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SOFTWARE
SUMMARY

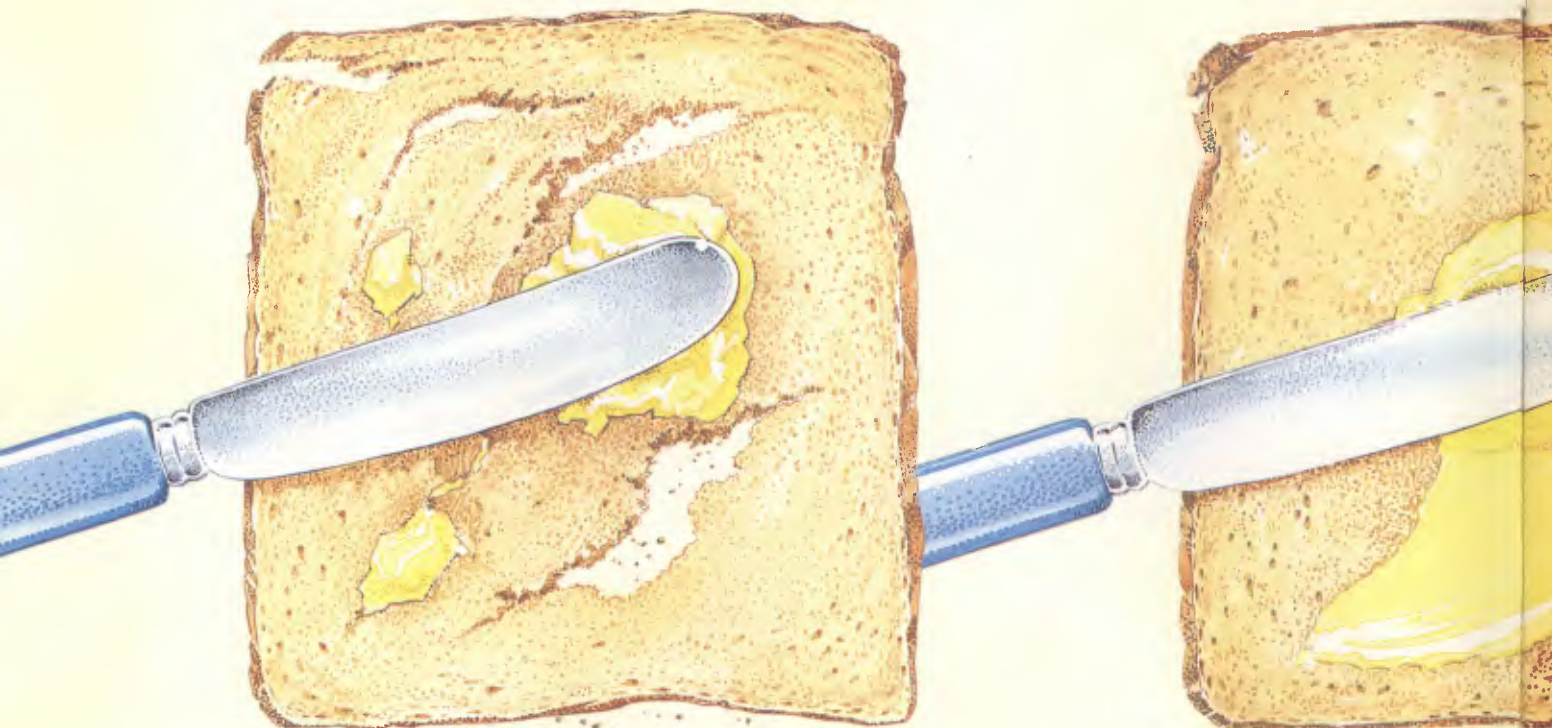
See what you
missed!

GREAT GRAPHICS
FROM SMALL
PROGRAMS

Laptop Lowdown ● The PC Dilemma ● User Groups

Communications Software ● Encrypt Your Files

A LOT HAS IMPROVED SINCE YO



BUTTER USED TO BE HARD TO USE.

NEW TECHNOLOGY MADE

You're probably quite happy with your current word processing software. Then again, you were probably quite happy with hard butter. Certainly, hard and soft butter look and taste similar. But when soft butter came about, it made life a lot easier. Which is exactly what would happen should you use Microsoft Word 4 for IBM PS/2 P.C.'s and compatibles.

Word 4 has the best implementation of the features that are most requested by word processing users. In fact, Word 4 is everything you'd expect from the leaders in software technology.

Most importantly, all the improvements to Word 4 will improve your productivity.

FASTEST W.P. SOFTWARE OF ALL.

For a start, it's exceptionally fast. Word 4 beats all the major word processors when it comes to speed (some functions are more than twice as fast).

You'll find amazing speed improvements in scrolling, file load and save, cursor movements and pagination.

You'll also use half the keystrokes that you would use with any other word processing software.

It's also easier. Word 4 works and looks the way you want it to.

Some of the features include a clean screen option, line number printing, paragraph borders to create organizational charts and a line and column counter on the screen.

It's also the only word processing program that has automatic redlining, to make it easier to track revisions and show changes made to a document.

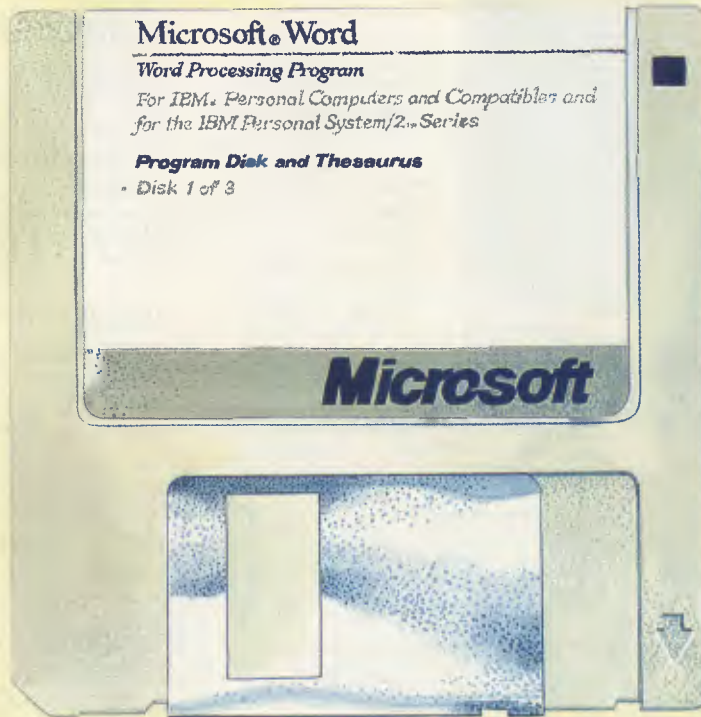
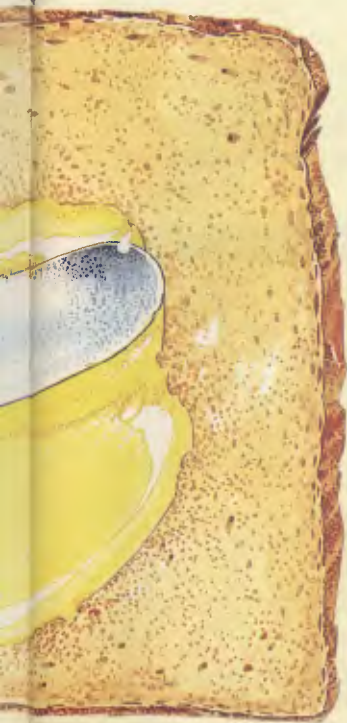
Word 4 will help you look more professional. The high quality output allows you the best appearance in important printed documents. This will, of course, make you stand out from the rest.

THE MOST POWERFUL MACRO CAPABILITIES AVAILABLE.

An exciting addition has made Word 4 a fully programmable word processor.

The new macro facility will save you time by automating long chains of commands, with a single keystroke taking the place of many. The newest

U LAST BOUGHT W.P. SOFTWARE.



IT MORE VERSATILE.

THE SAME HAS HAPPENED TO W.P. SOFTWARE.

Word has document management and retrieval. This feature is designed to make it easy to search for and locate documents and manage large directories.

You don't need to remember a cryptic eight-character name as you do with other software.

A summary sheet contains such information as the author, date and time created, document title, and comments. Even words and phrases within the document can be used to search for it.

Style sheets are now even easier to create. Any formatting in your document can be copied and recorded as a named style and can be applied to other text.

This way, you don't have to re-key previous formatting, resulting in a consistent look within your document.

THE LARGEST PC-BASED THESAURUS IN THE WORLD.

Microsoft Word 4 has expanded its spelling dictionary. Now, 130,000 words can be easily checked. It also has a thesaurus, to help you find the right words for your thoughts.

You'll have many words to choose from, 220,000 to be exact, as it's the largest and most complete PC-based thesaurus in the world. Of course, one of the best things about Microsoft Word 4 is it can convert many popular word processing programs, so it's easy to switch over to Word 4. It's also easy to learn, so you'll have no changeover problems. To prove it, Microsoft is offering a Word 4 evaluation pack. It's available for only \$25.

To see just how much better Word 4

is compared to your present word processing software, simply call Microsoft now on (02)452 5088 or toll-free on 008 226 850 and ask about the \$25 evaluation pack.

In fact, as Microsoft are always ahead of the field, you should call them for any of your software requirements.

Especially when it comes to your bread and butter.

*For more information on Word 4,
please send to Microsoft, Freepost 3,
Forestville, New South Wales, 2087.*

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Microsoft Word 4

FOR PS/2 PC'S AND COMPATIBLES.

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NEXT MONTH INCLUDES

ATs are fast becoming the standard machine for home and office use — to help you sort out the plethora of brands currently available, we've assembled reviews on eight machines and cataloged some 30 suppliers. Whether you're shopping or just dreaming, this is the place to start! (Speaking of dreams, we have the new range of Toshiba portables reviewed by John Hepworth and Part 2 of the Novix story: just *what* is a 4 mips computer used for?).

Since the schoolyear is about to begin again, we've assembled reviews on educational software, including a look at educational games for preschoolers (plus an Aussie software success story). For the rest you'll just have to wait!

Microsoft Computer Art Competition

Our search for the most eye-catching graphics (in less than 200 lines of code), drew almost 100 entries — and inspired our cover. The winning entries are available on our Bulletin Board for downloading — have a look for yourself!

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WE CAN'T KEEP THE LID ON THIS!

NEW RELEASE



At last! A portable Personal Computer with all the features you want at a price you can afford. The new Hitachi HL 300 laptop computer has so many features you'd never believe it could be so portable. From the office to the poolside the HL 300 is at home anywhere, running on mains power or its own recharge-able battery, the HL 300 is always ready to store and communicate your ideas.

Get to know the HL 300. You'll love all its features including

- Unique display - You can read from almost any angle
- Detachable keyboard
- Larger characters
- Contrast control
- Volume control
- Genuine portability
- IBM PCXT compatible
- External modem connection

You already know Hitachi for exceptional reliability and quality. Add portability and you've got the HL300. It's small, has loads of power and you can take it anywhere.

SPECIFICATIONS

80C88 (Running at 4.77MHz)
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Dual 3.5" 720K disc drives
Liquid Crystal Display,
Text Mode:
25 lines x 80 characters/line
25 lines x 40 characters/line
Graphic Mode:
640 x 200 dots resolution
320 x 200 dots resolution

Detachable Keyboard
U.S. ASCII based 78 keys
Parallel Interfaces - for printer
Disk Drive Interface - for external
5.25" disk drive (option)
Serial Interface - RS.232.C
Rechargeable Ni-Cad Battery -
6 hour cycle
Dimensions:
358(W) x 276(D) x 72(H) mm

Weight: 5.6kg,
excluding AC adaptor
Starter Kit:
User's Manual
MS-DOS V2.11 Manual
MS-DOS V2.11 3.5" Disk
Accessories:
AC Adapter
AC Power Cable
Battery Charge Cable
DC Power Cable
Carrying Case



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It's high time . . .

WHEN THE speaker at a recent computer seminar in South Africa made a comment in favour of software piracy, he was immediately attacked by a distributor in the audience: 'Anyone who uses pirated software won't get support from their dealer or the product's distributor,' he (accurately) pointed out.

The speaker's response (no, I've never even been to South Africa!) - 'nor will they get it if they buy a licensed copy' - elicited spontaneous applause from almost the entire audience.

I'm not suggesting the comment is generally valid in Australia, although I know of several cases where it *is* true. However, both the points illustrated in that exchange stand out in my mind just at the moment.

The piracy aspect loomed large during my current trip, which brought me to London via Singapore and Hong Kong. The support point came up during a visit to Ashton-Tate UK, which has followed the American lead of 'unbundling' support and selling it as a separate service.

Both are disturbing.

I couldn't believe my eyes in Singapore and Hong Kong. Copyright protection now exists in both places, yet you can have any piece of software you like at virtually no cost. Singapore's Funan Centre (a shopping complex almost entirely devoted to computer stores) has certainly changed since the pre-copyright days, yet a modem and a (free) local call to any one of dozens of pirate bulletin boards will allow you to collect anything from WordStar Release 4 to dBase III Plus and Microsoft C.

The Singapore Government has bowed to international pressure and cleaned up 'retail piracy', but seems almost to encourage the bulletin boards. Software piracy has done wonders for computer literacy there, and the locals tell me the government wants that to continue.

In Hong Kong the bulletin boards are 'clean', but Shamshuipo's Golden Shopping Centre is not. There you can buy high-quality copies of most software manuals for \$10 to \$20 without disks, or \$20 to \$40 with. It's all on wide-open public display, and seemingly token police raids every few months have little or no effect.

If people can buy the manuals and disks at that price, all they are missing is support. With support

'unbundled' from what are already overpriced software packages, the industry runs a great risk of encouraging piracy.

There are several good arguments to support separation of product and support 'purchases': it can keep the product cost down and improve the support quality. When people pay for support as a separate product, it is much easier for them to complain if they don't receive it. And it's also a lot easier for the customer support manager, who can show the company an income to justify expansion and improvement of his department's services.

However, it seems to me too many of the system's advantages are going to the manufacturer, too few to the user. I see three possible explanations for the excessive pricing of a high-volume product like dBase: 1) Too many stages in the distribution chain, meaning too many profit margins being added; 2) manufacturer's inefficiency (overstaffing, overspending and so on); or 3) the high cost of support.

If you remove the only variable in the equation (the cost of support), then a realistic price for the product can be reached with pinpoint accuracy. I'm convinced dBase is selling well above that point.

In fact, the Golden Shopping Centre is a useful guide to the manufacturing cost of products: those people are able to make and sell (at a profit) the packages at a few per cent. of the 'official' recommended retail price.

So where does the rest of the money go when you buy the real thing? Unfortunately, computer software seems to be priced on a 'what the market will bear' basis — how else could so many companies sell the same piece of software at different prices, depending on the target machine?

It's high time software was more realistically priced and/or properly supported. If that doesn't happen soon I'll start believing the South African seminarian, and register my protest by doing my shopping at Shamshuipo.

(Note: Ashton-Tate doesn't necessarily 'deserve' to be the example here; it just happens to be the one I've seen in action. The Australian distributor, Imagineering, has not yet implemented the separate support policy, and I don't know of any plans to do so.)

MATT WHELAN

American Graffiti

HERE'S A cautionary tale to open the new year. The lesson, I think, is, 'Before you fix a problem, make sure you know what the problem really is.' (Some of the names have been changed to protect the slow-witted.)

My friend Harry has a vintage PC. I mean *vintage*. He bought it in early 1982: 64 kilobytes, two single-sided drives, monochrome screen. Today, the polite term for that hardware is 'classic.' The machine has performed well. But almost from the day he got it, Harry's wife has razed

In the back of his mind, Harry had been pondering his next move. For a long time, in fact.

him about its being old-fashioned. Periodically, Harry's upgraded the machine, adding double-sided drives, adding a memory board, an additional 64 Kbyte of memory here and there. But time and technology march on, so these moves didn't stifle his wife for long.

In the back of his mind, Harry had been pondering his next move. For a long time, in fact. That's the way Harry works: he cogitates for a long time before acting.

Recently, Harry obtained a pop-up Rolodex/autodialer program from a Bulletin Board run by one of the magazines here. You activate it with a 'hot key' combo, and it automatically dials a number in one of the records you've created.

When Harry tried to fire up the program the first time, it seemed to work fine, but when he tried to use it, his system hung up. The standard way of rebooting an IBM PC — holding down the Ctl-Alt-Del — didn't work. He had to shut the power off, then restart his system.

At first, Harry believed that the problem was faulty software. He was about to fire

off a snide letter to the magazine when he realized that his problem might be that his machine — specifically, the ROM BIOS chip containing some fundamental read/write routines — might be obsolete. The more he thought about it, the more he believed that was the case, and that the chip had to be replaced with a more recent version.

I should also note that Harry enjoys political debate. And he figured that compared to dealing with a stubborn ideologue, changing a *computer's* mind would be easy.

IBM referred him to a dealer. The folks there were less than helpful. They barely seemed to be able to pronounce 'ROM BIOS,' let alone know what it was. Worse, they didn't seem to care very much.

Eventually, Harry obtained and installed the chip he was after. But when he booted up, the new chip issued a diagnostic message no one had ever seen before. The message could not be eliminated no matter what motherboard DIP switches he reset, so he removed the new chip and went back to the old one.

This went on for a few rounds — remove old chip, change switch settings, install new chip, power up — and Harry became concerned about the risk of bending a pin on his old chip. He'd already bent one of the pins once; if one of the chip's pins became badly bent, it could render his whole machine a useless pile of silicon and plastic. Out-of-date the chip might be, but it still provided the brain for his machine.

Nervousness growing, Harry decided to put the risk on someone else. The thing to do, he decided, was to find a dealer who still had the allegedly discontinued upgrade kit. Let them install it. If they bent the pins on the old chip, they'd be responsible, and maybe even obligated to replace his machine. In his fantasy, Harry calmly said to the store manager, 'Look, I came in here with a functioning machine, and I intend to leave with one. Your alleged service department screwed up. If you'd like, I *guess* I could part with Myrtle [here he envisioned a doleful look and the saddest tone of voice he could muster]

while you got her fixed up. You *are* going to lend me a replacement while you fix her, right?'

Eventually, Harry did find a dealer who had the part in stock. But after copious swearing and sweating and testing of memory chips, the dealer's service personnel returned his machine, with a puzzled observation. 'We tried everything ...'

Mustering his most enigmatic smile, Harry replied, '5055 201,' and left. He knew immediately that the same error message had plagued them both. It was pleasing to leave the dealer service manager with a puzzled look.

