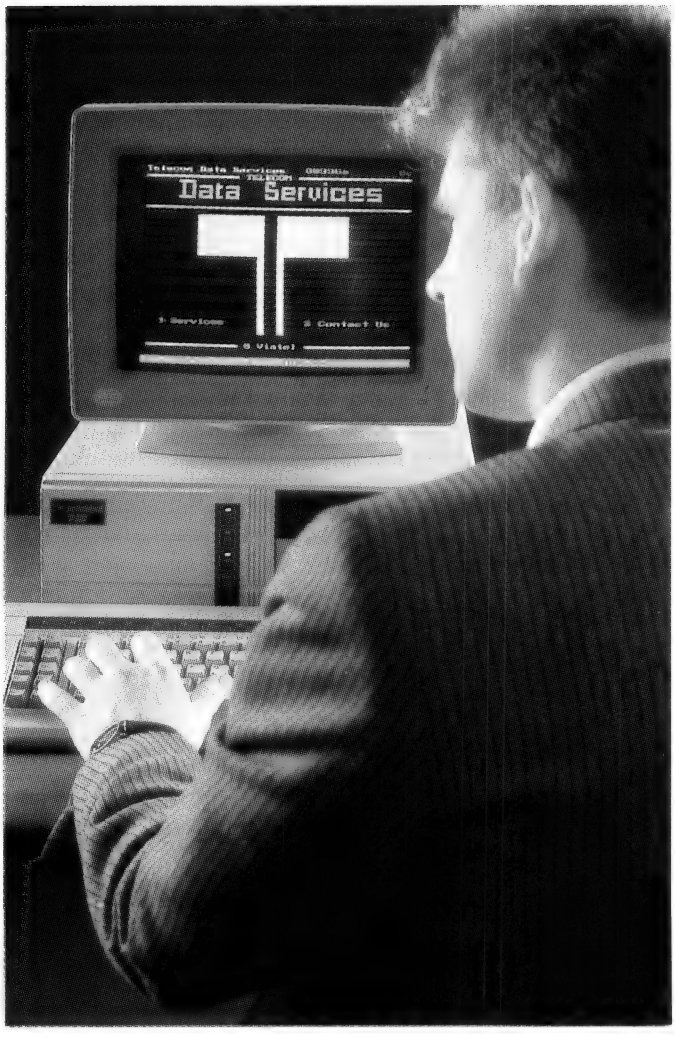
**Product:** QModem 3.1
**Distributor:** The Forbin Project, PO Box 702, Cedar Falls, IA 50613 USA
**Price:** QModem is shareware. The registration fee is $US30. For $US50 plus postage, the user receives the latest version on disk plus a printed manual. Many bulletin boards have copies of QModem.

### Product Details

**Product:** Boyan D3
**Distributor:** Justin Boyan, 9458 Two Hills Court, Columbia, MD 21045 USA
**Price:** Boyan is shareware. Registration is $US35. No printed manual is available.

# On-line Services

Once you have connected a modem to your computer and configured the software, the next step is the exciting one – Robert Thirlwell tells of the electronic world awaiting you . . .




YOUR OPTIONS are almost as many as you can imagine, with bulletin boards to access (there's a complete Australian listing starting on page 116), world-wide on-line database services, and electronic mail to send and receive. There are two things to watch out for: your phone bill will immediately skyrocket, and a lot of information you see will be of no interest to you whatsoever. That is because the information is usually of a specialist nature, and not really suited to browsing. But if you can tap into a bulletin board with an active interest area, often called a conference, or if you find a database with your interest at heart, good luck to you. A hint for new users: it will help to keep the costs down if you download the information rather than read it on-line.

One of the most useful utilities provided by some of the on-line services is electronic mail. Many corporations are using this facility for communications within their organizations where it can complement, or even replace phone calls, especially if people are constantly on the move. Insurance agents, sales representatives, and anyone working in field locations can use portable computers equipped with modems to dial up an electronic mail service at any time to place orders, file reports and leave messages. At the same time, they can download files and read messages addressed to them. In the non-corporate world, bulletin boards can also be used for the sending and receiving of electronic mail. In both cases, it is possible to do this on a global basis – limited only by your pocket.

*From the comfort of your home or office you can travel the world electronically, playing the share markets, delving into obscure databases, researching market trends, or finding that bit of esoterica. . .*

The amount of information that is stored in databases world wide is already staggering and it's growing all the time. From jam recipes to motor vehicle registration statistics; from jokes to international coverage of newspapers and magazines, it's all there for the asking (at a price). As an example, Orbit Information Technologies have INPADOC, from the International Patent Documentation Centre in Vienna. It contains information on patent docu-

ments from 55 international patent offices. There are in excess of 14 million records, and if that's not enough, 25,000 new records are added each week! From the comfort of your home or office you can travel the world electronically, playing the share markets, delving into obscure databases, researching market trends, or finding that bit of esoterica that has eluded you for years you for years.

Most of the on-line services have a joining fee and a monthly service fee. Several of the larger ones have a minimum monthly fee of around $30. In addition, fees are charged for access to various databases ($100 an hour is not uncommon) and if the database is an overseas one, there is an additional charge for Austpac or OTC Data Access. These figures are a rough guide to the larger on-line services that would mainly be used by businesses, government agencies and professionals. Local on-line services can be cheaper – for example the NSCU educational database charges only $30 per hour, and many bulletin boards have a small once-only fee to cover costs, while those in the worldwide FidoNet charge nothing for use.

## Databases of databases

Databases of databases exist, but they are often elusive because they only appear onscreen once you have subscribed to a service and are on-line. One such database is Hostess, which is based in the UK; it lists databases from around the world, and can be accessed via OTC's Data Access or Keylink. (See Stewart Fist's 'Data Access' on page 36 for more information.) A local guide is Telecom's ABCD (Australian Business Communication Directory), but it is only for text services such as telex, teletex, keylink, and faxstream. The information about each on-line service provided here is meant to be a guide only. Most offer extra facilities such as built-in search functions, electronic mail and printed hard copy on request (which can save the time charges for downloading). The phone numbers are provided for further information regarding the service. Access with your modem is through another number that you receive when you register with the service or subscribe.

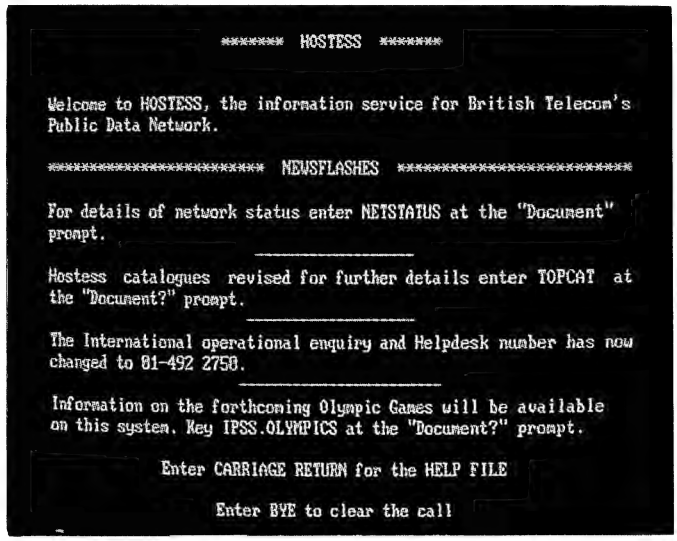
## Austpac

Austpac is Telecom Australia's packet switching network. It's not an on-line service as such, but it permits more efficient use of communications channels by allowing dozens of people to use the same lines. This is achieved by breaking up long messages into short groups of characters called packets, with address codes attached to ensure that the destination is reached. Austpac is used for transmitting information electronically within Australia, and for Keylink access. Austpac charges a monthly fee and registration charges.

## Keylink

Keylink is a joint service of Telecom and OTC, having replaced Telecom's Telememo and OTC's Minerva. It provides 24 hour national and international electronic mail, telex access, database gateways, ASCII file transfer, off-line word processing, bulletin boards, a personal diary and a spell checker. Messages may be sent to and stored in centralized electronic mailboxes (storage areas on mainframes). Each mailbox is assigned to a single user, who may be an individual, a company, or any group. Messages can be up to 'book length'. Keylink can be tailored for corporate use, with usage reflecting company hierarchy or function.

Keylink users can access any database worldwide for which they have a valid subscription. You can even set up a private database using 'Keylink D'. Libraries, stock ordering departments and on-line booking agencies can make use of customised on-screen forms for ease of data entry and retrieval. There is an on-line help facility in the form of menus. Keylink will soon accord with the OSI X.400 recommendations for the development of international mail using disparate equipment. The rates are based on connect time, with a minimum monthly charge of $33 per month for single-user business accounts, and $300 per month for multi-user corporate accounts. For more information: (008) 023 223.



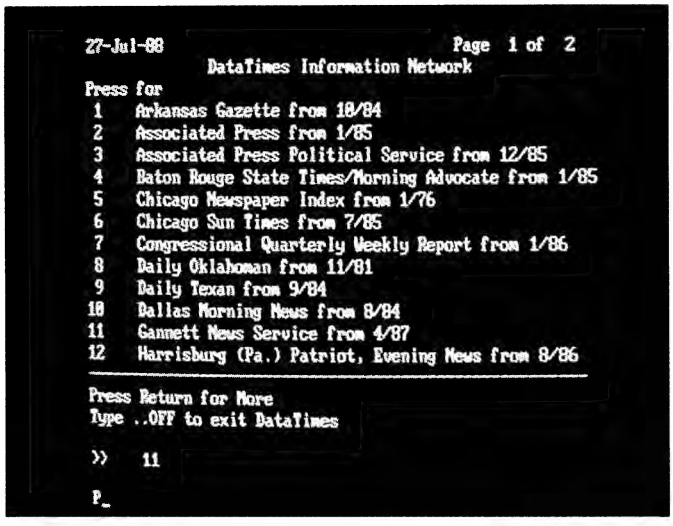

*When there are so many databases to choose from, it becomes necessary to use databases of databases. Hostess, a UK-based service, has a selection of subject areas with listings under each subject area. It gives world-wide coverage and can be accessed through Keylink or OTC's Data Access.*

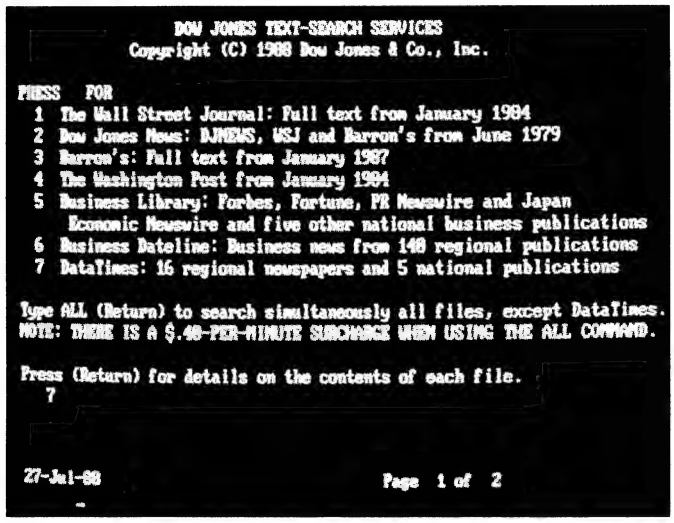
## Data Access

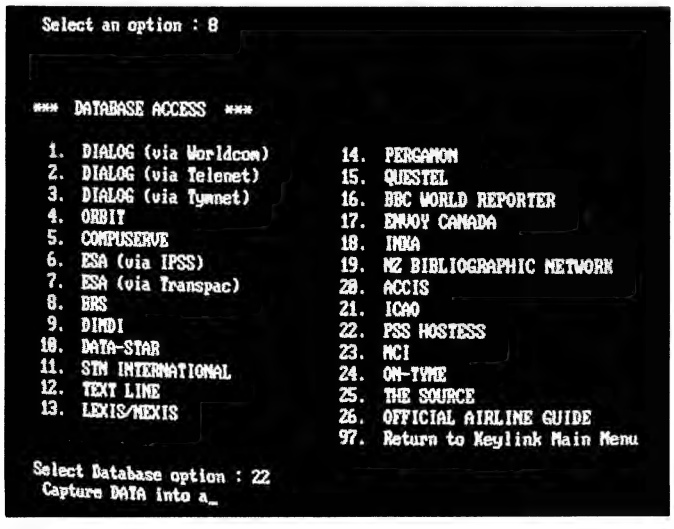
Data Access, run by OTC, allows sharing of information if your company has offices overseas, and can keep you in touch with your own office with electronic mail if you are overseas. Data Access can link you with most of the thousands of databases and Videotex services overseas. It's for those involved in research, marketing, the information industries, bankers, and many others who need to keep in touch with developments on an international scale. Data Access can reach some 34 countries. There are no monthly fees or registration charges; charges are based on connection time and the volume of transmitted data (plus the public database access fee). For more information: (008) 251139.

## Overseas Services

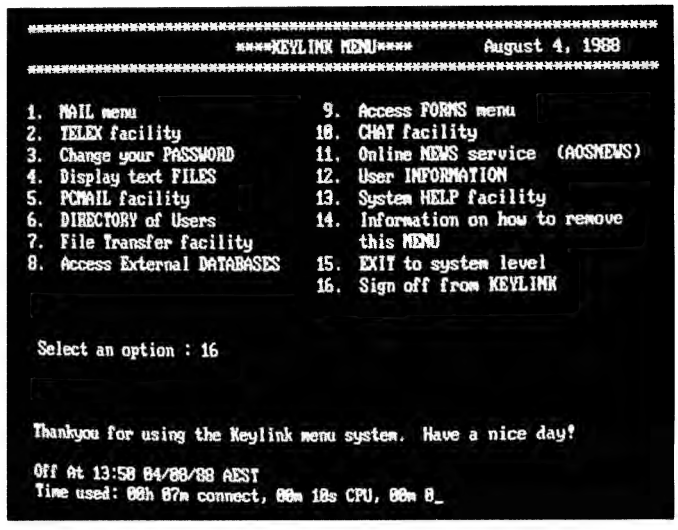
**ORBIT** is a US-based information retrieval service that specializes in patents, chemistry, energy, engineering and electronics. There are over 70 databases, covering health and safety, Chinese patents, imaging literature, rubber and plastics, electronic publishing, water resources and more. There is even a database of databases, CUADRA, that contains information on over 500 on-line services with some 3300 databases. Other services include customer support, a current awareness service, document delivery, and the Pergamon search service. For more information: (008) 22 6474.




*Menu screens from Keylink, a service provided by Telecom and OTC.*




**Dialog Information Services** is the world's largest public on-line service. It has over 350 databases that cover a huge array of subject areas. Dialog is based in Palo Alto, California.

**Mead Data Central** is a US service with two components, Lexis and Nexis. Lexis covers legal information from Western countries, and Nexis covers newspaper and magazine information on a number of subject areas including finance, business, science and technology. The information is in full text form.

## Viatel

**Viatel** is a Public Videotex service run by Telecom with some 30,000 users. Overseas equivalents are the very successful French Minitel/Teletel, and the British Prestel system. You can use a personal computer with a 1200/75 baud modem, a TV set with a Videotex adapter, or dedicated Videotex terminals. Viatel allows subscribers to access information provided on 'pages' by over 200 Service Providers, and to send messages, buy goods, download software, and make reservations. Services include Business and Finance, Travel and Tourism, Magazines, Microcomputing and a variety of others, some quite specialised. Subscription fees are $12.50 per month for businesses and $3.50 per month for non-business use; you will also be charged the local call connect fee and 9 cents per minute during business hours and 6 cents per minute at other times.

Here is a selection of Viatel Services –

*ABS* is provided by the Australian Bureau of Statistics on a 24 hour basis. The service provides users with short summaries of the most recent social, economic and population statistics, including CPI figures, average weekly earnings, motor vehicle registrations and so on. The system is menu-driven and well-indexed. For more information: (008) 03 3342.

*Telebank* is the Commonwealth Bank's home banking service that allows customers to access their accounts, transfer funds, view statements and open new accounts. There is also a travel service and a Telebroking service that facilitates share trading. Ask at your nearest Commonwealth branch or call (02) 261 4144.

*Microtex 666* For microcomputer users, this is the largest and fastest growing information provider on Viatel. There are over a thousand programs available for downloading in the software library, all discounted and some are free. There is also a 24-hour bulletin board service with thirteen bulletin boards, multi-player games, a

trading section, and daily computer news. (Microtex has released their own communications package – it's reviewed by Tim Hartnell in this issue).

*Money Watch* is a Viatel service that provides up to date information on financial markets including shares, futures and foreign exchange on Australian stock exchanges. It also has information on daily exchanges rates for foreign currencies. Other services include a capital gains calculator, a portfolio manager, telebroking and news updates.

*TAB VIABET* allows you to place bets on the WA TAB from your home or office. Or you can bet on the Victorian TAB with *TELEBET*.

*One of the most useful services provided by some of the on-line services is electronic mail.*

## Other Australian services

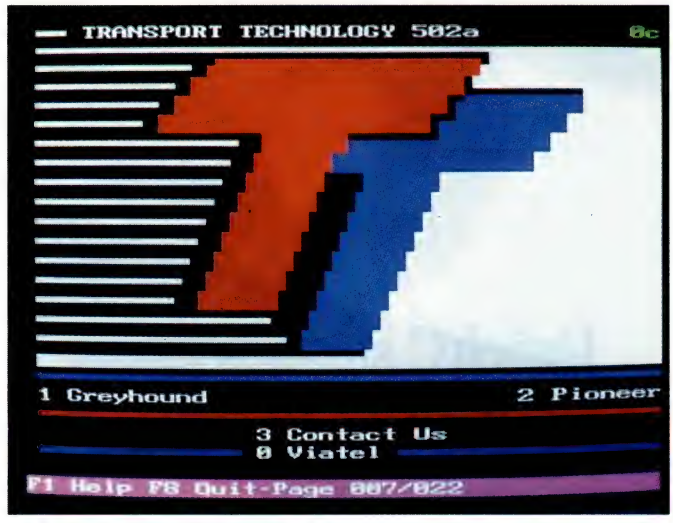
**Ausinet** has more than 30 Australian databases, including leading financial magazines and newspapers, business directories, and bibliographical databases. It includes Thorpe's *Australian Books in Print*, an on-line version with over 40,000 entries. Contact ACI computer services: (03) 541 5600.

**NSCU** is The National Software Co-ordination Unit's database project that provides on-line information about software and hardware use in Australian schools. Each record contains factual information for easy cataloguing, and an abstract, which is a review of software by users. Information is gathered from all State Departments of Education, and representatives from Private, Catholic, and Special Education systems. Contact NSCU Curriculum Development Centre, PO Box 34, Woden 2606 ACT. Also, Sharon France discussed the Unit's services in 'Educational Software', Sept.'88)

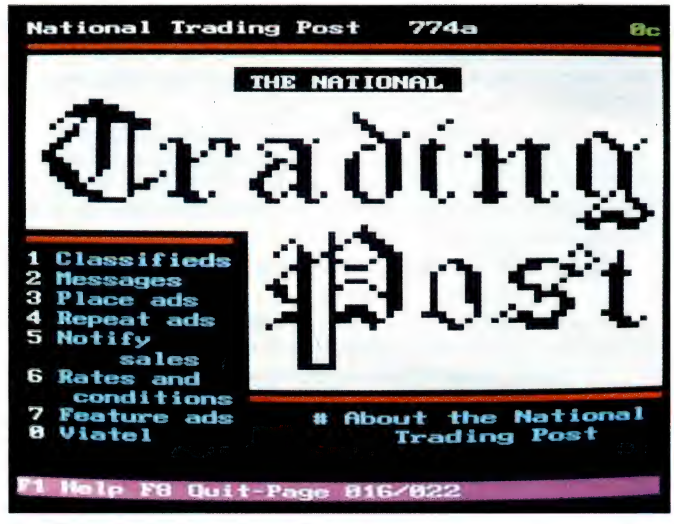
**Maynelaw** is a NSW-based legal system for solicitors. It contains information that is used in conveyancing, property searches and transactions. It automatically searches the records of relevant government departments. (02) 387 0911.

**Westpac Handyline** offers a bank by phone service with access to Advantage Saver, Cheque, Mastercard and Bankcard accounts. You can transfer funds between accounts with a tone phone, or a pulse phone with a tone adapter – this basic, no frills service is free. For $4.00 per month (plus a personal computer, modem and Videotex software), you can also view details of transactions, account statements, investment information, interest rates, travel details and insurance premiums. The third option adds an electronic mailbox, market rates, investment rates, bullion prices, foreign exchange and more (for $12.00 per month).

**Australian Medline Network** has four databases, comprising Medlar (information on health planning and administration), ATECS (a registry of the toxic effects of over 60,000 substances), Serline (US biomedical serials), and Catline (the catalogue of the US Library of Medicine and the Australian Medical Index). Contact the Medline Principal Librarian, Life Sciences Section, National Library of Australia, Canberra 2600 ACT, or call (062) 62 1523.




*Viatel's Transport Technology has mainland bus services and fare schedules.*



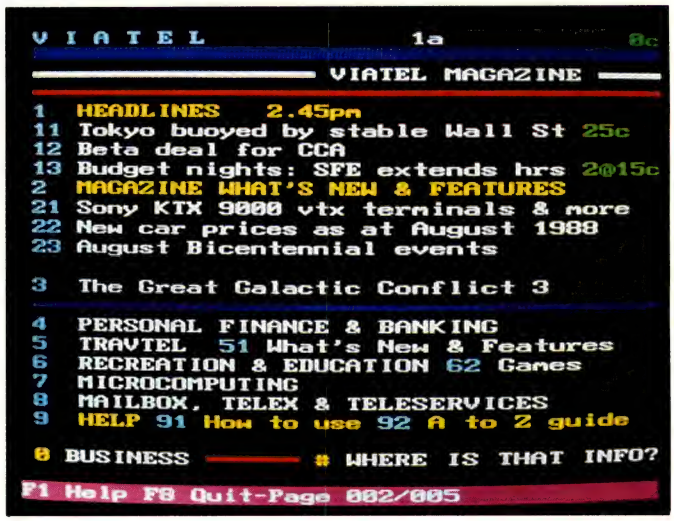

*A full-featured, Australia-wide, electronic garage sale – what a great way to use your computer!*

**PressCom** is the *Adelaide Advertiser's* electronic archive of every local, interstate and overseas article published by them since 1886. (08) 218 9645.

**Australian Bibliographic Network** is an extensive database of books, magazines, maps, films and sound recordings, all cross indexed by publishers. Contact the Executive Officer, ABN Office, National Library of Australia, Canberra ACT 2600. (062) 62 1546.

**CSIRO Australis** is part of CSIRONET. Australis contains 13 databases that cover various aspects of Australian agriculture, energy resources, marine research, engineering, water resources, wine, family studies, industrial relations, leisure, road research, and various conferences. There are also databases covering CSIRO information and research activities, films, a CSIRO index, electronic mail, and Australis News.

## ON-LINE SERVICES




*An electronic magazine is a great idea – but where's Erotix, that sexy database we've heard about?*

**Austats** is also part of CSIRONET. It's a complete listing of ABS (Australian Bureau of Statistics) statistics. Includes search facilities; and information can be extracted in graphic or numeric form.

**CSIRONET Inform** is a database search facility that is easy to use and has low on-line costs. Inform includes the Dun and Bradstreet Market Indicator, with a listing of Australian companies under several categories; Landsearch, a listing of all Commonwealth land in Australia; the Australian Innovation Search Service, which has information on any inventions under way; and NICAN, listing facilities available throughout Australia for people with disabilities. For any CSIRONET information phone (008) 02 6165.

**Moneycentre Stockwatch** offers access to foreign exchange, commodity futures and equity markets in all major trading centres around the world. News services such as UPI and *Agence France Press* are also available. The latest development with the Moneycentre is the ability to connect an FM receiver to a laptop computer, and then can receive and transmit live data within Sydney's central business district without using telephone lines. Stockwatch (02) 281 1666.

**APAIS-AGP** is the Australian Public Affairs Information Service, and Australian Government Publications information. (062) 62 1536.

**CLIRS** (Computerised Legal Information Retrieval System) provides access to a database containing primary legal material, legislation, criminal law, local government acts and government information. It also offers search facilities for land titles, documents from the Corporate Affairs Commission, and other legal information. Recent additions to CLIRS includes access to the Official Airline Guides Electronic Edition (OAG), and Spectrum, a database that provides details about Australian companies. (02) 233 1955.

**Elderlink, Farmlink,** and **Sharelink** are all run by Elders-IXL. Elderlink contains an interactive accounting package, Cash Book, which allows access to accounts and financial computations 24 hours a day. Sharelink covers the major Australian sharemarkets with constant updates, and Farmlink contains up to date information on meat and livestock markets. Contact Elders Pastoral on (08) 218 4626.


*If you've got a Commodore 128, for the cost of a membership to Microtex 666 plus $2, you can replace that worrisome fishtank.*

**Information Express** is a service specializing in business information, including updates on the share markets and futures markets directly from the Melbourne and Sydney stock exchanges. Also offered are portfolio monitoring, and access to foreign exchange, international commodities and the money market. There is also a news service giving updates on general news, business and agriculture, and electronic mail, telex access, and E-Post. (03) 209 2222 or (008) 33 8806.

**Infobank** provides information for market research based on data provided by the Australian Bureau of Statistics. It includes vehicle registration, retail sales, municipal affairs and similar information. (02) 439 0033

**Electronic White Pages** is Telecom's listed numbers database. There is a $100 registration fee, plus the cost of the Austpac link, and on-line charges. Special EWP software is required, too. □

## Tele/video/tex/text

What's a seven or eight letter word beginning with Tele- or Video- and ending in -tex or -text? The possibilities have almost been exploited to exhaustion, mainly by Telecom Australia, resulting in a confusing array of titles. Coming to grips with a growing array of terms, standards and services is not easy – these explanations should take some of the confusion out of telecomputing –

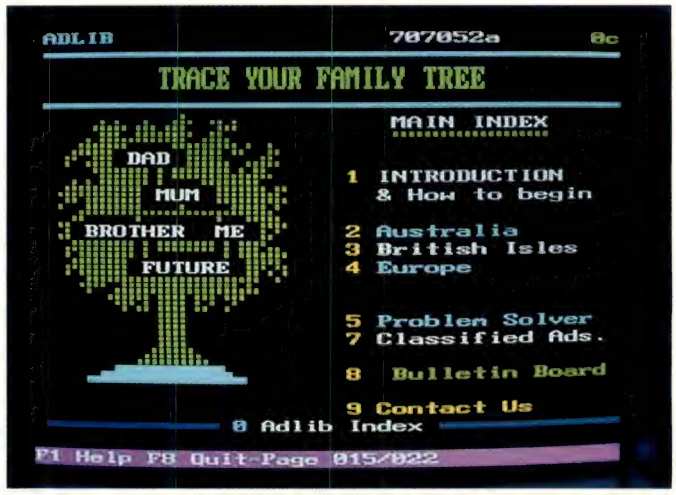
*Teletext.* Broadcast TV over normal channels using the vertical blanking interval. A one way flow of information.

*Teletex.* Telecom telecommunications service which transfers text documents and other data between a variety of computers. Also provides binary file transfer and Telex facilities. Using a 2400 baud modem, it takes around 10 seconds to send an A4 page of text to anywhere in Australia (for around 38 cents). A range of Teletex packs are on offer from Telecom, (008) 011 310.

*Videotex.* Uses the UK-developed Prestel system of sending information via telephone lines, and can be displayed using a TV set. It offers a two-way flow of information.

*Viatel.* Australia's Videotex service. It can be accessed with a personal computer and modem running at 1200/75 baud, or by attaching an adapter to a TV set.

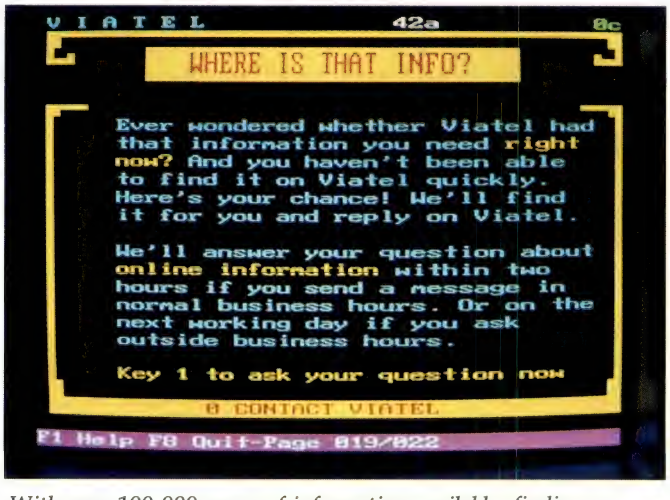

*Telecom's Data Services offers the latest information on DDS, Datel, Securitel, AustPac, ISDN and satellite services.*




*During the Bicentennial year, tracing family trees has proven to be one of the most popular family pastimes.*


*Sydney-based OziSoft have one of Australia's largest selection of computer games – here's an easy way to go shopping for them.*


*Welcome to Viatel! This is the first screen you'll see when logging on.*




*With over 100,000 pages of information available, finding a particular page can be a problem – unless you use 'Where's That Info?'*


*Telebank is a service provided by the Commonwealth Bank. It allows customers to access their accounts, transfer funds between accounts, open new accounts, read travel information and more.*


# HAVE YOU EVER SEEN A MODEM THIS SMART?

★ Fully Hayes compatible including Hayes 2400 baud commands. ★ As small as a credit card and only 3.2 cms thick. ★ Full duplex 2400 baud (V22 bis), 1200 (V22), 1200/75 & 300 baud (V21). ★ Operates directly on Telecom's new X32/X25 synchronous error correcting service (01925) using standard asynch input. It has its own packet assembler/disassembler (PAD) & replaces X32/X25 modem/driver cards costing $3000-$4000. All mainframes communicate using X25 as does the Telecom network, all overseas telephone systems and the new ISDN. If your present modem can't handle X32/X25 it is already obsolete. ★ Auto sensing data compression feature transfers data up to a rate equivalent to 5000 BPS, depending on material. ★ Auto sensing MNP error correcting protocol, compatible with forthcoming CCITT recommendation V42. ★ Incorporates DES data encrypton to AS2805. RSA public key encryption for key management will be available Dec. 88. ★ Inbuilt AX25 Packet Radio modem protocol. ★ Internal time/date clock can be programmed to time/date received files, send files at specified times or answer the phone only at set times. e.g. It can be plugged directly into a cash register and called after hours to download the day's transactions. ★ No batteries or power supply required. Internal NiCads are recharged by RS232 signals when the computer is on. Continuous modem operation (e.g. bulletin board) may require a plug pack. ★ Comms software for Apple or MS DOS included. ★ Context sensitive help screens. ★ Plugs straight into the computer RS232 connection, saving $30-$40 on a cable. ★ 8 Kbytes of battery RAM for phone no. & send/receive files. ★ Cards for internal mounting in MS DOS or PS/2 machines available Oct. 88.

MODEL PMA (as pictured) ..... **$399.00**

MODEL PMB (does not include 2400 baud) ..... **$299.00**

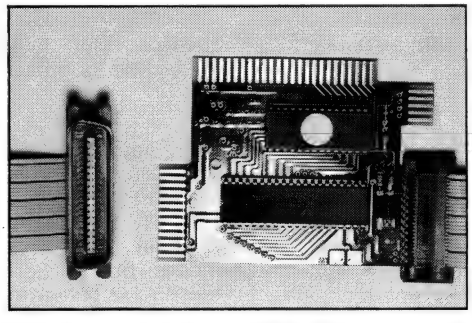
MODEL PMU (1200/75 & 300 baud — 2K RAM) ..... **$199.00**

*This modem is currently awaiting Telecom approval.*


## MAKE YOUR EPSON/EPSON COMPATIBLE PRINTER INTO AN IMAGEWRITER.

Use in place of normal printer cable (saving $30) to convert the serial output from Mackintosh, Apple II, IIe, IIGS or Apple IIc to parallel input for an Epson printer. As well as changing from serial to parallel, it changes the Imagewriter text and graphics codes to print on the Epson. Colour graphics are also supported. To all intents and purposes, the Epson becomes an Imagewriter (only cheaper). Please specify computer as the serial plugs are different.

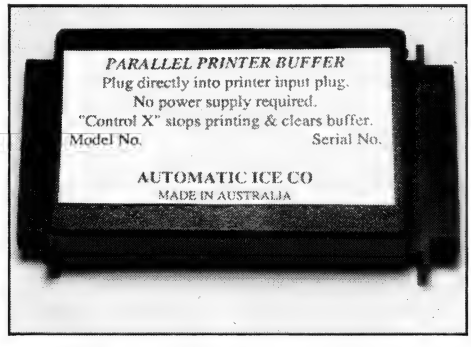
MODEL EIC ..... **$99.00**



## NEW AUTO ICE PARALLEL PRINTER CARD — IMAGEWRITER EMULATION.

New version of this well established card with a lot of extra features. It can turn an Epson compatible printer into an Imagewriter, especially useful for IIGS programs and other Imagewriter dependant programs such as Mousepaint. Contains inbuilt graphic dump routines including colour super Hi-Res for the IIGs. A keystroke immediately brings up the following utilities:- (a) A menu driven miniwordprocessor. (b) DOS and PRODOS diskcopy function. (c) BASIC program Renumber and Append functions. (d) A printout of the current textscreen. Conforms to Apple's official Firmware 1.1 specification for peripheral cards. Contains disk with printer drivers to convert old non standard programs.

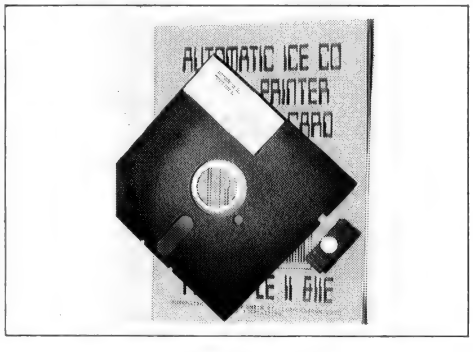
MODEL PR5-N ..... **$99.00**




## EASILY INSTALLED PARALLEL PRINTER PRINTER BUFFER.

Just insert between the normal printer cable and the printer input plug. Has 32 Kbytes of RAM but inbuilt data compression gives an effective buffer storage of up to 60 Kbytes (approx 35 pages). Transparent to software.

MODEL BF1 ..... **$99.00**




## AUTO ICE PRINTER CARD UPGRADE KIT

contains EPROM, disk and manual to add the above features to existing Auto Ice printer cards. Works only with cards marked PR4 or PR5 (please specify).

MODEL PR-K ..... **$49.00**

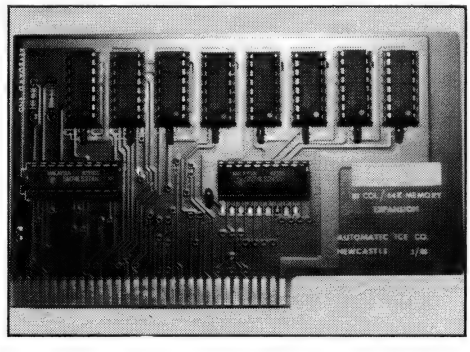
*All these products are designed and manufactured in Australia by:*

**AUTOMATIC ICE CO.**

**10 Smith St.,**
**Charlestown 2290.**

**Phone**
**(049) 63 3188**
**(049) 63 1386**

Bankcard, Mastercard, Visa



## 80 COLUMN DISPLAY — 128K MEMORY FOR APPLE IIE.

An old Automatic Ice Co. product. This is functionally equivalent to the original Apple product.

MODEL AM-1 ..... **$99.00**

# Modems

The modems mentioned in this survey are only representative of the range currently available for dial-up lines in the business and domestic markets. Many of them are manufactured in Australia to Australian conditions. There are models that range from the most basic 300 and 1200/75 baud modems costing $200 to the super fast, $3000 Trailblazer. Models that can run at 2400 baud are on offer from many manufacturers.

We have not been able to list every single modem available from every manufacturer, but some manufacturers, such as NetComm have other models in the same 'family' with different baud rates. Some of the modems that are used externally also have 'internal' counterparts that can be fitted to an expansion slot inside your computer. This has the advantage of saving space, and in some cases you pay less; but external modems have the advantage that they can be used by any computer with a standard RS-232 port.

Baud rates refer to the speed that data is sent down the line from the modem – 300 baud is the slowest speed generally seen in a modem today. At least 1200 baud is necessary for access to Austpac services, many bulletin boards and other on line services (most of which can also handle 2400). Viatel and other Videotex services use 1200/75. If you are dialling STD or downloading large files, 2400 baud is almost a necessity.

Specifications for modems can be as long as your arm, so we have left out the smaller details. The most important things are the baud rates, the CCITT specifications (and Bell specifications if you want to use the modem to access services in the US), whether the modem supports the full Hayes AT command set, and automatic features, such as auto-answer and auto-dial. Many of the modems covered here also have other features such as an internal speaker, status indicators, tone and pulse dialing, and remote diagnostic loop back. All prices are taxed.

**CCITT/Bell Baud rates**
V21/103 – 300
V22/212A – 1200
V22bis/- –2400
V23/202 –1200/75

**Avtek Minimodem II**
Price: $199.00
From: Avtek
300 full duplex, 1200/75 half duplex
CCITT V21, V23
A very basic modem, but all you need for accessing bulletin boards and Viatel. Asynchronous, line noise filters, manual operation.

**Datasat CD2123**
Price: $199
From: Datasat
300, 1200, 1200/75
CCITT V21, V23
Auto-dial, auto-answer, auto-disconnect, asynchronous, full duplex, 12 month warranty.

**Xitel 12 E**
Price: $250.00
From: Accord
300, 1200 Baud
CCITT V21, V22, Bell 103, 212A
Asynchronous, full duplex, auto-answer, auto-dial, auto-disconnect, Hayes AT compatible, low cost modem.

**NetComm Modem 64/128**
Price: $262.00
From: NetComm
300, 1200/75
CCITT V21, V23
For Commodore 64 and 128 computers. Full duplex, asynchronous, auto-dial, auto-disconnect, software included.

**NetComm 3+12**
Price: $299.00
From: NetComm
300, 1200/75
CCITT V21, V23, V22bis, Bell 103
Manual dial, manual answer, asynchronous, full duplex. Entry level modem for accessing bulletin boards, other on-line services and Videotex services such as Viatel. 3+12A has Apple II/IIe/c software; 3+12 NCP has IBM compatible NetComm Program included.

**Bit Blitzer 12E**
Price: $369.00
From: Mike Boorne Electronics
300, 1200
CCITT V21, V22, Bell 103, 212A.
Full duplex, asynchronous, auto-answer, auto-dial, auto-disconnect, full Hayes AT commands. Low power consumption.

**Bit Blitzer 12I**
**From: Mike Boorne Electronics**
Price: $339.00
Same as 12E, but internal for the IBM PC.

**Automatic Ice Co. Packet Modem (model PMA)**
Price: $399.00
From: Automatic Ice Co.
300, 1200, 1200/75, 2400 Baud
CCITT V21, V22, V23, V22bis
This is an amazingly small, powerful and inexpensive modem that plugs directly into the RS-232 port without requiring cables. It is the size of a credit card, and operates directly on Telecom's new X32/X25 synchronous error correcting data service using standard asynchronous input. It has its own packet assembler/disassembler (PAD), 8K RAM, a programmable clock/calendar that can be set to answer the phone, send and receive files at specific times, autosensing data compression, data encryption, and communications software for Apple or MS-DOS. No batteries or power supplies are required as an Nicad batteries are recharged by RS-232 signals when the computer is on. Model PMB, without 2400 baud is $299.00, and model PMV has 300 and 1200/75 baud, 2K RAM for $199.00. The PMV and PMB can be upgraded later.

**Bit Blitzer 123E**
**From: Mike Boorne Electronics**
Price: $449.00
300 asynchronous, 1200, asynchronous or synchronous, 1200/75 asynchronous, with a built in converter to change 1200/75 to 1200/1200.
CCITT V21, V22, V23, Bell 103, 212A.
Full duplex, auto-answer, auto-dial, auto-disconnect, full Hayes AT commands, low power consumption. There are no DIP switches or jumpers to set; all setup options are held in permanent memory, and can be altered via the Command Protocol.

**Avtek PC Megamodem 123**
Price: $449
From: Avtek
300, 1200, 1200/75
CCITT V21, V22, V23, Bell 103, 212A
Internal half card for IBM compatibles. Full duplex asynchronous, auto-answer, auto-dial, auto-disconnect, Hayes AT compatible. When accessing Videotex services, the Megamodem will automatically convert 1200/75 to 1200/1200. External models are also available, and the Megamodem 1234 has the addition of 2400 baud ($549.00). Avtek also make modems for Commodore 64/128 and Amigas (300, 1200, 1200/75).

**Bit Blitzer 124E**
Price: $459.00
300 asynchronous, 1200, 2400 baud asynchronous or synchronous
CCITT V21, V22, V22bis, Bell 103, 212A.

Full duplex, auto-answer, auto-dial, auto-disconnect, full Hayes AT commands. No DIP switches or jumpers to set; all setup options are held in permanent memory, and can be altered via the Command Protocol. Low power consumption.

**Interlink IQ-123-A**
Price: $495.00
From: Interlink
300, 1200, 1200/75, Baud
CCITT V21, V22, V23 Bell 103, 212
Full duplex asynchronous, Hayes compatible, auto-answer, auto-dial, auto-disconnect, LED status display. Includes a comprehensive manual and Videotex software.

**Bit Blitzer 1234E**
Price: $549.00
300 asynchronous, 1200 asynchronous or synchronous, 1200/75 asynchronous with a built in converter to change 1200/75 to 1200/1200, 2400 baud asynchronous or synchronous. CCITT V21, V22, V23, V22bis, Bell 103, 212A. Full duplex, auto-answer, auto-dial, auto-disconnect, full Hayes AT commands. No DIP switches or jumpers to set; all setup options are held in permanent memory, and can be altered via the Command Protocol. Low power consumption.

**NetComm Automodem 123**
Price: $599.00
From: NetComm
300, 1200, 1200/75
CCITT V21, V22, V23, Bell 103, 212A
Auto-dial, auto-disconnect, auto-answer, AT command set, asynchronous, auto ranging. Long term memory retains configuration settings even if modem is switched off. Other Automodems are available with different baud rates from NetComm.

**NetComm PocketModem 123**
Price: $599.00
From: NetComm
300, 1200, 1200/75
CCITT V21, V22, V23, Bell 103, 212A
Auto-dial, auto-answer, auto-disconnect, AT command set, asynchronous, full duplex. A small, lightweight modem in a rugged plastic case designed for portability. It has a direct connect RS-232 port, a rechargeable NiCad battery, car accessory connector, long term memory, and a battery charger. The Netcomm Program Volume 3 is included, and the Pocket Modem can be purchased for IBM compatibles, Commodore 64/128, and Amiga computers.

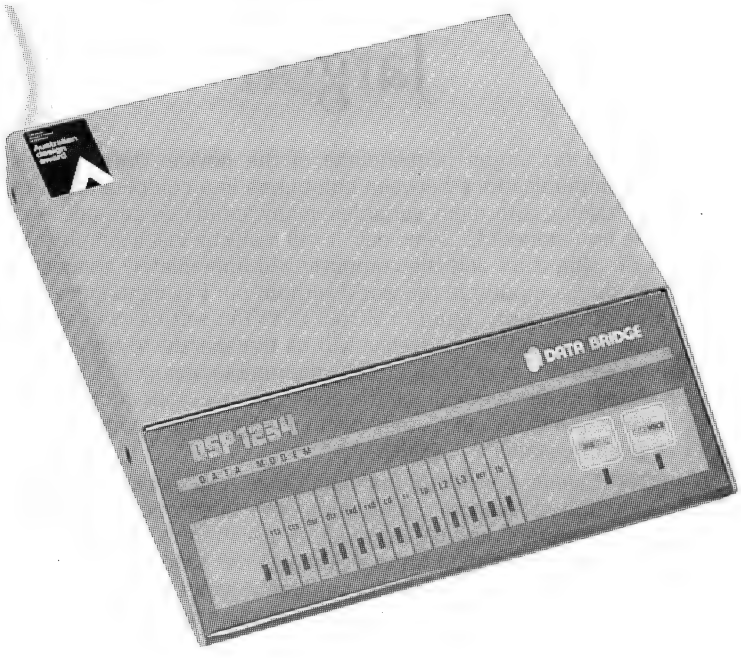
**Data Bridge DSP 1234**
Price: $995
From: Data Bridge
300, 600, 1200, 1200/75, 2400C-CITT V21, V22, V23, V22bis, V24, V54, Bell 103, 212A
Full duplex, asynchronous, synchronous, auto-dial, auto-answer, auto-disconnect, auto ranging, Hayes AT command set, help screens, telephone directory, stored configuration, internal power supply and many more features. This modem has been constructed to suit Australian conditions to give less errors over poor lines, and has won an Australian Design Award. Options include dial back security with password protection, remote configuration for networks, V25bis dialing, and Bell mode for USA communications. Other models are the DSP 1200, DSP 2400, DSP 123.

**NetComm Smartmodem 1234SA**
Price: $1049.00
From: NetComm
300, 1200, 1200/75, 2400 Baud
CCITT V21, V22, V23, V22bis, Bell 103, 212A, 202
Auto-dial, auto-answer, auto-disconnect, auto ranging, AT command set, asynchronous and synchronous. The Netcomm Program Volume 3 is included with all Smartmodem products. This modem has everything you could need for dial up communications.

**Dataplex DPX-224 Quad Speed Modem**
Price: $1162.00
From: Dataplex
300, 600/600, 1200, 1200/75, 2400 Baud
CCITT V21, V22, V23, V22bis, Bell 103, 212A
Auto-dial, auto-answer, full duplex, asynchronous, synchronous, Hayes AT compatible. This modem provides a high level of security, with password checking and the ability to dial back a predefined number corresponding to a password sent from a remote source. Twenty such dial-back numbers can be stored along with their corresponding passwords inside the modem. An inboard PC card version ($849.81) and a rackmount version ($992.00) are also available.

**NetComm Radio Smartmodem**
Price: $1995.00
From: NetComm
300 to 9600 Baud
This modem uses a radio connection instead of a phone line. It uses standard RS-232 data link parameters, and can be used for communicating between a PC or mainframe and some remote location from a few hundred meters to thousands of kilometers. Suitable for delivery vehicles, field sales, ship to shore communications and racing cars.

**NetComm Trailblazer**
Price: $3409.00
From: NetComm
300, 1200, 1200/75, 2400, up to 18,000 BaudCCITT V21, V22, V23, V22bis, Bell 103, 212A, High speed PEP
A super fast modem that ensures high speed, error free communications by using a proprietary Packetized Ensemble Protocol. It analyses the phone line and divides it into discreet channels, using only the cleanest noise-free ones for communication.




*An Australian Design Award Winner – Data Bridge's DSP 1234.*

## Suppliers –

**Avtek Electronics Pty Ltd**
Unit B, 25 Paul St.
North Ryde NSW 2113
(02) 888 5333

**Accord**
PO Box 215
Gordon NSW 2072
(02) 498 2155

**Automatic Ice Company**
10 Smith St
Charlestown 2290 NSW
(049) 63 3188

**Dataplex**
PO Box 541
Lilydale Vic 3140
(03) 735 3333

**Data Bridge Electronic Communications**
Suite 4, Henry Lawson Business Centre
Cary Street, Drummoyne NSW 2047
(02) 819 6474

**Interlink Electronics**
113 Fitzroy St
St. Kilda Vic 3182
(03) 525 3388

**Datasat**
Unit 1, 8 Lachlan St
Liverpool NSW 2170
(02) 821 1622

**Mike Boorne Electronics**
PO Box 8
Turramurra NSW 2074
(02) 46 3014

**NetComm**
PO Box 284
Pymble NSW 2073
(02) 888 5333

**The Nice Computer Co**
112/396 Scarborough Beach Road
Osborne Park WA 6017
(09) 242 2422

# Jargon

Computer jargon is the curse of the novice. Unfortunately, communications between computers is a complex technical undertaking, with many variables, many standards and and even more non-standards. Some day, it will really be just a simple matter of 'plug it in' and the computer will immediately connect to any other computer in the world without our having to know anything about parity, baud or XON/XOFF. The settings will still be there, but *then* their existence will be transparent to the user. In the meantime, don't be put off by the jumble of jargon. You don't have to understand all of the terms to use your modem and comms software – just some of them. The reward comes with a squelching-skritch ... CONNECT!

**CCITT.** *Comite' Consultatif International de Te'le'graphie et Telephonie.* A United Nations organization with international membership. Recommendations are made in an attempt to standardize various aspects of data transfer. The V series covers transmission of data over telephone circuits, and the X series covers data networks. 'Bell' standards may or may not correspond with CCITT V standards, and are used in the USA.

**CCITT V24.** The international standard, widely accepted, that defines the interface between a computer (or data terminal) and a modem. It includes a list of circuits allocated to specific tasks (for example, signal ground, transmitted data, received data, data terminal ready, timing information and flow control). These are non-mechanical aspects of the interface. Mechanical aspects are covered by the RS-232 standard.

**RS-232.** The USA EIA (Electronics Industries Association) standard for the mechanical aspects of the connection of serial transmission equipment, such as computers and modems (plugs and sockets, signal characteristics).

**Bits.** Binary digits. Each bit has either a 1 or a 0 value. A cluster of bits is called a byte or a word. Usually, 8 bits represent one data character.

**Block.** A sequence of bytes.

**Parity checking.** A technique of error detection. Each data bit has a parity bit which is added to the 7 bits of the ASCII code to form either an odd number of 1s (odd parity), or an even number of 1s (even parity).

**Stop bit.** Used in asynchronous transmission where each byte is preceded by a start bit and followed by a stop bit.

**Synchronous transmission.** Where the data is accompanied by clock information to synchronize transmitter and receiver clocks. This is achieved with a synchronisation byte or bytes that precedes the data.

**Asynchronous transmission.** Where transmitter and receiver do not have synchronized clocks, and start/stop bits are used instead. This means that an 8-bit byte ends up as a 10-bit byte, increasing the time it takes to transmit data.

**ASCII.** American Standard Code for Information Interchange. The ASCII 7-bit data code is widely used in data transmission between personal computers, usually with an extra parity bit to make up an 8-bit byte.

**ANSI.** American National Standards Institute. An ANSI.SYS file is often needed in your Config.sys setup (for IBM compatibles) to allow graphics characters to display correctly on your screen.

**Electronic mail (E-mail).** person-to-person communication using computers and modems or terminals. Several on-line services, such as OTC's Datalink and Keylink provide personal mail boxes, which are storage areas for messages, memos, files and data. You can read your mail, or print it out at any time, and send replies to other private mail boxes. This service is also available on many bulletin boards.

**Download.** To transfer data from a host computer to your computer.

**Upload.** To transfer data from your computer to a host computer.

**Data codes.** The ISO (International Standards Organization) 7-bit code, or the EBCDIC (Extended Binary Coded Decimal Interchange Code) IBM 8-bit code.

**Full/half duplex.** A full-duplex communications channel can have data transmitted in both directions at once. A half-duplex channel can only transmit in one direction at any time, and has to be 'turned around' before it can transmit in the other direction. The notation 300/300, 1200/1200 is equivalent to 300 baud full duplex, and 1200 baud full duplex.

**LAN.** Local Area Network. Usually spans one building or site, and interconnects a variety of computers and terminals.

**Modem.** (MOdulator-DEModulator) Data coming from a computer is in digital form as a series of bytes. A modem converts digital data from a terminal or a computer into analog form for transmission over the normal voice-carrying phone lines, and vice versa.

**Packet switching.** For large networks, and for long distance communication where lines must be used efficiently, data is broken up into packets. Each packet is of a pre-determined size and format. A packet can also contain a 'header' with the network address of the destination terminal, and/or a 'tail' section containing checking information. Austpac is Australian Telecom's packet switching network.

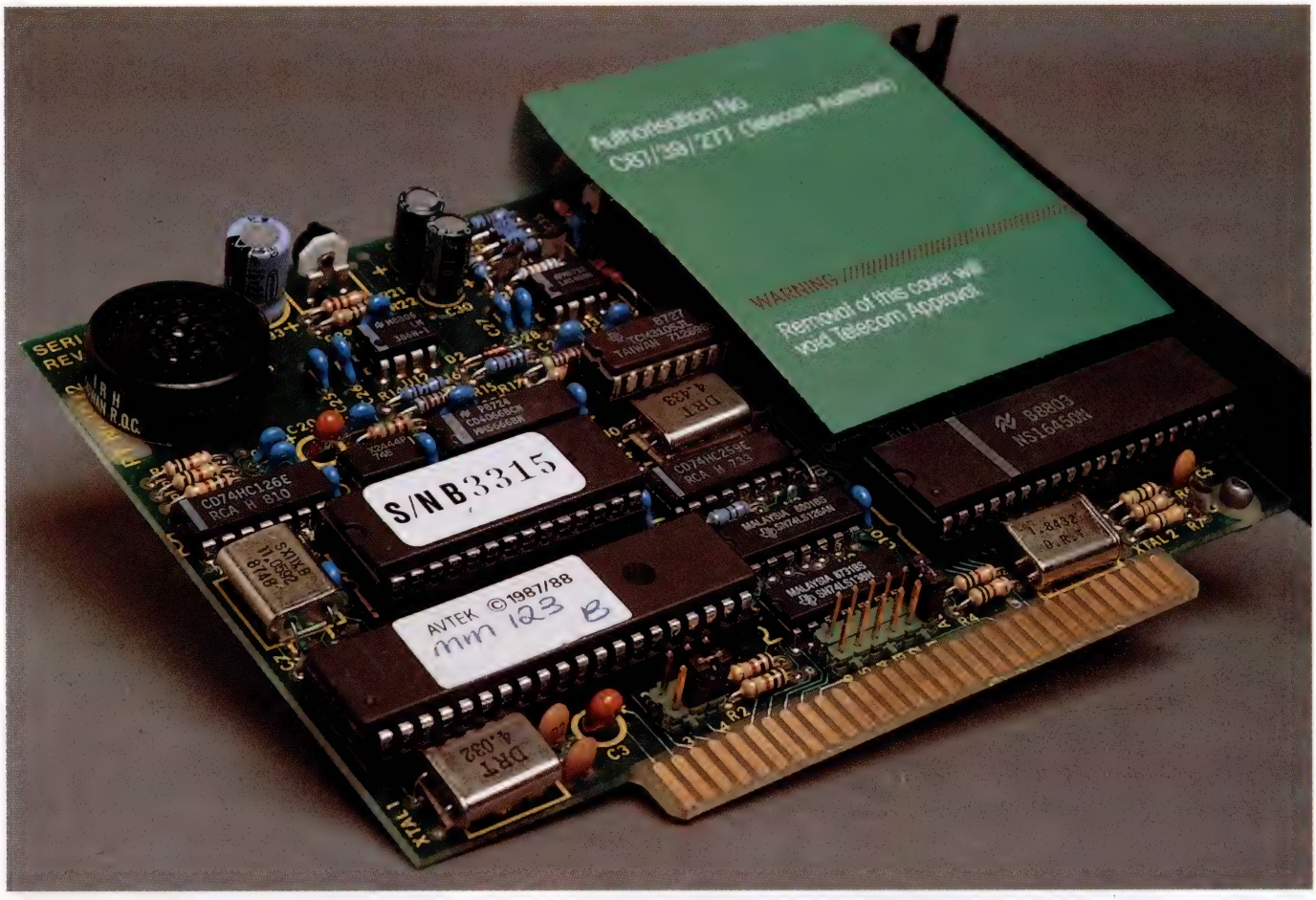
**Bps.** Bits per second. The rate of transfer of data. Local Area Networks can work at 10 Mbps or faster; digital telephone lines around 80 Kbps; ordinary telephone lines 16 Kbps.

**Baud.** A unit of measurement that denotes the number of signal elements per second that can be transmitted (from the surname of French pioneer in printing telegraphy J.M.E. Baudot). Strictly speaking, the baud rate is not necessarily equal to the rate measured in bits per second. Modems can operate from 300 baud to 1200, 2400, and up to the Trailblazer's present maximum of around 19,200 (with a fast AT computer).

**Null modem.** The modem you use when you aren't using a modem It is in fact a cable, used to connect two computers directly together through their serial ports, without a connection to a phone line. A 'straight' cable will not work, since it connects the pins transmit to transmit and receive to receive. On an RS-232-C serial connector, a null modem cable will have cross-overs between pins 2 and 3 (Data transmit and receive), pins 4 and 5 (Request to send and Clear to send) and pins 8 and 20 (Carrier detect and Data terminal ready). Proceed with caution here: not all serial ports are the standard RS-232-C, even if they are specified as such by the manufacturer. Check the serial pin designations of both computers first.

**Error checks.** Phone lines can suffer from interference, or noise, that can corrupt data being sent along the lines. There are several ways of dealing with this, and both the transmitter and the receiver need to use an identical method at any one time. This is also known as the protocol: Kermit, UUCP, XModem and YModem are examples of protocols.

**XModem.** An error checking protocol that became an industry




*The Avtek PC Megamodem 123 – an internal half card for IBM compatibles.*

standard for PC-based communications software. Now superseded by ZModem and YModem protocols, which increases the speed of transmission for faster modems.

**ACK or NAK.** ACKnowledge or Negative AcKnowledgment. ACK is sent by the receiving terminal if error checking determines that a data block was error free. NAK means that there was an error, and the data block has to be transmitted again.

**XON/XOFF.** Protocol between transmitter and receiver. The receiving computer collects data in a buffer where it is stored temporarily before it is sent to disk. When the buffer is full, the receiver sends an XOFF, and the transmitter halts until it receives an XON from the receiver, indicating that it is ready for more.

**CRC.** Cyclic Redundancy Check. An error checking protocol where a check character is added to each block of data, with the check character being 16 bits long. CRC provides reliable error checking because it computes a check sequence using each data bit in a block a number of times.

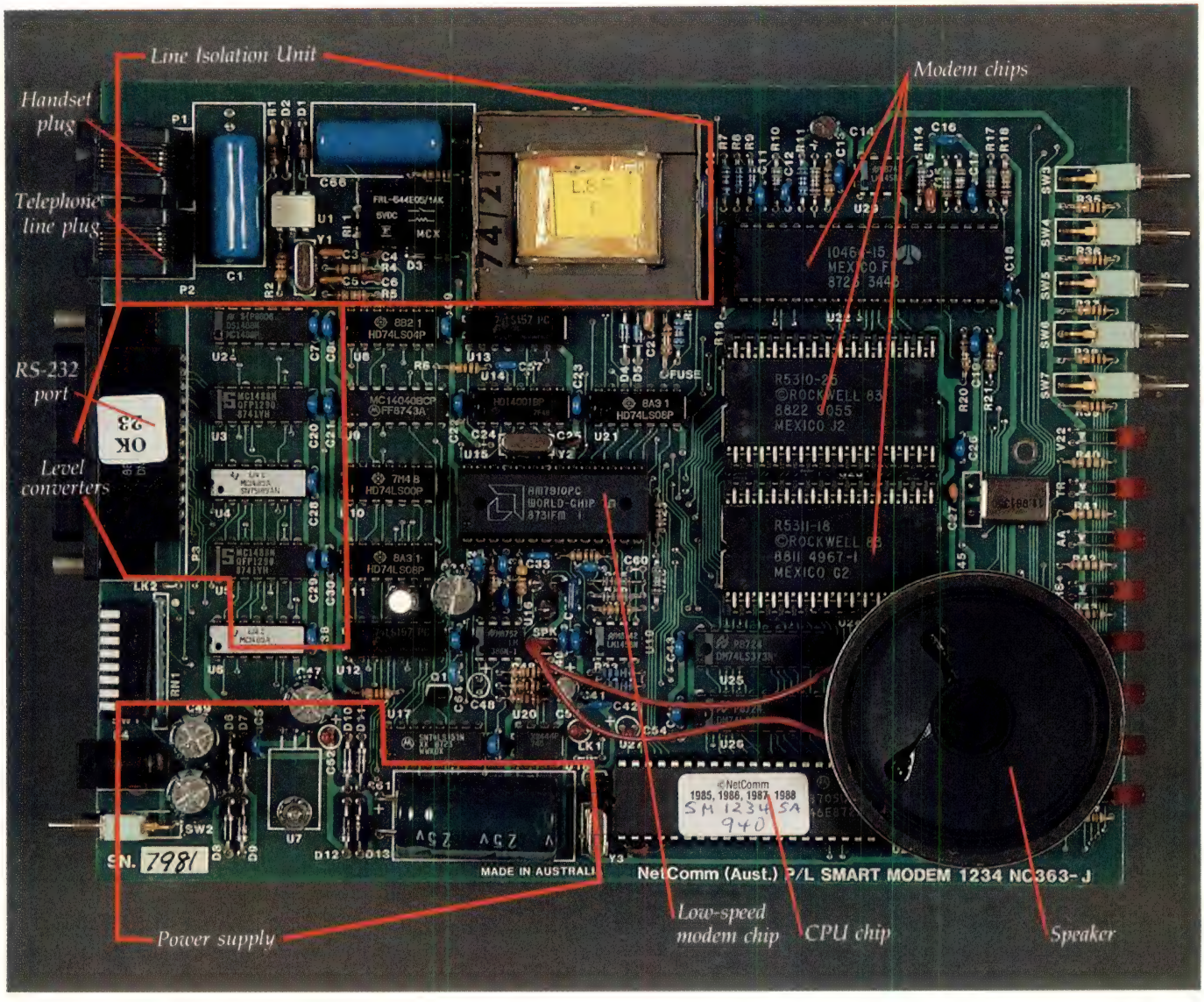
**8N1.** The communications protocol that is used by many bulletin boards and some on-line services. It means Eight data bits, No parity, One stop bit. If this doesn't work, try the other common protocol 7E1, which stands for Seven data bits, Even parity, One stop bit.

**Auto-dial, Auto-answer.** With 'intelligent' modems, and the appropriate communications software, the modem takes care of dialing, answering and disconnection for you.

**Hayes AT command set.** The Hayes SmartModem has been used as an industry standard for other modem manufacturers. The 'intelligent' modem translates commands entered into the computer's communications software to instruct the modem to dial, send data, hang up and so on. The commands are preceded with the letters AT (ATtention code). Some modems are so 'smart', they will automatically select baud rates, parity and other protocol settings to match those of the host computer when you dial.

**OSI.** Open Systems Interconnection. An ISO standard that aims to develop 'layers' of agreed standard procedures for data transfer, networks, quality control etc. In 1981 the first positive OSI results were achieved when General Motors developed the Manufacturing Automation Protocols (MAP), and a year later Boeing and the US National Bureau of Statistics produced TOP.

**ISDN.** Integrated Services Digital Network. High speed digital transmission of voice, data, electronic mail, fax and video over a single access line. A CCITT standardized service that is soon to be introduced around the world using existing wiring from exchanges to customers, and new digital exchange systems.




***The inside of a NetComm 1234SA*** *– we asked Mark Cheeseman of* Electronics Australia *to describe the innards: Signals from the computer or terminal pass through* ***level converters****, which change the voltage from the RS-232C levels, used between the terminal and modem (normally +/-12 volts), to the TTL levels used in virtually all digital computer equipment (normally between -12v and +12v). The modem is really a small computer in itself, containing a special custom* ***CPU chip*** *with in-built RAM and ROM. This ROM contains the 'operating system' for the modem, which handles all the functions expected of intelligent modems such as auto-dialing, auto-answering, auto-ranging and so on.*

*The three* ***modem chips*** *are the heart of the unit. They take care of all the modulation and demodulation of the signals traveling in both directions, and contain a scrambler and de-scrambler to ensure that long strings of 1s or 0s do not cause the receiving modem to get out of synchronisation with the transmitting end; they also handle the higher speeds (1200/1200 and 2400); 1200/75 and 300 are handled by the* ***low-speed modem chip****, and the CPU switches between the two as necessary. Both the high-speed and low-speed modem chips contain filters to remove unwanted noise, and to prevent the modem's own transmitted signal from swamping the incoming signal, which is much weaker due to the inherent losses in the phone system. A* ***speaker*** *is often included to assist the user in keeping track of the state of the connection, and can be enabled or disabled under software control.*

*Signals traveling between the modem chips and the telephone line have to pass through the* ***Line Isolation Unit*** *(LIU) which ensures that in the event of a major breakdown in the* ***power supply*** *of the modem, there is no possibility of potentially lethal mains voltages appearing on the telephone lines to injure Telecom personnel (it's this part of the modem that Telecom examines most carefully when evaluating a new modem for approval).*

*Power is supplied to the modem from an external sealed* ***plug-pack transformer****, which means that mains voltages are not present in the modem case itself, further reducing the chance of high voltages appearing on the phone line.*

# FINALLY – THE NETWORK YOU HAVE BEEN WAITING FOR – AT A PRICE YOU CAN AFFORD!

# *LANTASTIC*

Buy the Starter Kit now at our Introductory Price –

**$750**

### *High Speed Communications*

LANtastic's fast transmission rate of 2.0 megabits per second and efficient NETBIOS processing means data gets delivered to your programs faster. And because each LANtastic adapter contains a powerful 10MHz network coprocessor that handles all network traffic, your computer can be working for you and not for the network.

### *100% NETBOS Compatibility*

The NETBOS standard is completely implemented by the LANtastic adapter. NETBOS compatibility allows you to choose from many different network operating systems, gateways, micro-to-mainframe links and network applications. LANtastic's NETBOS only requires 2.5K of memory and delivers data two to six times faster than other manufacturer's implementations.

| | |
|---|---|
| *Starter Kit* | *$750* |
| • two adapters | • fifteen foot cable |
| • two-user version of LANtastic NOS | • terminators |
| *Additional Adapter* | *$332* |
| *NOS License* | *$490* |
| • 3-120 users | |

### *Low Memory Requirements*

LANtastic's network operating system is the smallest NOS available, requiring less than 40K on a Server and 10K on a Node. LANtastic NOS offers DOS 3.1 record and file locking, peer-to-peer networking, powerful access control, audit trails, print spooling and electronic mail. No extended memory boards are necessary, you don't have to reformat your hard drive or dedicate a file server and you can be networking in 20-30 minutes including installation time.

### *A Complete Network Package*

LANtastic provides fast network hardware, real peer-to-peer network software, in one package from one source. You can try LANtastic at no risk with our 30 Day Money-Back Guarantee. Order your LANtastic today!

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# Unpacking the packets

**Packet-switching is the computer equivalent of the international telephone service. Stewart Fist explains how to make the most of your 'electronic phone' using OTC's Data Access.**

INTERNATIONAL PACKET switching is an old technology now; it's been around since the Advanced Research Projects Agency (ARPA) of the US Department of Defence first formulated the idea in 1960.

Fundamentally, it just means that data is collected together into a reasonable size group (or 'packet'), then addressing information is added to each packet so that the information can be dispatched on a common network of cable and satellite links – sharing the connections with the packets from many other users.

Packet switching doesn't need a dedicated line between you and the receiver/-host – we talk about 'logical' connections, rather than 'physical' ones. In this way it is very much like the more familiar local area networks.

It has proved to be a resilient technology. At the ripe old age of 28, the Defence Department's first network, appropriately called ARPANET, is still up and running. In Australia, we now have two main packet-networks; our internal system, Telecom's Austpac, and our overseas (OTC) Data Access service, which was previously called Midas.

Through Data Access these services allow you to link to other packet-switching networks in other countries, and through these to other countries, still. From your home terminal you've now got access to thousands of computerised libraries (public databases), and tens of thousands of private computer installations around the world. Packet-switching is the computer equivalent of the international telephone service. There are three ways you can link to Data Access –

1) If your company owns a mainframe, you can get direct access to the networks by using the international X.25 (packet-switching) protocol;

2) If you've got a dedicated personal computer or dumb terminal linked by a dedicated tie-line to Austpac or Data Access, you can both initiate and receive calls;

3) If you've got a PC, modem and phone, you can access the Data Access computer on a temporary basis and initiate (but not receive) calls.

For some reason peripheral services have never evolved to the stage where packet-switching can be used on a casual basis between two participants, unless one of them has a permanent connection. The 'host' needs to have an international connection number (called an X.121 number) and the other party (the 'user') must initiate the dial-up connection.

This must be limiting the growth of the service, and I don't understand why OTC and Telecom don't try to help the small user. My local fast-print store will let me use its fax number and it will receive facsimile messages on my behalf, for a small charge. I can see no reason why Telecom or OTC can't have a small manual switching service that takes incoming packet-calls and redirects them to your home or business computer. Maybe its a matter of cost – or maybe they just can't be bothered with small users.

Before you use Data Access you will need to get a Network User's Identification (NUI) number from OTC. This is your identification to the Data Access computer and you key it in as part of your 'dialing' sequence. Data Access responds by creating a logical link to your host, and by clocking up charges to your account.

There is both a time charge component for the duration fo the call, and a transmission charge based on the number of half-packets (called segments) transmitted either way. You can easily clock up a $20 or $30 communications bill on a short overseas session – and this is in addition to any charges levied on you by the owners of the overseas database or computer you are accessing.

## Connection

There is no way you could say that Data Access is user-friendly. To make a connection to, say, Acme Information Services in the States you might need to key a sequence of alphanumerics like –

```
NABC123-031108930005612FRED
```

all without making a mistake.

The ABC123 in this example is my NUI, while FRED is my 'Call-User Data Password' into a special host (usually not required). The 3110 signifies that the signal will flow through Telenet in the United States, and the rest of the numbers constitute the identification number of the host plus a range of letters which tell the Data Access computer what information is coming next.

This system was designed by a sadist. Someone really ought to tell OTC about menus, and explain that computers are now quite capable of adding alphanumeric strings together on their own, if that is what the network requires.