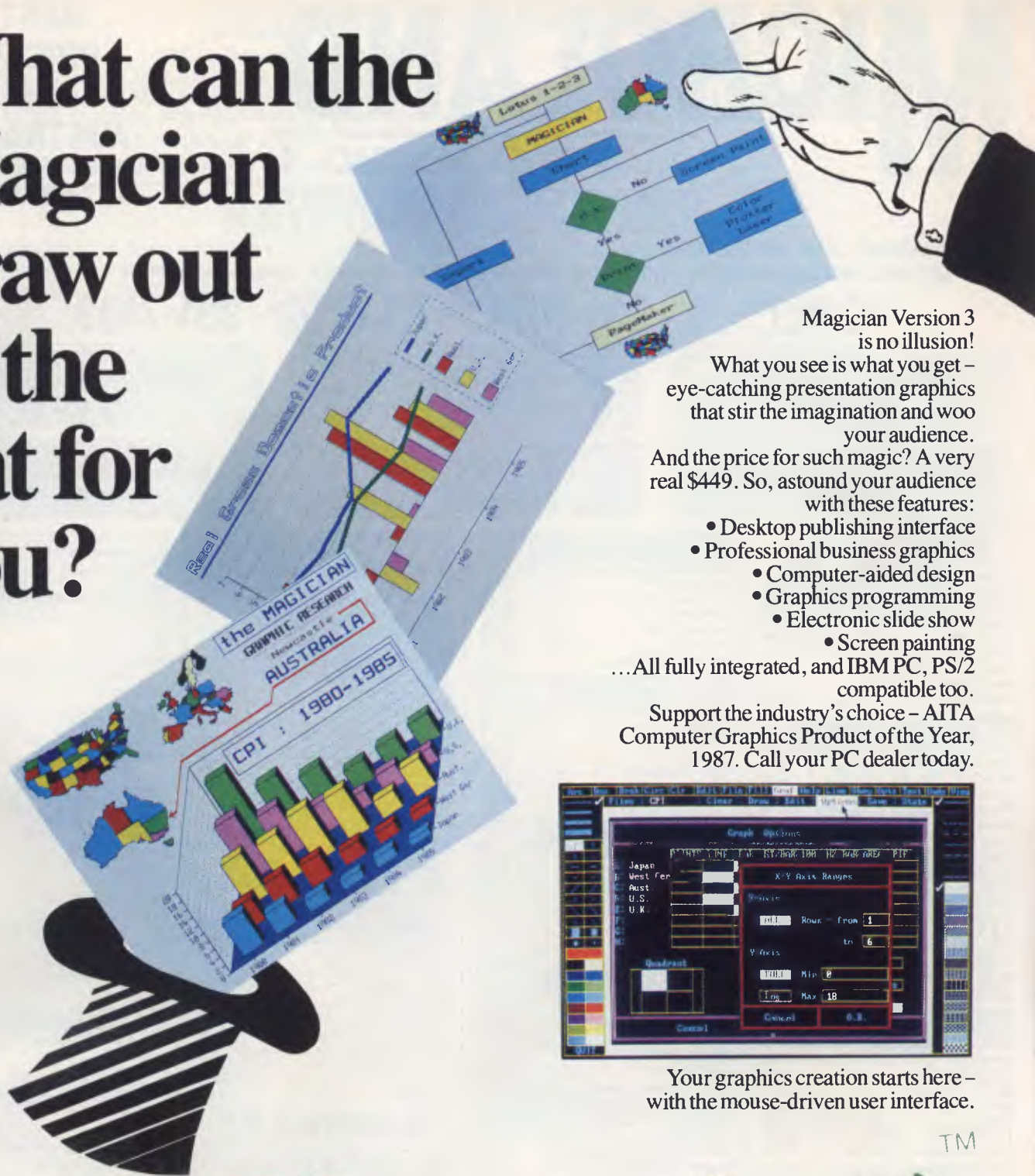
The friend who'd sold Harry the newer chip remembered something about changing switch settings before installing the chip. Harry decided he'd try that before abandoning the whole thing as a lost cause, and made the changes.

Pushing the new chip into the socket, he held his breath. He turned the computer on. It booted successfully! Emboldened, Harry decided to try again to use the free software he'd obtained. Looking more carefully at his boot-up procedure, he realized that he had a terminate-and-stay-resident (TSR) program that might, just might ... *hmm* ... have something to do with the freeware that wouldn't work.

It took less than five minutes to determine that the problem with the pop-up Rolodex did not lie in the ROM-BIOS, but in his boot-up procedure. Harry was so proud of himself — he'd solved both his problems within the space of 30 minutes. It was only after five minutes' of grinning that he added up the costs of his victory: 4 toll calls, one morning blown at the dealer, a parking ticket he'd received while waiting there, and a lot of frustration. True, his machine did not appear to operate any differently, but at least he had a good, upgraded, working BIOS.

What's the upshot of this whole affair? I saw Harry the other day, and it was clear that visions of upgrades were dancing in his head: more memory; a mouse; a hard disk! That would entail a replacement power supply, of course, but that should be a comparatively simple matter. □

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CANBERRA COMMENT

Hackers are not that big a problem, was the word at a recent security conference where the emphasis was on saving data from more permanent forms of disaster such as fire and flood.

Computer Security — Who Watches The Watchers?

Computer breakins from inside an organisation are a much bigger problem than outside hackers, according to security expert, Kevin Fitzgerald.

Fitzgerald was speaking recently at a seminar in Canberra organised by Infotex. He believes disruption is a bigger problem than security leaks, citing the fact that in the last 10 years there were only 200 cases prosecuted for computer crime in Australia which totalled \$10 million. However, disruption such as fire or water damage could send any business to the wall much faster than hackers.

After a major computer disruption, such as fire or flood, 43 per cent of businesses go broke immediately. Larger companies were now protecting themselves with 'hot' and 'cold' computer sites. A cold site is a prepared room away from the main system where computer operations could resume fairly quickly after a disaster. A hot site is an exact duplication of all computer facilities. All the hot site needs to begin running is the staff.

Turning to hacking, Fitzgerald believed it was an overrated problem. A much bigger problem was theft from within the organisation. This ranged from simple unauthorised use to manipulation of input and programs. There was also the potential to conceal extra cards in hardware systems.

Nevertheless, some hackers were known to obtain information from cleaners, maintenance and Telecom people. These sources were then traded on bulletin boards.

Fitzgerald said electronic joyriding was

now international. Known cases include Boston hackers breaking into Melbourne computers, and Australian hackers breaking into computer centres in Germany.

Another disturbing result of hacking was the future-date-triggered-logic-bomb or 'virus code' which gets into the back-up system then later wipes it. Hackers using these codes were electronic vandals, Fitzgerald said.

Passwords for computer security are rated one out of ten. According to Fitzgerald, super-user passwords are even more dangerous. Coupled with super-user passwords was the danger of Electro Magnetic Radiation from colour screens. Experiments showed this could be picked up within a five kilometer radius — using electronic devices costing less than \$100 to build. Colour screens tend to be placed in boardrooms or senior manager's offices and radiate valuable high level information.

The hand held authentication device is probably the best security item available now. This gives a different code each time an authorised person uses it. Even if the code is intercepted, it is useless because it is a once only code.

Fitzgerald believes other security devices, such as eye analysis and voice prints, were still a long way off because in trials so far they were producing many errors.

Canberra Sellout!

At present, Commodore PC10s from Canberra are selling to bookies and punters all over Australia. According to John Maher, sales manager at Steve's Communications, racing people have been ringing from interstate ordering the PC10.

The run on PC10s began when Maher sold one to Dr Cunningham, a horse doctor. Dr Cunningham has since produced a program which claims to predict horse race winners with 95 per cent success. The program, which sells for \$10,000, was written on the basis of horse muscle tone. Maher said Dr Cunningham is an expert in this field.

So now John Maher gets interstate phone calls every week from punters wanting to buy 'exactly what you sold Dr Cunningham.' They have the program, and they want the PC10 to win all those races. Maher does up the PC10 package then ships it out to them.

The amazing thing about this, according to Maher, is that the horse doctor just walked in off the street one day and left with a PC10.

When asked about which computers Canberra people are buying, Maher said that sales of the Amiga were very strong. The top-selling Amiga games in Canberra are Starglider, Faery Tale and Barbarian. Asked about Defender of the Crown, Maher said the graphics were fantastic, however the design of the game made it too easy to play.

Many Canberra buyers wanted a printer with their computer package. Maher said the Canon A50 and the Panasonic are big sellers now and they had sold out of the Canon.

Color printers are also becoming more popular, especially with Amiga buyers. The favourite choice at present is the Olivetti DIN 105. At the more expensive end of the range, the Fujitsu DL3400, a 24-pin colour printer costing \$1395, is also selling well in Canberra.

When asked about trends in Canberra over the next 12 months, John Maher predicted that Amiga sales would continue to grow, possibly at the expense of Apple. Also, the Amiga was now eating into business PC sales. With the release of Professional Page, the desk top publishing software for the Amiga, this trend would strengthen.

Finally, Maher said the peripherals Canberra buyers wanted most were second disc drives and modems

Educational Software Network

Australian schools are often accused of not doing enough to keep up with the pace of computer education. Local efforts in computer education are criticised for being too fragmented or not linked to the real world of computers.

Until now the problem has often been teachers not knowing about other schools' computer program.

Jean Krystyn, of the National Software Co-ordination Unit for Schools (NSCU), believes Australia has caught up with and now passed other countries' efforts. Just back from London, Krystyn said Australian ideas for co-ordinating and evaluating software in schools was far superior to that in England.

As one of the examples we have a database in Australia called ASCIS (Australian Schools Catalogue Information Service) which reviews each piece of educational software and compiles these reviews in the database. Each software review is in a standard format. Also there is a short bibliography giving the software name, publisher and publication date. This is fol-

lowed with technical information on the type of computer required to run the software including any peripherals needed.

There is also a brief description of the type of software, the subject area and the age of students it suits. As well, each entry has reviewer's comments about how well the software works.

At a recent forum, the NSCU asked for comments on its database from software manufacturers.

John Treloar, the education sales manager of Barson Computers, suggested multiple reviews for each software package. He cited the example of Logo, now recommended for schools in several states but panned in another state; multiple reviews would stop this problem, he feels.

Bruce Dixon from Softime said any software reviews should emphasise how good they are in a classroom. Also Dixon believes software warranty and back-up details are vital. He also stressed a preference for Australian software, with teachers being encouraged to buy Australian.

Copies of proposed software reviews

should go to their publishers first, according to Bruce Mitchell of Jacaranda software. Mitchell said education software reviews were of varying quality often failing to state which age groups the software suited.

Dianna Ryall of Apple questioned the accuracy of software reviews. Ryall was also worried about updating reviews as well as who was going to do the reviewing. For example Ryall thought 'tool' software was particularly difficult to assess because of the time needed for proper evaluation.

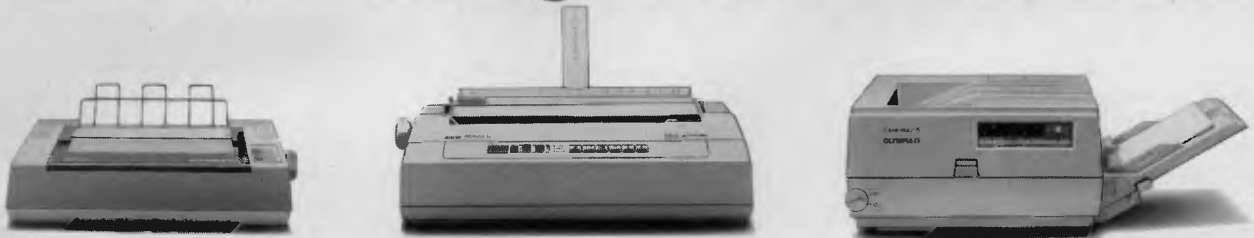
ASCIS Access

Australian schools in all states can access ASCIS through Telecom's Austpac network using a PC with modem attached. The dial-up cost is \$11.50 an hour with schools in country areas not paying STD rates.

ASCIS has easy to use screens to speed up searches. It also offers electronic mail for schools.

The ASCIS database, including NSCU software reviews, is mainly for teachers at present. However, there are plans to extend its use to students who have a PC and modem at home. □

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What's behind the 386?

'Why,' asks Stewart Fist, 'don't they just sell the 80386 as a mainframe and be done with it?'

IN THE microcomputer world at the present moment there are only two lines of processors that really matter: the Motorola 68000/20 line and the Intel 8088/8086 with its upgrades, the 80286 and 386. Despite the recent success of the Motorola-based Macintosh, the Intel family of chips is the main player in the world scene and looks likely to hold its dominant position until well into the 1990s.

In fact, Bill Gates, the young billionaire chairman of Microsoft, took this idea further when he stressed the importance of

the 80386 chip at a recent Tandy Corporation conference in Fort Worth, Texas.

He said that the 386's role for the next four years would primarily be in increasing the speed of MS-DOS machines. But from that point on, with better memory management and addressing capabilities, 386-based machines would offer benefits over even mainframe systems.

'I'm not saying that the (386 chip's) performance is better than a mainframe,' he said, 'but the gap is narrowing, and it looks like the two will converge in the early '90s.'

The dilemma of the next PC

IBM RELEASED its PS/2 (Personal System/2) range of computers in mid '87 and the release of their new multitasking operating system, OS/2 (Operating System/2), is imminent. These machines are to supersede the old IBM PC range: does this mean that the rest of the PC industry is about to be left behind in a time warp?

Most businesses, and many hobbyists, have IBM PC clones, generally of the XT variety. Now with IBM moving into its more powerful range of PCs, the consumer is faced with the choice of three ranges of PCs — you might buy an XT clone, which is the least expensive approach; or, you can buy a more powerful machine based on the 80286, an AT; now, the PS/2 range gives you a third choice.

The PS/2 series run on the same family of microprocessors as the IBM PC range with some hardware differences, generally centering around graphics. But the main thing that will distinguish the PS/2s from the older machines is the new operating system (although, currently all PS/2 computers are sold with a version of MS-DOS. OS/2 is a multitasking operating system, whereas MS-DOS

is a single tasking system). An interesting point to note, is that the low end PS/2 Model 30 is based on an 8086 microprocessor which does not lend itself to multitasking. This means that the PS/2 Model 30 will never be available with OS/2 and will only ever be sold with MS-DOS.

The big question is: will IBM be able to set a new standard with its PS/2 range, which the rest of the industry will then follow? Past experience has shown the PC industry to be driven by IBM — not led, *driven*: IBM is too big and inertia-bound to lead.

The whole of the PC market changed with the release of IBM's PC, its XT, and again with the AT. However, whether the market is again about to change because IBM is moving into a new range of computers is difficult to foresee. Literally thousands of companies have invested heavily in their current range of PCs, and, there is an enormous amount of hardware and software support for these. But, what is certain, whichever way things go, is that little more *new* software will be written for the 8086 and 8088 based machines.

As I mentioned earlier, MS-DOS is a

single tasking operating system; OS/2 is multitasking. Multitasking (the ability to keep track of more than one program at a time) is becoming increasingly important as personal computer hardware becomes more sophisticated. The 80286 (used in the PC/AT clones and the PS/2 Model 50) and 80386 microprocessors have built into them the ability to quickly swap between different activities without losing track or corrupting any of the idle ones.

This same ability is used by XENIX (the Microsoft version of UNIX) and the new OS/2 disk operating system. As this type of operating system becomes more popular on desktop computers, a clearer distinction will be drawn between the single tasking IBM PC/XT style of computer and the newer machines. The newer, more sophisticated application programs will tend to be written to run under the multitasking operating systems which will leave the older machines (running only MS-DOS), in a position similar to that of 8-bit CP/M computers of the '70s. (Will we see 'enhancements' that will let the XTs and ATs run OS/2 as a single tasking system?)

Perhaps you are still confident about

With a ringing endorsement like this, it is worth having another look at the Intel chip family and try to appreciate the changes that Intel have made in the development path of the IBM PC system.

To a very large degree, the success of Intel's hardware innovations is tightly linked to Microsoft's development of new operating systems — both in regular upgrades of the old MS-DOS and the development of OS/2 (Operating System/2) and OS/3 (Operating System/3) specifically designed for the new chips.

For the last few years, the major evolutionary change that took place in the world of IBM PCs and compatibles was the swap from the 4.77 MHz 8088 (16/8-bit hybrid) processor to the faster (true 16-bit) 8086. Both of these chips could, theoretically, address 1 megabyte of memory, although the usable limit was set at 640 kilobytes.

Intel's development of the 80286 boosted the addressable range up to 16 megabytes, but it also added a massive

'I'm not saying that the [386 chip's] performance is better than a mainframe,' [Gates] said, 'but the gap is narrowing, and it looks like the two will converge in the early '90s.'

virtual memory capacity. This allows a 286-based machine to work with up to 1000 Mbyte (1 gigabyte) of memory space on a hard disk, and use it as if it were active RAM.

To retain compatibility with the old limits imposed by the original 8088 stand-

ard, the 286 was designed to have two modes — the 'real' mode, which was simply an emulation of the original 8086 architecture, and the 'protected' mode, with a vastly expanded ability to use memory. It was called the 'protected' mode because the only valid use that anyone could see for a gigabyte of memory at the time was for multitasking.

Protected Mode

Protected mode lets you run a number of application programs at the same time — allowing spreadsheet calculations to carry on in the background while you write your report on a wordprocessor. But in the case of the 286, you can only multitask with 286-specific applications.

In the final analysis, providing hardware protection means that multiuser systems can also be implemented, and to take the idea even further, multi-operating system environments are possible — given the ability of software writers to implement these.

your choice of an MS-DOS computer system? What about all the new software we'll see for the OS/2 range in the next few years — it'll be faster, 'friendlier' and generally more useful across a broader range of applications. So, why stay with the old?

One important application which you will be able to run on the OS/2 machines is desktop publishing (DTP). Sure, you can purchase DTP for the 8086 or 8088, but if you don't want to wait half an hour for some elected text to change fonts you'll need a more powerful processor. Another example of software which gobbles up processing power is Microsoft Windows which emulates the much-favored Apple Macintosh environment with its pulldown menus, icons and windows.

Cost is an important consideration when deciding which computer to purchase. If you have already eliminated an IBM PC/XT clone, then the choice in dollar terms comes down to paying upwards of \$3000 for an AT clone with a hard disk included, or paying at least twice that for a PS/2 Model 50 with a hard disk.

One of the drawbacks of changing over to the PS/2 models is that it is not possible to swap disks between PS/2s and the older range of computers.

Logically, any disk format can be used with any of the range of IBM PC/XT/AT computers. Generally, however, the 360



kilobyte format is used with the PC/XT style computers, the 1.2 megabyte format is used with ATs; 3½ inch 720 Mbyte disks are used with the IBM PC laptop style computers, and the 3½ inch, 1.4 Mbyte format is used with the PS/2 range.

While there are obvious problems with the exchange of disks between machines using 3½ inch disks, and those using 5¼ inch disks (they don't fit in the drive), the problems arising between the 1.2 Mbyte and 360 Kbyte 5¼ formats need some explanation.

The 1.2 Mbyte disk drive can read a 360 Kbyte disk created on a 360 Kbyte disk drive. The 1.2 Mbyte disk drive can also write to, or even format a disk in the 360 Kbyte format. A disk written to, or formatted in this way, however, may not

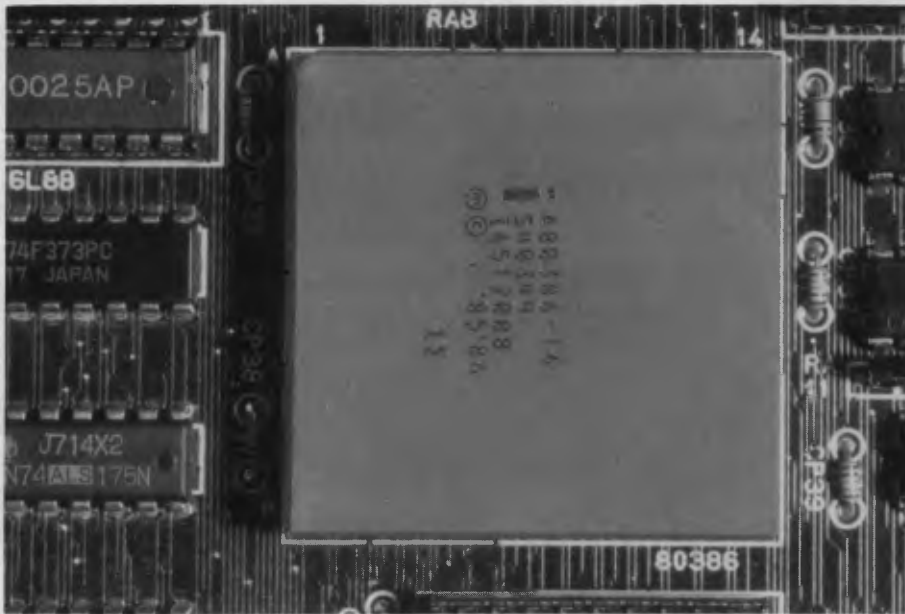
be readable by other 360 Kbyte drives. The reason for this is that the read/write heads of the 1.2 Mbyte disk drive must have a physically smaller headgap than that of a 360 Kbyte disk drive so that it can read and write the narrower tracks of its format.

Thus, while the track spacing and data density of the disk created in 360 Kbyte format by the 1.2 Mbyte drive will be correct, the track width will be much narrower than that written by a 360 Kbyte disk drive. In short, while a disk created on an IBM PC/XT style computer will almost always be readable on any IBM PC/XT or AT computer, disks created on an IBM AT style computer can only reliably be read by other IBM AT style computers.

The solutions to the problem of reading disks between the PS/2 range and the old PCs, are either very cumbersome or expensive. One solution, which IBM is very much in favour of, is to connect a cable between the two machines, and run communication software on each of the machines to swap files. In practice, as you can imagine, this is an awkward solution, to say the least.

So, the murky waters of the personal computer market are far from settled. But if you're thinking of buying, you probably won't go wrong with an 'industry standard' AT, for the time being. □

Katherine Harrington



The only way to effectively handle this range of requirements is through strict hardware and software partitioning of the memory so that one program (or file) can't overwrite an area of RAM being used by another. The system must have the capability of 'protecting' allocated memory space and that protection must be absolute, even when the size of a number of

... it now appears that Intel understood these problems even before they released the 286 onto the market.

files in memory is constantly changing.

To date, the 286 processor hasn't been all that successful — in part because the operating system hasn't been available to take advantage of its capabilities. But there are hardware design limitations as well, and it now appears that Intel understood these problems even before it released the 286 onto the market. The release of the vastly superior 386 wasn't that far behind.

The major problem with the 286 in its protected mode, is that it can't run MS-DOS applications. Also, programs specially written to take advantage of the pro-

TECTED mode are limited to program segment sizes of only 64 Kbyte.

This restriction to rather small program block sizes is a severe limitation to impose on engineering programs and for artificial intelligence and graphics-based applications. There's not much point in having such a fast processor when it will only handle relatively simple programs. The key thing to understand about the protected mode in the 286 is that it makes this chip a radically different processor to the old 8088s and 8086s; no DOS program now in existence will be able to run in this mode. Microsoft's new OS/2 operating system will handle single DOS applications on the 286, but only by switching the protected mode off.

All you really get here is the faster clock speed of the 286 chip, and an increase in addressable memory — you won't get DOS multitasking, at least not without extensive modifications to the software.

The 286 will, however, run multiple applications under OS/2, and to do this it relies on the operating system supervising both itself and the applications software. OS/2 does this by imposing 'privilege levels' (virtually a hierarchy of trustworthiness) that ensures that all applications are strictly quarantined.

Privilege Levels

There are four levels of privilege, with the core of the operating system reserving for itself the top level 0 and allocating to its extensions grades 1 and 2. The least trustworthy level is 3, and this is

reserved for application programs since it is suspected that these have probably been written by programmers bought up on a diet of shortcuts and code fiddles.

The Intel 386 appeared on the market with two modes also — the 'real' which emulates the 8088 architecture, and the 'protected' to run multi-tasking and multi-user applications. But there are a number of essential differences which set it way above the 286. Firstly, Intel boosted the maximum clock speed to 20 MHz (about 5 million instructions per second), and because this was a true 32-bit chip, physical memory addressability jumped to 4 Mbyte (256 times the IBM AT).

Virtual memory also soared to an unbelievable 64 terabytes, which is over 70 quadrillion bytes — a great leg-up for future expert systems which may need to access enormous databases of rules and data... assuming that we ever get mass storage capacity of these dimensions. We are talking here about juke-boxes full of 660 Mbyte CD-ROM disks.

The major difference between the 286 and 386, however, is in style rather than speed and quantity. Protected mode in the 386 has three basic 'environments': Native, Segmented and Virtual 86.

The Native Environment

The Native environment is the one that Bill Gates dreams about when he stargazes into the future. It will need a special 386 operating system, and will provide protected multitasking with the full virtual memory capabilities, operating under special memory management systems.

The segmented environment is the 386 emulation of the 286's simple protected mode. It provides 16 Mbyte of memory addressing divided into 64 Kbyte program blocks and it needs special 286-software.

It's the Virtual 86 environment that holds the more immediate benefits to IBM users, and is the major cause of excitement at the present moment. It will allow multiple MS-DOS applications to be run simultaneously within separate 1 Mbyte partitions.

So this Virtual 86 environment restores full 8088 compatibility while providing the necessary isolation and resource management for multiple program use. You should be able to run any number of your existing MS-DOS applications simultaneously in this environment if you've got the memory to hold them. Under the Virtual environment each MS-DOS application believes that it is running under its own 8088/8086 system.

Virtual multitasking doesn't change the



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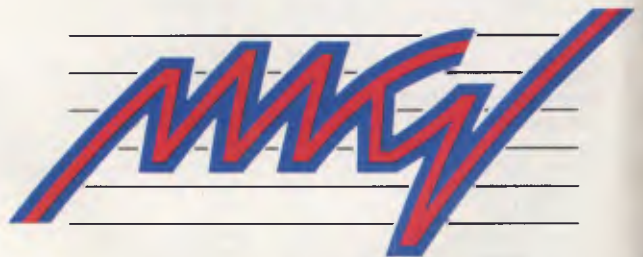
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To a very large degree, the success of Intel's hardware innovations is tightly linked to Microsoft's development of new operating systems . . .

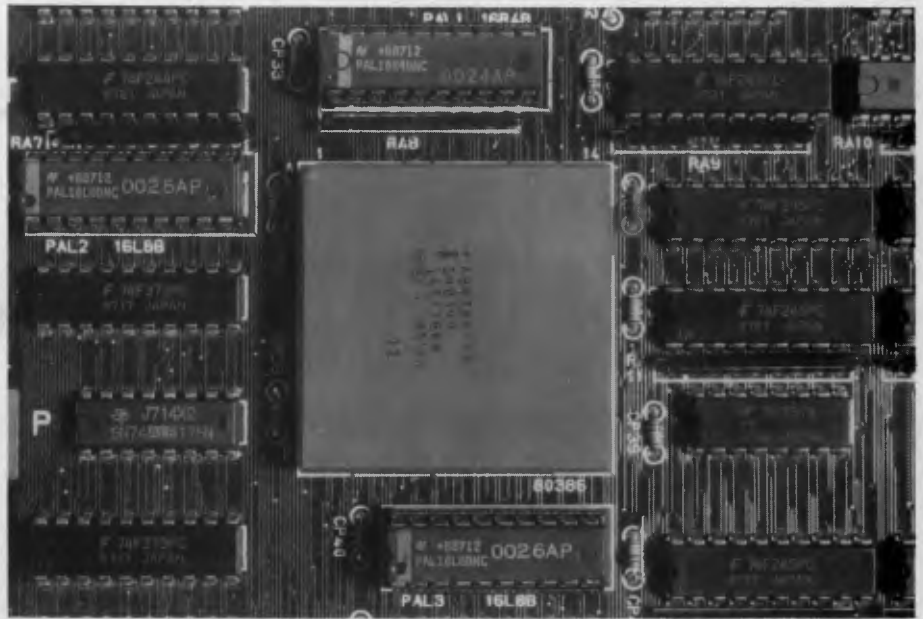
restrictions placed on applications by the 8088 specifications. Only 1 Mbyte of memory can be addressed for each application, but above the 640 Kbyte limit the normal reserved space can only be used to hold data needed by the system hardware. However it should be relatively easy to implement the Lotus/Intel/Microsoft (LIM) expanded memory specifications which allow applications to use this reserved space as a virtual RAM disk.

Because the Virtual 86 environment exists within the protected mode, it is also possible for future machines to run multiple MS-DOS applications in parallel with programs written for the Segmented environment (286 protected mode). The advantage derived from this arrangement is that many MS-DOS applications run quite happily within the 640 Kbyte barrier, but the Segmented environment allows memory addressing of up to 16 Mbyte (although still with the 64 Kbyte program block limitation).

All Intel microprocessors use a segmented memory-management system which allows the chip to handle the physical memory in smaller segments. The 286 allows up to 256 segments while the 386 jumps this figure to 16,000. But the 386 also manages memory by 'paging' (a page is effectively a smaller subdivision of a segment) and at the other extreme, it can treat all available memory as a single 4-gigabyte chunk.

This variability in the segmented approach is necessary to get the best out of virtual memory space supplied by the hard disk. The processor needs to automatically swap segment- or page-sized packets of data from the disk to the main memory as required, since the intention is to fool the application program into believing that the computer contains more RAM than it can possible hold.

Virtual memory systems are already widely used in minis and mainframes, and



it is this capability, as much as the speed, and multi-everything capability, that probably inspired Bill Gates' enthusiasm in predicting the merging of mainframe and micro technology.

If you couple speed and multitasking with the possibilities of the Native environment, which will eventually allow a 386 machine to simultaneously run MS-DOS and Unix — then add multiple applications running on top of these — you obviously

have a very powerful personal computer.

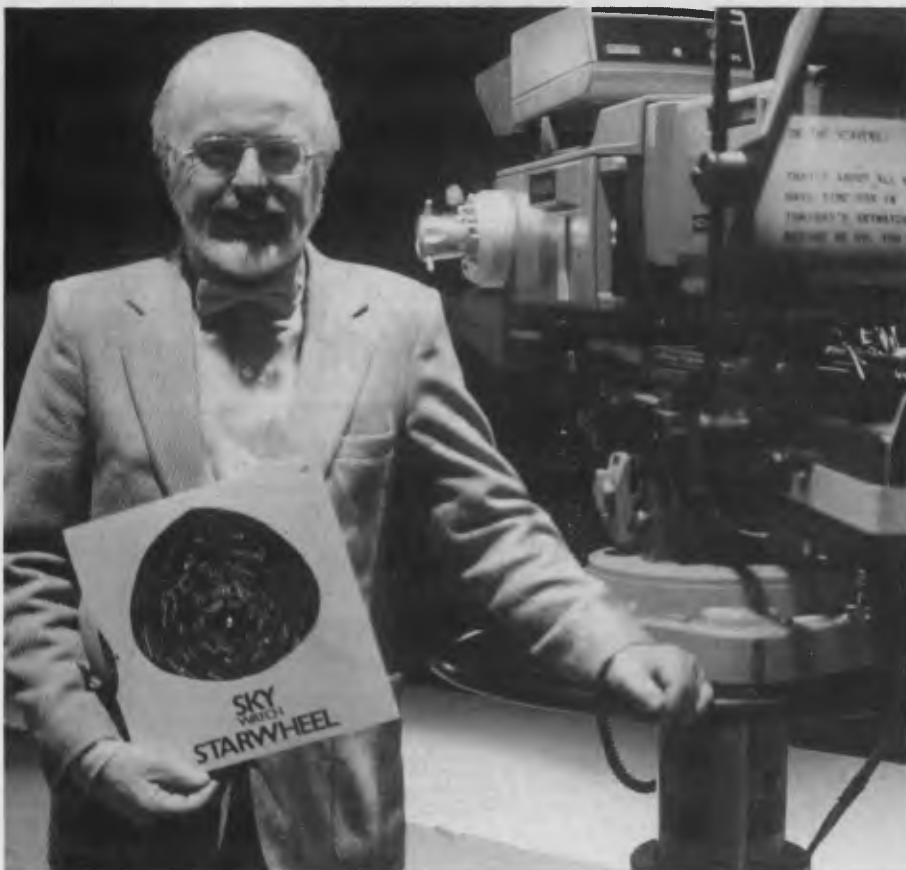
In fact, it is hard to see how anyone could conceivably use more than a fraction of the power that could be available. But of course no 'one' will; this can be a multi-user system as well. I don't know why they don't just sell it as a mainframe and save us the frustration of trying to understand where micros are supposedly heading! □



TAKING A QUANTUM LEAP

Quantum and the Computer

New technology can be frightening as Ian Allen found out when the ABC gave Quantum their first Decmate. Although the machine was limited, it gave them confidence in the world of computer technology.



In the entertainment business there is a famous line that goes something like: 'Nice work, but don't give up your day job'. It's a bit like that when writing for computer magazines — very few people do it as full-time occupation. In my case, my day job is a science researcher, working on ABC TV's Quantum — and this is a story about Quantum's encounter with a wordprocessor (and none of the names have been changed to protect the innocent).

It all began two years ago ... like many corporations, the ABC is organised in such a way that individual units are not permitted to simply run out and purchase a computer whenever they think they need one.

Quantum has become one of the most computer literate production units within the ABC.

Instead, control of all hardware is vested in a central EDP department; in the ABC it's called MIS (Management Information Services). They decide whether you really need a computer, and if they are satisfied with your request and have the budget, they also decide what type of system is most appropriate for your needs.

In Quantum's case, we wanted to be able to access online scientific databases, to do a limited amount of wordprocessing.

Figure 1. Presenter David Ellyard in the studio — the autocue is mounted in the panel behind the '1' (center right). It can be seen reflected of the glass pane which is mounted directly in front of the camera lens.

in the way of preparing scripts, and we wanted to have some way of computerising our information filing system. We expected to get a PC with modem, plus wordprocessing and database software, but we didn't. We ended up with a Decmate III wordprocessor.

The Decmate looks quite similar to Digital's Rainbow series of computers, except that it's not a true computer in any real sense of the term. The only software it will run is Digital's WPS (wordprocessing system). WPS however, does have a set of optional extras. Among them are CX (communications), LP (list processing) and SP (sort processing). All three were set up on our system.

Computer Resistance

At the time the Decmate arrived, very few people in the office had any computer experience, and no one had any experience with Digital systems. It's easy for computer literates to forget that a lot of people are still very intimidated by the technology. It's no use providing them with the hardware and expecting productivity gains unless you also spend time teaching them how to use it. Training requires time and money, and it's something everybody who computerises should budget for. It's probably even more important to motivate staff to make the effort, because if they are not in the right frame of mind, the resources you spend on training are simply wasted. The ABC is very good in this department, with a well developed training program for all manner of skills, including computers.

But even after having done the course, one member of the staff asked to be transferred. She simply didn't want to know about computers, period. The Decmate quickly proved itself adequate to the needs we had defined. We had a special large print daisywheel for the printer, and this meant we could produce our own 'autocue' scripts.

If you've ever wondered how TV presenters remember what they are supposed to say when on camera, well, that's what an autocue does. It's a device which sits on the front of the studio camera, which enables presenters to see the script, even as they appear to look directly down the lens of the camera. (To viewers, having the presenter look directly down the lens gives the illusion that the presenter is looking at you, no matter where you sit in the room).

Most presenters use the autocue as a prompter only if they lose track of what they are saying in mid-sentence, but some



Figure 2. As Reporter Jill Emberson and Producer Richard Smith have found, wordprocessing is invaluable when editing scripts and making last minute changes.

use it all the time. The way for a viewer to tell is to look closely at the eyes; if they are moving right to left, then the presenter is reading as they speak.

The autocue is important, because there are often last minute changes, in which case the presenters have little time to learn the new lines. Also, because the changes are last minute, having a wordprocessor makes it a snap to quickly print out an amended version.

Recurring Dilemma

Inoticed a recurring dilemma in introducing computer hardware to the office: heaps of people wax lyrical about computers and the potential of one service or another that they can offer, but how do you know if something will work *for you* until you try it?

Electronic databases are a typical example. You can't know what they have to offer until you pay up your subscription and go on-line yourself. In our case, we found that while the databases do offer a great deal of information, it's not information that we can directly translate into something useful. Connect time costs money, irrespective of the value to you of the information you get

We found we were serving our purposes

much better by the old fashioned technique of talking to people. While the database exercise proved unfruitful in our case, I don't have any regrets about undertaking the attempt — now we *know!* The irony of it all is that in the process of implementing our communications ability, the EDP department had plugged us into the ABC's VAX network. We hadn't asked for this; in fact we didn't even know what it had to offer, but we've since discovered all sorts of extremely useful things.

For example, we now have access to ratings figures at least a week faster than we did before, and better still, we can perform quite sophisticated analyses of them. We now have a much better idea of who our audience is, and this is invaluable when fine tuning our program's style and content. We also have access to the ABC film library's database, which means we can now perform 'what if' searches without tying up the valuable time of our librarians.

The third of our original requirements was to have some electronic assistance in co-ordinating and maintaining our own information files. To us, these files are essential because they give us the ability to place new developments in context, but

they do require constant updating and maintenance. These are not electronic files, they are manila folders packed with press clipping and research notes. New files are being created all the time, and the problem was keeping the indexes up to date. No matter how good your information, it's of no use unless the people who need it can find it quickly and easily. That's what we wanted from the computer: a way to easily produce an updated index whenever a new file was created.

the feature constantly. It's quite easy to make a mistake and overwrite a file that you didn't mean to. That's happened to me more than once, so what chance has someone less experienced? You have to remember that in a typical office the majority of people have no particular empathy with computers. To them the computer is just a gadget, useful perhaps, but no more so than a video recorder or a calculator. They will use new tools, but only if they are less trouble than they are worth.

could be in three months when we are in Queensland.

We had been using a manual system to keep track of our ideas, but having the Decmate made us think of ways to make life easier. One feature it had was List Processing. This enables lists to be assembled where a particular key field satisfies a set requirement. If we entered all of our story ideas in a form that specified their country, state and city, plus a short description and a file reference number, we could use List Processing to produce a complete list and description of all the stories we had for any particular location.

This took a little work to implement, but now it's up and running it's proved spectacularly successful as a production planning tool. It means that we can easily produce lists of the story ideas we have for any country, state or city. It's so much easier to plan our logistics if we can easily see where our stories are. We even extended it further to help us balance our program content, simply by adding a new key field which categorises stories into nine types of science, from medicine to philosophy.

My final observation has more to do with human nature. When the Decmate first arrived, very few people outside those who had to use it were interested. But the more we were seen to be using it, and the more comfortable we seemed to be with it, the more other people wanted to know about it. In other words they were motivated to learn! Quantum has become one of the most computer literate production units within the ABC.

We've now got two Decmates, and every single member of the staff uses them. In fact there is so much demand for access that we've now got a queuing problem and could easily use a third machine. Don't get me wrong — I'm not plugging Digital; compatibility is the only reason to get another one, but Decmates are no longer made. Their unexpandability and slow disk drives did them in.

In retrospect, if the MIS department had their time again they probably would have given us a PC or a clone; it certainly would have been more expandable. But we're not complaining. Having a computer, any computer, even if it's only a wordprocessor is much better than nothing.

If there is a moral to this tale, it's this: When you introduce a computer to an office, even if you choose almost obsolete equipment, even if you don't succeed in getting it to do all of what you intend, you're likely to pick up more on the swings, than you lose on the roundabouts. □



Figure 3. Quantum Researcher Jenny Goddard working on one of the Decmate's mounted in a mobile shuttle so it can be easily moved and shared.

At first we thought the Decmate would be useless at this. How can a wordprocessor function as a database? But with a little thought we found we could use the Decmates' Sort Processing option to give us what we needed.

A Sort Process

Sort Processing enables you to sort pre-defined field names in either alphabetical or numeric order. Our research file index consisted of just a name and a number, so after we had gone through the painstaking task of typing the existing data into the Decmate, we had a solution to our problem. Every time a new file is created, the researcher who created it only has to enter the details and perform a new sort.

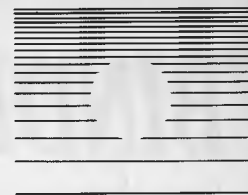
Although the chief feature of the WPS system is its 'idiot-proofness', it does leave something to be desired when activating the optional features. The user-friendliness only works for people who use

Fortunately, the Decmate has user-defined keys. These are similar to macros, in that you can pre-program a series of keystrokes into a single keystroke. This proved to be a godsend. We wrote a simple one page, step by step set of instructions which took the form 'do this, then press the Gold key and then 7,' or whatever. Since then we've had no disasters!

Quantum has three researchers, and a great deal of their time is spent in filtering the flow of information into the office. Stories can arise from any number of sources: scientific and medical journals, press releases, personal contacts, viewers letters, newspapers, or even telephone conversations. But before story ideas can be realised, they have to fit in with the unit's logistical and production requirements. If our film crew is in Perth next week, how can we use a great story idea set in Townsville? But while the Townsville idea might not be viable right now, it

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Software Piracy

Who's being ripped off?

Most of us consider software piracy a problem only for the developers and sellers. But as Linda Graham points out, it's costing us all a lot (and not just money!) . . .

WE'VE ALL SEEN the new machines released recently: the 286s and 386s, the new Macintoshes and the rest. There is an equally outstanding array of software that covers almost anything that you would want to do on this new hardware. But, it's easy to forget what provides the basis for all *this* technological advancement and for all the useful products we want to see developed.

The major resource available to the computer industry is the intellectual capacity of the people who work in it. People like Bill Gates (and I don't mean this to be a commercial because I'm not selling anything) and Steve George, who is a real wizard, don't grow on trees. Their intellectual capacity, their understanding of how to bend and twist technology and how to capitalise on opportunities is really unique. They are all this industry has to drive it forward.

So, I'd like to explain why we need to protect this resource and, more importantly, the adverse consequences which will follow if we don't.

This article was extracted from a speech given by Linda Graham, managing director of Microsoft Australia, at the 1987 ACS conference; she was speaking on behalf of the Australian Information Industries Association.

Now, how big do you think the piracy problem is? What percentage of the software in use in Australia today is legal? Some surveys say it's up to 50 per cent — Seymour Rubenstein of Micropro found that *that* was the proportion of 'unauthorized' usage of WordStar.