But while it is primitive, it is also adequate, and once the connection is made with your 'host', the network is generally

invisible – unless something goes wrong. You'll know when this happened because you'll get some cryptic error message like 'CLR NC' (network congestion problem) followed by a diagnostic code number like '72' which may be part of the international X.25 standard, or it may be a local code known only to a few engineers at OTC. Either way, it doesn't help you much.

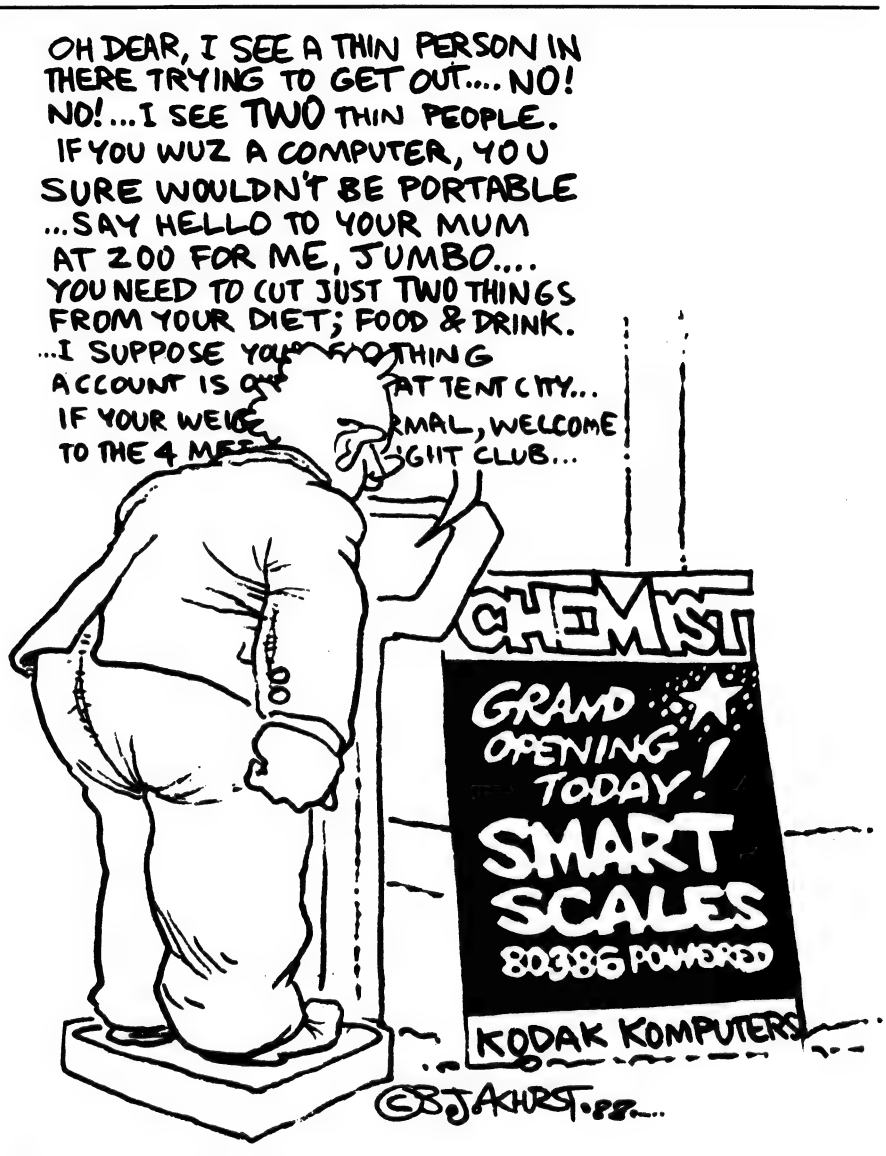
To make your connection you phone up the OTC Data Access computer on either of two Sydney numbers, or access it through Austpac. Austpac complicates this explanation somewhat since you are dealing primarily with Austpac peculiarities, so I'm going to pretend that everyone uses Data Access direct.

You will use the (02) 20991 phone number for general 'interactive' use. To clarify this: OTC means by 'interactive' that information will be sent both ways in short bursts – as distinct from large file transfers. The term also implies that the exchange of information between you and your host computer is going to be strictly alphanumeric characters and simple format characters like line feeds and carriage returns – no special error-check protocols and so on.

If you want to transmit or receive more complex formatted documents, or send files that need the control of some special protocol (for error-checking and so on.), you must use the (02) 2 0992 number, and this is designed to send large batches of information – big files all at one time.

This number has been provided to prevent your special file transfer control signals getting mixed up with those used by Data Access and the other packet-switching links in the network (mainly X-ON/X-OFF).

For this reason you can use the 2 0992 number generally for one-way transfers only – it is designed to be used either for uploading or for downloading. To swap from one direction to the other you've got to disconnect and then re-establish the link again (except for people with V.22bis modems).




## CCITT

Data Access now handles standard CCITT 300, 1200/1200, 1200/75 (videotex) and 2400 bits per second modem signals. When you dial the computer, the two modems exchange signals which establish the speed and audio frequencies they are going to use. This is all done now automatically – you used to phone different numbers for different data rates.

Note that you must use a standard Australian/European CCITT modem, even if you are communicating with a computer in the US (which uses the incompatible Bell standard). The modem tones are only used in the link between your computer and the OTC 'node' (packet-switching computer) in Sydney – the tones themselves don't cross the ocean, only the data.

Your signals are multiplexed with perhaps hundreds of other Data Access users, and carried by undersea cable (or satellite) at 9600 bits per second across the ocean using an international communications protocol – so there is no longer any compatibility problem between you and the host.

Each end of the link can use local communications standard and whatever datarate they choose. The packet-switching network is acting as translator, mediator, and even temporary store if the high datarate of one party looks like causing problems with the other.

At the other end of our trans-ocean link, your packets of information are selected out of the mass and redirected down other packet-switching networks towards your eventual host. At any one time there might be hundreds of packets, each containing addressing information and up to 128 characters of data, heading down any one line, and each packet can be switched in millionths of a second along another route towards its destination. If problems occur, these packets can be momentarily

held in store at one of these 'nodes' and then passed on when the congestion clears.

It is best to make your modem link to the OTC computer using the highest data-rate you have available, and also to use full duplex (simultaneous two-way communications over the same phone line). The system assumes you will use full-duplex, so its default setting is to automatically echo your characters back to you as you type. If you get doubled characters on the screen then you've left your communications program set in half-duplex – one of the characters is from your keyboard, and the other is the echo.

In full-duplex mode, this echo happens so quickly that you assume the characters appearing on your screen are those that you typed – but in fact they are characters received by the OTC computer, then regenerated and transmitted back along the line to you.

Full-duplex and echo are not the same, but they go hand in hand to create a very effective error-checking system. If a glitch appears on the line between you and the OTC computer, the character echoed back will be different to the one you typed. Generally, you will assume that you have made a typing mistake, and you'll backspace and correct the problem – but it may not have been your mistake at all. Don't complain! The point is that the problem has been corrected.

*Packet switching doesn't need a dedicated line between you and the receiver/host – we talk about 'logical' connections, rather than 'physical' ones.*

Your computer/terminal is dealing with a specific part of the Data Access computer called the PAD (Packet Assembler/Disassembler), and this PAD has been pre-set to assume certain things about your terminal. First of all it assumes that your modem will be set or ORIGINATE, and that you will be sending it standard 7-bit characters with one stop bit.

It also assumes that you are using full-duplex (so it echoes your characters back to you), that you have Parity switched to NONE, and that you have X-ON/X-OFF set to ON.

These last selections are usually done through the communications software. Parity is a form of error-checking at the bit level, and this is not used by Data Access because the echo system works just even better. Usually you can choose between Parity set to Even, Odd or None.

X-ON/X-OFF is much more complex, and is the cause of most of the problems with file transfers. So it is worth understanding what is going on here. X-ON/X-OFF is used to flow-control terminals, and to trigger flow-control further down the network with host computers and so on.

For instance, suppose you are in contact with a host computer at a time when the international network is extremely

## PAD parameters (default Profile 4 settings in parentheses)

1) Pad recall control – determines what key switches from the data to the command-mode (Ctrl-P = 1);

2) Switches on or off the echo function (on = 1);

3) Data trigger – defines what key sends an incomplete packet on its way (CR only = 1);

4) Automatic trigger timer – controls the delay before a packet is automatically dispatched (off = 0);

5) Allows the PAD to flow-control data from the user's terminal by using X-ON/X-OFF (on = 2);

6) Sets operation of service signals from the PAD to your terminal (all signals active = 13)

7) Break procedure – determines what happens if you hit the BREAK key (on = 21);

8) Controls the discard of data in the PAD buffer if the user enters a BREAK command to interrupt the host (no discard = 0);

9) Sets the delay after a carriage return needed by printer terminals to allow time for the print head to reposition (nil = 0);

10) Sets number of characters in a line before a line-feed is inserted by Data Access (no extra insertion = 0);

11) Access line speed – indicates speed of internal link between PAD and OTC's modem (can't change);

12) Flow-control of the PAD by the user's terminal via X-ON/X-OFF (on = 1);

13) Sets whether the system supplies a line feed after every carriage return (after the echo only = 4);

14) Line-feed padding – sets a delay needed by some systems after a line-feed (nil = 0);

15) Edit control – allows editing of current line before packet is dispatched (no = 0). Editing master control;

16) Delete key – sets key used for the single character delete function (DEL = 127);

17) Line-delete key – sets key used to delete a whole line (CAN = 24);

18) Line display key – sets key used to display of the current line for editing (DC2 = 18).

| Profile Number: | 1 File Upload. | 2 Basic | 3 File Download. | 4 Default | 5 Reserved | 6 No Echo | 7 Printer Terminal | 8 Reserved | 9 Videotex | 10 Reserved | 11 No Line Feed | 12 Read Only |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Mode Change | 0 | 1 | 0 | 1 | - | 1 | 1 | - | 1 | - | 1 | 1 |
| 2 Echo | 0 | 1 | 0 | 1 | - | 0 | 0 | - | 1 | - | 1 | 1 |
| 3 Data Forwarding | 0 | 126 | 0 | 2 | - | 2 | 2 | - | 126 | - | 2 | 2 |
| 4 Timer | 20 | 0 | 20 | 0 | - | 0 | 0 | - | 10 | - | 0 | 0 |
| 5 Flow Control | 0 | 1 | 0 | 2 | - | 2 | 2 | - | 0 | - | 2 | 2 |
| 6 Signal Services | 0 | 1 | 0 | 13 | - | 13 | 13 | - | 1 | - | 13 | 13 |
| 7 Break | 2 | 2 | 2 | 21 | - | 21 | 21 | - | 21 | - | 21 | 21 |
| 8 Break Discard | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | - | 0 | 0 |
| 9 CR Padding | 0 | 0 | 0 | 0 | - | 0 | 7 | - | 0 | - | 0 | 0 |
| 10 Line Fold | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | - | 0 | 0 |
| 11 TX Speed | | | | | Always | set at | 12 | | | | | |
| 12 Flow Control | 0 | 1 | 1 | 1 | - | 1 | 1 | - | 1 | - | 1 | 1 |
| 13 Line Feed/CR | 0 | 0 | 0 | 4 | - | 0 | 0 | - | 0 | - | 0 | 4 |
| 14 Line Feed Pad. | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | - | 0 | 0 |
| 15 Editing Control | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | - | 0 | 0 |
| 16 Charct. Delete | 127 | 127 | 127 | 127 | - | 127 | 127 | - | 127 | - | 127 | 127 |
| 17 Line Delete | 24 | 24 | 24 | 24 | - | 24 | 24 | - | 24 | - | 24 | 24 |
| 18 Line Display | 18 | 18 | 18 | 18 | - | 18 | 18 | - | 18 | - | 18 | 18 |

***Standard PAD Profiles.*** *Your computer/terminal is dealing with a specific part of the Data Access computer called the PAD (Packet Assembler/Disassembler), and this PAD has been pre-set to assume certain things about your terminal.*

busy. You may be sending data to the Data Access computer at 2400 bps, but it may not be able to interleave your packets into the network at this rate – so after a few minutes the PAD buffer handling your link begins to fill and is in danger of overflowing. At this stage, the Data Access computer will send your terminal an X-OFF message (ASCII 19 or Ctrl-S) which tells it to 'lay-off' for a while, and so your terminal freezes. When the buffers have a reasonable amount of space again, the computer will send a X-ON signal (ASCII 17 or Ctrl-Q) and the flow will begin again.

This system stops you from losing data if network congestion occurs, and the same system is used by the Data Access computer to control its own smart modems which store and forward data. Naturally, if you attempt to send a file which contains hidden Ctrl-S or Ctrl-Q characters, this disturbs the system . . . more than somewhat!

Hence the reason for the 2 0992 phone number which is only to be used for special file transfers – and then only one-way. Here Data Access transmits X-ON/X-OFF one-way, and only acts upon them when they are coming the other. If you are downloading a file, these characters will pass down through the network, but any traveling up are assumed to be intended to flow-control the source; *vice versa* if you are uploading. This is what OTC means by 'network transparency'.

The best way to think about the way the Data Access computer is set up, is to imagine that you have exclusive use of the PAD whenever you make contact with the computer. This isn't strictly correct in the engineering sense, but it is a concept necessary to understand how you customize the PAD to handle non-standard equipment, or do non-standard things.

When you phone in to the service, you will firstly get a welcome message followed by an '*' (asterisk) prompt which tells you that you are in the system's Command Mode. This is the mode which allows you to talk to the computer – to make changes, to instruct it to establish links and so on.

The other mode is the Data mode when you are transmitting or receiving data, and

in this case the Data Access computer and all other packet switching computers in the network are relatively invisible to you. To get back to the Command mode from the Data mode, you type –

```
<Control> P
```

but this can be changed, if it is essential.

## Parameters

There are 18 different parameters which can be modified by you to customize your communications, these are shown and explained in the boxed item. For instance, Parameter 9 lets you add a delay after an incoming Carriage Return. This is needed by the old printer-terminals which take time to mechanically reposition the printing head at the start of each line, and which don't have large-enough internal buffers to handle the constant flow of data.

There are two ways to make this change – the hard way, or the easy. The hard way is to make a parameter change to the existing 'profile' (Profile 4 – a group of 18 default parameter values presented to you automatically at the start of the session). From the Command mode, you type –

```
PAR?9
```

and the Data Access computer will reply with the present value for the Parameter 9. If you are using the default Profile 4, the reply will be –

```
PAR9:0
```

telling you that there is zero delay following a carriage return. To establish a new value for this parameter, you simply type –

```
SET9:4
```

which translates as 'Set Parameter 9 to value 4'.

There is no systematic choice of the values used in parameters; you need to look up the explanation of each in the Data Access Advanced User's Manual and select the appropriate one.

The value 4, in the above example, refers to the insertion of four 'nul' characters, but it could just as easily have referred to tenths of a second, or whatever. You've got to check your manual.

The easy way to make the same change is to select another 'profile' specifically set up for printer-terminals, and this, if you look at your manual, is Profile 7. From the command mode you type –

```
PROF7
```

and the new profile is set. The chart shows that this inserts seven nul characters after each carriage return – which is fine – but it also suppresses the echo (Parameter 2), and this may not be what you want. OTC obviously assumes that the old printer-terminals generally operate in half-duplex, not full, so this profile has two parameters set differently from the default Profile 4.

Profile 1 is used for uploading data in special file transfers on the 2 0992 number, and so a number of parameters are different from those used in Profile 4. The main ones are Parameter 5 (0 = OFF) which flow-controls your terminal, and Parameter 12 (0 = OFF) which defines the flow-control between the PAD and Data Access's own internal modem.

Profile 3, which is used for downloading data, is similarly modified except that the internal flow control (Parameter 12) is set to 1, which is ON.

Other profiles of interest are Profile 9 for videotex; Profile 11, which is the same as the default profile except that it doesn't add a line-feed after a carriage return (Profile 4 does this on the echo string only); and Profile 12, which prevents the remote host from turning off your echo – apparently some of them do!

You'll find quite a selection of possible values with some of the parameters. For instance, with line-feeds after carriage returns (Parameter 13) you can take your pick between seven different values, each of which cause the system to function in a different way. A value of 5, for instance, inserts a line-feed in downloaded data and into the echoed signal from your terminal, but it doesn't pass the line-feed on to the host.

Generally you can play around and modify these parameters or profiles if you wish and no long-term problems will result. If you bomb the system out, or disconnect for any reason, you will find you've dropped back to square-one when you reconnect. Any changes you make are only temporary – for that session only.

However, there are two parameter changes that can be costly, and you might well not notice them until much money has clicked up on the clock.

Parameter 3 defines the data-forwarding triggers, and this is usually set to the value 2. This value means that packets will be sent on their way ever time you hit a carriage return – which is essential for interactive use.

If the value of this parameter is 0, then packets are only sent when a full 128 characters are assemble (this is the standard packet size). So you could spend a lot of time waiting for the host to respond to a message that hasn't been received simply because your queries weren't dispatched by a carriage return.

By the same token, for uploading and downloading files this parameter is traditionally set to 0 so that the file transfer can just churn along without half-empty packets being dispatched every time a carriage return gets into the system. Here, you want only full packets to be sent.

Parameter 4 sets an automatic trigger timer which has similar problems to the above. Normally this is set to 0 which makes it inoperative, but you can set it to any number up to 255. These values represent twentieths of a second (20 = 1 second), and this setting establishes how long the system will wait before it automatically sends incomplete packets.

The idea behind this parameter is that you may forget to hit the carriage return at the end of your query, or the Carriage Return character might get lost between your terminal and the Data Access computer. If this parameter is set to 0, then the whole system will just sit and wait until you fill the packet, or hit a carriage return.

If it is set to a value of, say, 20, then if nothing happens for one second, it will send whatever it has in its outgoing buffer, without needing to be told.

You can see potential problems here. For instance, if this parameter was set to 1 then packets would be dispatched automatically every twentieth of a second – which for most typists would mean that each packet would contain on average of only one character instead of the full 128.

This would be a very costly exercise since the major component of the communications cost is calculated from the number of packets sent. Each packet represents two segments, and costs are calculated by the kilo-segments (1000 segments).

You can also see now why it is a very costly habit to hammer away on the carriage return key when the network is overloaded and sluggish. Hitting the return more than once doesn't speed anything up – it slows the system down, because each key press sends another empty packet – and each of these packets costs you money. □

# Computer Connections

## – Part 1

**If you're enthusiastic about computing, sooner or later you're going to have to join an 'external device' to your system. In this first article of the series, Mark Cheeseman gives a grounding.**

THE STATE of the art in personal computing has progressed a long way from the days when even a basic system required many boxes to be connected together to set up a workable system. Yet there still remains a need for most computer users to connect external devices to their computer. Virtually all personal computer systems (except for some notable exceptions, like laptops), require the connection of an external video monitor of some description and the common 'desirables' might be a printer (or two), mouse, modem, or even another computer.

If you are game to wield a soldering iron you should be able to construct virtually any cable which your heart (and computer) desires. Even if you do not have enough confidence to start dolloping bits of molten metal around the place, there are many types of plugs and sockets which do not require soldering.

### Mechanical considerations

Before we look at the requirements for specific types of connections, a brief look at the variety of cables and connectors available is in order. Your choice of connector and cable types will be dictated, at least in part, by the environment (both mechanical and electrical) in which they will be used.

The quickest and easiest way to attach a connector to a cable is to use an *Insulation Displacement Connector* (IDC). These connectors are attached to the cable simply by placing the cable between the two parts of the connector, and forcing them together in a small vice. This causes specially shaped metal blades on the back of each pin to pierce the insulation of the individual wires, thereby making electrical contact.

Internal latches in the connector then prevent the connector from springing apart and releasing the cable. Often there is a third part to the connector, which fits on the back of it to relieve stress on the rather delicate joints where the pins meet the conductors in the cable. Nevertheless, a cable with this type of plug should never be removed by tugging on the cable.

The range of insulation displacement connectors available is enormous. It includes the ubiquitous 'D' plugs and sockets, from 9 to 50 pins, Amphenol-type connectors from 14 to 50 pins (including the 36-way Centronics variety), edge connectors, DIL plugs that fit in IC sockets, and various other types.

Now for the bad news. The insulation displacement connector is the least flexible of the connectors. It can only be used on ribbon cable, and it can only connect the pins at one end of the cable to the corresponding pins at the other end. You cannot easily jumper a pin to another on the same connector, or cross-connect two pins (unless you put one of the connectors on backwards, in which case it is unlikely to do anything sensible at all!).

Thus it is limited to connecting Data Terminal Equipment (otherwise known as a DTE, or dumb terminal) to Data Communications Equipment (DCE; a modem, for example). The two devices must also have compatible handshaking procedures. It is also a rather expensive way of doing things, with the cost of both the connectors ($2 to $6 each) and ribbon cable ($3 to $6 per metre) being higher than alternative types. Ribbon cable is physically not very rugged, and is a bad choice if there is a high probability of someone planting their foot (or a chair leg) on it.

### Solderable connectors

The solderable connector is probably the most common variety, and virtually every type of computer connector can be obtained in this form. What the solder-type connector lacks in ease of assembly it makes up for in flexibility. For example, you only need to connect the pins which are actually going to be used, which can mean a considerable saving in cable cost on a long cable run.

It is also possible to connect any pin at one end of the cable to any pin at the other end (or indeed at the same end). An example of this may be to swap the transmit- and receive-data pins over, to allow the connection of two similar devices together, such as two computers to allow the transfer of data without the use of modems. This is known as a *null-modem* cable. The use of a null-modem will be discussed in more detail later. Really adventurous people sometimes even manage to cram a small amount of circuitry inside(!) the backshells themselves.

Solderable connectors are usually sold with the connector itself ($2 to $10, depending on the number of pins) and the backshell (cover, $1 to 6 dollars) separately. If you are using them to make cables (why else would you be reading this article?), the use of backshells is strongly recommended. They are usually supplied with a strain relief which is quite effective in protecting the internal connections from an over-enthusiastic extraction by means of the cable.

## Crimp connectors

The other common type of cable termination is the crimp connector (not to be confused with the IDC variety mentioned above). They are available in all common sizes (9, 15, 25, 37 and 50 pins) for D-connectors, in both male and female. These are supplied with the pins separate from the connector shell. The pins are crimped onto the conductors in the cable, and then subsequently inserted into the shell.

In this way, only those pins which are connected need to be present. One advantage of this is that *some* idea of the configuration of the cable can be obtained without opening the connectors. The cost of these connectors is approximately the same as an equivalent solder connector.

Like solder connectors, crimp connectors have a separate backshell to protect the wires from damage, and to provide a sound mechanical connection between the cable and plug or socket. One advantage of crimp connectors is that you do not need to be able to solder at all, yet you are not limited by the inherent inflexibility of IDCs.

## Cables

The other mechanical consideration relates to the cable types themselves, so it would be a good idea to take a brief look at the range available before going further. Ribbon cable has already been mentioned above in relation the IDC connectors. However there is nothing to prevent its use with other types of connectors, bearing in mind its lack of ruggedness. The other point to watch is the spacing of the individual wires in the cable if you are using it with IDC connectors – these are designed to be used with cable spaced at 0.05 inch-centres (about 1.27 mm), and any other spacing is bound to be a pain in the, er, posterior. Ribbon cable suitable for use with IDCs is usually advertised as such.

Round cable, on the other hand, is more difficult to work with, but when assembled correctly the completed cable can cop a lot more abuse before throwing in the towel. One point to keep in mind is only to use stranded cable, that is, cable in which the conductor in each wire consists of several strands (seven is common) rather than a single, solid, strand. Solid-cored cable is really designed for permanent installation where it will not be subject to continual flexing. However, multipair telephone cable with stranded conductors is quite suitable provided it contains enough conductors for your purpose.

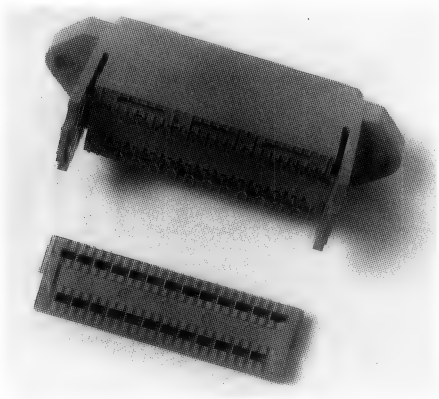


***Figure 1.*** *An Insulation Displacement Connector (IDC) is the quickest and easiest way to attach a connector to a cable.*

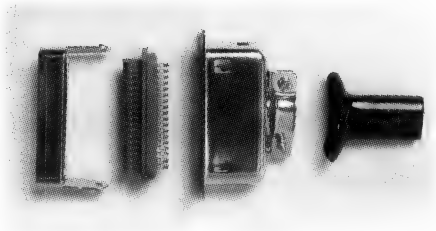


***Figure 2.*** *The solderable connector is probably the most common variety, and virtually every type of computer connector can be obtained in this form.*

One variation on round cable has all the conductors surrounded by an overall shield. This provides good immunity to ElectroMagnetic Interference (EMI), an increasing problem as more and more information is squirted around the place at ever-increasing rates. The disadvantage of shielded cable is that its greater capacitance reduces the distance that can be covered by before the pulses become too distorted at the far end. The protection afforded by this cable works both ways, protecting sensitive devices (such as radios and television sets) from interference, and also protecting the data flowing in the cable from corruption from nearby radio transmitters, for example.

## Serial links

While the variety of connectors and cable configurations is virtually unlimited, the most commonly encountered connections tend to fall into only a few types. Of these the most common is probably the RS-232C serial link. However, because of the large number of variations on this theme, a great deal of confusion generally surrounds it. Rarely is it a simple matter of plugging a cable into each device and sitting back and watching them chat together!

The primary advantage of a serial link is that usually far fewer wires are necessary to establish a communications channel between two devices than are necessary for a parallel connection (which we'll discuss in the next article in this series). Although 25 pins on an RS-232 connector may seem a little excessive, in most connections only a few of these are used, and some manufacturers (for example IBM with the PC AT) have seen fit to sidestep existing standards and use plugs and sockets with a fewer number of pins.

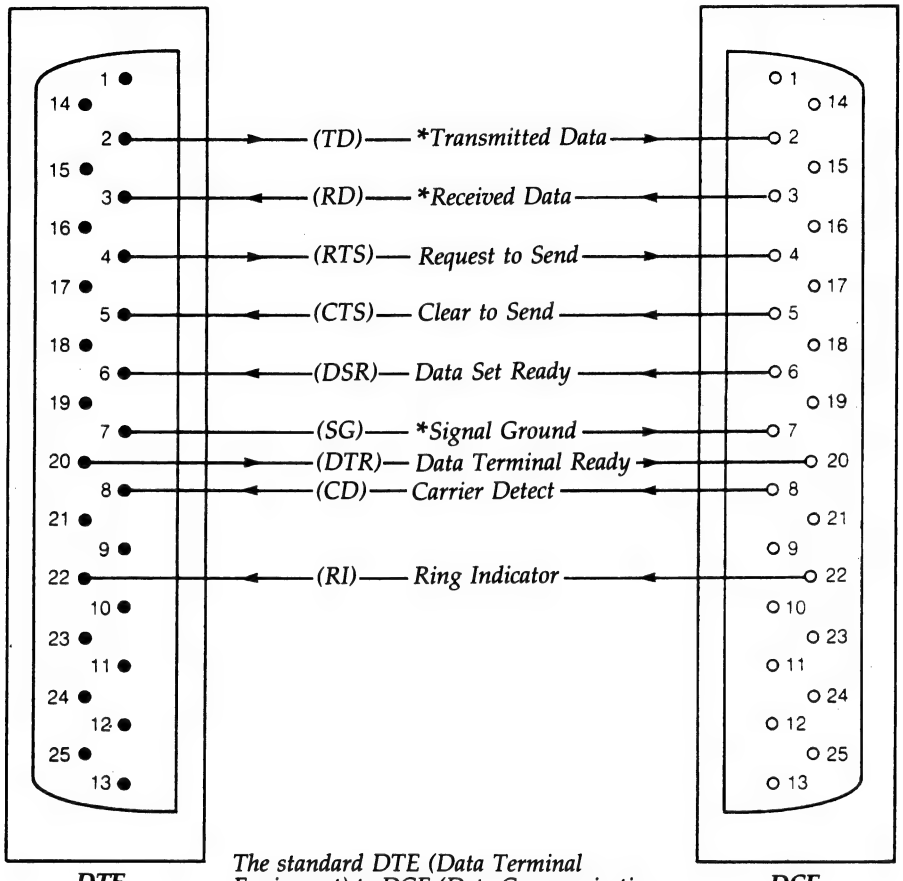
In fact, the most basic of all serial connections only requires 3 wires for a full-duplex link (one in which data can flow in both directions at once). One wire is the signal ground, which ensures that the signal voltages at each end are referenced to the same level. The other two wires each carry data in one direction. In this simple connection, no handshaking lines are used, although the ASCII characters DC3 (Ctrl-S, pause) and DC1 (Ctrl-Q, continue) can be used.

Figure 3 shows the most common signals used for asynchronous RS-232C communications, and their pin numbers in the original standard (on a DB-25), and the IBM PC AT configuration using DE-9 connectors. The RS-232C standard was defined for connecting terminals to modems, so the devices at the two ends of the link are usually a DTE or a DCE. However it is possible to link two DTE (or DCE) devices together.

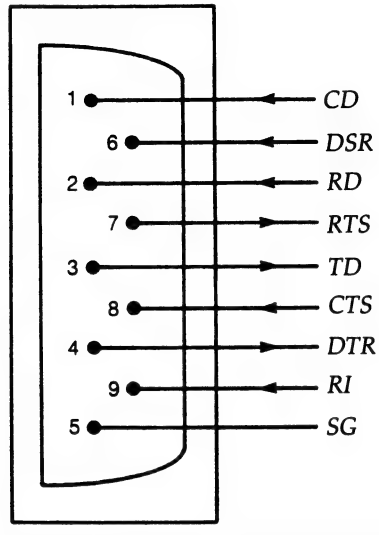
If you intend to do a fair bit of serial cable-making, you should seriously consider the purchase of a break-out box. They can be found as low as $100, and are invaluable for determining the activity of RS-232 signal lines, and are indispensable when you are dealing with unfamiliar devices with no documentation.

A break-out box effectively has two sides, one for each piece of equipment which is to be joined. A series of internal switches allow each line to be either connected or isolated to the corresponding pin on the other side of the device. Two rows of small sockets, into which the ends of small jumper wires can be inserted, allow an almost limitless range of connection possibilities.

One row of dual colour LEDs or two rows of single colour ones provide an indication of what is happening on one side of the box, using one colour (usually red) to indicated a positive voltage and the other for a negative one. These not only show




*The standard DTE (Data Terminal Equipment) to DCE (Data Communications Equipment) connections.*




*The 9-pin connector used in IBM's AT and compatibles.*

***Figure 3.** The most common signals used for asynchronous RS-232C communications, and their pin numbers in the original standard (on a DB-25), and the IBM PC AT configuration using DE-9 connectors. The most basic serial connection only requires the 3 wires marked with an astrisk (*) for a full-duplex link. The RS-232C standard was defined for connecting terminals to modems, so the devices at the two ends of the link are usually a DTE or a DCE. However it is possible to link two DTE (or DCE) devices together.*

the presence of signals on the line, but can be used to determine whether an unknown device is DCE or DTE. With a bit of thinking you can also make a reasonable guess at which handshaking lines need to be tied where.

## What it all means

Assuming that you have in front of you two devices to be connected together by a serial cable, the first thing to do is to determine whether each of the devices is configured as DTE or DCE. If you have access to the manuals for the two pieces of equipment there should be no difficulty here. Otherwise, a little bit of detective work will be needed.

A modem, as you might expect, would be configured as DCE. Multi-user computers often have their terminal ports set up as DCE, to allow terminals to be connected without the need for null-modem cables. Therefore, if you wish to connect a modem to a user port on such a system, it will be necessary to use a swap-over cable

If you are unsure, use a break-out box or in-line signal monitor to determine which of the two it is. Plug it into the port in question and, with the equipment turned on, take note of the state of the LEDs (the colour is irrelevant here). If the Transmit Data (TD) LED is on, the device is configured as DTE. If the Receive Data (RD) one is alight, then it is DCE. If both of these LEDs light up with approximately equal brightness, start to suspect something – like the port into which you have plugged the device being a parallel port, or something totally weird and unrelated to RS-232 communications.

If the above test tells you that the device is DTE, then one or both of DTR (Data Terminal Ready) and RTS (Request To Send) may also be illuminated. If it is DCE, then some combination of CTS (Clear To Send), DSR (Data Set Ready) and DCD (Data Carrier Detect) may also be alight. Make a note of the presence or otherwise of these signals, as you'll need to know them later. Repeat this test for the device at the other end of the proposed cable. You should now be in a position to start joining things together.

Before connecting the break-out box to the two devices, make sure that all the switches connecting the two sides are in the 'open' position. Connect one device to each side of the box, and turn every thing on. The golden rule is that no output pin should ever be connected to another output pin, nor should it be connected to any power supply rail. Doing this is bound to cause unpredictable results, and could well cause damage to the equipment. The pins which illuminated the LEDs in the break-out box above may all be considered to be outputs.

Begin with the two data pins. If you determined above that the two devices were the same type (either both DTE or both DCE), then these pins must be crossed. That is, use jumper wires to connect transmit data on one side to receive data on the other, and vice-versa. If you have a DTE and a DCE, then simply con-

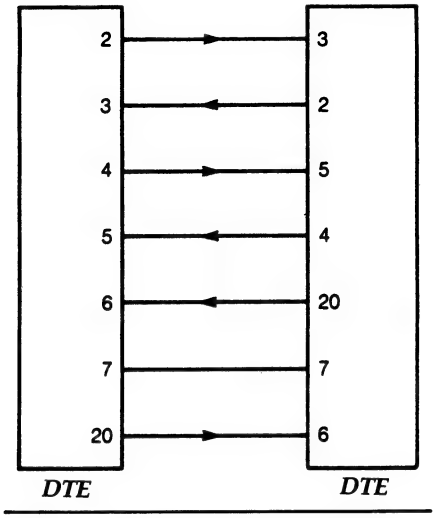



***Figure 4.** Null-modem connections with handshaking.*

nect both pins straight through, using jumpers or the switches. Getting these connections wrong will guarantee failure right from the start. You will have both devices screaming at each other on one wire, and listening intently to the silence on the other.

## Shake on it!

Chances are, this won't be enough to get things going, but give it a go – you may be pleasantly surprised. Assuming nothing happened, it is time to start connecting some more pins. How you do this will depend partly on whether you want hardware handshaking between the two ends. If one of the devices is a printer which doesn't support software handshaking, then hardware handshaking in a must. The same applies if the printer supports software handshaking but the computer doesn't.

It is in the use of the handshaking pins that differences in interpretation of the standard most arise, and it would be impossible to enumerate all possible combinations here (whole books have been devoted to the subject!). Instead, I will try to describe a methodical approach to bridging the communications gap. I make no claims as to it's completeness, as there are some pretty strange implementations.

There are basically two ways in which the handshaking pins can be handled. The first is to connect them in such a way that the equipment at each end of the link knows what is going on at the other end (this is the reason that such lines were defined in the first place!). This is most easily achieved if you are connecting a DTE to a DCE, as the order in which things are supposed to happen is quite clearly defined.

The other way to do it is to fool each device into thinking that the other one is doing what is expected of it, whether or not that is the case. This configuration is the easiest to implement, but can be an invitation to problems if the devices at one or both ends rely on these lines for information regarding the state of the communications link.

## The Null-Modem

One very common situation is when you have two DTE devices (such as PCs) to connect together in order to transfer files or data between the two. Assuming that a compatible file transfer program exists on both systems, a null-modem cable can be used to transfer the data – the name arises because terminals usually expect to see a modem at the other end of the cable. While it would be possible to transfer the data through modems, it is much faster and more reliable to do so with a direct link. The cable appears to be a very fast modem to the computer at each end, hence the name.

Other advantages with the omission of modems from the link are even more apparent. Firstly, the cost of a short cable is much cheaper than a pair of modems, even the cheapest. Also the use of modems greatly restricts transmission speed, with the cheapest running at a mere 300 baud, although the prices of 2400 baud modems are starting to fall.

A null-modem cable without any handshaking only needs a three-core cable to connect the two ends together (see Figure 3). One wire is the common ground line, and the other two carry data in one direction or the other. The handshaking pins at each end are tied in such a way that provided the cable is plugged in, the computer will see the other end as being ready.

The connection for the handshaking lines is the same at both ends. First tie DTR to DSR and CD on the same connector. This means that whenever the terminal is ready (DTR high), it sees the 'modem' as being ready (DSR high), and that the 'modem' is talking to another modem at the other end (CD high). The fact that a modem is not connected is immaterial here – computers are pretty naive devices. The other thing to do is to tie RTS to CTS, again on the same connector. Thus, whenever the terminal requests permission to send, it is granted regardless.

Of course, if you plug a null-modem into only one computer and proceed to send data down the line, it will merely spew forth from the plug at the other end all over the floor, never to be seen again. For this reason, whenever you bypass handshaking lines, remember they were put there for a reason, and if they can't do their job keeping track of the other end, then you'll have to do it yourself!

To connect two DCE devices together is usually more complicated. Because of the order in which events are supposed to happen, the jumpering used for fooling a DTE device may not work here. For example, if the modem waits for a ready signal from the terminal (DTR) before asserting its own ready signal (DSR), then tying the two together externally will get you nowhere, as DTR will follow DSR, but DSR will not go high until the modem sees DTR. A similar situation also exists for RTS and CTS. The reasons for this stem from the fact that the terminal usually controls the modem, not vice-versa.

The only time that you are likely to need to use any trickery of this kind with a modem is if you want to connect it to a terminal port on a multi-user system which is configured as DCE. To start with, pins 2 and 3 will need to be swapped as for a null-modem cable.

If the computer (configured as DCE, remember) raises DSR when it is ready, regardless of the state of DTR, then things are going to be relatively easy. Just cross-connect DTR at each end to DSR at the other, and tie RTS at each end to CTS at the same end. If the computer is not going to be this co-operative, the best thing to do is to get the modem to raise DSR all the time that it is powered up. Most modems have a DIP switch which tells it to ignore DTR, and assume that it is high. The same cable configuration can then be used for this situation too.

Now that you have your two devices having a friendly chat via a break-out box, it would be nice to do away with the box in the middle, and use a special cable to do the job – that's what we set out to do.

Bearing in mind all the preceding about the benefits of the various types of connectors and cables, you should now go and collect the various bits and pieces required to make the cable. A few tools won't go astray here, although the actual ones you need will depend on which type of connector you have decided to use. □

*The prices quoted in the article for connectors were taken from a number of suppliers' catalogs and are intended as a guide only.*

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YC/12

# Behind HyperCard – Part 4

## Now that you've learned what's behind HyperCard version 1.0, there's a new version out – Stewart Fist reports. . .

THIS IS THE last in this brief four part introduction to HyperTalk, the language of HyperCard. We have not aimed to produce a definitive tutorial – more a taster, to give you a flavour of the language, and to demonstrate how easily simple, useful scripts can be added to your stacks.

If you want to go further with this language, we suggest you buy one of the many good books now available on the subject. Danny Goodman's *The Complete HyperCard Handbook* is excellent for the beginner, as is Carol Kaehler's *HyperCard Power*. For more advanced programming try Dan Shafer's *HyperCard Programming*.

Despite the obvious enthusiasm of a lot of Mac programmers for HyperTalk, it is becoming increasingly obvious that the programming language has substantial limitations. Many serious programmers see it only as a junior sibling of 'real' object oriented languages like SmallTalk and Lisp.

But for the non-professional user/programmer the language is superb. It has a complete set of system messages (mouseUp and so on), excellent mathematical functions and text-string commands, variables (both global and local) and even includes nestable condition testing (if . . . then).

And the language is dynamic; the new release (Version 1.2) fills some of the gaps and improves the range of possibilities without creating any problems with past scripts. This latest version has just arrived on my desk, so it should be in the hands of dealers by the time you read this.

### Some changes

One of the more important changes is to increase the range of actions of 'me' and 'target'. We discussed 'target' briefly in the previous part: remember, it is a function that returns the point of entry for a system message. For instance, if you click on a certain card field or button, then the button or field ID or name is returned and can be used or displayed as required. If the cursor is outside a button or field when you click, then the Card ID is returned.

Try this simple script to understand how this works. We'll use the mouseEnter, rather than the mouseDown or mouseUp system messages, and add the script at the card level –

```
on mouseEnter
   put the target
end mouseEnter
```

MouseEnter is a system message that is sent whenever the mouse enters an active area (field or button), and if we don't specify where to 'put the target' information, then it will be displayed in a message box by default.

Previously 'the target' referred only to the object (the button or field), and if the target was a field, there was no way of accessing its contents. In Version 1.2, 'target' (without the 'the') refers to the contents of a field.Therefore –

```
put target into myVar
```

or

```
put "Fred" into target
```

are now acceptable, whereas they wouldn't have been in the earlier versions.

It is difficult to separate the concept of the object and its contents sometimes – but this distinction needs to be made if you are to keep the logic of the language in your handlers.

There is a similar problem with the use of 'me'. Change the middle line of the above handler so that it reads –

```
on mouseUp
  put the name of me
end mouseUp
```

You will find now that whenever you enter a field or button area, the message box will pop up with the name (or ID number) of the Card (not the button or field). The term 'me' always refers to the object containing the current handler – and since you wrote this handler at the card level, it will always return the name or ID of the card. Try this change –

```
put the name of this background
```

and you will see that the word 'this' is also an object descriptor.

To get this all straight: 'target' will return the name or ID of the entry point for system message; 'me' returns the same for the object which holds the current handler; 'this' returns the current card, background or stack (not field or button – and you must specify).

After you've played around with these changes for a while, try this – but only if you have the new Version 1.2. Firstly, create a new card field and give it the name Display; then at card level write –

```
on mouseUp
   put the target into me
   put me into card field Display
end mouseUp
```

This handler illustrates the newly extended operation of 'me'. Previously 'me' was just a convenient synonym for the current object, but now it is a 'container' as well. In HyperCard jargon, the term 'container' means 'variable' in its widest sense.

You might think this distinction is a bit esoteric, but HyperCard fields are also both containers and objects. The term object refers to the status in the message hierarchy, while container indicates that data (text) can be added to the fields, and that the fields will hold and regurgitate this data when required. A field is just like a big variable that is visible on the screen. Handler lines like –

```
put the name of this card into card field Display
```

are virtually the same as –

```
put the name of this card into myCard
```

In the first case the card filed 'Display' must be created first before the handler is activated. It doesn't need a name because an ID number is automatically generated. In the second case, the new variable 'myCard' is automatically created to hold the information.

You assign value to a field by typing into it, and you assign value to a variable with a script line that begins with the 'put' command. You don't need to establish local variable names before you use them; but note the qualification 'local'.

HyperCard has both local and global variables. The distinction is between those which are only valid during the execution of the current handler, and those which carry the value throughout the program. Note that a local variable is valid only within the handler – it doesn't extend to other handlers in the same script –

```
on mouseEnter
   put the target into myVar
end mouseEnter

on mouseWithin
   put myVar
end mouseWithin
```

will not give you a message box revealing the name of the target – it will simply print the word 'myVar' inside the message box every time. The middle line of the second handler needs to be the third line of the first handler (and the second handler deleted) for the system to work, since myVar hasn't been defined. Therefore, by default, it is a local variable. You could also make the above script work by adding a second line to both handlers –

```
global myVar
```

which is the way you define global variables, before the 'put' statements. You must create the global definition both in a handler before adding a value, and also before using that value in another handler – which will seem a bit odd to most programmers.

You can declare more than one global variable in the same line, with the names separated by commas, if you wish –

```
global chapters, sections, pages
```

defines three different global variables into values can then be put.

If you change the value of a global variable anywhere, you change it everywhere – but the changes aren't saved to disk between sessions or when you swap out of a stack.

A good example of a built-in local variable is one named 'it' which is used by default if no other variable name is declared. So if you write the line –

```
get the ID of target
```

the target ID will be written into a variable called 'it'. You haven't had to define it – or (in this case only), even use the variable name, but the next line –

```
put it
```

will result in the target ID being revealed in the message box.

## Scripts

The use of all these common English words and defaults makes HyperTalk appear to be deceptively simple to write, but in some ways it also complicates the reading of scripts. It is hard to get use to the idea that 'it' and 'this' are active parts of the language, not just loose connective words.

It takes some familiarity with the program to remember that 'put it' means 'place the contents of a variable (which has probably not even been named, let alone defined) into the contents of a message box (that isn't mentioned) and display this on the screen (which is assumed).' One rather difficult distinction the tyro programmer in Basic or any of the other popular programming languages needs to make is that between numbers as literal strings, and numbers as numerals.

When we write 2000 into a variable meant to contain the number of widgets on a warehouse shelf then it makes sense to treat 2000 as a numeric value. When the 2000 represents a postcode, it means nothing more than 'Sydney', and should be treated as a literal string.

Just when you think that you are getting the distinction clear, someone points out words like 'second' and 'ninth'. Are these terms more aligned with literals or with numbers?

Bill Atkinson, who wrote HyperCard, has dealt with this problem in a novel way. He treats every word or number as a literal – until the program attempts to undertake some computation. At this stage, HyperCard 'interprets' the string as a number and uses it in the calculation – returning the result to literal form again.

The point here is that you don't need to bother about making the distinction, since everything is a literal. Also, the interpreter can handle the word 'nine' in exactly the same way as the number '9' – or in fact, as the word 'ninth'. Up to 'ten' the program doesn't care. This is another of the reasons why HyperCard appears to use a very English-like language.

However there are limitations. A number can include only one period (.) representing the decimal point, and no other punctuation or spaces apart from a plus (+) or minus (-) sign at the front.

With calculations, you can have precision up to 19 decimal places, but this is unnecessary for most common uses. So you can set the precision you require by using the 'numberFormat' command –

```
set numberFormat to 0.00
```

This example would result in a string with at least one digit to the left of the period, and two to the right. If you don't want unnecessary zeros in the decimal places you can request –

```
set numberFormat to 0.####
```

and the trailing digits will only be added when they are non-zero, to a maximum of four.

Range is established by the word 'to' –

```
repeat with increment = 1 to 19
```

Along with these literals and numbers you will need to use operators such as equalTo (=), greaterThan (>), lessThan (<), and so on, to write command lines like this one –

```
if usersAge > 45 and usersAge < 60 put "Middle Aged" into card
field "ageClass"
```

As in most languages, parentheses are used for groupings, with the innermost expression being evaluated first. There are the normal +, -, *, and / arithmetical operators, and also the logical operators =, >, <, and ≷, and, or, and not, as well as a few other more obscure ones. You can use either the words 'is not' or the symbols ≷ to mean 'not equal to', and the words 'contains', 'is in' and 'is not in' are all evaluated to be either true or false.

The words 'true' and 'false' are both constants recognised by the program along with 'up', 'down', 'left', 'right', 'space' (for example: " "), 'tab', 'return', 'empty' (for example: the null character ""), 'return', 'lineFeed', 'formFeed', and 'pi'.

And, to end this brief four-part look at HyperTalk, a quick tip on security. If you want to ensure that no one can modify one of your stacks try this handler at the Stack level –

```
on openStack
   set userLevel to 1
end openStack
```

This allows the user to Browse only (userLevel 2 allows them to type). There are ways around this script through the message box, of course, but it's a simple handler which makes access to change difficult for the less experienced.

I was going to conclude this part with three substantial scripts that I developed for importing text, spreadsheet and database files into HyperCard. But Version 1.2 landed on my desk last week and its utilities disk includes ready-made handlers for both importing and exporting files – and I have to admit that they are better than the ones I wrote.

So if you are still staggering along with the early version, take your current HyperCard disk down to the nearest Mac dealer and demand the upgrade! □

## AMSEC

AMSEC is an Australian software evaluation group with consultants in the workplace, in schools and in tertiary institutions around Australia. It can be contacted at PO Box 140 Hurstbridge 3099 Vic. or PO Box 1339, Armidale 2350 NSW.

## Like to know more?

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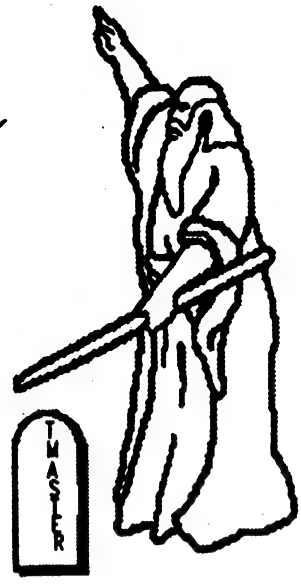


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# HyperCard – potential and promise

**Jeff Richardson, AMSEC consultant and computer education lecturer at the Gippsland Institute of Advanced Education, believes that HyperCard is the most significant innovation in personal computing since the release of the Macintosh itself.**

YOU WILL probably have noticed that most articles about HyperCard deal with the question 'What is HyperCard?'. 'What is so extraordinary about that?', I hear you ask. Well the very need to explain just what HyperCard is indicates that we have before us something very different.

We all share assumptions about what a computer is and the functioning of the the components that make up different system configurations. We share a notion of a 'word processor', a 'spreadsheet', a 'database' and other application and utility software; and we share a notion of a 'programming language' and an 'operating system.' We know, or at least think we know, what these things are, and when an innovation is made in any particular area there is no need to explain the basics of that area in itself. Not so with HyperCard. Sure, its a piece of software – but what is it?

Most of what I've read about HyperCard since its launch last August has attempted to answer this question. If you've been fortunate enough to use HyperCard yourself you'll probably understand why reviewers feel the need to stress so urgently that HyperCard is so much more than just a showy electronic filecard system.

I was initially very sceptical of HyperCard but after using it I became a total convert. I'm writing from the perspective of a HyperCard devotee, so be warned. HyperCard is the most significant innovation in personal computing since the release of the Macintosh itself.

HyperCard is a total computer environment: it's a modern and powerful programming language; it's a multipurpose application, able to manipulate and integrate text, graphics, data and complex calculation; it has a range of user entry levels that span from computer novice to application's programmer; it has the power to usurp the front end of the operating system, allowing the user to open any other application or utility from within their own customised HyperCard startup environment; and it can import other programs and run them, or use parts of them. It's simple enough for users to create their own applications without writing any program code at all. It can interface with the outside world through robotic control, digital sampling of sound and vision, through sound synthesis, and through video disk. It comes with a range of ready to use applications, but it is also open-ended, extensible and user definable. HyperCard empowers and emancipates the user in relation to software in the same way that the Macintosh does in relation to hardware.

At the heart of all this power is HyperCard's builtin programming language, HyperTalk. Like HyperCard itself, HyperTalk is not like other programming languages – and then again it is. But the languages it is descended from are not like the languages that are commonly used for program development. Programming in HyperTalk/HyperCard is a little bit like programming within a spreadsheet, attaching formulae to cells and sending output to other cells, but it is a lot more like programming in Logo and in Smalltalk.

Both these languages have been around for some time but have not been used by serious programmers who have recognised their revolutionary nature, because both languages have been held back by hardware which lacked the speed and memory to keep pace with their brilliance. HyperTalk is very much like Boxer, which is currently under development at the Massachusetts Institute of Technology – Boxer is a WYSIWYG system in a total sense; the entire system is visually represented and manipulable in a way that is similar to the Macintosh desktop, and the entire system, program, data, text, the lot, is always visible and available and alterable on the screen. Within Boxer, there is no distinction between an editor or any other part of the system. HyperCard/HyperTalk operates in the same spirit.

In HyperTalk it is messages, rather than commands which are the basis of getting things done. This is a subtle but profound difference from the imperative, sequential and procedural way in which most common computer languages are expressed. Messages are passed between objects and may use functions. User-defined objects and functions can be used in addition to those that are built in to HyperTalk. The language has a lexicon of primitives to meet the needs of the user. But it is very powerful and forgiving; it has a very high tolerance for natural language syntax and for the syntax of lower level computer languages. It is quite possible to write HyperTalk code in a pidgin of pseudo-code, debugging as you go, or as happens surprisingly often, HyperTalk gets your drift and is able to do what you want anyway. This style of programming is close to the ideal of 'descriptive programming', the most well known embodiment being the language Prolog, where the emphasis is on describing what is to be done rather than devising an algorithm to do it.

Modules of HyperTalk code, or scripts as they are called, are attached to objects. Objects are arranged in a hierarchy and this hierarchy determines how messages will be handled. Scripts are capable of altering other scripts and of altering themselves. There is no real distinction between programs and data. If all of this sounds confusing, I'm not surprised. HyperCard really does stretch and change the notion of just what programming is – try it and see for yourself!

Of the objects available in HyperCard, the button is the most immediate and dynamic. It responds to a click of the mouse, and this really lets you start pushing the computer around. You get the feeling that it will never kick sand in your face again. Yet for all this there are shortfalls. Other users will find their own gripes, but for me there are two types of object that are glaringly missing. They are sprites, the basis of any animation, and demons, the parallel processing tool for ordinary folk, lying silently in wait for a specified event. Both have been available in versions of Logo for well over five years now, and running on very dinky little machines.

Still, the whole HyperCard environment feels very Logo like. Certainly its the first Mac program that has made me seriously consider the machine as a realistic option for schoolchildren. And for me, HyperCard is the best realisation so far of the potential and promise I felt when I first sat down in front of a Macintosh. □

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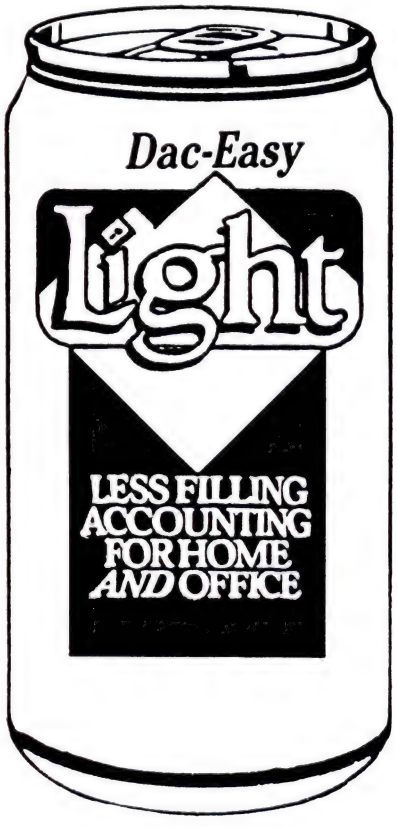


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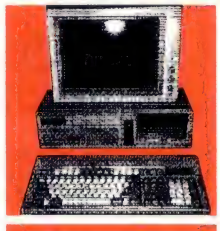

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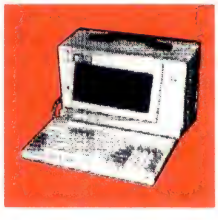

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# You only have to ASK!

## Batch files are clunky in operation but they allow fairly sophisticated DOS control – Peter Nolan tells how to write a Turbo Pascal ASK program to give your batch files more flexibility (and reduce operator training).

THE MAIN drawback in Batch files that I have encountered has been the lack of operator interaction with the process flow. PAUSE has been the only option. Often I have had the need to pass a series of options to the batch file so the user can select a specific task from a list.

Whilst the Public Domain has provided many programs like ASK and GETKEY, all of them have their own little quirks and shortcomings. To maintain uniformity with other commonly used software, it is nice to be able to use specific keys for familiar responses to questions – so, there is a need to be able to change the questions and responses encountered in a batch file.

Halt; is the Turbo Pascal instruction to immediately stop processing and return to DOS – a little known feature of Turbo Pascal is that the HALT command can be used to pass an ERRORLEVEL back to DOS. The format is HALT(ErrorLevel); and this gives you the freedom of writing your own ASK program to include with your Batch files. Giving you a much greater degree of freedom and user interaction with your batch system, which hopefully will reduce the need for operator training in the use of PCs.

I have included my version of the program and called it ASKIT; in it I have used a byte as a counter in the 'for next' loops, not for any great savings of memory in this instance, but to demonstrate the fact that a loop incrementor need not always be an integer. Indeed, FOR I:='A' TO 'Z' is quite legal, after, of course, declaring I to be a char.

Many other features could be added to the ASKIT program, for instance you may want to offer the option of using the Escape key as a valid response or the F1 key. These could be passed as special characters –

```
ASKIT Press either the F1 or F2 key !0
```

In your ASKIT program you could check for an extended key press, which you could then relate back to your chosen special character –

```
read(kbd,CH);
if CH=#27 and keypressed then  { Extended key pressed }
begin
  read(kbd,CH);
  case ord(CH) of  { see Keyboard return codes in the manual }
    59 : CH:='1';
    60 : CH:='0';
    else CH:=#0;
  end;
end..... etc.
```

If you wanted to include the Escape key as a valid response then just assign it a character that is not normally available from the keyboard. For example you could use the character 27, which, as you probably are aware, is the left pointing arrow. This is actually the return code for the Escape key. To include this character in your batch file you would merely use the Alt key plus the numeric keypad.

For those unfamiliar with this technique, I will explain – One of DOS' functions allows you to create any character in the range 0 to 255 by holding down the Alt key and pressing the decimal code for the desired character. Upon releasing the Alt key the chosen character will be displayed. Give it a try: hold down the Alt key then press 027 on the *numeric keypad*, then release the Alt key and, presto, a left pointing arrow. Neat huh?

Remember, though, this technique will only work with the numeric keypad and *not* the numbers across the top of the keyboard. Also it only works at DOS level and with programs that use the BIOS for keyboard input. Turbo Pascal doesn't honour this technique as it uses its own keyboard driver.

When you use ASKIT in a Batch file always check for the highest ERRORLEVEL first as DOS will accept all ERRORLEVELs from the one being tested on up to 255 as equal. ERRORLEVEL should be regarded as EQUALorGREATERthan rather than an exact value.

Your MENU.BAT batch file might look like this –

```
echo off
cls
type MENU.TXT
ASKIT Please select abc
if ERRORLEVEL 3 goto Three
if ERRORLEVEL 2 goto Two
:One
   cd \lotus
   Lotus
   goto End
:Two
   cd \wordstar
   WS
   goto End
:Three
   cd \xtalk
   XTALK
:End
menu
```

The program begins by setting the strings and character set to Null; that is, equal to nothing. If no parameters are passed, then ASKIT will assign defaults to use. This will take the form of a Yes/No prompt and answer.

If parameters are supplied then we know that the last one in the line has to be the string of acceptable characters to look for. Therefore, we read in the parameters until we reach the last one. All of the preceding words read in must make up the prompt to print on the screen. So we build them into the prompt string adding a space between each word as we go.

Next we read in the last parameter which contains our list of acceptable characters. Stepping through this list we force them all to uppercase and add each character plus a slash for appearance to our screen prompt. We also add it to our acceptable character set. Sets can be manipulated much in the same way as strings. To add a character to a set merely enclose it in square brackets and perform the add.

Let's say our set (SELSET) already has the characters 'ABGR' in it and we need to add 'K'. The set will already look like ['A','B','G','R'] so all we need do is say SELSET:=SELSET+['K']; and it's done.

When the last character has been added the screen prompt will have an unwanted slash at the end, so it is hacked off with the delete command just to tidy up the appearance of the displayed prompt.

Finally, all is ready to display the prompt after first attracting the user's attention with the little bell. I chose to make a special bell sound as a user will often ignore the normal beep given out by the machine. Now all we need do is loop until an acceptable response is received and then HALT the process will pass the position of the acceptable character back to DOS with the HALT command.

By now, you may also have considered the possibility of using the halt command for many other things as well. For starters, you could attempt to reset a file and pass the result from IORESULT back to DOS indicating a file's status –

```
program ASKIT; { For Batch file interaction }
const
  EmptyStr          = '';
  EmptySet          = [];
var
  PrLine,
  PrChars           : string[80];
  PrSet             : set of char;

{---------------------------}
procedure LittleBell;       { NOT a Les Bell offspring }
var
  i                 : byte;  { always define loop variables within their }
                             { own scope. Since the count will never be  }
begin                        { more than 255 use a byte and save memory  }
  for i:=1 to 10 do
  begin
    sound(1200);
    delay(20);
    nosound;
  end;
end; { procedure LittleBell; }

{---------------------------}
procedure AskIt;
var
  OK                : boolean;
  CH                : char;

begin
  LittleBell;                { get their attention                          }
  repeat                     {                                                }
    write(PrLine,'  ');      { display our prompt string complete with the }
    read(kbd,CH);             { acceptable characters now added, and wait   }
    CH:=upcase(CH);           { for a key. Make it upper case and test to   }
    writeln(CH);              { see if it's in the acceptable group.        }
    OK:=(CH in PrSet);        { if NOT then let them know                    }
    if not(OK) then
       writeln('That character is NOT in the list',#7);
  until (OK);                 { the #7 will sound the computers BEEPer      }
  halt(pos(CH,PrChars));      { pass the character's postion in the list of }
end; { procedure AskIt; }     { acceptable characters back to DOS           }

{---------------------------}
procedure GetParameters;
var
  i                 : byte;

begin
  PrChars:=EmptyStr;           { set to NULL length                         }
  PrSet:=EmptySet;             { set up an empty SET                        }
  PrLine:=EmptyStr;            { set to NULL length                         }
  if (paramcount < 1) then     { NO prompt or characters supplied so we  }
  begin                        { will use the default Yes/No game        }
    PrLine:='Press Y/N';       { prompt to display                       }
    PrSet:=['Y','N'];          { SET of acceptable characters            }
  end else
  begin
    i:=1;                                  { read in the list of parameters  }
    repeat                                 { which actually are the words    }
      PrLine:=PrLine+paramstr(i)+' ';      { that make up the prompt string. }
      i:=succ(i);
    until (i = paramcount);                { read all but the last parameter }
    PrChars:=paramstr(paramcount);         { as that will be the list of     }
    for i:=1 to length(PrChars) do         { characters to test for          }
    begin
      PrChars[i]:=upcase(PrChars[i]);      { force character to upper case   }
      PrSet:=PrSet+[PrChars[i]];           { add it to the SET               }
      PrLine:=PrLine+PrChars[i]+'/';       { add it to the prompt line also  }
    end;
    delete(PrLine,length(PrLine),1);       { subtract 1 from the length of   }
  end;                                     { string which will drop the last }
end; { procedure GetParameters; }          { delimiter that was added '/'    }

begin
  GetParameters;
  AskIt;
end.                                                                        □
```

# Upstart

## Looking for an integrated communications program? One that plays the Blue Danube Waltz? Keith MacKay reports. . .

UPSTART is a TSR communications program by the Australian company, CyberSoft (developers of the NetComm Program), distributed by its marketing arm, Cynetics. The package also features a number of desk-top utilities such as a calendar, appointments reminder and a card file, which are integrated with the communications side of the program.

Upstart is distributed on one floppy disk and is not copy protected. The program runs on DOS 2.00 or higher (earlier DOS releases will not run any TSR software), occupies a little over 340 kilobytes of disk space and requires a hefty 100 Kbyte of RAM if used memory-resident. It may also, however, be run as a stand-alone program, although two of its features, Data Import and Data Export, are only available in memory-resident mode.

Upstart's documentation consists of a slim ring binder whose author consistently uses irritating combinations such as 'return back' ('. . . return back to the application . . . ' – one can hardly return forwards, after all). There is also at least one feature of the program which did not find its way into the manual at all, but these minor blemishes aside, the manual is a well organised and informative piece of work and should be enough to get the inexperienced user up and running without further assistance – this is, of course, what software manuals are supposed to achieve, but it is a sad fact that few of them manage it.

As a pop-up, Upstart runs happily with other TSR software – I tried it with SuperKey, Lighting, SideKick and Metro and had no difficulties. As I have suggested before in these articles, a feature which should be included automatically with all TSR programs is a facility for unloading them from memory. I was therefore pleased to find that Upstart offers this option.

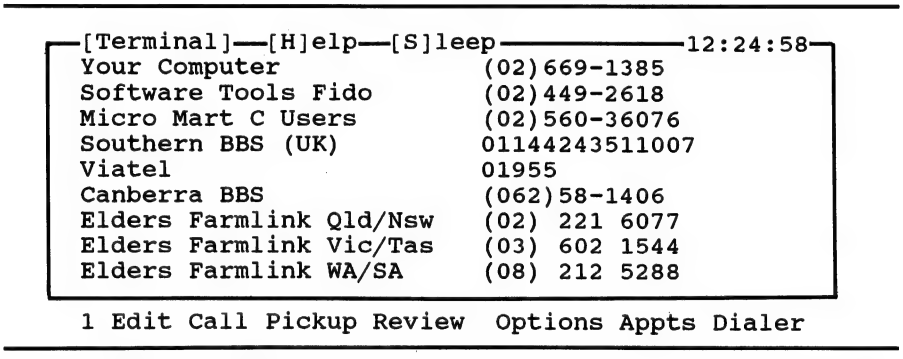



*Figure 1. Upstart is entirely menu-driven, and the arrow keys may be used to reposition the menus. Once Upstart has been loaded to RAM, its Main Menu is brought up by pressing Alt-Grey Plus.*

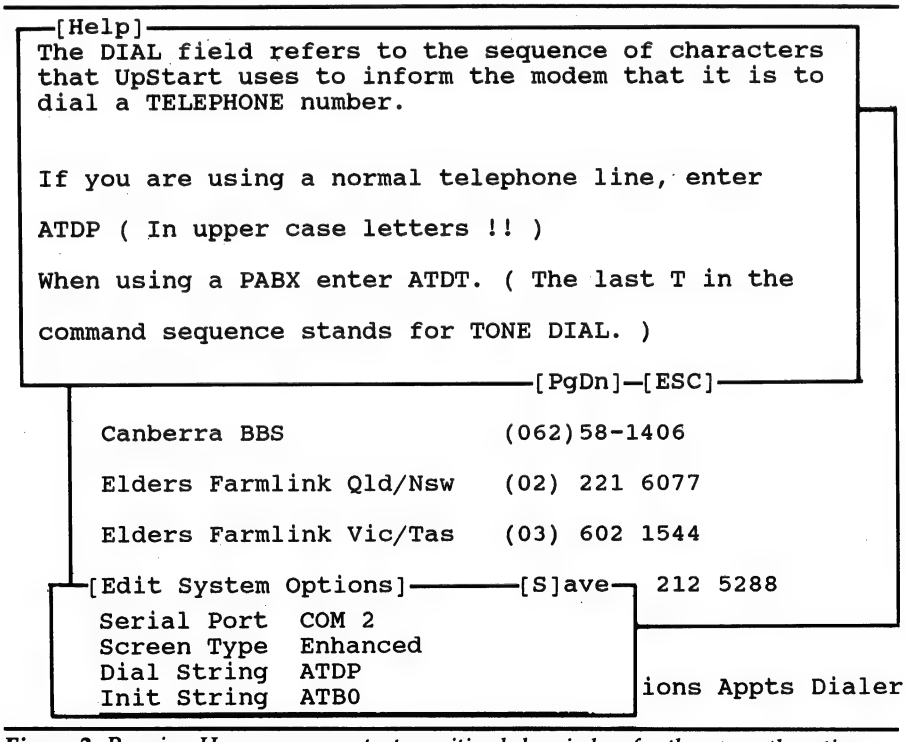



*Figure 2. Pressing H pops up a context-sensitive help window for the currently active menu.*

In stand-alone mode, the program must be invoked from within its own directory, even if that directory is on the path, otherwise the overlay files cannot be found. Another small difficulty I encountered in stand-alone mode was that a large cursor was left behind when I exited, which is somewhat untidy, although the normal cursor was easily restored with the DOS MODE command.

Upstart has no installation procedure – it is simply copied to a hard disk directory or run from a working copy of the distribution disk. All configuration is carried out from within the program itself, although there is a command-line switch to load Upstart with a Hercules card.

Upstart is entirely menu-driven, and the arrow keys may be used to reposition the menus. Once Upstart has been loaded to RAM, its Main Menu is brought up by pressing Alt-Grey Plus, which is not the most comfortable choice of hot key – even on an AT keyboard with duplicate Alt keys, two hands are required if the command is to be given without dislocating anything important.

One of the program's desk-top utilities, the calculator, can also be invoked from the DOS command line, the hot key in this case being the equally (or on an AT even more) uncomfortable Alt-Grey Minus. A separate utility, 'Hotkeys' allows the hot key to be changed, but the permissible combinations still involve the Grey Plus and Minus – the only thing which can be changed is the 'primary' hot key, which may be Alt, Ctrl or either Shift key. Right-Shift-Grey-Plus is, however, slightly easier to reach; and it must be said in the program's defence that the range of available hot keys is rapidly diminishing as more and more TSR packages are released.

*It may also, however, be run as a stand-alone program, although two of its features, Data Import and Data Export, are only available in memory-resident mode.*

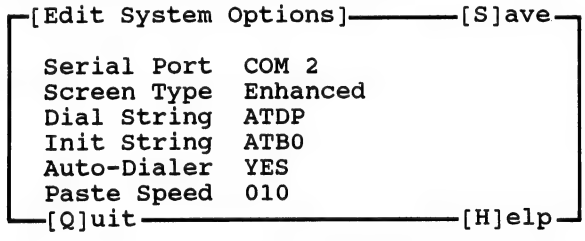



***Figure 3.*** *The Options menu offers the choice between serial ports COM1 and COM2; and allows screen type to be selected.*

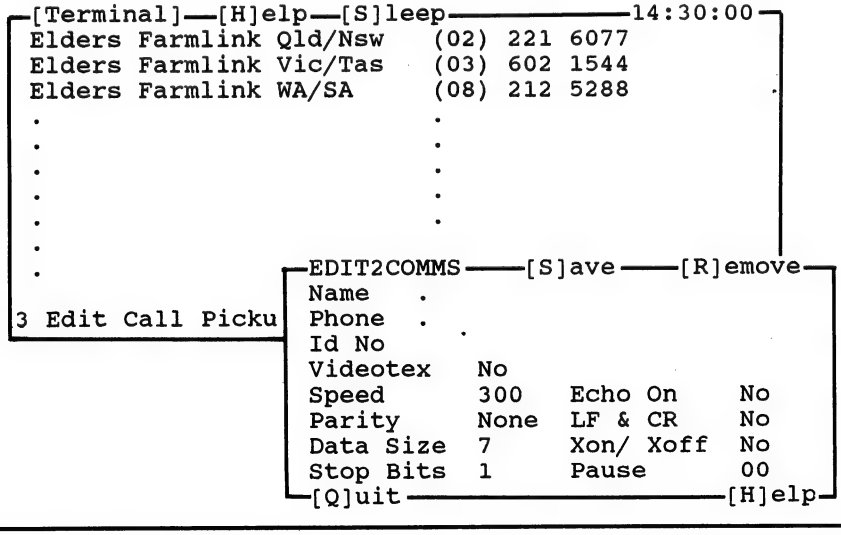



***Figure 4.*** *The Edit menu allows for the addition, editing or removal of items from the list of systems which can be called.*

## Options

Any of the seven options offered – Edit, Call, Pickup, Review, Options, Appointments and Dialer – can be invoked simply by pressing the initial letter. Pressing H pops up a context-sensitive help window for the currently active menu.