Now the Australian Computer Society would have to be the most 'aware' group in the Australian industry and its members would all be using PC software in one form or another. But I've found that almost one-third of the members don't have the master disk or the original disk of at least one commercial program they are using.

About a year ago, the AIIA came to me and said: 'Piracy is a problem. We want you to head a committee on software theft.' I started researching the problem right in Microsoft's own offices.

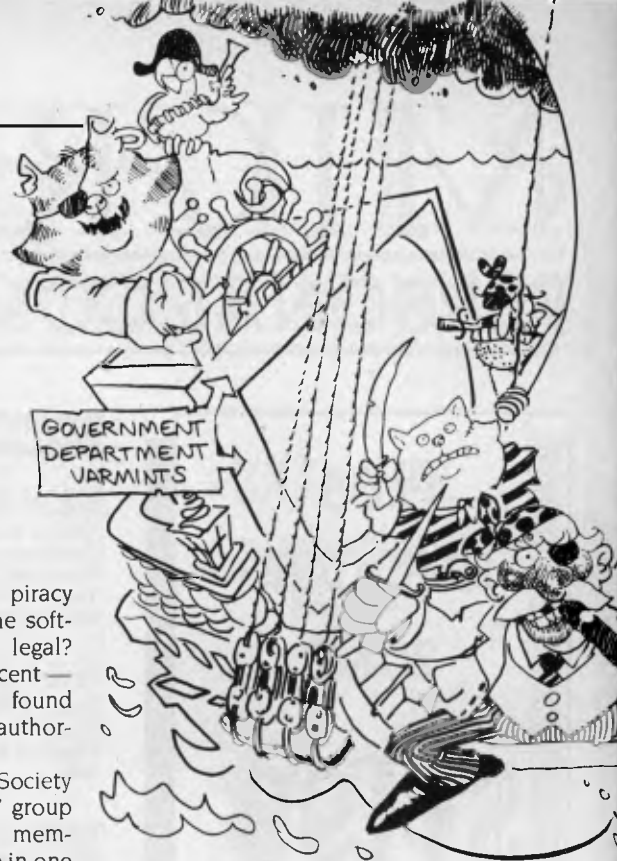
I walked around and checked everyone's disk boxes, and it wasn't a very pleasant experience. Remember, we publish and distribute a product in virtually every category. We have no reason to steal it — just go down to the warehouse and put in a requisition. I found that about one-quarter of the software was illegal! Needless to say, we had a complete sweep. There were heartfelt renditions of 'Oh my God, I'll never, never, do it again.' I just told everyone to either requisition what they needed or buy it at a dealer price.

So, before that, my company would have been one of the guilty ones, too.

At the same time, few of us would dream of walking into a computer store and shoplifting the software — it's just not on. Yet, people all over Australia, in fact all over the world, are increasingly making unauthorised copies of software.

When you think about it, it's obviously illegal. Why, then, are the laws relating to copyright being ignored? The logic of the law is quite rational.

I had a great letter from the secretary of one of the PC user groups. He uses Word, and he justified the cost like this — he used the wordprocessor about 10 hours a



week, that's about 500 hours a year. Based on the full retail price he paid, it worked out that it cost him \$1.60 per hour for a year, and then it was paid for and he still had it to go on using! That was good value in his mind.

At \$1.60 per hour there's not many pieces of intellectual property you can play with. For example, I read an \$8 science fiction novel in about six hours, but then, it's valueless to me — I can't go on reading it — it has nowhere near the same value as software that I can go on using.

Incentive

IF THERE'S A name to the problem the industry has, it's incentive. Developers are not going to sit in their chairs for hundreds of hours developing code or templates just to have some sod rip them off, essentially saying their work is worth nothing.

In a perfect world, the next Visicalc or Multiplan might be developed solely for the common good of mankind. But, earning money has become an essential process for modern man — we all have to eat. As a result, money forms a major component of the incentive structure. In the software industry it has become very difficult to maintain this incentive. You can't pay the rent, overheads, support staff, afford updates, do decent documentation and make the whole thing hang together if users aren't paying for the services, the software and the support, you offer. That's the bottom line.

There continues to be this irrational belief, however, that we are supposed to pro-

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vide all this for *free*. I asked people on my staff: 'Why do you [illegally] copy software? I can't understand it because if you need a specific tool to get your job done you don't have to justify it with a five page memo — just go buy it.'

None of those involved really had an answer for me. They couldn't tell me why it is that they felt it was alright if they just copied it from one of their buddies. So it seems either that people don't acknowledge or they don't *want* to acknowledge that unauthorised copying of software — piracy — is purely and simply theft.

Who wants to put it that blatantly? But that's the bottom line. The copyright laws are there to protect our industry's most valuable resource — the brains.

What people fail to realise is that all of us are hurt by software theft — not just the developer and the publisher, but the legitimate user has been suffering for years from copy protection schemes. If you're using 'protected' software and your hard disk dies, you have to buy new disks — it's an expensive pain. Those companies, the paranoid ones, still 'offering'

copy protection are penalising only honest users — there's a very active copy protection breaking industry that wholesale pirates can turn to.

Users as a whole lose because developers must build into their pricing structure the fact that piracy will substantially reduce the potential market.

The AIIA's Response

OUR RESPONSE at the AIIA is try to stop the pilfering. All the members are trying to recoup our losses as best we can, but some companies just can't afford to stay in business. Now I'm not saying that all those who 'can't' are going out of business because of software theft, but, I wonder — if we just added the 20 or 25 per cent of their software that had been ripped off to their sales, maybe many of them would have had a better chance of making it. And again the computer community has lost — there's some terrific software (and some brilliant brainpower) that's now been lost for the industry.

On a different level, the fines under the amended Copyright Act are pretty stiff:

\$250,000 maximum for a Proprietary Limited company, and up to \$50,000 for an individual. And be warned, we're looking for a good test case!

What is the AIIA doing?

WHAT IS THE AIIA doing about piracy? User education forms the basis of our attack — education on what the laws are about, on what the penalties are, on what the benefits are to the legitimate user. And, it is the corporate users we are going to aim this campaign at. I don't really accept the idea that PC user groups are the hotbeds of piracy. I work intimately with a number of groups, and I find them to be well aware of the rules of the game. They know the difference between shareware and strictly commercial products.

The crux of the problem, so far as we see it, lies in the medium to large organisations, government departments, utility companies, and advertising agencies. Some of the guys that work for these companies think they are doing the firm a favour. We want to change the attitude that 'I'm doing a good thing by ripping off a

\$1,000 piece of software for the company.'

These people are misguided. To educate them we are running an education campaign that talks about the penalties and the damage that these employees could do to their companies. Needless to say, these employees won't be thanked for

their efforts if they got caught, either.

As part of the educational program, the AIIA has prepared a booklet explaining the benefits of legal software and penalties of piracy which is inserted into the software packages of all the member companies.

When you look at the alternatives to

education it soon becomes a real spy versus spy thing, a joke — and it would cost everybody, users included, a lot of money. Those of you who paid your money for the real thing don't want to be hassled with all sorts of copy protection nonsense, and neither do I! □

The Legal Impact

I FIND I can sum up the attitude of most people to software piracy with this short joke: Two social workers were walking along the street and they saw a man lying in the gutter, battered and bleeding. After a moment's consideration, one turned to the other and said: 'Gee, I really feel sorry for the guy who did that.' Now — that social worker has no appreciation of the what's morally wrong with what had happened and no sympathy for the victim. And *that* seems to sum up the government's attitude to pirates who are victimising the software industry at a cost of some millions of dollars a year.

We all know that the Copyright Act has been changed so that there are big fines for copyright infringement and that copyright now applies to computer programs. But changes to the Copyright Act aren't going to change the behaviour of people.

If we are going to change the piracy environment in Australia, we have to educate users that not only is software piracy illegal and a breach of the Act, but there is something morally wrong with it. Now, let's say your office has run out of stationery, you don't send the junior clerk to steal a few pads from the local newsagent. By the very same reasoning, the same sense of morality, you don't send the clerk, or any one else out to illegally copy a software package you want to use in the office.

Of course, one reason you won't send a clerk out to steal office supplies is that there are usually store detectives guarding against it. But, I'm not going to suggest for a moment that we have special copyright police who are going to jump out from behind your terminal and throw you in jail. The approach the software industry is taking to solve the problem of piracy is one of moral persuasion and education.

And, the place to start is with the government itself — at its various levels, 'government' would probably be the big-

gest software copier around. For example, the Queensland Minister of Education sent a circular around his department suggesting that under Section 200 of the Copyright Act, teachers could copy as much software as they liked, so long as it was for the purposes of teaching. Well, that's a completely wrong interpretation of Section 200, but the Minister refused to withdraw his 'suggestion.' And, teachers themselves are a problem: they seem to assume that teachers should be paid for their contribution to education but not the software houses whose product they are copying.

The argument I've heard used by teachers is that under Section 183 of the Copyright Act they can copy as much as they like. Now, that Section of the Act is a real problem — it says that the Commonwealth or State can copy as much as they like so long as they tell the copyright holder what they have done. It's then up to the copyright holder to bear all the costs (and trouble) of getting paid for what was rightfully theirs — so even getting paid can get expensive, and those costs are, of course, passed on to the legitimate purchasers.

There is another catch to that Section — nobody really knows what the Commonwealth or a State is. Obviously a government department is the Commonwealth or the Crown. But, there are good reasons for me to say that the ABC or Qantas or the Commonwealth Bank are 'government.' And where does the Taronga Park Zoo fit in?

Home Copying

Home copying is another problem area and it requires a different solution. If you ask someone why they think it's alright to copy software for use at home, you'll often get the answer: 'Well, if I copy the Match of the Day at home on my video, it's an offence under the Copyright Act, but it's not immoral — everybody does it. If I copy my favourite record on a tape, it's a breach of the Act, but it's not immoral. And people are always going to do it. And nobody is going to catch me. It's exactly the same with home copying of computer programs.'

The industry is taking a realistic approach to that attitude and is joining in the blank tape levy debate which acknowledges that we can't stop home copying. Rather, let's make it legal, or, at least, not illegal, and levy one or two cents on every blank audio or video tape (or floppy disk) that's sold, pool the money and distribute it amongst the copyright holders.

Once those changes are made to the Act, and we've instituted a 'blank floppy levy,' the law will no longer be such an ass and those setting prices for software will no longer have to add some factor into their calculations to cover the anticipated piracy. And that translates into less expensive software for everyone.

Institutional Copying

That leaves us the area of institutional copying to concentrate on. I know of a case where a government department made lots of copies of Multiplan and distributed it around the department.

I also know of a large advertising agency, which has a number of software houses as its customers, and makes copies of software that passes through its hands for distribution amongst the staff.

But how does the software industry gain the support of corporate customers? A corporate financial manager is hard to convince that piracy is wrong — after all, it could be saving his company thousands of dollars a year. That's one argument in favor of a lot more multi-site licenses of various types, and that's the approach that many vendors are now taking.

I hope the points I've covered add a positive aspect to the copyright software piracy debate — and I hope that we will soon be in an environment where commercial copying will be seen as the immoral act it is.

Once again, that translates into less expensive software for all of us. □

This item was extracted from a speech given at the 1987 ACS Conference; Peter Knight is a partner in a Sydney legal firm and a member of the NSW Society of Computer Law.

Artificial Intelligence and Chess

— or checkmate by computer

As Tim Hartnell relates, there is one field in which Artificial Intelligence research appears to have been successful — game-playing.

PROGRAMS TO play games were among the earliest attempts to 'create' Artificial Intelligence (AI). In fact, the whole field of AI really began with the idea that when a machine could play a complex game, such as chess, it would be, by definition, 'intelligent'. In 1950, Claude Shannon published a paper, now considered a classic, called Programming a digital computer for playing chess. Even earlier, in 1890, the Spanish inventor Torres y Quevedo built a machine for playing the chess endgame, King and Rook against King.

In 1958, Newell, Shaw and Simon wrote a paper, 'Chess-playing programs and the problem of complexity,' in which they put forward a convincing argument linking game-playing computer programs with the production of intelligence: 'Chess is the intellectual game *par excellence*. Without a chance device to obscure the contest, it pits two intellects against each other in a situation so complex that neither can hope to understand it completely, but sufficiently amenable to analysis that each can hope to out think his opponent.

'The game is sufficiently deep and subtle in its implications to have supported the rise of professional players, and to have allowed a deepening analysis through 200 years of intensive study and play without becoming exhausted or bar-

ren. Such characteristics mark chess as a natural area for attempts at mechanization. If one could devise a successful chess machine, one would seem to have penetrated to the core of human intellectual endeavour.'

Could future chess programs approach the situation in a way which is more like the way in which humans play?

The Core of Intelligence

Unfortunately, although very successful chess machines have been built, we no longer believe that this has 'penetrated to the core' of intelligence. Indeed, the boundary separating AI from the rest of the world is a constantly retreating one. As soon as a successful AI program is demonstrated, the cry goes up: *That's all very well, but it ain't intelligent*. This has led to the morbid conclusion in AI circles in the United States: *If it works, it isn't AI*.

Despite this, the interest in research

into chess-playing programs has continued, and not only from computer scientists. In *Computer Game-Playing: Theory and Practice*, editor, M. A. Bramer, indicates that in addition to the fact that many leading AI people have worked on chess-playing programs for a number of years, an increasing number of strong chess-players, including former world champion Mikhail Botvinnik, have become involved. In fact, over the past decade, Botvinnik seems to have lost interest in playing against humans and has concentrated almost entirely on the machine side.

Early chess programs were fairly crude. Bramer writes: 'Early chess programs had no pre-stored opening 'book' and performed abysmally badly. It seems that good opening moves are too difficult to find by general principles alone ...'

'Adding an opening book improved the programs' play to a respectable level, at least in terms of the occasional or club player. The first tournament program appeared in the mid-sixties, but it took another ten years for the first tournament successes to arrive. Today, the strongest programs, together with the purpose-built chess-playing machine BELLE, frequently win tournaments against human opposition and are claimed to be approaching master standard ... there is no doubt that the best programs perform at a level far above the vast majority of the human race ...'

Despite these achievements, P. W. Frey, in his book, *Chess Skill in Man and Machine*, points out that the success of machines like BELLE is profoundly dissatisfying, as they work solely by deep analysis of board positions in a way which is completely different to the way in which human players approach the game.

Astronomical Explosion

Not that this matters much to some of us. It seems to many ordinary people interested in chess (including such abysmal players as myself, who can be beaten by Tandy's cheapest chess machine, running on the lowest level!), that computers do a pretty good job of displaying intelligence in playing chess.

Indeed, if computers work by simply analysing every possible move, and then picking the best one, why doesn't a chess computer play perfect, unbeatable chess?

It all comes down to the problems of 'astronomical explosion', the fact that the number of possible outcomes of a game increases as a function of the complexity of the game at a frightening rate. Think of humble noughts and crosses, on a 3 x 3 board. Imagine the computer makes the first move, leaving 8 possible replies by the human (9 x 8 possibilities, then, for the first two moves). There are 7 possible responses to that move, 6 to that, and so on, if every possible noughts and crosses game was played out to completion. In all, there are 9 x 8 x 7 x 6 x 5 x 4 x 3 x 2 (or 9!, nine factorial), possible noughts and crosses games, a total of 362,880. This is not a very big number in computer terms, so a 'brute force' noughts and crosses program, which analysed every possible move to the end of that game, would be a reasonable proposition.

But, as David Peat points out in *Artificial Intelligence: How Machines Think*, if the board is increased from 3 x 3 to 4 x 4, the number of possible moves rises to 16!, which is around 2 x 10¹³ moves, simply by increasing the number of rows and columns by one. A 5 x 5 board has around 15 million million million moves. *Whew!*

I'm sure you can see the problem we're approaching. When it comes to chess, on a 64 x 64 board, there are around 10¹²⁰ possible combinations of moves. This may not sound like an impossibly large number, but if every atom in the universe was replaced with the fastest computer available to us now, and put to work on the job, the universe would end before all the possible moves had been considered.

Despite the impossibility of doing the job completely, the main approaches in the past have been modified versions of the 'brute force' approach. Could future chess programs approach the situation in a way which is more like the way in which humans play? Several groups of programmers are now working on chess programs in which the program is given a basic body of knowledge, and then sets out to *learn how to play better*.

Indeed, if computers work by simply analysing every possible move, and then picking the best one, why doesn't a chess computer play perfect, unbeatable chess?



Machine-Learning

One H.I. Messerschmidt, who worked for IBM in South Africa before the company pulled out, has approached chess from the machine-learning position. In his paper 'Machine learning and chess,' he says that future advances in chess-playing programs are almost certain to occur in programs which are based on machine learning.

One advantage of working in this way is that the computer program need not know everything before it can start, in fact the knowledge can be far from perfect, and still produce a worthwhile result. He has written that: 'This makes the learning task considerably easier, since machine learning and most other complex computing tasks are subject to the 80-20 rule. This means that 80 per cent of the result can be achieved by 20 per cent of the effort, but the remaining 20 per cent is subject to heavy diminishing returns penalties

'Whatever method (of allowing a computer to learn to play chess) is chosen, the amount of knowledge needed to play reasonable chess is vast. However, when Messerschmidt tried the machine-

learning approach in practice, analysing just the endgame of King and Rook versus long King, he found it didn't work out so well: 'In order not to extend the project indefinitely and to be able to test its effectiveness... the endgame was chosen. Since this endgame is very simple, the objective of perfect play was added. After all, if the method cannot succeed in playing the KRK endgame perfectly, there is not much hope for the full game of chess

'The initial results from the learning process were disappointing. An enormous number of patterns (about 9000) were generated for the very simple KRK endgame. The program was modified to discard moves which were judged to be non-plausible, and there was a considerable improvement: 'It was a relatively simple task to create an introspection and consolidation module to generalise and create the (move) patterns... The patterns in the knowledge base allow (the program) to play the KRK endgame perfectly. A small number of plausible moves is generated

'This project has shown it is possible to construct a... chess-playing program to play a very basic endgame perfectly. It further shows that with the correct, plausible move generation and an efficient tree-searching algorithm, the program can do so much more efficiently than a brute-force program.

'More important, however, it proves that the knowledge needed for plausible move generation need not be perfect and can be generated automatically.'

Progression

As an alternative to changing every Atom in the universe into a Cray, then, it looks as though a machine-learning approach may produce better and better chess programs in the future. When I progress to level 2 on my Tandy chess machine, I'll be ready to take on any machine-intelligent opponent. □

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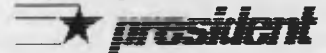
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Pyro

FIRST PRIZE was awarded to Pyro, a simulated pyrotechnics display. For his efforts, Kelvin Shields of Jamboree Hts, Qld, won an ECS '286 with 2 megabytes of memory and a 40 Mbyte hard disk, plus an Epson LQ2500 colour printer plus Microsoft software to the value of \$2000. (Let's see what he can do *now!*)

Kelvin's comments —

Program Pyro utilises the power of an IBM AT compatible and the colour graphics capability of an EGA display to pro-

duce a realistic simulation of a Pyrotechnics (fireworks) display. It requires an AT compatible (preferably running at 8 MHz), an EGA compatible display card, and a colour display.

Pyro has been tested on a variety of machines running at 8 and 10 MHz. Although optimised to give the best effect on an 8 MHz machine, it still gives quite acceptable results on the faster processors. (For a good display on very fast machines the program may be modified by inserting a suitable delay in the innermost loop of the move—points function.) When running at the correct speed, one complete

Pyrotechnics show will take about four minutes to execute. Most PC and XT compatibles are not fast enough to give a realistic display, however future plans for Pyro include a simplified version that will run on a PC/XT and be capable of driving a CGA display.

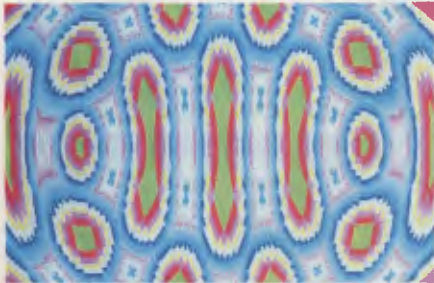
Like a real fireworks display, Pyro is really meant to be viewed in the dark. For the most realistic effect, first darken the room as much as possible and cover or turn off any LEDs or pilot lights on the computer and keyboard. If darkening the room is too difficult Pyro will still give a convincing display by normal room lighting, but I recommend viewing it in the dark at least once to experience the full impact.

The program is written in Turbo C and compiles using default options. To achieve the required speed, the EGA registers and memory are accessed directly. In general, Pyro works by generating points and allowing them to continue in motion under the effect of simulated gravity. The attributes of a point include position, velocity, size, colour, lifetime and rate of fade at the end of its life. Most attributes are generated randomly for each point, but the various effects are achieved mainly by manipulating the limits within which each attribute may lie.

There are five different effects currently programmed: *Spurt* produces intermittent eruptions of coloured sparks which fill the sky then fall gently to earth; *Flare* gives a continuous stream of sparks emitted at high speed which fade quickly before they

begin to fall; *Burst* gives a starburst of brightly coloured points complete with sound effects; *Rocket* sends a skyrocket across the screen leaving a diffuse trail behind (most end in a starburst, but for realism a percentage of 'fizzlers' simply fade away to nothing); and *Roman Candle* produces a large fiery ball shot skyward, leaving a short, quickly fading trail (the ball explodes in a large burst that sometimes seems to fill the entire sky).

Ipattern



Second Prize Winner *Ipattern*, from Alan Wilkie.

SECOND PRIZE was won by *Ipattern*, written by high school student Alan Wilkie of Bulli NSW, who is now \$2000 richer in Microsoft software.

Alan's comments —

Ipattern is a computer art program with a technical basis. It requires an EGA card and monitor and runs best on an 8 MHz or faster PC-AT. The algorithm generates a false-colour map of the interference pattern produced by two point sources of waves. Once the pattern is drawn, the colours are rotated through the EGA palette 16 at a time from the 64 available. This produces the illusion of movement in several directions at once and as new groups of colours burst through, the pattern takes on a different character. The result is quite hypnotic.

When the program is run, it will request integer values for the wavelength and distance between the sources (both measurements are in pixels) for the pattern to be generated. Entering zero for either value causes the computer to make random choices, but some suggested values for wavelength and distance respectively are 30 and 20, 50 and 30, and 25 and 10. For speed purposes, the program cannot be interrupted (except by reset) during drawing of the pattern since debugging code slows down operation, but once the colours begin to cycle, pressing any key will cause the program to exit to DOS.

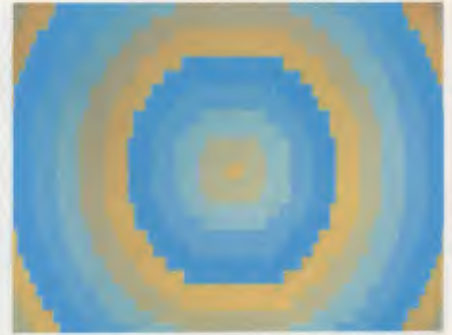
Change

THIRD PRIZE was taken by *Change* from Jeff Richards of West Ryde NSW. Jeff now has \$1000 worth of Microsoft software to add to his collection.

Jeff's comments —

This program is simply 'wallpaper for the mind.' It contains 30 different patterns, each described by a simple one-line mathematical and/or logical expression. Patterns are selected at random and displayed over the top of the previous pattern in a character-replacement procedure that is also selected randomly. Each pattern consists of two randomly selected colours, with toning achieved by the use of shaded characters of 5 different intensities.

In order to maintain adequate speed the patterns are made up of character blocks — not pixels. Therefore, the program will run on monochrome screens as long as the controller supports the colour command, either by ignoring it or convert-



Third Prize Winner *Change*, from Jeff Richards.

ing colours to shades of grey.

A delay loop ensures that each pattern is displayed for at least five seconds. During this time the next pattern is being prepared. On a standard PC some patterns take longer than five seconds to prepare, so the previous pattern stays on the screen for longer. An AT should be able to prepare all patterns in less than five seconds.

Honorable Mention

SIMON RATCLIFFE'S *Tangle* was probably the most visually powerful of all of the entries we received. Unfortunately there were technical problems that disqualified it as a winner. Nevertheless, the judges agreed unanimously that *Tangle* deserved a mention — an Honorable Mention and a Microsoft Quickbasic 4 Compiler. Simon is a high school student from West Beach SA; his comments —

Here are two Basic programs to be run with Advanced Basic or a similar extended Basic: *Tangler* and *Tangle* are exactly the same program except *Tangler* contains extensive comments and explanations, while *Tangle* is the stripped down version.

Tangle is simply a simulation of three bodies exerting gravity on one another. The effects of this simulation are spectacular especially with the vibrant, ever-changing space created by the default parameters.

My Basic doesn't support error trapping, so I was forced to program a STRIG(0) trap (Button 1 on the joystick). This trap enables you to change one or all of the parameters during a simulation without damaging the image on the screen. If a joystick is not available and BasicA or a similar Basic which supports error trapping is available, then simply change the STRIG(0) in Lines 1130 and 1140 to KEY(10). Use the F10 key to change the parameters.



Well-worthy of an Honorable Mention: *Tangle* from Simon Ratcliffe.

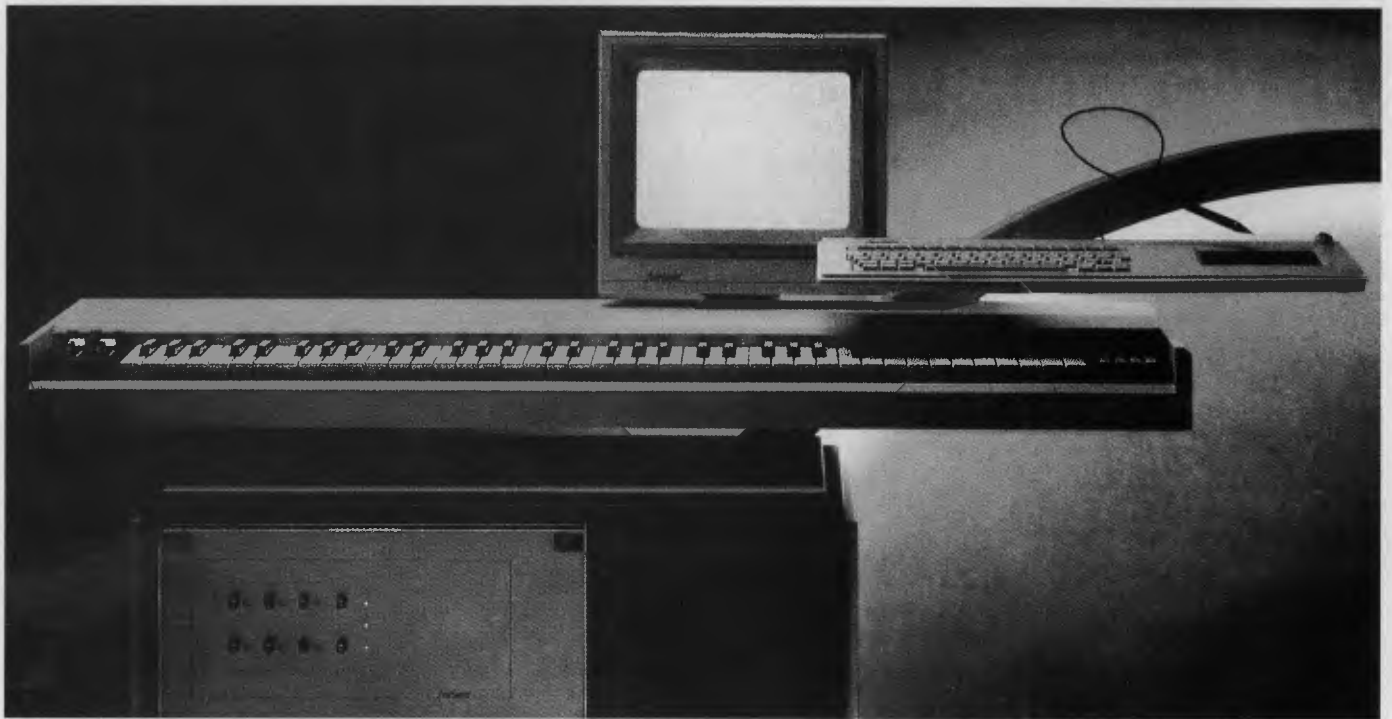
When changing parameters, enter the new number and press return. Just pressing return will preserve the old parameters. Changing a couple of parameters will create wildly different effects. I found that 100 for the mass of each body, 4 for the size, -0.5 for the bounce factor and 10 for the minimum distance, creates a subtle, twisting, slowly changing, tangling effect — hence the name of the program.

and speaking of honorable mentions: the judges were Andrew Larkin, Microsoft's Senior Technical Advisor, Phil Jones, Microsoft's Technical Manager, Mark Elder, Art Director of *People*, and Pamela Horsnell, Greg McBean and Jake Kennedy of *Your Computer*. □

FAIRLIGHT INSTRUMENTS

The Series III CMI

In December, Andrew Symaniz tracked the development of Fairlight's CMI, one of the most significant musical instruments of the '80s. Now, let's look at the current offering . . .



SEVERAL YEARS after the release of the first CMI system, a core group of ten Fairlight designers began developing a new generation Computer Musical Instrument, which later evolved to become the Series III CMI. Unlike previous CMIs (the Series I, II, and IIx) which used a single dual processor to control virtually all functions of the machine, the Series III architecture incorporates no less than twelve microprocessors for each group of sixteen voices. The dual-6809 'administrative' CPU and 1 megabyte of system RAM is used primarily for graphics and disk control; it's complemented by two Moto-

rola 68000s and eight 6809 peripheral processors.

One 68000 complete with 512 Kbyte of reserved RAM acts as an all-purpose Waveform Processor which is employed for sound sampling, waveform manipulation, and special audio effects. The General Interface 68000 processor which uses a further 64 Kbyte of private RAM is dedicated to handling 'performance' operations such as sequencing, MIDI, SMPTE and external synchronisation. Each pair of sound channels on-board (coupled for stereo) share a 6809 processor and 64 Kbyte of working memory for real-time

control of voice characteristics such as pitch, enveloping and looping.

Also, video RAM requires an extra 16 Kbyte, and there can be anything from 2 to 14 Mbytes of common Waveform RAM (WRAM), required for on-line sound storage.

The Series III CMI is capable of reproducing all sequences and sounds created on earlier Fairlight machines, and is available in a number of different configurations. Starting with a 2-voice/2 Mbyte WRAM, dual-floppy version costing a cool \$35,000, all the way up to the ultimate system: an 80-voice/140 Mbyte WRAM system

For those less concerned with making music than in editing stereo program material or sound effects, the 2-voice/2 Mbyte compendium (with 20 seconds of CD-quality sampled sound online) is probably adequate for most production needs.

that might include as many as 32 optional storage devices; at current prices this dream machine would set you back to the tune of a half-million dollars, or so.

The new industry standard SCSI (Small Computer Systems Interface) on the Series III allows for considerable future expansion with up to eight external modular options per 16 voices. These might include four extra 16-voice slave Fairlight units, a 600 Mbyte hard disk, 20 Mbyte (removable) cartridge disk, 60 Mbyte cartridge tape for backup and 400 Mbyte of optical-disk storage.

But, even the minimum Series III configuration is fully upgradable. Most multi-sample sounds in the III's sound library require less than 4 Mbyte WRAM so many of these could be pressed into service equally effectively on the smaller versions. Since all configurations share the same hardware and software features, extra voices may be added as finances allow.

For those less concerned with making music than in editing stereo program material or sound effects, the 2-voice/2 Mbyte compendium (with 20 seconds of CD-quality sampled sound online) is probably adequate for most production needs.

Sound Quality

In physical appearance, the Series III CMI closely resembles its predecessors, although the somewhat unwieldy light-pen apparatus has been replaced by a high resolution graphics tablet and stylus built into the alphanumeric keyboard. In operation, the III provides sonic performance comparable with the compact disks.

Previous CMI's (and indeed, most other RAM-based sampling systems currently available) use 8-bit waveform memory,



Figure 1. Fairlight's CMI (Computer Musical Instrument) Series III incorporates twelve microprocessors for each group of sixteen voices: a dual-6809 CPU (and 1 Megabyte of system RAM), which is used primarily for graphics and disk control, plus two Motorola 68000s and eight 6809 peripheral processors.

with a maximum sampling rate (typically) less than 30 kHz. Although some manufacturers of digital sound equipment continue to employ a variety of ingenious schemes to extend the inherently low (48 dB) dynamic range to more acceptable levels (60 to 90 dB), the total harmonic distortion of 8-bit sounds can never be much less than 1 per cent.

The 16-bit (linear format) waveform resolution of the Series III CMI provides sounds with a theoretical 96 dB dynamic range, and virtually insignificant distortion components (around 0.01 per cent).

Another factor that determines the quality of a sampled sound is the sampling rate. In order to provide 20 Hz-20 kHz bandwidth, a sample-rate of at least 44.1 kHz (compact disk standard) is required. The Series III allows sampling in 16-bit mode, in mono or stereo, and with a maximum (mono) recording sampling rate

of 100 kHz (and 200 kHz maximum playback rate). The previous 8-bit sounds can still be loaded in under 16-bit mode.

Sound Organisation

The Series III's most dramatic improvement in sound storage is its flexible waveform processing/WRAM architecture, which can now handle sounds with variable sample lengths, and it has over 100 times more total waveform memory than previous CMI's.

Sounds designed on the earlier machines were often limited by the relatively small storage capacity (16 Kbyte) of peripheral waveform RAM (contained on each of the voice channel cards). The III's sample data, however, is stored in a 'common pool' of Waveform RAM. A single sound may take up as little as 16 Kbyte of memory, or as much as 14 Mbytes. All sounds digitised and stored in WRAM are

organised for transfer to their respective channels by the Waveform Processor card.

To date, the maximum on-line storage available for the Series III has been 14 Mbytes of Waveform RAM, plus 150 Mbytes (formatted) of hard disk space (5 1/4 inch Winchester). Sounds sampled at the default sample rate of 44.1 kHz allow approximately eleven seconds of sample-time per megabyte. So, the maximum sample-time (of continuous, monophonic, CD-quality sound) available on the 'standard 16-voice' system is just over 2.5 minutes.

Now, since the CMI software is written on top of the Unix-like OS9 operating system, it is possible to exit from the CMI software to run games, wordprocessing, telecommunications or other software — or even tinker around with the Fairlight software itself.

However, 'looping' techniques can save enormous amounts of sample-memory. And, since the Series III is a multi-tasking system, additional samples can be loaded in from a hard disk for playback while a sequence is playing.

The provisions for setting up 'natural' sounding instrument configurations on the III are very flexible, in terms of the number and duration of sounds capable of being stored in memory.

At the lowest level are the samples or subvoices, up to 64 of which can be grouped together to comprise *one* multi-sampled voice. Each of these 64 possible subvoices can be individually 'mapped' across different ranges of the keyboard in any combination upwards from a single two-way 'split', to unique samples assigned to each key.

On the Series III, an instrument is defined, conceptually, as a general structure that functions as receiver and or transmit-

ter of MIDI-channel information — as such, all manner of MIDI input/output 'plumbing' is supported. More specifically, the currently active instrument is what actually appears on the music keyboard. It's defined by some combination of voices, which themselves might contain various permutations of active subvoices.

Each instrument is assigned an 'Nphony' value for voice-polyphony (any combination from a single 16-note polyphonic voice, to 16 individual monophonic voices). Also, two or more independent voices can be 'layered' to play together as a dynamic composite of blended sounds.

A System is a configuration of one or more Instruments — it's used during composition and playback to set up multi-instrumental keyboard assignments, MIDI routings, sound effects and so on.

Sound Effects

But the Series III is even more versatile than this. Sampling sounds and re-arranging them across a musical keyboard may be one thing, but most musicians, especially those trained on traditional acoustic instruments, invariably require a creative musical 'environment' capable of responding to the nuances of expression — that by and large contributes to a particular musician's personal playing style.

At present, individual keys on the 6-octave MIDI keyboard provided with the system respond only to attack velocity; although during 'live' performances, the Series III can monitor up to 8 variable external sound controllers, 5 switches and 16 'function-curves' — all of which can be used to modify the quality of certain sounds in real-time.

Each voice (in fact, each subvoice) has its own comprehensive effects 'patch bay' that assigns the various hardware and software controls that might be used to enhance a musical performance. Parameters controllable by these expressive devices include AHDSR amplitude enveloping, slur, filter, tuning, vibrato, pitch-bend and so on — most of which can be patched individually for each subvoice, if desired.

All these, and other major functions of the Series III system are organised into a heirarchy of menus and icon-driven display 'Pages' — each one of which is designed to assist in a variety of sound manipulation procedures and musical tasks.

The variable gaggle of sound manipulating functions available via the various

Pages, sub-Pages and interactive windows is quite mind-boggling; portions of sampled waveforms can be re-drawn, looped, edited, mixed, merged, analysed and resynthesised. And a lot more!

Sounds can be modified using popular time-modulated digital-delay effects such as 'Flanging'. Or, distorted beyond all recognition, using more arcane 'harmonic massaging' techniques found on the Fast Fourier Transform Page.

For example, up to 255 harmonics per sound sample (displayed as over 2000 'overlapping' profiles) might be called up for re-synthesising a sound. In this situation, the musician has 'total' control over all amplitude variations and pitch variations (phase) of each individual harmonic. Together these describe the dynamic frequency spectrum of a sound throughout its audible 'lifespan'.

Any sound analysed in this way into its many independent harmonic profiles, can be subsequently re-synthesised with considerable precision. According to Kim Rylie (one of the founder's of Fairlight), the re-synthesised version is indistinguishable from the original (unless one or more profiles are altered, of course).

Music Sequencing

So then, unless the musician becomes *Shopelessly* sidetracked (as often happens!) by all the irresistible audio 'tweaking' possibilities of this sound laboratory *par excellence*, he/she might at some stage consider sitting down to actually compose some music.

Since its inception, there have been several different styles of music sequencer planned for the Series III, each one with unique features.

There is a non real-time text-based Music Composition Language (MCL) that can be programmed in either Direct mode, for beginners coming to grips with MCL syntax, or in Indirect mode for more advanced users.

Now, since the CMI software is written on top of the Unix-like OS9 operating system, it is possible to exit from the CMI software to run games, wordprocessing, telecommunications or other software — or even tinker around with the Fairlight software itself (*hmmmm*).

However, using the powerful screen editing facilities of the OS9 editor, it's also possible to create MCL source-text files in 'Indirect mode'. These can then be compiled into special 'MIDI frame' formatted files required for playback on the CMI.

Using MCL, the composer is able to specify in extremely fine detail the beha-

viour of every note in a sequence, and the articulation of the various controls and switches patched to specified effects. There are convenient multi-level repeat facilities, and any defined blocks of music can be interspersed with labels or comments. Also, complex poly-rhythms and poly-tonalities (that might otherwise be impossible to perform) can be input with very few keystrokes.

Real-Time Sequencer

The CMI Series III Real-Time Sequencer/Rhythm Composer is essentially a revamped, polyphonic version of the now-legendary Page-R Real-Time Sequencer. Like its predecessor, the Series III RTS allows editing and overwriting 'quantitised' performances in real-time.

Although the Series III RTS is a 16-Part sequencer that can monitor the settings for up to 16 controls (including pitch-bend) and 16 switches, each Part is stored monophonically. Nevertheless, polyphonic performances can be recorded, either in real or step time, but the maximum possible note polyphony within a single pattern can never be more than 16 simultaneous events.

As far as synchronisation goes, the III's RTS can be paced by a variety of external sync methods (MIDI-timing, sync-tone, and trigger) or SMPTE/EBU timecode — which the CMI III can also generate itself.

The SMPTE chase/lock facilities of the Real-Time Sequencer allow precise synchronisation with external tape machines, video and film soundtracks, whatever. This liaison between sound and image is particularly useful when structuring musical film scores, or laying-in sound effects.

Hot Off The Press . . .

The long-awaited CAPS sequencing software (Composer, Arranger, Performer, Sequencer) for the Series III is due for release in early '88.

Looking forward, some other upgrades planned for the Series III which should become available in the not too distant future include: a Waveform Supervisor card (that replaces the existing Waveform Processor hardware) which will enable five times faster loading of sounds and instruments from hard disk — so, literally hundreds of instrumental sounds can be made available for use during composition.