The Options menu offers the choice between serial ports COM1 and COM2; and allows screen type to be selected as Enhanced (in other words, high-res mono), Mono, Mono-ROM, Colour and Colour-ROM (and since this is an Australian product, the word 'colour' is spelt correctly), where the ROM settings refers to Cybersoft's optional Videotex ROM. As I use a mono screen, I cannot say what the preset colours are. The default dial string is ATDP and the default initialisation string is ATB0, either of which can be changed. Auto or manual dialling are offered; while Paste Speed is a feature which I shall return to later. Once the system has been set up, the configuration is saved by pressing S.

Edit is, logically, the next menu item to pick in a first-time configuration, allowing as it does the addition, editing or removal of items from the list of systems which can be called. Up to 30 entries are allowed, which may be a little on the light side for some users, although I cannot see myself using that many. An ID string of up to 25 characters can optionally be included for feeding to the system being contacted. The baud rates offered range from 150 through 1275 to 9600.

The system is now ready for action. Calling a number is a matter simply of positioning the highlight bar on that number and pressing C to call (assuming an autodial modem is connected, otherwise the number is dialled by hand). Upstart's Terminal Window presents a full screen with a menu bar across the top. The functions available are: F1, Help; F2, Options; F3, Save Page; F4, Edit Comms and F5, Utility.

Since the alphanumeric keys will be required by the host service, Upstart is now driven by function keys, with F1 invoking help. F2 accesses the online options, which govern data transmission and receiving. Aside from ASCII, the only protocol which Upstart offers is XModem. F4 allows particulars for any of the services listed to be edited on the fly, while F5 invokes the utilities menu, offering a number of DOS commands. F6 leaves the terminal window active and returns (or returns back) to the main application.

The Sleep and Wake Up options allow Upstart to operate while the main application is active. Any data received is saved to a buffer, although its capacity is limited to roughly 2 Kybte. Wake Up will interrupt the main application and return to Upstart if the buffer is getting full. The buffer size, however, is too small for this feature to be of any great use – connected to a bulletin board's Download Files section, for example, and requesting a list of files, one screen will be enough to fill the buffer; and at 2400 baud, one screen is sent fairly briskly. Given the amount of RAM which Upstart itself occupies and the memory requirements of a word processor or spreadsheet program – say 500 Kbyte altogether – I would have thought it possible to allow a somewhat larger buffer.

Upstart features Import and Export facilities which, as I remarked above, are only available when the program is memory-resident. Import allows a screen from the main application to be captured for transmission, while Export works the other way around, capturing material from the system contacted for sending to the main application. It would thus be possible to snatch a screen from Lotus, for example, and send it to a colleague – indeed, Upstart has a special command for exporting Lotus spreadsheets and maintaining the integrity of cells.

The Dialer option is linked to a card file holding a maximum of 99 entries, which is definitely on the light side – my Metro main phone directory, which also has a dialing option, currently holds approximately 250 entries and grows longer every week.

As with the other Upstart menus, the initial letter of the desired function is pressed to invoke that function. Thus D dials, C brings up the Calculator, E allows entries to be edited and so on. If option V is selected (View), the data contained in the card can be exported – particulars can thus be fed to a Viatel response frame, for example. T returns to the Terminal Window. Two separate utilities, SORTDIAL and PRINTOUT allow cards to be sorted and printed respectively.

The Appointments utility, which is linked to the Dialer and the Terminal Window, displays month-by-month calendars and can also be set up to display a window and sound an alarm when an appointment falls due, showing the date and time of the appointment and a message of up to 25 characters. The alarm consists of a rather lengthy chunk of the Blue Danube Waltz, which is very far from being my favourite piece of music but there seems, alas, to be no way of making the program play a few bars of a Brandenburg Concerto instead. The British convention of Day/Month/Year is used for entering appointments, which relieves feeble minds such as my own from the strain of transposing to the American format, as one often has to do with utilities of this sort.

In the course of my work in software development, data transfer with my colleagues is a fairly regular necessity. After experimenting with several other packages, I had settled on Procomm, which is a reasonably versatile program and displays that transparency which is the hallmark of any good software. However, I have now changed to Upstart.

Although there are a few improvements I would like to see, such as a much higher card file allowance and the possibility of using multiple card files, the program as it stands offers a wide variety of useful features – perhaps the next release will incorporate these enhancements. This is, with one or two minor exceptions, a well thought-out, tidy and elegant package, easy to drive and a pleasure to use, as well as being reasonably priced. □

## Product Details

**Product:** Upstart
**From:** CyberSoft Corporation
**Distributor:** Cynetics, 6th Floor, 579 Harris Street, Ultimo 2007 NSW (02) 281 3030
**Price:** $99 taxed;
Limited time introductory price, $69.95 (available until November)

```
[Dialer]—[H]elp—[S]leep————————11:59:50
UpStart Communications  - CyberSoft (C) 1986
Arthur Frampton           345-5471
George Frampton           345-5472
Henry Frampton            345-5473
Dugald Frampton           345-5474
Martha Frampton           345-5475
Edna Frampton             345-5476
Ma Frampton               345-5477
Pa Frampton               345-5478

1 Dial Find View Edit Calc Option Util Appt Term
```

*Figure 5. The Dialer option is linked to a card file holding a maximum of 99 entries. As with the other Upstart menus, the initial letter of the desired function is pressed to invoke that function.*

```
[Appointments]—[H]elp—[S]leep————12:24:58
Marriage Guidance        29/05/88-13:00     *
Probation Officer        30/05/88-12:30     *
Community Singing        01/06/88-19:30
.                          /  /  -  :
.                          /  /  -  :
.                          /  /  -  :
.                          /  /  -  :
.                          /  /  -  :
.                          /  /  -  :

1 Edit Activate Calendar Option Dialer Term
```

*Figure 6. The Appointments utility, which is linked to the Dialer and the Terminal Window, displays month-by-month calendars and can also be set up to display a window and sound an alarm when an appointment falls due.*

# Multi-user systems

For many small businesses, a multi-user system may obviate the need to network. Multi-tasking Matt Whelan introduces six multi-contenders . . .

MULTI-USER PC operating systems, Jake said. Simple, I said. Wow, did I goof! Far from being simple, this has turned into one of the most complex areas in the industry at the moment.

I said simple because I've been playing with multi-user/multi-tasking operating systems for several years. *YC* ran off a multi-user CompuPro for most of its recent life, and we ended up installing six of the beasts for Federal Publishing and its parent, Eastern Suburbs Newspapers. Meanwhile, we were always looking at comparable systems 'just in case'.

*Concurrent has both benefited, and suffered, from having to carry its past with it.*

And more recently I've experimented with a number of PC multi-taskers to see how well they can handle running a multi-line bulletin board. I also use Microsoft Windows (effectively the basis of the OS/2 Presentation Manager) on an almost daily basis because it 'fits' with my favourite desktop publisher, PageMaker.

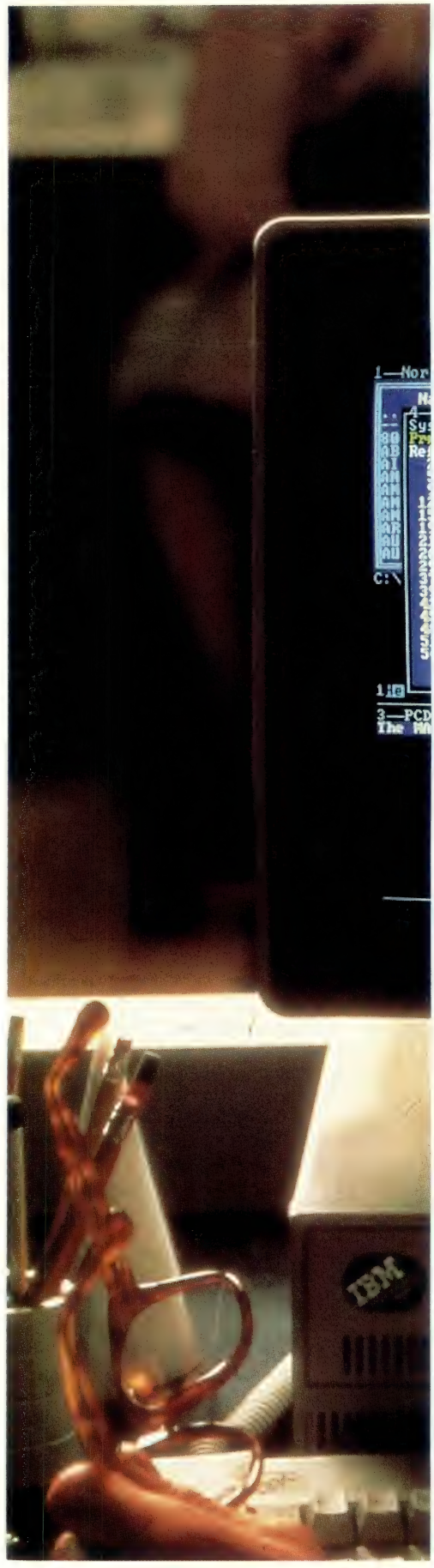
Not only that, but I also participate in several international conferences on multi-taskers such as DesqView, DoubleDOS, Windows, Concurrent DOS, OS/2 and more.

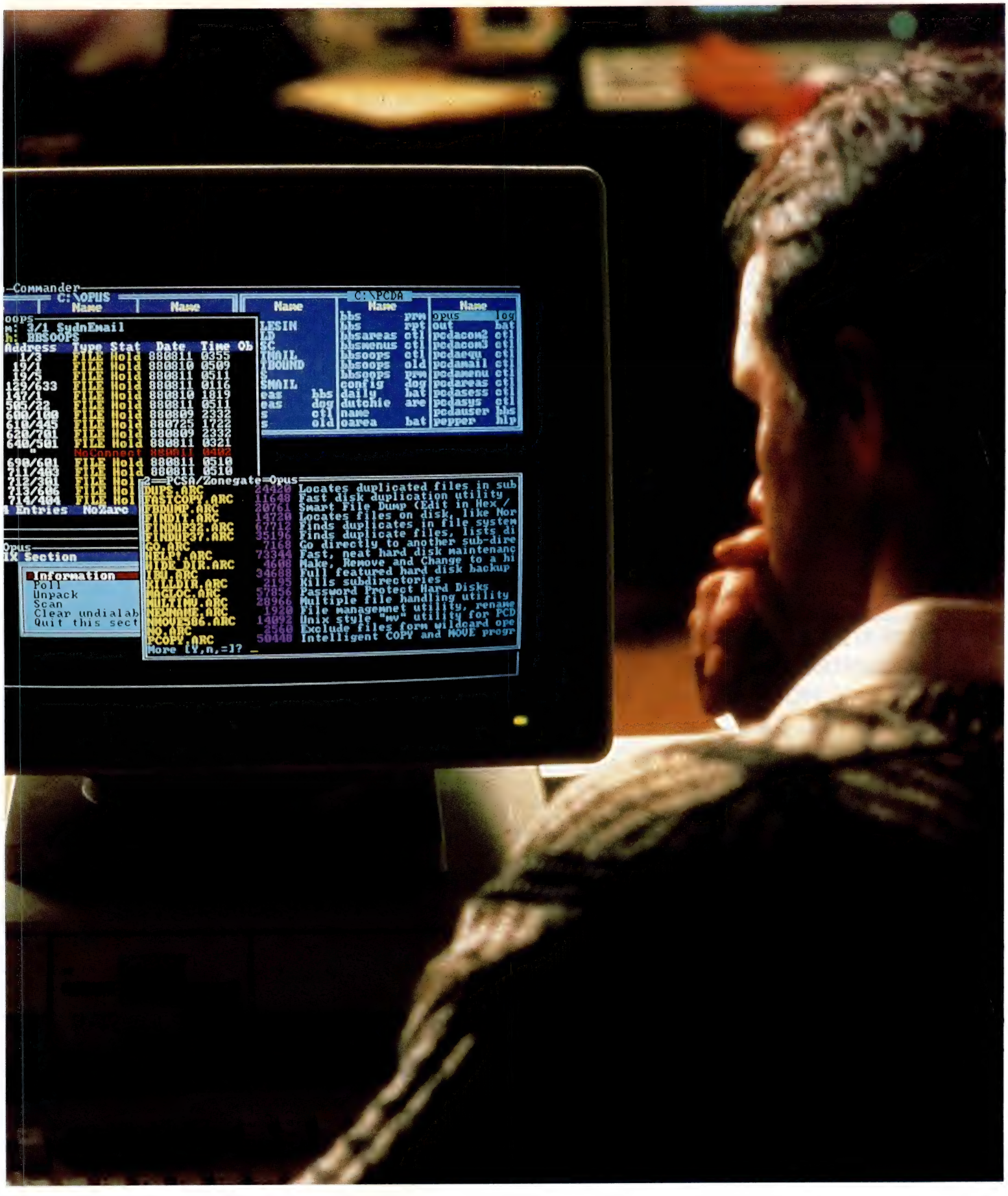
## Know-It-All . . .

I must know everything there is to know about multi-taskers, right? Yes, you're right – I was wrong. I might have thought so when Jake first raised the subject, but since then I've discovered there's a lot more here than meets the eye. (Actually, discovered is not a good word – I probably knew it all along, but hadn't been forced to admit it to myself quite so bluntly before).

You see, what's good in the real world isn't necessarily what's good on the PC. And no matter how good something is, it's useless if it's not what the users want. An evaluation of operating systems or operating-system 'shells' can't just concentrate on what's best – it needs to think about what the users want out of it no matter how strange their requirements.

And that's where we run into real problems in the PC marketplace – the users don't really want what's good for them. What they're after is a system which will let them worm their way past the PC architecture's 640 kilobyte limitation – and as long as it does that, they don't care how.




-Commander
C:\OPUS
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FILE Hold 880811 0355
FILE Hold 880810 0509
FILE Hold 880811 0511
FILE Hold 880811 0116
FILE Hold 880810 1819
FILE Hold 880811 0511
FILE Hold 880809 2332
FILE Hold 880725 1722
FILE Hold 880809 2332
FILE Hold 880811 0321
NoConnect 880811 0402
FILE Hold 880811 0510
FILE Hold 880811 0510
FILE Hol
FILE Hol
FILE Hol
Entries NoZaro
Section
Information
Poll
Unpack
Scan
Clear undialab
Quit this sect
2==PCSA/Zonegate=Opus
DUPS.ARC 24420 Locates duplicated files in sub
FASTCOPY.ARC 11648 Fast disk duplication utility
FBDUMP.ARC 20761 Smart File Dump (Edit in Hex/
FINDIT.ARC 14720 Locates files on disk, like Nor
FINDUP32.ARC 67712 Finds duplicates in file system
FINDUP37.ARC 35196 Finds duplicate files, lists di
GO.ARC 7168 Go directly to another sub-dire
HFAP*.ARC 73344 Fast, neat hard disk maintenanc
HIDE_DIR.ARC 4608 Make, Remove and Change to a hi
IBU.ARC 34688 Full featured hard disk backup
KILLDIR.ARC 2195 Kills subdirectories
LOCK.ARC 57856 Password Protect Hard Disks
MULTIMV.ARC 28966 Multiple file handling utility
RENAME.ARC 1920 File managemnet utility, renam
MOVE386.ARC 14092 Unix style "mv" utility for PCD
NO.ARC 2560 Exclude files form wildcard ope
PCOPY.ARC 50448 Intelligent COPY and MOVE progr
More [Y,n,=]? _

They really don't give a Fourex about the finer points of such a system, like how it handles file and record-locking, printer sharing, and so on. Interprocess communications, pipes and queues mean even less, because the applications they want to run don't know about them anyway.

Even worse, the more effort a developer puts into these niceties, the more of that precious, limited memory it takes – and the less time put in by the developer in making it totally, transparently DOS-compatible.

The success of 'low end' products like DoubleDOS and DesqView is testimony to this proposition – they are the 'least-multi' of the lot, yet they are the most successful. What is 'least-multi', anyway? Well, these two allow only multi-tasking, not multi-user operation, and to our (admittedly biased) minds, they're doing only half the job.

Yet, according to generally rave reports from users, they're the 'flavour of the month'. They provide exactly what most of the DOS world wants, with none of the complication-generating frills.

I suspect the market only wants it this way because it doesn't yet realise how beneficial the extras are. But there is no point in arguing with the buyers unless you're planning on retiring from selling . . .

## Speed kills

The other major consideration is the target machine – too many people want to achieve all this on an XT or an AT for our liking.

We're firmly convinced the only truly satisfactory way to tackle multi-tasking (and certainly so with multi-user) is to use an 80386-based machine – but again, that's not what the majority of the market wants.

Given the limitations imposed by the PC architecture – and the horrid introduction of non-linear, bank-switched (expanded) memory to cope with it – we would suggest the multi-user, multi-tasking scenario was an impossible dream. Yet plenty of people have already proven us wrong on that score, so we'll just try to put our personal biases aside for the moment.

Whether we believe in it or not, they can achieve their aims with an 80286. But whether they believe us or not, we're saying they can do it a lot better with an 80386. If they choose not to buy one, that's their business, but there's no way they can convince us of the wisdom of the move.

Once the processor question is decided, memory configuration becomes vital – the systems which deliver worthwhile results on 'standard' hardware only do so with the help of some investment. Extended memory cards, 'charge' cards, and co-processors with their own memory are solutions which make the 286 workable, if not ideal.

## Multi-user system

Different systems take a different approach to the hardware/memory problems, so some work better than others in a 'limited' environment. Our aim is to examine all the systems, to see how low you can go with hardware before they become a waste of time, and then to see just how well they manage without any hardware limitations.

Each system is big, and deserving of extensive testing if we're to come up with any concrete recommendations (and comparisons), so we'll be looking at them individually, in detail, over the next few issues before doing a final comparison.

We're a little uncertain about lumping OS/2 – 'operating system of the future' – and even Unix/Xenix in there with the DOS-dependent solutions. However, for the moment, while we're still making up our minds, the plan is to look at seven systems (okay, if we've missed your favourite – and it's significant – scream now and we'll try to get it in there), which represent a cross-section from plain and simple 'stuff two programs into the one chunk of memory' to advanced, 'real' multi-user systems.

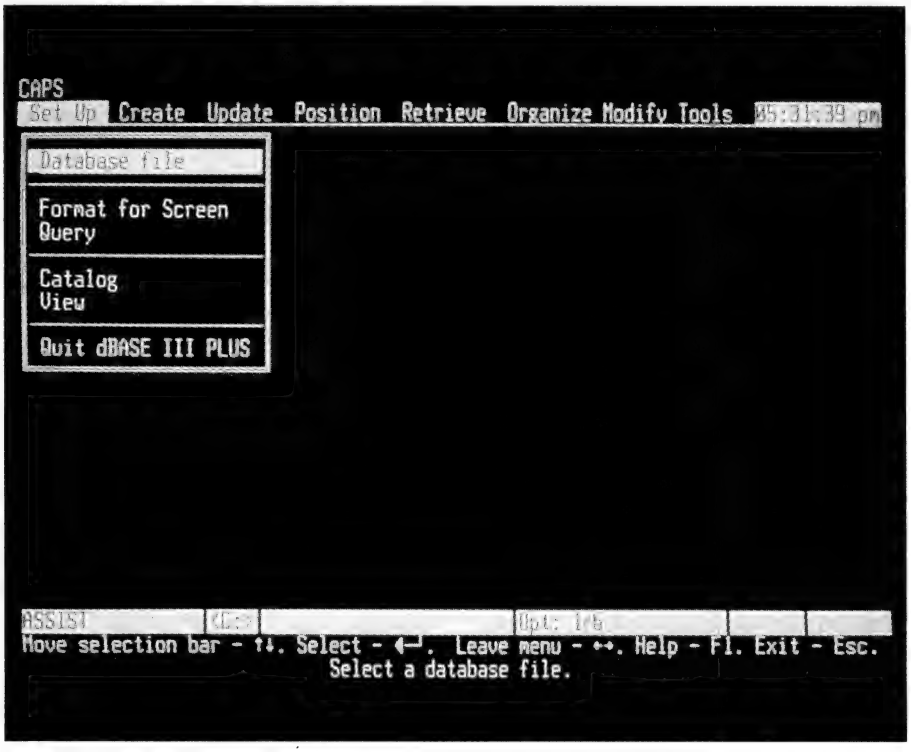
Our contenders will be –

**Concurrent DOS** – Our old favourite, Concurrent kept the *YC* CompuPros running for years. It has proved a solid and adaptable system, with 'real' multi-user capabilities, excellent speed, a high level of configurability, multi-tasking and task-switching on serial terminals, and some worthwhile software support.

However, Concurrent hasn't taken the migration to the PC architecture all that smoothly, and it's really only the latest versions (XM 6.1 for the PC and AT, and 2.1 for the 386) which handle the compatibility issue adequately for most users.

Concurrent has both benefited, and suffered, from having to carry its past with it. It was available well before PC multi-tasking became a concern, and inherited much of its style and capabilities from its 'predecessors', CP/M and MP/M.

The benefits are that it's a tried and proven system, with a solid file system extended to provide full locking facilities. It




has also provided an excellent upgrade path for those anti-DOS holdouts, and manages to squeeze a lot out of the 1 megabyte address space of the 8088 in non-PC implementations such as CompuPros.

It is a fast operating system, too – we had 13 terminals running of an 8 MHz 80286 for a while there, and it was surprisingly good at handling the load.

The negatives relate almost totally to its transportation to the DOS environment. First off, it has had a hard time catching up. The file systems are incompatible, and Digital Research has spent a lot of time weaning it off its 'natural' file system to get it to handle DOS files, subdirectories and so on correctly.

Second, because it was designed without the PC's limitations even being known, let alone kept in mind, it has had a hard time getting itself up to speed in the compatibility stakes. Much of the effort has gone into converting the existing system to allow for the idiosyncrasies of DOS (and the hardware-dependency of most DOS programs) in a series of 'after the event' patch ups

**DesqView** – Like other PC-specific multitaskers, Desqview has the distinct advantage of having been designed to co-exist with DOS right from the start. For this reason – and because it doesn't attempt the more difficult task of providing multi-user capability – DesqView is an 'out-of-the-box' success. It is an ideal DOS extender, with its window-based multi-tasking providing excellent DOS extensions with little 'culture shock', and seems to be the most popular – if not the most capable – system around.

*Yet it is lean, and dedicated to the purpose of allowing you to fit two tasks into your PC at the one time.*

**DoubleDOS** – At first we dismissed DoubleDOS totally – it's more a 'toy' program. Yet it is lean, and dedicated to the purpose of allowing you to fit two tasks into your PC at the one time. It has proved a big hit with bulletin board operators, for example, who have two clearly defined tasks and just want something cheap and simple which will allow them both to reside in the same machine.

It is probably the only product to have if you plan to stay with the 640 Kbytes your machine came with, rather than extend it.

**OS/2** – Is it really the operating system of our future? As it is based on the 80286 we doubt it, although it will probably show us the path of the future, and OS/3 will be the product to finally take us down that path.

OS/2 is probably the least DOS-compatible of all the multi-taskers, because it isn't accepting the past as a limitation. It is designed to allow one DOS program to be run, in its 'compatibility box', while the other tasks will have to be written as OS/2 programs.

This decision to abandon compatibility in favour of an improved environment is one that only IBM and Microsoft would dare make, and it will be interesting to see how quickly they can make the rest of us adjust to sharing the vision.

It will be made easier by the guaranteed support of the major software suppliers – it's not good enough to come out with a great operating system, you have to deliver one with great applications.

**PC-MOS** – PC-MOS (Modular Operating System) sets out to be a 'real' operating system, rather than a DOS 'add-over', but unlike Concurrent it has the benefit of being designed after the PC, and with full knowledge of the importance of compatibility.

This has allowed it to achieve that 'transparent compatibility' much more quickly, while still leaving room for the extensions and improvements required of something that wants to be seen as an operating system in its own right.

I must admit, my initial impressions of PC-MOS are very favourable – it could well replace Concurrent as my preferred operating system. Like Concurrent, it provides a nice integration of both one-operator multi-tasking and real (multi terminal) multi-user operation. But it throws in some extras which are very attractive.

**Unix/Xenix** – Surprisingly, while Unix has the following and the capabilities as an alternative operating system and is one of the few which can live happily without making concessions to DOS and the PC Architecture, many implementations handle the compatibility issue quite well. And they handle multiple 'compatibility boxes' without losing any of their power as Unix systems, which makes Microsoft look a little 'lazy' with OS/2.

However, Unix still hasn't managed to get itself off the ground as a PC operating system, and is succeeding by selling to the converted (or selling by the converted, in the common situation of vertical-market software developers who choose a Unix environment for their product).

**VM/386** – VM/386 is the 'baby' of the group, yet it has already received some pretty impressive support. It tries to take the compatibility issue to its extreme, using the 80386's Virtual-86 mode to create separate 'virtual machines'.

The result is something akin to having a row of PCs on your desk, each with 640 Kbytes, a hard disk and so on, each totally separate. If one crashes, the others continue happily on – and you can reboot the problem maker without hurting the others. While there's a reasonable overhead associated with this approach – each 'machine' has to have its own copy of DOS loaded, its own area of configuration memory, and so on – it's one which many PC users will love. □

# The Olivetti M280

## The M280 is one of the more stylish machines around, and Olivetti have put plenty of effort into its design, as Robert Thirlwell found.

IN THE DIM, dark days before we had PCs and word processors, I was the proud owner of an Olivetti portable – typewriter, that is. Many a rushed essay was hammered out on a machine that was purchased for its looks. It was small, sleek and blue with a good tapping action. Its zip-up case looked like it had been designed in an Italian wind tunnel used by Ferrari. Quality is what we are talking about here: not only did that typewriter look good, it worked well and it lasted for years without requiring any maintenance.

In keeping with this tradition, the M280 is one of the more stylish machines around, with Olivetti putting plenty of effort into its design. This is a welcome change from the clone-in-the-box approach that produces thousands of computers that all look the same. The system unit, monitor and keyboard complement each other visually. They look solid and built to last, and this is borne out in the weight of the monitor and the use of heavy gauge plate in the system box. The keyboard is also heavier than most, with the result that it lacks the tinny feel that can be an irritation with many of the clones.

Considerable thought has been put into ergonomics, with the power switch where it should be at the front, along with a small reset button (recessed to prevent accidental re-booting) and LED indicators for the hard disk, power and keyboard lock. At the rear of the system box are a power socket for the monitor, keyboard socket, and a square steel grid that covers the fan. The parallel and serial ports have been positioned horizontally beneath the seven expansion slots, which makes the box higher, whilst retaining a narrow footprint. This is a good idea, saving desk space without sacrificing any potential for internal expansion.

***Figure 1.*** *The Olivetti M280 design is ergonomic, enduring and elegant. It is well suited to word processing and general computing in an office environment.*

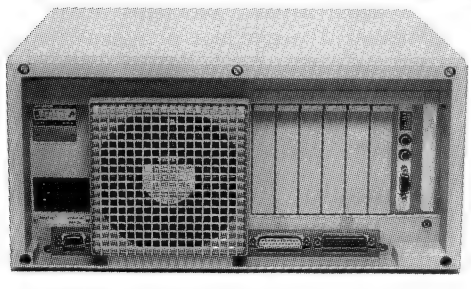


***Figure 2.*** *The parallel and serial ports have been positioned horizontally beneath the seven expansion slots, which makes the box higher, whilst retaining a narrow footprint.*

## Specifications

The M280 is an IBM AT compatible running at 12 MHz. One megabyte of RAM is standard, and this can be expanded up to 7 Mbyte with the addition of memory expansion boards. It can be configured in any of six ways, using either a single 1.2 Mbyte 5¼ inch or a 1.44 Mbyte 3½ inch floppy drive; and a 20 Mbyte, 40 Mbyte or 60 Mbyte hard drive. The review machine came equipped with a single 5¼ inch drive and a 20 Mbyte hard disk. According to Norton's Systems Information, the Computing Index relative to an IBM XT is 11.7.

There are four 16-bit expansion slots, and three 8-bit slots. Two of these are already occupied by the OEC (Olivetti EGA Controller) display card and the drive controller card, leaving three 16-bit and two 8-bit slots free. The manual mentions additional hardware options, including streaming tape drives, memory expansion kits, RS232 multiport board, maths co-processor and mouse interface board. All things considered, this is a fast AT compatible, with plenty of room for expansion.

The monitor is a heavyweight, with shielding all round and a built in swivel/-tilt stand. When it is perched on top of the box, the combined height of box and stand brings the display to eye level – another ergonomic feature that could save a lot of neck strain. The display that came with the review machine is EGA compatible, with the OEC video controller board. The screen has quite a lot of curve to it, but this is not a problem unless you are used to a flat screen display. The colours are all brilliant, and there is no distortion.

Altogether it is one of the best EGA displays I have seen. On the other hand, I found that if a third party EGA monitor is connected to the video card, it either does not work at all or it displays a narrow picture.

## Keyboard

Keyboard feel is excellent, and it is suited to fast typing, although there are no little bumps to tell touch-typists where the home keys are. The keys have plenty of spring and audible feedback. There are 101 keys, with 12 function keys positioned in a line above the main keyboard in IBM enhanced keyboard style. All of the usual features are present, with a separate numeric keypad doubling as arrow keys and three indicators for Num Lock, Caps Lock and Scroll Lock.

There is a space running along the top of the keyboard decorated with subtle light grey squiggles, a bit like the smooth bark of the Scribbly Gum. At first I thought it was wasted space – decoration is fine but not if it takes up valuable room on my desk. Then I found a use for it and all was forgiven: it is useful for propping up books or hard copy if you are reading and typing at the same time. You can sit the base of the book against a small ridge that runs above the function keys, and rest the top of the book against the system box. (Of course, it could also be useful for those quick reference cards that are supplied with many word processors and other programs.)

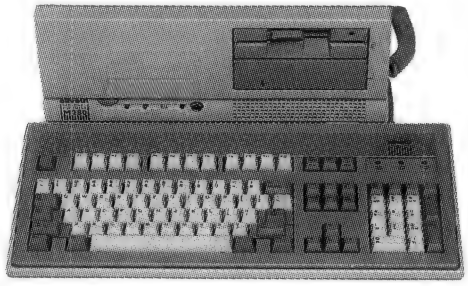


*Figure 3. The 101-key keyboard has a good springy feel to it, and it is suitable for heavy duty word processing.*

One gripe I have with this keyboard is that the Num Lock comes on every time you power up, making it annoying if the first thing you want to do is to use the cursor keys for menu selection. (Yes, there are separate arrow keys as well, but we all have bad habits don't we?) The Enter key is smaller than I'm used to, but I became accustomed to this after a while.

I ran a number of programs on the Olivetti, including WordStar, dBase III Plus, Norton Commander, SideKick, PC Paint, The Magician, Telix, The NetComm Program and the occasional game (the graphics in Leisure Suit Larry were amongst the best I've seen on a DOS machine). All performed as expected, with no obvious incompatibility problems. A PC Mouse worked quite happily when connected to the serial port, and several different printers have been tested using the parallel port, again without problems from the computer. The graphics programs made good use of the speedy hard disk and the 12 MHz clock rate. And there was sufficient memory to display high resolution graphics screens.

## Setting up

The manual is thorough enough to enable most experienced users to set up and configure the computer to their particular needs. For new users, the diagrams included with the manual would help, but there is a lack of explanation for some of the terminology. Setting up the system requires the unusual practice of turning the system unit upside down to read the factory configuration label. Fortunately this is mentioned in the manual before any connections are made, or the power is switched on. The configuration information is used later when running the SETUP. A version of GW Basic that makes use of the OEC video display card is included on disk, with an insert for the manual that explains how to use the commands COLOR, SCREEN and PALETTE.

To install an 80287 maths co-processor or to disable all RAM memory above 512 kilobytes it is necessary to remove the lower cover. This is because of the unusual, but efficient, arrangement of the internals to allow for the small footprint. If the upper cover is removed, a daughter board containing the expansion slots is exposed, and it is possible to access the power supply, the drives and drive control components. When the lower cover is removed (by turning the unit upside down), the motherboard is exposed, which is the same size as the computer's base. The motherboard also has the parallel and serial ports attached; adjacent and horizontal to each other. (See Dennis Fox's review on the Olivetti M28 in our April '88 issue for a discussion of this packaging.)

Included with the hardware manual and the Starter Kit are a Customer Test disk and a Utilities disk that also contains keyboard drivers for European users.

The M280 gave me plenty of trouble-free service, and it is well suited to heavy duty word processing applications and general computing in an office environment that favours a bit of stylish hardware perched on its desks. When I had used it for a while and I had become used to the keyboard, typing actually began to feel pleasurable – just like that old Olivetti portable I used to work with. □

### Product Details

**Product:** Olivetti M280
**From:** Olivetti Australia, 140 William St, Sydney 2000
(02) 358 2655
**Price:** M280 with 20 Mbyte hard disk, MS-DOS, colour display, $8211;
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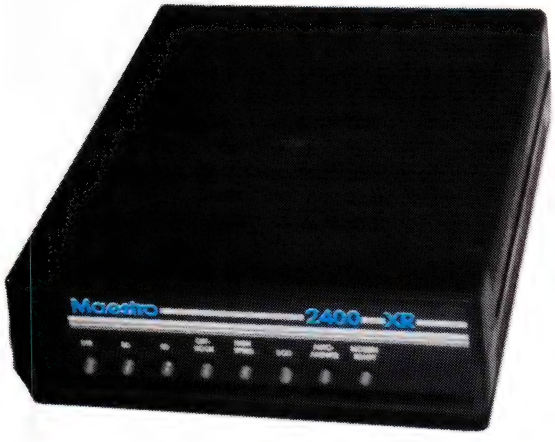


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# Networking for Efficiency!

**There are two fundamental reasons to network – first, the quicker information can be shared amongst a work group, the more efficiently it (and the group) can be used. And, there are a number of advantages in sharing expensive peripherals. Let's look at the competing 'standards' and features that need to be examined before choosing a system. . .**

NETWORKS HAVE been with us almost as long as computers, but it's only in the last few years that they've become cost-effective for small and medium size businesses. In the last 12 to 18 months we've seen the price of XTs and ATs – practically, a network minimum – drop to the point that these businesses could justify a machine on almost every desk in each branch. Concurrently, we've seen the price of networking software and hardware drop.

Anyone who has wondered which of the standalone PCs in the office has the current version of the inventory or consolidated spreadsheet has soon realised the need for a Local Area Network (LAN). It doesn't take much extrapolation to see that the need for a network increases geometrically with the number of PCs being used by a business (and exponentially with the number of sites these PCs are located at!).

But, a LAN is not simply a matter of running a wire between several PCs, a printer and the mainframe down the road. The basic needs of a network are a common pathway to share the data (and peripherals such as printers and modems) and a method of preventing one set of data from 'colliding' with another, plus a method of directing that data - you generally wouldn't want your electronically mailed request for a raise to the boss, broadcast to the printer and every other hard disk in the net.

## Topology

The earliest method of networking PCs used a ring topology – computer A is connected to B, which is connected to the printer, which is connected to C, connected to A, all 'daisy-chained' together. This is often referred to as a Cambridge Ring, after the British university where it was devised. Although it is certainly a workable system, it has an inherent fault: if one node goes offline, the whole system comes to a halt (the data is only transmitted in one direction, like the movement of traffic in a roundabout).

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

The second networking method used a star topology – think of a PABX with a number of phones hanging off it (that's what the originators at AT&T did). There's a central 'server' with a number of nodes connected to it, but not to each other. If the network length is less than 600

meters, star networks are usually connected by twisted pair cables, which limits data transmission to about 1 Megabyte per second (Mbs). Since they are only handling traffic between the server and one node this is usually adequate. Over longer distances, coaxial cable or optical fibre can be used.

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

IBM developed their own topology, the Token Ring – a star-wired ring. Here, the cabling radiates from a series of Multistation Access Units (MAUs, often referred to as 'wiring concentrators'). Up to eight terminals can be connected to a MAU, and these can then be linked to form a major network with up to about 260 PCs in it. The MAU uses relays to automatically bypass a node if the device is disconnected or another 'fault' is detected. The Token Ring uses a PC Adapter Card which is fitted to each PC in the network and provides the logical link and diagnostics for the system. (Refer to the boxed item for more detail on IBM's Token Ring LAN.)

## Signal Transmission

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

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

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

## Protocols

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

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

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

## OSI

In the early '70s, the Paris-based International Standards Organization (ISO) set a standard model for data communications between terminals and computers, and computers and computers – the seven-layered Open System Interconnection (OSI) model. (The other models currently in use are IBM's System Network Architecture, SNA, and the DEC Network Architecture, DNA). Since most of the jargon associated with networking is derived from the OSI model, it's worth looking at in some detail.

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

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

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

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

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

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

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

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

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

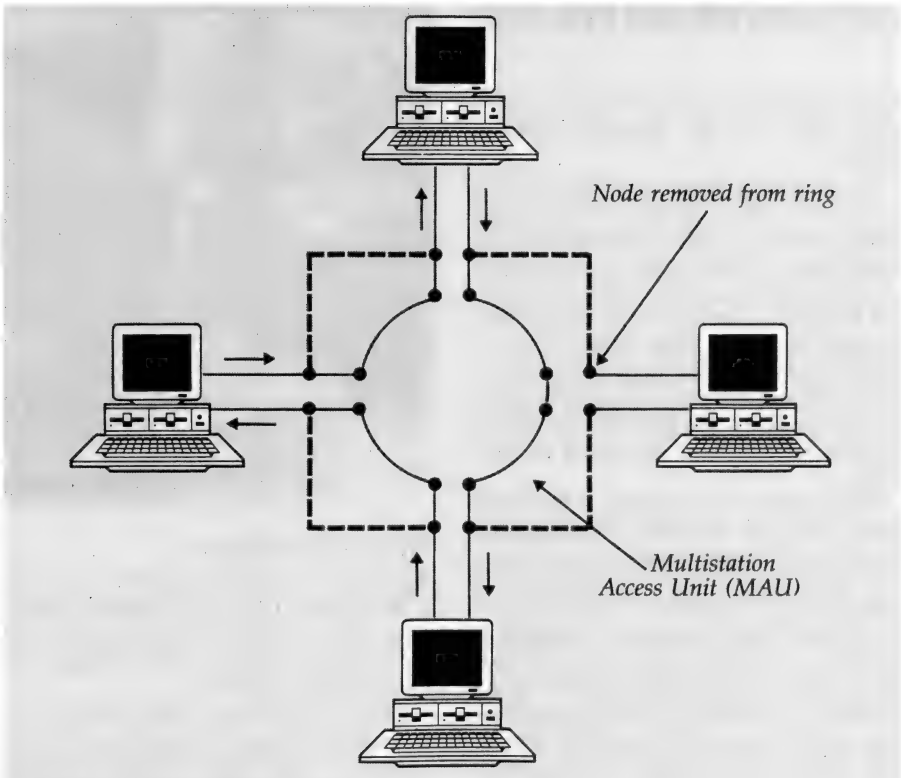
The second layer in the model is the **data-link layer** which controls the flow of data between different computers on the network. The access method of a LAN is defined by a part of this layer called Medium Access Control (MAC). It both controls the network and corrects faults – for example, MAC packages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

The Logic Link Controller (LLC) is a second part of the data-link layer; it's common to the three IEEE (Institute of Electrical and ELectronic Engineers) standards that describe the cabling, electrical and physical topology and access scheme protocols for the bottom two OSI layers: 802.3 for CSMA/CD Ethernet, 802.4 for Token bus and 802.5 for IBM's Token ring.

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

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

The third layer, the **network layer**, decides which physical path the packages of data should follow with software switches in the network itself – these switches are set according to preset priorities, the volume of traffic and other network conditions. In smaller networks this layer has




## IBM's Token Ring Lan

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

Even though the cabling radiates out from a series of central 'concentrators', the Token Ring is logically a circle. The network passes information around the circle with each computer in the system reading the frames of information and either acting upon them or passing them on to its neighbor.

The cables from each node in the network radiate from the Multistation Access Unit (MAU, often referred to as a 'wiring concentrator'). The specifications allow for normal twisted-pair telephone cables, but recommend special shielded twisted-pair cable.

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

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

The PCs in the Token Ring require a PC Adapter Card to provide the logical link control functions and diagnostics. The card can transmit and receive data at 4 Mbs (compared to Ethernet's 10), limited to a large degree by the fact that each node needs to read, reconstruct and retransmit every frame of data as it travels around the ring. Every node plays an active role with every piece of data in the system, unlike Ethernet systems where the nodes are passive until they recognise data addressed to them (see the separate Ethernet box for more detail).

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

While there is no way of predicting when a particular node on an Ethernet line is going to be allowed to transmit, in a token-passing system, a strict order of access can be enforced. And, priorities can be allocated so that particular nodes have double, triple or quadruple the chance of transmitting than others.

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

little importance because there will generally only be one pathway between nodes.

The **transport layer**, the fourth in the model, is a 'local' version of the network layer; this layer's tasks are handled by the networking software and can be thought of as the quality control centre of the net. For example, it ensures that data (within packets) is in the right order when received and saves the data if the net is broken (or decides on an alternative route, if it exists). This is the layer that allows different computer systems to talk to each other.

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

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

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

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

## Network software

Network operating systems can be divided into two very general categories: those derived from MS-DOS and those that originally were designed for minicomputer systems.

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

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

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

Another disadvantage with these DOS-derived systems is that they all use a minimum of 120K of RAM for their own purposes; with only 640K or 512K of RAM available, this can be significant.

While these systems all offer the basics necessary for resource sharing (like print spooling and queueing), they do not generally offer network management features or electronic mail. These need to come from third party vendors. Although, 10NET offers a powerful library of features, Torus' Tapestry has electronic mail and 3+Share has a variety of add-on options, features like network statistics and diaries will generally need to be sourced separately.

The two most well known network operating systems based on minicomputer operating systems like Unix are Banyan's Vines and Novell's NetWare. Because minis were designed as multi-user, multitasking systems, these features needn't be 'patched' on or added through modules, although the need to emulate DOS and associated elements like NetBIOS is still there.

Standard features usually include electronic mail, support for remote workstations, network bridging and print spooling. If these aren't included in the basic package, they are most-often available as inexpensive add-ons from the original vendor.

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

## Network features

As we saw above, a network can be defined in terms of its topology, the access protocol it uses and its method of signal transmission; and it can have its roots in either DOS or Unix. All of these offer their own advantages (and disadvantages) when choosing a network. But even more important to users and managers are the particular features of each net-

working system. If you're considering a network, the following should bear heavily on your choice –

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

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

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

**Dedicated servers** will offer faster network performance and won't slow down locally run programs, but in most small networks the difference in speed will hardly be noticeable to the user. And, in a small network, the cost of a dedicated server can be a significant part of the total cost of the system.

**Special disk formats** needed for some networking systems can make the disk unavailable to DOS. This is an important consideration if the server is *not* to be dedicated.

**Server based applications** can be a more efficient method of handling disk intensive tasks (like indexing a database), than leaving it to each workstation where the application is being run.

**RAM usage** is particularly important if servers are also to be used as workstations – usually a minimum of 120K of RAM is needed to run the networking software. Also, some operating systems can use 100K or more of RAM in each workstation; depending on the particular applications being run, this can be important. A number of systems offer blocks of memory on optional cards to cover the required workstation RAM.

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

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

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

## Ethernet

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

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

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

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

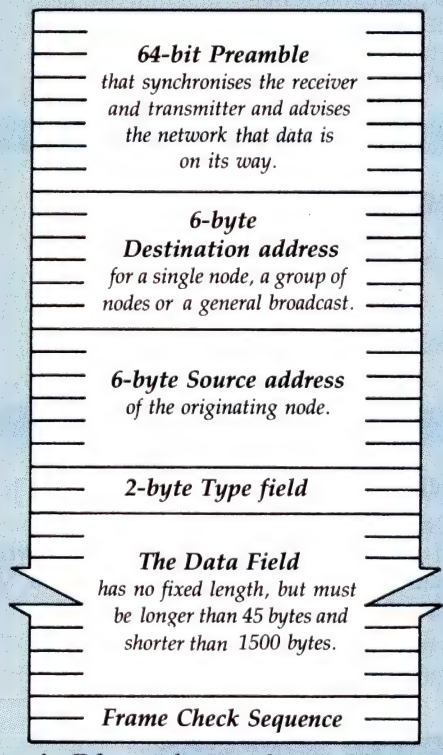
A collision results in overlapping pulses that are detected by the Ethernet controller in each node monitoring all communications on the line – and transmission is stopped. The competing nodes immediately issue an abort pattern over the LANs informing all nodes on the network that a collision has occured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

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

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

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

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




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

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# User Groups

User Groups must be the biggest source of information for computer users of all levels of experience, as well as for those just thinking about buying a computer. Go along to a meeting, see what others have achieved (or failed to achieve – it happens) with their machines. User Groups can also help you with secondhand peripherals, Public Domain software, advise and lots more.

## Australian Capital Territory

**PC Users Group Inc,** The Secretary, PO Box 2229, Canberra 2601 ACT. Meetings last Monday of each month at Coombs Lecture Theatre, ANU Campus. (062) 58 7484.

**ACT VIC-20 Users' Association,** Chris Groenhout, 25 Kerferd St, Watson 2602. Meetings first Monday each month at Boys' Grammar Scout Hall, Red Hill, 7.30 onwards. (062) 41 2316.

**Albury Wodonga Apple User's Group,** Jenny Scott (secretary), (060) 24 3225 or Don McLennan (president), (060) 46 028; meets second Wednesday every month at Wodonga High School at 7.30 pm.

**ATARI,** Chris McEwan, co-ordinator, ACTARI, PO Box E112, Canberra 2600, (062) 88 7861.

**ACT Apple User Group,** S. Nielsen, PO Box 1231, Canberra, ACT, 2601.

**Australian ZX80 Users' Association (AZUA),** David Vernon, 50 Waller Crescent, Campbell 2601; for ZX81, ZX Spectrum and Sinclair QL owners. Meets on the last Wednesday of every month at the Woden Valley High School library
at 7.30 pm.

**Barrier MicroBee User Group,** Michael Quinn, 69 Eyre St, Brocken Hill, 2880; Meets the last Sunday of every month at the town library.

**Canberra ACT Sirius User Group,** Jim Bland, (062) 81 2824, (062) 81 2832.

**Canberra Compucolor Club (CCC),** Meets 7.30 on first Sunday of every month at the offics of Digital Equipment, 28 Lonsdale Street, Braddon ACT.

**Canberra Microbee Users' Group,** Meets 7.30pm on first Tuesday of every month at Woden Valley High School Library. PO Box 227, Weston Creek, ATC, 2611. (062) 71 6081.

**Canberra Micro-80 Users' Group,** Don Jender (secretary), 18 Callabonna St, Kaleen 2617 ACT; meetings third Monday each month, 7.30 pm in the large theatre, 'J' Block, Reid TAFE, for System 80, TRS80 and similar. (062) 58 3700.

**Canberra NEC Users' Group,** Brian Embury, PO Box 173, Belconnen 2616; meets first Tuesday each month at Seminar room A or D, H.C. Coombes Building, ANU Campus, at 7.30 pm. (062) 584 519.

**Canberra Osborne Group,** c/o Geoff Cohen, PO Box 136, Kippax 2615; (062) 54 7608.

**IBM User Group,** Ron Pollack (president), PO Box 5010, Sydney 2001; meets third Monday of every month at the Esso Training Centre Auditorium Forum Centre, 35 Clarence St, Sydney, at 5.30 pm. (02) 29 7033.

**Kaypro User's Group (ACT-KUG),** meets on the third Thursday of each month from 6.30 pm in the J Block theatre, Canberra TAFE, Constitution Avenue, Reid. Contact Des Ireland, on (062) 47 5330.

**Micsig,** Registrar, PO Box 446, Canberra 2601.

**PC Users' Group** (for users of IBM PC and similar machines); meets on the last Monday of each month at 8 pm in the main theatre, Building J, Canberra TAFE. Contact address: PO Box E188, Parkes, ACT 2600.

**Sirius/Apricot User Group,** M J Sim, 253 Hindmarsh Drive, Rivett 2611; meetings 7.30 pm third Tuesday each month, 88 Wollongong Street, Fyshwick 2609.

## New South Wales

**ACS AI Special Interest Group,** contact Sue Zawa on (02) 798 1073.

**Amiga Users Group.** Meetings are held on the second Monday of each month at the Burwood RSL, 96 Shaftesbury Rd, Burwood, 7:30 pm. $10.00 joining fee plus $12.00 per annum.

**Apple IIGS Users' Group,** Terry Cass, PO Box 210, Wentworthville 2145 NSW; (02) 688 2701

**APF Users' Group,** Norm McMahon, 288 Kissing Point Road, Turramurra 2074, (02) 44 2645.

**Apple Team Australia,** 5 Walpole Place, Wahroonga 2076; (02) 48 1018.

**Apple Users' Disk Exchange Club,** Phillip Donnadieu, Flat 1 8-10 Lancelot Street, Allawah 2218; (02) 579 4547.

**Apple Users' Group,** Colin Rutherford, PO Box 505, Bankstown 2200; meets 6.30 pm, first and second Monday of each month (except public holidays) at the University of Sydney, Stephen Roberts Theatre.

**Atari Computer Enthusiasts,** Tony Reeve, PO Box 4514, Sydney 2001.

**Ausborne,** The Secretary, PO Box C530 Clarence Street, Sydney 2001; meetings third Wednesday each month at 6.30 pm, at Burwood RSL, 96 Shaftesbury Rd, Burwood. (02) 95 5378. Bulletin board: (02) 439 7072.

**Ausbug,** Stephen Ford, PO Box 62, Londonderry 2753.

**Australian Amiga User Association,** provides a bi-monthly newsletter, news and reviews on software and hardware, hints and tips and howtos, and public domain software. Post to PO Box 389 Penrith 2750, or phone (047) 514 143.

**Barrier Microbee User Group,** Michael Quinn (secretary), 69 Eyre St, Broken Hill, 2880 NSW. Meets 3.00 pm last Sunday each month at town library.

**Banana Coast Microbee Users Group,** Ken Darby, 168 Sawtell Road, Toormina, 2452. (066) 531 439.

**Bay Microbee Users Group,** Wayne Herring, Box 308, Nelson Bay, 2315.

**Bankstown-Fairfield Computer Group,** Arthur Pittard, 36 Hubert Street, Fairfield 2165; meets 4th Wednesday of the month at Canley Vale High School, Prospect Road, Canley Vale at 7 pm, (02) 72 2881.

**BEDBUG,** Chris Fallshaw, Eltham College.

**Blue Mountains Microbee User Group,** meets first and third Friday of the month, at 7.30 pm at the Springwood Neighbourhood Centre. All correspondence to Joe McKay, Secretary, 25 Reserve Avenue, Blaxland 2774; (047) 39 3154.

**Blue Mountains Homebrew Computer User's Group,** Eric Lindsay (secretary), (047) 51 2632.

**Bondwell User's Group,** Ray Richards, 7/39 Ross Street North Parramatta 2151, (02) 683 3940.

**Casio PB 700 User Group,** Terry Gill, 27 Greenleaf Street, Wentworthville 2145, (02) 636 1652.

**Central Coast Apple Users' Group,** Charles Lee, (043) 67 6845 or Mick Tierney, (043) 41 9350. Meets first Tuesday each month at the Central Coast Grammar School, Erina Heights from 7.30 pm. (043) 84 3419.

**Central Coast Microbee Club,** Max Maughen, PO Box 36, Ettalong Beach 2257, first Tuesday every month at Applied Technology, West Gosford. (043) 24 2711.

**Club Mac Users' Group,** meets the second Wednesday of each month at the Brennan Room, Footbridge Theatre, University of Sydney. Contact Brian Hinder on (02) 439 3358.

**Combined Ashton-Tate User Group (dBase),** Hans Schneider, (02) 309 2961. Meetings are held on the third Tuesday of each month, 6:30 pm, Expert Technology Education Pty Ltd, 185 Elizabeth St, Sydney 2000 NSW.

**Combined Ashton-Tate User Group (Framework),** Jim Milson, (02) 498 5843. Meetings are held on the third Tuesday of each month, 6:30 pm, Expert Technology Education Pty Ltd, 185 Elizabeth St, Sydney 2000 NSW.

**Compucolor Users' Group,** Tony Lee, 52 Cowan Road, St. Ives 2075, phone (02) 449 8824.

**Cooma Microbee User Group,** Phil Zikan, PO Box 92 Cooma 2630, (053) 52 2756; meets on the second Friday of the month.

**Dataflex User Group,** Roger Walker, (02) 699 3877.

**dBase Users' Group,** PO Box 3019, Sydney 2001; meets every second Tuesday each month at the Bird Cameron Training Room, 15th Floor, Bligh House, 4 Bligh Street Sydney at 6 pm.

**DEC Personal Computer Special Interest Group,** Maggie Alexandria, DEC Australia, Northern Tower, Chatswood Plaza, Railway Street, Chatswood 2067, (02) 412 5252.

**Dubbo and District Microbee Users' Group,** John Taylor, 18 Cunningham Street, Dubbo 2830; meets fourth Wednesday each month at 7.30 pm in the Dubbo High School Computer Room.

**Gosford Commodore Users Group (GOSCOM),** meets every third Wednesday of the month at Niagara Park Public School at 7.30 pm. Queries to PO Box 86, Umina 2257; (043) 24 7124 or (043) 84 3429. Bulletin board: (043) 41 3135. **Griffith Computer Association,** Ron Gauci, PO Box 425, Griffith 2680, (069) 62 5877.

**Griffith Microbee User's Group,** Rick Mines, 2 Edmondson Avenue, Griffith, 2680; meets the fourth Monday of each month at Neighbourhood House at 7.30 pm.

**Hawkesbury Apple User Group,**Secretary Steve Bennett; meets fourth Monday each month at 7.30 pm, Richmond Primary School, (045) 78 2195.

**Hawkesbury Commodore Computer Club,** Richard Farrell, 12 Inverary Drive, Kurmond 2757; meets fourth Tuesday of each month at 7.30 pm at Neighbourhood Centre, West Market Street, Richmond 2753.

**Hawkesbury Microbee Users's Group,** Peter Christie, 9 Potts Street, Richmond 2753; workshops 7.30 pm third Friday, and general meetings 7.30 pm first Friday of each month in the Microbee Network Room, Library Building, Richmond High School, Cnr Penrith and Lennox Streets, Richmond 2753. (045) 78 4613.

**Hitachi/6809 User Group,** meets on the first Saturday of each month, at 2 pm; contact Robert Lohr on (02) 662 4150, after 6 pm for locations.

**HP Desktop Computer Users' Group,** Dr R W Harris, CSIRO Division of Mineral Physics, PMB 7, Sutherland 2232, (02) 543 3460.

**Hewlett-Packard Users Group (HPUG),** Darren Stokes, 3 Buckley Drive, Coonamble 2829.

**Hunter Users' Group – All Microcomputers,** Secretary, PO Box 39, Broadmeadow 2298; meets on the second Wednesday of each month in Room 308, Building W, University of Newcastle, at 7.45 pm. Membership is primarily Apple II oriented, but anyone with an interest in micros welcome.

**Illawarra Apple Core,** Secretary, Chris Haley, 358 Cordeaux Road, Mt Kembla 2526. Meets at 8 pm in the library of the Holy Spirit College Bellambi on the 4th Monday of each month.

**Illawarra IBM PC Club – All IBM compatibles,** Dick Adams (secretary), c/o John Lysaght Ltd, Delivery Code 29, PO Box 77, Port Kembla 2505; (042) 75 6721.

**Illawarra Microbee Computer Club,** Ronald Read, 49 Beatus St, Unanderra, 2526; meets every 4th Monday at 7.30 pm, Wollongong Institute of Education, Northfield Ave, Gwynneville; (042) 95 1142.

**Illawarra Super 80 Users' Group,** Jim O'Grady, Chairman, PO Box 1775, Wollongong 2500.

**Lotus Users Group (Sydney),** Peter Philippsohn, Box 5010, Sydney 2001.

**Macarthur Computer Users Association,** Brian Cooper, 20 Hunter St, Campbelltown, 2560; meets first Monday each month at Airds High School, Briar Road, Campbelltown 2560, at 7.30 pm; all machines are catered for. (046) 25 1146.

**Macquarie Microbee Users' Group,** Brian Thompson; meetings first Monday each month at Denistone East Primary School at 7.30 pm. (02) 85 1659 after hours.

**Macwest Users' Group,** PJ Lynden, 11 Toohey Avenue, Westmead 2145; Services will include newsletter, bulletin board and public domain library. Membership $10 per annum.

**Maitland Microbee Users Group,** Ross Bell, 42 Redbill Drive, Woodberry, 2321. (049) 332 972.

**MEGS (Microcomputer Enthusisasts' Group),** John Whitlock, PO Box 1309, Chatswood 2067; meetings third Monday each month at rear of St Andrew's Presbyterian Church, 37 Anderson Street, Chatswood 2067, (02) 638 1142.

**Microbee Users' Club (Broken Hill),** Peter Cotter, 533 Radium Street, Broken Hill 2880, (080) 48 8813.

**New England Microbee Users Group,** CSIRO, Pasteral Research, New England Highway, Armidale, 2350. (067) 784 000.

**Newcastle Microbee Users' Group,** Heather Clarke, 31 Pokolbin St, Broadmeadow, 2292.

**Newcastle Microcomputer Club,** Angus Bliss, PO Box 293, Hamilton 2303; meetings 7.30 pm second and fourth Monday each month at Room G12, Physics Building, Newcastle Uni. (049) 67 2433.

**Nightline** is an after-hours (10 pm to 7 am, seven days a week) computer information service, which provides local and overseas news, clues and reviews. Mainly for Apple users, but others are welcome. Offers around 20 different bulletin boards, and uploading and downloading facilities; phone (02) 528 8968. Sysop: Hamish Bowly.

**Northern Beaches VIC User Group,** E Tuxford, 161 Barrenjoey Road, Newport 2106, (02) 997 2467.

**Northern NSW MICC Chapter,** Alen Hartley, Dundurrabin via Dorrigo 2433, (066) 57 8160.

**Nowra Apple User Group,** Col Hayman (secretary), 48 Salisbury Rd, Nowra 2511. Meetings held every third Monday each month at 7.30 pm. Venue is Computer room, F block, Nowra High School, Moss St, Nowra.

**NSW Primary School Microbee Users' Group,** Mr Peter Stretton, c/- Hunters Hill Primary School, Alexandra Street, Hunters Hill 2110.

**NSW NEC Users' Group** meets in the NEC Auditorium, 99 Nicholson St, St Leonards, Sydney on the second Tuesday of each month. Contact Ian Barns (02) 46 1272.

**NSW 6800 Users' Group,** 27 Georgina Avenue, Keiraville 2500.

**Open Access User Group,** Steve Cook, Advanced Data Technology Pty Ltd, 1 Terrell Avenue,

Wahroonga 2076; (02) 48 0511.

**OSI Users' Group,** Nigel Bisset, (02) 411 7142.

**Ozbeeb User Group for the Acorn BBC Microcomputer,** Meets twice a month at the Australian Film & Television School – Open Program, 3 Lyon Park Road, North Ryde – second Wednesday of every month at 7 pm (organised talks and demonstrations); 4th Monday of each month at 6.30 pm (general meeting). Annual subscription for full membership $10.

**PC Users Group,** meets third Monday of each month at 5.45 pm at Cooper and Lybrand Auditorium, Norwich House, Bligh St, Sydney. Has special interest groups. Bulletin boards: (02) 238 9034 (300 baud) and (02) 221 5520 (1200 baud). Queries to PO Box 5010, Sydney 2001. (02) 297 033.

**Pocket Computer Users' Club,** George Antonijevic; for those interested in pocket computers, whatever the brand. Meetings held on the first Wednesday of each month at 7.30 pm at the Woodstock Community Centre, Church St, Burwood 2134, (02) 683 4296.

**President Computer Users' Group** for owners of President and other IBM-compatible PC and AT computers. Meets on the last Tuesday of every month at the Hornsby Inn, (Claude Fay's Hotel), 29 Florence Street, Hornsby, from 8 pm. Contact Raymond or Trichia Toms (02) 456 3756, or Rick West (02) 872 4177.

**RAT Microbee Users Group,** James Quinn, Box 207, Raymond Terrace, 2324.

**Sega Users' Club,** Jim Robinson – Penrith branch, (047) 30 1834; Jeff Wilson – Parramatta branch, (02) 684 4128.

**Sinclair QL User Group,** contact Vadim Kuchin, PO Box 729, Parramatta 2150.

**Sharp PC-1350 User Group,** contact Bob Hamilton, (02) 639 3637.

**Sharp MZ-700 User Group,** contact Terry Gill, 27 Greenleaf Street, Wentworthville 2145; (02) 636 1652.

**Sirius/Apricot User Group,** Mark Dickinson, Barson Computers; meets first Tuesday each month at 6.30 pm, Unit D, 55 Talavera Road, North Ryde 2113, (02) 888 9444.

**Sorcerer Users' Group,** President Michael Manaz; PO Box E162, St James 2000; meetings third Friday each month at 8 pm in Greenwich Community Hall, Greenwich Road, Greenwich 2065.

**Southern Districts Commodore Users' Group,** Lex Toms, 3 Lucille Crescent, Casula 2170; meetings first and third Wednesdays each month, API Hall, Currajong Road, Prestons 2170. (02) 602 8691.

**Sutherland Super 80 Group,** Jim Traeger, (02) 525 2018.

**Sydcom 64 (C64 User Group),** Philip Dean, GPO Box 1542, Sydney 2001; meets on the second Friday of each month at the Ryde Catering College, Blaxland Rd, Ryde at 7.15 pm.

**Sydney Apple User Group,** meets the first and second Monday of every month at the Stephen Roberts Theatre at Sydney University. Contact Graham Clarke on (02) 958 2709.

**Sydney Forth Group,** Peter Tregeagle, 10 Binda Road, Yowie Bay 2228; meets second Friday of each month at 7.00 pm in the John Goodsell Building, UNSW room LG19. (02) 524 7490.

**Sydney Kaypro Users' Group,** Hans Schneider, C/O Dr H. Schneider, Geography Department, UNSW, PO Box 1, Kensington 2003; meetings second Tuesday of each month, 8.00 pm, Burwood RSL Club. (02) 697 4400 (w) or (02) 309 2961 (h).

**Sydney Lotus 1-2-3 User Group,** Ron Pollak, (02) 29 5316.

**Sydney Macintosh Users Group,** Alan Todhunter, PO Box 505, Bankstown 2200. Meets the last Tuesday of the month at 6.30 pm in Laboratory 1 of the Carslaw Building, Sydney University. (B) (02) 736 0488, (H) (02) 637 6775.

**Sydney Microbee User Group,** Ron Taylor (secretary), (043) 41 5251 after 7 pm; PO Box C233, Clarence St, Sydney 2000. Meets third Saturday each month from 1 to 4.30 pm, in he assembly hall of Strathfield Girls' High School, Albert Road, Strathfield, (02) 810 4758 (after 7.30 pm).

**Sydney Multitech Owners Group (SMOG),** meets on third Saturday each month at 1.30 pm, Caritas, 299 Forbes St, Darlinghurst in the lecture room. PO Box A791, Sydney South NSW 2001.

**Sydney TRS80 Users' Group,** meetings second, third and fourth Saturday of each month at Botany. (02) 666 4716 bh.

**System 80/TRS-80 & Colour Computer Users' Group,** Jim Fisher, 37 Fairburn Avenue, West Pennant Hills 2120.

**TAG – The Access Group,** Bob Dolton, PO Box 943, Orange 2800; for Access and Actrix users.

**Tandy CoCo and IBM Compatible User Group** provides a newsletter and public domain software – send a SSAE to PO Box 286, Broadmeadow 2292 NSW for more information.

**The Great Western Computer Users' Group** Jim Graham, PO Box 210, Wentworthville 2145; (02) 636 9219. All micro users are welcome. A 40-minute beginner's session is held at the start of each meeting. The club meets on the first Tuesday of each month, at 8 pm.

**The Morrow User Group** Alan Stern, (02) 750 8274; meets on the fourth Wednesday of every month at the Woodstock Community Centre, Church Street, Burwood at 7.30 pm.

**TI Sydney Home Computer Users' Group,** PO Box 149, Pennant Hills 2120.

**Tuggerah Lakes Computer Users' Group,** Frank James, 125 Woolana Avenue, Budgewoi 2262; meetings second Thursday each month at Old Primary School, Wyong, at 6.30 pm. (043) 907 339.

**Wagga Microbee Users' Group,** John Simmons, 47 Undurra Drive, Glenfield 2650; meetings first and third Tuesdays each month in the Tolland-Glenfield Neighbourhood Centre at 8.00 pm. (069) 31 1302.

**Western Sydney PC and Compatible User Group,** Ben Sharif, (047) 36 4825; meets on the third Sunday of the month at 1.30 pm, 27 Cosgrove Crescent, Kingswood 2750.

**Wizzard User Group,** John Mifsod, 150 Bouganville Road, Blackett 2770, (02) 628 0801.

**Wizzard Software Exchange of Australia,** John Pospisil, 3/7 National Avenue, Bulli, 2516. (042) 67 4518.

**ZX-Spectrum Users' Club,** Craig Kennedy, PO Box 466, Epping 2121.

## Victoria

**Albury Wodonga User's Group,** Jenny Scott (secretary), (060) 24 3225 or Don McLennan (president) (060) 46 028; meets second Wednesday of every month at Wodonga High School at 7.30 pm.

**Apple Users' Society of Melbourne (AUSOM Inc.),** meets first Saturday of each month (except January) at the VITRACC Centre, Victoria College, Burwood Campus, Burwood Highway, Burwood at 1 pm. Queries to Alex McKenna (secretary), PO Box 49, Burwood 3125; (03) 772 5891.

**Apricot-Victor Users' Group** meets the second Wednesday of every month at 6.15 pm at Prince Henry Hospital, Melbourne. Contact Elizabeth Lyons on (03) 611 2873.

**Atari User Group Melbourne,** Kelvin Eldridge, PO Box 173, Reservoir 3073.

**Australian Forth Interest Group,** Tony Latermore, PO Box 704, Sale 3850, (051) 44 2011.

**Australian North Star Users' Association,** PO Box 194, Wangaratta 3677.

**Australian Paradox Users Group.** Meetings are held on the last Tuesday of each month at Bird Cameron, 316 Queen St, Melbourne at 6:00 pm. Enquiries to Leon Shapiro, (03) 523 0333, or Ron Polak, (03) 690 9055. Postal address: PO Box 26, Chadstone Centre 3148 Vic.

**Ballarat Computer Users' Group,** Publicity Officer: John Preston, (053) 31 4363.

**BBC Users' Group,** Mr Howell (Secretary), 1 Washusen Road, Heathmont 3135, (03) 420 2611 (B). Meets last Wednesday each month from 7 to 9.30 pm at Copiquest, 423 Clarendon Street, South Melbourne 3205.

**Billanook Computer Forum,** Maurie Canterbury, Cardigan Road, Mooroolbark 3138, (03) 725 5388.

**Chip 8, 6800, 1802 User Group,** Frank Rees, 27 King Street, Boort 3537.

**Compucolor Users' Group,** L. Ferguson, 12 Morphett Avenue, Ascot 3342.

**Computer Users of Victoria (CUVIC),** caters for users of Compucolor II, Intecolor and IBM or compatibles. Meetings held on the first Wednesday of the month at the Surrey Hills Neighbourhood Centre, 157 Union Rd, Surrey Hills. Contact is Howard

Rice (secretary), PO Box 420, Camberwell 3126; (03) 277 2957.

**DEC Personal Computer Special Interest Group,** see NSW entry.

**Essendon Commodore 64 User Group,** George Stathoulis, 8 Byron Avenue, East Keilor 3033, (03) 337 4159.

**Forth Interest Group,** Lance Collins, PO Box 103, Camberwell 3124; meets on the first Friday of the month at the Bowen Street Neighbourhood Centre, 102 Bowen Street, Camberwell South 3124. (03) 29 2600.

**Geelong Commodore Computer Club,** Phil Rayner, PO Box 1455, Geelong 3220, (052) 75 4949.

**Geelong Computer Club,** Colin Lowne, PO Box 520, Geelong 3220; (052) 55 1232. Meets at 8 pm, on the first and third Friday of each month in the rooms of the Geelong Amateur Radio Club, Storrer Street, East Geelong.

**Kaypro Users' Group of Victoria,** George Kunz, PO Box 159, Forest Hill 3131; meetings fourth Sunday each month at Burwood State College Community Resources Centre at 2 pm. (03) 857 5462.

**KAOS (Ohio Scientific),** John Whitehead, 17 Frugal Cres, Knoxfield 3180. Springvale meeting, first Sunday of each month (except January) at 1 pm; venue is Sandown Scout Hall, Dowling Ave, Springvale. Essendon meeting last Sunday of each month except December, also at 1 pm; venue is Essendon Primary School, Raleigh St, Essendon. Phone (03) 763 5983 (after hours).