This hardware will also provide a doubling of WRAM and sample-time, to 28 Mbytes and just over five minutes, respectively and, a more flexible 'Timecode-Trig-

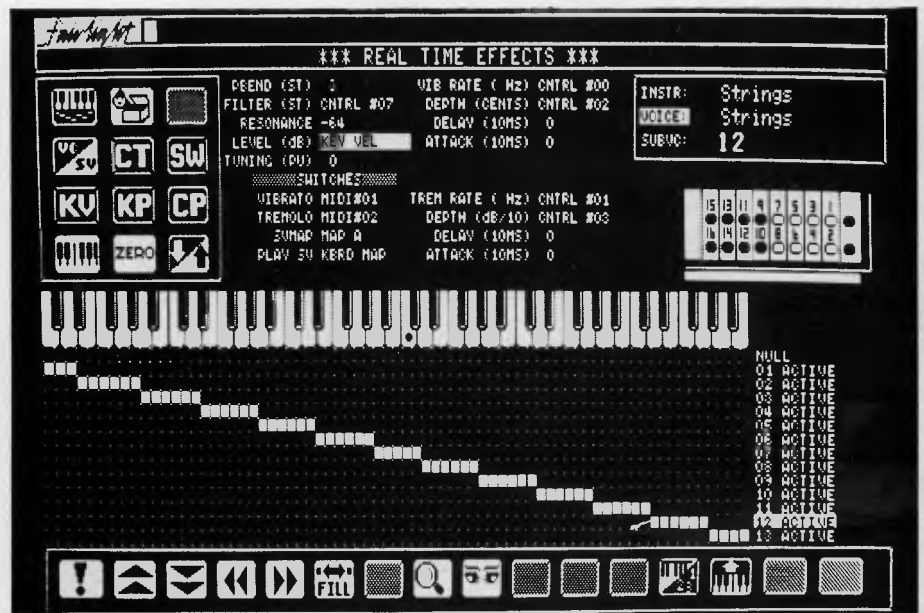


Figure 2. The Real Time Effects Page: the upper screen contains the voice effects 'patch bay', while the lower has 13 different subvoices allocated across the musical keyboard.

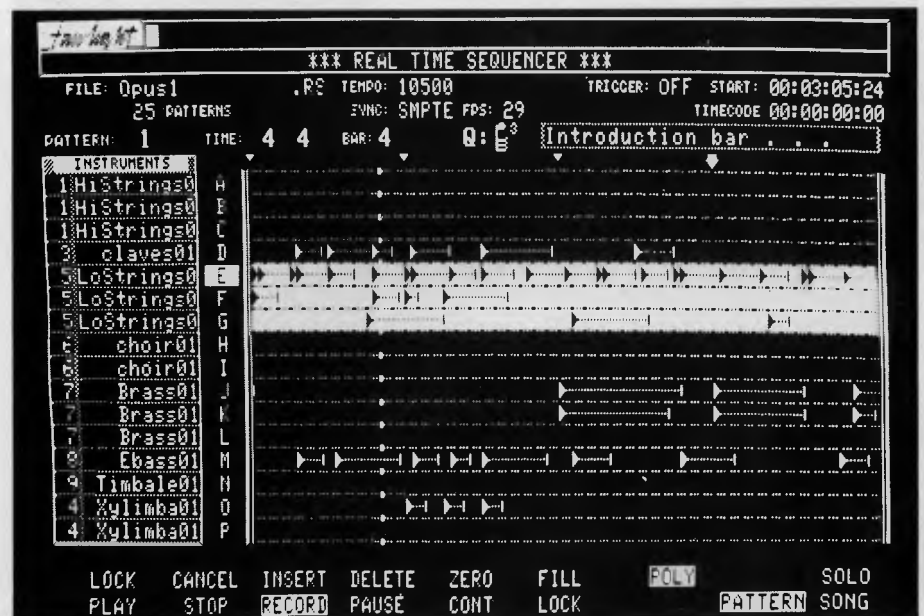


Figure 3. The Page-R Real Time Sequencer: each pattern presents the 16 Parts shown as 16 individual 'tracks' across the screen.

ger' arrangement — called the Cue-List Sequencer — which will enable virtually any possible string of Series III CMI commands to be processed at precise points of SMPTE-time. This will allow for (say) hours of pre-produced incidental music to appear throughout a film score at specified time-cues.

In the third and final part of our look at this highly successful Australian company, we'll briefly examine some developments planned for the CMI, plus a few other surprises. Also, Peter Vogel and Kim Rylie, Fairlight's co-founders, will offer some thoughts regarding the future of Fairlight, computers, music and video □

Genoa better way?

If losing your files gets your back up, and you're streaming over re-building your hard disk from floppies, then Ewart Stronach's foray into the Genoa Galaxy may bring back some restful nights.



MY HARD DISK was a *mess*. Hundreds of files, mountains of sub-directories and little apparent order. Month in, month out, I have been threatening to format about 50 disks, create normal backup files and methodically tidy up my act. Month after month, I haven't got around to it.

Unlike a normal business user, the data and programs I amass are not critical. My beloved wordprocessing files, I dump to a

floppy for archiving but the rest came from disks which I retain and can reload or re-install if needed.

The need to back up data becomes critical in a business environment when the day's results are crucial to the overall accounting system and lost data requires as much time (or longer) to re-create as it took to create in the first place.

DOS' backup is sufficient for many smaller users but has some real hangups.

Restoration of files between computers is fraught with dangers and varying versions of DOS handle restoration differently, causing its own particular brand of head ache. DOS backup requires heaps of disks if you need to copy the whole drive for security, plus equal heaps of time.

There are a few good backup utilities around which take a lot of the pain out of the exercise but the definitive answer is some form of 'off line' storage. By this I mean a separate unit which will soak up your data in some magical way.

For some users, an additional hard disk drive could be the answer. With the falling price of the slower types of drives and the 'drive on a card' style available, this method can be viable, particularly if the data storage is required for one machine only.

When the data needs to be transported as well as secured, the only viable option is what is known as a 'Streaming Tape' style of backup unit. These tape units sim-

DOS' backup is sufficient for many smaller users but has some real hangups.

ply write data continuously along a tape not unlike a wider version of normal cassette tape. It is not really viable as a normal storage device as it needs to search 'end to end' to find a particular piece of data, rather than across a spinning platter as a disk does, and the search time goes up dramatically as your data amasses.

The Genoa Galaxy is such a unit. About the size of a shoebox, it comes with a short card which can live in any slot and connects directly by a shielded cable with DB39 sockets at both ends. With a mains power lead, you're ready to go.

Style That Makes The Ticker Tape

THE STYLE of hardware is not exclusive or fantastic. It's functional to look at with a power indicator and 'busy' light on the front panel and a slot to take the tape cartridge. There is a model which uses a cassette very similar in size to a normal audio cassette available but I understand there is an inexplicable buyer resistance to this style in Australia.

The cartridge is a solidly built bit of gear, smaller than a video cassette and built on a rigid alloy base plate. It contains about a squillion miles of 1/4 inch tape (QIC-24 standard) which can hold up to 60 megabytes of data. Because of the fact that it writes sequentially, no formatting of the tape is necessary and a fresh cartridge is ready to use the minute you unwrap it.

Installation of the hardware is simple. My Lingo PC-88 (from Hypec, the same source as the Genoa), opens like a car bonnet and apart from re-arranging some other boards for convenience, the physical assembly took only five minutes.

The software, and this is the part that makes Genoa leap out of the crowd, comes on two floppy disks. You place disk 1 in drive A and type the magic incantation 'Tapeinstal'. The system verifies that the date is correct, because it automatically makes a log of each of its operations and stores it in a file for future reference, then the opening menu is displayed. This command menu offers: Backup, Disk Image Backup, File by File Restore, Disk Image Restore, File by File Display tape directory, View Tape Logfile and Exit to Command Menu 2.

Command Menu 2 offers tape utilities and parameter settings such as: Retension Tape, Erase Tape, Certify Tape Media, Diagnose Tape Drive, Modify Parameters, Setup Auto-backup and Return to Command Menu 1.

My first exercise was to totally backup my hard disk, at that time carrying just on 20 Mbytes of data. I opted for the File by File backup for two reasons.

- 1) The Whole Disk Image backup takes a picture of the whole disk, including unused portions, and does not produce a tape directory. It's primary use is for backing up a disk with non-PC-DOS partitions.
- 2) I wanted to get an idea of the time required to backup and restore from individual files.

Emboldened by a three minute, in depth, evaluation of the manual, I typed in BF and was presented with the Source Menu. This listed the files on my hard disk and allowed selection of the required files. Selection is made either by typing in a single file name or moving a pointer to highlight the desired files.

Selecting 'All files in path C:' results in a warning on screen that all tape data will be overwritten if segment 0 of the tape is used, and the opportunity to append this new backup to the end of the existing tape files is given.

Electing to start at segment 0, I pressed enter and sat back as my hard disk was committed to tape for the first time in its life. The transfer of data is reflected on screen and the speed of file copying, even on an XT, is stunning. Some of my sub-directories are *very* big and this posed the only significant problem encountered with the Galaxy.

One of my sub-directories contains printer fonts for a program called Fontasy, and runs to 410 files for a total of 2.1 Mbytes. The Galaxy rattled through the first 120 odd files in very short order but then started to slow down incredibly. The time taken to find and transfer each file continues to get slower and slower, and backing up the whole directory took nearly twice as long as the rest of the entire disk.

I feel the problem is probably DOS based with a limitation of the directory size, as the hard disk was searched for each file after the initial load of about 120 files. The answer is simple, for efficient use of the Galaxy, sub-directories should be limited to around 100 entries and the sub-directory tree extended after that.

The status window is displayed on the right of the screen at all times, indicating what is going on and reporting a successful completion of each task. There is plentiful help available on screen under three headings: Current Menu Examples, Function Key Definitions, and Howtos.

The Howtos offer complete directions on a full range of functions, in plain English, with very clear directions. So clear in fact I'm glad I didn't spend too long pour-

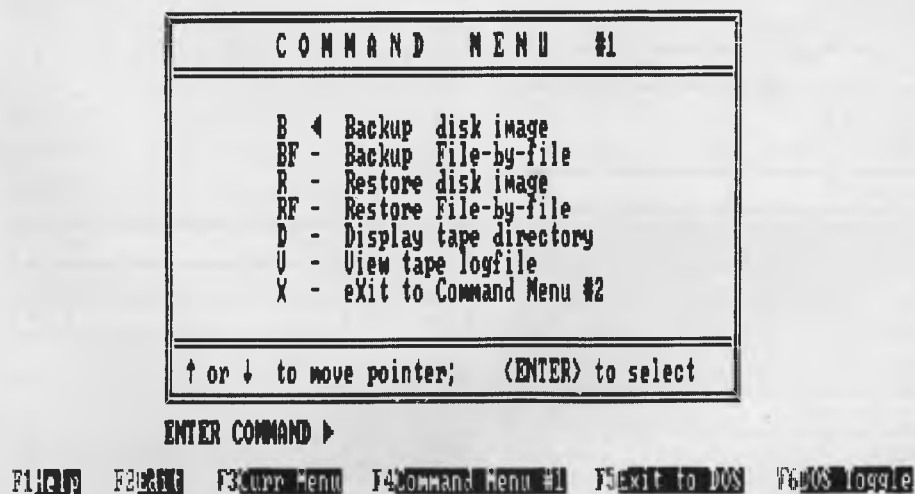


Figure 1. The main Command Menu for the Genoa Galaxy.

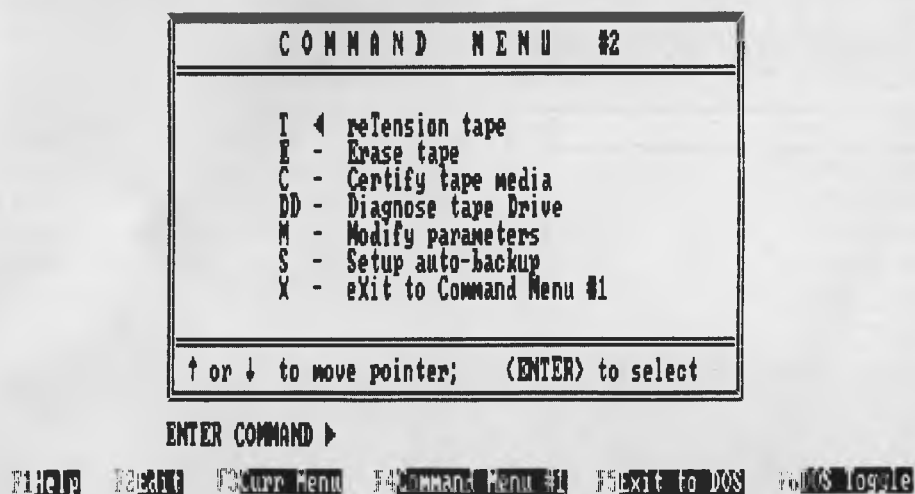


Figure 2. The second Command Menu offers tape utilities and parameter settings.

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INPUT/OUTPUT:	serial/parallel/game port/8 slots	
SCREEN:	mono	colour

AST Premium 286

MODEL:	85	140
CPU:	286 @ 10MHz	286 @ 10 MHz
RAM:	1 MB	1 MB
DISK STORAGE:	1.2 MB	1.2 MB + 40 MB
INPUT/OUTPUT:	serial/parallel/7 slots	

TOSHIBA T3100/T3200/T5100

MODEL	T3100	T3200	T5100
CPU:	286 @ 8MHz	286 @ 12MHz	386 @ 16 MHz
RAM:	640 KB	1 MB	2 MB
DISK STORAGE:	720 KB + 20 MB	720 KB + 40 MB	1.44 MB + 40 MB
INPUT/OUTPUT:	Ser/Par/Exp	Ser/Par/Exp/2 slots	Ser/Par/Exp



WYSE 286

MODEL:	2200	2112
CPU:	286 @ 10MHz	286 @ 12.5 MHz
RAM:	640 KB	1 MB
DISK STORAGE:	1.2 MB	1.2 MBN + 40 MB
INPUT/OUTPUT:	serial/parallel/8 slots	



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ing over the manual. If you type in an erroneous command, the system will highlight the error on the command line for editing with the inbuilt Command Line Editor. If you have typed in some potentially disastrous request, key F4 to return to the previous menu without further action. F6 allows a temporary exit to DOS to

check a directory or move files about before backing up, and returns control to Galaxy at the point of exit.

Restoration is simply a reversal of the backup procedure with similar menus and commands. The time is about the same with slight additional time requirements for the tape to search end to end for some

files. Before first use and after lengthy storage, it is recommended that your tapes be re-tensioned. This is carried out automatically for you and the Galaxy just runs the tapes right through each way before reporting Ready to Use. At the same time as being re-tensioned, a tape may be totally erased for security.

Got Your Backup Now?

GALAXY OFFERS an Automatic Backup Mode. Once established, a backup schedule will automatically perform a series of pre-set tasks whenever your system is switched on. If you are in the middle of an application, a little tune will be played to remind you its backup time again. Next time the system sees no keystrokes or activity for 10 minutes, the backup will proceed automatically. All the parameters available at the normal command menu are available for auto backup, and this time consuming job can be carried out while we rush to the pub.

Genoa offer a sample backup schedule, designed for maximum security of data.

Le Specs

FOR THOSE OF you with a technical bent (gained from stooping over a soldering iron), here are a few specifications — the cartridges hold 600 feet of tape and can store up to 60 Mbytes of data. It records over nine tracks in a serpentine pattern at a tape speed of 90 inches per second, transferring information at 86.7 Kb/sec. It has a soft error read rate of 1 x 10 to the power of 8 and a hard error read rate of 1 x 10 to the power of 10. Running off 240V mains it needs 12 and 5 V with a +/- 5 per cent with maximum power consumption at start-up surge of 4.2A.

Data storage and security does not come cheap. This type of unit has not kept pace with the falling costs of hardware. Clone PCs with a hard disk are now available for less than the cost of a Galaxy unit, but there is no shortcut to security or protection. If you need this security and don't want the hassle of backing up to floppies, grit your teeth and buy a Galaxy. And sleep easy. □

Product Details

Product: Genoa Galaxy External Backup System
 From: Genoa
 Distributor: Hypec Electronics,
 21 Ryedale Road, West Ryde 2114.
 (02) 808 3666
 Price: \$2401 taxed

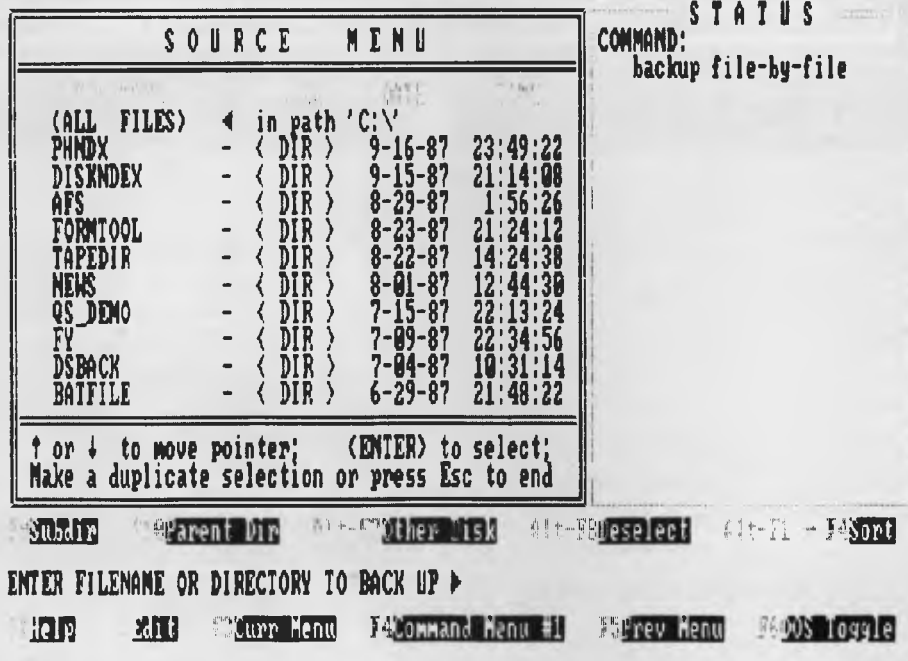


Figure 3. After issuing the command to backup file-by-file, the Source Menu lists all the files on the hard for selection.

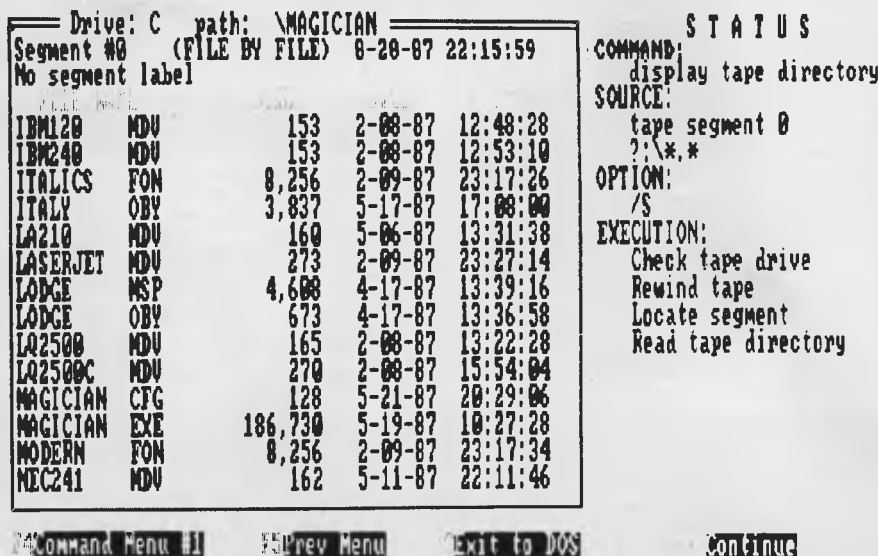


Figure 4. The tape directory, as displayed from the main Command Menu.



Just because they look the same doesn't mean a thing.

A Nashua diskette looks like most others. But, as with identical twins, there's a world of differences between them. Important differences in how they're made and, consequently, how they perform.

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1987 Software Roundup!

Welcome to our Software Roundup! Here we have summarised the indepth reviews from YC presented during 1987. We hope these pages will help you find a package that does exactly what you want it to — in most cases we've included who the package is aimed at, or the uses the reviewer thought it would be most suitable for.

January

Borland Roundup: Turbo Pascal offers a source code editor plus a compiler (and there's Turbo Tutor to teach you how to use it); the Borland range also includes four Turbo Pascal Toolboxes: Editor, Graphix, Gameworks and the Database Toolbox; SideKick is a TSR (Terminate and Stay Resident program) offering a mini-wordprocessor, calculator, ASCII table and a phone dialler; Turbo Lightning is a RAM resident dictionary/thesaurus offering real time spell checking and alternatives; Reflex is a RAM-based database with an exceptionally powerful Report facility.