**Latrobe Valley Colour Computer Users' Group,** George Francis, 31 Donald Street, Morwell 3840; for TRS80 and MC10 users. (03) 22 1389.

**Melbourne Atari Computer Enthusiasts,** PO Box 340, Rosanna 3084; meetings held on second Sunday of each month (except January) at 12 noon at Monash University Rotunda.

**Melbourne BBC Users' Group,** meets last Wednesday in the month at Conquest P/L, 423 Clarendon Street, South Melbourne. Ring the secretary on (03) 729 4619 (AH).

**Melbourne Lotus 1-2-3 Users' Group,** Robert Taylor, (03) 267 4800.

**Melbourne Microbee Users' Group (MBUG Australia Inc.),** Grant Forrest, PO Box 157, Nunawading 3131; meets at 7.30 pm on the second Wednesday of each month at Mount Waverley Community Centre, Cnr Miller Crescent and Stephenson's Road, Mount Waverley. Different types of membership, including standard, and student. Hackers night held on fouth Wednesday of each month at the same address.

**Melbourne PC User Group,** meets on the first Wednesday of the month at 6 pm in the Ground Floor Auditorium, Clunies Ross House, 191 Royal Parade, Parkville. Contact Gordon Castle on (03) 569 6838. Mail to PO Box 1728P, Melbourne 3001.

**Melbourne Hitachi Users' Group,** Branko Colavizza, PO Box 191, Rosanna 3084 Vic, (03) 434 2541.

**Melbourne Super 80 Users' Group,** Hon. Sec. Victor Shuttleworth, (03) 723 2713.

**MICOM (Microcomputer Club of Melbourne),** Steve Walker, PO Box 60, Canterbury 3126. Meets on the third Saturday of the month at 2 pm, in Building E, Victoria College. (059) 78 6133.

**Motorola Users Group Society** (MUGS), Tony Douglas, 10 Savannah Crescent, Epping 3076. Meets on the second Tuesday of the month, at 7.30 pm, at Box Hill Technical College.

**MSX and Spectravideo Users Group,** Mitch Raitt, (03) 438 2687; meets the first Saturday of each month at Nunawading Civic Centre, 12 noon.

**National Mutual Micro Users' Group,** R Prewett, NMLA, PO Box 2830AA, GPO Melbourne 3001; for National Mutual staff.

**National Sinclair User Group,** PO Box 148, Glen Waverley 3150.

**North East PC Users Group.** Contact Jane Bartram, 151 Murdoch Rd, Wangaratta 3677; (057) 21 4201.

**Northern/Western Suburbs Computer Users' Group,** John King, 284 Union Road, Moonee Ponds 3039. Contact CP/M Data Systems, (03) 338 9304.

**Peninsula Computer Club,** George Thompson, 3 Patterson Street, Bonbeach 3196; meets second Tuesday each month at Chisholm College, Frankston 3199; many types of computers catered for. (03) 772 2674.

**Puckapunyal Microbee Users Group,** G Chinner, 9 Monash Drive, Seymour, 3660.
**RBase Users Group,** Malcolm White, (03) 329 0766; meets first Monday of each month at Communicat, 502 Spencer St, Melbourne.
**Seymour-Pucka Computer Club,** Garry Sutton, 25 Malaya Road, Puckapunyal 3662; (057) 93 1091.
**Sharp Computer Users' Association,** The Presiden, 7 Faye Street, East Burwood 3151.
**Sharp MZ-700 User Group,** Anthony Saliba, 6 Elm Court, Rosebud 3939; (059) 86 3024.
**Spectravideo Users' Group,** Mitch Raitt, 3 Clivejay Street, Glen Waverley 3150, (03) 233 2357.
**Sorcerer and CP/M Users of Australia,** Secretary, SCUA Inc, GPO Box 2402, Melbourne 3001. Meets on the first Sunday of the month, February to December, at 2 pm at Victoria College, Burwood Campus, 221 Burwood Highway, Burwood 3125. RCPM (03) 754 5081.
**Southern Amstrad User Group,** Bob Patterson, PO Box 100, Seaford 3196. Meets third Tuesday each month at John Paul College Senior Campus, McMahons Road, Frankston, at 7.30 pm.
**TI-99/4A Users' Group Melbourne,** Wayne Worladge, 123 Ashburn Grove, Ashburton 3147, (03) 25 1832.
**The Motorola User Group (MUGS),** Clive Allan, 11 Haros Avenue, Nunawading 3131; group is interested in 6800/02/09-based computers, particularly if running Flex, although this is not a prerequisite to join. (03) 878 1298.
**Upper Yarra Computer Reference Group,** for microcomputer enthusiasts and educators. Contact Albin Wallace, Woori Yallock Education Centre, (059) 64 6617.
**Victorian Association of Computer Educators,** Arthur Totrall, PO Box 69, Whittlesea 3757.
**Victorian Osborne Users' Group,** Tony Clay, PO Box 169, Camberwell 3124, (03) 697 6479.
**Victorian Sega Users Group,** PO BOx 589, Mordialloc 3195 Vic.
**Victorian VZ-200 User Group,** Luigi Chiodo, 24 Don St, Reservoir 3073, (03) 460 3770.
**Victorian Wizzard Users' Group,** Barry Klein, 24 Russell Street, Bulleen 3105, (03) 850 7275.
**West Microbee Users Group,** Peter Hallgartent, PO Box C299, ST Albans 3021. (03) 366 7055.
**Wizzard User Group,** for owners of Dick Smith Wizzard and Funvision computers. The group operates only by mail and phone at present. Contact Barry Klein 24 Russell Street, Bulleen 3105, (03) 850 7275.
**Yarra Valley Commodore User's Group** – affiliated with the Melbourne Central Commodore User's Group, Barrie Vickers, PO Box 176, Lilydale 3140, (03) 735 0638; meets on the first Tuesday of each month at the Melba Hall, Cnr Market & Castella Streets, Lilydale at 8 pm.
**Yarrawonga Computer User Group,** Chris Younger, 10 Witt Street, Yarrawonga 3730, (057) 44 385; for all machines.

## Queensland

**Adventure Club,** Christine Ogden, 37 Samford Road, Leichhardt, Ipswich 4305; for all Adventure-type game players.
**Adventure News,** Stuart Elflett, MSF.550, Toogoolawah 4313. For Commodore 64 adventures only.
**Adventure Special Interest Group,** Ernie Sugrue, PO Box 594, Maryborough 4650.
**Amstrad Postal Users' Group,** Frank Elliot, 59 27th Avenue, Palm Beach 4221; a group for isolated Amstrad users – meets monthly by cassette.
**Apple-Q – The Brisbane User Group,** The Secretary, PO Box 721, South Brisbane 4101; meetings every third Sunday of month at Hooper Education Centre, Kuran Street, Wavell Heights 4012. Centre is open from 8.30 am till 4.30 pm; members encouraged to bring Apple along.
**Australian Sirius Users' Group,** PO Box 204, Chermside 4032; looks after the needs of Sirius One and Victor 9000 computer users; (07) 350 2611.
**Basic User Group,** Chris Lucey, Cranium Computers, 34 Lawless Street, Blackwater 4717.
**Brisbane Amstrad Computer Club,** John Roberts on (07) 283 3349. Meets four times a month with the first meeting held on the first Tuesday at Junction Park State School, Weidheim St, Annerley.
**Brisbane Medfly Users' Group,** K J Walker, 120 Highgate Street, Coopers Plains 4108.
**Brisbane Sinclair (Spectrum) Computer Club,** V. Lewis, 37 Samford Road, Ipswich 4305; meets third Sunday at Everton Park State High School, at 2.00 pm. (07) 355 7809.
**Brisbane Super 80 Users' Group,** Gary Gatfield, (07) 355 3173.
**Brisbane SVI and MSX Users Group,** N Berryman, (07) 288 1324 after 7pm; meets the fourth Tuesday of each month at 25 Primrose St, Woodridge 4114 Qld.
**Brisbane TRS 80/System 80 Computer Group,** F.J. Secull, 41 Montclair St, Apsley 4034; (07) 263 6313.
**Brisbane Youth Computer Group,** A. Harrison, PO Box 396, Sunnybank 4109.
**Brisbug,** Sylvia Willie (president), PO Box 305, Wynnum Central 4178. Meets at 2 pm on the third Sunday of each month at the Toowong High School. (07) 393 3388.
**Cairns Microbee Users' Group,** 21 Marr Street, Edmonton 4869; (070) 55 4531.
**Commodore Computer Users' Group,** Norm Chambers (secretary), PO Box 274, Springwood 4127, (07) 808 2125.
**Computer Owners' Group,** Betty Adcock, 42 Lucan Ave, Aspley 4034; meets second Wednesday each month, 7.45 pm; all kinds of computers are catered for. (07) 263 4268.
**Computer Users Group of Australia,** David Siebuhr, PO Box 166, Pittsworth 4356. Meets first Tuesday of each month at 5 pm in the St Peters Lutheran Hall, Grand St, Pittsworth. Phone (076) 931 690.
**Darling Downs Apple Users' Group,** Lloyd, PO Box 53, Darling Heights 4350. (07) 38 3060.
**DEC Personal Computer Special Interest Group,** see NSW entry.
**Gold Coast Amstrad User Group,** Mark Abbott, 17 Ewan St, Southport Qld; (075) 31 2114; meets second Saturday of each month at Benowa State High School, Mediterranean St, Benowa at 2 pm.
**Gold Coast Computer Club** meets every Tuesday night at the Elanora State School from 7 pm to 9.30 pm. Contact Ivan Black (president), PO Box 645, Palm Beach 4221; (066) 722 631.
**Gold Coast Microbee User Group,** Col McLaren, 1/100 Imperial Parade, Labrador 4215; meetings first Saturday of each month, 3.00 pm, at the Southport High School. (075) 31 4610.
**IREE Microcomputer Interest Group,** N. Wilson, PO Box 811, Albion 4010.
**Mackay Microbee User Group,** Geoff Gehring, PO Box 230, Mackay 4740, (079) 42 3214.
**MSX-Australia,** PO Box 1319, Southport 4215.
**NEC PC-8000 Users Group,** David Clark, PO Box 281, Upper Mt Gravatt, 4122; (07) 52 3662 (B), (07) 343 7680 (H). Meets on the second Friday of the month at the Old Town Hall, South Brisbane.
**Osborne Users' Group of Queensland Uni,** Glen McBride; meetings second Wednesday each month, open to all. (07) 870 1177.
**PC-8000 Users' Group of Queensland,** David Clark, (07) 343 7680 (AH); Meets second Friday of each month at the Old Town Hall, South Brisbane.
**QBUG (Queensland BBC Users' Group),** Meets first Tuesday each month. Ring (07) 386 022 (AH) for details.
**Queensland CP/M Users,** The Secretary, PO Box 1025, Milton 4064; meets on the last Sunday of each month at the University of Qld, Civil Engineering Room 1.01 (off Staff House Road) from 1 pm.
**Rockhampton Microbee Users Group,** A. Parr, Frenchville State Primary School, Frenchville Road, North Rockhampton, 4701. (079) 27 9065.
**Sharp User Group of Brisbane,** meets on the second Wednesday of each month at Graceville State School. All Sharp owners welcome. Contact Bill Laidlaw, 51 Sandon Street, Graceville 4075; (07) 379 3457.
**Sega Users' Association,** GPO Box 433, Lutwyche 4030 Qld; meets first Saturday of each month at the YMCA, Ann St, Brisbane at 12:30 pm.
**Southport Commodore Computer Users Group,** Bill Fitzpatrick, PO Box 790, Southport 4125, (075) 32 0061.
**Superboard Users' Group,** Ed Richardson, 146 York Street, Nundah 4012.
**Tandy, Apple, Commodore User Group,** Chris Lucey, 34

Lawless Street, Blackwater 4717.

**The Microcomputer Society,** The Secretary, PO Box 580, Fortitude Valley 4006; meetings are held on the second Friday of each month in the Old Town Hall, corner Vulture and Graham Streets, South Brisbane 4101. Meetings start at 7.30 pm; if main gate is closed use the back stairway.

**Twin Towns Computer Users Group,** Cyril White, 16 Burdock Street, Palm Garden Water. Meets every second Tuesday night at the Elanora State School from 7 pm to 9.30pm. (075) 562 336.

**Townsville Micro Computer Group (TMUG),** PO Box 5751, Townsville 4810; meetings 7.30 pm on second Monday each month at the Pimlico High School, Fulham Rd, Pimlico. Contact Mannie Van Rijswijk, PO Box 5751, Townsville 4810; (077) 89 1695.

**Townsville PC Club,** PO Box 92, Townsville 4810. Contact A. Moore (secretary) on (077) 722 722.

**TRS80/System 80 Computer Group,** Secretary, 16 Laver Street, Macgregor 4109; meets first Sunday each month at Lindum Hall, Lindum Street, Lindum 4178, at 2.00 pm. (07) 343 5771.

**University of Queensland Osborne User's Group,** Glen McBride (president) (07) 870 1177, or Richard Duczmal (treasurer) (07) 377 3139; meets on the second Wednesday of the month, in the Axon building on campus. Membership is open to both students and non-students.

**VZ-200 Pacific Region Club,** J. D'Alton, 39 Agnes Street, Toowong 4066, (07) 371 3707.

**Yass Microbee Users Group,** 25 De Mestre Street, Yass, 2582.

**ZX81 Club,** P. Carswell, 22 Braud Street, Bundaberg 4670.

## South Australia

**Adelaide Atari Computer Club (AACC),** Secretary, PO Box 333, Norwood 5067; meets at Gilles Street Primary School, City, on first Monday (second if first is on public holiday) of each month, 7.30 to 9.30 pm.

**Adelaide Beebnet,** Contact the secretary at PO Box 262, Kingswood, SA.

**Adelaide Lotus 1-2-3 User Group,** Paul Wragg, Pannell Kerr Foster, GPO Box 1969, Adelaide 5001.

**Adelaide Micro User Group,** Helen Ross, GPO Box 214, Adelaide 5001; for TRS80 and System 80 users.

**Adelaide Osborne Group,** Russell Barter, The Secretary, GPO Box 603, Adelaide 5001.

**Adelaide PC Users' Group,** PO Box 68, Walkerville 5081; contact John Roberts (08) 212 5020 (B). Meets on the second Thursday of each month, at 195 Gilles Street, Adelaide, at 7.45 pm; or as advertised in the computer section of the *Advertiser* on the Saturday prior.

**Adelaide Sega User's Group,** John Maynard. Meets on the first Wednesday of each month at 7.30 pm, at the Lutheran Hall, 137 Archer Street, North Adelaide. (08) 264 2747.

**Adelaide Super-80 User's Group,** Mr L. White, The Secretary, 503 Churchill Road, Kilburn 5084; meets on the third Monday of each month, (the second Monday in the case of a public holiday) at 7.30 pm in the canteen of Mason & Cox Foundry, 123 Hayward Avenue, Torrensville 5031, (08) 260 6226. Subscription: $5 pa.

**Amstrad Computer Club Inc,** Frank Matzka (President), (08) 382 2101; meets every Tuesday at Church Hall, Clayton Ave, Nth Plympton, 6:30 pm. PO Box 210 Parkholme 5043 SA.

**Aquarius Users' Club,** Benedict Sabel, 7 Duncraig Lane, 5152. $5 membership fee covers the cost of a bi-monthly newsletter.

**Beebnet, BBC and Econet User Group** PO Box 262, Kingswood 5062; the group intends to produce a newsletter on a monthly basis. It is interested in any software producers or distributors who would be interested in serving the group's market requirements.

**Commodore/VIC Computer Users' Association,** Mr Eddie Hann, 13 Miranda Road, Paralowie 5108; the SA branch meets monthly.

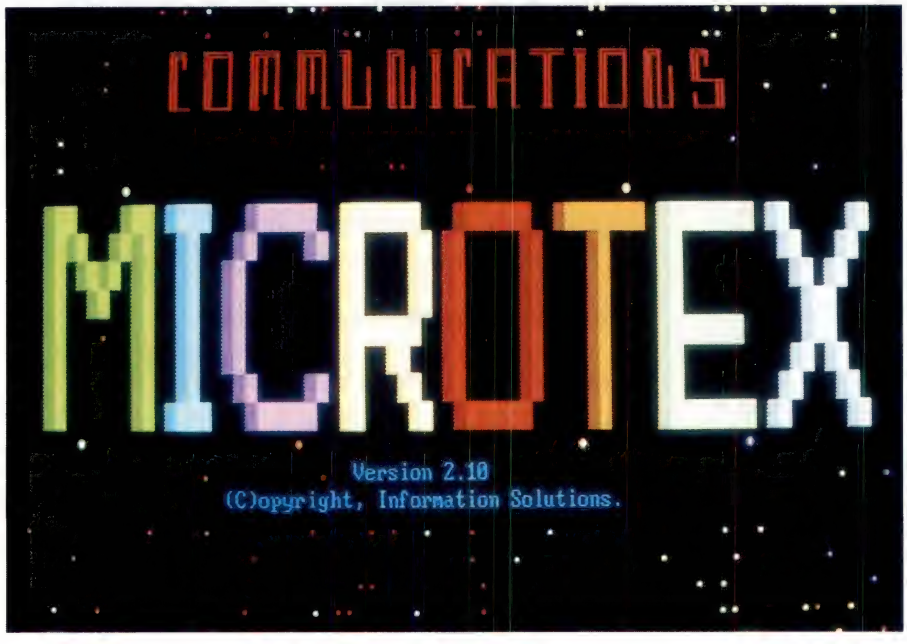
**Compucolor-Intecolor Users of South Australia,** PO Box 86, Torrensville 5031, (08) 352 3296.

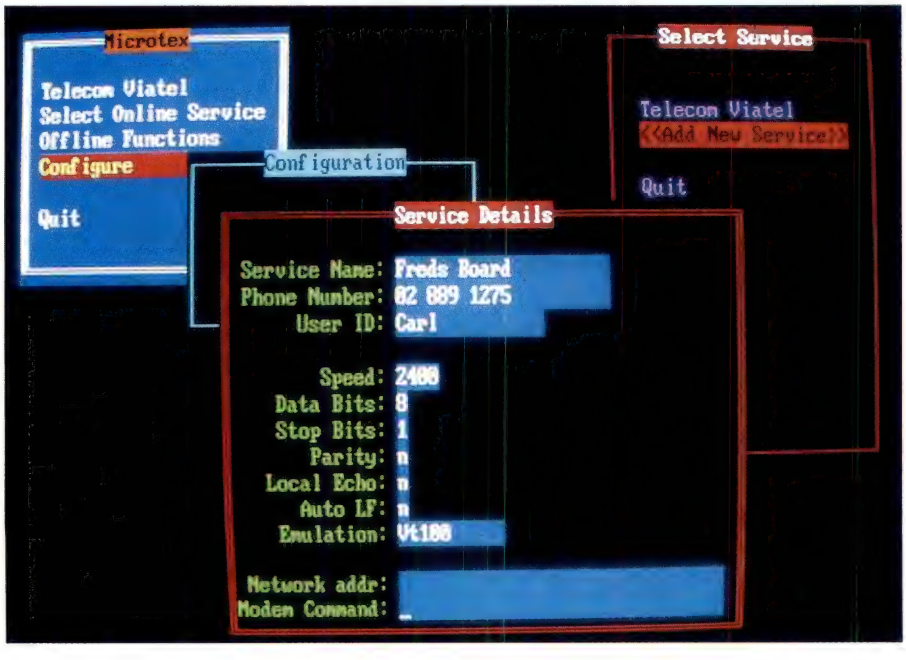
**Kaypro User Group,** Ralf Engler, 16/34 John Street, Payneham 5070.

*Continued page 125*

# Microtex Communications

If fear of the unknown has kept you away from computer telecommunications, here's your software answer (even Tim Hartnell didn't suffer on using it!).




INFORMATION Solutions in Melbourne have just released their new videotex and terminal communication software package, Microtex Communications. Distributed exclusively by Island Technology, this software is designed to provide access to Videotex, Viatel and Microtex 666, plus other bulletin boards and computers.

As an experienced 'sufferer' of incomprehensible instructions, communications software which hangs in mid-career, and many, many hours of frustration when working with comms material, it is a joy to find a program which is written so obviously with the non-technical end-user in mind.

One of the dangers of software which is easy to understand the first time you run it, is that the features which make for ease of initial use can become very annoying once you've graduated from the first-time user category. This is not the case with Microtex Communications. Although context-sensitive help is only a couple of key presses away, and a list of commands can be generated at any time simply by pressing F1, these aids to the confused do not impose themselves on the non-confused. That is, the help is there if you need it, but it doesn't get in the way if you don't.

The program is operated by a series of logically-designed 'drop down' menus, which make good use of colour (but are still readable on a mono screen). The menus lead you in a sensible sequence through the steps you need to take, whether you're installing the software for the first time, changing your hardware configuration, calling up your mate's computer in Papua New Guinea, or looking up the weather forecast on Viatel. If you've ever been frightened of the whole world of

*Microtex Communications offers a host of features, including videotex and teletype emulation. It is fully compatible with Telecom's Viatel Telesoftware recommendation.*

communications, simply because it seems just too complicated to be worth the trouble, this package is for you.

Provided on a single floppy disk, with a clear and easy-to-follow manual, the package needs a minimum of 196K. In addition, you need a modem capable of working at 1200/75 bps for access to videotex, and at 300 bps to log onto bulletin boards, and talk to your mate in PNG.

The program is fully compatible with Telecom's Viatel Telesoftware recommendation, as implemented by Microtex 666, and offers a host of features, including videotex and teletype emulation.

And, for when you don't want to stay logged on for ever to read some material, you can use the package's graphics print facilities for GX80-type bitmap printers, or the standard text printout. As an alternative, instead of printing out a screen, you can save text, or a full Videotex frame, direct to disk. This means, in addition, that you can download 'Telesoftware' for running later. If a frame is corrupted, due to line noise or the like, up to five automatic retries will be attempted before the software gives up in despair, and aborts the download automatically. This should ensure that you're not charged for Telesoftware you were not able to get.

Microtex Communications also offers you the facility of issuing DOS commands while offline, and of offline frame editing for later online transmission to Videotex services. Many public videotex systems such as Viatel charge users by online connect time, as well as specific frame charges. Therefore, the ability to edit videotex frames offline – such as when you are completing a response frame – means that connect time charges can be kept to a minimum.

## Colour and graphics

The program gives you the ability to use colour and graphics on a page which can lead to more attractive results than just plain old boring text. Some response frames will ignore these characters if entered, but others will accept the use of colour and graphics.

If you're a service provider, which gives you page edit privileges on a videotex service, you can use the software's offline editor to prepare frames to transmit to the service. Once the frames are finished, you can transmit them by moving back online in page edit mode.

The manual which comes with the software is to be commended (even though much of the software operation is so clearly signposted with the dropdown menus you probably won't refer to it very much once you're up and running). The instructions assume you have not used a modem before with your computer (a very sensible assumption, as many of the buyers of this package will presumably buy it the same day as they get their modem), and starts off by telling you how to link the modem up with the Telecom socket, and with your computer. Hints on determining the correct cable to connect the modem to your PC are also given, along with an offer to call Information Solutions if you need a special cable because your configuration is not one of the standard ones.

Part of the joy in downloading Videotex screens is in the graphics (and the way in which clever screen designers have got around the extraordinary limits which block graphics can impose). However, unless you have a character ROM, you won't be able to see them, as the Prestel standard character set is not fully represented by the IBM PC character set. To overcome this, a character ROM is available from Island to fit the optional character ROM, and the necessary installation steps are explained clearly.

If you have numbers you call a lot, like your mate in PNG, you can store information such as the phone number, customer ID, user name and communications parameters on up to ten services. In addition, you can customise Microtex Communications with new services, and specific hardware and modem parameters. This information is retained between sessions in the configuration file Microtex.sys.

To simplify your life, the first of your (up to ten) services which are stored with the package is held to be the 'preferred' or 'main' service. Fairly obviously, this should be the service you use the most. When you first run Microtex Communications, the Telecom Viatel service is determined to be the 'preferred' one, but you can, of course, change this at any time.

## New configurations

Setting up a new configuration for storage is easy, as you simply have to fill in answers, where prompted, on the dropdown blank forms. The software is 'intelligent' as well, as by simply telling it you want to emulate Videotex, it will automatically 'fill in' all the other blanks with the required information. If you don't fill in all the data, the package will provide the best default it can for that field.

The software also has a window in which you specify which printer and communication ports are to be used, and whether or not the optional character ROM is installed. By default, the software assumes that the printer is attached to LPT1:, the modem to COM1:. and that the optional ROM is not installed. The software supports printer interfaces LPT1: and LPT2:, and communications interfaces COM1: and COM2:. The software will not drive a printer attached to a serial interface.

When setting modem parameters, the software needs four items of information. These are 'modem attention', the string to be sent, before the dialing sequence, to 'wake up' the modem; the 'dial prefix', which is the command which tells the modem to start dialing (it follows the 'wake up' and precedes the actual phone number); the 'dial suffix' which tells the modem that the telephone number is complete; and 'hang up', which is the command that tells the modem to terminate the call and go offline.

Back in the dark ages, before *Your Computer* was around, computers didn't use VDUs. Instead, they used the old technology of paper, and a noisy, jumpy printer. The legacy of this bygone age lives on in the bulletin board world, which uses the screen of your monitor as a 'glass teletype', with the words appearing on the screen as it scrolls up patiently to accommodate them. Microtex Communications can get your computer to behave like an ancient teletype, so you can call up ASCII services such as Telememo and bulletin boards. In addition, you can tell the software to direct part, or all, of a session to your printer or to a disk.

Finally, the manual comes with a two-page set of answers to 'common questions' such as 'I crashed out of the system and now nothing seems to work properly' (A: If you end a Microtex session without exiting from the main menu, you must reboot the system before you do anything else on the PC), and so on. This is likely to be a boon to inexperienced operators. □

### Product Details

**Product:** Microtex Communications
**Distributor:** Island Technology,
PO Box 381, Werribee 3030 Vic.
(03) 741 9981
Viatel 374140570
**Price:** $199 untaxed

# A case study in networking

**The most basic question in networking is: why? Starting with the answer to that question, Peter Heath relates the implementation of a LAN for the Defence Services Homes Corporation.**

PROGRESSIVE managers in small to medium sized firms must now be feeling a sense of *deja vu* about Local Area Networks (LANs). Having grappled with the need for PCs in business during the last few years to the point where words and acronyms such as DOS, bits, bytes and ROM no longer send shivers of fear down their back, along comes a whole bag full of new terms such as CSMA CD/CA, token passing and topology.

Managers coming to grips with this move in microcomputer use should draw some consolation from the experience of the Defence Service Homes (DSH) Corporation. During the period from November 1986 to 30 June 1987 DSH found, for a range of reasons, it had to install a medium size LAN in each of its mainland state capital offices. The installation of these networks required the selection of software and hardware, the purchase of components, the physical delivery and installation of those units, the training of staff, consultation with staff organizations whose members were likely to be affected, and, most importantly, the explanation of each step in this process to the corporation's management.

I was fortunate enough to have been the Technical Director for this project and, as such, spent a large proportion of my time answering the questions which any reasonable manager must ask or worry about as such a project progresses. Many of the questions were quite basic and, I must admit that from the perspective of a person already in possession of the answers, I wondered about why they were being asked. It was in a general discussion with my then general manager that I realised how much of the information needed by a good generalist manager was just not available. Often texts and articles started from the assumption that the benefits of using a LAN were so self-evident that no discussion of this basic issue was necessary. Other sources of information were found to be either too technical or so superficial as to not address the needs of management.

## Why network?

The most basic question is 'why should a LAN be considered for my organization at all; after all can't the job be done without the added level of complication brought about by introducing networking?' Very often the answer to this and similar questions is made in platitudes – 'the acknowledged future direction' and 'the future for shared facilities' have a blandness with which managers are singularly unimpressed.

Managers are real world creatures dealing largely with profit and loss statements, while balancing long term plans with short term expediencies. Their ideas of what constitutes a justification must consequently be coloured by the need to show a likely dollar benefit for any expenditure. Some areas of the PC industry, whilst driven by the thoughts of future sales, have further complicated the use of LANs by providing information purporting to show LANs to be a universal panacea to the ills of any small organization using PCs. This is patently impossible. Each case justification of a LAN must take into account the particular environment to be addressed.

What can form the basis for a discussion of LANs at the management level is the general economics of the use of LANs. In almost all cases a LAN option is worth further consideration, on economic grounds if the number of users or user groups requiring access to individual machines exceeds three or four; and the geographic area over which the groups are spread is not too large.

This economic rationalization is supported by assuming a fully configured price of $7-8000 per unit for a standalone workstation and comparing this with the network cost of around $7-8000 for a network server, $5000 for network software and $2-3000 for diskless PCs, including the cost of miscellaneous bits and pieces such as cables, network cards and so on. Of course, there is always a situation where this rule of thumb breaks down.

Of course quite often at this stage an even more basic question needs to be answered: 'what is a local area network?'

Once, when faced with this question, I launched into a half hour discourse on topologies, logical forms, and control structures, only to be asked again at the end of what I had thought to be a very

clear and concise explanation of a technically complex subject 'What is a LAN?' My reply this time was that a LAN was just a way of interconnecting two or more PCs so that the users could share data and other facilities within an office – and that was quite adequate for these preliminary discussions.

An important lesson in office communications was thus driven home: replies to questions should be pitched at the right level with a view to the current stage of discussions and the current level of managers knowledge; and that it is essential to make certain that the base level of information necessary to understand a topic is available before providing additional information.

In the area of LANs the next most common question I have experienced is 'what is a topology?' and/or 'what is a Token Ring?'

From the outset it is important to differentiate between the IBM Token Ring product and the generic token-passing logical topology. This almost always leads to an explanation of 'Physical Topologies' as the way devices are connected together and 'logical topologies' as the way they work once that physical connection is made.

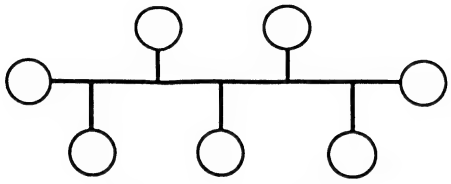
When interconnecting PCs to form a LAN, it is essential that the devices interconnected be able to communicate at all levels and in some way manage the sharing of all facilities. This process of sharing may in some cases require that software actually police users and exclude some from some areas of data.

## Collision sensing

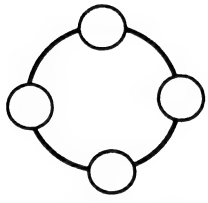
At the physical or electronic level there are only three basic ways in which machines can be connected. These methods of connection are known as physical topologies and are shown in Figure 1.

Regardless of the physical topology selected for interconnecting machines there are, in practice, two ways of providing and policing connection at a logical level: collision sensing and token passing. Collision sensing is more properly known as Collision Sense Multiple Access (CSMA) with Collision Detection and Collision Avoidance (CD/CA).

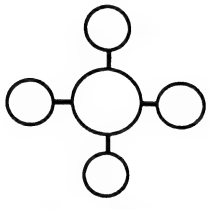
Collision Sense indicates that before the node attempts to make use of a network, it checks the cable to determine whether there is other network traffic already on the line. Multiple Access means that any machine on the network has an equal right to gain network access at any time; Collision Detection means that as a node commences to use the network, it listens to determine whether another machine has started to transmit (a 'collision' has occurred).



*Bus or dropline network*



*Ring network*



*Star network*

***Figure 1.*** *At the physical level, there are only three basic ways in which machines can be connected – they are the bus (or drop line) topology (whose dominant feature is that a single wire runs from one end of the network to the other with all equipment tapped into it); a ring network, as indicated by the name, has a cable joining all machines in a ring. The final physical form that a LAN may take is a star network, where all the nodes are connected to a server (usually used only for that purpose).*

Collision avoidance covers the system's operation after a collision is detected. The machines which attempted to use the network will wait a randomly determined period between an upper and lower limit preset by the system before retrying the transmit sequence. Of course this means that it is possible (although unlikely) for another collision to occur; if it does, the process is repeated.

Collision sensing is a 'let's see what happens approach'. With the high speed of computers there is rarely any significant delay in data flow. However, in very congested networks this may not always hold true and some queue analysis may be necessary to determine whether collision detection systems are adequate for a particular implementation.

## Token passing

Token passing is the other logical design for a system. This method of controlling data transmission and receipt may be compared to a classroom of students (the LAN) where the teacher (the network software) has a rule whereby a student may only speak when a 'token' is in his possession; if the student has nothing to say, the token must be passed on to the next student. On token passing networks, digital tokens are passed around the network and when this token is received by a machine, it checks to see if it needs to send information or instructions. If not, the token is simply re-transmitted to the next machine physically on the network.

If a machine initiates a transfer of data, all other machines are effectively locked out of the network until a 'received' token has been sent from the receiving machine back to the sending machine. Because of the speed of data processing devices, this is transparent to the users.

Basically, a network may either share the 'management and control' functions between all machines on the network or a single machine (the network server) may be allocated to this task. In most cases however, where there are in excess of four machines, a dedicated server is usually worthwhile. Shared peripheral devices, such as printers, are generally connected physically to the server and are accessed by other networked machines through it.

One often asked question is, 'why the current level of interest in LANs?' The simple answer is that both the technology and the market for it are maturing. PC LAN techniques have gone from comparative immaturity to a point where they are reportedly in use in almost all government agencies, and a huge number of private organisations – all in just a few years.

Three years ago it was quite common for MIS (Management Information System) managers to avoid the issue of LANs with a blanket statement that they lacked security, support and were unreliable. From that point we have seen the emergence of a respect for LAN products which can only be paralleled with that of the PC itself. Data processing managers who thought LANs too risky for use, now view it as an alternative to the 'traditional' minicomputer.

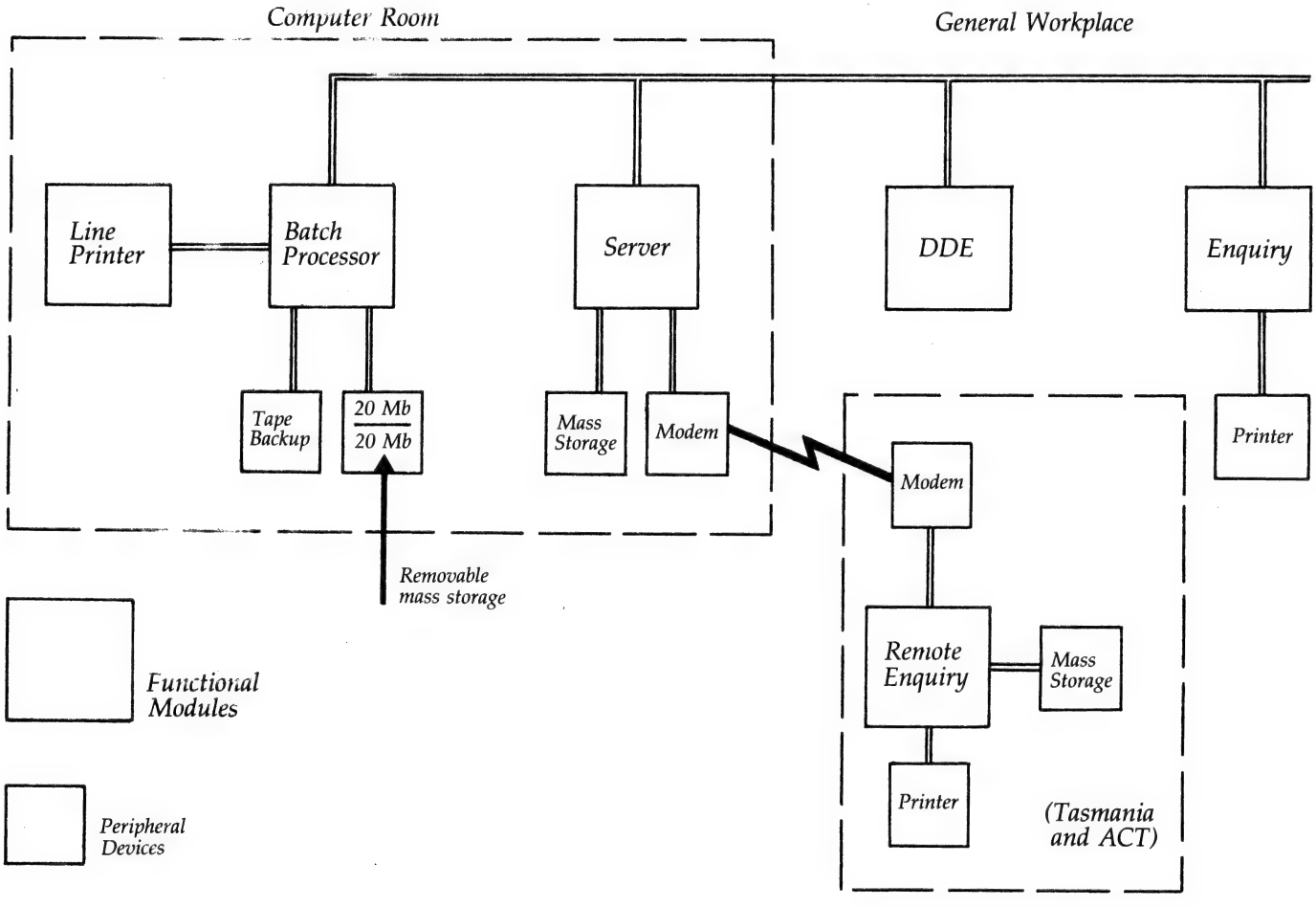



***Figure 2.*** *A typical configuration of a DSH State Office – Compaq 286 PCs used as batch processors and servers were networked with Banyan Vines 286 to IBM PCs used as enquiry and dedicated data entry (DDE) terminals, and a variety of other peripherals.*

This change in the view of LANs by data processing professionals has been brought about by the increased maturity, reliability and security of LAN software. The fears about the security of data held on networks have been addressed by vendors for the most basic of reasons – to make their product marketable. Because of this competition amongst vendors, more and more of the necessary tools to allow the control and management of LANs (such as error logging, access list, password control and file locking) have been added to products or have been marketed as third party products to overcome perceived deficiencies in otherwise secure products.

Managers who have in many cases been left unfettered to use their 'personal data' must now face the fact of the corporate ownership of data. Additionally the 'hollow log' purchases of office machines and calculators (and in some cases even consumable stores) which look suspiciously like PCs, must now be examined with a closer eye to connectivity. These changes have not always been received with a great deal of enthusiasm.

Recently, there have been a number of software releases, which, along with the increased processing power of PCs, take the possibility of the use of LANs out of the exclusive realm of office automation and make them an attractive alternative to the use of small to mid-range minicomputers. In fact this has been the course followed by such organisations as Deloite Haskins and Sells and the Defence Service Homes Corporation.

## Strengths and weaknesses of networking

Now, let's examine in greater detail the strengths of networking, particularly in the area of control and management of data and highlight some of the risks involved in the use of networks. This discussion will again be based on my experience in managing a large scale system of local area networks and experience gained in answering questions from managers about networks.

A LAN can provide for shared access of expensive peripheral devices which may individually cost 40 to 45 per cent of the total cost of a system. This in itself is a reasonable saving for any organization to aim for, however, a local area network used in a traditional manner for office automation and management reporting may, in fact, provide a far greater saving by preventing duplication of data and, most importantly, duplication of effort in the input of data and its manipulation. In this mode a LAN is one of the most powerful tools in the armoury of the MIS manager.

However, as mentioned above, there have been a number of software releases, which, along with the increased processing power of PCs, take the possibility of the use of LANs out of the exclusive realm of office automation and make them an alternative to small to mid-range minicomputers.

Although the future is likely to see an increase in the use of LAN technology in this role, it is likely that in the longer term, LAN technology will fill the role of a vehicle for mid-volume processing of a day to day nature, and be the method of delivering, at a realistic price, many of the long awaited benefits of office automation. This predicted integration, of course, is made on the assumption that PCs will continue to offer more 'bang per buck' than minicomputers.

For the most part, this differential in favour of PCs is the result of different methods of software sale in the two market areas. PC software is offered for a one time only charge, whereas minicomputers generally have ongoing contracts for maintenance and software licences requiring ongoing payments. Typically, these charges can amount to 20 to 25 per cent of the original purchase price of the machines per year.

However, all is not sweetness and light in the area of networking. Nor is networking the universal panacea of the computing industry. Cost reductions can occur, general efficiencies can be achieved and a greater control over strategic data can be exhibited. At the same time, if this technology is misused or not understood when it's implemented, then the effects may be disastrous.

If an implementation has not been well planned and installed, then the risks are enormous and the only possibility of recovering may be to tear it down and start again. Local area networks can (and do!) result in the misuse of resources. This commonly occurs in two areas – the first can be described as the 'familiarity breeds contempt syndrome.' It's the abdication of individual responsibility for the backup and management of systems or data to the nebulous (or even nonexistent) system or network controller. Such a situation, if allowed to develop, is fraught with danger, particularly when data is viewed from a local perspective as trivial and not worth the effort to backup. Of course, this same data can be of strategic importance to another division of the organisation.

This situation is exacerbated by the fact that the (often self-imposed) restrictions

*In most cases however, where there are in excess of four machines, a dedicated server is usually worthwhile.*

on the use of strategic data on a mainframe system are absent on a LAN as there is often no feeling of the corporate ownership of data.

The second opportunity for misuse is the 'use it because it's there' scenario – for example, material may be continually printed for working drafts on a laser printer rather than an equally effective dot matrix machine simply because the facility is available. Both of these difficulties are only likely to occur when education has not been thorough. As in most automated data processing operations, end user education and involvement in design of systems is essential if such misuse is not to occur.

In fact, this ability for a LAN to be directly designed to meet end user needs can be one its major strengths. The low cost and great availability of software has meant that the systems can be customised in terms of an organisational unit's particular needs.

The flexibility of LANs means that they can also continue to absorb new technology as it becomes available or appropriate for use, without major redesign or redevelopment work. This ability itself creates a situation where ongoing savings can result.

But – a number of companies have developed market driven dead ends in technology. These generally consist of local area network products which have inbuilt deficiencies or limitations which may restrict a user's ability to benefit from that flexibility.

Another difficulty in the successful implementation of local area networks is the dearth of high quality, highly knowledgeable and experienced consultants. In most areas of computing operations, there are consultancies which have had experience with the technology and equipment. However, I found that most consultants have had no hands on experience in the use or implementation of local area networks.

## The Defence Services Homes Corporation Network

The Defence Service Homes Corporation is a Commonwealth Agency responsible for the DSH Scheme (formerly the War Service Homes Scheme). In its present form, the Scheme provides subsidised housing finance and insurance for former and serving Defence members.

The DSH system processes 142,000 mortgage accounts, 189,000 insurance policies and approximately two million financial transactions from clients per year.

Until 30 June, 1987, the Corporation's computing operation consisted of ten-year-old ICL 2903 minicomputers in each state capital. In 1984, DSH began considering moving from the ICLs to something along the lines of an IBM System 38. However, a series of Government decisions to review the form of the DSH benefit, resulted in that move's being deferred.

In August 1986, ICL advised that it would be unable to continue maintenance on the DSH machines beyond 30 June, 1987, but alternative ICL minicomputers were available for around $2.2 million. By 1 July, 1987, DSH had dispensed with the ICL equipment and was fully operational with all strategic processing undertaken on a set of microcomputer networks.

Corporation staff and a consultant from Doll Martin Associates had already looked at the available offering in the PC market in early 1985. The conclusion reached then was that although the processing power of the available PCs was sufficient to meet the needs of the Corporation, such use was not practical as the development software available was immature, the operating system most commonly in use had some major deficiencies, and these machines did not appear to offer the Corporation anything but the most limited scope for improvement in the use of auto-

mated data processing as a management, rather than accounting, tool.

The inability of MS-DOS to address more than 32 megabytes of hard disk storage or 640 kilobytes of RAM were seen as major problems. In short, the idea of using PCs for vital processing purposes did not appear to be attractive.

However, in the face of the changed circumstances confronting the Corporation in 1986 a re-examination found that the release of mature software development tools and solutions to the other low level difficulties found during the previous consideration of this option now made the use of networked PCs a viable alternative to the purchase of minicomputers.

The only apparent difficulties found during the detailed examination of this option, were in emulating the inquiry system, the data entry 'key-to-disk' systems, finding a software development environment which was sufficiently close to the 2903's to allow fast migration to the new system, and finding a secure method of backing up files up to 14 megabytes in size.

The answers to these last questions regarding the viability of using a LAN to support strategic data processing were the release of EDSI controller cards which allowed hard disk storage to reach 130 megabytes on a single fixed hard disk drive; the release of the Lattice RPG2 compiler which allowed the importation of much of the code from the existing 2903 minicomputers to the network environment without a major reprogramming effort; the provision of a file sharing facility on the network; the ability to emulate the ICL's direct data entry system using the Rode PC package; and the release of the Bernoulli 20+20 removable dual 20 megabyte cartridge disk drives.

All that remained was to assess the market and select the network.

## Banyan Vines 286

The network selected was Banyan Vines 286. This system required a dedicated file server to manage disk usage and peripheral device control. Although this was an overhead not necessary with some of the other LANs initially considered, the performance of this product in the evaluation phase was so good as to make this a negligible consideration.

The selection of this LAN package was predicated on the performance of the product during extensive trials of networking packages. Vines 286 proved itself reliable – although the Corporation's technical staff attempted to cause a system failure, both through hardware operation interruption and software hacking, the system recovered without fault or loss of data under all circumstances. Also, security was the most stringent of all the systems tried.

Vines 286 offered the use of files which exceeded 32 megabytes in size, while giving end users and programmers the use of MS-DOS as the environment for system control. And, file sharing with record locking was a standard feature which allowed the use of the inquiry system at the same time as files were being updated under batch control.

It was decided during this evaluation that the overhead of a dedicated 80286-based machine – an AT – for batch processing was also worthwhile (this batch processing machine is used to execute all of the RPG code necessary to update the Corporation's files).

### Like to know more?

If you'd like to know more about networking, refer to Stewart Fist's tutorials: LANs (October '87), Ethernet and CSMA/CD (November '87), Token Rings (February '88), Networking Possibilities (March '88) and Changing Concepts (May '88).

## The hardware

Compaq 286 PCs were chosen as the file servers and batch processors, mainly on the basis of the robust nature of the units, the capacity of the standard power supplies, the ready availability of competitive third party maintenance and the ability of these machines to run a wide range of software developed for the IBM-compatible market. IBM PCs were selected for use as inquiry terminals and data entry terminals.

Bernoulli cartridge drives were purchased on a one off basis for each office as the need arose. These units have continued to prove both as an aid to processing and as a medium for data transfer between states. (Copying a 12 megabyte file takes an average of 5 minutes).

Additionally, a single 9-track 16/3200 bpi tape drive was purchased for the Melbourne office of DSH to ease data exchange with external organizations. This basic facility was no longer readily available for the 2903s and when second hand units were found, they were prohibitively expensive.

This batch environment strictly mir-

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**"The Best idea I've seen for a spreadsheet in years"**
Jim Seymour, Columnist, PC Magazine, PC Week

Lucid is as simple as the pictures show. And you don't have to write formulas to do that. All you do is look at the other file, navigating through easy, point and shoot directories. When you come back up (with one key) the link is made automatically for you.

Everything about Lucid works that way. Users say "*It is so intuitive that I really don't need a manual.*" That's because we use something we call a visual command menu. Jim Seymour, the noted PC columnist, talking about Lucid in a recent article said, "*If there ever was an interface idea so good it ought to be stolen and widely used, this is it.*"

### Memory Resident

You can pop Lucid up instantly while working in your word processor or any other program. You can cut anything on the screen and paste it right into Lucid, or cut anything from a Lucid worksheet and paste into the application below. You can even run Lucid on top of 1-2-3 if you like, and cut and paste information from one to the other, including formulas.

### Notepad Behind Every Cell

Another 3-D feature is that any cell can also contain a multiple page note window that you instantly access with a single keystroke. You can write notes, memos or letters that relate to your work, save them as individual files and even print them separately or with your spreadsheet.

### Other Features

Lucid has over 100 innovations that cause users to say it is the best of all the spreadsheet offerings! Things like: **Speed** - background, minimal and visible recalc. **Macros** - learning macros, autoexecute macros, macros work between spreadsheets, user defined macro menus. **Mouseability** - total Mac-like mouse access, but easy keyboard control as well. **Color or Mono** - 17 user controlled color displays. **Audit** - six displays and printouts. **Windows** - multiple sheets on screen at same time. Multiple views of the same sheet. Pop-up windows of function formulas, range names, favorite labels, macro names, filenames, even a calculator. All let you select and insert right into your spreadsheet. All windows (even notes) resize and move where you want them. **Cut and Copy** - between spreadsheets, documents and between sessions. **Help** - press F1 anywhere, you get help specific to what you are doing.

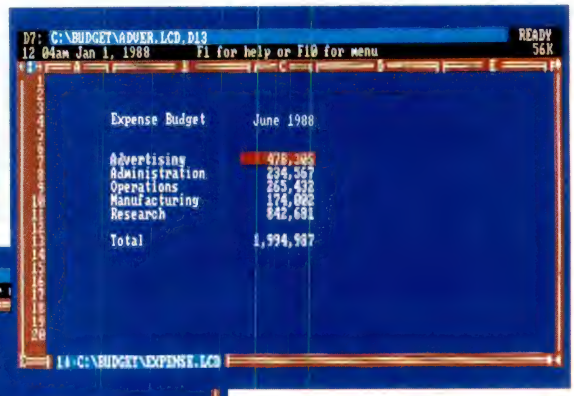


Fig. 1. Let's get the detail on those ad costs, just move the widebar to that cell and press one key (grey +).

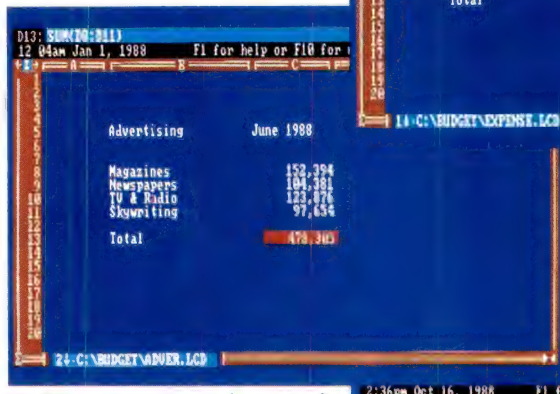


Fig. 2. Here we are instantly. Notice the lower left corner showing we are on level 2. Grey – takes you back. There is no limit to the levels you can go. Move right down to transaction level if you like.

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The other winner: Microsoft's Excel

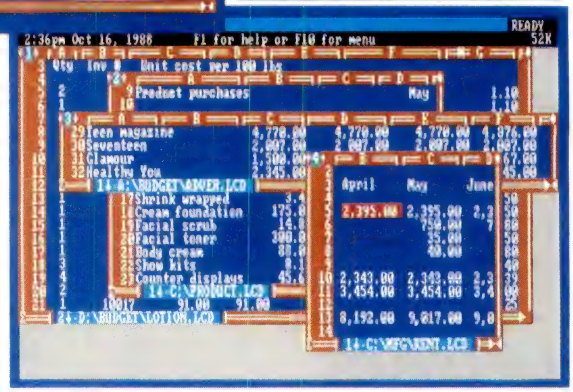


Fig. 3. Of course, Lucid does multiple windows. Notice, you can simultaneously open windows in different directories, different drives, even down as many 3-D levels as you like. No one else can do that.

### Masterwork

Lucid is more than a bag of features. It is a masterwork. The overall feel is tight and polished. In fact, Paul Somerson, executive editor of PC *Magazine*, used one word to describe it, "*Slick*".

PCSG has built an excellent reputation as a developmental laboratory. Now those who have worked with Lucid 3-D tell us "*you have done it again. This is software everyone should have.*"

Even if you don't plan to abandon 1-2-3, Lucid makes sense. Files are converted between them with ease so there's not an interoffice compatibility problem. This means you can have the power and fun of Lucid 3-D, without having to upset your present systems.

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rored the previous environment on the 2903 minicomputers. Dedicated data entry was emulated using the Rode PC package which allowed up to four network users to key directly to input files which were held awaiting batch processing.

dBase III+ was selected as the file maintenance environment for the system as this provided compatibility between Rode PC and the RPG application programs converted from the 2903 by way of the Lattice development system.

The major project costs, including hardware and software licenses came to $289,000. Additional to this were the costs of human resources within the Corporation and the travel costs to enable a project team to visit each site to undertake the installation of the networks. It was assumed that these installation costs would have been the same regardless of the replacement equipment selected. Since software licences for PCs are based on a one time charge, the Corporation realised an ongoing saving of about $100,000 per annum. Maintenance on this type of equipment is also considerably lower than for mainframes or minis – this gave an additional saving of $100,000 to $150,000 per annum.

The structured approach to this project adopted by the Corporation meant the only human resources required to complete the exercise were the existing 8 technical staff members and approximately 200 hours programming time on a contract basis from an ex-staff member.

Of the 8 technically skilled officers available to DSH, only 7 could be freed to undertake the work of the conversion; a team of 4 undertook the conversion of applications programs and 3 officers were responsible for the actual installation of the LANs. The most senior of these officers also acted as the liaison between technical areas, unions, vendors and the Corporation's general management.

Generally the performance of the network PCs has been as good or better than the 2903 machine. Independent reviews of the Corporation's new automatic data processing system have confirmed that the system is as secure as the old one, and that it offers an extremely low entrance and maintenance cost solution to the computing needs of medium sized financial processing organizations. □


***Figure 3.*** *The DSH system uses Compaq 286 PCs (top) as the file servers and batch processors, and the Banyan Vines 286 network package (opening menu shown bottom).*

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# Hardware Hacking

**Now that we're all feeling like a little 'connectivity', here's some sneaky input and output techniques from Tom Moffat.**

IT'S ALWAYS interesting to hook new gadgets up to your computer. I have designed many projects for electronics magazines, and just about every one of them has been intended to connect to a computer. There are radioteletype receivers, facsimile receivers, morse code converters, speech synthesizers, EPROM programmers . . . just to name a few. Most of the development work on these devices was done on a Microbee, partly because the designers of the machine saw fit to install lots of connectors on the back so external devices could access its innards.

The IBM isn't so well endowed in this department. Sure enough, it has all those slots into which you can plug all sorts of lovely cards such as graphics adapters and memory expansion. Until recently you had to buy these extras, usually for big bucks, although now I notice that build-it-yourself kits for things like EGA cards are becoming available in Australia. Good! It's about time!

Microbee once put out a gadget called an 'experimenter board' that was designed especially for hardware hackers. Its main feature was heaps of new input and output lines so you could hook it up to pushbuttons, lights, keys, burglar alarm sensors, speakers, with applications only limited by the experimenter's imagination. I have seen ads for similar cards for the IBM in overseas magazines, but they appear to be aimed at the richest universities and research institutions; certainly not destitute hackers like you and me.

However, if we want to hook things up to an IBM, there are ways, using the hardware most of us have already got. Namely, an RS-232 serial connector and a joystick connector, which IBM prefers to call a 'games adapter'. We can get at both of these handy devices right down at the chip level, with most satisfactory results!

## The RS-232 serial port

First of all, forget about the 'serial' part. We will make use of the modem control lines only, but there are plenty available: four lines into the computer and two lines out. These six lines go from the 25-pin connector on the serial card, through some RS-232 voltage level converters, and into the 8250 Asynchronous Communications chip.

This chip has several data, command, and status registers which the computer uses to communicate with it. Two are of interest to us, the Modem Control Register and the Modem Status Register. These are assigned in/out port addresses in the IBM scheme of things, with the Control Register at address 3FC (hexadecimal) and the Status Register at 3FEh. They don't require any initialization to make them work, they are always available to use with a minimum of fuss.

The Control Register outputs are latches, meaning that whatever number is written to them stays there until replaced by something else. The Status Register reflects the status of the four input lines, and the computer can inspect them at any time.

Table 1 shows a list of these lines, their official RS-232 designations, and where they appear on the 25-pin serial connector and the in/out ports. Because of the conversion to RS-232 standards, the voltages that appear on the 25-pin connector bear no relation to those floating around inside the computer. The computer uses +5 volts as a 'high' logic level, and 0 volts as a 'low' level. These are traditionally called TTL voltage levels. On the other hand, on the serial connector, you will find around +12 volts for high and -12 volts for low. This is no hassle as long as you allow for it when connecting external gear. In fact, on the inputs, you can usually cheat and feed them TTL levels (0 and +5 volts) and get away with it.

| DESIGNATION | PIN_NO. | PORT | DATA_BIT | |
|---|---|---|---|---|
| Clear To Send | 5 | 3FE | 4 | INPUT |
| Data Set Ready | 6 | 3FE | 5 | INPUT |
| Data Carrier Detect | 8 | 3FE | 7 | INPUT |
| Ring Indicator | 22 | 3FE | 6 | INPUT |
| Request To Send | 4 | 3FC | 1 | OUTPUT |
| Data Terminal Ready | 20 | 3FC | 0 | OUTPUT |
| Ground | 7 | --- | - | |
| +12 volts | 9 | --- | (USER MOD.) | |

***Table 1.*** *The four input lines, their official RS-232 designations, and where they appear on the 25-pin serial connector and the in/out ports.*

If you would like to try out the input lines, get a female type DB-25 serial connector and solder five wires to it. One goes to ground, pin 7. The others go to the four input lines, pins 5, 6, 8, and 22. On most of these connectors the numbers are written next to the pins, but you will probably need a magnifying glass to make them out. Make the wires long enough to come around to the front of the computer, and tag their far ends with bits of tape showing their pin numbers. You will also need a small 6 or 9 volt battery (a transistor radio battery is ideal).

Once the connector is plugged in and with the wire ends sitting in front of the computer, type in and save the little Basic program shown in Listing 1. When the program is run, it should continuously print 'Nothing Detected'. Next hold the wire from pin 7 (Ground) to the minus (-) terminal of the battery. If you now hold one of the input wires to the plus (+) terminal, the computer should tell you which line it is.

*Actually it's an example of one of those programs which appears utterly brilliant to its author, but has absolutely no practical use.*

```
10 REM GW-Basic program to read the modem status register.
20 REM Message is displayed when the pin is pulled HIGH.
30 REM
40 X=INP(&H3FE): REM MAKE X = VALUE OF MODEM STATUS REG.
50 IF X AND &H10 THEN PRINT "Pin 5, Clear To Send.": GOTO 40
60 IF X AND &H20 THEN PRINT "Pin 6, Data Set Ready.": GOTO 40
70 IF X AND &H40 THEN PRINT "Pin 22, Ring Indicator.": GOTO 40
80 IF X AND &H80 THEN PRINT "Pin 8, Data Carrier Detect.": GOTO 40
90 PRINT "Nothing Detected.": GOTO 40
100 END
```

***Listing 1.*** *GW-Basic program to read the modem status register.*

```
                        PAGE    55,132
                        TITLE   "Toggle DTR as fast as possible"
                ;
0000            CSEG SEGMENT BYTE PUBLIC
                ;
                        ASSUME CS:CSEG, DS:CSEG, ES:CSEG, SS:CSEG
                ;
0010                    .RADIX  16
0100                    ORG     100H
                ;
                ; Switch clock speed of Turbo PC to FAST.
                ;
0100  E4 61     START:  IN      AL,61   ;PORT "PB" OF 8255
0102  0C 04            OR      AL,4    ;00000100, FORCE BIT 2 HIGH
0104  E6 61            OUT     61,AL   ;MAKE THE SWITCH
                ;
                ; Toggle DATA TERMINAL READY line until hardware reset.
                ;
0106  BA 03FC           MOV     DX,3FC  ;MODEM CONTROL REG.
0109  B0 00             MOV     AL,0    ;ALL BITS LOW TO BEGIN
010B  FA                CLI             ;STOP INTERRUPTS INTERRUPTING
010C  34 01     LOOP:   XOR     AL,1    ;INVERT BIT 0 OF AL EACH TIME THROUGH
010E  EE                OUT     DX,AL   ;SEND AL TO MODEM CONTROL REG.
010F  EB FB             JMP     SHORT LOOP
                ;
0111            CSEG    ENDS            ;END OF SEGMENT
                :
                        END     START
```

***Listing 2.*** *An Assembly language program to use as a model to learn how to send information out of the computer. The program continuously flips the pin 20 output line up and down until you send a hardware reset to the computer. (If you didn't install the magic reset button described in the first installment of this series, you will have to turn the computer off to stop the program.)*

The program uses the AND function to isolate the appropriate bit from the Modem Status Register, and it prints the message if that bit is non-zero. With this technique the program should respond to more than one input connected to the (+) terminal simultaneously. You'll notice the program uses hexadecimal numbers throughout. This isn't for deliberate confusion, it's just to make it easier to see how the numbers relate to each other when working right down at the bit level. It would have been even better to express them in binary, but it appears GW-Basic doesn't believe in binary numbers. Pity.

Listing 2 is an Assembly Language program you can use as a model to learn how to send information out of the computer. The program continuously flips the pin 20 output line up and down until you send a hardware reset to the computer. If you didn't install the magic reset button described in *YC* 'Hardware hacking', July '88, you'll have to turn the computer off to stop the program. If you change the value in the XOR statement fro 1 to 2, pin 4 will toggle up and down, and if you make the number 3, both pins will toggle together.

Listing 2 was a little experiment just to see how fast it was possible to send information through the modem control lines. The 8250 communications chip has clock pulses flowing into it to determine the rate at which serial data is sent and received. I was concerned that transfers between the RS-232 connector and the modem status and control registers might somehow be synchronized with this clock, limiting the speed of access, but this doesn't appear to be the case.

The machine code to test this was written to execute as quickly as possible, and the results were surprising, to say the least. The sluggish old PC/XT was making it around the loop in something like 10 microseconds. I didn't quite believe the measurements made with an oscilloscope hooked to pin 20 of the connector. So I confirmed them with a precision frequency counter – the output was cycling up and down exactly 99,408 times a second. As Inspector Gadget would say, Wowsers!

At the start of the program you may notice something familiar: the machine code to force a Turbo computer into HyperDrive to achieve the fastest possible execution speed (see 'Hardware hacking', Aug.'88). Next we load the DX register with the modem control register address,

since this is the fastest way to access a port. Actually, it's the *only* way you can access a port when its address is above 0FFh.

After initially setting all the bits in the AL register low, we next disable the interrupts, to prevent things like the time-of-day clock stealing execution time from the processor. The lack of interrupts also zonks the keyboard, hence the need to leave the program with a hardware reset. Finally comes the endless loop: invert the bit to be sent to the output line, send the bit out, and then jump back to the start of the loop.

To see this program in action you will need an oscilloscope, which you probably don't have. Oh well, you'll just have to believe it's fast! Actually it's an example of one of those programs which appears utterly brilliant to its author, but has absolutely no practical use. I guess that's really what hacking is all about.

## The joystick connector

Here we have four more handy input lines which can be accessed via another input port, at address 200 (hexadecimal). They are available on bits 4, 5, 6, and 7 of a byte read from the port. The lower four bits are involved with determining the positions of two analog joysticks (one for each hand!) and we won't be concerned with them here.

Several electronic project designers (including myself) have found how easy it is to use the joystick switch lines as digital inputs, and there are now some electronics enthusiast type kits available that use them. The technique is exactly the same as reading the inputs from the RS-232 Modem Status Register, and the Basic program in Listing 1 could easily be changed to do the job. You would only need to substitute the port address &H200 for the existing &H3FE and change the pin numbers and text content of the four messages. The joystick port pin numbers and bit numbers are shown in Table 2.

## Getting free electricity

Well, it's almost free, anyway. You won't have to buy one of those little 12 volt plugpacks to run your project, or build a 5 volt power supply. Two pins on the joystick connector, pins 1 and 9, are connected to the computer's main +5 volt supply. You can use them to power small projects, drawing less than 100 milliamps or so.

I use one of these pins to power a Listening Post digital communications interface kit, and the received data is presented to the computer through bits 6 and 7 of the joystick port. Only one plug required for both power and signals!

The RS-232 serial port doesn't normally have power available for devices connected to it, but on many serial interface cards it should be possible to pinch the voltage required and wire it across to an unused pin on the serial connector. A bit of research revealed that pin 9 is seldom used in the RS-232 system, and certainly not by the IBM.

| PIN | BIT | |
|---|---|---|
| 2 | 4 | (Ground on pins |
| 7 | 5 | 4, 5, 12. |
| 14 | 6 | +5v on 1, 9) |
| 10 | 7 | |

***Table 2.** The joystick port pin numbers and bit numbers.*

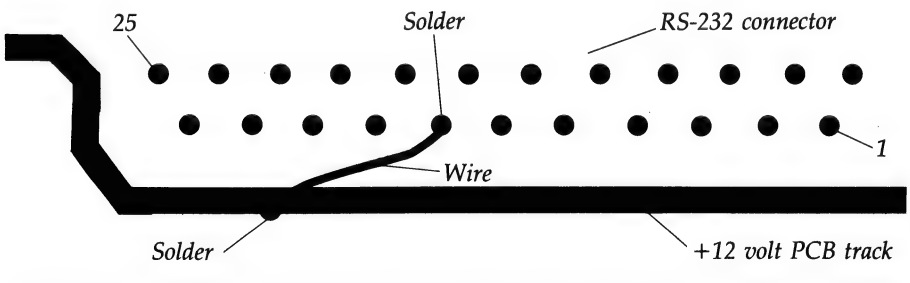



***Figure 1.** The RS-232 serial port doesn't normally have power available for devices connected to it, but on many serial interface cards it should be possible to pinch the voltage required and wire it across to an unused pin on the serial connector. On my serial interface card I have picked up +12 volts from a nearby power track on the circuit board, and wired it up to pin 9. My card is a combined disk controller, serial interface, and clock/calendar card; the +12 volt power track runs just below the connector that feeds out to the back of the computer. Your serial card will most likely be different, but the same principles apply.*

On my serial interface card I have picked up +12 volts from a nearby power track on the circuit board, and wired it up to pin 9. The setup on my card, which is a combined disk controller, serial interface, and clock/calendar card, is shown in Figure 1. The +12 volt power track runs just below the connector that feeds out to the back of the computer, so hooking up to it was dead easy.

Your serial card will most likely be different, but the same principles apply. You must first establish that pin 9 is *not* connected to anything on either side of the circuit board. Of this you must be absolutely certain, otherwise you could cause damage to the card. The next job is to find a source of 5 or 12 volts, whatever you need. Tracks carrying power voltages are generally wider than signal tracks. Use a voltmeter connected between the track and ground to find the right one.

Once it's identified, carefully solder a small piece of insulated wire right to the track. Then solder the other end to pin 9 where it comes through the back of the circuit board. Be absolutely sure you haven't shorted your connections to anything else nearby, or you could cause some real damage when you fire it up. You must also be careful when plugging anything into the RS-232 connector while the computer is switched on, because one of the pins is now 'hot' with 12 volts, and can short against the metal shell of the plug. On my computer this has produced sparks a couple of times, but hasn't yet damaged anything. I try to be more careful now, or turn the computer off before inserting or removing the plug.

This power addition to the RS-232 connector has proved very useful. I have a small modem which now plugs into the RS-232 connector at one end, and the phone line at the other. There is no need for a separate power supply, since its power is taken from the computer.

I'll just repeat a warning once more: *please be ultra-careful when you start making hardware modifications inside the computer. If you don't feel up to it, don't do it!* The work would take a skilled electronic technician only a few minutes, and could save you lots of heartache. If you know a technician, it might be worth dropping some suggestions on him. It will most likely cost you a couple of bottles of beer, but it could save you a computer. □

# NEW PRODUCTS

## Software

### General Ledger Release 3.00

BASS
Phone: (07) 229 7712
Price: See below

General Ledger 3.00 allows posting to any accounting period and the previous financial year. The files have also been set up to cater for the multi-user version (to be released next year). The functions of the transaction and history files have been combined and a separate transaction file is maintained for posting and enquiry purposes.

The new master file size of 480 bytes and a conversion program is provided with the upgrade. The batch posting upgrade allows for balanced batch for review before posting. A complete rewrite of Budget Reports gives many new options, including summary or detail, subtotals by group and last year comparisons.

An upgrade from Release 2.50 costs $260; for Release 2.1 or earlier it costs $370.

### Microbee software

L. Boughton
Address: See below
Price: See below

Two new software programs for Microbees have been released. Ways We Were researches Australian history since 1788 by searching for key words that the user enters. Research can be conducted over any chosen period of the whole 200 years. A teacher can alter the information contained in any year.

Ways We Were allows information to be sent to a word processor (Simply Write or WordStar) to be included in pupil written reports. The program was written in Pascal and includes documentation and tutorials. Units of work covered include gold, exploration, people, Aborigines and government.

Poetry Machine is an authoring program to encourage pupils to write poetry. Types of poems covered include: nonsense, similes, free verse, name poems, cinquain, septolet, diamante and limericks. On screen guides are given to assist the student.

Ways We Were costs $55 and Poetry Machine costs $30; programs are supplied on 3½ inch disks. For a school site license add $15 to each program. If you order both programs before November 1 the price is reduced to $70. Orders and payments to: L. Boughton 15 Francis St, Paxton 2325.

### The Works Release 2.0

Idealogy Systems
Phone: (03) 580 6997
Price: $800 taxed

The Works Release 2.0 has all the capabilities of previous releases as well as major new features including integration of spreadsheets or access reports, true multi-column manipulation, automatic printer font control, split screen operation, horizontal scrolling to 280 characters and WYSIWYG reveal option.

The Works also offers the user a set of replacement keycaps for the keyboard (or alternatively a replacement keyboard pre-set for the Works) on which important word processing commands are etched, thus making entering commands with one keystroke easy for the operator. The Works utilises the Pick operating system.

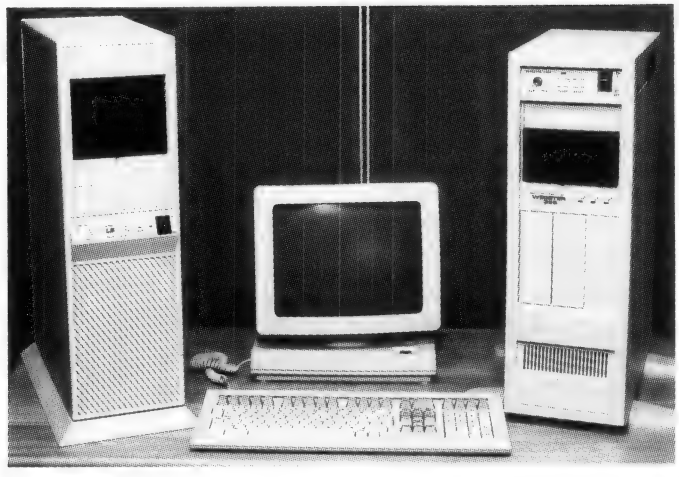
### Magic Mirror

The Computer Factory
Phone: (02) 938 2522
Price: $245 taxed

Magic Mirror is an advanced information integration facility that allows you to exchange information between different applications programs, or different parts of the same application. This is accomplished by capturing from the screen display of one program and providing that screen information as keyboard input to another program, as though you had typed it.

It allows you to capture graphics and text. Magic Mirror features Library functions that allow you to repeat lengthy and complex data transfer operations with just a few keystrokes.

## New Machines



### Mercury Tower △

Webster Computer Corporation
Phone: (03) 764 1100
Price: See below

The Mercury Tower is an AT&T 3B-series compatible, VME-bus based computer system, which runs the Unix System V operating system. Webster has released two models in this range, the Model 5410 and Model 5418. Model 5410 supports up to 10 users and utilises a 14MHz CPU. The more powerful Model 5418 supports up to 18 users and utilises an 18 MHz CPU.

Contained within the Mercury CPU is 1 Mbyte of memory with byte parity. The 5410 and 5418 are supplied standard with 5 Mbyte of memory. Additional VME memory boards of 4, 8 or 16 Mbyte are available. Maximum memory on both models is 16 Mbyte. List price for the 5410 is around $35,000 and around $40,000 for the 5418.

### Webster 386 △

Webster Computer Corporation
Phone: (03) 764 1100
Price: See below

The Webster 386 is an Intel 80386 based tower system capable of supporting up to 34 users. A choice of either a 16 MHz or 20 MHz processor is available. The 20 MHz processor can support up to 4 Mbyte of memory whereas the 16 MHz processor provides support for up to 16 Mbyte.

An ST506 disk controller is integral to the Webster 386 system for direct interfacing to a selection of disk drives from 51 Mbyte to 143 Mbyte. The Webster 386 supports MS-DOS, Pick and Xenix operating systems and applications. The CT16 model (16 MHz processor) retails at around $7000 taxed, while the CP20 (20 MHz processor) retails at around $7,900 taxed.

### NEAT range

Lawson Banner Computers
Phone: (03) 879 5332
Price: $8750 taxed

A range of 20 MHZ, zero wait state AT compatible desktop and tower encased supermicrocomputers has been released by Melbourne-based company, Lawson Banner Computers. The NEAT (New Enhanced AT) top end of the range basic unit comprises 2 Mbyte of RAM (expandable to 8 Mbyte), 40 Mbyte voice coil disk space and Harris 80286-16 microprocessor with 10/12/16/20 MHz switch selectable speeds, six disk drive spaces, six expansion slots, 1.2 Mbyte and 1.44 Mbyte floppy drives, and 1024 *x* 768 Vega ultra graphics card.

Systems with similar features but designed for less sophisticated applications will retail for around $3500 taxed.

# Peripherals and Extensions

## B1100 and B1150 △

Elmeasco
Phone: (02) 736 2888
Price: See below

Elmeasco has released two new printers from Facit, the B1100 and B1150. They are suited to those applications that do not demand the extensive capabilities of the more sophisticated models. The B1100 offers 80 columns and the B1150 offers 136 column capability. The 9 needle printhead on both models provides for draft output at 135 characters per second (cps) and near letter quality at 27 cps. They provide IBM Proprinter emulation and a choice of Centronics parallel or RS 232 serial interfaces. Both offer multi-resolution graphics. B1100 priced from $636, B1150 from $1034.

## Network Assistant Plus

Micro Networks
Phone: (02) 969 6922
Price: $940 taxed

Network Assistant Plus allows printers on a NetWare based LAN to be accessed from any workstation, rather than via a file server. This eliminates the need to physically attach printers next to a file server. Micro Networks claims that the program is the only printing utility which works with versions 2.1 and 2.0 of NetWare.

Network Assistant Plus gives the user control over many NetWare capabilities, such as printer selection, print font and queue control, sending messages or restoring deleted files, while running any software application program.

## MICRO NETWORKS

### G/x.25 Gateway

Micro Networks
Phone: (02) 969 6922
Price: $3495 taxed

Micro Networks has released a new high speed C/X.25 Gateway Wide Area Networking product for any NetWare based Local Area Network (LAN). The Gateway is an enhanced version of the gateway portion of the G/X.25 Gateway and Bridge, featuring 16 additional terminal emulations.

In addition to the existing DEC VT100, IBM 3101, Televideo 950 and glass TTy terminal emulation capabilites of the G/X.25 Gateway and Bridge product, the new gateway supports DEC VT220, VT52; Data General 200, 410 and 6053; Hewlett-Packard 2622A; NCR 7901; Adds 60 and Viewpoint; Honeywell VIP720 5 and VIP7801 and Zenith Z19. It can emulate up to 20 different terminals. It also incorporates a complete packet assembler/disassembler function.

# WIN WITH SONY®

## Win with Your Computer

This incredible $10,000 Sony prize giveaway can be yours just by subscribing to Your Computer. On purchasing a subscription your name and address will enter the draw! You have six chances of winning!


Simulated TV picture

*1st prize*

*This*

*Plus*

**KV-27 VX1MT, flat square black screen television.** System memory and display. Detachable hi-fidelity stereo speakers, output jacks and speaker terminals.

**CCD V50 video 8 camera,** high performance instant playback on 8mm cassettes. Zoom with macro feature. Linear auto-white balance. Flying erase head ensures noise free picture. Brilliant clear pictures even under low light.

| | |
|---|---|
| 1st prize: | SONY Trinitron & Camcorder. Total value $6,225. |
| 2nd prize: | SONY Hi-Fi system. Total value $1,300. |
| 2rd prize: | SONY Portable CD player. Total value $800. |
| 4th, 5th & 6th prize: | SONY sports walkman — three people will win one of these beaut SONY sports walkmans. Valued at $270 each. |

**Sony Tape**

***Audio : Computer : Video***

**Sony Tape's HF series utilises magnetic particles resulting in even higher music clarity. The range symbolises the combination of fine performance and reliability that characterises all of Sony's Audio and Video tape products.**

ALSO subscribe and enter the draw early and you'll receive a SONY twin tape pack. **FREE**

# SUBSCRIBE AND BE IN IT TO WIN IT


## 2nd prize

**FH-203, sleek new and exciting Hi-fi look,** handle allows portability. 3 band graphic equaliser with independent 3 colour level metre. 3 way speaker system. FM/MW/SW2/SW1 manual tuning with tuning indicator and fine-tuning knob. Dolby B for crystal-clear play back. Low frequency sound with super acoustic turbo (SAT) for powerful bass reproduction.

**12 months subscription only $42**


## 3rd prize

**D-100, portable stylish Disc player,** super compact, ultraslim, uses rechargable batteries, rich sound, liquid crystal display. Able to set track numbers for playback, can connect to AC or DC to your home or car hi-fi system.

**TO SUBSCRIBE simply fill out the coupon attached — or if missing, send name, address, phone number and cheque, money order or credit card details (card type, card number, expiry date and signature) to Federal Publishing Sony Deal, Freepost No. 4, P.O. Box 227, Waterloo, NSW 2017. Any enquiries phone 693-9515 or 693-9517.**

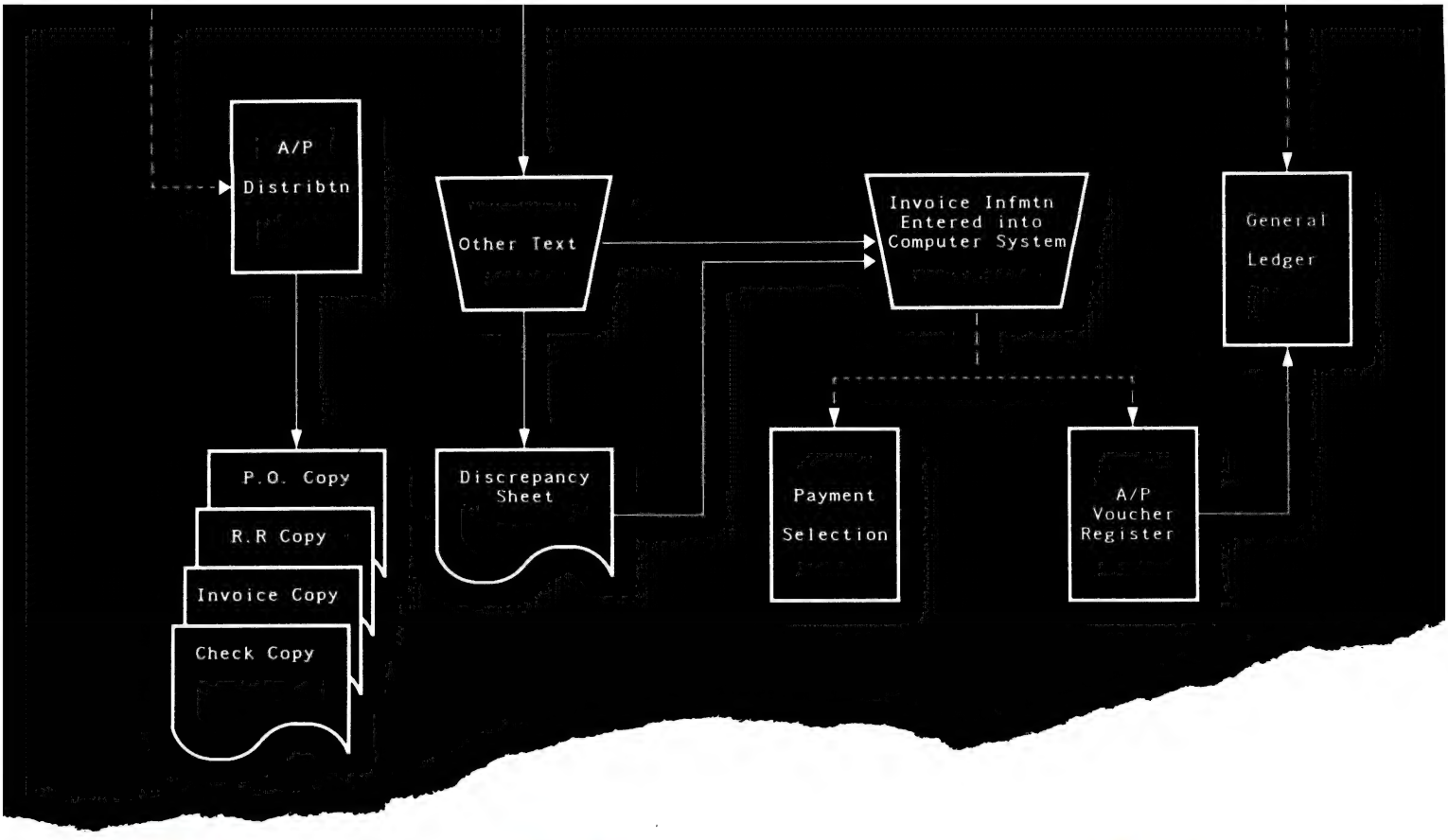

## 4th prize

**WM-F63, Waterpoof Sport Walkman** with FM stereo/AM reception. Tape type selector (Normal, CrO2, Metal). 2 mode auto reverse with splash resistant headphones. 3 to be won!

## Hurry! Offer closes 31st October, 1988

CONDITIONS OF ENTRY

1. The competition is open only to Australian Residents authorising a new/renewal subscription before last mail October 31st, 1988. Entries received after closing date will not be included. Employees of the Federal Publishing Company, Sony 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 purchase a subscription to enter, but may enter only once by submitting their name, address, and a hand-drawn facsimile of the subscription coupon to The Federal Publishing Company, PO Box 227, Waterloo, NSW 2017. NZ residents ineligible for draw.
3. Prizes are not transferrable 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 July 20, 1988, and closes with last mail on October 31st. The draw will take place in Sydney on November 2 and the winner will be notified by telephone and letter. The winner will also be announced in The Australian and a later issue of this magazine.
7. The prizes are as follows: 1st prize — Sony Trinitron + Camcorder $6225; 2nd — Sony stereo system $1300; 3rd — Sony Portable compact disc $800; 4th — 3 x Walkmans $270.
8. The promoter is The Federal Publishing Company, 180 Bourke Road, Alexandria, NSW 2015. Permit No TC88/1650 issue under the Lotteries and Art Unions Act 1901; Raffles and Bingo Permits Board Permit No 88/995 issued on 10/6/88 Permit No TP88/538 issued under the Lotteries Ordinance, 1964.




# Flow Charting II+

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

## Created Specifically for Flow Charts:
Flowcharting II+ is a precision instrument specifically designed for flowcharts and organisation charts. Flowchart construction is not just a sideline on a graphics program that has other things to do. Flowcharting II+ lets you:

Type inside or outside shapes, on line or free area.

Define pieces of your chart to save in special image files for later use in other charts; define pieces or sections anywhere on the chart, to move, copy, or even delete.

Zip across your charts with an accelerated cursor or use the cross hairs on the shrink screen at a faster pace.

## Organisational Charts:
In addition to process and program flow, Flow Charting II + can be used to produce organisational charts. Every time you reshuffle the deck chairs, with charts produced at will, everyone can know their place in the order of things.

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

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

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

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

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

## Print Multiple Files Without Interruption:
Charts are constructed for standard paper sized, 8½" x 11", 8½" x 14, or 14" x 11". Select charts to be printed, and the computer can print them without interruption.

## Presentation Quality Charts with Flowchart II+:
Using Flow Charting II+ you can either print out draft quality charts for quick evaluation, or presentation quality for your moment in the spotlight.

## In Line Mode Your Cursor Is A Scribe:
The F2 key turns your cursor into a scribe and gives it the run of the page in any of four widths; normal, bold, hollow and dashed. You can choose whether the line stops at a shape, or draws right over it!

## Three Screen Views:
Flow Charting II+ gives you a flexible screen ensemble that makes chart construction and editing a pleasure.

- 40 Column viewing screen - on a blue or black background helps you with detailed editing.
- 80 Column viewing screen - still detailed - gives you twice the information.
- Shrink Screen: gives a complete 14" x 11" chart on a 200 column by 120 line screen. Do major editing, such as relocating, deleting and inserting shapes, while viewing the entire chart.

## Hardware:
Flow Charting II + is compatible with IBM* PC, XT, AT, and compatibles. Mouse utility available. 192K RAM memory required for 200 column charts. A minimum of one 5¼" floppy disk drive and screen graphics capability is required.

## Used by these major companies:
Flow Charting II+ is used by CSIRO, Telecom, SIO, Rosella Lipton, Toyota, State Bank, CIG Gases, Department of Defence, Wormald, Honeywell Bull, Cadbury Schweppes, NEC, Cool Dry Consolidated Industries, Carlton United Breweries, among many other companies.

**$479**

**If you would like to receive a free demonstration disk of Flow Charting II+, simply send us a copy of this advertisement with your business card attached.**

SOFTWARE Express

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PHONE (03) 663 6580 FAX (03) 663 6117

### The Scrooge NP 1215 △

Canon
Phone: (02) 887 0166
Price: $4000 taxed

The NP 1215 copier – nicknamed The Scrooge – is a compact unit that features a front loading paper cassette and fixed copying board, A3 size compatibility, zoom, two way paper supply, automatic exposure, two page separation copying and colour copying.

A new mono-component toner system and automatic exposure copies from one toner. The new copier can deliver 15 A4 size copies per minute and can be set for runs of up to 99 copies.

### Telebyte Model 451

Dataplex
Phone: (03) 735 3333
Price: Not supplied

Users can now determine, in advance, how their data communications equipment will perform over varying cable lengths and loadings, using the Telebyte Model 451 from Dataplex.

The Telebyte is a compact instrument that simulates the frequency response and propagation delay of 26 gauge telephone cable up to 1 MHz under laboratory and production testing conditions. Six internal sections, selected by front panel pushbuttons, simulate cable lengths from 150 metres through to 7,800 control ensures sharper, clearer metres. Termination points are provided to simulate loading cells.

Because of its wide bandwidth, the Telebyte is ideal for bench testing the performance of most data communications equipment, including short haul modems, LANs and ISDN modems.

## Services

### Running MS-DOS video learning system

Micro Management Services
Phone: (02) 452 5966
Price: $797 taxed

An in-depth video learning system on MS-DOS has been released by Micro Management Services. The tutorial offers complete training on the operating system.

The video is based on the best selling book *Running MS-DOS*, and covers basic internal and external DOS commands, offers detailed instructions on hard disk management and shows users how to protect their work.

The learning system is divided into four sections: Section One covers the theory and operation of DOS and the five most commonly used DOS commands, their parameters and switches. Section Two covers external DOS commands; Section Three covers hard disk management and the creation of prompts and directories. Section Four shows you how to protect your work.

## Miscellaneous

### Dataflex Desk

Sylex
Phone: (02) 647 2888
Price: $445 taxed

Sylex has released a functional computer workstation which maximises convenience, ergonomics and workspace but takes up no extra floor space – the Dataflex Desk. It has an adjustable keyboard platform that is offset but still provides work surfaces on both sides. A rear overhang and a thick table top allow clamping on of space saving monitor arms, copyholders and desk lamps, thereby freeing up more desktop. Side overhangs can allow you to place your CPU off the desk in a vertical CPU stand but still out of harm's way. The deep recess lets operators positions mobile drawer pedestals or data binder trolleys underneath.

### Over Desk Trolley

Sylex
Phone: (02) 647 2888
Price: $295 taxed

Sylex has introduced the Over Desk Trolley to solve the problem of one computer for multiple computer users. With the Trolley you can save time, space and work with all your materials at hand as this stand fits right over the top of your free standing desk. The top measures 660 *x* 720 mm – large enough for all PCs.

The top is height adjustable via simple tri-wheel adjustments between 635 mm and 850 mm; it can also be used as a regular mobile computer trolley. It fits through doorways to allow you to roll it between offices. doorways to allow you to roll it between offices.

olivetti

### ET typewriters △

Olivetti
Phone: (02) 358 2655
Price: See below

Olivetti has announced a range of electronic typewriters and videotyping systems. The ET 2200 provides automatic paper handling, word correction and centering. It incorporates a 500 character correction memory. An extended keyboard allows the handling of mathematical symbols and a numeric lock gives the option of PC keyboard emulation. Priced at $1195.

The ET 2300 has a 30 character display, a permanent working memory of 32 Kbytes and allows the connection of an external disk drive unit. Priced at $1596. The ET 2400 features both 17 inch and 21 inch carriages. Priced at $1395.

The Olivetti videotyping range encompasses the ETV 260 and the ETV 500. Each model gives the user a secretarial workstation that also offers full PC$1596. The ET 2400 features both 17 inch and 21 inch carriages. Priced at $1395.

The Olivetti videotyping range has full PC capability. The ETV models feature monochrome video displays, letter quality

print units providing 30 characters per second bi-directional printing as well as keyboards designed for typewriter, videotyping and PC use.

### Battle Hymn

New Rainbow Publications
Phone: (049) 54 8982
Price: $55

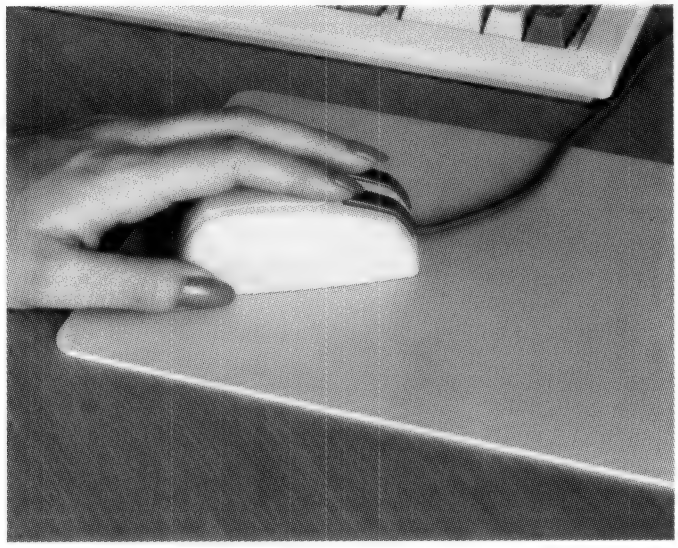
Battle Hymn – the Battle of Gettysburg. Command Lee's army of 39 divisions, including infantry divisions led under the command of famous names such as Johnson, Heth, McLaws, Hood, Early and Pickett. Try to do what the real Confederates couldn't: destroy Mead's army at Gettysburg. New movement and turn structure; form lines, rally, limber and unlimber cannon, backstep and do your best to outflank the Union line. For IBM PCs and compatibles.

### PL410/A

Sylex
Phone: (02) 647 2888
Price: $215

Standard office lighting often proves unsuitable for EDP operators; glare and reflection being a major problem. As a solution to the problem, Sylex has introduced the PL410/A desk lamp.

It is specifically designed for use with data terminals where good light quality and glare avoidance from glass VDU sources is essential. The PL410/A is an ideal light for workstations in open office environments which may be shaded by partitioning because the asymmetric lamp head throws a soft wash of natural light over the keyboard and work surface but shades the screen from annoying refections.

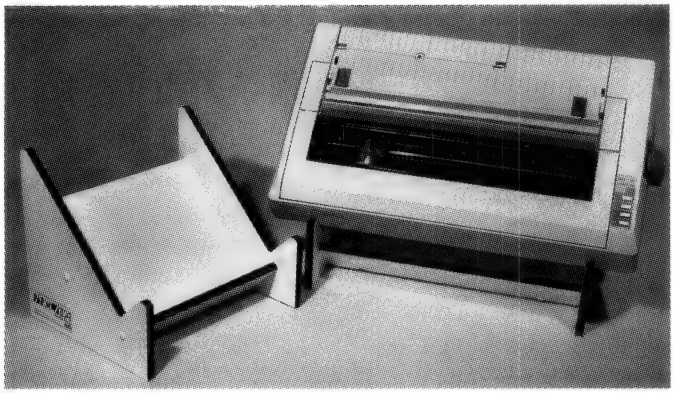


### Sylex Rodent Rug △

Sylex
Phone: (02) 262 1500
Price: $29 taxed

The life of an hi-tech mouse is not all that cheesy. Use on timber grain desks and harsh laminated desktops can reduce the life of your mouse; wear and chips can occur in the track ball, delicate internal wheels and gears can become clogged with desktop dust and grit.

Sylex Ergonomics has released the Rodent Rug as a solution to these problems. It is made of soft textured vinyl, providing smooth grip and positive mouse location. The Rug permits full screen cursor movement – but does not take up a large amount of deskspace.



### ENTRETEC Pty. Ltd.

**Incline** △

Enterec
Phone: (097) 61 1806
Price: $29.95 taxed

Incline is a computer printer stand that offers storage for up to 350 sheets of continuous printout paper. The stands is available in two sizes: Incline80 for 80 column printers and Incline132 for 132 column printers. The Incline is made from white Lamiwood and supplied in a flat pack, ready to assemble.

### Inventory of Agricultural software in Australia and New Zealand

Queensland Department of Primary Industries
Phone: (07) 224 6599
Price: See below

The Queensland Department of Primary Industries has released the fourth edition of its *Inventory of Agricultural Software in Australia and New Zealand*. Details on over 300 agricultural software programs, including description, price, supplier, address, contact person and telephone, are listed. Information on hardware requirements for running the program and compatible operating systems are also described.

The author, Glen Mickan, a DPI agricultural economist, believes the book will be useful to primary producers, extension officers, agricultural consultants, researchers, teachers and students. The book is available from the DPI Information Centre, GPO Box 46, Brisbane 4001 for $15 and $5 postage within Australia.

# Events

**A series of seminars** will be conducted by Management Technology Education. Seminars include Successful User Documentation (to be held in Sydney, Melbourne, Adelaide and Perth), OS/2, PC/MS-DOS and Supporting PCs (Sydney and Melbourne). For further information contact: (02) 262 5555, (03) 670 7117 or (008) 22 4514.

**The Fifth National Conference of the Australian Society of Wang Users** will be held from October 2 to 5 at the Hilton Hotel, Brisbane. Contact Sue Wood on (03) 824 0022.

**TADSEM '88**, the sixth national seminar hosted by Technical Aid to the Disabled, will be held at the Queen Elizabeth II Rehabilitation Centre, Camperdown on the 7 and 8 October. The topic for this year's seminar is Computers Serving People with Disabilities. Contact (02) 808 2022.

**The First World Congress of Prime Users** is to be held at the Conrad International Hotel, Gold Coast from October 9 to 14. Contact Koncepts on (02) 957 5102.

**Beyond 2000 Science and Technology Spectrum** is a multimedia multi dimensional 'experience' held in conjunction with the *Beyond 2000* TV technology show. Five interconnecting pavilions will present working displays of life in the future including lifestyle, medical (featuring a replica of a human heart), industrial, science and electronics. Contact Spectrum Exhibitions on (02) 281 2555.

**SUGA '88**, the SAS Users' Group of Australia annual conference will be held 12 to 14 October at Darling Harbour. Contact the coordinator on (02) 908 2244.

**Australian Industrial Publications** will be holding an introduction to computer based training workshop from October 17 to 21. Contact Cathy Chambers on (02) 805 0077 or David Goldsmith on (03) 819 4855.

**The Communication Research Institute of Australia** five-day

workshop on advanced forms analysis will be held from October 17 to 21 in Melbourne. Contact Julie Dixon on (062) 57 3155.

**The Project Management Workshop** is a four day hands-on training workshop integrating traditional management and control methods with contemporary software. It has been organised by Namara-Numerix, To be held at the Macquarie University Graduate School of Management, Sydney. Contact: Wendie Bailey on (02) 963 2301.

**The International Symposium and Exposition on Robots** will be held at the Sydney Hilton and Centrepoint from November 6 to 10. Contact the Australian Robot Association, GPO Box 1527, Sydney 2001 NSW.

**AI '88** , the Australian Joint Artificial Intelligence Conference, will be held in Adelaide on November 15 – 18. Contact (08) 228 5586.

**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.

**SST-88**, the second Australian International Conference on Speech Science and Technology, will be held at Macquarie University, Sydney, on November 29 and December 1. Contact the Secretariat at Macquarie University on (02) 805 8784.

**Australian Society for Computers in Learning in Tertiary Education Conference** will be held at the Canberra College of Advanced Education from December 4 to 7. Contact Kay Fielden on (062) 522410.

**Microbee Users Group of WA.**- New members please note that the group meets at the Leederville Technical College. For further information contact the secretary, Ross Gould on (09) 417 1374 after hours; or write to PO Box N1090, Perth 2000.

**The Australian Paradox Users Group (APUG)** has been formed. Regular monthly meetings will be held on the last Tuesday of each month at Bird Cameron, 316 Queen St, Melbourne 3000 Victoria. For further information contact Gordon Castle on (03) 563 1037. Or write to APUG PO Box 26, Chadstone Centre 3148 Victoria.

**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.

**The President Users Group** meets on the last Tuesday of each month at the Hornsby Inn. Contact Raymond Toms on (02) 212 5277.

**Applications** are invited from research workers or technical managers who wish to attend the fifth Mathematics-in-Industry study group to be held at Monash University from January 31 to February 4 1989. Contact Dr N. G. Barton on (02) 467 6702.

**Computer '89** will be held at the Perth Entertainment Centre from April 27 to 29. Contact swan Exhibitions on (09) 443 3400.

**Watercomp '89**, the first Australasian conference on Technical Computing in the Water Industry organisers are asking for papers. The conference will be held from May 30 to June 1, 1989 at the Regent Hotel, Melbourne. Contact the Institute of Engineers, Australia on (062) 70 6549.

**Computer Systems in the Mining Industry** is the theme of a conference to be organised by the University of Wollongong Mining Research Centre. It will be held from 26 to 28 September, 1989. contact Anna Rousch on (042) 27 0956.

## Overseas Exhibitions

**The Hong Kong Computer Expo '89**, incorporating Cad-Cam '89, software Village, Asian Computer Mart and the HK International Computer Conference will be held at the Hong Kong Conference and Exhibition Centre from April 10 to 13. Contact Hong Kong 5-75 6333.

# Singing the Interplanetary Mining Blues . . .

**Now you can take over control of a city beneath a dome on an asteroid . . . and gain hands on experience with computer simulations at the same time.**

ONE OF THE earliest games to be widely used on mainframe computers was Hammurabi, in which the player was the ruler of a fairly wayward country. Rat plagues, crop failures and starvation hit the country with monotonous regularity. The aim of the game was simple – keep control of all the parts of the economy, to make sure that your humble subjects didn't starve, lose their sophisticated cool, and lynch you. (A listing for Hammurabi is in David Ahl's classic book *Basic Computer Games*, and a variant of it, called Dukedom, is in Ahl's *Big Computer Games*.)

There have been many, many computer simulations since that early one. The Club of Rome ran a simulation on the future of that well-known planet Earth, in the late 1960s, and predicted that it wouldn't be long before the whole planet would be down the tube. Coming real soon to a galaxy near you, folks. Stay tuned.

Economic simulations have proved an effective way of teaching a variety of subjects. Several studies in America found that computer simulations worked well in the classroom by creating 'an intense and often enjoyable interpersonal experience' (*Individual and Group Effects on Enjoyment*

*and Learning in a Game Simulating a Community Disaster* by M. Inbar). I'm all for that, except I think it was against the rules when I went to school. This intense and interpersonal thing was 'due in part to the interdependent task structure that requires interaction among the players'.

Despite their entertainment value, computer simulations are not just elaborate games. Simulations have found ready acceptance in many situations where reality is too expensive, too dangerous or too complex to allow human beings to learn to control. Many, many hours of airtime during pilot training are clocked up on elaborate flight simulations – controlled, of course, by computers – rather than up in the air.

*Economic simulations have proved an effective way of teaching a variety of subjects.*

Operators in conventional and nuclear power-plants around the world train on simulators, where they can learn their skills without facing the real catastrophes which could come from making mistakes. (I do not believe they used to play 'Nuclear Meltdown' on a Microbee at Chernobyl, which is a pity.) One of the electricity boards in this country recently spent half a million dollars to buy a simulator to train its operators. The simulator, developed and marketed by the Australian company Control Simulation Technology, allows a number of emergency situations to be created, so that staff can learn to cope with them. Such training would be impossible without the use of a simulator.

Another computer simulator, which might be seen as a little sinister; uses the reactions of a few test subjects to simulate the reaction of a significant portion of the population in testing the effectiveness of television and print advertising. The simulator, developed by a psychologist named Marcus Tomlian, is claimed to be 'the most sophisticated precision system for measuring consumer reactions to advertisements' (*The Australian* newspaper, February 29, 1985).

The device, called Mind Monitor, is made up of a series of sensors for taking brain and heart readings of the sample group of people. The readings from these sensors are fed into the simulator proper, which analyses the brain waves and cardiovascular readings, and from them extrapolates the probable reaction of the population as a whole. The simulator runs while an advertisement is being shown to the test group, and gives a second by second reaction readout.

Mr Tomlian says Mind Monitor can therefore be used to find weak points in an advertising campaign, leading to 'fine-tuning' of particular campaign elements. The US company General Electric is believed to be currently at the forefront of developing computer simulations which can help gauge viewers' attention to advertising, while one of the world's biggest agency networks, Young and Rubicam, is also investigating the field.

Whether you wish to replicate the chemical processes inside an atomic reactor, mimic the reactions of potential purchasers to consumer advertising, or control the fate of miners living in the Asteroid Belt, a computer simulation can be employed. With such a simulation, the actions and reactions of a complex system can be manipulated in ways which would be difficult, dangerous or just goddamn impossible (as we Yankees say) in real life.

In the program Asteroid Mine (see Listing 1), your management skills will be called into full action. The entire economy of a mine, built on an asteroid, is in your hands in this strategic simulation.

You'll find, despite the bewildering array of decisions you'll be called upon to make, that the program assists you every step of the way with very clear prompts. Any illegal entries or choices will be rejected. The aim of the simulation is simple: keep your asteroid alive and profitable for as long as you can. The central computer on the asteroid gives you feedback from month to month on how things are going. Here's the way a run might begin with this program –

```
STATUS REPORT 1 FROM ASTEROID'S
CENTRAL COMPUTER. MESSAGE CODE # 684
.....................................
>WARNING - HYDROPONIC STATUS LOW
THIS IS YEAR 1
SENTIENT ENTITY TALLY IS 107
>>> INTERGALACTIC CREDITS $ 4236
ONGOING OVERHEADS - $ 599
   OXYGEN WEB STATUS 2136 UNITS
   OXYGEN COSTS $ 3.3 PER UNIT
EACH ENTITY REQUIRES 3 UNITS A YEAR
<< HYDROPONIC STATUS- 916>>
.....................................
MINING DECISION REQUIRED:
.....................................
*** EACH HECTARE CONSUMES 5
OXYGEN UNITS FOR THE EXPLORATION
       AND MINING PROCESS
AND YOU NEED 4 PEOPLE TO EXPLORE AND
       MINE EACH HECTARE

HOW MANY HECTARES WILL YOU EXPLORE AND
       MINE THIS YEAR?
? 16
.....................................
15 HECTARES WERE LODE-BREAING
WE SELL NOW TO NATIVES OF IIPLLILCOPO
PRESS 'RETURN' KEY FOR SALES...
                  OK, SALE UNDERWAY
.....................................
YOU MANAGED TO SELL 12
THEY SOLD FOR $ 321
.....................................
THE MINING PROCESS CONSUMER
80 UNITS OF OXYGEN (WORTH $ 264 )
     > 3 ORE UNITS SPOILED
.....................................
```

And so on. You have to buy food, oxygen, look after your hydroponic crops, keep your credit balance up, and more. In The Rocky Horror Show, Dr Frankenfurter remarked that it wasn't easy having a good time. You'll soon discover that it isn't easy be the Big Boss on an asteroid. And you won't have any energy left to worry about 'having a good time'. Good simulating.

***Listing 1.*** *The listing for Asteroid Mine – a simulation game that tests your management skills.*

```
10 REM ASTEROID MINE
20 REM
30 REM (c) Tim Hartnell, 1987
40 REM Interface Publications
50 REM
60 GOSUB 1930:REM INITIALISE
70 GOSUB 200:REM ENTITIES
80 GOSUB 250:REM STATUS REPORT
90 GOSUB 500:REM MINING
100 GOSUB 250
110 GOSUB 860:REM HYDROPONIC
120 GOSUB 250
130 GOSUB 1110:REM OXYGEN WEB
140 GOSUB 250
150 GOSUB 1610:REM ROBOT MAINTENANCE
160 GOSUB 250
170 IF RND(1)>.8 THEN GOSUB 1260:REM IMP
ERIAL FORCE
180 GOTO 70
190 REM **********************
200 REM MODIFY ENTITY STATUS
210 YE=YE+1
220 FO=FO+INT(FO/(12+RND(1)*8))
230 RETURN
240 REM ***************
250 REM STATUS REPORT
260 RP=RP+1
270 CLS
280 PRINT "STATUS REPORT"RP"FROM ASTEROI
D'S"
290 PRINT "CENTRAL COMPUTER. MESSAGE COD
E #"INT(RND(1)*999+RND(1)*999)
300 GOSUB 2210
310 IF OX<NE*FO THEN 1740:REM OXYGEN WEB
S DEPLETED
320 IF FD<EA*FO THEN 1800:REM HYDROPONIC
 EXHAUSTION
330 IF CA<50 THEN 1840:REM ZERO CASH
340 IF FO<2 THEN 1880:REM ZERO INHABITAN
TS
350 IF FO<13 THEN PRINT ">WARNING - ASTE
```

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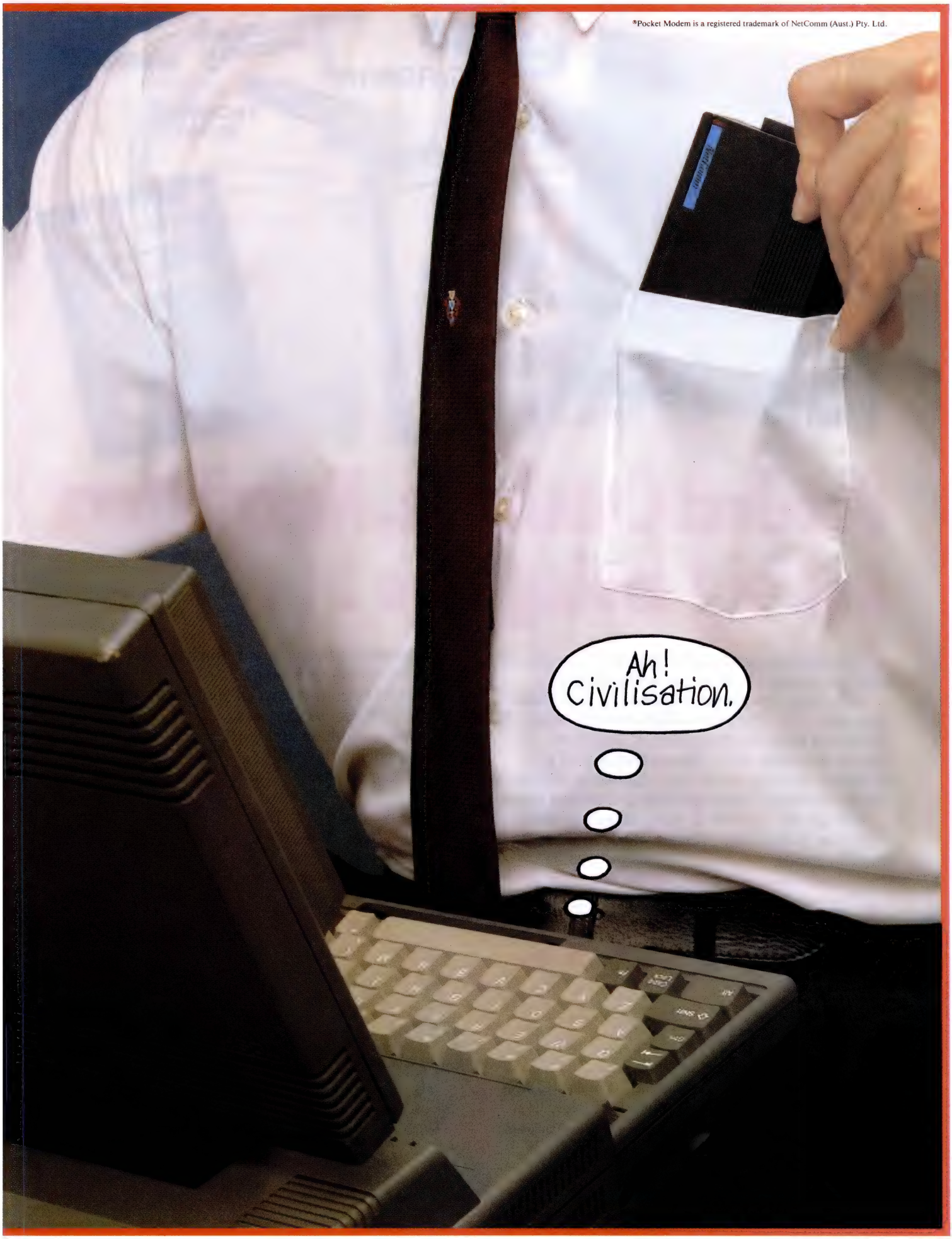
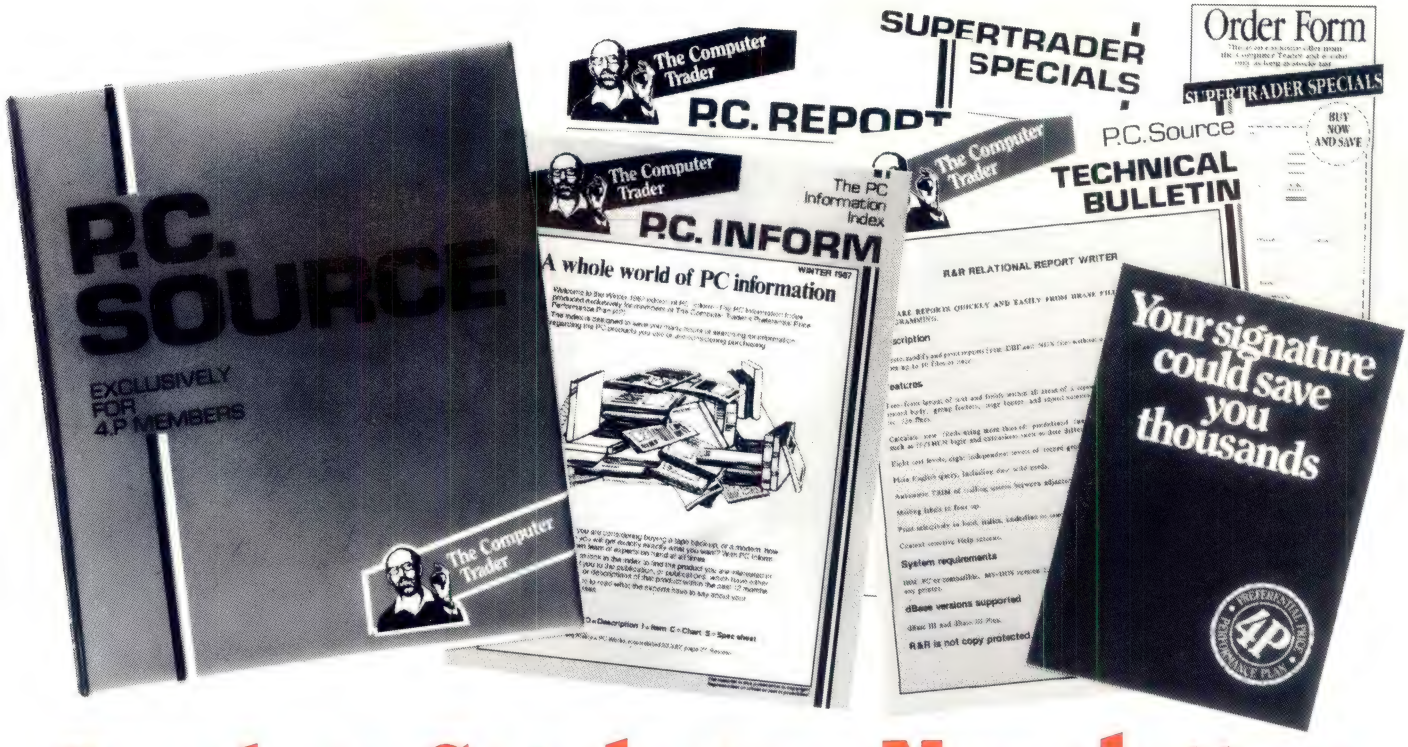



*Pocket Modem is a registered trademark of NetComm (Aust.) Pty. Ltd.

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| | | | | | | | | | | | | | | | |

Signature: .....

**The Computer Trader**

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**261 Broadway, Sydney 2007**

SA 1357

```
ROID POPULATION LOW"
360 IF OX<2*NE*FO THEN PRINT ">WARNING -
 OXYGEN WEBS CRITICAL"
370 IF FD<2.1*EA*FO THEN PRINT ">WARNING
 - HYROPONIC STATUS LOW"
380 IF CA<1789 THEN PRINT ">WARNING - CR
EDITS AT CRITICAL"
390 PRINT TAB(17);"THIS IS YEAR"YE
400 PRINT TAB(6);"SENTIENT ENTITY TALLY
IS"FO
410 PRINT ">>> INTERGALACTIC CREDITS $"C
A
420 PRINT "ONGOING OVERHEADS - $"RE
430 PRINT TAB(4);"OXYGEN WEB STATUS"OX"U
NITS"
440 PRINT TAB(4);"OXYGEN COSTS $"CO"PER
UNIT"
450 PRINT "EACH ENTITY NEEDS"NE"UNITS A
YEAR"
460 PRINT TAB(8);"<< HYDROPONIC STATUS-"
FD">>"
470 GOSUB 2210
480 RETURN
490 REM *******
500 REM MINING
510 PRINT "MINING DECISION REQUIRED:"
520 GOSUB 2210
530 PRINT "*** EACH HECTARE CONSUMES"AC
540 PRINT "OXYGEN UNITS FOR THE EXPLORAT
ION"
550 PRINT TAB(8);"AND MINING PROCESS"
560 PRINT "AND YOU NEED"NO"PEOPLE TO EXP
LORE AND"
570 PRINT TAB(8);"MINE EACH HECTARE"
580 PRINT
590 PRINT "HOW MANY HECTARES WILL YOU EX
PLORE AND"
600 PRINT TAB(8);"MINE THIS YEAR?"
610 INPUT B
620 IF B=0 THEN GOSUB 2210:RETURN
630 IF B*AC>OX THEN PRINT "OXYGEN WEBS I
NSUFFICIENT":GOTO 580
640 IF B*NO>FO THEN PRINT "INHABITANT NU
MBERS TOO LOW":GOTO 580
650 GOSUB 2210
660 SUCCESS=INT(RND(1)*B)+1:IF SUCCESS<B
/2 THEN 660
670 PRINT SUCCESS"HECTARES WERE LODE-BEA
RING"
680 GOSUB 2210
690 PRINT "WE SELL NOW TO NATIVES OF ";D
$(INT(RND(1)*8+1));E$(INT(RND(1)*8+1))
700 PRINT "PRESS 'RETURN' KEY FOR SALES.
.."
710 IF INKEY$="" THEN 710:REM OR USE GET
$ OR JUST INPUT
720 PRINT TAB(18);"OK, SALE UNDERWAY"
730 SALES=INT(RND(1)*SUCCESS+1):IF SALES
<SUCCESS/2 THEN 730
740 GOSUB 2210
750 PRINT "YOU MANAGED TO SELL"SALES
760 PRINT "THEY SOLD FOR $"SALES*AP
770 GOSUB 2210
780 PRINT "THE MINING PROCESS CONSUMED"
790 PRINT B*AC"UNITS OF OXYGEN (WORTH $"
B*AC*CO")"
800 PRINT TAB(5);"> "SUCCESS-SALES"ORE U
NITS SPOILED"
810 CA=CA+B*AP
820 OX=OX-B*AC
830 GOSUB 2210:GOSUB 2210
840 RETURN
850 REM ****
860 REM FOOD
870 PRINT "STATUS DECISION REQUIRED:"
880 GOSUB 2210
890 PRINT "FOOD COSTS $"FC"PER UNIT TO G
ROW"
900 PRINT "AND CONSUMES"OG"UNITS OF OXYG
EN"
910 PRINT "EACH INHABITANT NEEDS"EA"UNIT
S A YEAR"
920 PRINT "($"FC*EA"EACH, $"FC*EA*FO"FOR
 THE ASTEROID)"
930 PRINT "CURRENT STOCKS WILL LAST"INT(
.5+FD/(EA*FO))"YEARS"
940 PRINT "WITH OUR PRESENT POPULATION O
F"FO
950 GOSUB 2210
960 PRINT "HOW MANY HYDROPONIC UNITS TO
HARVEST";
970 INPUT C
980 IF C=0 THEN 1050
990 IF C*FC>CA THEN PRINT "INSUFFICIENT
CREDITS!!:GOSUB 1910:GOTO 800
1000 IF C*OG>OX THEN PRINT "INSUFFICIENT
 OXYGEN!!":GOSUB 2210:GOTO 960
1010 PRINT "$"C*FC"PAID OUT FOR HARVESTI
NG":GOSUB 2210
1020 PRINT C"UNITS OF FOOD ADDED TO SUPP
LIES"
1030 FD=FD+C
1040 CA=CA-C*FC
1050 FD=FD-EA*FO
1060 OX=OX-C*OG
1070 RETURN
1080 REM ******
1090 PRINT "STATUS DECISION REQUIRED:"
1100 GOSUB 2210
1110 PRINT "OXYGEN WEB HOLDINGS WILL LAS
T"INT(.5+OX/(NE*FO))"YEARS"
1120 PRINT "WITH OUR PRESENT POPULATION
OF"FO
1130 PRINT "HOW MUCH OXYGEN WILL YOU BUY
";
1140 INPUT D
1150 IF D=0 THEN GOTO 1190
1160 IF D*CO>CA THEN PRINT "YOU DO NOT H
AVE SUFFICIENT CREDITS":GOSUB 2210:GOTO
1130
1170 OX=OX+D
1180 CA=CA-D*CO
1190 OX=OX-FO*NE
1200 IF D=0 THEN 1230
1210 PRINT "$"D*CO"PAID OUT":GOSUB 2210
1220 PRINT D"UNITS OF OXYGEN ADDED TO WE
BS"
1230 GOSUB 2210
1240 RETURN
1250 REM ******
1260 REM ATTACK
1270 JJ=INT(RND(1)*8)+1
1280 JK=INT(RND(1)*8)+1
1290 PRINT "WARNING!! WARNING!!"
1300 IF RND(1)>.5 THEN 1290
1310 PRINT "THE ASTEROID IS UNDER ATTACK
 FROM"
1320 PRINT "THE IMPERIAL FLEET FROM ";D$
(JJ);E$(JK)
1330 GOSUB 2210
1340 PRINT "THE ";D$(JJ);E$(JK);" FORCE
HAS HIT"
1350 PRINT "THE DWELLING AND STORAGE UNI
TS"
1360 GOSUB 2210
1370 DE=INT(FO/(RND(1)*35+4))+2
1380 DA=INT(RND(1)*CA/9)
1390 IF CA-DA<1 THEN DA=0
1400 DD=INT(RND(1)*FO/2)+2
1410 DO=INT(RND(1)*OX/2)
1420 PRINT "DEATH TALLY:"DE
1430 FO=FO-DE
1440 GOSUB 2210
1450 PRINT "DAMAGE REPORT TO STORES AND"

1460 PRINT "DWELLING UNITS TOTALS $"DA
1470 GOSUB 2210
1480 CA=CA-DA
1490 PRINT DD"HYDROPONIC HARVEST UNITS D
ESTROYED"
1500 GOSUB 2210
1510 FD=FD-DD
1520 PRINT DO"OXYGEN UNITS BLED FROM WEB
 FRACTURE"
1530 RC=RC+1+INT(RND(1)*3)
1540 PRINT "ROBOTS DAMAGED..."
1550 PRINT "MAINTENANCE COST FOR THESE N
OW $"RC
1560 GOSUB 2210
1570 OX=OX-DO
1580 RE=RE+INT(RND(1)*30+4)
1590 RETURN
1600 REM ******************
1610 REM ROBOT MAINTENANCE
1620 RM=RM+INT(RND(1)*4)
1630 PRINT "THERE ARE"RM"ROBOTS ON ASTER
OID"
1640 PRINT "EACH ONE COSTS $"RC"TO MAINT
AIN"
1650 GOSUB 2210
1660 PRINT "CREDIT BEFORE ROBOT MAINTENA
NCE: $"CA
1670 CA=CA-RC*RM
1680 GOSUB 2210
1690 PRINT "NOW WE HAVE $"CA"CREDITS"
1700 GOSUB 2210
1710 RETURN
1720 REM ************
1730 REM TERMINATION
1740 REM ** 02 WEB ZERO **
1750 PRINT A$
1760 PRINT "OXYGEN WEB STATUS ZEROED IN
YEAR"YE
1770 GOSUB 2210
1780 PRINT "ENTITY DEATH TALLY IS"FO"!"
1790 END
1800 REM ** HYDROPIC ZERO **
1810 PRINT A$
1820 PRINT "HYDROP. STORE STATUS ZEROED
IN YEAR"YE
1830 GOTO 1770
1840 REM ** CREDIT TALLY ZERO **
1850 PRINT A$
1860 PRINT "CREDIT STATUS ZEROED IN YEAR
"YE
1870 GOTO 1770
1880 REM ** POPULATION ZERO **
1890 PRINT "YOU ARE THE ONLY SENTIENT BE
ING"
1900 PRINT "LEFT ON THE ASTEROID..."
1910 END
1920 REM ***************
1930 REM INITIALISATION
1940 RANDOMIZE VAL(RIGHT$(TIME$,2))
1950 DIM D$(8),E$(8)
1960 CLS
1970 YE=0
1980 A$="THE MINING ASTEROID IS DEAD....
"
1990 FO=INT(80+RND(1)*40)
2000 CA=INT(3900+RND(1)*400)
2010 FD=INT(700+RND(1)*500)
2020 FC=INT(RND(1)*7+1)+.4
2030 RC=INT(RND(1)*4)+1
2040 RM=INT(RND(1)*24)+3
2050 EA=INT(RND(1)*5+2)
2060 AC=INT(RND(1)*5+2)
2070 AP=INT(RND(1)*AP+18)+.75
2080 OX=INT(3000-RND(1)*2000)
2090 OG=2+INT(RND(1)*2)
2100 NE=INT(RND(1)*4+3)
2110 CO=INT(RND(1)*7+3)+.3
2120 IF AC*CO>=AP THEN 2060
2130 RE=INT(200+RND(1)*400)
2140 RP=0
2150 NO=INT(2+RND(1)*3)
2160 FOR J=1 TO 8
2170 READ D$(J),E$(J)
2180 NEXT J
2190 RETURN
2200 REM *****
2210 REM DELAY
2220 FOR J=1 TO 1500:NEXT J
2230 PRINT "..........................
..........."
2240 RETURN
2250 REM ****
2260 REM DATA
2270 DATA "HARY","JASI","PRITU","QASIO",
"MONI","SWERI","KLLER"
2280 DATA "WEOPO","QQAS","XCERV","QPLSI"
,"ALEWO","FIWA"
2290 DATA "LCOPO","IIPLLI","IUOUSU"
```

## References


1) Ahl, David, *Basic Computer Games*, New Jersey, Creative Computing Press;
2) Ahl, David, *Big Computer Games*, New Jersey, Creative Computing Press;
3) Boocock, S. S. & Schild, E. O. (Eds.), *Simulation Games in Learning*;
4) Inbar, M. *Individual and Group Effects on Enjoyment and Learning in a Game Simulating a Community Disaster*;
5) *The Australian* newspaper.

# Let's get started . . .

IT IS ALWAYS a pleasure to be able to report favourably on a new Australian product, and when there are four of them, the pleasure is almost overwhelming. The team at Intouch has built on Richard Swannell's success with the Complete PC Tutorial to produce excellent tutorials for two popular word processing packages, Multimate Advantage II and Microsoft Word version 3; for the top-selling spreadsheet, Lotus 1-2-3; and for the most popular database, dBase III+. It has also produced a tutorial for PC- and MS-DOS, but that is not reviewed here. These programs are all designed to run on IBM PCs and compatibles.

Each of these tutorials uses the 'on-screen learning' method of concurrent windowing developed by Perth programmer Richard Swannell for The Complete PC Tutorial. This allows a person to run the tutorial at the same time as experimenting with the program which the tutorial teaches. Indeed, it is not possible to use the tutorial effectively unless the program which is the subject of the tutorial is available on the machine in question. The Complete PC Tutorial was released in 1986 and immediately attracted wide attention by winning several awards, including *Your Computer* magazine's Australian Software Product of the Year for 1986 and *Australian PC World* magazine's Best Training Software of 1986. This program has now sold over 15,000 units and is still popular.

These programs reside in memory like SideKick and can be called up and used even when you are running another program. This means, especially with the original program, that the tutor can be called up whenever you run into a snag. Indeed, Gareth Powell, the computer editor of the *Sydney Morning Herald*, admitted to keeping the original Complete PC Tutorial permanently in memory as a reference file and memory tickler. Of course, installing such a program can play havoc with other resident programs.

**Greg O'Brien of AMSEC advises anyone wishing to learn Lotus 1-2-3, Word, Multimate Advantage or dBase III+ quickly, to try Intouch Computing's latest tutorials (and improve the country's balance of payments!).**

I found minor interaction problems with SideKick and eventually was forced to deinstall all resident programs. This is mentioned in the documentation, and not left as an unsolved mystery.

The tutorials are not copy protected; the company relies on the install program adding the licensed owner's name to the program. This is the sensible approach which distinguishes sensible software companies from the pack. There is no need for any other documentation since the programs themselves are so clear and easy to follow.

## Running the tutorials

Once the tutorial is installed, which is simply done by typing INSTALL and following the simple instructions, it is ready to run. This is achieved by entering whichever of the commands COLOR, MONO or LCD is appropriate to the monitor which you are using. I tried the tutorials on an AT, an XT Turbo compatible and a Toshiba T1200. There was no difficulty on any of these machines once I had removed the memory resident utilities.

The tutorials come on a single 5¼ inch floppy and are neatly packaged in a plastic box, about the size of a large video tape box, together with the documentation and a lifetime warranty card. The software is specifically guaranteed against virtually any mishap and will be replaced without question if damaged by 'spilt coffee, children with scissors, hot sun on car seats, inquisitive pets, accidental formatting or any other calamity.'

Each tutorial consists of seven or eight lessons; every lesson comprises of the order of a hundred screens. Each lesson takes about 45 minutes to complete and after lesson 1 it is possible for a novice to begin to use the database, spreadsheet or word processing package, that is, to 'get started'. The whole seven or eight lessons will take between six to eight hours to complete and will provide a good working knowledge of the most commonly used features of the software being taught.

As the user proceeds through the tutorials, the software automatically advances the tutorial when the appropriate instruction has been typed, but remains at the current task otherwise. Each time a key is pressed the windows disappear from the screen to give the student a clear view of the screen and they return after a couple of seconds. Most of the learning tasks in the tutorials have three windows associated with them which overlay the screen.

On a coloured monitor these are blue, red and light blue, and they are quite clear and easy to distinguish on a mono or LCD screen. The blue screen contains the teaching information, the main learning

**AMSEC**

This review was prepared for AMSEC by Greg O'Brien of the Department of Economics at La Trobe University. AMSEC is an Australian software evaluation group with consultants in the workplace, in schools and in tertiary institutions around Australia. It can be contacted at PO Box 140, Hurstbridge 3099 Vic. or PO Box 1339, Armidale 2350 NSW.

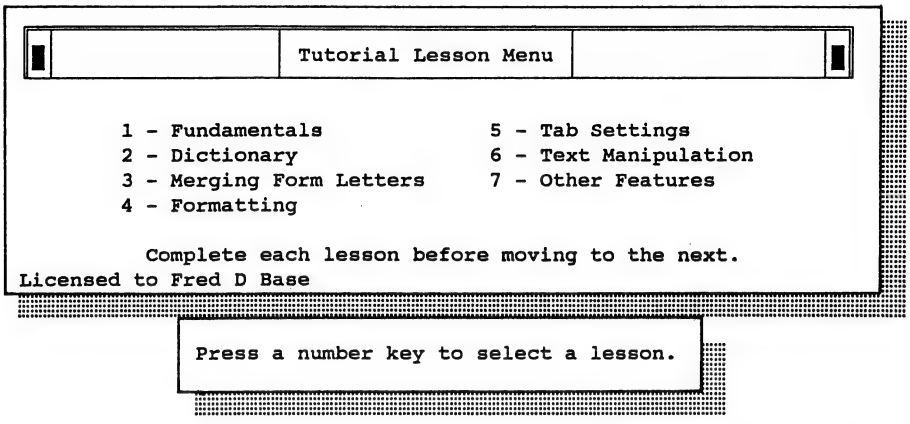


***Figure 1.*** *The opening screen to the Microsoft Word tutorial – all of the tutorials are targeted at new users without any support other than the program's official manual.*

part of the current task. The red screen details what action the student is asked to take, while the third light blue screen contains comments, asides or even, in some cases, a joke. Often there are arrows pointing to various parts of the screen. It is this idea of windows overlaying the operation of the basic program being learnt which obviates the need for complicated lesson sequences in the manual.

## Difficulties

I have only one serious gripe with the tutorials. The design is such that it is not possible to commence where you left off in the last session – unless you completed the current lesson. The ideal tutorial, in my view, would enable the user to access that part of the tutorial relating to a specific task or difficulty by, for example, a help menu or a set of key word descriptors of tasks. The tutorials are designed for the absolute beginner and, while they cover most of the regular features of the related software, they may appear too basic for a person with reasonable familiarity with the software. However, they all have some lessons relating to 'advanced features'. It is extremely difficult to write learning software which is useful over a wide range of experience.

The difference for the home computer owner follows from the requirement to possess the software before using these tutorials to learn it. One use of tutorials by this group in the past has been as a way of evaluating the software before purchase. Moreover, you need to learn to load the base program before the tutorial can be used. In some cases assistance is given with doing so, but not always.

## Conclusion

These four tutorials are Australian made and are good value for money. Potential purchasers should be warned that the proprietary software which is the subject of the tutorial is required to effectively complete the tutorial. The 'on-screen learning' approach is ideal for beginners and obviates the the need to keep referring back to the manual. Unfortunately, you cannot stop and then start where you left off unless it is the end of a lesson. Indeed, to go to the next lesson the program must be run again so as to replace the memory resident program with the one appropriate to the next lesson. It is impossible in general to determine where a topic appears in the tutorial and even more difficult to go efficiently to the topic if it is late in the relevant lesson.

The educational philosophy is some years out of date in that the student is clearly directed without much of a chance to proceed at their own pace, or in a direction of their own choice. Even so, these tutorials are among the best around, particularly when the cost is taken into account. □

### Product Details

Product:
Let's get started with . . .
MS Word Ver 3.0.
Multimate Advantage II.
dBase III+.
Lotus 1-2-3.
From: Intouch Computing, PO Box 460, Victoria Park, 6100 WA
(09) 339 4431
Price: $89.95 each

### Lotus 1-2-3

The seven lessons in this tutorial are entitled: Introduction; Manipulating Worksheets; Functions, Copy; Formulas, Move, Format; Display, Memory, Titles; Data Sort, Distribution; Insert/Delete, Range Names.

The tutorial covers most of the basic functions of Lotus and completing it should enable the user to perform most of the usual Lotus tasks. It is a very fast and efficient way to learn the package, if no teacher is available. Unfortunately, it does not cover graphs and it uses financial examples and exercises. This ignores the other non-financial applications of Lotus.

### dBase III+

The eight lessons in this tutorial are: Creating a Database; Displaying Data; Sorting Data; Printing Reports and Labels; Practical Demonstration I; Practical Demonstration II; Variables and Functions, and Programming. The tutorial is aimed at the first time user and covers the elementary dBase operation through the Assist Menu. It makes no attempt to teach programming, in the same way that the Lotus tutorial ignores macros. Most of the basic ideas about records and files are well covered. Unlike the first tutorial, the Complete PC Tutorial, the four tutorials reviewed here would probably not warrant a second running.

### Multimate Advantage II

This tutorial contains more genuinely elementary material than the other three and comprises eight lessons. These are: Word Processing Basics; Key Chart, Tabs, Underlining; Copy, Replace, Move; Indent, Decimal Tabs, Bold; Spell Check, Page Breaks; Merge, Mailing List; Libraries, Chain Columns and Thesaurus, Backup. Again, the material is well presented and the basic philosophy makes the package worthwhile. Unfortunately the tutorial is based on the assumption that the user has not used a word processor. Even if this is the case, some of the ideas of word processing are no longer unusual, and lesson 1 is a little drawn out.

### Microsoft Word version 3

This Tutorial has seven lessons and is a good tutorial for the learner who has no teacher. The lessons are: Fundamentals; Dictionary; Merging Form Letters; Formatting; Tab Settings; Text Manipulation and Other Features. The main difficulty is that it interferes with the graphics mode for Word which must be loaded using the /C option. The tutorial covers many of the elementary features of Word and enables a new user to be in a position to use the official Manual to master advanced features. Like the other three tutorials, the target audience is a first time user with no support. As I mentioned earlier, Microsoft Word is required to run the tutorial, so the tutorial cannot be used as an evaluation tool.

# A taste of Artificial Intelligence

So you want to have a chat with your computer? And, of course you want it to program itself. If that sounds more challenging than that C compiler you finished last week, let Miroslav Kostecki tell you how to get started.

WE'LL BEGIN by examining the major techniques used in AI (Artificial Intelligence) and how to apply these to real programs. The first technique we'll look at is semantic trickery.

A very common form of natural language processing is based on sentence structure by separating nouns, adjectives, verbs and so on. These patterns are used to build the sentences. ELIZA is a program of this type. It was completed in 1966 by MIT Computer scientist Joseph Weizenbaum. His version, called DOCTOR, simulates the conversation between a psychotherapist and a patient. It does this with such realism that the program soon became known as a breakthrough in AI development. Other programs to use this type of processing include poetry writing, and question/answer programs.

This type of processing has advanced rapidly because it is easy to apply. However, it is mostly accomplished by using coded patterns rather than any real understanding on the part of the program. It's like a person who answers Chinese questions by using a code book!

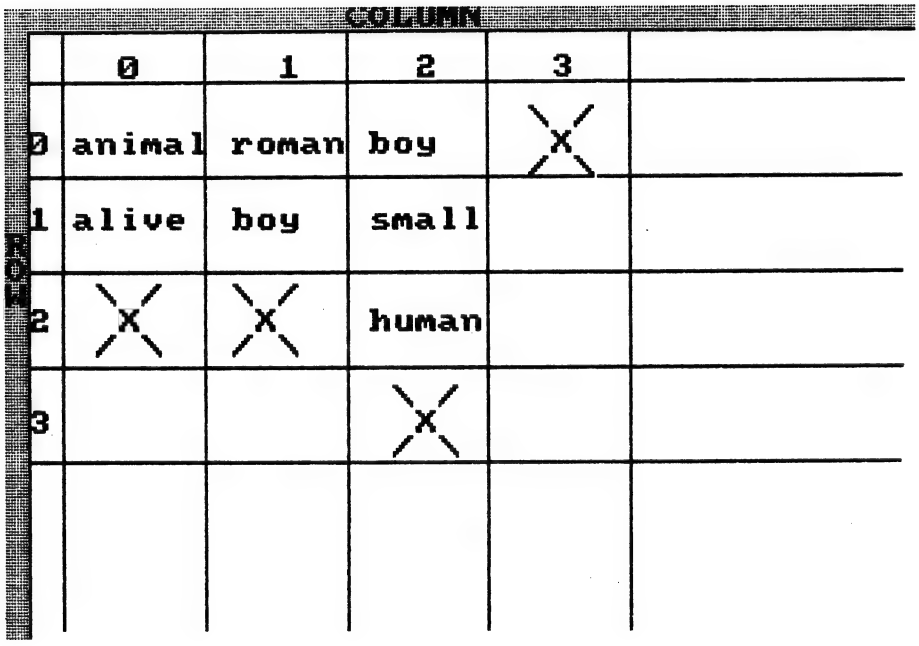


*Figure 1. The program in Listing 1 simply separates both sides of the 'IS' keyword, then deletes A, AN or THE. The resulting data is stored in an array as above. The 'X' markers are used to show the end of a group of data items.*

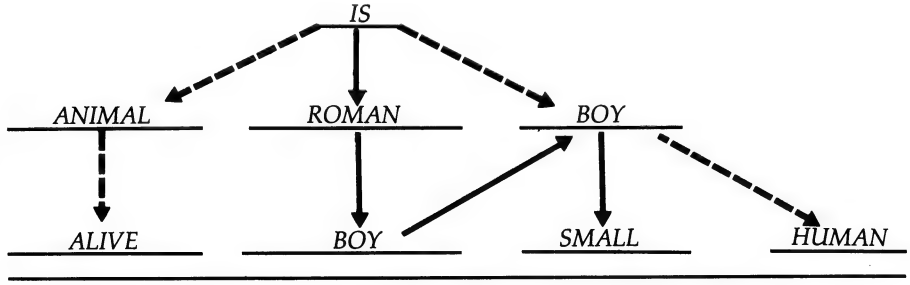


*Figure 2. Referring to the tree above, we can see how the program in Listing 1 finds whether or not the question IS ROMAN SMALL? is true. It scans the branches of the tree structure trying to connect ROMAN to SMALL. The dotted lines show other possible routes.*

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## Storage and logic

One of the most talked about techniques now in use is the Expert System. These systems store information in a knowledge base and then use stored logical rules to answer questions. The rules relate questions to answers directly and without generalising. Careful coding of these rules and a large knowledge base has resulted in many powerful AI programs.

The program in Listing 1 was written to show the vital importance of good storage and logic. It's similar to the program called SIR, completed in 1964 by Bertram Raphael. It effectively shows three key areas of AI – natural language processing, information storage and retrieval and logical reasoning.

Notice that the program has a very limited Format for its exchanges of data – it's limited to short 'IS' sentences or 'REQUEST'S'. Notice too that it can answer using its acquired data and inbuilt logic.

Let's say we put in the information –

```
AN ANIMAL IS ALIVE.
ROMAN IS A BOY.
A BOY IS SMALL.
A BOY IS A HUMAN.
```

The program simply takes the words either side of the IS keyword, then deletes A, AN or THE. The resulting data is stored in an array, as illustrated in Figure 1. Now, say we ask IS ROMAN SMALL? Referring to Figure 2, we can see how the program finds whether this is true or not.

As more information is entered, the number of connections becomes large very quickly. This becomes a problem when it takes too long to scan an answer.