Prices and availability were given with the original review — please do not ring our offices for this information (we're on holidays, too!). To obtain Back Issues, refer to the services page.

The Great C Comparo: Microsoft C Compiler V4 is a good choice for professionals working with DOS systems; Computer Innovations Optimising C86 offers both DOS and CP/M versions with a good set of general facilities; the Mix C offering is an 'entry level' compiler for both DOS and CP/M; DeSmet C offers fast performance, but supports only the small memory model; Eco-C also only supports the small memory model, but it does support the

construction of rules in memory, allowing access to large data sets; the Hi-Tech C Compiler has versions for CP/M-80 and -86, and PC- and MS-DOS, with local support direct from the author.

Spotlight is a copy-protected TSR offering an appointment book, a DOS Filer (for DOS tasks without leaving the current program), a phone book and auto-dialler, note pad, index card file and calculator.

Write-Hand Man is a set of RAM-resident accessories that runs under 8-bit CP/M. It includes a notepad, calculator, calendar, directory manager, file viewer, and a utility to write macros to the number keys.

```
Open the transactions file.
Read first record into the buffer.
While not at end-of-file
```

```
Process record in the buffer.
Read next record into buffer.
```

```
Generate exception report.
Close all files.
```

February

Touching Base: Rose Vines compared four databases and found: Reflex is a fast 'list manager' that can be used effectively by the non-programmer; Powerbase is a rather limited relational database *without* a programming language, and it's easy to learn; TAS Plus is a powerful relational database with an excellent price; Guru combines a programmable relational database with a spreadsheet, graphics, communications, wordprocessor, and an expert system builder (for \$7000!).

WordStar 2000 Plus is a secretarial version of WordStar which includes MailMerge, Telemerge and StarIndex, as well as the facility to import Lotus files.

JED Modula-2 is an inexpensive implementation of Modula-2 that closely follows Wirth's original.



March

Stylus is a programming tool aimed at the professional software writer, but it is also an excellent aid to learning structured programming in various dialects of Basic, Pascal (including Turbo), Fortran 77, C, PL/I, dBase II and III, COBOL and Prolog.

Framework II offers an integrated spreadsheet and wordprocessor that includes a



spell checker, idea outlining, mail merge, a database, telecommunications and graphics as well as its own fairly powerful programming language. It's well-worth a look if you a single program for a small- to medium-sized office.

Alice, the Personal Pascal is a menu-driven implementation of Pascal aimed at professional developers.

April

Microsoft Access (PCOTY Software Finalist) is a sophisticated, menu-driven communications program aimed at the corporate users; it's designed specifically for packet-switched networks and supports an electronic mail system.

Javelin (PCOTY Software Finalist) is a business analysis program that allows the user to 'fine-tune' relationships between data by using ten different views (Diagram, Formula, Table, Chart, Worksheet, Notes and so on).

Harvard Presentation Graphics (PCOTY Software Finalist) is a powerful object-orientated graphics package which gives 'professional' results while still being extremely easy to use and versatile.

DesqView (PCOTY Software Finalist) is a multi-tasking system that incorporates macro and cut-and-paste facilities — it's a good way to keep your AT fully employed!

Mace Plus Utilities (PCOTY Software Finalist) can treat your hard disk to UNformatting, UNDELETING, condensing, squeezing, and sorting; it includes Diagnose and Remedy functions for suspect hard disks.

PageMaker for the Mac (PCOTY Software Winner) is the standard that every other desktop publishing package is measured against.

System Builder (PCOTY Software Finalist) is a sophisticated applications generator that writes the documentation as the application is created.

Texas Personal Consultant (PCOTY Soft-

ware Finalist) is an expert system development tool that includes an application generator.

Turbo Prolog (PCOTY Software Finalist) is an enhanced version of Edinburgh Prolog; it's useful for writing expert systems and AI applications such as robotics.

Ace Cobol (PCOTY Software Finalist) is an effective programming and operating tool for commercial applications; it's also a useful link to mainframe applications.

XL (PCOTY Software Finalist) is a 5th generation language developed in Australia that 'uses artificial intelligence techniques for the purpose of building expert systems.'

Supercom (Australian Software Commendation) can support communications up to 38,400 bps, run DOS applications, run from script files, remotely emulate terminals, and has almost every other feature a communications packages *should* have — including Viatel support and remote screen capture.

System V/AT offers a complete multiuser operating system (based on Unix) that's much more powerful than DOS.

Genius is a full-featured, menu-driven genealogy program.

Source Print is a source code formatting utility for C, Basic, Pascal, dBase and Modula-2; it can output to the screen, a printer or a disk file.

Vital F&I is a speciality package for car dealers.

May

R:Base System V is an industrial strength database system for industrial strength data management.

Pizzazz offers printing enhancement for almost any application that can run under DOS.

WordStar V3 added place markers and a spell checker to this powerful, flexible wordprocessor. A writer's wordprocessor.

Word 3.1 is a powerful wordprocessor offering a spell checker and a thesaurus plus the Galley, a 'style editor.' An office wordprocessor.

June

PageMaker for the PC is the desktop publishing program for producing short (up to 8 pages) documents like newsletters and flyers.

Ventura Publisher is a full-featured package for producing lengthy documents.

Desktop Video for the Amiga reviewed two packages for producing and editing videos, adding stereo sound, and producing animated sequences: Deluxe Video and Aegis Animator.

Basic2 on the Amstrad is an enhanced Basic featuring windows and drop-down menus.

SuperCalc4 now has even more features and functions (including graphics) than 1-2-3 — at it uses fewer keystroke, too! Hints on Spreadsheet Shopping are included with the review.

Hot is a powerful DOS shell that creates fully commented custom menus, or a system of menus several levels deep — good enough to make DOS user-friendly!

HAL adds the ability to enter commands in structured English to Lotus 1-2-3.

System Builder is a powerful Pick-based applications generator, particularly suited for applications with a large 'financial component.'

WordStar V4 added 125 enhancements (and the need for 256K of RAM) including a thesaurus, undo command, and macro facility

```

***  T U T O R . C O M  ***

          M a i n  M e n u

Following are up to nine tutorials that can be accessed from this menu. To
start the one of your choice, simply press the appropriate number on the
keys found at the top of your main keyboard. No carriage return or other
keystroke is necessary after the number. On exiting any tutorial you will
be brought back to this menu.

Tutorial      Subject

1. . . . Description of the TUTOR.COM program (Ver 4.31)
2. . . . Description of the IBM-PC keyboard & special keys
3. . . . A short history of computers
4. . . . Intro to the computer, Part 1 (basic terms and CPU)
5. . . . Intro to the computer, Part 2 (input/output and storage)
6. . . . Elementary IBM-PC DOS (commands)
7. . . . Advanced IBM-PC DOS (subdirectories)
8. . . . DOS batch files
9. . . . Not presently assigned

0. . . . Exit TUTOR.COM and return to DOS
    
```

```

Selection
TO: the Boss
FR: the Salesman
RE: Expense Account

I know my expenses have been high in the past quarter. I did do quite a
bit of traveling, and a careful review of my itineraries will explain how
many of these charges were incurred.

Shei
but The top line contains 'selection', which allows
The the user to get to word processing commands. Assuming a mouse were
gues connected, the user might click 'selection', causing a menu of
woul editing options to appear. The desired option would then be
                                     e
                                     '
                                     ,
                                     I
                                     y
                                     n
                                     t
that speaking English. So, he went to Australia instead of Austria, I still
sold four widgets there.
    
```

July

Direct Helper offers reading and spelling exercises — it's particularly aimed at the dyslexic, but it's useful to any one with reading problems, including adults.

PolyBoost is a memory-resident accelerator that speeds disk access, screen display and keyboard input.

Above Disc is a software memory expander that can give up to 8 megabytes of RAM.

Digi-View captures color screens from the Amiga for editing; it can also be used to produce 32-color pictures for inclusion in other files.

Modula-2 is a 'structured programming language with the power and flexibility of C, but with the high-level syntax of Pascal. **muMath** was the first computer algebra implementation on a microcomputer.

Sort makes sorting data simple — it includes a well-presented tutorial and programs for six different types of sort.

Postcode/Postcoder — either of these two programs will keep a list of postcodes for reference and/or automatic insertion into text.

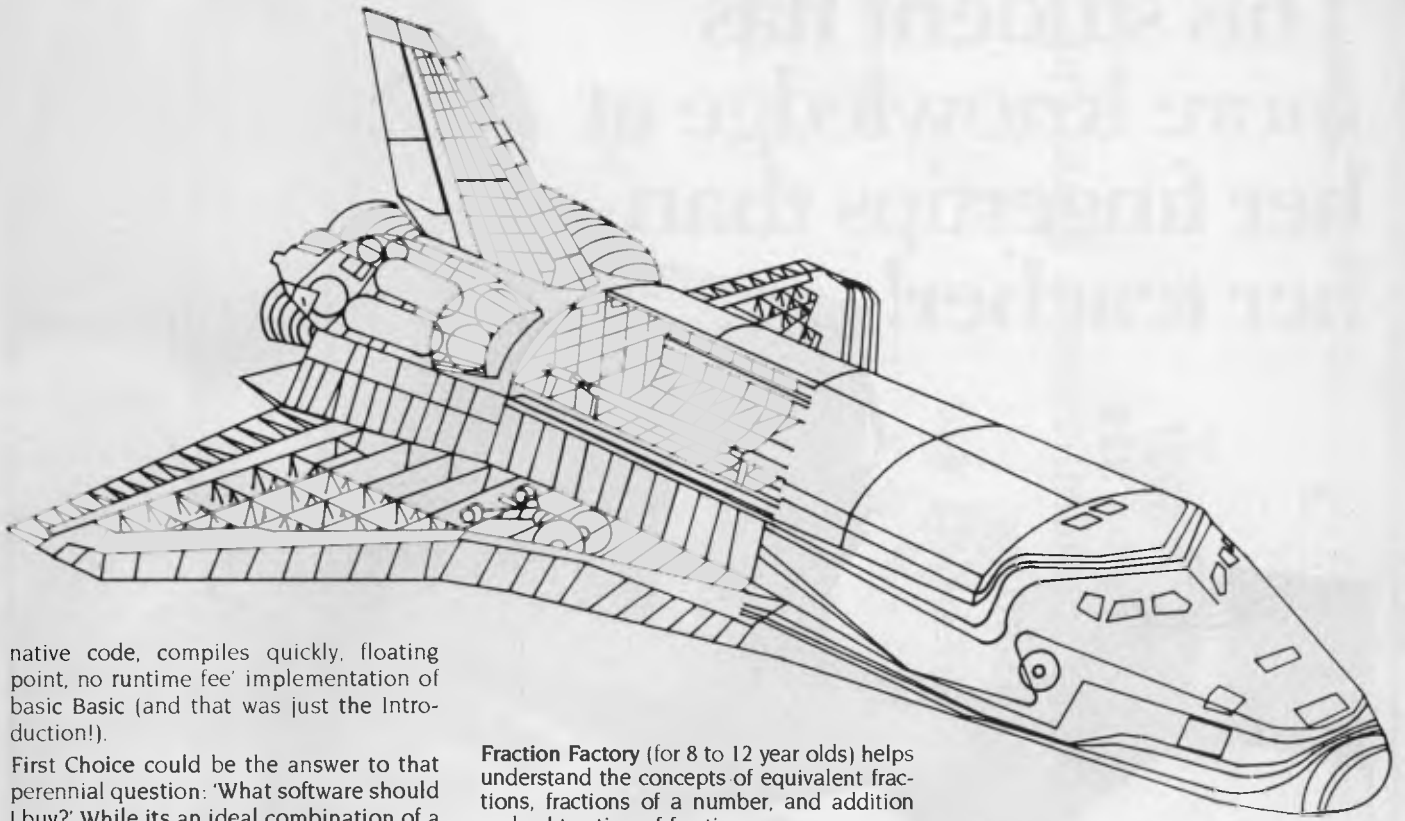
Effective Business Accounting is a full-featured accounting package that's particularly suited for service oriented businesses.

Open Access II includes graphics and a goal-seeking command as part of its spreadsheet — but the documentation is lousy (but the price is right!).

MTBasic offers a 'multitasking, windowing, interactive, handles interrupts, fast

August

LogoWriter — Logo is back with a wordprocessor and an easier to use programming language for the turtle

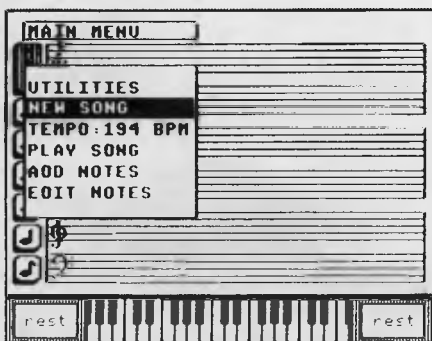


native code, compiles quickly, floating point, no runtime fee' implementation of basic Basic (and that was just the Introduction!).

First Choice could be the answer to that perennial question: 'What software should I buy?' While its an ideal combination of a simple wordprocessor, database, spreadsheet and communications program for home use, it lacks power to be of real use to medium or large businesses.

Metro is Lotus' answer to SideKick and SuperKey — 'with even wider scope for the creation of elaborate macros.'

September



The Word (not to be confused with Microsoft's offering) is a customisable aid for learning to read and spell and vocabulary building.

Make a Match is a challenging (for 2½ to 6 year olds) introduction to spatial relationships.

Early Games has nine activities for 2½ to 6 year olds — four number games, three language games, a shape game and a drawing utility.

Fraction Factory (for 8 to 12 year olds) helps understand the concepts of equivalent fractions, fractions of a number, and addition and subtraction of fractions.

Stickybear Music (for ages 7 and up) 'lets you create, edit, play and save your own songs' on an Apple II.

Computer Tutorial offers an introduction to IBM personal computers (and compatibles) and PC-DOS to those too lazy to read the manuals.

Fastype is a typing tutor that 'will probably appeal to the [arcade] games player, for it employs much the same challenge and reward psychology.'

Intuit 'is one of the easiest to learn and most comprehensive integrated packages around — rated excellent for home and small business use.

Micropro Easy V1.5 is an all-around beginner's wordprocessor, particularly suited for secretarial work.

pfs:Professional Write V1 is a basic processor, perhaps best suited to managerial staff who have neither the time nor the inclination to learn a full-featured package.

Norton Utilities V4 (and Advanced Edition) — both offer a number of improvements over V3; almost every utility has been enhancements and a number of new programs have been added: these include an interactive batch file utility, and File Info which attaches comments to file names. The Advanced Edition adds Format Recover, Speed Disk (for optimizing a hard disk), and FAT, directory and partition editors.

Toy Shop 'is fun, creative and uses a computer.' It also enables the construction of models (using the Tab A in Slot B method), either from a library or custom designs (for the Macintosh, Apple II, C64, and IBMs)

October

Communications Software covered Crosstalk XVI (the industry standard for PC to PC communications) and its clone, Mirror II V3.6.11, which has a number of additional features; Access V1.01, aimed at corporate data handling; Softerm PC V2.00.08 with its multiple emulations and (almost) multitasking; and Relay Gold V2, which is best used for PC to mainframe communications.

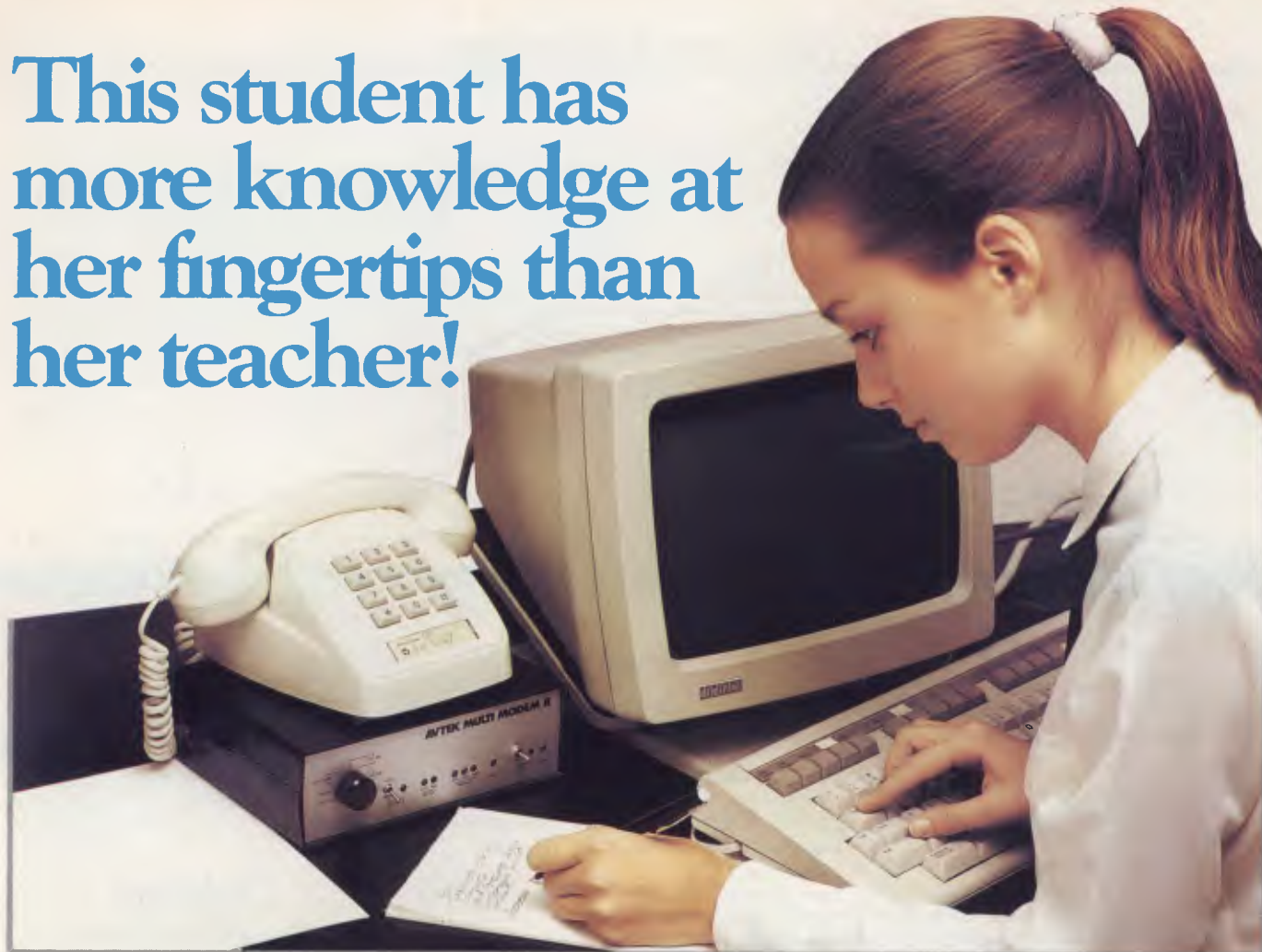
WordPerfect V4.2 'has one or two defects but they detract little from the power, versatility and elegance of a program that is not only easy to use, but easy to learn.' It's a powerful wordprocessor with thesaurus, spelling checker, mail merge, sophisticated automatic footnoting, macros, maths functions and more.

XyWrite III V3.24 is a full-featured and powerful wordprocessor that can be (relatively) easily modified to suit the user or the application.