Try extending the program by adding more keywords or use it as a shell for your own Artificial Intelligence system. □

```
100 REM   ### THIS IS ### June 1985
110 REM   >>> Miroslav Kostecki.
120 GOSUB 1000  : REM Set up
130 GOSUB 2000  : REM Input
140 GOSUB 3000  : REM Type?
150 ON x GOSUB 4000, 5000, 6000
160 REM/Ø Data, Questions, Requests
170 GOTO 130
180 '
1000 REM      Set up.
1020 DIM m(30), z1$(30), a1$(30,50)
1030 FOR i=0 TO 50
1040 a1$(0,i)= "X" :a1$(1,i)= "X"
1050 IF i< 31 THEN z1$(i)="."
1060 NEXT i
1070 CLS : LOCATE 1,4
1080 RETURN
1090 '
2000 REM   Input.
2010 x=0 : INPUT d1$
2020 RETURN
2030 '
3000 REM       Determine type.
3010 l=LEN(d1$) : p1$=MID$(d1$,1,1)
3020 IF ASC(p1$)> 64 THEN 3040
3030 l= l-1 : d1$=LEFT$(d1$,l)
3040 i= INSTR( d1$, " IS ")
3050 IF i>0 THEN x=1 : RETURN
3060 IF LEFT$(d1$,3)= "IS " THEN x=2
3070 IF LEFT$(d1$,8)="REQUEST "THEN x=3
3080 IF x>0 THEN RETURN
3090 PRINT"I dont understand. "
3100 x=4 : RETURN
3110 '
4000 REM                  Information.
4010 REM               A. Find words.
4020 l1$= LEFT$(d1$, i-1)
4030 r1$= MID$(d1$,i+4, l-i-3)
4040 u=1 :c=1
4050 FOR i=1 TO 6
4060 READ q1$ : q= LEN(q1$)
4070 IF LEFT$(l1$, q) <> q1$ THEN 4090
4080 l1$=MID$(l1$, q+1, LEN(l1$)-q):c=0
4090 IF LEFT$(r1$,q) <> q1$ THEN 4110
4100 r1$=MID$(r1$, q+1, LEN(r1$)-q):u=0
4110 NEXT i
4115 IF u=0 THEN 4130
4120 IF INSTR(r1$, "ING " )>0 THEN u=2
4130 RESTORE
4140 DATA "A ","AN ","THE "
4150 DATA " A "," AN "," THE "
4500 REM
4510 REM            B. Storage.
4520 r1$= STR$(u)+ r1$ : z3$=r1$
4530 l1$= STR$(c)+ l1$
4540 y=-1 : GOSUB 5510
4550 y1$= "I already knew that. "
4560 IF y=1 THEN PRINT y1$ :RETURN
4570 r1$=z3$
4580 FOR i=0 TO 50
4590 IF a1$(0,i)= l1$ THEN 4670
4600 NEXT i
4610 FOR i=0 TO 50
4620 IF a1$(0,i) <>"X" THEN 4660
4630 a1$(0,i)= l1$ : a1$(0,i+1)="X"
4640 a1$(1,i)= r1$ :a1$(2,i)="X"
4650 GOTO 4720
4660 NEXT i
4670 FOR j=1 TO 30
4680 IF a1$(j,i) <>"X" THEN 4710
4690 a1$(j,i)= r1$: a1$(j+1,i)="X"
4700 GOTO 4720
4710   NEXT j
4720 IF y=2 THEN 4740
4730 PRINT "OK. " :RETURN
4740 PRINT "Now I know about ";
4750 IF LEFT$(l1$,2)=" 0"THEN PRINT"A ";
4760 PRINT RIGHT$(l1$, LEN(l1$)-2 );"."
4770 RETURN
4780 '
5000 REM                  Questions.
5010 REM            A. Find words.
5020 c=1
5030 d1$= RIGHT$(d1$, LEN(d1$)-3 )
5040 FOR j=1 TO 3
5050  READ q1$ :q= LEN(q1$)
5060  IF LEFT$(d1$,q) <> q1$ THEN 5080
5070  d1$=RIGHT$(d1$, LEN(d1$)-q ):c=0
5080 NEXT j
5090 FOR j=1 TO 3
5100  READ q1$ :q= LEN(q1$)
5110  i=INSTR( d1$, q1$)
5120  IF i=0 THEN 5160
5130  l1$= LEFT$(d1$,i-1)
5140  r1$= RIGHT$(d1$, LEN(d1$)-i-q+1)
5150  u=0 :GOTO 5270
5160 NEXT j
5170 i=0 :u=1
5180 i=INSTR( d1$," ")
5190 IF i=0 THEN 5250
5200 l1$= LEFT$(d1$,i-1)
5210 r1$= RIGHT$(d1$, LEN (d1$)-i )
5220 IF INSTR( r1$,"ING") >0 THEN u=2
5230 IF i>0 THEN 5270
5240 RESTORE
5250 PRINT "I don't understand."
5260 GOTO 5770
5270 RESTORE: y=3
5280 r1$=STR$(u)+r1$
5290 l1$=STR$(c)+l1$
5500 REM
5510 REM            B. Find answer.
5520 FOR i=0 TO 50
5530  IF a1$(0,i)= l1$ THEN 5580
5540  IF a1$(0,i) <>"X" THEN 5570
5550  IF y=-1 THEN y=2 :GOTO 5770
5560  z2$="A " : GOTO 6550
5570 NEXT i
5580 k=0 :n=0
5590 FOR j=k TO 50
5600  IF a1$(0,j)="X" THEN 5720
5610 FOR i=1 TO 30
5620   IF a1$(i,j)="X" THEN 5710
5630   IF a1$(i,j) <>r1$ THEN 5700
5640   IF a1$(0,j)=l1$ THEN 5830
5650   v=0 :IF n>0 THEN GOSUB 5780
5660   IF v<>0 THEN 5700
5670   n=n+1
5680   z1$(n)= r1$ :r1$= a1$(0,j)
5690   m(n)= j+1 :k=0 :GOTO 5820
5700  NEXT i
5710 NEXT j
5720 IF n<=0 THEN 5750
5730 k=m(n) :r1$= z1$(n)
5740 n=n-1 :GOTO 5590
5750 IF y=-1 THEN y=0 :RETURN
5760 PRINT "I don't know."
5770 RETURN
5780 FOR w=n TO 1 STEP -1
5790  IF z1$(w)= r1$ THEN 5810
5800 NEXT w :v=0 :RETURN
5810 v=1 :RETURN
5820 GOTO 5590
5830 IF y=-1 THEN y=1 :GOTO 5770
5840 PRINT "Yes." :GOTO 5850
5850 GOTO 5770
5860 '
6000 REM                  Requests.
6010 REM               A. Find words.
6020 c=1
6030 d1$= MID$(d1$,9,l-8)
6040 FOR j=1 TO 3
6050  READ q1$ : q= LEN(q1$)
6060  IF LEFT$(d1$,q)<>q1$ THEN 6090
6070  d1$= RIGHT$(d1$, LEN(d1$)-q )
6080  c=0 :z2$= q1$
6090 NEXT j
6100 RESTORE :l1$= STR$(c)+ d1$
6500 REM
6510 REM            B. Display data.
6520 FOR i=0 TO 50
6530  IF a1$(0, i)= l1$ THEN 6590
6540 NEXT i
6550 PRINT "I have no data about ";
6560 IF LEFT$(l1$,2)=" 0" THEN PRINT z2$
;
6570 PRINT RIGHT$(l1$, LEN(l1$)-2 );"."
6580 RETURN
6590 IF c=0 THEN PRINT z2$;
6600 PRINT RIGHT$(l1$,LEN(l1$)-2)" IS...
"
6610 FOR j=1 TO 30
6620  IF a1$(j,i)="X" THEN 6670
6630  z2$= a1$(j,i)
6640  IF LEFT$(z2$,2)=" 0"THEN PRINT"A "
;
6650  PRINT RIGHT$(z2$, LEN(z2$)-2)
6660 NEXT j
6670 RETURN
```

***Listing 1.*** *This program was written to demonstrate three key areas of AI – natural language processing, information storage and retrieval and logical reasoning.*

LARRY LEWIS

# THE PROPHET

This month a full listing of all Bulletin Boards that have been online for more than 60 days is included for your BBS dining pleasure (we publish the full listing in April and October of each year). The reason we restrict the listing of new systems to one's that have been online for 60 days is that experience has shown if a SysOp can keep it together that long, then the system will probably be 'permanent' and that period is also (conveniently) our publishing lead time.

By the time you read this we (that is my wife, Helen, and I) will be the proud parents of our second child. We figured out that having two might mean that they will play, argue, fight with each other rather than just poor Pamela beating up on her Mum and Dad – well that's the theory anyway. Probably just means that they'll work as a duo at shutting down Prophet whenever they manage to get into the room. *NEWS FLASH – On Saturday, July 30, Helen (with me helping) had a baby BOY!!*

## Computer virus infections and other little nasty things

There has been a lot of hysteria in computer magazines (mainly driven by security consultancies, it seems) that every computer in the world will be infected by virus programs and all sorts of other assorted nasties. On my desk today I have yet another warning that I am likely to see my PC catch some terminal virus.

Contrary to popular belief, Virus, Trojan and Trapdoor type programs have been around since computers were invented. In fact, I think you'll find that it doesn't just relate to computers (why are Trojan Horse programs called that!).

*Contrary to popular belief, Virus, Trojan and Trapdoor type programs have been around since computers were invented.*

A Trojan Horse type of program is based on the same premise that the Greeks used against Troy – give someone something (in this case a program) that looks nice and they'll use it; and when they do, it will do something nasty. Common examples of this sort of thing are programs that reformat your disks, delete important files or, in the case of Bulletin Boards, one that was around at one stage gave the miscreant SysOp access to wreck havoc online.

Trapdoors are also old hat – these relate to someone putting into a piece of software, a way to do something generally not permitted. An example would be a security (logon type) program that validates whether you can use the system. An enterprising programmer may put a special code word into the program that, when used, automatically give you access whether or not you were authorised.

Virus programs, although the flavour of the month for security consultants, are also nothing new.

Where does that leave us? If you believe the prophets of doom, all our computers would have to practice safe sex with a condom (oops, sorry wrong virus) and we could never run any program picked up in the street (er, I mean from a BBS). That would make life a bit boring and would also mean no more free Public Domain or Shareware software.

This would leave only commercial software left, oops again – there is a published case of a virus in commercial software, so where does that leave us?

Some people have suggested to me that all of this is a plot by the software companies to dry up the Shareware market; the premise being that they feel threatened that software is available for (basically) nothing and it is often as good or better than the programs you pay hundreds of dollars for. (This is probably not true, although you never can tell in this warped industry: where else could you buy a product, find it defective and have the manufacturer charge you to have it fixed!)

Oh well, back to the point. Apart from a couple of Trojan Horse incidents, I have never found anyone who can say 'Yes, I was affected by a virus program.' It's always 'Yeah, a mate of mine . . .' or 'I heard from . . .'. I know there are real, live ugly little virus critters out there just waiting to chomp on my poor little machine – but is it really as wide spread as we are being led to believe?

## Floppy disks

One of the readers of this column sent me an article on a review of floppy disks on the market. The idea was to see which floppy disk manufacturers produced a reasonable quality disk for the price charged.

The test revolved around purchasing two boxes of each brand to be tested, where possible, from separate batches. Also, they included one 'No Name' disk brand in the test as being 'representative' of all of these types.

Firstly the 'No Name' business. Some of those who sell disks under their own 'label' are not just relabelling from a single source, but obtain their supply from various manufacturers. If you bought a box this week you may get Control Data disks, next week Wabash, the week after Memorex.

Even those that are unlabelled are sometimes manufactured that way. For example, I buy disks that are imported from a manufacturer in the USA that only makes unlabelled disks. The whole business revolves around manufacturing disks for other companies to resell: you can have black disks, green, blue, rainbow or candy; 5¼ inch, 3½, low density and so on.

And – some of the major manufacturers play a cute game, if they are overstocked they will not reduce the price of their 'name brand' because they think that's bad marketing. So what do they do? Sell them as 'No Name' for 25 per cent less. (Of course, this doesn't only happen with floppy disks; almost every other industry would have similar examples.)

Secondly, how could you possible assess the quality of a manufacturer's product on the basis of 20 disks?

Now I am as rabid as the next guy about wanting value for money (if it's free I'll have two!), but for a commodity like disks, could you possibly expect every disk to be absolutely perfect? If I could buy 50 disks for about $50 and have one or two that failed, or get 10 disks for the same price and I could be sure all of them worked, I know which disks I'd be buying! Also, I have never had a problem getting a disk exchanged if it failed. □

## Primary electronic collection points

**ACT** – PC Exchange RIBM
(062) 58 1406

**NSW** – Prophet TBBS
(02) 628 5222

**Vic.** – Brainstorm Australia
(03) 758-7086

**Qld.** – AMPAK RCP/M
(07) 263-7070

**SA** – The Electronic Oracle
(08) 260-6222

**WA** – Nemo Multiple BBS RAPL
(09) 370-1855

## PAMS Listing 8808

## AUSTRALIAN CAPITAL TERRITORY

**AMIGA Opus**
*Sysop:* Wayne Miles
*Phone:* (062) 58-9967
*Baud:* V22 V22bis B103
*Access:* Public
*BBSoftware:* Opus

**Commodore Users Group BBS**
*Sysop:* James Hacker
*Phone:* (062) 81-0847

**PC Exchange Opus**
*Sysop:* Phil Harding
*Phone:* (062) 58-1406
*FIDOnet:* 626/220
*Baud:* V21 V22 V22bis V23
*Access:* Mem LVA

**PCUG Bulletin Board**
*Sysop:* Alan Salmon
*Phone:* (062) 59-1244
*Baud:* V21 V22 V22bis V23
*Access:* Mem LVA
*Computer:* IBM AT
*DOS:* PC DOS
*BBSoftware:* Opus
*Note:* Access free to members of PCUG $15pa incl. monthly newsletter

**Pharmacy BBS**
*Sysop:* Michael Pye
*Phone:* (062) 92-3875
*FIDOnet:* 626/223
*Baud:* V21 V22 V22bis V23 B103 B212
*Access:* Reg Public
*Computer:* Kaypro 16
*DOS:* MS DOS
*BBSoftware:* Opus

## NEW SOUTH WALES

**2000 and Beyond TBBS**
*Sysop:* Greg Kuhnert
*Phone:* (02) 522-6514
*Baud:* V21 V22 V23 B103 B212
*Access:* Mem VA
*Computer:* System One
*DOS:* CP/M
*BBSoftware:* TBBS

**ABCOM-dataLINK**
*Sysop:* Ben Sharif
*Phone:* (047) 36-4165
*FIDOnet:* 713/304
*Baud:* V21 V22 V22bis V23
*Access:* Mem Reg VA
*Computer:* IBM AT Clone
*DOS:* PC DOS
*BBSoftware:* QuickBBS

**ACE (NSW) BBS**
*Sysop:* Larry O'Keefe
*Phone:* (02) 529-2059
*Baud:* V21
*Access:* Mem Reg LVA
*Computer:* Atari
*DOS:* Atari
*BBSoftware:* Michtron

**Airlock Hermitage**
*Sysop:* Greg Glynn
*Phone:* (02) 600-1822
*FIDOnet:* 713/609
*Baud:* V21 V22 V22bis V23
*Access:* Reg VA
*Computer:* IBM PS/2 60
*DOS:* PC DOS
*BBSoftware:* Opus

**Alpha Juno BBS**
*Sysop:* Kevin Withnall & John L. Rich
*Phone:* (02) 774-4709
*FIDOnet:* 620/701
*Baud:* V22 V22bis
*Access:* Public
*Computer:* Olivett M24
*DOS:* MS DOS
*BBSoftware:* Opus

**Amiga Zone BBS**
*Sysop:* Richard Duffy
*Phone:* (02) 771-6351
*Baud:* V21 V22 V23 B103 B212
*Access:* Mem LVA
*Computer:* Amiga 1000
*DOS:* Amiga
*BBSoftware:* BBS-PC!

**Amstrad ABBS**
*Sysop:* Riccay Schmahl
*Phone:* (02) 981-2966
*FIDOnet:* 714/903
*Baud:* V21 V22 V22bis V23
*Access:* Reg VA
*Computer:* Amstrad PC1512
*DOS:* MS DOS
*BBSoftware:* Opus

**Apolloline BBS**
*Sysop:* Richard Heppell
*Phone:* (02) 869-8349
*Baud:* V21 V22 V23
*Access:* Reg VA
*Computer:* Macintosh
*DOS:* HFS
*BBSoftware:* Red Ryder Host

**Apple Users Group – Apple II BBS**
*Sysop:* Cameron Brawn
*Phone:* (02) 449-7798
*Baud:* V21 V22 V22bis V23
*Access:* Mem LVA
*Computer:* Apple IIE
*DOS:* PRODOS
*BBSoftware:* Proboard II

**Apple Users Group – MAC BBS**
*Sysop:* Bruce Stanley
*Phone:* (02) 498-7084
*Baud:* V21 V22 V22bis V23
*Access:* Mem LVA
*Computer:* Macintosh
*DOS:* HFS
*BBSoftware:* Red Ryder Host

**Arknet**
*Sysop:* Andrew Khoo
*Phone:* (02) 868-4836
*FIDOnet:* 711/805
*Baud:* V22 V22bis B103
*Access:* Reg
*Computer:* IBM AT
*DOS:* Xenix
*Note:* Logon as guest and mail user admin for access.

**Arrow KBBS**
*Sysop:* Mark Sinclair
*Phone:* (02) 451-2660
*Baud:* V21 V22 V23
*Access:* Mem VA
*Computer:* C-64
*BBSoftware:* KBBS

**AUGUR TBBS**
*Sysop:* Mark James
*Phone:* (02) 311-3052
*FIDOnet:* 712/302
*Baud:* V21 V22 V22bis V23
*Access:* Reg VA
*Computer:* IBM XT Clone
*DOS:* PC DOS
*BBSoftware:* TBBS

**Australian Pick User's BBS**
*Sysop:* Kurt Johannessen
*Phone:* (02) 631-8603
*Baud:* V21 V22 V22bis V23
*Access:* Reg VA

**BAD NEWS travels fast**
*Sysop:* James Stevenson
*Phone:* (02) 540-1879
*Baud:* V21 V22 V22bis V23
*Access:* Reg VA
*Computer:* IBM XT
*DOS:* MS DOS
*BBSoftware:* Opus

**Bill's BBS**
*Sysop:* Bill Mastro
*Phone:* (049) 62-2044
*Baud:* V21 V22 V23
*Access:* Reg
*Computer:* Apple IIE Clone
*DOS:* PRO DOS
*BBSoftware:* GBBS PRO

**Books BBS**
*Sysop:* Jon Ruwolt & Chris Ruwoldt
*Phone:* (02) 281-4791
*Baud:* V21 V22 V22bis V23
*Computer:* IBM XT Clone
*DOS:* MS DOS
*BBSoftware:* Opus

**Bramblebush**
*Sysop:* Ken Allan
*Phone:* (02) 829-1809
*Baud:* V21 V22
*Access:* Mem Reg LVA
*Hours:* Mon – Sat: 24 Hours
*Computer:* Clone88 turbo
*BBSoftware:* Opus

**Cesspit RAPL**
*Sysop:* Andrew Winter
*Phone:* (02) 543-7204
*Baud:* V22 B103 B212
*Computer:* Apple IIE
*DOS:* PRO DOS
*BBSoftware:* GBBS PRO

**Club Amiga BBS**
*Sysop:* Ross Kellaway
*Phone:* (02) 521-6338
*Baud:* V21 V22 B103 B212
*Access:* Mem LVA
*Computer:* Amiga 1000
*BBSoftware:* BBS-PC

**Club Mac Remote Maccess System**
*Sysop:* Jason Haines
*Phone:* (02) 73-1992
*Baud:* V21 V22 V22bis V23
*Access:* Mem LVA
*Computer:* Macintosh
*DOS:* HFS
*BBSoftware:* Red Ryder Host

**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

**Coastal Opus BBS**
*Sysop:* Kevin Mann
*Phone:* (043) 23-2275
*FIDOnet:* 711/430
*Baud:* V22 V22bis V23
*Access:* Reg VA
*Computer:* IBM AT Clone
*DOS:* MS DOS
*BBSoftware:* Opus

**CoCo Arena**
*Sysop:* John Kelly
*Phone:* (02) 646-5573
*FIDOnet:* 712/625
*Baud:* V21 V22 V23 B103 B212
*Access:* Reg LVA
*Computer:* IBM XT Clone
*DOS:* MS DOS
*BBSoftware:* QuickBBS

**CoCo Connection**
*Sysop:* Barry Darnton
*Phone:* (02) 618-3591
*Baud:* V21 V22 V22bis V23
*Access:* Reg
*Computer:* IBM PC
*DOS:* MS DOS
*BBSoftware:* QuickBBS

**Comet C-64 BBS**
*Sysop:* Eric Davis
*Phone:* (02) 599-7342
*Baud:* V21 V23
*Access:* Mem VA
*Computer:* C-64
*BBSoftware:* Comet
*Note:* Requires UlatraTerm or Palette on C-64

**CommLink BBS**
*Sysop:* Jeff Campbell
*Phone:* (043) 41-3135
*Baud:* V21 V22
*Access:* Mem Reg VA
*Computer:* Commodore
*DOS:* Basic IEEE
*BBSoftware:* Punter

**Commodore C-64 BBS**
*Sysop:* Graham Lee
*Phone:* (02) 664-2334
*Baud:* V21 V22 V23
*Access:* Mem VA

*Computer:* C-64
*BBSoftware:* Punter

**Commodore Pursuit KBBS**
*Sysop:* Warren Hillsdon
*Phone:* (02) 522-9507
*Baud:* V21 V22 V23
*Access:* Mem VA
*Computer:* C-64
*BBSoftware:* KBBS

**Compax Computers BBS**
*Sysop:* Alex Sardo
*Phone:* (02) 683-3956
*FIDOnet:* 713/601
*Baud:* V21 V22 V22bis V23
*Access:* Mem
*Computer:* IBM XT Clone
*DOS:* PC DOS
*BBSoftware:* Opus

**Contact BBS**
*Sysop:* Peter Hall
*Phone:* (02) 798-6368
*Baud:* V21 V22 V23 B103 B212
*Access:* Mem Reg
*Computer:* IBM XT
*DOS:* MS DOS
*BBSoftware:* TBBS

**CSACE BBS**
*Sysop:* Larry O'Keefe
*Phone:* (02) 529-8249
*Baud:* V21
*Access:* Mem LVA
*Computer:* Atari 800
*DOS:* Atari
*BBSoftware:* AMIS V 36
*Note:* Atari protocol only, logon delay answering machine for 30 seconds then BBS

**Cursor Contact Amiga BBS**
*Sysop:* Greg Minahan
*Phone:* (02) 637-8131
*Baud:* V21 V22 V23
*Access:* Reg LVA
*Computer:* Amiga 500
*DOS:* AmigaDOS
*BBSoftware:* BBS-PC!

**Cybersoft Opus**
*Sysop:* Heath Rogers
*Phone:* (02) 212-2261
*FIDOnet:* 712/202
*Baud:* V22 V22bis PEP
*Access:* Reg LVA
*Computer:* IBM XT
*DOS:* PC DOS
*BBSoftware:* Opus

**Delta Net**
*Sysop:* Geoff Arthur
*Phone:* (02) 457-9831
*FIDOnet:* 711/416
*Baud:* V21 V22 V22bis V23
*Access:* Public
*BBSoftware:* QuickBBS

**Dick Smiths RIBM**
*Sysop:* Paul Beaver
*Phone:* (02) 887-2276
*Baud:* V21 V22
*Access:* Public
*Computer:* Multitech PC-500
*DOS:* MS DOS
*BBSoftware:* Opus

**Down Under KBBS**
*Sysop:* Glen Myles
*Phone:* (02) 674-6647
*Baud:* V21
*Access:* Mem VA
*Computer:* C-64
*BBSoftware:* KBBS

**Eagle One BBS**
*Sysop:* Terry Harvey
*Phone:* (02) 745-3190
*FIDOnet:* 712/704
*Baud:* V21 V22 V23
*Access:* Reg LVA
*Computer:* Tandy 1000
*DOS:* MS DOS
*BBSoftware:* BBS-PC!

**Eagle's Nest C-64 BBS**
*Sysop:* Philip Dean
*Phone:* (02) 451-0535
*Baud:* V21
*Access:* Mem VA
*Computer:* C-64
*BBSoftware:* KBBS

**First Nice MIDILine**
*Sysop:* Andrew Khoo
*Phone:* (02) 868-4347
*FIDOnet:* 711/805
*Baud:* V22 V22bis B103 PEP
*Access:* Public
*Computer:* IBM XT
*DOS:* PC DOS
*BBSoftware:* Opus
Galaxy RAPL
*Sysop:* Chris Nelligan
*Phone:* (02) 875-3943
*Baud:* V21
*Access:* Mem LVA
*BBSoftware:* Proboard II

**HighTech**
*Sysop:* Ross Wheeler
*Phone:* (060) 25-1813
*FIDOnet:* 712/201
*Baud:* V21 V22 V22bis V23 B103 B212 PEP
*Access:* Reg LVA
*Computer:* IBM AT Clone
*DOS:* PC DOS
*BBSoftware:* Opus
*Note:* 147.575 Mhz VK2DGY (Radio)1200 bps Amateur Packet Radio

**Illawarra C-64 BBS**
*Sysop:* John Simon
*Phone:* (042) 61-8230
*Baud:* V21
*Access:* Reg VA
*Computer:* C-64
*BBSoftware:* KBBS

**Integra TEX**
*Sysop:* Kevin Leong
*Phone:* (02) 746-1109
*FIDOnet:* 712/703
*Baud:* V21 V22 V22bis V23
*Access:* Public
*Computer:* IBM AT Clone
*DOS:* PC DOS
*BBSoftware:* QuickBBS

**Landover Amiga BBS**
*Sysop:* Lance Lyon
*Phone:* (02) 319-1793
*Baud:* V21 V22 V22bis V23 B103 B212
*Access:* Mem LVA
*Computer:* Commodore PC5
*DOS:* PC DOS
*BBSoftware:* BBS-PC!

**Lodestone BBS**
*Sysop:* Ian McWhirter
*Phone:* (02) 456-3264
*FIDOnet:* 711/407
*Baud:* V22 V22bis B103
*BBSoftware:* Opus

**Manly BBS**
*Sysop:* Chris Patten
*Phone:* (02) 977-6820
*Baud:* V21 V22 V23
*Access:* Reg VA
*Note:* C-64 Needs Rterm or Ultraterm

**Micro Design Lab**
*Sysop:* Kevin Lowton & Lindsay Gorrie
*Phone:* (02) 663-0151
*Baud:* V21
*Access:* Reg VA

**Micro Mart C Users**
*Sysop:* Rick Polito
*Phone:* (02) 560-3607
*FIDOnet:* 712/501
*Baud:* V21 V22 V22bis V23
*Access:* Reg LVA
*Computer:* DECA AT
*DOS:* MS DOS
*BBSoftware:* QuickBBS
*Note:* C & dBase User System

**MicroBASE BBS**
*Sysop:* Dave Whiteman
*Phone:* (047) 35-1358
*FIDOnet:* 713/305
*Baud:* V21 V22 V22bis V23
*Access:* Mem VA
*Hours:* Daily: 2200 – 0600
*Computer:* IBM XT Clone
*DOS:* MS DOS
*BBSoftware:* QuickBBS

**Milliway's**
*Sysop:* David Coucke
*Phone:* (02) 357-7027
*FIDOnet:* 712/306
*Baud:* V21 V22 V22bis V23 B103 B212
*Access:* Reg VA
*Computer:* Amiga 1000
*DOS:* AmigaDOS
*BBSoftware:* QuickBBS

**Moebius Trip**
*Sysop:* David Butler
*Phone:* (02) 439-7072
*FIDOnet:* 711/408
*Access:* Mem VA

**Nebula RAPL**
*Sysop:* Sean Craig
*Phone:* (02) 407-2729
*Baud:* V21 V22 V22bis V23 B103 B212
*Access:* Mem VA
*Computer:* Apple IIgs
*BBSoftware:* Big Bikkies

**NetComm Australia**
*Sysop:* Bill Bolton
*Phone:* (02) 887-3297
*FIDOnet:* 3/113
*Baud:* V22 V22bis PEP
*Access:* File Server
*Hours:* Weekdays: 1900 – 0900Weekends: 24 Hours
*Note:* Software support system for FidoNet SysOps – File Request ONLY Wazoo and Bark requests honoured

**Newcastle Amiga BBS**
*Sysop:* Stan White
*Phone:* (049) 58-7099
*Baud:* V21 V22 V22bis V23
*Access:* Public
*Computer:* Amiga 1000
*BBSoftware:* BBS-PC!

**Newcastle Micro Club RCPM**
*Sysop:* Tony Nicholson
*Phone:* (049) 68-5289
*Baud:* V21 V22 V23
*Access:* Mem VA
*Hours:* Weekdays: 1700 – 0830-Weekends: 24 Hours
*Computer:* Ferguson Big Board
*DOS:* CP/M80+
*BBSoftware:* ROS

**Night Shift BBS**
*Sysop:* Binky
*Phone:* (02) 635-8175
*Baud:* V21 V22 V23 B103 B212
*Access:* Public
*Hours:* Daily: 2030 – 0500
*Computer:* TRS-80
*DOS:* OS-9 Level II
*BBSoftware:* TABBS

**Nightmare BBS**
*Sysop:* Todd Wright
*Phone:* (02) 545-1132
*FIDOnet:* 712/503
*Baud:* V21 V22 V22bis V23
*Access:* Reg
*Computer:* FTC 1600XT
*DOS:* PC DOS
*BBSoftware:* Opus

**Omen RTRS**
*Sysop:* Ted Romer
*Phone:* (02) 498-2495
*Baud:* V21 V23
*Access:* Public
*Hours:* Weekdays: 1630 – 0900-Weekends: 24 Hours

**Palantir C-64 BBS**
*Sysop:* Steve Sharp
*Phone:* (060) 40-1284
*Baud:* V21 V22 V22bis V23 B103 B212
*Access:* Reg VA
*BBSoftware:* Punter

**Pandemonium**
*Sysop:* Mark Farnan
*Phone:* (02) 411-7642
*FIDOnet:* 711/414
*Baud:* V21 V22 V22bis V23 B103 B212
*Access:* Reg VA
*Computer:* IBM XT Clone
*DOS:* MS DOS
*BBSoftware:* QuickBBS

**Paragon Bulletin Board**
*Sysop:* Jennifer Allen
*Phone:* (02) 597-7477
*FIDOnet:* 712/502
*Baud:* V21 V22 V22bis V23
*Access:* Reg VA
*BBSoftware:* TBBS

**PC Users Group – IBM Board**

*Sysop:* John Clarke
*Phone:* (02) 724-6813
*Baud:* V21 V22 V22bis V23
*Access:* Reg LVA
*Computer:* IBM AT
*DOS:* PC DOS
*BBSoftware:* Opus

**PC Users Group – Microcomp Board**
*Sysop:* Bruce Edney
*Phone:* (02) 540-1842
*FIDOnet:* 712/505
*Baud:* V21 V22 V22bis V23
*Access:* Mem Reg VA
*Computer:* IBM PC
*DOS:* PC DOS
*BBSoftware:* Opus

**PC Users Group – Westpac Board**
*Sysop:* Geoff May
*Phone:* (02) 221-5520
*Baud:* V21 V22 V23
*Access:* Mem VA
*Computer:* IBM PC
*DOS:* PC DOS
*BBSoftware:* Opus

**Phantomland**
*Sysop:* Bob James
*Phone:* (02) 399-7716
*Baud:* V21 V22 V23
*Access:* Reg VA
*Computer:* C-64
*BBSoftware:* KBBS

**Playground BeeBS**
*Sysop:* Brett Selwood
*Phone:* (02) 53-9688
*FIDOnet:* 712/504
*Baud:* V21 V22 V22bis V23
*Access:* Mem Reg LVA
*Computer:* IBM AT Clone
*DOS:* MS DOS
*BBSoftware:* Opus

**Poet's Dilemma**
*Sysop:* John Della-Torre
*Phone:* (02) 804-6412
*Baud:* V21 V22 V22bis V23
*Access:* Public
*Computer:* IBM PC
*DOS:* PC DOS
*BBSoftware:* GTPower

**Program Paradise**
*Sysop:* Matthew Wood & Andrew Avery
*Phone:* (02) 969-5861
*Baud:* V21 V22 V22bis V23
*Access:* Mem Reg
*Hours:* Daily: 1600 – 0700
*Computer:* IBM XT Clone
*DOS:* MS DOS
*BBSoftware:* QuickBBS

**Prophet TBBS**
*Sysop:* Larry Lewis
*Phone:* (02) 628-5222
*FIDOnet:* 713/600
*Baud:* V21 V22 V22bis V23
*Access:* Public
*Computer:* IBM XT Clone
*DOS:* PC DOS
*BBSoftware:* TBBS

**RCOM C-64 BBS**
*Sysop:* Simon Finch
*Phone:* (02) 667-1930
*Baud:* V21 V22 V23 V23ORG B103 B212
*Access:* Reg VA
*Computer:* C-64
*BBSoftware:* RCOM
*Note:* Requires UlatraTerm or Palette on C-64

**RUNX**
*Sysop:* Mark Webster
*Phone:* (02) 487-2426
*Baud:* V21 V22 V22bis V23
*Access:* Mem LVA
*Computer:* PDP11/73
*DOS:* Xenix

**SBA BBS**
*Sysop:* Bob Wilson
*Phone:* (02) 411-1850
*FIDOnet:* 711/406
*Baud:* V22 V22bis
*Access:* Reg LVA
*Computer:* IBM AT
*DOS:* PC DOS
*BBSoftware:* Opus

**Sci-Fi BBS**
*Sysop:* Greg Hope
*Phone:* (02) 646-4865
*Baud:* V21 V22 V23
*Access:* Public

**Sentry**
*Sysop:* Trev Roydhouse
*Phone:* (02) 428-4687
*FIDOnet:* 711/401
*Baud:* V21 V22 V22bis V23
*Access:* Mem VA
*Computer:* IBM AT Clone
*BBSoftware:* Opus

**Shore BBS**
*Sysop:* Jason Sharp & David Kok
*Phone:* (02) 959-3936
*Baud:* V21
*Access:* Reg VA
*Hours:* Weekdays: 1800 – 0730- Weekends: 24 Hours
*Computer:* Macintosh
*DOS:* HFS
*BBSoftware:* Red Ryder Host

**Silent Running**
*Sysop:* Frank Sinatra
*Phone:* (02) 599-1711
*Baud:* V21 V22 V22bis V23
*Access:* Reg
*Hours:* Weekdays: 1430 – 0730- Weekends: 24 Hours
*Computer:* Apple
*DOS:* PRO DOS
*BBSoftware:* Prime

**SMUG Bee RCP/M**
*Sysop:* Stephen Thompson
*Phone:* (02) 476-6396
*Baud:* V21 V22 V22bis V23
*Access:* Mem Reg VA
*Computer:* Microbee
*DOS:* CP/M80
*BBSoftware:* PBBS

**Software Connection**
*Sysop:* Graeme Nichols
*Phone:* (02) 975-1006
*FIDOnet:* 714/404
*Baud:* V21 V22 V22bis V23 B103 B212
*Access:* Reg VA
*Computer:* IBM XT Clone
*DOS:* PC DOS
*BBSoftware:* Opus

**Software Tools**
*Sysop:* Bill Bolton
*Phone:* (02) 449-2618
*FIDOnet:* 711/403
*Baud:* V22bis PEP
*Access:* Reg VA
*Computer:* Sharp 7501 AT
*DOS:* PC DOS
*BBSoftware:* Opus

**Sorcerer Users Group**
*Sysop:* John Cepak
*Phone:* (02) 626-8020
*FIDOnet:* 713/607
*Baud:* V22 V22bis B103
*Access:* Mem VA
*BBSoftware:* Opus

**Sorcim microS**
*Sysop:* John Caine
*Phone:* (065) 59-8854
*FIDOnet:* 711/405
*Baud:* V21 V22 V22bis V23 PEP
*Access:* Reg
*Hours:* Daily: 2100 – 0800
*BBSoftware:* QuickBBS

**Steel City**
*Sysop:* Craig Sinclair
*Phone:* (042) 83-7247
*FIDOnet:* 712/420
*Baud:* V21 V22 V22bis V23
*Access:* Reg LVA
*Computer:* IBM XT Clone
*DOS:* MS DOS
*BBSoftware:* Opus

**Tachyonics**
*Sysop:* Richard Lenz
*Phone:* (02) 438-2682
*FIDOnet:* 620/402
*Baud:* V21 V22
*Access:* Reg VA
*BBSoftware:* Fido

**Texpac Electronic Magazine**
*Phone:* (02) 319-1009
*Access:* Mem LVA

**The Black Hole**
*Sysop:* Ken Thompson
*Phone:* (02) 81-4253
*Baud:* V21 V22 V22bis V23 B103 B212
*Access:* Reg VA
*Computer:* IBM XT Clone
*DOS:* MS DOS
*BBSoftware:* GTPower

**The Exchange KBBS**
*Sysop:* Scott Caundle
*Phone:* (02) 644-9211
*Baud:* V21
*Hours:* Daily: 1900 – 0730
*Computer:* C-64
*BBSoftware:* KBBS

**The Ivory Tower**
*Sysop:* Colin Leslie
*Phone:* (02) 668-8021
*FIDOnet:* 712/624
*Baud:* V21 V22 V22bis V23 B103 B212
*Access:* Public
*Computer:* IBM XT Clone
*DOS:* MS DOS
*BBSoftware:* Opus

**The Kiwi Konektion**
*Sysop:* Robert Earle
*Phone:* (02) 439-6178
*FIDOnet:* 711/410
*Baud:* V21 V22 V22bis V23
*Access:* Reg VA
*Computer:* IBM XT
*DOS:* PC DOS
*BBSoftware:* Opus

**The Lost Tavern**
*Sysop:* Sean Murphy
*Phone:* (02) 938-6836
*FIDOnet:* 714/902
*Baud:* V21 V22 V22bis V23
*Computer:* Blue Chip PC/XT
*DOS:* PC DOS
*BBSoftware:* QuickBBS

**The Runway**
*Sysop:* Colin Lean
*Phone:* (02) 569-5130
*FIDOnet:* 712/506
*Baud:* V21 V22 V22bis V23
*Access:* Reg VA
*Computer:* IBM XT
*DOS:* PC DOS
*BBSoftware:* Opus

**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 (???)
*BBSoftware:* RBBS V151a

**Trantor**
*Sysop:* Matthew Geier
*Phone:* (02) 543-6899
*Baud:* V21 V22 V22bis B103 B212
*Computer:* MicroBee
*DOS:* CP/M
*BBSoftware:* ROS
*Note:* * RINGBACK *

**Triops BBS**
*Sysop:* Pdisk
*Phone:* (063) 62-9715
*Baud:* V21
*Access:* Public
*Hours:* Daily: 2100 – 1800
*Computer:* C-128
*BBSoftware:* KBBS

**YABB**
*Sysop:* Jonathan Chin
*Phone:* (02) 804-6837
*FIDOnet:* 711/803
*Baud:* V21 V22 V22bis V23 B103 B212
*Access:* Reg VA
*Computer:* IBM XT Clone
*DOS:* MS DOS
*BBSoftware:* TBBS

**Zeta**
*Sysop:* Nick Andrew
*Phone:* (02) 627-4177
*FIDOnet:* 713/602
*Baud:* V21 V22 V22bis V23 B103 B212
*Access:* Mem VA
*Computer:* TRS-80
*DOS:* NEWDOS 80
*Note:* C, Unix & Minix Users

## NEW ZEALAND

**Poly Vox ///**
*Sysop:* Darrin Gordon
*Phone:* (03) 79-1917
*Baud:* V21 V22 V22bis
*Access:* Reg
*Hours:* Weekdays: 2100 - 0700Weekends: 24 Hours
*Computer:* IBM PC Clone
*DOS:* MS DOS
*BBSoftware:* Opus

**QuantumNET**
*Sysop:* Jeff Whiteside
*Phone:* (064) 36-9602
*Baud:* V21 V22
*Access:* Mem
*Computer:* IBM AT Clone
*BBSoftware:* BBS-PC!

**Southern Express!**
*Sysop:* Phil Walding
*Phone:* (024) 87-7440
*Baud:* V21 V22 V23
*Access:* Reg LVA
*Computer:* Atari 130 XE
*DOS:* Sparta DOS
*BBSoftware:* BBS Express!
*Note:* Logon either ASCII or ATASCII

## NORTHERN TERRITORY

**Outback RCPM**
*Sysop:* Phil Sampson
*Phone:* (089) 27-7111
*Baud:* V21 V23
*Access:* Public
*Computer:* Bigboard II
*DOS:* CP/M80
*BBSoftware:* Minirbbs

## PAPUA NEW GUINEA

**PNG One**
*Sysop:* Daltron
*Phone:* (675) 25-6984
*FIDOnet:* 710/11
*Baud:* V21 V22 V22bis V23 B103 B212

## QUEENSLAND

**Access North Queensland**
*Sysop:* Access NQ
*Phone:* (070) 51-0566
*Baud:* V21 V22 V23
*Access:* Reg LVA
*Computer:* IBM Clone
*DOS:* MS DOS
*BBSoftware:* Videotex-Multi User

**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
*BBSoftware:* PBBS
*Note:* 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 IIe
*BBSoftware:* GBBS PRO

**Apple-Q Node 2**
*Sysop:* Kelvin Saggers
*Phone:* (07) 800-4660
*Baud:* V21 V22 V22bis V23
*Access:* Mem
*Hours:* Weekdays: 2130 – 0530

**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
*Note:* User Works Node #2

**Commodore Computer Users Group**
*Sysop:* Greg Shea
*Phone:* (07) 344-1833
*Baud:* V21 V22 V22bis V23 B103 B212
*BBSoftware:* Punter

**Comtel BBS**
*Sysop:* Warren Mason
*Phone:* (077) 89-1655
*Baud:* V21 V22 V22bis V23 B103 B212
*Access:* Mem VA
*Computer:* Commodore 64
*DOS:* Basic IEEE
*BBSoftware:* Comtel

**Cyberpunk City**
*Sysop:* Greg Mc Cormick
*Phone:* (07) 355-0760
*FIDOnet:* 640/303
*Baud:* V21 V22 V23 B103 B212

**Educational RBBS**
*Sysop:* Andrew Waddell
*Phone:* (07) 266-3369
*Baud:* V21 V22 V22bis V23
*Access:* Mem VA
*Computer:* IBM XT clone
*BBSoftware:* Mailbox
*Note:* USERWORKS Node #1

**Electric Dreams BBS**
*Sysop:* Joe Altoff
*Phone:* (07) 399-1322
*Baud:* V21 V22 V23
*Access:* Mem VA
*Note:* User Works Node # 5

**FAR-NOR-64 BBS**
*Sysop:* Ian Pearse
*Phone:* (070) 54-6892
*Baud:* V21 V22 V23 B103 B212
*Access:* Mem Reg LVA
*Computer:* C-64
*DOS:* BASIC IEEE
*BBSoftware:* BBS64

**Greenhorn Experimental**
*Sysop:* Mike Richardson
*Phone:* (07) 208-2640
*FIDOnet:* 640/301
*Baud:* V21 V22 V22bis V23
*Access:* Reg VA
*Computer:* Cleveland 286
*DOS:* MS DOS
*BBSoftware:* Opus

**Hi-Tech CBBS**
*Sysop:* Clyde Smith-Stubbs
*Phone:* (07) 300-5235
*Baud:* V21 V22 V23

**Kangaroo Point TAFE**
*Sysop:* Troy O'Malley
*Phone:* (07) 393-1763
*Hours:* Weekdays: 0900 - 2200Weekends: 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
*FIDOnet:* 640/501
*Baud:* V22 V22bis B103 PEP
*Access:* Reg VA
*Computer:* Cleveland 286
*BBSoftware:* Opus

**MilliWays BBS**
*Sysop:* Geoff Ryan
*Phone:* (07) 285-5814
*Baud:* V21 V22 V22bis V23 B103 B212
*DOS:* PC DOS
*BBSoftware:* Focus

**Missing Link BBS**
*Sysop:* Mike Barber
*Phone:* (07) 808-3094
*Baud:* V21 V22 V23
*Access:* Reg
*Computer:* C-64
*BBSoftware:* Punter

**NQ Connection**
*Sysop:* Geoff Gordon
*Phone:* (077) 79-7660
*FIDOnet:* 640/710
*Baud:* V22 V22bis B103 PEP
*Access:* Reg VA
*Computer:* Kaypro XT
*DOS:* MS DOS
*BBSoftware:* Fido

**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
*FIDOnet:* 640/203
*Baud:* V21 V22 V22bis V23
*Access:* Reg VA
*Hours:* Weekdays: 1700 - 0800Weekends: 24 Hours
*Computer:* IBM Clone
*BBSoftware:* Fido

**Rock Cave BBS**
*Sysop:* Rick Dalley
*Phone:* (07) 395-1809
*Access:* Mem VA
*Note:* User Works Node # 4

**Sidecar Express BBS**
*Sysop:* Brendan Pratt
*Phone:* (075) 46-3252
*Baud:* V21 V22 V22bis V23 B103 B212
*Access:* Mem Reg
*Computer:* Amiga Sidecar
*DOS:* MS DOS
*BBSoftware:* Focus
*Note:* User works node 7

**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
*FIDOnet:* 640/702
*Baud:* V21 V22 V22bis V23
*Access:* Mem LVA
*Computer:* IBM Clone
*DOS:* MS DOS
*BBSoftware:* Opus

**Sunshine Coast Connection**
*Sysop:* Brian Boseley
*Phone:* (071) 44-2889
*FIDOnet:* 640/401
*Baud:* V21 V22 V22bis V23
*Access:* Public
*Hours:* Mon - Sat: 2000 - 0800; Sun: 24 Hours
*Computer:* IBM AT Clone
*DOS:* MS DOS
*BBSoftware:* Opus

**TommorrowLand BBS**
*Sysop:* David Drummond
*Phone:* (07) 371-0944
*FIDOnet:* 640/305
*Baud:* V21 V22 V23
*Access:* Reg LVA
*Computer:* Cleveland PCII
*DOS:* MS DOS
*BBSoftware:* Opus

**Toowoomba RBBS**
*Sysop:* Chris White
*Phone:* (076) 30-1762
*Baud:* V21
*Access:* Mem Reg LVA
*Hours:* Daily: 2100 to 0630
*Computer:* C-128

**TurboLink Australia**
*Sysop:* Viv Brunner
*Phone:* (07) 262-1414
*Baud:* V21 V22 V22bis V23 B103 B212
*Computer:* IBM XT Clone
*DOS:* MS DOS
*BBSoftware:* Opus

**Youth Extension Service (Toowoomba)**
*Sysop:* Wayne Bucklar
*Phone:* (076) 39-1790
*FIDOnet:* 640/302
*Baud:* V21 V23
*Access:* Public
*Computer:* Sperry
*DOS:* MS DOS
*BBSoftware:* Opus

## SOUTH AUSTRALIA

**ADelaide AMiga user group (ADAM)**
*Sysop:* Greg Hicks
*Phone:* (08) 270-2455
*FIDOnet:* 680/805
*Baud:* V21 V22 V22bis V23
*Access:* Reg LVA
*Computer:* IBM AT
*DOS:* MS DOS
*BBSoftware:* PC Board

**Aquarium BBS**
*Sysop:* Bream LeFish / Martin Sandiford
*Phone:* (08) 270-4341
*FIDOnet:* 680/807
*Baud:* V21 V22 V22bis V23
*Access:* Mem Reg VA
*Computer:* PC230
*DOS:* MS DOS
*BBSoftware:* Custom (Aquarium)

**Burning Bush**
*Sysop:* Douglas Carthew
*Phone:* (08) 272-8405
*FIDOnet:* 680/811
*Baud:* V21 V22 V22bis V23
*Access:* Public
*Computer:* IBM XT Clone
*DOS:* MS DOS
*BBSoftware:* Opus

**Multiple System BBS**
*Sysop:* Danny Vozzo
*Phone:* (08) 255-5116
*Baud:* V21 V22 V22bis V23
*Access:* Reg LVA
*Computer:* Apple II+
*DOS:* Apple DOS
*BBSoftware:* GBBS

**Nexus Education Dept BBS**
*Phone:* (08) 243-2477
*Baud:* V21
*Access:* Mem

**Oracle PC-Network**
*Sysop:* Don Crago & Grayham Smith
*Phone:* (08) 260-6222
*FIDOnet:* 680/804
*Baud:* V21 V22 V22bis V23
*Access:* Mem LVA
*Computer:* IBM AT Clone
*DOS:* PC DOS
*BBSoftware:* TBBS

**Phone Box BBS**
*Sysop:* Darryl Merritt
*Phone:* (08) 380-5505
*FIDOnet:* 681/854
*Baud:* V21 V22 V23
*Access:* Public
*Computer:* Mitec
*DOS:* MS DOS
*BBSoftware:* Opus

**S A C BBS**
*Sysop:* Austen Evans
*Phone:* (08) 387-0249
*Baud:* V21 V22 V23 V23ORG B103 B212
*Access:* Mem LVA
*Computer:* C-128
*BBSoftware:* Blue Board

**Sorcerer Users Group BBS**

*Sysop:* Steve Fraser
*Phone:* (08) 260-6576
*Baud:* V21
*Access:* Mem LVA
*Computer:* Pulsar LBB
*DOS:* CP/M
*BBSoftware:* ROS

**The IDN Board**
*Sysop:* Dave Winfield
*Phone:* (08) 352-2252
*FIDOnet:* 681/852
*Baud:* V21 V22 V22bis
*Access:* Reg LVA
*Computer:* IBM Clone
*BBSoftware:* Opus

**The Olympic Board**
*Sysop:* Greg Sanderson
*Phone:* (08) 265-4232
*FIDOnet:* 680/801
*Access:* Public
*Computer:* IBM AT Clone
*DOS:* PC DOS
*BBSoftware:* Opus

**Trivia BBS**
*Sysop:* Daron Ryan
*Phone:* (08) 377-0049
*Baud:* V21 V23
*Hours:* Weekdays: 1800 - 0800; weekends: 24 Hours
*DOS:* MS DOS
*BBSoftware:* QBBS

## TASMANIA

**Hobart Users Bulletin Board**
*Sysop:* Alan Hughes
*Phone:* (002) 43-5041
*FIDOnet:* 670/700
*Baud:* V21 V22 V23
*Access:* Reg VA
*Computer:* IBM XT Clone
*DOS:* PC DOS
*BBSoftware:* Opus

**Tassie Bread Board System**
*Sysop:* Ian Campbell
*Phone:* (003) 26-4248
*FIDOnet:* 670/751
*Baud:* V21 V22 V22bis V23
*Access:* Mem LVA
*Computer:* Kaypro PC
*DOS:* MS DOS
*BBSoftware:* TBBS

## VICTORIA

**ABE Opus**
*Sysop:* Paul O'Connor
*Phone:* (03) 288-3599
*Baud:* V21 V22 V23
*Access:* Plic

**ACES High**
*Sysop:* Daryl Harvey
*Phone:* (03) 878-2918
*Baud:* V21 V22 V23
*Access:* Public
*DOS:* PRODOS
*BBSoftware:* GBBSPro

**AIM – A)ccess I)n M)elbourne**
*Sysop:* David Hellwege
*Phone:* (03) 592-3338
*FIDOnet:* 633/361
*Baud:* V22 V22bis
*Access:* Reg VA
*Computer:* IBM Clone
*BBSoftware:* Opus

**AM-NET RTDOS**
*Sysop:* Peter Hallgarten
*Phone:* (03) 366-7055
*Baud:* V21 V23
*Access:* Mem VA
*Computer:* Pulsar 8000
*DOS:* TurboDos
*BBSoftware:* RBBS4
*Note:* 147.600 Mhz VK3RPA (Radio)1200 bps Amateur Packet Radio

**AmigaLink**
*Sysop:* Bohdan Ferens
*Phone:* (03) 792-3918
*FIDOnet:* 631/324
*Baud:* V21 V22 V23

**Anzugs CBCS**
*Sysop:* Gordon Castle
*Phone:* (03) 563-2496
*FIDOnet:* 631/329
*Baud:* V21 V22 V22bis V23
*Access:* Mem Public
*Computer:* IBM Model 80
*DOS:* PC DOS
*BBSoftware:* Opus

**AUSOM Apple II BBS**
*Sysop:* Grahame Willis
*Phone:* (03) 877-1990
*Baud:* V21
*Access:* Public

**Ballarat C.A.E.**
*Sysop:* Paul Kelly
*Phone:* (053) 339-285
*Baud:* V21 V22 V23
*Access:* Reg VA
*Computer:* IBM XT
*DOS:* PC DOS
*BBSoftware:* Opus

**Bayside Opus**
*Sysop:* Paddy Plebanowicz
*Phone:* (052) 53-1110
*FIDOnet:* 630/313
*Baud:* V21 V22 V22bis V23
*Access:* Reg Public
*Computer:* IBM Clone
*BBSoftware:* Opus

**Big Tedd's Bulletin Board**
*Sysop:* Rob Bates
*Phone:* (03) 509-6067
*FIDOnet:* 630/308
*Baud:* V21 V22 V23
*Access:* Reg LVA
*Computer:* IBM XT Clone
*BBSoftware:* Opus

**Brainstorm Australia**
*Sysop:* Rowan Stevens
*Phone:* (03) 758-7086
*FIDOnet:* 631/322
*Baud:* V21 V22 V22bis V23 B103 B212
*Computer:* IBM XT
*DOS:* MS DOS
*BBSoftware:* Opus

**C-64 BBS**
*Sysop:* Alan Miles
*Phone:* (03) 489-4555
*Access:* Public

**Cave 76**
*Sysop:* Avatar
*Phone:* (03) 882-9179
*Baud:* V21 V22 V22bis V23
*Hours:* Daily: 1800 – 1000
*Computer:* IBM XT Clone

**COM ONE**
*Phone:* (057) 62-5150
*Baud:* V21
*Access:* Public

**Compusoft BBS**
*Sysop:* George Tsoukas
*Phone:* (03) 386-6019
*Baud:* V21 V22 V22bis V23 B103 B212
*Access:* Reg VA
*Computer:* Mitac 386
*BBSoftware:* Opus

**Crystal Palace**
*Sysop:* Chris Brunton
*Phone:* (03) 725-1923
*Baud:* V21 V22

**Crystal Symphony Opus**
*Sysop:* Greg Jones
*Phone:* (03) 874-4176
*FIDOnet:* 632/346
*Baud:* V21 V22 V22bis V23 B103 B212
*Access:* Mem VA
*Hours:* Daily: 2200 – 0700
*Computer:* IBM XT Clone
*DOS:* PC DOS
*BBSoftware:* Opus

**Custom Programming OPUS**
*Sysop:* Allan Williamson
*Phone:* (03) 848-3331
*FIDOnet:* 632/340
*Baud:* V21 V22 V22bis V23 B103 B212
*Access:* Mem VA
*Computer:* IBM PC Clone
*DOS:* PC Dos
*BBSoftware:* Opus

**DECUS**
*Sysop:* Peter Hill
*Phone:* (03) 62-5806
*Baud:* V21 V22 V22bis V23
*Access:* Mem VA

**Delta BBS**
*Sysop:* Big Mother
*Phone:* (03) 793-4548
*Baud:* V21 V22 V22bis V23
*Access:* Reg
*Computer:* Apple IIE
*BBSoftware:* GBBS PRO

**Down Under Amiga/IBM**
*Sysop:* Greg Hudson
*Phone:* (03) 429-5819
*FIDOnet:* 630/306
*Baud:* V22 V22bis V23
*Access:* Public
*Computer:* Compaq 386
*DOS:* PC DOS
*BBSoftware:* Opus

**East Suburb Eighty User Group**
*Sysop:* Martin Axford
*Phone:* (03) 819-5179
*FIDOnet:* 632/347
*Baud:* V21 V22 V23 V23ORG

**Eastcomm Opus BBS**
*Sysop:* Keith Haslam
*Phone:* (03) 288-0775
*FIDOnet:* 630/312
*Baud:* V21 V22 V23 V23ORG
*Access:* Public
*Computer:* Eastcomm PC/AT
*DOS:* PC DOS
*BBSoftware:* Opus

**Eastwood Opus**
*Sysop:* Mick Stock
*Phone:* (03) 870-4623
*FIDOnet:* 632/343
*Baud:* V22 V23
*Access:* Reg VA
*BBSoftware:* Opus

**Electronic Cross-Over BBS**
*Sysop:* Stephen Paddon
*Phone:* (03) 367-5816
*Baud:* V21 V22 V22bis V23
*Computer:* IBM AT
*BBSoftware:* QuickBBS

**Engbase CBCS**
*Sysop:* Greg Furlong
*Phone:* (03) 29-6336
*FIDOnet:* 631/325
*Baud:* V21 V22
*BBSoftware:* Opus

**Entropy BBS**
*Sysop:* John Hardy
*Phone:* (03) 583-9747
*FIDOnet:* 632/244
*Baud:* V21 V22 V23
*Access:* Public
*Computer:* IBM XT
*DOS:* MS DOS
*BBSoftware:* Opus

**EXCALIBUR-64 RCP/M**
*Sysop:* Maurice Copeland
*Phone:* (057) 83-1964
*Baud:* V21 V22 V23 V23ORG
*Access:* Public
*Hours:* Weekdays: 1800 – 0800-Weekends: 24 Hours

**L & A Opus BBS**
*Sysop:* Phillip Kelly
*Phone:* (03) 800-3215
*FIDOnet:* 631/327
*Baud:* V21 V22 V22bis V23
*Access:* Reg LVA
*Computer:* IBM AT
*DOS:* PC DOS
*BBSoftware:* Opus

**Labyrinth**
*Sysop:* Stephen Jones
*Phone:* (03) 318-6562
*Baud:* V21 V23
*Access:* Reg VA
*Computer:* IBM XT Clone
*DOS:* MS DOS
*BBSoftware:* Fido

**MACE-ATARI BBS**
*Sysop:* Stuart Szabo & John Burgess
*Phone:* (03) 899-6203
*Baud:* V21 V22 V23
*Access:* Mem VA

**MacLink BBS**
*Sysop:* Roger Harris
*Phone:* (03) 772-4098
*Baud:* V21 V22 V23

**Maxitel BBS**
*Sysop:* Jos Van Der Sman
*Phone:* (03) 882-6188
*Baud:* V21
*Access:* Public
*Computer:* C-64
*BBSoftware:* FPR BBS

**MBUG Australia Inc**
*Sysop:* Mike Thompson
*Phone:* (03) 882-9421
*FIDOnet:* 633/362
*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
*FIDOnet:* 633/360
*Baud:* V22 V22bis V23
*Access:* Reg VA
*BBSoftware:* Opus

**Melbourne PC Users Group BBS**
*Sysop:* Charles Sandercock
*Phone:* (03) 819-5392
*FIDOnet:* 631/323
*Access:* Public
*DOS:* MS DOS
*BBSoftware:* Opus

**Melbourne PIE**
*Sysop:* Len Gould
*Phone:* (03) 878-5743
*FIDOnet:* 632/351
*Baud:* V21 V22 V22bis V23

**Mercury BBS**
*Sysop:* John Fisher & John Swanland
*Phone:* (03) 887-1475
*Baud:* V21

**MESA RBBS**
*Sysop:* David Woodberry
*Phone:* (03) 754-5081
*FIDOnet:* 632/349
*Baud:* V21 V22 V23
*Access:* Mem Reg VA
*Computer:* IBM XT Clone
*DOS:* MS DOS
*BBSoftware:* Opus

**Micom BBS**
*Sysop:* Peter Jetson
*Phone:* (03) 762-5088

**Midnight Frog BBS**
*Sysop:* Scott Enwright
*Phone:* (03) 596-1589
*FIDOnet:* 630/303
*Baud:* V21 V22 V22bis V23
*Access:* Public

**Miki's Opus CBCS**
*Sysop:* Miklos Bolvary & Emil Zudic
*Phone:* (03) 887-1756
*Baud:* V22 V22bis B103 B212
*Access:* Reg VA
*Hours:* Daily: 2100 – 0900
*Computer:* ELT 286 Baby AT
*DOS:* PC DOS
*BBSoftware:* Opus

**MIN-NET BBS**
*Sysop:* Max Fields
*Phone:* (054) 41-3013
*Access:* Public

**MouseText**
*Sysop:* Glen McBride
*Phone:* (059) 42-5528
*Baud:* V23
*Hours:* Daily: 1000 – 2200
*BBSoftware:* Videotext
*Note:* 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

**Outer Limits BBS**
*Sysop:* Peter Dorell
*Phone:* (03) 725-2895
*Baud:* V21 V22 V23

**Pacific Island**
*Sysop:* Craig Bowen
*Phone:* (03) 890-2174
*Baud:* V21 V22 V22bis
*Computer:* Apple
*BBSoftware:* GBBS

**Pegasus**
*Sysop:* Lee Gordon-Brown
*Phone:* (03) 725-4948
*FIDOnet:* 630/309
*Baud:* V21 V22 V23
*Access:* Public
*Hours:* Weekdays: 1700 – 0900-Weekends: 24 Hours
*Computer:* IBM AT
*DOS:* MS DOS
*BBSoftware:* Opus

**Sams**
*Sysop:* Alan Haslar
*Phone:* (03) 563-1117
*FIDOnet:* 630/305
*Baud:* V21 V22 V22bis V23
*Access:* Public

**Software Bank**
*Sysop:* Simon Walsh
*Phone:* (03) 820-1632
*FIDOnet:* 632/342
*Baud:* V21 V22 V22bis V23
*Access:* Reg LVA
*Computer:* IBM Clone
*DOS:* PC DOS
*BBSoftware:* Opus

**Sotec BBS**
*Sysop:* Jim Tsorlinis
*Phone:* (03) 890-8166
*Baud:* V22 V22bis B103 B212
*Access:* Reg VA
*Computer:* Sotec XT Turbo
*DOS:* PC DOS
*BBSoftware:* Opus

**Southern Mail**
*Sysop:* Maurie Halkier
*Phone:* (03) 725-1621
*FIDOnet:* 631/320
*Baud:* V22 V22bis
*Access:* Public
*Computer:* Eastcomm PC/XT
*DOS:* PC DOS
*BBSoftware:* Opus

**Super Dimensional BBS**
*Sysop:* Mulia Marzuki
*Phone:* (03) 560-2659
*Baud:* V22 V22bis
*Hours:* Daily: 2100 – 0800
*BBSoftware:* Opus

**Tardis II**
*Sysop:* Malcolm Miles
*Phone:* (03) 859-3109
*Baud:* V21 V22 V22bis V23
*Access:* Public
*Computer:* PC
*DOS:* Concurrent DOS
*BBSoftware:* 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
*BBSoftware:* Videotext
*Note:* Videotext Compatible ONLY

**The Amiga Limits**
*Sysop:* Captain Kirk
*Phone:* (03) 725-2895
*Baud:* V21 V22 V23
*Access:* Reg VA
*Computer:* IBM AT
*DOS:* PC DOS
*BBSoftware:* QuickBBS

**The Australian Pub with NO Beer**
*Sysop:* Grahame Mitchell
*Phone:* (03) 736-1814
*FIDOnet:* 632/350
*Baud:* V21 V22 V22bis
*Access:* Mem VA
*Computer:* Amstrad 1512
*BBSoftware:* Opus

**The Clone Phone**
*Sysop:* Greg Naylor
*Phone:* (03) 876-4118
*Baud:* V21 V22 V23
*Hours:* Weekdays: 0800 – 2300-Weekends: 24 Hours
*BBSoftware:* Opus

**The Dreamscape BBS**
*Sysop:* Michael White

## Primary electronic collection points

ACT – PC Exchange RIBM (062) 58 1406
NSW – Prophet TBBS (02) 628 5222
Vic. – Brainstorm Australia (03) 758-7086
Qld. – AMPAK RCP/M (07) 263-7070
SA – The Electronic Oracle (08) 260-6222
WA – Nemo Multiple BBS RAPL (09) 370-1855

*Phone:* (03) 562-0489
*Baud:* V21 V22 V22bis V23
*Hours:* Daily: 0700 – 2359
*Computer:* IBM XT
*DOS:* Double Dos
*BBSoftware:* Opus

**The Info-Source BBS**
*Sysop:* Clement Maloney
*Phone:* (03) 397-1165
*Baud:* V21 V22 V22bis V23 B103 B212
*Access:* Mem VA

**The Krime Philes CBCS**
*Sysop:* The Renegade
*Phone:* (03) 743-0324
*Baud:* V21 V22 V22bis V23
*Computer:* Mitac XT
*BBSoftware:* Opus

**The MACBOARD**
*Phone:* (03) 435-9152
*Baud:* V21 V22 V22bis V23
*Access:* Public

**The Magic Pudding**
*Sysop:* Rupert Russell
*Phone:* (03) 429-9681
*FIDOnet:* 633/363
*Baud:* V21 V22 V23
*Access:* Public
*Computer:* IBM XT Clone
*DOS:* MS DOS
*BBSoftware:* Opus

**The NATIONAL CBCS**
*Sysop:* John Blackett-Smith
*Phone:* (03) 25-6904
*FIDOnet:* 630/301
*Access:* Public
*Computer:* IBM AT
*DOS:* MS DOS
*BBSoftware:* Opus

**The Outer Limits**
*Sysop:* Captain Kirk
*Phone:* (03) 725-6650
*Baud:* V21 V22 V23
*Access:* Reg VA
*Computer:* IBM AT
*DOS:* PC DOS
*BBSoftware:* Opus

**The Real Connection**
*Sysop:* The Real Article & Deep Image
*Phone:* (03) 288-0331
*Baud:* V21 V22 V23
*Access:* Public
*Computer:* IBM XT Clone
*DOS:* DoubleDOS
*BBSoftware:* Opus

**The Software Bank**
*Sysop:* Simon Walsh
*Phone:* (03) 820-1632
*FIDOnet:* 632/342
*Baud:* V21 V22 V22bis V23 B103 B212
*Access:* Reg LVA
*Computer:* IBM XT Clone
*DOS:* PC DOS
*BBSoftware:* Opus

**The Time Warp**
*Sysop:* The Alien
*Phone:* (03) 813-1663
*Baud:* V21 V22
*Access:* Reg
*Computer:* IBM XT
*BBSoftware:* Opus

**The Twilite Zone**
*Sysop:* Fearless Fred
*Phone:* (03) 562-0686
*Baud:* V21 V22
*Access:* Reg
*Computer:* IBM XT
*DOS:* MS DOS
*BBSoftware:* Opus

**Thongheads Welfare BBS**
*Sysop:* Thongers
*Phone:* (03) 419-9256
*Baud:* V21 V22 V22bis
*Access:* Reg
*Hours:* Weekdays: 1800 – 0900- Weekends: 24 Hours

**Yarra Valley BBS**
*Sysop:* Frank Conner
*Phone:* (059) 64-3126
*Baud:* V21 V22 V23 B103 B212
*Access:* Mem VA
*Computer:* C-64
*BBSoftware:* Punter

**Zoist**
*Sysop:* Bob Fletcher
*Phone:* (03) 467-7984
*FIDOnet:* 633/366
*Baud:* V21 V22 V22bis V23
*Access:* Mem VA

## WESTERN AUSTRALIA

**Amiga Mouse BBS**
*Sysop:* Martyn Bate
*Phone:* (09) 310-2457
*Baud:* V21 V22 V22bis V23 B103 B212
*Access:* Reg LVA
*Computer:* Amiga 1000
*DOS:* Amiga DOS
*BBSoftware:* BBS-PC!

**AMSNet BBS**
*Sysop:* Ted Marsden
*Phone:* (09) 453-3590
*Baud:* V21 V22 V22bis V23
*Access:* Reg
*Computer:* AMSTRAD PC1512
*DOS:* MS DOS
*BBSoftware:* Opus

**Bit-Board**
*Sysop:* John Hamill
*Phone:* (09) 417-3706
*FIDOnet:* 692/622
*Baud:* V21 V22 V22bis V23
*Access:* Public
*Computer:* Everex AT

**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

**Kardinya Turbo BBS**
*Sysop:* Tony Salmeri
*Phone:* (09) 331-1695
*Baud:* V21 V22 V23 B103 B212
*Access:* Reg LVA
*Computer:* IBM XT Clone
*DOS:* PC DOS
*BBSoftware:* Turbo BBS

**Lightning BBS Line 1**
*Sysop:* Simon Blears
*Phone:* (09) 275-8225
*FIDOnet:* 690/601
*Baud:* V22 V22bis B212 PEP
*Access:* Reg LVA
*Computer:* IBM XT Clone
*DOS:* MS DOS
*BBSoftware:* Opus

**Mini Omen**
*Sysop:* Greg Watkins
*Phone:* (09) 279-8555
*Baud:* V21 V22 V23
*Access:* Public
*Computer:* TRS-80
*DOS:* NewDos
*BBSoftware:* Omen

**Murdoch University ES-BBS1**
*Sysop:* Roger Atkinson
*Phone:* (09) 332-2604
*Baud:* V21
*Access:* Mem VA
*Computer:* Commodore 128D
*DOS:* CP/M
*BBSoftware:* Turbo BBS

**Nemo 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 LVA
*Computer:* Atari

**Pegasus Entertainment System**
*Sysop:* Michael Russell & John Chin
*Phone:* (09) 344-8025
*FIDOnet:* 692/620
*Baud:* V21 V22 V22bis V23
*Access:* Reg VA
*Computer:* Epson AX
*DOS:* MS DOS
*BBSoftware:* Opus

**Perth Omen**
*Sysop:* Mark Dignam
*Phone:* (09) 276-2777
*Baud:* V21 V22 V22bis V23 V23ORG
*Access:* Mem Reg
*Computer:* TRS-80
*DOS:* NewDOS
*BBSoftware:* Omen TRBBS

**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
*FIDOnet:* 691/611
*Baud:* V21 V22 V23

**The Hotel**
*Sysop:* Rod Evans
*Phone:* (09) 325-4752
*FIDOnet:* 691/612
*Baud:* V21 V22 V22bis V23
*Access:* Public
*Computer:* IBM AT Clone
*DOS:* MS DOS
*BBSoftware:* Opus

**The Turing Circus**
*Sysop:* Phil Sutherland
*Phone:* (09) 385-2100
*FIDOnet:* 690/603
*Baud:* V21 V22 V23 B103 B212
*Access:* Public
*Computer:* IBM XT Clone
*DOS:* MS DOS
*BBSoftware:* Opus

**Treasure Island**
*Sysop:* Gloria Platt
*Phone:* (09) 271-0471
*Baud:* V21 V22 V23
*Access:* Reg VA
*BBSoftware:* GBBS PRO

**WA Atari BBS**
*Sysop:* Graham Basden
*Phone:* (09) 306-2134
*Baud:* V21 V22
*Access:* Mem LVA
*Computer:* Atari ST
*DOS:* Atari
*BBSoftware:* 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

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**Microbee Users' Group of South Australia (MUGSA),** The Secretary, GPO Box 767, Adelaide 5001.
**Sega Users' Club,** H. A. Jacobson, 10 Pioneer Avenue, O'Sullivan Beach 5166; (08) 382 7967.
**South Australian Apple Users' Club,** PO Box 322, Prospect 5082; secretary (02) 293 7183. Club caters for Apple II series and Mac computer users.
**South Australian Commodore Computers' User Group,** Clive Palfry, (secretary), PO Box 427, North Adelaide 5006. Meetings first and third Tuesday of each month, 7.30 pm, at ITTE (Information Technology Training & Enterprise), 253 Grenfell St, Adelaide.
**South Australian Commodore User Group** meets on the first Tuesday of every month at Gilles St Primary School. Contact Dr Ian Murdoch on (08) 270 1577.
**South Australian Foundation for Computer Literacy,** Michael Kennett, PO Box 210, Norwood 5067; caters for children from six years (unaccompanied) or four years with older friend or brother or sister. Special emphasis on the needs of handicapped, educationably disabled and socially disadvantaged children, but *all* children welcome. Family participation encouraged. (08) 51 5474.
**South Australian Peach User Group,** Geoff Drury, 27 Creslin Tce, Camden Park 5038; special interest group attached to the SA Microprocessor Group, which holds separate meetings; (08) 295 2778 ah.
**South Australian Microprocessor Group Inc (SAMG),** The Secretary, PO Box 113, Plympton 5038, (08) 278 7288.
**Sorcerer Users' Group of South Australia,** Don Ide, 14 Scott Road, Newton 5074.
**South Australian Apple Users' Club,** The Secretary, c/o The Bookshelf, 169 Pirie Street, Adelaide 5000.
**South Australian Microprocessor Group Inc.(SAMG),** secretary Rick Matthews, 9 Anglesey Ave, St Georges 5064; (08) 79 3445; meets second Friday of every month, Institute of Engineers, Aust Bldg, 11 Bagget St, North Adelaide.
**South East Computer Enthusiasts' Group,** Glenn Mibus, 3 Millard St, Mount Gambier 5290; meetings second and fourth Tuesday of each month from 6.30 pm at Mt Gambier High School Computer Room, for all machines and interested parties. (087) 25 1046.

## Northern Territory

**Alice Springs Microbee Users' Group,** Douglas Craigie, PO Box 1786, Alice Springs 5750; (089) 525 214.
**Darwin Microbee Users' Group (DBUG),** Felino Molina, PO Box 3111, Darwin 5794, (089) 82 5613 bh, (089) 88 1455 ah.
**Darwin PC Users' Group,** Terry O'Brien. Meets on the first Sunday of every month at 8 pm, at 5 Binet Court Malak. (089) 27 4454.
**Northern Territory Computer Club,** Ian Diss; meets at Wulagi Primary School on the first and third Thursday of each month at 7.30 pm. Users of all machines and other interested parties welcome. (089) 27 9208.
**Northern Territory 80 Computer User Group,** R T O'Brien, 433 McMillans Road, Jingili 5792.
**VZ-200 Users' Club,** 7 Abbott Crescent, Malak 5793, (089) 27 2830.

## Western Australia

**Agriculture Users' Group,** c/o Mr R. Fenwick, Department of Agriculture, Albany 6330. For farmers and the agriculture service industries.
**CU West WA Compucolor/Intecolor Users' Group,** John Newman, 8 Hillcrest Drive, Darlington 6070.
**DEC Personal Computer Special Interest Group,** see NSW entry.
**KAOS-WA,** Gerry Ligtermoet, 39 Cloister Ave, Manning 6152; for Ohio Scientific Users. (09) 450 5081.
**Kaypro User Group of Western Australia,** Ainslie Sharpe, PO Box 91, Claremont 6010; meetings second and fourth Mondays of each month in the Canteen of the Department of Agriculture, Jarrah Road, South Perth 6151. (09) 384 5511.
**Microbee Users' Group of Western Australia,** meets at 7 pm on the first Sunday of the month in the Leederville Technical College Cafeteria, Cnr Oxford and Richmond Sts, Leederville. GPO PO Box N1090 Perth 6001; (09) 417 1374 or (09) 44 6819.
**PC Micro Users' Group,** meets on the first tuesday of the month at Royal Kings Park Tennis Club, Lower Tennis Pavilion, Kings Park Road, at 5.30 pm. Contact Peter Goodwin on (08) 274 5911 (B), or on 386 4502 (H).
**OSWEST-Osborne Users' Group of Western Australia,** Mal Ferguson, PO Box 149, Applecross 6153; meets first and third Wednesdays at the Palmyra Recreation Centre and the Subiaco Exhibition Hall respectively from 7.30 pm, for Osborne and other interested computer users. (09) 295 1449.
**Perth 80 Users' Group,** C. Powell; for System 80 and TRS80 users. (09) 457 6849.
**Perth Hitachi Peach Club,** The Secretary, 1 Charf Court, Riverton 6155; for Hitachi Peach and 6809s. (09) 367 5880.
**Perth PC Users Group,** meets on the first Tuesday of each month at the Royal Kings Park Tennis Club. Contact Patrick Roche, 18/11 Scaphella Ave, Mullaloo 6025.
**Sharp PC Users' Group,** John Paulic, PO Box 79, Gosnells 6110, (09) 398 6303.
**Sega Users' Group,** John McClemmon, 33 Favell Way, Balga 6061; (09) 342 5905.
**The Sorcerer & CP/M Users' of Australia,** Dave, 22 Verbena Road, Willetton 6155, (09) 457 1917. Meets every fortnight.
**Sorcerer Computer Users of Australia,** The Secretary, 90 King George Street, South Perth 6151, (09) 367 6351.
**The West Australian Atari Computer Club,** Mr Alf Gaebier (Secretary), PO Box 7169, Cloisters Square, Perth 6000.
**The WA Cromenco Users' Group,** CA Marshall, Suite 2, 294 Rokeby Road, Subiaco 6008. Meets third Tuesday each month. (09) 382 2692.
**TI Users Group of Perth,** Nigel Mercer, PO Box 246 Mt Lawley 6050, (09) 409 9683. Meets on the third Saturday of each month.
**VIC-Ups,** Russ Coppins (secretary), PO Box 178, Nedlands, Perth 6009; (09) 332 5313.
**West Australian Microbee Users Group,** 4 Gannkirk Rd, Greenwood 6024.
**Western Australian Wizzard Users' Group,** John Reid, 13 Wenlock Road, Wattleup 6166, (09) 410 2359.
**Western Australian ZX Users' Group,** Phil Taylor, (09) 328 4111 bh.
**Western Australian University Computer Club,** 2nd Floor, University of WA, Guild Building, (09) 386 1455.

## Tasmania

**Apricot User's Group,** Rick Snell, PO Box 286 C, GPO Hobart 7001, (002) 23 399926.
**DEC Personal Computer Special Interest Group,** see NSW entry.
**Devonport Computer Interest Group,** John Steveson, RSD 422, Sheffield 7306, (004) 92 3237.
**Hobart Tasbeeb.** Meets on the first Friday of the month at Rose Bay High School at 7.30 pm. (002) 34 2704.
**Launceston Microbee Users Group,** Graham Jones, 28 Lavender Grove, Launceston, 7250.
**Down Under Atari User Group;** contact Robert Bronstein, 191 Rokeby Street, Howrah 7018.
**Spectravideo Computer Users' Group,** PO Box 191, Launceston South 7249; membership costs $20, which entitles members to a newsletter and to discounts on computer equipment. (003) 44 2493.
**Southern Tasmanian Amstrad Club,** meets at 7.30 pm on the first Wednesday of the month at Elizabeth Matriculation College (first floor). Contact Vern McKay (002) 29 4528.
**Tandy Hobart Users' Group,** Ms KJ Rees, GPO Box 1271 N, Hobart 7001, (002) 72 1426; meets on the third Thursday of each month – contact Ms Rees for details of venue.
**Tasbeeb,** John Hannon, PO Box 25, North Hobart 7000; meetings first Monday each month at Elizabethan Matriculation College in D Block at 8 pm, for BBC computers. (002) 34 2704.
**Tasmanian Apple Users Group,** Ray Williams, PO Box 188, North Hobart 7008, meets third Tuesday each month at 8.15 pm, 73 Murray Street, Hobart.
**TAS-Micro,** Peter Deckert, 1/456 West Tamar Road, Riverside 7250.

## New Zealand

**Palmerston North Microbee Users' Group,** Contact R Anderson, 6 Hendon Place, Palmerston North, New Zealand. □

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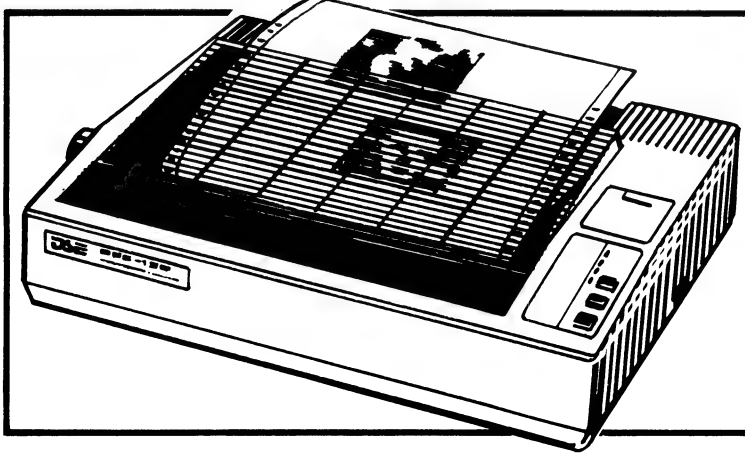

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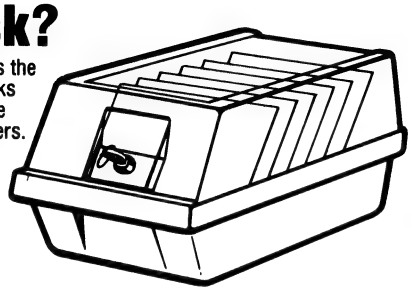

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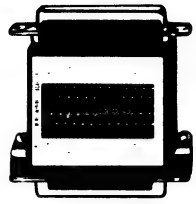

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## Gender Bender Male/Male

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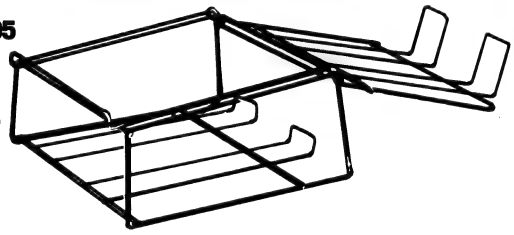

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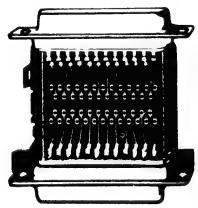

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Similar to above but the connections are made internally and soldered for permanent applications. All 25 pins are open. Wire links supplied ready for soldering. Cat X-3569

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Standard "Centronics" type printer cable with 36 pin Centronics plug (as used by 99% of parallel printers) one end. 25 pin D socket the other. 1.7 metres long. Cat X-8614 **$24.95**

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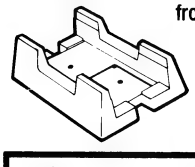

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A series of six entertaining educational games that will help improve a young childs ability to recognise numbers, letters, and words. Cat X-9815 **$34.95**

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Another Australian package, this is a series of three helicopter word games. The first, you fly through the forest in the oppocopter and find the antonym of the displayed word. Then you use the synocopter to land on the synonym of the word displayed. Finally, you use the alphacopter to stack the like words together. Cat X-9817 **$39.95**


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# Hard Copy

## Chris Allen bones up on his knowledge of computer terms – and DOS . . .

### Coming to terms with computer terms.

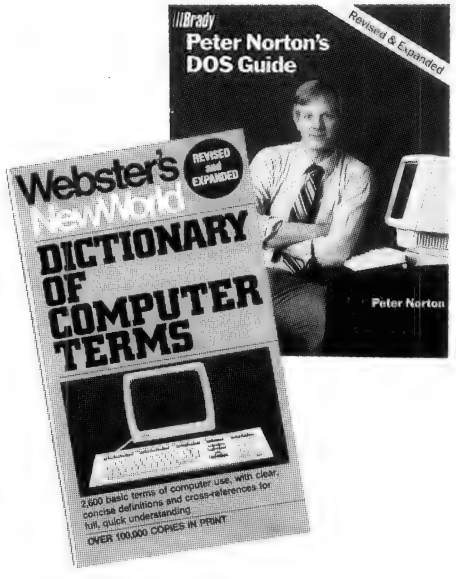
So you think you're smart. Know alot about computers, do you? Well, do you know the difference between a breadboard and a break point, a fox message and a full adder or how about the difference between simplex and full-duplex? If you know those terms you're probably an ex quiz show champion or you've read *Webster's NewWorld Dictionary of Computer Terms* from cover to cover, or both.

The computer industry creates jargon faster than an unsupervised classroom of teenage rebels. Nobody knows them all (and nobody needs to), but if you should need to clarify the meaning of a computer-speak term it is more than likely that the standard English dictionary will be of little assistance. Hence the creation of dictionaries of computer terms.

To be useful, a dictionary needs to be accessible and comprehensive. *Webster's NewWorld Dictionary of Computer Terms* retails for just over $10 – that makes it very accessible. Unfortunately it was published in 1983, and in this industry that fact alone means it cannot be comprehensive. The very latest industry terms such as OS/2 and Transputer are probably not found in any dictionary, so the age of this dictionary must be weighed against its price and your requirements. If you think it is important enough, you will spend $30 to $50 on the best dictionary of computer terms that you can find. Most computer users cannot afford to be without this little gem, if only for its interesting trivia value alone. Recommended for anybody with more than $10 in their pockets.

### Peter Norton strikes again

For the first time user, the IBM PC-DOS operating system is often a daunting mystery. The way DOS functions, and what it can and can't do, are concepts that are rarely explained clearly – if at all. Most newcomers to DOS are shown only the few basic commands that they need to get started and nothing more. It shouldn't be surprising that the full functionality of




DOS is rarely used when people do not not know what functionality exists.

To correct this problem there are at least four alternatives. Firstly (and most commonly), the hard way using the DOS manual and alot of possibly hazardous exploration time. Secondly, having a knowledgeable user teach the beginning user (possibly via a commercial course). The last and most cost effective solution is to find a good book on the subject – which is not as easy as it might sound.

Fortunately Peter Norton has produced such a book, titled *Peter Norton's DOS Guide*. There are a range of Peter Norton books all aimed at different areas of computing. The *DOS Guide* is for newcomers to DOS (and old hands who aren't afraid of learning a few new tricks). This is by far the best book of its type that I have come across. It starts with the basics and covers nearly all the areas of microcomputer usage that the average user will ever need to know. Peter Norton's approach with this book is to hold hands with the user, show them what can be done and offer a great variety of handy tips on not only the subject of DOS, but using computers in general. That means topics like tasks that a computer is good at and those it isn't, what to look out for when buying a new system and how to keep your computer organized.

This book is unusual in that it contains no diagrams as a means of explanation. Computer concepts are related to examples from the non-computer world. For example, the FORMAT command is explained as being the equivalent of drawing rules on a blank sheet of paper, to make it possible to later write evenly on the paper. The explanations of computer concepts and the handy tips offered are clear and very readable.

Peter Norton's DOS Guide is 350 pages long. The printing is in a fairly large type and generally easy on the eye. Many computer books of this size appear daunting to the newcomer to computing, the *DOS Guide*, however, is a joy to read.

*Peter Norton's DOS Guide* is one of the few computer books that a newcomer can and will read from cover to cover and learn a lot about running a computer in the process.

If you want to obtain this book make sure you buy the revised and expanded edition. The first edition was published in 1984, the current edition was published in 1987. □

**Product Details**
**Title:** *Webster's NewWorld Dictionary of Computer Terms*
**Author:** Laura Darcy and Louise Boston
**Publisher:** Prentice Hall Press
**Distributor:** Simon & Schuster, 7 Grosvenor Place, Brookvale 2100 NSW (02) 939 1333
**Price:** $12.95 (no tax applicable)

**Product Details**
**Title:** *Peter Norton's DOS Guide (Revised & Expanded)*
**Author:** Peter Norton
**Publisher:** Prentice Hall Press
**Distributor:** Simon & Schuster, 7 Grosvenor Place, Brookvale 2100 NSW (02) 939 1333
**Price:** $$39.95 (no tax applicable)

IAN ALLEN

# YOUR C64

## Doubling the Function keys

Here's a little mystery: the C64 has four different keyboard modes; one is standard and the other three are generated when you use the Shift, Commodore Logo and Control keys – but why do the function keys only seem to work in two modes, Shift and Standard?

It's not really a hypothetical question, because a lot of people find the function keys very useful in controlling program options and branching, and in a lot of situations it would be handy to provide more than eight options per screen. You don't have to be an assembly language programmer to use them either. A simple Basic program can test for function keypresses. All you have to do is check for ASCII values between 133 and 140 –

```
20 Get A$: If A$ = "" then 20
30 Print ASC(A$)
40 Goto 20
```

If you run this short program and hold down the CBM logo key while pressing function keys, you get exactly the same ASCII values as you would have for Shift -F2, -F4, -F6 and -F8. That's not much help because we need a way to differentiate between Shift and CBM logo modes. The thing is, the computer must know what's happening – it's just not telling us. So one way to crack the problem is to have a look at what's happening inside.

## ROM Keyboard Decode Routines

When a key is pressed, the 64's IRQ driven kernel goes through a few steps to work out what's happening. The first thing it does is work out which physical key was pressed. This is recorded as a keyboard matrix value between 0 and 64 and stored in location 203. Then it works out which keyboard mode the computer is in, and based on that value it goes to one of four lookup tables to find the appropriate ASCII value. The matrix value is used as an index pointer, indicating the number of bytes from the table's beginning to the desired value. This is an ASCII number which is then placed in the keyboard buffer ready for our program to play with.

Well, we know what key we pressed, so let's skip step one. Step two is more promising. How does the computer know which mode it is in? It turns out there's a flag set at location 653. A simple 0, 1, 2 or 4 depending on the mode. That should be easy enough to test for if we modify our

program by adding a peek statement to line 30 and try the combinations again –

```
20 Get A$: If A$ = "" then 20
30 Print ASC(A$); peek (653)
40 Goto 20
```

Now we get results like –

```
133  0      (Standard)
134  0
135  0
136  0
137  1      (Shift)
138  1
139  1
140  1
137  2      (CBM logo)
138  2
139  2
140  2
```

That's fine. A workable way of testing for the CBM key. It just means we have to test for two conditions instead of one. However, if we try it with Control, we don't get anything at all. Another little mystery, but again, it has to be something to do with the kernel keyboard decode routines. We've looked at step two, so let's look at step three – the look-up tables themselves.

The look up tables live high up in the memory starting at locations 60289. Each table consists of 65 bytes, the last one being 255 or $FF. $FF is used as a delimiter or null value. In look-up table four where the Control function key values are, they all read as $FF – and that's our problem. The computer get's to the end of it's keyboard decoding process and decides that wasn't a valid keypress at all. It returns a null value to the keyboard buffer, and when our program finds that it loops in line 20, so we don't get anywhere near testing for ASCII values or even which mode we are in.

It's an interesting problem, and probably an unnecessary one. I'd certainly like to know the reasoning the CBM designers used when making the Control/Function key lookup values into nulls. Still there is more than one way out. We could copy all of the Kernel ROM into RAM and change the numbers to suit. That's not difficult, but it seems like a waste of an awful lot of memory just to change four bytes. And it's memory that we might want to use for other purposes.

A better way is to test for a Control keypress first up and then do our own evaluation of the keyboard matrix values. We can keep the rest of the code as it is, and treat the Control key as a special case –

```
10 If Peek(653)=4 then 50
20 Get A$: If A$ = "" then 10
30 Print ASC(A$); peek (653)
40 Goto 10
50 I = Peek (203)
60 If I=3 then print "CNTRL F7"
70 If I=4 then print "CNTRL F1"
80 If I=5 then print "CNTRL F3"
90 If I=6 then print "CNTRL F5"
100 Go to 50
```

Line 10 checks for the control keypress. If so, we skip to line 50 where we peek location 203 for the keyboard matrix value. Instead of leaving the computer to look up things, we test for the values we want directly. Cumbersome, but it works. Now we have a way of testing for 16 different function key states.

(An interesting aside: In CBM ASCII, the value for *pi* is $FF or 255. However, in the look-up table it is recorded as $DE, and elsewhere in the decode ROM there is a special test for $DE, whereupon it is converted to the correct ASCII value of $FF before being placed in the keyboard buffer. I suspect that is yet another example of how a 'special case' is created because of the compounding of earlier errors. □

TIM HARTNELL

# YOUR AMSTRAD

In the column this month I'll be examining how one reader got around the PCW software drought, reviewing a book on using a hard disk with your PC and explaining how the law of averages can be determined on your Amstrad machine.

## Transferring Software to the PCW

A number of ingenious solutions have been developed to the problem of getting software for the undersupplied (in Australia) PCW series. David Higgins from Cooma points out that when he purchased his Amstrad PCW, the dealer provided a list of some 15 pieces of software which were available. However, when he tried to get them, he was told they had to be ordered, and would take 'some time'. Unwilling to wait, Dave did some scouring around and found another local dealer who handled Osborne computers.

'After a period of experimentation, we worked out how to transfer files from the Osborne to the PCW, via a null modem connection. Once we'd done this, we fired up both machines, typed in the SEND.COM program (supplied with the CPS8256 interface) into the Osborne, and ran MAIL232 on the PCW.

'Setting both machines up at 9600 baud, we tested a COM file transfer. A few minutes later we had a working copy of a very well known database program for the Amstrad. (Well, almost, as the help facility did not work, but after successive attempts, we had a no-holds-barred version working; this is a problem with MAIL232 and not the database program.)

'So what's my point? No, I'm not suggesting you go out and pirate software. You can purchase software for other CP/M 3 (CP/M+) machines and transfer them to PCW format. In many circumstances, there will be no programs. In others, you may have to select the 80 *x* 24 format screen, and in still others, the software won't work at all due to various screen or memory characteristics of the 'host' machine. Perhaps you could arrange to try out some programs before actually buying them, to see if the procedure works with the specific programs you want.

'Finally, if you do decide to adopt this approach, then I suggest that the transfers be made using Xmodem type packages, as these are far more reliable than MAIL232. When you are transferring software, keep in mind the various licensing requirements, and make sure you transfer all associated programs and their utilities, especially if the software comes with an installation program.'

With Dave, I wonder what the legality of the file transfer idea is. In theory, there should be no problems if you actually buy the software, and then restore it in a different format, for your own use.

## Looking after your hard disk

A new book called *The Amstrad PC Hard Disk Guide*, written by Ian Sinclair, a prolific computer writer I knew quite well when I was in the UK, has just been released in Australia by Blackwell Scientific Publications, (03) 347 5552. Due to the pretty sick state of the Aussie dollar against the pound, the 128-page book comes in at a massive $44, but it is an investment which may well repay itself many times over, especially if you are a novice when it comes to using a hard disk, and want to get the most value out of it.

All programs are supplied on floppy disks, leaving you to cope with the copying to hard disk, and the organisation of all your programs and data on the disk. Unless you know how to do this, your use of the hard disk is severely restricted, and you may well find yourself still having to run some of your programs direct from the floppies.

The Amstrad PC Hard Disk Guide leads you step-by-step through the use of a hard disk, covering the installation of a hard disk card (along with adding extra memory to the PC1512), disk directories, the use and writing of batch files, using programs which were not intended to be placed on hard disk, subdirectories and more.

## The mean old average

Our program for this month accepts a set of figures, and then calculates the mean (the average), the median (the 'middle' figure in the set) and the mode (the most common number in the set). Listing 1 is for the PC models running Basic2, while Listing 2 is for the CPC models.

```
'Mean, Median, Mode
'Your Amstrad - Your Computer
'*****************************
CLS
INPUT "How many figures";i
DIM a(i)
PRINT:PRINT  "Enter the figures:"
FOR n=1 TO i
    PRINT "Enter figure";n
    INPUT a(n)
NEXT n
PRINT
m=0
FOR n=1 TO i
    m=m+a(n)
NEXT n
m=m/i
PRINT "The mean is";m:PRINT
FOR r=i-1 TO 1 STEP-1
 FOR n=1 TO i-1
  IF a(n)>a(n+1) THEN GOSUB 20
 NEXT n
NEXT r
t=INT(i/2)
PRINT "The median is";a(t):PRINT
c=1
5 FOR n=1 TO i-c
IF a(n)=a(n+c) THEN 10
NEXT n
GOTO 15
10 m=a(n):c=c+1
IF c<i/2 THEN 5
15 PRINT "The mode is";m
END
20 t=a(n+1)
a(n+1)=a(n)
a(n)=t
RETURN
```

***Listing 1.*** *This month's program accepts a set of figures, and then calculates the mean, the median and the mode. Listing 1 is for the PC models running Basic2.*

```
10 REM MEAN MEDIAN MODE
20 REM YOUR AMSTRAD - YOUR COMPUTER
30 REM ****************************
40 CLS:INPUT "HOW MANY FIGURES";IT
50 DIM A(IT)
60 PRINT:PRINT "ENTER THE FIGURES:"
70 FOR N=1 TO IT
80 PRINT "ENTER FIGURE";N
90 INPUT A(N)
100 NEXT N
110 PRINT
120 M=0
130 FOR N=1 TO IT
140 M=M+A(N)
150 NEXT N
160 M=M/IT
170 PRINT "THE MEAN IS";M:PRINT
180 FOR R=IT-1 TO 1 STEP-1
190 FOR N=1 TO IT-1
200 IF A(N)>A(N+1) THEN GOSUB 340
210 NEXT N
220 NEXT R
230 T=INT(IT/2)
240 PRINT "THE MEDIAN IS";A(T):PRINT
250 C=1
260 FOR N=1 TO IT-C
270 IF A(N)=A(N+C) THEN 300
280 NEXT N
290 GOTO 320
300 M=A(N):C=C+1
310 IF C<IT/2 THEN 260
320 PRINT "THE MODE IS";M
330 END
340 T=A(N+1)
350 A(N+1)=A(N)
360 A(N)=T
370 RETURN
```

***Listing 2.*** *The program for the CPC models.*

The program accepts the numbers first, holding them in an array. To find the mean, all it has to do is add up the numbers, and then divide them by the number of numbers you have. The median is determined by sorting the items by magnitude, and then selecting the middle value. The mode, the most common item, is found by comparing the numbers to each other, and determining which one appears the greatest number of times within the array.

## A sensitive mouse

Mark Thomas from Port Lincoln has discovered that changing the 'mouse movement scaling' in the NVR file, does not affect the mouse rate in application programs like PAINT. However, if you run GEM from MS-DOS, using its MOUSE driver, you'll find that the mouse requires about 40 per cent less deskspace. That is, it is more sensitive.

## I wanna be a rock star . . .

Keep an eye open for Amstrad's Studio 100, a MIDI-sound system with six-track mixing, dubbing from one cassette to another, the ability to listen to one – or more – tracks while adding a third (a whiz for harmonizing with yourself), zillions of buttons and dials and controls. It is expected to cost a shade (actually, a dollar) less than a thousand bucks, and I can see it being a great big hit: . .I can hardly waitn to mmix my first gold album!

## Editing Basic2 files

Mark Thomas from Port Lincoln, points out that sometimes – particularly when you have tried to edit a .BAS file with a word processor – you may find that the file refuses to load in Basic2, and an 'End of file met' message appears.

If this happens, it could well be that a Ctrl-Z (hex 1A) character has attached itself to the end of the file. If you have a suitable utility program, or know how to use DEBUG, you can edit the file. If not, you'll find that some word processors (working in ASCII, or 'DOS text' mode) do not place a Ctrl-Z character at the end of their files. Try loading a copy of the .BAS file into a different word processor, and then save it as an ASCII file without editing. Take note, however, that you may have to play with the margins before you load the file.

Also, when experimenting in Basic2, in the Dialogue window, use Ctrl-A, to repeat the last command for editing. This is in the manual, but hidden very cleverly, so you're most unlikely to find it.

Mark's final tip is regarding the use of two of the function keys. He points out that using F9 to run the current program, and F10 to swap between the Edit and Dialogue windows, is much more convenient than using the mouse.

We'll be including Your Amstrad in future issues of the magazine. I'd be interested in hearing from any companies making hardware or software for any of the Amstrad range, for a review in this column.

As well, I'd be more than happy to share any of your discoveries, hints, tips, comments and programs with other users of the great Amstrad machines, along with details of any Amstrad specific user groups. A copy of my 'Amstrad PC Users Companion' (disk and manual) will be given to anyone supplying hints which are used in this column. Please write to Your Amstrad, Tim Hartnell, *Your Computer*, Box 227, Waterloo, NSW, 2015. □

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# Manipulating Batch Files

## Here's a DOS Dirty Trick from Jeff Richards – a batch file created by a program to re-start itself.

HERE'S A DIRTY DOS trick that you might find handy: when DOS processes a batch file, it only reads as much of the file as it needs to execute the next command. It then remembers its position in the file, and returns there when the command or program has been executed. This means that it is possible for a progam to modify the batch file which invoked it, and to control the sequence of processing that will occur when it terminates.

Of course, for many procedures with a sequential processing path there is no need to fiddle with the batch file. Because one batch file can chain onto the next, a program that needs to control the chain of events simply creates its own batch file, and arranges for the batch file that invokes it to chain onto the file it creates. This is the way that installation programs work – SETUP.BAT might run SETUP.EXE then continue on to INSTALL.BAT – but INSTALL.BAT was actually created by SETUP.EXE based on the answers given to the installation questions. In itself, this hardly qualifies as a dirty DOS trick.

### Circular batch file

However, a batch file created by a program to re-start itself is a rather dirty trick. Such a circular batch file might be useful when one program needs to run another program and retrieve an answer from it. Let's call the main program ASKER, the program that provides the response ANSWER and the batch file CONTROL. ASKER accepts a command-line argument of NUL which indicates that this is the first time it has been started, or a three-letter command returned from ANSWER.

Initially, CONTROL would contain the single line 'ASKER NUL'. When run, this would start ASKER. If the program needed an answer it would rewrite CONTROL to contain two additional lines – ANSWER and CONTROL and then terminate. DOS would execute ANSWER, which would work out the result of the question. It would then rewrite CONTROL from the start, replacing NUL with the reply (say, 'ONE'), and terminate.

DOS would then execute CONTROL, which is a batch file that starts ASKER with the argument ONE. ASKER would detect that this was not an initial startup, and would retrieve its answer. It should then re-write CONTROL to delete the last two lines, so that when it terminates, DOS detects the end of the batch file, and returns to the command prompt. (Actually, replacing the last two lines with an innocuous command such as CLS is a better habit.)

Each program that re-writes the batch file must be sure that the point in the file where processing resumes is unchanged. The contents of the file, both before and after this point, can be altered, but the byte position of the start of the next command line must remain the same.

This procedure is not restricted to cases where ANSWER actually returns a result – it could be that ASKER simply wanted to regain control after the job (such as a formatting a disk) was done. In this case it inserts the 'reply' into the first line of the file itself, so it can detect that control is being returned from a task that it initiated, rather than from a cold start.

### Do-nothing batch file

If you have wondered why some software requires a tiny, do-nothing batch file to start it, the answer just might be that it will re-write that batch file if you ask it to execute a system utility, and then set it back to the standard form when it regains control. For circumstances where you don't want to, or can't, use DOS' CHAIN and SHELL facilities, rewriting batch files can be an effective dirty trick. □

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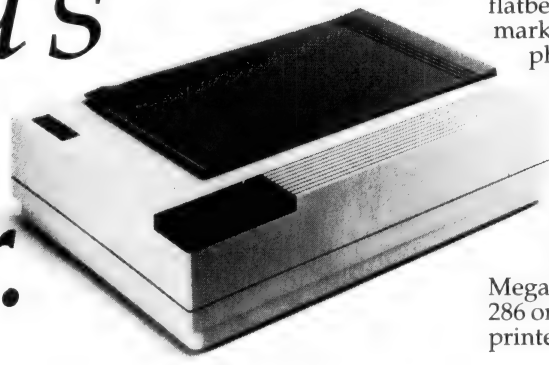

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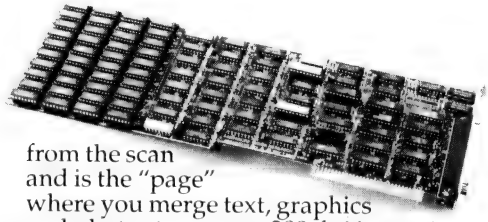

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# YOUR APPLE

## A quick dip in the executive sandpit

I must admit I am not an enthusiast when it comes to business graphics. Ninety-nine percent of the business reports that I have read over a lifetime have been either perfectly comprehensible without graphics, or hopelessly incomprehensible even with graphics-overload.

The blame for this ridiculous emphasis or graphing everything in a report can fairly be placed at Apple's door. With the Mac, they made such a fuss about how inferior reports were without liberal doses of pies, bars and miscellaneous other page decorations, that the IBM camp was forced to follow. They've followed ever since – never quite catching up.

If your desk had a computer without Mac graphs, it was worse than the combined effect of bad-breath, body odor, and assorted infectious diseases – according to the Macintosh television ads. Your prospects as an executive were zilch. But that's no reason for strong-headed AppleWorks users to tread the same path, or swallow the same line. Surely we aren't so gullible.

## Software

So now a cursory glance over the market revealed three obvious choices. There are probably more, but this is already an overdose for me, and I'm not going to risk it any further.

TimeOut Graph from Beagle Brothers is part of its group of enhancement products for AppleWorks. There are seven in all at the last count.

This graph package contains two disks (one 5¼ inch and one 3½ inch) and an excellent manual. TimeOut Graph installs inside AppleWorks 2.0, so it is always available without needing to leave the program. It looks and feels like a segment of the original, rather than an add-in.

However it does use up 54 kilobytes of space, so you aren't going to keep it in RAM if you've only got a 128 Kbyte IIe. Fortunately, you can choose to auto-load it into RAM space or leave it resident on the disk.

TimeOut Graph requires you to highlight the data ranges you wish to graph on your spreadsheet, and then select from a range of graphs that include XY (scatter), point, line, plain and exploded pie, vertical bar, stacked bar, area bar or high-low.

It doesn't handle horizontal bars or any three dimensional (3D) graphs.

For decoration, you've got a pretty good choice of fonts and fill patterns, but it is not always easy to place elements on the screen exactly where you would like. A further minor annoyance is that you've got to type in the labels yourself – it doesn't transfer these from the spreadsheet.

You can resize and save to disk either the graph itself, or the 'template' that controlled the appearance of the graph on the screen. If you save the latter, it means that updates can be made without repeating the whole exercise – just change the basic data.

MagnaCharta from Third Wave Technologies is a stand-alone product that will probably be the first choice of GS users since it supports a mouse. 'If you've got a mouse, flaunt it!' I always say. However it does also work without a mouse – using the keyboard or even (God help us!) a joystick, so it can also be used on the IIe or IIc.

It comes on a single 5¼ inch disk with a moderate amount of documentation (92 pages) in a binder. As with other Mac-like programs it doesn't need too much in the way of explanation since you select everything through Mac-type menus and there is a good on-line Help system.

This is not strictly on AppleWorks add-on since it can't handle AW spreadsheet files. You've got to cough them out in ASCII text form first, or key them into the program itself.

The data appears in a spreadsheet window below the menu bar, and you highlight the range you want, then select the graph type from the Graph menu. You can adjust the graphic image after it is drawn in a number of ways, including changing the horizontal dimensions and repositioning the labels.

You've got the normal range of graphic options with MagnaCharta plus a 3D chart which plots three axes (but not 3D pie or stacked-bar), and the 3D option might make this program worthwhile for some.

## New version

The third possibility – and I must admit that I haven't yet managed to get hold of a copy – is a new version (1.01) of Graphics Edge from Pinpoint. At one stage Pinpoint appeared to be becoming the pre-eminent company in the field of AppleWorks add-ins, but lately they haven't maintained as much lead over the rest of the field.

The old Graphics Edge was an excellent on-board program that was hot-linked to the AppleWorks spreadsheet data. Change the data and the graph changed. It also handled full colour on the GS with resolution high enough for colour slide production.

The new version improves the scrolling (which was a problem) and adds better error handling. This program uses an object oriented approach which means that the resolution of the graph on paper is set by the resolution-potential of the output device, rather than of the program. So if you've got access to a laser printer you will get the best final quality from Graphics Edge.

In this review, we shouldn't forget VIP Professional, of course, the 'Lotus 1-2-3 for the GS' according to the advertising blurb. It mimics all the Lotus commands, so anyone familiar with the MS-DOS program can upgrade to a GS with little trouble and strife.

This is really an excellent spreadsheet program with 8192 by 256 cells, built in macros and its own graphics – although like 1-2-3 these are created by a separate program to the main spreadsheet. You can handle VIP Professional with a mouse or by the more conventional keyboard. It has fifty-plus built-in financial and mathematical functions, can handle up to 4 megabytes of memory, and it displays the 'standard five' graph types with plenty of options.

So now you've got your spreadsheet and a good choice of graphics programs, and it's time to play in the executive sandpit! Who cares if it's unproductive? The end result will look great. □

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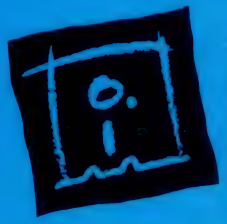

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|---|---|---|
| PRICE: | $1750 | $2680 |
| MODEL: | XT floppy | XT30MB |
| CPU: | 8088-2 10MHz | 8088-2 10MHz |
| RAM: | 640 KB | 640 KB |
| DISK STORAGE: | 1x360 KB | 360 KB + 30 MB |
| INPUT/OUTPUT: | serial/parallel/game port/8 slots | |
| SCREEN: | mono | colour |

## OLIVETTI M280/M380

| | | |
|---|---|---|
| MODEL: | M280 | M380C |
| CPU: | 286 @ 10MHz | 386 @ 16 MHz |
| RAM: | 1MB | 1MB-EXPAND > 4MB |
| DISK STORAGE: | 1.2 MB + 20 MB | 1.2 MB + 40 MB HD |
| SCREEN: | MONO | MONO |
| PRICE: | $4550 | $8490 |

## TOSHIBA T3200/T5100

| MODEL | T3200 | T5100 |
|---|---|---|
| CPU: | 286 @ 12MHz | 386 @ 16 MHz |
| RAM: | 1 MB | 2 MB |
| DISK STORAGE: | 720KB + 40MB | 1.44MB + 40MB |
| INPUT/OUTPUT: | Ser/Par/Exp/2 slots | Ser/Par/Exp |

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|---|---|---|
| PRICE: | $4250 | $3490 |
| MODEL: | AT 30MB | AT 30MB |
| CPU: | 80286 10MHZ | 80286 10MHZ |
| RAM: | 1 MB | 1 MB |
| DISK STORAGE: | 1.2 MB | 1.2 MB |
| INPUT/OUTPUT: | serial/parallel/game port/HDD/FDD controller | |
| SCREEN: | EGA | MONO |
| KEYBOARD | Enhanced 101 | Enhanced 101 |

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*"If ever there was a small software accounting system that could be described as ideal for the very small business, Lewis CROSS-CHEQUE would fit the bill."* Dan Lawrence, Your Computer, August 1986.

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***Dr Geoffrey Lewis.*** *In 1965 he was selected by IBM to demonstrate the new System 360. He was selected following a sensational score of 150 out of 120 in a university test for mathematical aptitude. He was awarded the extra points for exceptional problem solving ability and in the next ten years nobody else got more than 75 marks. He has applied his problem solving ability in producing four software packages written for Australian conditions.*

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Most wordprocessors let you do all forms of word processing: letters, articles, books, price lists, footnotes and computer programs. They become top-heavy with features and hard to operate.

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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.

### DEMO PACKS

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.....

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All prices include sales tax. If paying by Bankcard or Mastercard, include card name, number, expiry date and signature.

ROY HILL

# THE FORTH COLUMN

Last month I promised that I would provide some abstracts of papers delivered at the recent symposium. One of the greatest surprises of the conference was the wide variety of uses to which Forth and Forth-like applications such as Asyst, are being put.

## Forth in education

Forth programming and engineering applications are being taught in at least four states in Australia. NSW is a fairly typical example, with a specialised Post Certificate course being taught by North Sydney College of TAFE's School of Electrical Engineering. Students are presented with problems and applications which must be solved using F83 as the Forth dialect.

The structure of the course covers all the main features required for fairly complex programming. The contact person is Mr Faisal Ramadan. Likewise, Mr Ian Walsh at Nepean CAE in NSW., Mr Paul Wilson at QIT in Queensland, Dr Tony Pugatschew at SAIT in South Australia and Mr Clive Maynard at Curtin University in Western Australia, should be contacted for any relevant courses being run at each of these institutions.

## Picking fruit the easy way

Ray Gardiner, of Ardmona Fruit Products in Victoria, is not only using Forth, he's using an NC4016 based computer to automatically sort peaches, on the basis of colour, size and defects. The processing power of the Novix has been used to develop a colour imaging technique, thus overcoming a large number of the problems inherent in trying to use grey scale image processing.

## The Campfire Computer

Jake has asked me to spend a little time discussing the 'Campfire computer' that I briefly mentioned in last month's column. Charles Moore is rather different from the normal 'software' person. Most software hackers use their software and think very little of the hardware behind it.

Chuck thinks a great deal about the hardware behind Forth (that's the reason he designed the Novix), to the extent that he thinks 'How can I replace this hardware in software?'. This philosophy has been extended to the Campfire. It was designed to use a minimum of hardware – a Novix, an EPROM and RAM chip and four I/O chips – and a three key keypad! Each of the keys is colour coded (red, green and blue) and depending on the application, they each serve different purposes.

*Forth programming and engineering applications are being taught in at least four states in Australia.*

Chuck drives *everything* via software – the disk drive (a 3½ inch microfloppy) and the video. All the timing and frequency generation is done from Forth source screens.

We were using a 33 inch Mitsubishi monitor to demonstrate the Campfire. The monitor that Charles normally uses does not provide for a Vertical Sync and the Mitsubishi requires one. No problem, just dive into the source code for the video traces and write in a VYSNC driver. The driver for the disk drive is fairly trivial, compared with the video driver code.

### Hints, tips and ideas!

Got any hints tips or ideas you'd like to share with other Forth enthusiasts? Or maybe you've discovered (or written) a great new program you'd like to tell others about – if so, send them (on disk) to *Your Computer, PO Box 227, Waterloo 2015 NSW*. Please include a printout of the disk and caption any illustrations. Unfortunately, because of space limitations, we cannot publish listings over 200 lines long.

One of the conference attendees (obviously a hardware hacker) asked 'How would you provide for an A/D converter?'. Charles thought for several seconds and then answered 'Two components – a resistor and a capacitor. I'd use the R/C time constant to calculate the decay rate of an applied voltage.'. I guess if he says it can be done, who am I to argue? The hardware person didn't. The Forth version that Charles uses is cmForth, his own variety developed specially for use with the Novix. cmForth has been extensively revised and pruned, until it can fit in the minimum amount of memory – in this case, 4 kilobytes.

When the Campfire is booted, a menu is pulled down and the three keys are used to navigate through the menu. One key forwards, one back and one to select. To edit a source code screen, one first cycles through the screens until the desired screen is reached. The keypad is then used to pull down a Screen Function menu. Edit is selected and a new menu appears (all of these menus are colour coded, according to the colour scheme on the keys) and the keys are used as cursor keys to navigate to the correct line for editing. Another menu allows insertion/deletion/overtyping and a further menu allows for the 'normal' keyboard characters to be selected from several groups. This may all seem very cumbersome, but it works extremely efficiently (at least in Chuck's hands). I'm sure there are other people who could use Campfire as efficiently as Charles does, but I don't include myself in that category. I think I'll stick with QWERTY for the time being.

## Newcomers' corner

In the last column I discussed the use of Forth words that manipulate the position of data on the stack. This month I will discuss some of the arithmetic words that are used to perform calculations on the data. I will then present several examples of the combined use of these words to produce a meaningful output.

Firstly, we have the standard operators +, -, *, and /. One should remember that all of these operators apply to integer arithmetic only. Thus, 3 2 / would leave only the integer portion of the calculation on the stack, no remainder. MOD does the reverse – it leaves only the remainder. /MOD (a combination of the previous two words) leaves both the quotient and the remainder on the stack.

There are several other important words (including ones that provide for a combined multiply/divide operation), but I'll leave them for the next column. In that, I will combine some of these words into a compiled word that performs a 'pseudo floating point' division – remember that 'standard' Forth is integer only. Beginners should try all of the words mentioned above, for example –

```
7 3 /MOD . .
3 7 /MOD . .
```

Remember the spaces between words. The two periods (full stops – or dots) are the 'word' that Forth uses to print the top value on the stack to the screen. □

JOHN HEPWORTH

# IBM UNDERGROUND

Its always easy to recommend utility programs. Every PC user with a problem writes a little program and many find their way into the Public Domain. Databases and spreadsheets are the same, for there are many powerful and friendly ones in the Shareware and Public Domain arena. Word processors are a different story, for there are few in the Public Domain and even fewer worth recommending.

Once upon a time I would have suggested PC Write, which is still a very good word processor. Unfortunately, the distribution arrangements have been changed. Previously, PC Write was Shareware throughout the world. The current version is Shareware in the US but is commercial in Australia, and thus users cannot evaluate free and register (and pay) later. Even worse is that, with commercial distribution, comes a hierarchy of middlemen and the price has almost tripled. An alternative could be New York Word, but I found that it was almost impossible to use on mono or Hercules. Even worse, New York Word uses the F1 key to delete a line. With most users attuned to F1 being Help in many packages, the potential for disaster is enormous.

You can imagine my joy to find Galaxy, a slim, fast and elegant word processor. It can be driven via a menu system, with comprehensive help available, or many of the same functions can be rapidly accessed via WordStar compatible combinations of Ctrl and another key. In addition many functions can be swiftly operated by pressing Alt and another key at the same time.

A good range of hardware is supported; as just one example, EGA support in 25 and 43 line modes is included. No spell checker is included, though the Galaxy documentation does suggest the use of Turbo Lightning. A nice touch is that two documents can be edited at the same time, by separating the top and bottom of the screen into separate windows and going back and forth from one to the other by pressing Alt-W.

## Galaxy files

Galaxy has a very simple file format. Every line is in plain ASCII, with a hard carriage return/line feed pair at the end of each line. Those hi-bit characters WordStar uses to flag the end of a word are not needed, for Galaxy can format, justify, unjustify and reformat straight ASCII files. A few control characters do get inserted in the text, to turn on and off printer enhancements like underline, bold or italic. Galaxy can read WordStar files, and can create soft carriage-return/line-feed pairs so that WordStar can reformat Galaxy files, but it does not flag the ends of words with hi-bits and so WordStar cannot remove justification.

*Alternatively, it can be driven from a menu system, which also serves to remind the user of the Ctrl and Alt combinations for variations functions.*

Files being edited are completely held in memory, so the file size is limited by available memory. On my 640 kilobyte machine the maximum file I could edit was 233 Kbyte, which is a large document for any writer. If I loaded co-resident software like SideKick to reduce my available memory, the maximum document size reduced by about 50 Kbyte for each 100 Kbyte reduction in available memory. Printer support is provided for 29 printers, including the LaserJet and the Canon laser, plus printers from many manufacturers including Epson, IBM, NEC, Star, Brother and Toshiba. A program is included which creates and edits printer definition files.

## Running Galaxy

Galaxy fits comfortably on a disk, and the version 2.3 reviewed is available on PC-SIG disk 765. Installation is a snap. On an all-floppy system, merely make a working copy of the distribution disk and use that. On a hard disk system, make a Galaxy subdirectory and copy the necessary files across. A documentation file on disk totals 90 Kbyte, and prints out to 57 well-organised pages, and naturally this does not need to be on the hard disk, nor do the printer definition files for more than one printer. In this form, only about 150 Kbyte of disk space is needed for the main GALAXY.EXE file, a file containing the text of error messages, the macro file, initialisation file and printer definition file. Galaxy fully supports multiple drives and directories, can edit files in other directories and when executed via a path, can find its own support files easily.

Run Galaxy by typing GALAXY at the DOS prompt. This brings up an opening copyright message, and then enters edit mode, ready to write or to load a document to modify. Alternatively, the document to be edited can be specified when starting the program, by entering the command GALAXY FILENAME at the DOS prompt. Either way, a clear, uncluttered screen appears. The top two lines are for status information and a ruler line showing the current margin and tab positions.

The status line shows quite a bit of information in a neat and legible form. First is the drive, directory and name of the file being edited. Second is a reminder that F10 accesses the menu structure. Third is an indication if word wrap is operative or not. Finally comes the cursor location, and the current page number, line number and column number are shown.

## Second level menus

From the file menu, one can open a file, close a file, save a file under the existing name, save it under a new name, get a directory listing of files on disk, change the logged directory, copy, rename and erase files. The user can quit to DOS by selecting an option from this menu. Some of the functions have quicker alternatives. F2 saves a file, Ctrl-F2 saves it under a new name, F3 loads a file, F4 lists files on disk and Alt-X quits to DOS.

From the printer menu files may be printed or repaginated. Flags may be set to pause between pages or to print double spaced. Left, right, top and bottom margins can be set, page length adjusted, printer definition files selected and settings saved to the intialisation file.

The Windows menu opens and closes a second window, switches the cursor from one window to another, zooms a window to fill the screen, jumps to DOS, or runs an external program.

The search menu initiates searches for words and phrases. Search-and-replace is also made from this menu. F5 will initiate a search, F6 a search-and-replace, and Ctrl-F5 repeat a search.

The GoTo menu takes the user to top or bottom of file, to beginning or end of a block, to a line or a marker. Markers can also be set within the text from this menu. In addition, quick combinations like Ctrl-PgUp and Ctrl-PgDn will go to top and bottom of the file and Ctrl-Q will access many of the other commands.

Block moves can be done from the block menu, by using WordStar-like command function keys. Whichever is most convenient and familiar is the one to use! Marking the beginning of the block is done from the menu, or by pressing F7 or Ctrl-K-B. End is menu, F8 or Ctrl-K-K. Copy is menu, Ctrl-F7 or Ctrl-K-C. Move is menu, Ctrl-F8 or Ctrl-K-V. In addition, blocks can be read or written from or to files, or deleted form the document, using either the menu or the familiar WordStar commands. A block may be spell-checked (if Turbo Lightning is available) by pressing Ctrl-K-L.

Up to 10 macros are available. They are executed by pressing Alt and a numeric key.

Help is available from the second level Help menu, or from help options in all the other second level menus. From edit mode, the help second level menu is accessed directly by pressing F1. Help is clear, concise and well-written.

## Documentation

A 57 page manual is on disk, and a printed manual is included with registration. It is a model of good Shareware documentation, with clear, concise information and a good table of contents, index and quick reference tables.

## Availability

Galaxy is a product of Omniverse, PO Box 2974, Renton WA 98056, USA. It is Shareware and can be copied and evaluated freely. Fully functional evaluation copies, with manual on disk, can be obtained from bulletin boards and user groups, or via C-SIG. If you get an evaluation copy of Galaxy, and continue to use it after a few weeks evaluation you are legally and morally obliged to register. Registration, including a printed manual, is $US49.95 plus postage direct from Omniverse.

Mannacomm is the Australian distributor for PC-SIG, the American publishers of much Shareware. It can sell you evaluation copies of Galaxy on PC-SIG disk 765 for $A13 plus $A5 postage. It can also provide registered copies with printed manual for $A120 taxed, plus postage. Mannacomm is at Freepost 29, PO Box 509, Kenmore 4069 Qld, (07)-374-1311. Mannacomm and its agents are the only commercial organisations in Australia that can legally charge for PC-SIG disks, though user groups are okay. A real PC-SIG disk is grey, and the labels and sleeve are grey, white and red, making it easy to detect a counterfeit PC-SIG disk! □

```
File: D:\WORDFILE\TEMP.DOC   Press ESC to exit menu WW    Pg  1 Ln   25 Col   1
 File   Print   Windows   Defaults   Search   Go to   Block   Macros   Help
                          Insert          Ins     ON
Its always easy to reco   Word wrap       ^OW     ON   y PC user with a
problem, writes a little pr Auto indent   ^QI     ON   into the public
domain. Databases and sp  Graphics      Alt-G     ON   r there are many
powerful and friendly ones EGA 43 lines Alt-E     OFF  main arena. Word
processors are a differe  Justify text  Alt-J     ON   the Public Domain
and even fewer worth recomm Format WS             OFF
                          Screen updates          FAST
Once upon a time I would su Tab size              8    a very good word
processor. Unfortunately  Undo limit            20   ave been changed.
Previously PC Write was   teXt color            7    ld. The current
version is Shareware in   Block color           14   stralia, and thus
users cannot evaluate free hiLite menucolor     112    Even worse is
that, with commercial dist Normal menucolor     15   middlemen and the
price has almost tripled. A fraMe menucolor     15    Word, but I foun
d that it was almost imposs Default data directory   es. Even worse,
New York Word uses the F1 saVe parameter file      users attuned to
F1 being Help in many packa Read parameter file    is enormous.
                          Help
You can imagine my joy to f                        nd elegant word
processor. It can be driven via a menu system, with comprehensive help
```

*Figure 1. Pressing F10 pops down menus from the top of the screen – the first level menu is a single line across the screen showing the names of the next lower level.*

STEWART FIST

# YOUR MAC

Far be it for me to suggest that any reader of *YC* would buy special copying software or add-in cards to make illegal copies of protected software! But other less ethical people do. Of course the law allows you to make backup copies of copy protected software, so a good copying program or card is essential . . . Right?

*For the Mac transfers, you get a series of simple-to-use batch files, and for creating backups, you have a menu selection system.*

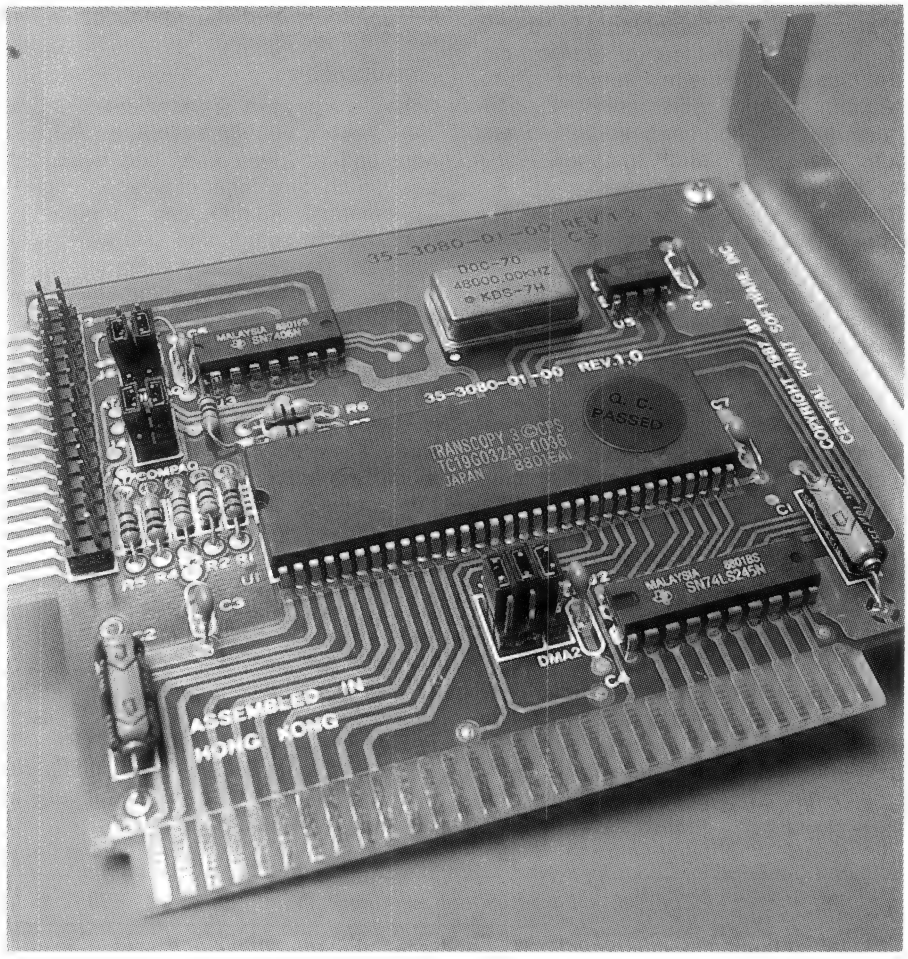
Well now there's another legal and legitimate reason for having a copy board in your PC, and it's a very good excuse when you have to explain to your company why you invested a couple of hundred dollars in a pirating system for your IBM PC.

The new CopyIIPC Deluxe Option Board from Central Point Software Incorporated (9700 SW Capitol Hway, Portland, Oregon, 97129) also allows you to transfer files from, and to, a Macintosh. It handles the conversion between formats either way.

This is the simplest way yet to integrate Macintoshes and IBM PCs in an office environment, and it is often all that a company needs to bring their otherwise-incompatible systems together.

The CopyIIPC board is actually an 8-bit half-slot disk controller card which, in effect, makes your 3½ inch IBM drives into dual IBM/Mac floppies. It comes with a hundred page tabbed instruction manual which is easy to follow, and which also includes an excellent trouble-shooter's guide. There's a lot in here about breaking copy-protection systems also.

Installation of the card isn't all that simple; it has 9 different jumpers that need to be set to match your machine. Fortunately, the manual leads you through the procedure a step at a time so you won't find any hassles.




## Software

The card comes with software to make the transfers and create the backups. For the Mac transfers, you get a series of simple-to-use batch files, and for creating backups, you have a menu selection system. It is all about as difficult as copying unprotected files from one floppy to another.

Probably the best feature of the system is that it handles non-standard text and graphic files almost as well as it does standard text files. If, for instance, you have both PC and the Mac versions of Pagemaker, you can swap files between the two retaining the internal Pagemaker file format. This works both ways.

Obviously, if you are dealing with complex file structures, you will need to ensure that you have compatible software on either end of the exchange – don't try to shift a PC PageMaker file to something else on the Mac. However, if you face the problem of incompatible software, you can usually exchange through one of the standard intermediate file formats, ASCII, DIF or DAC.

In its protection-breaking mode, the CopyII board works by creating an exact image of the original disk onto your hard disk, and then 'backing up' this file onto a floppy again. There's utility called TCM which does this, and it works extremely well, handling quite complex copy-protection schemes like Superlok in a matter of minutes.

CopyII costs $US159 (plus postage) direct from Central Point Software; it is distributed in Australia by PC Extras on (02) 319 2155. Price is $299 taxed. That's good value for money. □

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| **Carbon Copy Plus** *( NEW Version 5 )* | **$295** |
| DeskLink | $260 |
| **LapLink Plus** *( NEW Version 2 )* | **$210** |
| Mirror II *( Crosstalk Compatible )* | $ 95 |

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| **D B X L Ver 1.2** | **$269** |
| **Q & A Version 3** | **$489** |
| Quicksilver Compiler Ver 1.2 | $750 |

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| **PageMaker 3.0** *( NEW Version )* | **$Call** |
| Pizazz Plus | $199 |
| Publisher's Paintbrush *(& FREE Book )* | $440 |

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| Microsoft Fortran Compiler V4.1 | $640 |
| **Microsoft Windows Ver. 2.10** | **$165** |
| Microsoft Works *(& FREE Book)* | $310 |

## SPREADSHEET

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| **P C E X C E L** *(FREE 101 Macros)* | **$720** |
| **QUATTRO** *(FREE Using Quattro Book)* | **$320** |
| VP-Planner Plus *( Lotus 2.01 compatible )* | $260 |

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| | |
|---|---|
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### *Turbo Prolog 2.0 - New* — $Call

### *WordPerfect 5.0* — $589

## WORD PROCESSING

| | |
|---|---|
| **MICROSOFT WORD 4.0** NEW | **$589** |
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## UTILITIES

| | |
|---|---|
| Above Disc | $150 |
| **Copy II PC Ver. 4.01 *** SPECIAL ***** | **$ 59** |
| **Copy II PC Deluxe Option Board** | **$199** |
| **DESQview 2.01** | **$199** |
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| D U E T *( Print Spooler & sideways printing )* | $130 |
| **Fastback Plus** *( NEW Version )* | **$260** |
| FormTool with Free Greatest Hits | $197 |
| Mace Utilities *( Inc. FREE Mace Vaccine )* | $147 |
| **Norton Editor** | **$ 99** |
| Norton Commander 2.0 | $120 |
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| Print Q | $179 |
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| X-Tree | $ 99 |
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## COMPUTER BOOKS

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|---|---|
| 1-2-3: The Complete Reference | $42.50 |
| TURBO C: The Complete Reference | $48.50 |
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| DOS: The Complete Reference | $49.50 |
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| Using Microsoft QuickBasic | $37.50 |
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# ROD IRVING ELECTRONICS

## 8087 CHIPS

**Genuine Intel chips with manual and data sheets packed in boxes!**

| | | |
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| **8087-3** | (4.77MHz) | $195 |
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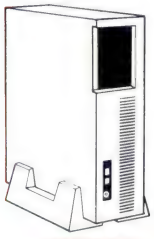

## VERTICAL COMPUTER STAND

FREE VALUABLE DESK SPACE OF YOUR PC BY PLACING IT ON ITS SIDE ON THE GROUND!

- Adjustable width from 115-188mm (4¼"-7¼")
- Accomodates IBM*PC/XT/AT and most compatibles
- Light weight, durable construction

C21076 ..... **$24.95**

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**MELBOURNE:** 48 A'Beckett St.
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56 Renver Road, Clayton.
Phone: (03) 543 2166 (3 lines)
Fax: (03) 543 2648

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## PRINTER RIBBONS TO SUIT:

**CP80, SX80, DP80, BX100 MB100**
1-9 (C22036) 10+
**$8.95** **$7.95**

**MX70/80 FX70/80 RX70/80**
1-9 (C22031) 10+
**$8.95** **$7.95**

**MX100, FX100, RX100**
1-9 (C22002) 10+
**$19.95** **$18.95**

**LX80**
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**$9.95** **$8.95**

**LQ1000**
1-9 (C22012) 10+
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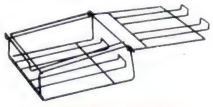
## CANON A-50 PRINTER

- Serial Impact Dot Matrix
- 180 C.P.S
- Near Letter Quality Mode
- 1.4K Buffer

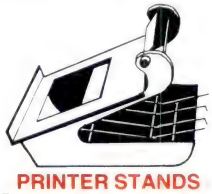
Cat. C20045 ..... **$595**



## PRINTER LEAD

- Suits IBM* PC/XT, compatibles
- 25 pin "D" plug (computer end) to Centronics 36 pin plug

P19029 (1.8 metres) **$14.95**
P19030 (3 metres) ... **$19.95**



## 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 (80/132 column)
- Excellent value at these prices!

C21054 ..... **$26.95**

## 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**

## PANASONIC KX-P1081 DOT MATRIX PRINTER

- 120 C.P.S.
- Pica or Elite character set
- Print Modes: NLQ, Dot Graphics, Draft, Proportional Font.
- Reliable and Compact
- Proportional Printing
- Logic Seeking
- 1K Printer Buffer

C20035 . Normally $595
We won't be beaten! **only $379**


## BABY AT* COMPATIBLE COMPUTER! FROM $2,295

- Final assembling and testing in Australia!
- 1 M/Byte Main Board
- Switchable 8/10/12 MHz
- 1.2 M/Byte Floppy Disk Drive
- 80286 CPU
- Colour Graphics Display Card
- 8 Slots
- Floppy & Hard Disk Controller
- Printer Card and RS232
- Keyboard
- 200W Power Supply
- Manual
- 6 Months Warranty
- Size: 360(W) x 175(H) x 405(D)mm

**SHORT BABY AT***
512K RAM ..... **$2,295**

**STANDARD BABY AT***
640K RAM, hard disk drive....
**& 20 M/BYTE HARD DISK $3,295**
**& 40 M/BYTE HARD DISK $3,795**
**& 80 M/BYTE HARD DISK $4,695**

## PRINTER LEAD

- Suits IBM* PC/XT, compatibles
- 25 pin "D" plug (computer end) to Centronics 36 pin plug

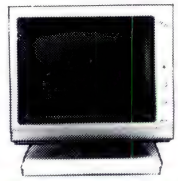
P19029 (1.8 metres) **$14.95**
P19030 (3 metres) ... **$19.95**

## APPLE* COMPATIBLE SLIMLINE DISK DRIVE

Compatible with Apple 2+
Cat. X19901 . **Only $179**

## APPLE* IIC COMPATIBLE DISK DRIVE

(including cable ..... **only $199**
(*Apple is a registered trade mark.)



## RITRON 2 MONITORS

Stylish 20MHz monitors available in green or amber displays and with built-in swivel and tilt base.

**SPECIFICATIONS:**
**CRT Display Size:** 12 inches non-glare 90 degree deflection.
**Input Signal:** 1.0 - 2.5V p-p composite video signal.
**Input Impedance:** Normal 75 ohm, high approximately 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.

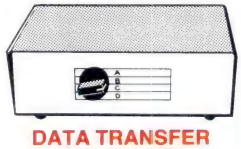
Green Cat.X14506 ..... $179
Amber Cat.X14508 ..... $179
**ONLY $149**

## GOLDSTAR 20MHz COMPOSITE MONITOR

X14514 (GREEN) . **$119**
X14516 (AMBER) . **$119**
10 OR MORE $109 EACH

## GOLDSTAR 12" TTL MONITOR

X14500 (GREEN) . **$139**
X14502 (AMBER) . **$139**
10 OR MORE $129 EACH

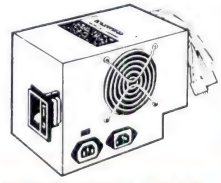


## DATA TRANSFER SWITCHES

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

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

**2 WAY RS232** X19120 ..... **$49**
**4 WAY RS232** X19125 ..... **$59**
**2 WAY Centronics** X19130 . **$49**
**4 WAY Centronics** X19135 . **$59**



## 150W SWITCH MODE POWER SUPPLY FOR IBM* PC*/XT* & COMPATIBLES

**DC OUTPUT:** +5/13A, -5V/0.5A +12V/4.5A -12V/0.5A
Cat. X11096 ..... **$129**

## RS232 BREAK OUT BOX

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.
**Indicators:** Tricolour LED's for TD, RD, RTS, CTS, DSR, CD, TC, RC, DTR, (E)TC.
**Jumper Wires:** 20 pieces.
**Power:** Interface power.
**Dimensions:** 85 x 95 x 30mm
X15700 ..... **$94.95**

## COMPUTER CABLE

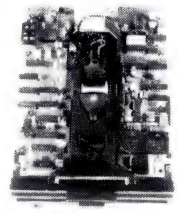
**CIC6** 6 conductor computer interface cable. Colour coded with braided shield. (to IE422 specifications). Copper conductor 6 x 7/0.16mm.
1-9 metres 10+ metres
**$1.90/m** **$1.70/m**

**CIC9.100** 9 conductor computer interface cable. Colour coded with mylar shielding. 9 x 7/0.16mm.
1-9 metres 10+ metres
**$2.50/m** **$1.95/m**

**CIC12** 12 conductor computer interface cable. Colour coded with mylar shielding. 12 x 7/0.16mm.
1-9 metres 10+ metres
**$2.70/m** **$2.50/m**

**CIC16** 16 conductor computer interface cable. Colour coded with mylar shielding. 16 x 7/0.16mm.
1-9 metres 10+ metres
**$3.90/m** **$3.40/m**

**CIC25** 25 conductor computer interface cable. Colour coded with mylar shielding. 25 x 7/0.16mm.
1-9 metres 10+ metres
**$4.90/m** **$4.40/m**



## MITSUBISHI 5¼" DRIVE 4851/MF501

Slimline 5¼" disk drive, double sided, double density. 500K unformatted, 360K formatted. 40 track/side. Steel band drive system.
Cat. C11901 ..... **$239**

## MITSUBISHI 5¼" DRIVE 4854/MF504

Slimline 5¼" disk drive, double sided, high density, 1·6MB unformatted, 1·2MB formatted.
Cat. C11904 ..... **$279**

## MITSUBISHI 3½" DRIVE MF353C

Double sided, double density, 1MB unformatted, 720K formatted.
C11908 ..... **$239**
C11909 Incl 5¼" mount bracket **$269**

## MITSUBISHI 3½" DRIVE MF355

1·6 M unformatted, 1M formatted.
C11910 ..... **$269**
C11911 Incl. 5¼" mount bracket **$299**

## 5¼" MOUNTING BRACKET KIT FOR 3½" DRIVE

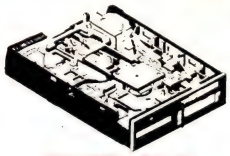
X11050 ..... **$29**

# ROD IRVING ELECTRONICS

## 20 M/BYTE HARD DISK
Tandon drive with controller card. IBM* compatible. 12 month warranty
X20010 ..... **ONLY $549**

## 40 M/BYTE HARD DISK
Seagate drive, IBM* compatible. 12 month warranty.
X20020 ..... **ONLY $649**

## 80 M/BYTE HARD DISK
Seagate drive, IBM* compatible. 12 month warranty.
X20030 ... **ONLY $2,490**

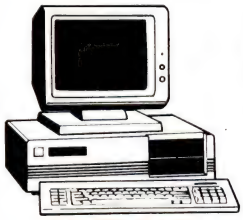


## FUJITSU 5¼" 1·2 M/BYTE DRIVE
- 1·2 M/Byte unformatted, (720K formatted),
- IBM* AT* compatible
- Quality at an affordable price

Cat.C11906 ..... **$249**

## FUJITSU 3½" DRIVE
- 1 M/Byte unformatted 640K formatted
- Double sided, double density,
- Affordable quality

Cat. C11905 ..... **$255**



## IBM* XT* COMPATIBLE COMPUTERS FROM $875

***Check these features and our prices. We're sure you'll agree they're exceptional value for money!***

- Final assembling and testing in Australia!
- Fast 8MHz TURBO Motherboard
- AT* style keyboard
- Tested by us for 24 hours prior to delivery!
- 8 Slot motherboard
- 12 months warranty!
- 150W power supply

### *$875 COMPATIBLE COMPUTER
256K RAM Single Drive, Graphics and Disk Controller Card. ... **$875**

### 256K RAM TURBO COMPATIBLE COMPUTER
2 x 360K Disk Drives, Multifunction Card, Colour Graphics, Disk Controller, 1 Parallel Port. (Includes Timer Disk) ..... **$1,045**

### 640K RAM TURBO COMPATIBLE COMPUTER
2 x 360K Disk Drives, Multifunction Card, Colour Graphics, Disk Controller, 1 Serial, Parallel Port. (Includes Timer Disk). **$1,175**

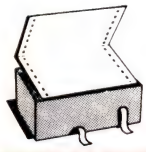
**WITH 20 M/BYTE HARD DISK:**
& single 360K Disk Drive .. **$1,775**
& dual 360K Disk Drives .. **$1,975**

**WITH 40 M/BYTE HARD DISK:**
& single 360K Disk Drive .. **$2,475**
& dual 360K Disk Drives .. **$2,675**

**WITH 80 M/BYTE HARD DISK:**
& single 360K Disk Drive .. **$3,895**
& dual 360K Disk Drives .. **$4,095**

## COPY HOLDER (YU-H33)
- Copy area 9½" x 11"
- Sliding line guide
- Flat metal base

C21060 ..... **$39.95**



## COMPUTER PAPER
Quality paper at a low price! 2,000 sheets of 70 gsm bond paper.
C21003 11 x 9½" **$39.95**
C21005 15 x 11" **$67.95**

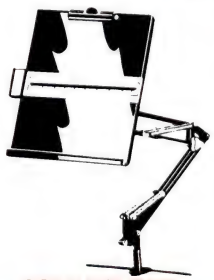
# CHEAP DISKS

## 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

C16038 ..... **only $19.95**

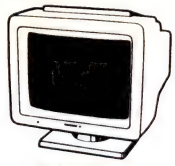
## 3½" DISK STORAGE
- Holds up to 40 x 3½" diskettes.
- Lockable (2 keys supplied)
- High impact plastic lid and base

C16035 ..... **only $14.95**



## COPY HOLDER (YU-H33)
- Copy area 9½" x 11"
- Sliding line guide
- Flat metal base

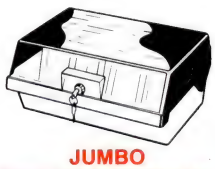
C21060 ..... **$39.95**



## 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:** 0.38mm
**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:** 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 ..... **$695**
**EGA CARD** ..... **$195**



## 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 $19.95**

## 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 $15.95**

## 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

C16025 ..... **only $14.95**

# "NO BRAND" DISKS!

**Now you can buy absolute top quality disks that are also the cheapest in Australia! They even come with a lifetime warranty, 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" 2S/2D "NO BRAND" DISKS

| 10+DISKS | 100+DISKS | 1,000+DISKS |
|---|---|---|
| $6·95ea | $6·75ea | $6·50ea |

(ALL PRICES PER 10 DISKS. TAX EXEMPT PRICES LESS $1)

## 5¼" HIGH DENSITY DISKS
**(DOUBLE SIDED)**

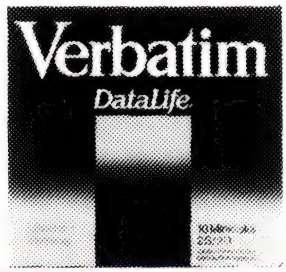
| 10+DISKS | 100+DISKS | 1,000+DISKS |
|---|---|---|
| $27·95ea | $26·95ea | $25·95ea |

(ALL PRICES PER 10 DISKS. TAX EXEMPT PRICES LESS $1)

## 3½" 2S/2D "NO BRAND" DISKS

| 10+DISKS | 100+DISKS | 1,000+DISKS |
|---|---|---|
| $24 | $23 | $22 |

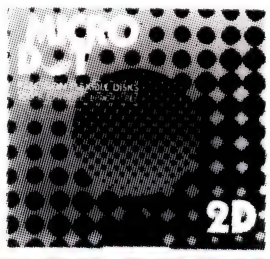
(ALL PRICES PER 10 DISKS. TAX EXEMPT PRICES LESS $2)




# VERBATIM DISKS!

**(ALL PRICES PER BOX OF 10 DISKS)**

| DESCRIPTION | 1-9 BOXES | 10+BOXES |
|---|---|---|
| 3½" 1S/2D | ...$39.95 | $37.95 |
| 3½" 2S/2D | ...$46.95 | $43.95 |
| 3½" 2S/HD | ..$99.00 | $89.00 |
| 5¼" 1S/2D | ...$22.00 | $21.00 |
| 5¼" 2S/2D | ...$26.00 | $24.00 |
| 5¼" 2S/4D | ...$75.00 | $70.00 |
| 5¼" 2S/HD | ..$41.00 | $39.00 |




# MICRODOT DISKS!

FREE PLASTIC LIBRARY CASE WITH EVERY 10 DISKS!

| DESCRIPTION | 1-9 BOXES | 10+ BOXES |
|---|---|---|
| 3½" 2S/2D | .....$32.95 | $30.95 |
| 5¼" 1S/2D | .....$11.95 | $10.95 |
| 5¼" 2S/2D | .....$13.95 | $12.95 |
| 5¼" 2S/HD | .....$24.95 | $23.95 |

SHARON FRANCE

# MICROBEE FILE

As many readers will already know, Microbee Systems has undergone many dramatic changes over the last 12 months, not the least of which was the take over of the company by two entrepreneurial Melbourne brothers, Serafino and Giuseppe (Joe) De Simone in May this year.

Where did the brothers come from and why did they take over the failing Microbee Systems? Under this new regime, what will happen to the upgrade policy and will the Gamma be re-introduced? Where is Microbee heading? Where will it be in 1990? These questions and more were put to Serafino, the younger brother of a marketing, administration and financial control partnership which hopes to see Microbee back on its feet by 1989.


Serafino is twenty six and a half, with a background initially as a computer enthusiast. He considers himself a product of the 'baby boom of computers' during his high school years, and went on to complete a computer science degree at the University of Melbourne.

His aspiration in life was to be the best computer programmer in the world and, after a year and a half, when close to achieving these goals, was lured away by brother Joe, who had started a business as a computer consultant. Serafino modestly points out his destiny was to become 'a business man of sorts' involved with DOS computers, which were becoming popular. As the business grew, it moved from its initial set-up as a consultancy to venture into computer retailing. Joe De Simone is a qualified lawyer with interests in economics and accountancy, tools which will be useful if Microbee is to be re-structured successfully.

The brothers run a number of concerns – two of which are CompuMark and MicroHelp. Compumark is an investment company which owns shares in Microbee Systems. The work of the De Simone brothers, however, is probably better known through their shop front trading business – MicroHelp. This company specializes in sales and support of network and communications computers, particularly to TAFE and Government bodies. Perhaps because of its heavy emphasis on support, MicroHelp won the National 3COM Dealer of the Year Award in 1987.

I spoke with Serafino De Simone at Microbee's West Gosford Headquarters –

***When did you first hear of Microbee Systems?*** I've known about Microbee for years. Like anyone who had ever picked up a computer magazine or computer paper, or was into hacking with computers, I knew what a Microbee was.

I never actually got a Microbee, I was more involved with other brands – Sinclairs and Tandys – and never got into the Microbee fold but was always aware that it was a popular machine, both for the home use and as an educational computer. Our interest in Microbee as an acquisition was to tap into that user base and to tap into that unique Australian character.

***CompuMark has a controlling interest in Microbee – how are the shares actually split?*** Compumark has 47.2 per cent of the shareholding which gives us effec-

tive control; we are the largest single shareholder. The board has effectively passed control to us, and Joe and I both have Executive Director's positions. I am in charge of Sales and Marketing and Joe is in charge of Finance and Administration. We are involved in the day to day running; we are in effective control. The other 52.5 per cent of the shares is spread over 900 individuals – quite a widespread shareholding.

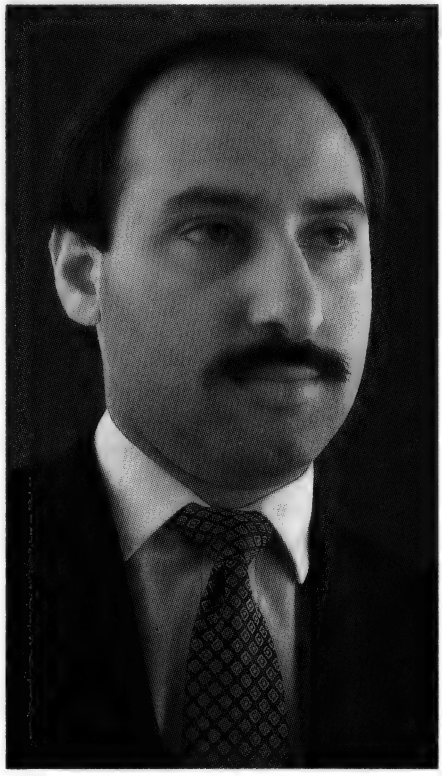
***What role does Owen Hill play?*** The company has been split three ways – Finance and Administration, Sales and Marketing, Research and Development. Owen Hill has been made Chairman of the Board and Director of R & D.

***Microbee had three main selling points – 'Australian made', 'affordable' and 'upgradable'. These obviously worked towards selling over 70,000 units and securing contract tenders. Will these remain the selling strategies for Microbee?*** 'Australian made' is very, very important. The issue of local content and especially the trend of late, by the Federal Government with its 'Help a mate' approach – that was very important in our eyes. So that flavour must remain in a lot of the products. Australian made these days probably means adding value in Australia rather than 100 per cent Australian made. There will be mix and match across products; some products which will be 100 per cent Australian and some 80 and some 70 per cent.

***So it won't be the true 100 per cent designed and manufactured unit as we had known the old Microbee to be?*** The problem is to remain competitive in the market place. We want to really add an Australian touch to all the products, so that they are not the standard products that are coming in from overseas. That may mean some locally written documentation or some locally written software to supplement the range. We must be realistic about the degree of Australian content; we must consider economic viability. But our products will have more Australian content than any of our competitors.

In terms of the 'cheapness' or 'affordability' of the system, we have a very strategic role to keep the company involved in the education and home user market and that, by definition, means affordability. We want to address what most people call the low end market. MicroHelp is already addressing the medium and high end market so there would be a conflict if we tried to push Microbee up or MicroHelp down.

Upgradability is a hot issue, which all of the users were very accustomed to. We are looking at new trading policies and upgrade policies at the moment; there will certainly be an element of that continued.



*When we bought the company, the Gamma technology was written off already. We are taking it that way at the moment, unless we can be shown some good reasons why we shouldn't.*

Maybe in terms of the existing product range, they have reached their natural life and upgrading from a 32K to 256TC is really swapping a unit over – it is not upgrading. With some of the new products we hope to bring to market, an important criteria will be that you can buy the unit as a low end unit and then add on cards, options or whatever to enhance it.

***The Gamma, an R & D initiative in 1985-86 was forecast to become the flagship of the Microbee range. It was an innovation in graphics based processing design, utilizing a 68000 processor (a la Macintosh, Amiga and Atari), with the ability to run MS-DOS and CP/M systems. After 18 months of research, $2 million investment, the hardware was 90 per cent complete and the software was 15 to 20 per cent finished. The project was then canned due to lack of funds. Will you be resurrecting the Gamma?*** When we bought the company, the Gamma technology was written off already. We are taking it that way at the moment, unless we can be shown some good reasons why we shouldn't. It was an issue that was settled before we became involved and unless somebody wants to add new light to it, it is probably closed.

***Microbee was involved in design and manufacture, distribution, retail and wholesale, sales and rentals, software writing and publishing and in-house advertising and magazine production. What is your view about this?*** Microbee was successful because it tried to satisfy as much of the user demand as possible and it created a real community around its product. For it to be successful again, that has to happen again. For example, the *Online* magazine will now be re-introduced. The company is now keeping in closer contact with the user groups than it has for the last 12 months.

We are really the backyard company to a certain extent and we don't want to shut the doors to many facets of the operation. One motive for success was that it was significantly a more openly run company than, say, international companies, where everything is a secret and you can't get a look in, and the information doesn't flow to the customer base to any great degree.

***You see user groups as having an important role to play in the future of Microbee?*** Yes. Since I have been involved, I have spoken to two or three of the user groups' Presidents to get an idea of what their feelings are and so on. I think it is fair to say that there is dwindling interest amongst some of those, whereas others are still very strong. The Melbourne user group still has over 100 members turning up every meeting. That's amazing. What we have done internally is set up a user group liaison person who will be responsible every two weeks to send a letter to the

President or the Secretary letting them know about internal developments, product news, staffing changes and also to contribute articles for insertion in their magazines. There is a screaming cry for more and more information by the user base. The people in user groups are some of our most loyal customers. We should take care of them the best we can. We also want them to be involved in design and manufacture. We want user input from that.

***What are your feelings about third party software producers? Do you feel that Microbee should support them?*** The more products there are available to work with the Microbee, the better the Microbee is going to sell. Obviously, then we should support third party developers by providing them with some formal guide lines for the software and a form of certification to say that the product is Microbee 'approved' even though it might not be a product we sell ourselves.

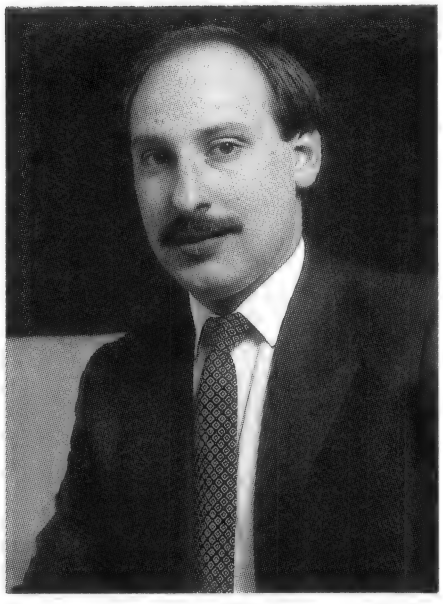
Also, it is probably true that we should be looking at selling some of the third party titles through our own retail and distribution channels. Those people are all very important. If they do not want to be under Microbee's wing directly, we should still be able to support them and help them.

***How is Microbee situated today? What is happening with Microbee?*** When we became involved with Microbee we set some short term and long term goals: essentially a three phase plan. Number one is returning it to a cash flow neutral position, number two is making a small profit and number three is re-investing in the future. Phase one, which is getting to a stage of consolidation and break even, should finish some time around September.

After that, we expect that between September and Christmas we can introduce a sprinkling of new software and add ons and some new products in the DOS range which will generate some positive income for the company. Between about November and January/February, 1989, we will be producing new products to bring to the market place – that is the growth phase.

***So by early next year you hope to be into your third phase?*** We hope that by February/March we would have returned to profitability and will be actually introducing new products to the market place.

***How many Microbees and what types are being produced at the moment?*** The 256 family is currently being produced; we are probably in the middle of a batch run of 500 which are going through at 100 a time. We are selling these to the home and school markets.



*Microbee was successful because it tried to satisfy as much of the user demand as possible and it created a real community around its product. For it to be successful again, that has to happen again.*

***What do you see as Microbee's best potential markets? Education and home or will you also be looking at going into the small business area?*** We are not looking at the small business office environment. Predominantly we see ourselves staying where our greatest successes have been reached, which is in the primary and secondary education market and in the home/hobbyist market place. The products that we will be bringing to market and the support materials offered will be in line with those markets.

I think it would be fair to say that we want to make the percentage of revenue about 50/50 between the education and home markets. In fact, there is probably a strong argument that the home and education markets are very similar. When you have children going to school, a computer could be very portable and carried back and forwards all the time.

***How are you going to target the home market?*** The home market is pretty hungry for a new product at the moment. So, we are really trying to bring a product that is upgradable and expandable which comes in at a basic price of just around $500. Then if the customer wants extra memory, a printer or something else, they can just click it on, rather than having to spend $1000 or more up front.

***Will we see a move away from CP/M and a move towards MS-DOS? Is CP/M dead?*** I think that you will see a future Microbee product with a non-DOS operating system. Whether it will be CP/M or not hasn't been decided yet. I don't believe CP/M is dead, just from the fact that there are 70,000 Microbees out there all running the software. It is a large enough installed base, and in the US there are many CP/M user groups which are still very strong. And, there are still some commercial CP/M machines which are still in use.

It depends on what hardware architecture we bring out for our products as to which operating system will be most suitable for those. I think that graphics are a very important part of computers generally now. Whether CP/M is well positioned to take care of that or not, at this moment, is an unresolved issue.

***So you do intend to support the existing Microbee owners?*** We have to take care of them so that the next computer they buy comes from Microbee. It just makes good common sense.

***There are currently Microbee owned retail outlets in Melbourne, Sydney, Gosford and Newcastle. How will these fit into your distribution and sales plans? Are you intending to open up or re-open outlets in states other than NSW and Victoria?*** In the consolidation phase we want to open up all over Australia, but we are taking the first step of the three step phase I mentioned earlier, very, very seriously. Until we get that totally running, we are not going to make any commitments to open in any of the other states. We want to bring Microbee back to its former glory, which involves an Australia wide presence.

At the moment there are no plans because the company is not in a position to make those kinds of commitments. One of our goals is to sell a lot of computers, to get Microbee back to its former glory and to have a totally Australian company doing the right thing.

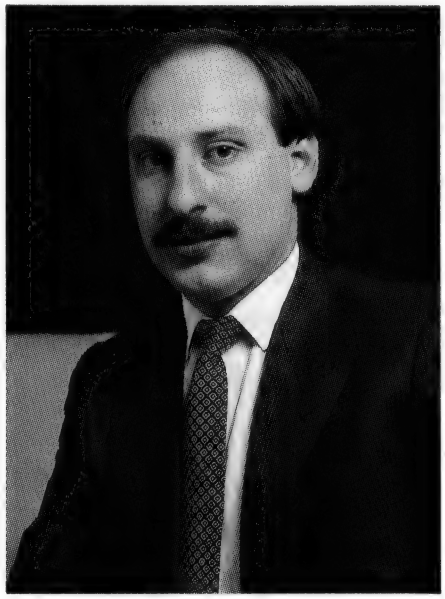
***You are going to release IBM PC clones from the Samsung range under the Microbee label. Is this viable considering the not so successful but similar Mitac experience of mid-1986?*** I'd say 'yes' due to that fact that people from MicroHelp,

myself and my partner, have a very strong understanding of the DOS marketplace. It was probably a very dramatic change for Microbee to move away from its home-grown product to be importing a product which it had very little knowledge of and to sell it through the same channels without additional support.

***How is the Samsung going to be different?*** When we re-introduce a range that is in the DOS arena, we are going to be very careful to choose a supplier who has good local support. The products are being sourced in Australia rather than overseas, which takes a lot of the administration problems and support considerations away from us. The products are of high quality and highly advertised, so that the market awareness is probably better than it was with the Mitac range. The pricing will be more aggressive and also the company is preparing more information for its sales people, so they are armed with more answers when customers ask questions. We are also looking at software to go with the products rather than just producing a range of products with nothing much to go on them. We are looking at something like a first choice or low end integrated packages that are suitable for the marketplace we are talking about.

***That will be the MS-DOS component of the Microbee range?*** That will be the first phase of the MS-DOS component. That's probably going to be only part of the DOS offering that we have. We have the potential, in-house, to develop DOS oriented products with some components that we are currently using in our computers. So this fits us in the standard end of the DOS market with the large foot-print and full height expansion slot. We also see a market for a smaller DOS package, maybe something even in the 256 case, which is already neat and more portable. The Samsung range is not a total DOS offering, but it is a good start.

***Gareth Powell, a computer journalist with the 'Sydney Morning Herald', once described Microbee as 'Australia's best kept (computing) secret'. What do you think of this?*** Going back three or four years, you certainly couldn't have been with computers and ignore Microbee's presence in the market place, but that has dwindled over the past few years – very much so. If you ask today 'What is Microbee?' you would only get a fraction of the people knowing about Microbee compared with a few years ago.



*The home market is pretty hungry for a new product at the moment. So, we are really trying to bring a product that is upgradable and expandable which comes in at a basic price of just around $500.*

So the 'best kept secret' from that point of view – most definitely. As the company closed offices around Australia and as the number of staff has dwindled away, it has probably exaggerated that effect.

***Perhaps what has affected Microbee has been the exposure a lots of its competitors like Amstrad, BBC and Commodore have had.*** I think that we can beat our competition from the bottom up. If we can deliver to the market place in a friendly fashion, rather than in an aggressive, advertising oriented way, that will engender a certain amount of sales on its own. We are still getting at people in their backyard and the challenge for us is to respond accurately to their needs.

***Are you planning any high profile campaigns, or planning to put Microbees into chain stores?*** Depending on the success of the product we launch in the low end, and that hasn't been full 'specced' (it isn't a product we can talk a lot about except to say that we are aiming at designing something in the $500 bracket), then you are looking at a distribution channel in line with that. So certainly it wouldn't be out of consideration and would make good business sense to talk to chain stores and department stores about carrying the product.

Whether they will commit themselves the way we want them to or not, I don't know, but certainly, that is one of the considerations. Also we can beat them by just having a better product, and having the users saying that it is the best product to be involved with; for example, 'Look at all of the support we can get – there is a magazine that comes out from them'. We can give them input on the software areas or software enhancements and upgrades. It really is Australians making products for Australia.

***Where do you see Microbee Systems at the end of 1988?*** By then, we want Microbee Systems to be making a reasonable return on our investment and to be making money which we can redeploy to development future products. We see it being a very stable organisation, able to go very rapidly to meet increasing demands placed on us by sales. By Christmas 1988, we want it to be in a very stable state and ready to roar again in 1989.

***What will Microbee Systems be doing in 1990?*** By 1990, Microbee should have re-established its dominant position in the education sector and be well on the way to becoming the de facto standard for home computing. I think it would be fair comment to say that we are stronger in the education market than in the home market so that we can dominate that first and follow on in the home market secondly.

***That's pretty heady heights.*** It is, but I think it is achievable – look at the chain store experience for a home user. They walk into a shop and are served by a not very knowledgeable teenager, there's no follow up support, and no range of options to support the products – they seem to sell only on price and we certainly want a bit more for our product than that. The support mightn't be as extensive as having someone come out to your home to show you how the computer works, but there will be supporting materials, and we will be active in user group meetings; we will be putting out a lot of newsletters and new software. It is really a community effort.

The thing that truly amazed and invigorated me when we became involved with the company is the amount of support we have – within the company and by our customers. That base line support has been there from the beginning, is still there and we want to maintain it and help it grow. □

GREGG FAULKNER

# YOUR AMIGA

A familiar theme in this column is the general friendliness and helpfulness of Amiga owners toward each other. I guess a large part of the reason for this is the lack of support from Commodore, something which is mentioned whenever Amiga owners meet. Whatever the reason, there has developed, worldwide, a real bond between us.

Even greater than the unity between owners is the pride each seems to have in the machine. This is reflected particularly in gatherings such as that being organised by the Armidale (NSW) Amiga Users' Group. This energetic and fast-growing group is in the process of organising an Amiga-Expo to be held in Legacy Hall, Armidale on 29th and 30th October 1988.

With assistance from the Armidale Amiga dealer, Chanticleer, the user group is planning a public exhibition of Amigas in use. The event is planned as a fundraiser for the user group and will include demonstrations of many of the more popular music, graphics, desktop publishing (DTP), word processing and games packages available in Australia. DTP will be demonstrated using a laser printer, and video digitised images will be printed using a Hewlett-Packard colour ink-jet printer. The demonstration will also include MIDI interfacing of Amigas to various instruments.

I'm assured that the Armidale user group includes some really hot shot Amiga drivers (remember it's the home of University of New England) so it would be a great place to have all your questions answered. Thanks to Barry Hopkins for news of the event. Further information could be obtained from Basil Flinter at Chanticleer on (067) 72 8888.

### Hints, tips and ideas?

Got any hints, tips or ideas you'd like to share with other Amiga users? Or maybe you've discovered (or written) a great new program you'd like to tell others about – if so, send them (on disk) to *Your Computer, PO Box 227, Waterloo 2015 NSW*. Please include a printout of the disk and caption any illustrations. Unfortunately, because of space limitations, we cannot publish listings over 200 lines long.

A Sydney based Amiga user group is undergoing major expansion having successfully survived its first year of operation (I've been told the first three are the hardest!). The Amiga User Group meets at the Burwood RSL in Shaftsbury Road Burwood on the second Monday of each month at 7.30 pm.

*A little bonus with Excellence! is the provision of Workbench 1.3 printer drivers which really speed up your printing.*

The Group offers a monthly newsletter on disk for members as well as access to a library of Public Domain material. Thanks to Colin Tringham for the news. (Colin wrote the *Your Microbee* column for a couple of years . . . I guess he's seen the light in 4096 colors!)

Colin has also drawn my attention to Appendix E of the Amiga ROM Kernal manual, which lists preferred printer switch settings and codes to use for specialised printer functions. He is delighted in finally being able to access the Shadow Print mode on his Brother HR-15. If any of you are having trouble getting your printer to strut its stuff then the ROM Kernal Manual may have the answers.

## Amiga Mega-Pak

Now it's time for my monthly swipe at Commodore (you remember them – they sell Amigas by the clever policy of keeping them a secret). Commodore's latest trick is the so-called Amiga Mega-Pack. This comprises an Amiga 500, some mediocre software and a Thompson television receiver (modified to accept video input).

The reason for this marketing ploy would seem to be that there is a shortage of 1081 and 1084 monitors. Invariably the demonstration Amiga in the store is connected to a *monitor* with a nice sharp, colourful picture. Invariably, also the salesperson refers to the Thompson TV as a *monitor*, and the buyer is given no indication that the resulting image will be very poor compared to the demonstration machine. The Thompson TV is *not* a monitor and it cannot provide the same image quality as a monitor does.

The result of this 'confusion' (misrepresentation is such a nasty word!) is a lot of disappointed Amiga owners who, if they want to improve the image quality in the future, will have to end up buying a monitor anyway. Nice one Commodore!

## Software

On to a look at some new software. Trying to keep up with software releases for the Amiga now is a bit like trying to count ants at a picnic. It seems only yesterday that we were all complaining about the shortage of packages for the machine – let me tell you, that situation has changed!

In no particular order here they come. First up is Excellence!, a word processor in the style of Prowrite and Textcraft Plus. It permits a good range of fonts and layout formats. Colour is supported and text wrap around images is okay. A little bonus with Excellence! is the provision of Workbench 1.3 printer drivers which really speed up your printing.

For first-time users of word processors Excellence! would be a good choice. It's friendly and yet powerful. It gives the user true WYSIWYG (what you see is what you get) screen presentation. Personally I hate it. I think a word processor should be for the purpose of writing and creating text. Packages like Excellence!, in my humble opinion, don't know whether they want to be word processors or DTP packages and they don't do either very well.

I really hate so-called word processors which use the graphics mode of the printer to produce dot-matrixed fancy fonts. Apparently I'm out of touch with the world these days as all the newer word processors seem to go to great lengths to permit more and more exotic fonts to be produced. If that's what you want then Excellence! is for you. For me, I'll stick to WordPerfect.

A really interesting package which I do like very much is Reason. This is a document editor which analyses text in the same way that a human editor would do. It seeks out such constructs as passive verb structures, sexism, jargon and inappropriate sentence opening and closures. It also

analyses your text for reading age required and other such valuable aids to targeting your desired audience.

Reason is, like many of the other packages which I seem to like most, boringly businesslike in its presentation. It does not make particularly good use of the Amiga environment, in fact it reeks of being quickly ported across from another machine. Its screen displays leave heaps to be desired and its choice of colours is plain lousy. So what makes it a good package? It does what it sets out to do, and it does that very well.

*If any of you are having trouble getting your printer to strut its stuff then the ROM Kernal Manual may have the answers.*

For anyone with any intention of producing serious writing this package is a must. I enjoy using it and I enjoy the feedback I can get from an impartial evaluation of my creations. It's a lot like a package which I saw not long ago for the IBM clunkers called StyleWriter. A very good idea for anyone who does a lot of writing – student or professional.

## Games

On the games front, the Cook and her mother, The Old Outlaw, have gone into raptures over Bubble Bobble. It looks like a very clever recreation of the arcade version. Graphics are colourful and fast, and the action is exciting. I'm told by the aforementioned duo that it can be enjoyed by all ages and is not overly violent in its theme. There must be something in it because I've had to fight hard to get at the machine to put this month's column together.

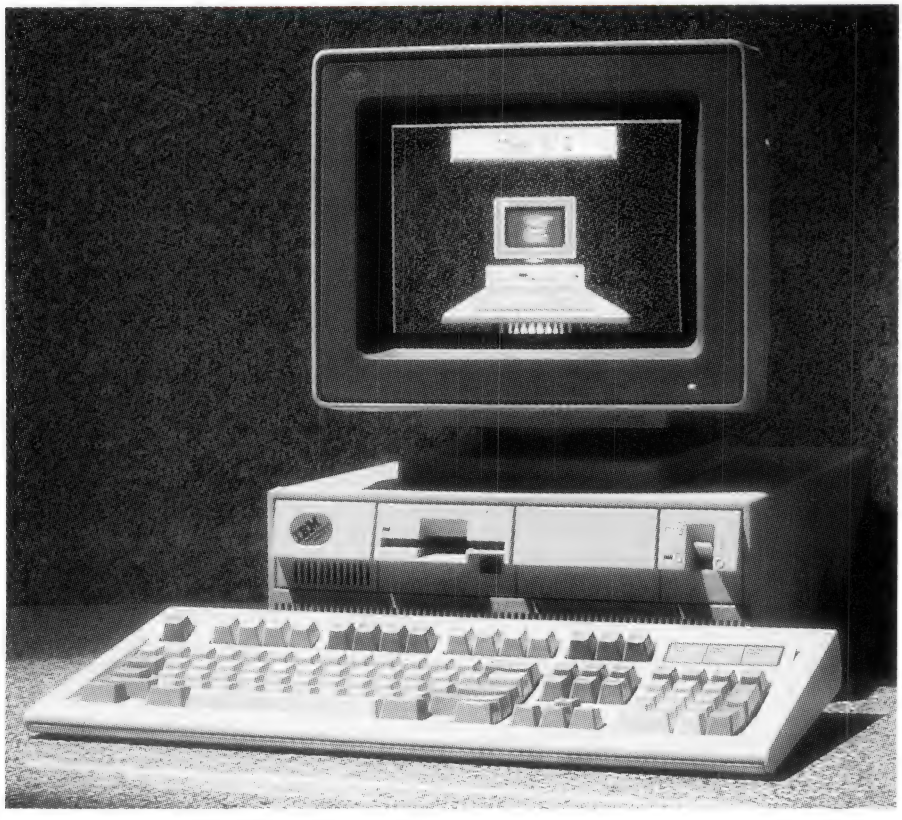
My big buzz of the month continues to be FA-18 Interceptor. I'm getting those carrier-deck landings down to a fine art, I even remember to lower the arrester hook most of the time. I've set up a ghetto blaster in my computer room to amplify the excellent stereo. The neighborhood shakes to the explosive sounds of MiGs meeting their doom and the rubber-smoking screech as my trusty FA-18 touches down on deck after yet another successful mission. Move over Maverick, I'm on my way to Miramar.


I've had a sneak look at a game called Crack. It's a development from Arkanoid and the game is pretty good. What I really love though is the title sequence. First up a cluster of cave men waddle out to a boulder and chisel the title into the rock. Next, accompanied by a blood curdling Tarzan yodel, a cave man swings across the screen from right to left on a vine. He collides with the left edge of the screen with a thud and slides down off the bottom of the screen. Very clever stuff. Nice animation and stunning sound. The rest of the game is accompanied by a sound track which I would describe as Neanderthal boogaloo, a very catchy foot-tapping rhythm with good instrument sounds.

Well, that's about it for another month. Keep the cards and letters pouring in (thanks mum!). See you next month. □

JOHN HEPWORTH

# YOUR IBM



This month I have for you a few of the gems and baubles that have come my way recently. First are the Zortech range of libraries of C functions for Turbo C and Quick C, at very reasonable prices. Second is the CopyIIPC Deluxe Option Board, an expansion board which is connected between your floppy controller and the floppy drives. It makes backup copies of any software, and reads, writes and formats Macintosh disks in a PC.

## Zortech C libraries

One of the greatest strengths of the C language is its ability to create functions which can be separately compiled and reused time after time. After compilation, individual functions can be collected in a library file, with the linker taking care of extracting the necessary code and forming the executable file. Users can create their own libraries of standard functions, or can buy off-the-peg commercial libraries.

Historically, commercial libraries have been fairly costly, though far, far cheaper than the equivalent in time for a programmer to reinvent the wheel. In part, this has been due to the relatively high price and small numbers of many of the older generation of C compilers. Turbo C and Quick C made cheap compilers available, and their large sales means that there is a legion of C programmers needing economical functions libraries. In return, having so many potential customers means that the libraries can be priced much lower than before.

Zortech has created no less than six specialised libraries. These are HotKey, Windows, Supertext, Games, Pro-Screen and Comms. My initial impressions are so positive that I felt that I should let you know of their existence immediately. Just remember that these are first impressions, not critical reviews!

HotKey has one disk and a 34-page, A5 manual, which starts with a discussion of the principles of memory resident ('pop-up') programming. While rather terse, it does cover the principles quite well, and clearly shows the use of the functions. Some of the library functions were written in Assembler, and the others in C, but in each case source code is provided as well as the library. It is still essential to observe some restrictions when writing a TSR, and it's not possible to make any old program memory resident, but the limitations are clearly pointed out. A sample program, in source and executable form, is included.

Comms has three disks and a 122-page manual. One disk has source code and a working communications program written with the library. The other two disks are libraries for Turbo C and Quick C respectively. Functions are included for control of Hayes modems, ASCII, XModem and Kermit file transfer. Autodial is supported. A sample communications program on the disk is reminiscent of the design of PC-Talk, Telix and QModem.

Games has two disks, and a 156-page manual, which details the theoretical and practical aspects of writing games programs, and also each of the functions in the library. Along with source, object and executable files are included three running games: Chess, Backgammon and Wari.

Windows comes on two disks and with a 86-page manual. It is designed to make it easy to create Lotus-style menu bars and pop-up windows within programs. Now it's easy to have text scrolling within a small area of the screen.

SuperText contains on three disks the source code for all functions to make a word processor with WordStar compatible commands, though able to edit up to eight files at a time. The manual is 256 pages long, and is well laid out and easy to read.

Pro-Screen is a code generator to readily and easily create C source code for screen displays. It comes on three disks with a 76-page manual. Generating screens manually is hard enough in monochrome, but becomes tedious when boxes are to be drawn, and worse when colour is needed. Pro-Screen allows the user to paint a screen, or import a screen image created with a word processor, and creates C source code for it. It also takes care of creation of data entry fields in the screen.

Each of the Zortech libraries are priced at $99.95. My copies came from MultiView Computers Pty Ltd, First floor, 565 Willoughby Rd, Willoughby, NSW 2068, (02) 958 2477.

## CopyIIPC Deluxe Option Board

I have installed a CopyIIPC Deluxe Option Board in my PC. Two problems have been solved at one blow. I can now make backup copies of a vast range of disks that DiskCopy won't touch, and I can format, read and write Macintosh disks with the aid of my 3½ inch floppy drive.

The CopyIIPC Deluxe Option Board comes as a short expansion card ready to plug into a free slot. The cable from the floppy disk controller to the floppy drive is disconnected at the controller end, and plugs onto the Option Board. Another ribbon cable, included in the package, connects from the Option Board to the floppy controller. The standard package is arranged for XTs and clones, and variations are available for ATs, PS/2 and so on, with the changes mainly relating to the cable.

A disk of software is included, with two main groups of programs. One group allows reading writing and formatting of Mac disks, provided that a 3½ inch drive is available. Transfer of files from PC to Mac formats is easy. Often a Mac package can directly read files created by the PC equivalent. The Mac version of Microsoft Word can directly read PC Word with all formatting preserved. Mac PageMaker can read PC Word, again with formatting preserved. Other transfers may be as successful but I have not tried them extensively.

If the files created by the applications software at one end cannot be read by the applications software at the other, text files can be transferred. In such cases, minor manipulation may be required. PCs typically use a carriage return/line feed pair at the end of a paragraph in text files while Macs use only a carriage return. Files may be transferred unchanged, or the line feeds can be added or stripped by the Option Board software.

Overall, copying files from a PC disk to or from a Mac disk was smooth and reasonably quick. All disks formatted and written on the PC were successfully read on various Macs. Only once did I have a problem, where a disk formatted in a Mac II couldn't be read by the PC. Making a PC handle a Mac disk is a big challenge. While the risk of corrupting data is small, it might could happen in rare cases. To play safe, whenever transferring files from one disk to another radically different disk, as in PC to Mac, I always make the transfers to a freshly formatted disk.

The second group of Option Board software allows copying of protected software, and will allow transfer of such software from one disk size to another. I refuse ever to use an original disk on my machine, except to install it on my hard disk or make a backup copy. I automatically make the backup, and then the factory disk goes into storage in another room, just in case disaster strikes. I refuse to use original disks, for I have seen too many master disks corrupted by operator or machine error. Usually replacements are unavailable or exorbitantly expensive. In my tests, the Option Board copied virtually any PC software. The manual states that it can also copy Amiga, Atari, Apple, Mac and Commodore, though without such a range of hardware and software, this is a claim I couldn't verify. Just remember – don't pirate, just make working copies of legitimate software that you already own.

The CopyIIPC Deluxe option Board is a product of Central point Software, and is distributed in Australia by PC Extras on (02) 319 2155. Price is $299 taxed. □

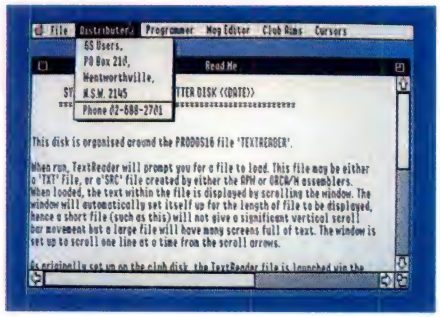
TERRY CASS

# YOUR APPLE IIGS


## Xmas products

Last month I was lucky enough to spend some time at Apple Fest in San Francisco. With the Christmas sales period just starting, there was an abundance of new IIGS products being released; the good news is that software for the IIGS is being released now at a pace that is hard to keep up with.

I brought 25 new packages back home with me to review in the GS Users Newsletter; most of these packages will never reach Australia so we will tell you how to obtain them from the USA yourself. The Apple IIGS is out selling the IIe three to one in the States, and this has started some of the greatest software releases I have seen for some time. Most software packages I brought back have (as yet) not been released for the Amiga or the Macintosh.




My greatest acquisition in the USA was the latest IIGS accelerator board, giving my IIGS incredible operating speeds; I will review this board (hopefully) next month, and the new desktop publishing package, Medley, is one of the best quality programs I have seen for some time. Apple Works GS and over five different MIDI interfaces are now available. All in all the future of the Apple IIGS looks great.

As the space available to me in this column is not large enough to review all these products, interested users may want to get a copy of the last IIGS Users Association News Disketter where we have reviews of all the latest software, hardware, and technical changes released at Apple Fest. If you missed it, please write to me at the IIGS Users Association, PO Box 210, Wentworthville 2145.

## Operating system

The new Apple IIGS operating system is now available, and is twice as fast as the old time ProDos 16. Developers in Australia who have been using Developer 15 for some months can now get down to some serious business writing in the new operating system. Chris Nilegen has released his IIGS communication program Connect and Apple Australia is very impressed. This software could end up being packaged together with Apple modems by the time you read this article.

I have now reviewed over 18 Educational packages for the IIGS, but the latest collection I brought back with me, seem to be some of the best released. I do not normally support IIc/IIe/IIGS software, but one program I have come across I feel is so good it should be mentioned. Full points go to Explore Australia. This totally Australian program starts off with two school children standing in a classroom – a spinning world globe, a blackboard, the Australian flag, and an Australian history book are present. At this point you choose from which item you wish to continue. The program's intention is to teach children basic Australian history, Australian animals, Aboriginal paintings and so on. There is even a part where a sailing ship retraces the First Fleet's movements.

The main menu bar has been changed to make it attractive and easy to use by children of most ages. The biggest drawback is that this program was not written especially for the IIGS so therefore lacks sound, which would have made it the program of the year in my eyes. Well, we can hope that someone sees the logic in this and brings out a total GS version of this great program.

By the time you read this article Data Flow will have released Read & Rhyme, Magical Myth and Journey in Greek Mythology from Unicorn in Australia, and I have another six packages I have as not yet had time to look at; interested parties in education software for the GS are welcome to contact me through GS Users for more information.

User groups in the States are now releasing CD disks with up to 500 megabytes of Public Domain software. Moves have been taken to make a collection of these disks which will be made available to all users groups around Australia; for more information please write to myself or Apple Australia.

*This is the first program I have seen that utilizes all the music generating power of the Ensoniq music chip, built into every Apple IIGS.*

I've had a lot of requests as to my choice of a software package for Xmas and I think it must go to Sierra's Police Quest – this program is definitely fun for young and old.

It is an interactive adventure game, in which you become a Police Officer for a day on the beat; you will come across murder, bikies, drugs and so on – all you have to do is solve the crimes. The game starts off in the police station, in super hires graphics. You (the police officer) move around the screen, first attending briefings and getting the things that you'll need during the day. You then make your way to the police car, and learn how to drive around the city streets. You must always ask questions or you won't find the answers (and beware of the blonde who drives the little red sports car – what looks good may not be good for you).

Remember the names of the streets as you drive around as sometime during the game you may have to find your way back there. We have an adventure corner in the GS Users Newsletter so for those adventure game fanatics who get stuck, this is where the solutions are found.

## MIDI programs

I have had a lot of letters asking for information on music programs with MIDI compatibility. Diversified Software Research Incorporated is now shipping a fantastic new music program for the IIGS, called Diversi-Tune. This is not just the best Apple IIGS music program; as a person heavily involved in the music industry I must say this is by far the best music program running on any computer that I have seen.

Diversi-Tune is the first single computer program I have seen that combines the three basic functions of a music synthesizer, a unique screen display, and a MIDI song recorder, which all run simultaneously. Unlike most other MIDI sequencers, Diversi-Tune's MIDI recorder captures and reproduces every nuance of a live performance by real musicians, so when you play it you feel as if you are listening to a musician not a computer. You can also modify the song by changing the tempo key, instrument sounds, adding or subtracting parts and so on. Best of all you can play Diversi-Tune on any 512 Kbyte Apple IIGS with a MIDI interface.

This is the first program I have seen that utilizes all the music generating power of the Ensoniq music chip, built into every Apple IIGS. The synthesizer capacity is 16- or 32-voice polyphonic, with up to 128 different, stereophonic, instrument sounds – the sounds are incredible.

The best is still to come, Diversi-Tune displays the old time sing-a-long words with the bouncing ball; this can be selected in either large or small print, watch the music in its piano roll form, or as a piano keyboard. You can also see a full print out in Hex of how the program uses the MIDI Interface.

The Diversi-Tune program is like a videocassette recorder (VCR). Most people will use Diversi-Tune to play back prerecorded songs, just like most people use their VCRs to watch pre-recorded movies. You'll be able to buy Diversi-Tune pre-recorded song disks from a variety of sources, just like you can buy video movies by mail or at the local video store.

Using Diversi-Tune to play back pre-recorded songs is just as simple as putting a video cassette in your recorder and playing it. So far I have seen six different song disks for this program – Nathan Page Live At Applefest, Gay Nineties songs, folk and patriotic songs, Christmas songs, Jewish songs and Gospel songs. I believe another eight are just about to be released.

## Recording

A few people actually use the record button on their video recorder. This takes a little more effort, but you can then record movies off the air when you're not home, fast-forward through commercials, and do all kinds of fun things.

Diversi-Tune also has a record button, fast-forward, rewind and so on. You'll find these controls are always present at the bottom of the screen. Finally, some people buy video cameras and use their VCR to make their own home 'movies'. These may not look or sound as good as pre-recorded cassettes, but they're much more meaningful to the person who made them. With Diversi-Tune, you can buy a MIDI music keyboard and interface, and connect it to your Apple IIGS. This will allow you to record your own songs. I highly recommend a stereo card. These cards will let you hear the incredible stereo effects produced by Diversi-Tune. Here are the three cards I recommend – MDIdeas (Supersonic), Applied Visions (G Stereo) and Applied Engineering.

MIDI stands for 'Musical Instrument Digital Interface'. The best place to learn about MIDI is a music store, not a computer store. Ask a music salesman to explain MIDI, and buy an introductory book on the subject. A MIDI interface allows you to connect the Apple IIGS to an external music keyboard. You'll need this combination if you want to record your own music into Diversi-Tune. Also, most music keyboards can generate their own sounds. You can play these sounds with Diversi-Tune, as well.

Diversi-Tune supports two types of MIDI interfaces. I recommend you buy the one from Apple, called the Apple MIDI Interface, available from your Apple dealer. It lists for $100, and plugs into the modem or printer port in the back of the IIGS. With Diversi-Tune, you can actually connect and use two interfaces at once, one to the printer port, and the other to the modem port of your IIGS.

If you've got a modem and printer connected to your ports, you'll need a switch to avoid having to unplug the modem every time you want to use your MIDI keyboard. Under these circumstances, your best bet may be to buy the Opcode Studio Plus Two Interface. It was designed for the Macintosh Plus, but works great with the IIGS. It has two MIDI interfaces, which connect to the modem and printer ports, with front panel switches so you can use your modem and printer, too. It's all the interface you'll ever need!

The other type of interface plugs into a slot inside the IIGS and was designed for the old Apple IIe. If you've already got one, you can configure Diversi-Tune to use it (I don't recommend buying this type of interface, however). Some of the songs included on the data disk I used are Give My Regards to Broadway, He's Got the Whole World in His Hands, La Cucaracha and Havah Nagilah. To order Diversi-Tune contact DSR Incorporated, 34880 Bunker Hill, Farmington, MI 48331-3236 USA.

Unlike some of our other programs, Diversi-Tune is not a Shareware program, and may not be copied except for backup use by the original purchaser. But to allow GS Users to see a demonstration of Diversi-Tune they have put together a demo disk for $US5 American, which includes the full documentation, and will play one of the songs on the program disk.

*The new Apple IIGS operating system is now available, and is twice as fast as the old time ProDos 16.*

The purpose of this demo disk is to convince you that Diversi-Tune is the fantastic program. You can use it to play the song, Grand Old Flag, and as a live MIDI synthesizer. If you do not wish to go to the trouble of ordering this program from the states, copies are available through GS Users Association.

## Other DSR programs

The Diversi-Tune program disk contains a disk speed-up program, Diversi-Cache, which will remain active until you turn the power off on your computer. Try booting the IIGS system disk after running Diversi-Tune, and you'll notice the improvement. To legally use Diversi-Cache with other programs, besides Diversi-Tune, please send $35 payment. Diversi-Cache dramatically increases the I/O speed of the Apple Disk 3.5, under any operating system (ProDos, Pascal, DOS 3.3).

Diversi-Cache speeds up the Disk 3.5 in two ways. First of all, whenever the system reads a block, Diversi-Cache actually reads an entire track. This triples the speed of disk reads, and doubles the speed of ProDos writes. Secondly, Diversi-Cache allows you to allocate a cache memory buffer from 0 to 800 Kbyte in size. Whenever the system reads a block, Diversi-Cache saves it in the cache buffer. If the system asks for this block again, it comes out of memory at Ramdisk speed. Diversi-Cache only speeds up the Apple Disk 3.5 designed for the Apple IIGS, and will not affect the speed of the older Apple IIc compatible UniDisk 3.5.

Diversi-Copy is the fastest and easiest way to make back-up copies of your 3½ and 5¼ inch disks. Diversi-Copy will use all available memory in an Apple IIGS, IIe, IIc, or II+ compatible to allow 1-pass copying with a single drive. Diversi-Copy was chosen as inCider magazine's Editor's Choice. It is the best copy program available, for both 5¼ and 3½ inch drive copying.

Diversi-Key is a keyboard macro program for the Apple IIGS that will work with any program that allows interrupts. This includes programs that run under Pascal, ProDos, or DOS 3.3 Diversi-Key works with Appleworks 2.0, as well as other programs.

Diversi-Key sends macro keystrokes as if you had typed them at the keyboard, so you don't need to modify your programs to work with Diversi-Key. It also allows you to add an almost unlimited number of custom functions to any program. Diversi-Key includes a flexible way to program the mouse to work with any program, as well as date and time macros, nested macro calls, nested repeat, IF, and WHILE conditional loops, and much much more.

## Agreement

Apple Computer Incorporated has signed a partnership for development agreements with the Australian Government. This agreement will provide new opportunities for Australian firms through the transfer of manufacturing technology; access to components and product specifications, assistance to Australian companies to reach international levels of volume manufacturing, quality control, and price competitiveness in the international market place.

Australian companies will now be able to take a greater part in major research and development programs critical to Apple Computers products cycle and development in communications technologies. Under the agreement, Apple has agreed to boost exports from Australia to $107 million and increase research and development expenditure in Australia to $18 million a year by 1994. □

**Swap**
Commodore 64 software wanted to swap. Write to: Nevzat Ismaili, 28 Eirene St, Yarraville 3013.

**Printer buffer**
New 64-256 Kbyte printer buffer design release. Version 4.0 and REV G boards now available. Double sided PCB, EPROM and instructions, $39. Optional additions include 2 by 7 SEG LED front panel display of percentage full, 1 to 99 copies select, 3 polled computer inputs, printer switches, computer switches and serial converter boards. For a free catalogue send a 37 cent stamp to Don McKenzie, 29 Ellesmere Crescent, Tullamarine 3043.

**Microbee**
Increase memory from 64 Kbyte to 128 Kbyte. Gain RAMdisk and cursor keys. $70 or $80 (depending on serial number) plus transport costs. FGP Computers, Cabbage tree Road, Grose Vale 2753. Phone (045) 72 1254 after hours.

**Ribbon reinking**
Don't throw them away – fabric ribbons can be reinked. Small cartridges to 15 mm wide cost $4.75 for 11 plus (Vic. only). Over 15 mm and all spools $5.50 – mainframe from $7.50 (NSW and SA plus 25 cents per ribbon – Qld and WA plus 50 cents per ribbon). Colour changes from $5 each. Ribbons repaired if required and reloads fitted to worn out ribbons – returned in sealed bags. All prices include post both ways. Swifte Ribbon Reinking, Freepost 22 Kerang 3579. Phone (054) 52 2877 or after hours on (054) 52 2061.

**Wanted**
Person or organisation capable of replacing faulty keyboard chip in Kaypro II computer. Contact Reg Rae on (02) 764 8464 (business hours)

**Swap**
Amiga user wants to swap software, tips and information. Brett Cooper, 128 Argyle St, Hawera, New Zealand.

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# SERVICES PAGE

## LETTERS TO THE EDITOR

We are happy to receive your comments and, if they are of interest to other readers, publish them. Letters will only be considered for publication if they include your name and address, although we can withhold such details from publishing on request. Note that we reserve the right to (and probably will) edit all letters for the sake of brevity, clarity or accuracy.

## SUBSCRIPTIONS

Standard 12-issue rate within Australia: $42. Standard 24-issue rate within Australia: $79.80. Surface rate for New Zealand and Papua New Guinea: $51.80; airmail rate: $57. Rates for other countries on application. All overseas rates quoted are to be paid in Australian dollars. Allow up to eight weeks for subscription processing.

## BACK COPIES

Back copies of *Your Computer* are available from The Federal Publishing Co, PO Box 227, Waterloo 2017 at A$4.00 each, including postage for Australia and New Zealand. We will supply photostat copies of articles where a back issue is not available, at the single-magazine price for each feature copied. A special service is offered for Tutorials: see below.

## TUTORIALS

All Parts of Tutorials published within the last 2 years are available as photocopies for a charge of $0.50 per Part plus $4.00 for postage and handling within Australia (overseas postage additional). Please identify the Tutorial by its complete name and specify the Parts by number or the issue of publication. All but the latest of our Tutorials are listed in our 5-Year Index, published with our July 1986 issue.

## READERS' ENQUIRIES

We will make every effort to answer readers' written enquiries, if accompanied by a stamped, self-addressed envelope, although staff shortages and deadline pressures may cause delays. Please include your telephone number(s) with any enquiry. Phone enquiries not related to subscriptions, readers' advertisements, or other 'service information' cannot be accepted.

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## LIABILITY



## EDITORIAL CONTRIBUTIONS

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**All Contributions:** should include your name, address, and home and office phone numbers (in case we need to check details). Each page of your submission, and any material sent with it, should also carry your name.

**Contributions by Telephone:** Contributors who have modems and suitable software (in the MODEM7/YAM mould – see our stories on Christensen Protocols in the May and June 1983 issues) can arrange direct transfer to our computers through our Bulletin Board system, which is on-line 24 hours a day, seven days a week. Contact our office by phone for details on transferring material in this way.

**Contributions on Disk:** Contributions can be accepted in most disk formats, although some have to be converted outside our offices, which will add to the (often lengthy) delay between receipt and acknowledgment. The preferred medium is IBM standard format single-sided, single-density, 20 cm CP/M disks or IBM PC-DOS minifloppies. We can also handle, in-office, most soft-sectored 13 cm disks, thanks to PC-Alien – so unless you have a particularly strange format, send it on disk straight from your machine. Please pack them extremely carefully if posting and label all disks with your name, address and phone number.

**Listings:** Unless it is absolutely impossible, we want listings produced on the computer. This reduces the risk of error – if the computer typed it, the computer probably accepted it. Print listings with a dark – preferably new – ribbon on white paper, and try to format the output to a narrow (40 characters) width. If they can't be produced on a printer, borrow a good typewriter – hand-written material is likely to sit around the office for a year before someone can find time to type it all out for you! Please provide an account of what the program does, how it works and so on. Any comments on the program should refer to the address, line number or label rather than to a page number. Any comments on modifying the program to work on other machines will be appreciated. Try to include a printout of at least part of a sample run if possible.

**Style:** All items should be typed (or printed) and double-spaced on plain white paper. We will only accept original copies – no photostats. Include your name, address, telephone number and the date on the first page of your manuscript (all manuscript pages should have your surname and page number in the top right-hand corner). Be clear and concise, and keep jargon and adjectives to a minimum. □

# AD INDEX

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**ALL MS-DOS**
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$12 plus tax

## WORD PROCESSORS

**501 PC WRITE:** A high quality word processor equal to those that could cost $500 or more. Includes the use of help screens, split screen edit and wide printer support.
**612 CAPITAL WORD:** (NEW YORK WORD). A powerful word processor with multiple windows. Has EGA support. Index generator, mail and mailmerge. (Requires 2 drives and 256K)
**517 SPELLING CHECKER:** A spelling checker for use with many word processors including PC WRITE (NOTE: NOT WORDSTAR). (Old number 501-2)

## DATABASES

**520 FREE FILE DATABASE:** Considered the best form (single disk) database around. The equivalent would cost $100s.
**521 FILE EXPRESS DATABASE:** This is a 2 disk set database that is unequalled for value as it has most options and facilities of the MORE EXPENSIVE comparison packages. (NOTE: 2 disks).
**502 PC FILE:** Another high quality product for your business use. An excellent, yet easy to use database program. Menu driven for ease of use. It can be integrated with the word processor and allows full functioning as a database should.

## EDUCATIONAL

**578 COMPUTER TUTORIAL:** Gives instruction that is easy to follow and helps the novice to overcome most difficulties.
**579 TYPING TUTOR:** A well presented typing tutor which checks timing and errors. The disk also includes a well presented Finance calculator and maths conversion program.
**581 MATHS TUTOR:** Ideal for teaching as you can change the set up to suit different age groups.
**87 SECONDARY MATHS:** A good progression for the high school student or teacher.
**614 EDUCATION 6:** Maths and music programs that suit Elementary to High School levels. Very entertaining music games. (Requires CGA CARD and 128K).
**680 PC DOS HELP:** A very comprehensive tutorial covering all areas of DOS. This will help you understand and accomplish more with your computer.
**590 MUSICIAN:** A good program for the budding composer. This enables you to enter your own composition or sheet music notation and then have it played back. The system requirements are 128K memory at least, one disk drive, 80 column display mode and graphics card.

## SPREADSHEETS

**503 PC GRAPH:** From the same stable as the other PC programs and as functional. This allows utilization of data from PC FILE to produce graphs for greater presentation.
**504 PC CALC:** Of course there had to be a spreadsheet. This one has its own tutorial and a number of advanced features. It also has screen prompts and a wide range of print options.

**NEW ZEALAND ENQUIRIES INVITED**

## COMMUNICATIONS

**537 PROCOMM:** The latest version of an excellent Terminal Program for modem. It has all the features of commercially based packages. BAUD rate 300 to 9600, auto dialling DOS pathway, etc.
**540 Q-MODEM AND KERMIT:** Two terminal programs on one disk with documentation and easy to use.
**701 VIATEL:** A good communications program which includes the source code. This program runs a 1200/75 modem without a baud rate converter.

## GAMES

**543 GAMES 1:** Sopwith, Pacgirl, Three Demon, Baby, Castle Adventure and Boggy.
**544 GAMES 2:** Spacewars, Dragons, 747, Flighmare and others.
**545 EMPIRE:** The war game to end all war games.
**548 BASIC GAMES:** A compilation of the best games written in BASIC.
**550 GREAT BASIC GAMES:** Written in Basic and includes Wizzard. Mars, Racecar, etc.
**551 SUPER COMPILED GAMES:** A collection of arcade games includes Striker (a great helicopter adventure), Kong and Frog, etc.
**552 BERMUDA:** Go sailing in the Bermuda Triangle and see if you survive.
**556 CHESS:** Excellent Graphic games includes Solitaire.
**564 GAMES 5:** This collection includes Face, Hopper and Insults (they will delight your friends).
**566 GAMES 7:** Bridge, keyno and other games with a biorythym charting program to interest all.
**557 BILLIARDS:** Naturally it also includes 8 ball and straight pool. A tennis program is also included on this disk.

## UTILITIES

**532 POWER MENU:** A hard disk system that allows you to choose programs from a menu of what is available on your h/disk.
**527 ULTRA UTILITIES:** Rated with NORTONS UTILITIES. Allows examination of disks, files, etc.
**531 HARD DISK UTILITIES:** A selection of utilities to make your hard disk a blessing.

## GENERAL

**525 FARM MANAGEMENT:** A 3 disk set of analysis tools for the person on the land. (NOTE: 3 disks)
**652 TENANT AND PROPERTY MANAGEMENT:** A handy program for real estate management. This program can be used in conjunction with DBase11,111, & +. (2 DISKS)
**535 DISK CATALOGER:** A handy program to keep track of all your records.
**536 INVENTORY AND STOCK CONTROL:** A must for the small businessman to keep track of the turn-over of stock and stock on hand.
**506 PC DRAW:** A new two disk set consisting of programs that give keyboard drawing AND MOUSE AIDED operation to allow printing of graphics with slide show capabilities. Simulates a COMPUTER AIDED DESIGN SYSTEM program. (REQUIRES CGA CARD [standard with most IBM computers]). (NOTE: 2 disks)

## ACCOUNTING

**510 GENERAL LEDGER:** An excellent general ledger program for small or large business applications which is menu driven for easy use.
**511 FINANCE MANAGER:** A micro accounting program that exceeds expectations. Ideal for small business or home. Easy to use.
**542 PC ACCOUNTING (SINGLE ENTRY ACCOUNTING):** Handles general ledger, accounts receivable and payable, etc. Comes with good documentation. (NOTE: 2 disks)

## DESKTOP UTILITIES

**512 PC YEARBOOK:** (INSTANT RECALL) A good calendar type program to organise. This is excellent value for the number of programs on this disk.
**513 PC DESKMATE:** A memory resident pop-up utility. Allows access whilst running other programs. It includes alarm, calculator, phone directory, DOS and print controls. Manual included on disk.

**PLEASE FORWARD THE SELECTED PROGRAMS INDICATED BELOW**

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INQUIRY 503

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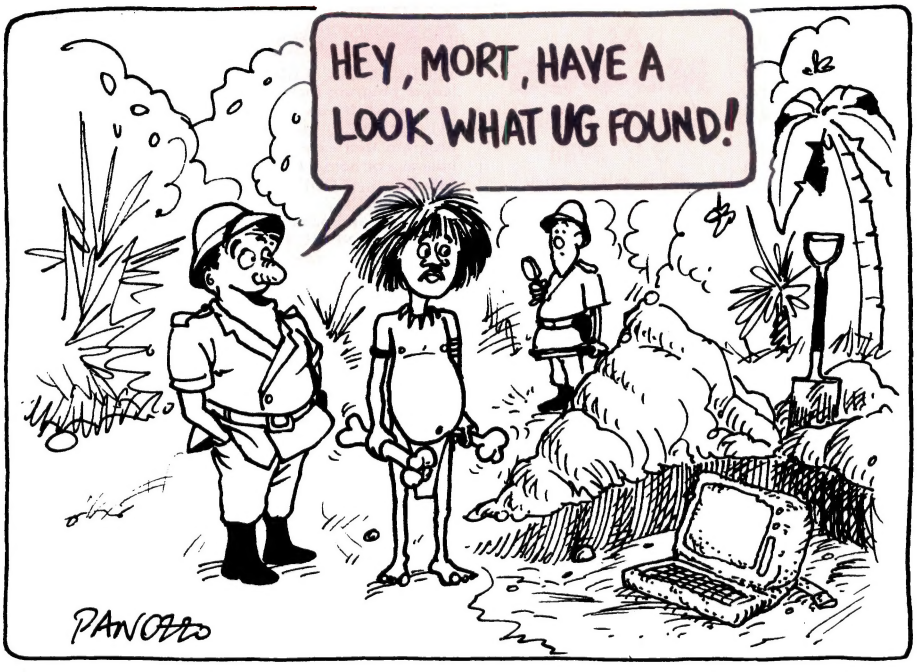
# CURSORY GLANCE




A person relatively new to computing commented recently that whenever she saw a printer under a perspex hood it brought back childhood memories of fairy tale princesses under glass.

■ The very personal nature of a word processor is a big factor in determining which program you will use best. Many people develop affinities and feelings about their word processors in the same way as they do about their romantic partners. And then there are born-again users of this or that program, other people who have fallings out with their programs, divorces and new romances. Some even have reconciliations. Beware the person who is still in love – they are almost certainly blind.

■ On my way to a previous job I used to walk past a shop which sold computer bras. The reason they named them that was that the bras added or subtracted inches in seconds. The question remains, can they read Lotus files?

■ Why are computers booted? Is it because the operator wishes to vent some anger? Of course not – otherwise we wouldn't have a cursor. In the old days (back in about 1974 when I was operating a mainframe with 48 kilobytes of memory and less power than any modern micro) computers were started by using a bootstrap loader or routine. The routine was a mini-program which had to be run before the computer could be used. But the computer had to be *told* to run this bootstrap routine. One machine I operated then needed a command like B440000 and then a press of the RUN button. The meaning of the command was 'Run a bootstrap routine (B) which you will find by reading (4) from the disk (4) and load this into the first place in memory – location 0 (0000)'. In the even older days the loader had to be keyed in. These days the process is much the same but the computer does it all for us automatically – they are self booting. Warm boots and cold boots are terms common among users of various computer operating systems. The temperature of these boots was determined by how close you went to absolute zero – whether the machine was turned off or just taken back a few steps.

■ Compuskill in Sydney's Matraville trains unemployed people in word processing and office skills. One of the staff was away one day and a replacement training person came in to work. One of the trainees said to the replacement, 'Are you the trainer?' The substitute replied without pausing for thought, 'No, I'm TRAINER-BAK!'

■ On September 23, 1968, Raymond Schoolfield stood naked in front of IBM's Atlanta (US) building carrying a placard which said 'Computers are obscene'. With some software they would have been clothed, but would it make them less obscene? That was 20 years ago. Today computers are almost commonplace, but are they still obscene? Hard to tell, but they certainly wear a better standard of clothing. I hope Raymond wears more clothes these days, North American winters can be a little chilly with just a placard to keep you warm.

## BOOTSTRAP:

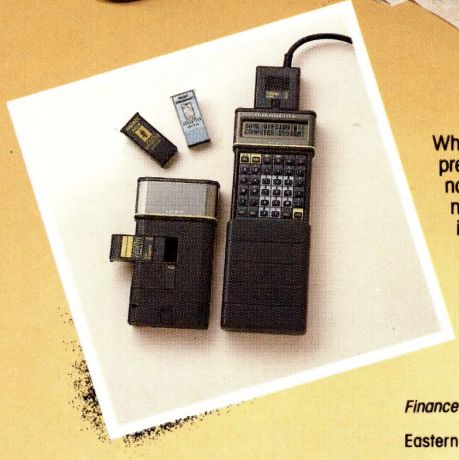
Paleontologists (people who know about fossils other than the ones you work with) have discovered the remains of a primitive computer. The machine is the earliest known automatic programmable device. They have not pieced together the whole machine, but have identified sufficient parts to guess at the overall picture. Interesting reversal of the modern practice of using computers to divine the nature of fossils from the remnants which they find.

Here they have found the remnants and divined the meaning of them without the use of a computer and the result seems to be a computer. The bits they found are magnetic and seem to also be organic – derived from or part of some living organism. It seems that earlier cultures had worked out how to generate biocomputers by using organisms which had magnetic properties.

*The machine is the earliest known automatic programmable device.*

Biocomputers are part of the next era of computers which our supposedly advanced civilization will produce. So much for progress. The organisms were found near the old tower of Babel and have been named Trilobytes. The computer seems to have been used to translate the many tongues used in the tower, indicating that the locals must have been pretty advanced in their use of software as well. Watch this space, more news as it comes to hand from the Chariots of the ROMs.

# When brief is not the case... keep an Organiser II handy



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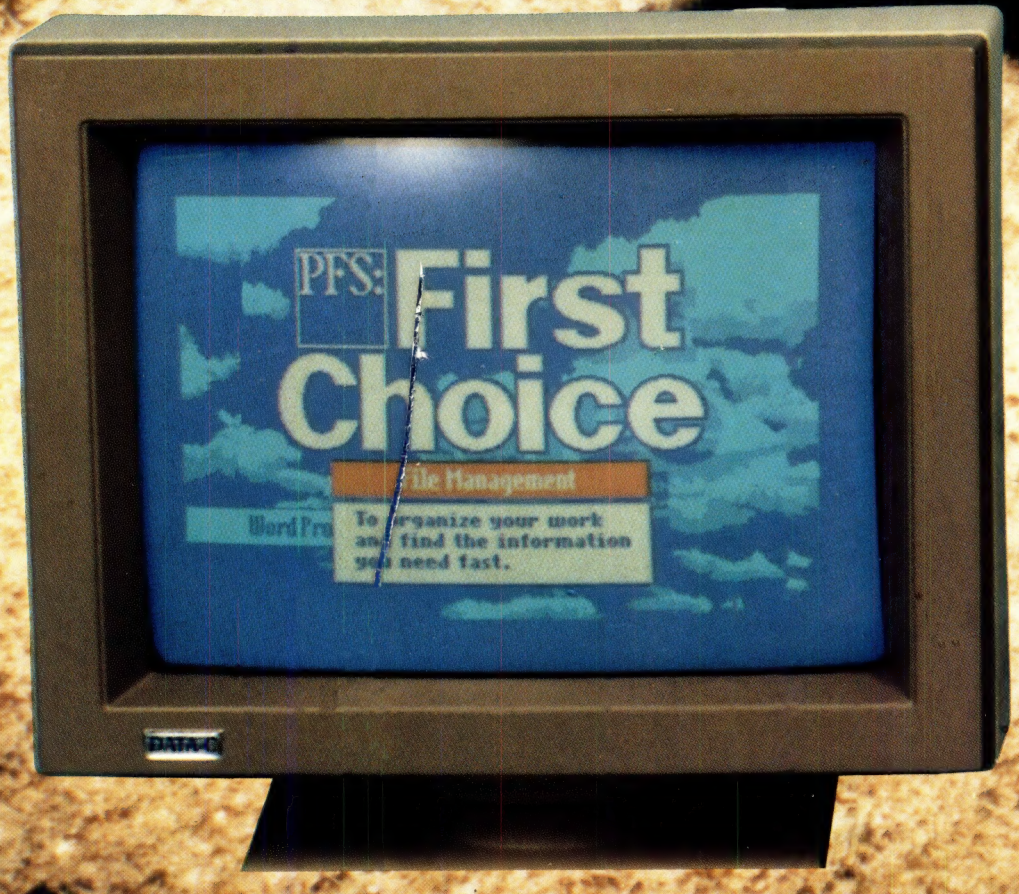
# See the light with Data-C

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