November

Graphics Arts and DTP covered two professional *typesetting* packages for the PC, both can be used as wordprocessors and are much more flexible in setting type than DTP packages: Itek's Personal Typesetting Workstation is a complete system,

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- Macquarie Dictionary of Motoring
- Macquarie Dictionary of Cooking
- People and Places

- Economics & Finance
- Australian Politics
- The Australian Encyclopaedia
- Grolier Universal Encyclopaedia
- Kirk-Othmer Encyclopaedia of Chemical Technology
- E.R.I.C. (Educational Resource Information Centre)
- Electronic Mail Service
- Electronic Bulletin Board
- Educational Software
- Computer Games

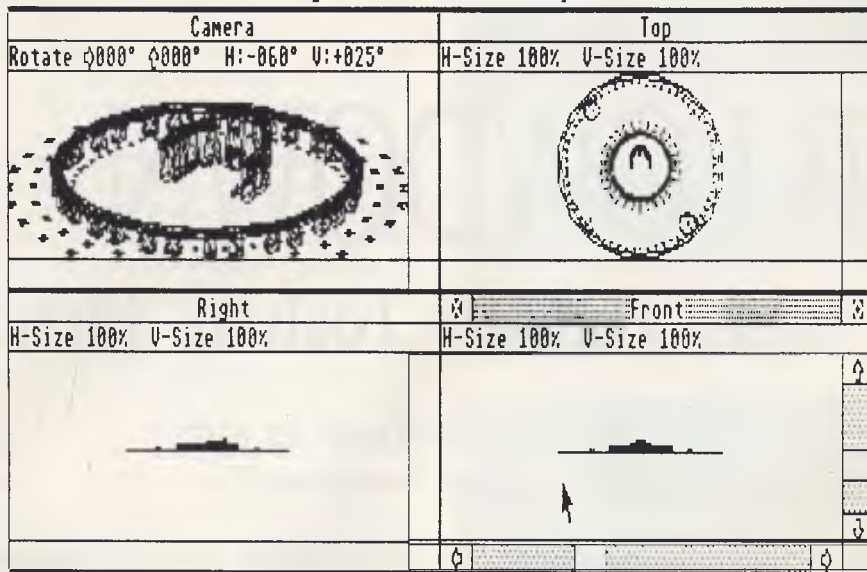
Schools Across Australia

This School-based Bicentennial Initiative aims to create a National Computer Link between Australian schools so that ideas, resources and experiences can be shared.

This link is hosted by CTC.

*AVAILABLE 1988

Desk File Modes Views Light Generate Join Objects



and Compugraphic's **Personal Typesetting System** offers software only.

AutoSketch is an excellent introduction to CAD; it includes such advanced features as 'ghost,' which previews the result of commands, and a 'memory gauge' showing the percentage of available memory used.

The CADalog lists over 20 CAD and graphics packages, plus graphics cards, accelerator cards and boards, high-resolution monitors and suitable printers and plotters; distributors and prices are also shown.

Polaris includes a display driver card as well as the software. Primarily aimed at factory implementations of CAD (Computer Numerical Control is part of the package), it offers such advanced features as 3D drawing and dual-monitor use.

CAD-3D for the Atari 520ST offers flexible viewpoints of the drawings, as well as animation and a highly developed 3D facility — slow, but a good introduction.

Silk is a full-featured spreadsheet with graphics, and a powerful macro facility; it supports circular references and time series modelling.

December

VP-Planner and **Silk** both take similar approaches to spreadsheeting, but **VP-Planner** will probably be the choice for professional users who want a high degree of compatibility with 1-2-3 (at half the price), while **Silk** is an excellent standalone integrated package for home and business use.

Fantasy is 'the bottom line alternative to costly DTP kits — it offers the talents of a reasonable graphics editor and wordprocessor combined with a range of fonts that would knock your eye out.'

The Magician is an award winning integrated graphics package that accepts input from the keyboard, a mouse or digitiser; features include a powerful, builtin programming language, the ability to change mouse sensitivity, full compatibility with Windows, and extensive support for a variety of printers and plotters.

Business Software presented 30-odd 'minireviews' on packages aimed at small (under \$500,000 turnover per annum) businesses.

Statgraphics is a 'specialised (and sophisticated) package that can save days of calculations and scribbling. Couple that with the flexible methods of presenting the data, and this becomes a very useful package for any one undertaking even a single, large statistical project.'

PrintQ is a mainframe-type print spooler that 'is far more flexible and capacious than a RAM spooler, and more convenient and controllable than an external hardware spooler.'

Letter Magic combines a wordprocessor and database so 'that most of your standard letter writing, labelling and direct mail chores fade into the background.'

Prodesign II doesn't claim to be a serious competitor for AutoCad, but it's ideal for drawing simple building plans, manpower schedules, and charts. It's a good package to answer the question: 'Do I really need a CAD package?' □

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LAPTOP LOWDOWN

Sharp's PC-7000 Series and the Toshiba T1000

Jan Roberts' battle of the laptops (and portables) hots up with new contenders for the 'best cheapie' and the 'best overall'...

Laptop Lowdown

IN OUR August '86 issue Jan Roberts reviewed the Bondwell 8 distributed by Pulsar Electronics, (03) 330 2555, and the PHC-16 from Kohjinsha-Sotec, (03) 534 0286. In September, she compared the Gridlite from Vicom, (03) 699 3239, NEC's Multispeed, (02) 438 3544, and the (superceded) Toshiba T1100+. If you're in the laptop market, see the Services page for back issues; please check with the distributors for currently available configurations and present prices.

IN THE SEPTEMBER '86 issue of YC, I adjudicated a contest in which Toshiba's aging T1100+ bit the dust before the mighty NEC Multispeed. Now, Toshiba has come back with a vengeance. Its new entry offering, the T1000, differs little in appearance from the defeated champ but has a far greater punch.

The T1000 competes effectively in the laptop market at two different levels. The recommended retail price is almost \$2000 less than the T1100+, which makes it the Bondwell 8's first real competitor at the low end of the laptop market. The Bon-

dwell 8 is a neatly made, plain vanilla IBM clone that cannot be expanded.

The Toshiba provides 512 kilobytes of RAM to play with, the same as the Bondwell, but has MS-DOS and utilities installed in ROM in an internal C:drive. Whenever you switch it on, it boots itself from C:drive — even if you haven't put a disk in the machine!

The boot priority can be set so it goes A:drive, B: and then C:, or goes first to C: or first to D:drive. It allows 40x25 or 80x25 colour displays on an external monitor. You can set it to use either an 84-key keyboard or an 'enhanced' 101-key unit (which is not yet available).

Toshiba is so confident that its machine is failsafe, that it doesn't even provide a boot disk. It turned out that Toshiba was a trifle over-confident and had to rush me a special boot disk down from Sydney. (I was told this had never happened before — I'll tell you how it happened in a bit.)

There's a (quite expensive) memory expansion kit available for the T1000 that brings the machine up to just under the price of the NEC Multispeed, but this expansion also makes it a strong competitor against the Multispeed. It's hard to say which machine would win in a battle between the expanded Toshiba and the Multispeed: both have praiseworthy (albeit, different) talents.

1280 Kbyte of RAM!

The only limitation of the Multispeed is that you cannot install extended memory or have a RAM disk larger than 128 Kbyte. This is where the new Toshiba T1000 (Expanded) excels. The expansion board gives it an extra 768 Kbyte of memory which can be assigned in different ways. For example, it can be added to



Figure 1. The Toshiba T1000 is light, neat and compact: it only weighs 2.9 kg (that's about 6.4 lb) and measures 31 cm wide, 5 high, and 28 deep (roughly 12 x 2 x 11 inches).

your RAM for programs like Lotus that can use Expanded Memory. This way you will have 1280 Kbyte of RAM at your disposal — if you want big spreadsheets on a portable, this machine may be the answer.

You can also assign 128 Kbyte of the expanded memory to RAM to bring it up to 640 Kbyte. You can put all or some of this memory into a permanent battery-backed RAM disk (D:drive) that can be up to 768 Kbyte in size. The machine came to me with 640 Kbyte of RAM and another useable 640 Kbyte.

This is a great talent as you can load your favourite programs into D:drive and have them thenceforth instantly at your call. I loaded Microsoft Word, Multiplan and a mouse driver into D:drive. They worked perfectly. I could switch the machine off and on — and they were always there. This is like putting them into ROM on the Multispeed, but the Toshiba alternative is far cheaper and more flexible. Remember, however, that NEC can permanently hold 2½ megabytes worth of programs in ROM chips, and it has two disk drives.

While this new Toshiba laptop is a far more sophisticated machine than the earlier Toshiba of a similar size, it still gave me some hassles.

The documentation does not live up to the machine: it's none too clear. It talks about hard RAM and hard ROM — terms which seem to be unique to Toshiba — without clearly explaining just how the memory is used. The C:drive is mostly ROM, but the manual indicates it contains RAM as well. The Toshiba consultants I talked to couldn't explain this. That's the trouble with new machines from overseas: it takes local staff time to catch up.

As it happened, the previous user of my review machine had wiped clean the extended memory D:drive in such a way that I found it impossible to access it. I struggled for some hours before I found that there's a manual for the expansion card that wasn't supplied.

Eventually a very helpful Toshiba consultant told me that I needed to re-format the D:drive. After I'd done that, I had the full power of this little machine at my fingertips — a battery-backed RAM disk is a dream to use.

Both Word and Multiplan loaded with a speed I had never seen before — and the clock speed is only a standard 4.77 Mhz. (I'm told the new Toshiba series has excellent integrated gate arrays that add at least 5 to 10 per cent to the machine's speed, but I think its RAM disk adds a lot as well.)



Figure 2. The back of the T1000 has a mouse, parallel printer, serial, colour monitor and composite monitor ports, a mains socket and a power switch. And, there's a plate behind which you can install the optional (Australian made) modem card.



Figure 3. The Toshiba comes standard with an 84-key keyboard, but there will be a 101-key option shortly. There's an Fn key that turns the right side of the QWERTY keys into a keypad.

However, I hit another snag. I set the machine to boot first to the D:drive and when reset, it just locked up, asking stubbornly for a 'Systemed Toshiba Disk' to be inserted. Now this shouldn't matter — it should cruise straight past D:drive, A:drive and B:drive, to find its System files in C:drive, but it didn't.

Luckily I had practically finished reviewing the Toshiba before I trapped it into looking at the wrong drive for its system files, so I carried on writing while I waited for the master disk to be sent down from Sydney. At least I had found no other snags.

The disk arrived and all was revealed. There is a minor software problem (that I'm sure Toshiba will soon resolve). But, until they do, they'll have to warn customers about putting an autoexec.bat file in

D:drive. When I copied a disk of programs onto D:drive, I had inadvertently also copied an autoexec.bat file that happened to tell the computer to go to B:drive to find data files — which totally sabotaged the 'fail-safe' Toshiba.

I wouldn't let my account of this snag put you off buying the T1000. After all, you just need a back-up master disk, clearer documentation — and a clear warning about keeping certain autoexec files out of D:drive. Otherwise, it is a delightful little machine.

It's very light, neat and compact: it only weighs 2.9 kg (that's about 6.4 lb) and measures 31 cm wide, 5 high, and 28 deep (roughly 12 x 2 x 11 inches).

It has a single 3½ inch disk drive on the left hand side. On the right, it has a darkness control for the screen, an A/B switch



Figure 4. Sharp's PC-7000A comes with 320 kilobytes of RAM, expandable on the main board up to 704 Kbyte. It has an 80C86-2 processor with a clock speed of 7.37 MHz.

(setting an external drive as A: or B:), and a socket for the optional keypad.

This keypad extra isn't really needed since part of the regular keyboard can be toggled into a keypad. There is an extra key, Fn, which allows access to the + and — keys as on the right side of a normal IBM type keyboard. I was not too keen on the touch of the keyboard, but that's a personal matter; it felt a little cramped to me.

In the back, there are mouse, parallel printer, serial, colour monitor and composite monitor ports, a mains socket and a power switch. And, there's a plate behind which you can install the optional modem card.

The modem card is being manufactured in Australia right now so it should be ready about the time you read this article; it's expected to cost just under \$500.

A True Laptop!

The screen, which isn't detachable, requires an external light source since it's not backlit. The default has dark blue text on a lighter background, but this is reversible; black on white (and the reverse) are other options. I found it didn't strain my eyes at all, although I thought it could be brighter. The hinge holds it in any angle you chose right back to nearly horizontal — the T1000 can be used as a true laptop with you looking down on the 24 line, 640 x 200 pixel display. If you fold the screen down, it automatically switches off; when it's re-opened, it switches back on to the same display.

The Fn-key plus the right arrow toggles the onscreen text between a very fine font and a thicker one.

The only disadvantage I found with the screen is that the text casts a shadow when the display is not at 90 degrees to the eyes. I found this could cause me to confuse letters like *c* and *e*.

The keyboard is easy to use and has a good touch. All the QWERTY keys are in white with the others in grey. The function keys are arranged along the top. There are LEDs indicating power on, low battery (the green power on LED gradually turns orange and then red as power drops) and disk drive access. Sadly, there are no LEDs to denote NumLock or CapsLock.

The Sharp PC-7000 Series

The Sharp PC-7000s are portables, as opposed to laptops. They are rather like small sewing machines and weigh about 8½ kg (about 19½ lb). It's a rival of the Sotec PHC-16. In 'portable mode', the keyboard fits like a front cover over the screen. Below the keyboard is a compartment for the keyboard cable.

There's provision for a printer to be fitted onto the back of the unit — it's good to see the need for a printer addressed. So often it's presumed that we need only a computer with us when travelling. This fusion of a portable typewriter with a full-screened laptop is a very attractive proposition!

The Sharp screen display is one of the best I've seen — better than the plasmas

I've previously praised and much better than the Toshiba's. It's a backlit LCD blue and has no glare.

I was surprised to find instructions in the manual for replacing the backlight. It seems that it dims with use — at full brightness, I'm told, it loses half its brightness in about 1000 hours. In practice, the screen is bright enough for at least three years. A new backlight costs about \$100. There's a builtin screen saver which turns the screen off after two minutes (the time can be varied).

I tested two of the Sharp portables: the PC-7221, an AT clone with a 20 megabyte hard disk and a single 5¼ inch drive (other configurations are available); and the PC-7000A, an XT (sort of) clone with two 5¼ inch drives.

The PC-7000A comes with 320 Kbyte of memory but this is expandable on the main board up to 704 Kbyte of user-available RAM. It has an 80C86-2 processor with a clock speed of 7.37 MHz. An 8087-2 co-processor can be added to speed up number crunching. Instructions on how to do this are clearly set out in step-by-step diagrams in the excellent documentation.

Basic BIOS and set-up functions are controlled by a 32 Kbyte ROM. There is no provision to add ROM.

The PC-7221 is an AT clone supplied with 640 Kbyte of RAM and 64 Kbyte of ROM. To this you can add a whole megabyte of RAM following the clear instructions. You can also add a co-processor and a 5¼ inch drive (a high density drive is available, although this wasn't fitted to the review machine).

It has a fan (unlike its cheaper cousin), and its hard disk drive seems a little noisy. (But listen for yourself: maybe that was just my unit).

The PC-7200 has an 80286 processor with clock speeds switchable from 6 to 8 to 10 MHz, so it's a relatively fast machine. A maths co-processor also can be installed.

There is room for one expansion board (either full or half size) in the base of the computer itself. It's a pity both models don't have this — it would be a big plus for the 7000A. You can get an expansion unit with room for two full-sized 16-bit cards, one 8-bit full sized card and one 8-bit half-sized card. I believe an expansion box is also available for the PC-7000A.

The keyboards for the two machines are neat and light and are tethered to the machine with a spiral cord that plugs into a socket on the right hand side.

The keyboards for the two differ for

some reason. The PC-7000A is LEDless and has a single row of ten function keys along the top, Ctrl in the lower left, and Esc, upper right (where I found it hard to locate quickly).

The keyboard of the PC-7221 has Esc upper left (where it *should* be) and a separate cursor pad. I definitely do not like the location of the Ctrl-key in the lower right corner — this could make life nearly impossible for a touch typist using WordStar (like me). I much prefer the keyboard supplied for the PC-7221 and wish Sharp had standardized on it.

Both machines have identical screens that can be tilted forward. The PC-7000A has a contrast and tilt control to the left of the screen and lights indicating if power is on, which disk drive is being accessed and whether the screen has been timed-out and switched onto standby.

The PC-7221 also has a brightness control and a switch on the front to inverse the display. I also wish that Sharp had given them both these controls.

The power switch for both is on the left side and the disk drives are mounted on the right. I found it *very* awkward to have both the drives and power switch on the side — it's just not easy to use!

The 7000A has a serial and parallel port on the back and a switch from 110 to 240 volts. Rather meanly, it doesn't have a port for a colour monitor, just a space for it — if you want one you have to pay extra.

The 7221 does have a colour monitor port as well as useful switches between clock speeds, between different displays (an 'other' setting allows the use of an EGA card) and a volume control. Both machines have nice wide handles on top.

Both units ran all the programs I tried on them with no hassles.

They both have a Set Up key which allows you to set time and date, specifications for an internal modem, and the timing for the screen cut-out.

A Printer!

Then, of course, there's the printer. This weighs just over 5 kg (11 lb) on its own. Although it fits snugly on the back, it adds considerably to both bulk and weight. But, believe me, having a printer so convenient is worth it — all portables need a printer to be really useful.

This printer is remarkable in having a wide variety of print qualities from Very Near Letter Quality, printing at a rated 20 characters per second, 10 characters to an inch, to Near Letter Quality at 40 characters per second, to Draft with 72 characters a second. It is also very quiet.

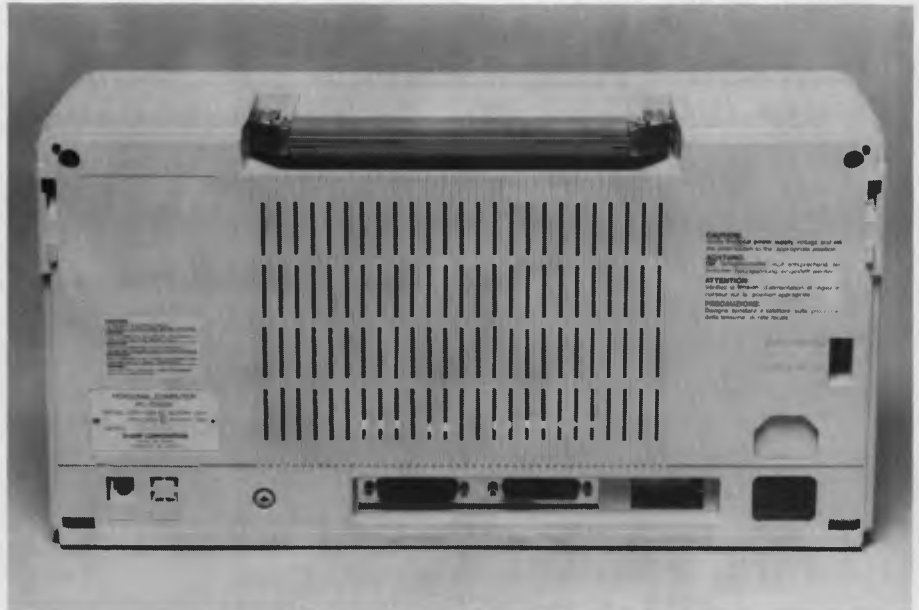


Figure 5. The 7000A has a serial and parallel port back and a switch from 110 to 240 volts — there's no port for a colour monitor, just a space — you have to pay extra for it. However, the 7221 has a colour monitor port as well as switches between clock speeds, between different displays (an 'other' setting allows the use of an EGA card), and a volume control.



Figure 6. That nice wide handle for carrying the Sharp PC-7000 Series is a necessity: with the printer attached the unit weighs almost 14 kg (30 lb) — but the convenience of having a printer more than makes up for the weight (and bulk).

MODEM PACKAGES

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Figure 7. The Sharp printer offers Very Near Letter Quality, at a rated 20 characters per second, 10 characters to an inch, Near Letter Quality at 40 characters per second, and Draft with 72 characters a second. An optional font card gives it additional fonts.

The printer takes (expensive!) thermal paper or ordinary, good quality cut sheet. An optional font card will give it two more fonts — Orator and Boldface. It gave me no trouble at all.

But, in comparison, the Sotec has the edge if you don't need full AT capabilities. The Sotec has an infrared keyboard and, like the Sharp, holds up to 1½ Mbyte of RAM. (This bit of information was accidentally omitted from the review of the PHC-16 in August). It also works off batteries as well as the mains, unlike the Sharp.

So, my portable computer score card now has the Toshiba T1000 Unexpanded leading the Bondwell 8 in the very good and cheap section.

The NEC Multispeed and the Toshiba T1000 Expanded are very close competitors in the middle price range, \$2400 to \$3400.

The Toshiba T1000 Expanded is ahead for its extended memory and RAM disk capabilities. Its only RAM disk competitor is the Sotec, but the PHC-16 blanks its RAM when power is switched off. The Sotec is heavier, but it has the better screen and keyboard. The Gridlite has great extended memory and ROM capabilities — but it's price puts it out of most people's reach.

The NEC, so far, has absolutely no competitors in the builtin software division. It's ahead of the Toshiba, too, for its removable high-class screen, two drives, changeable battery pack and roomy keyboard — but it's heavier.

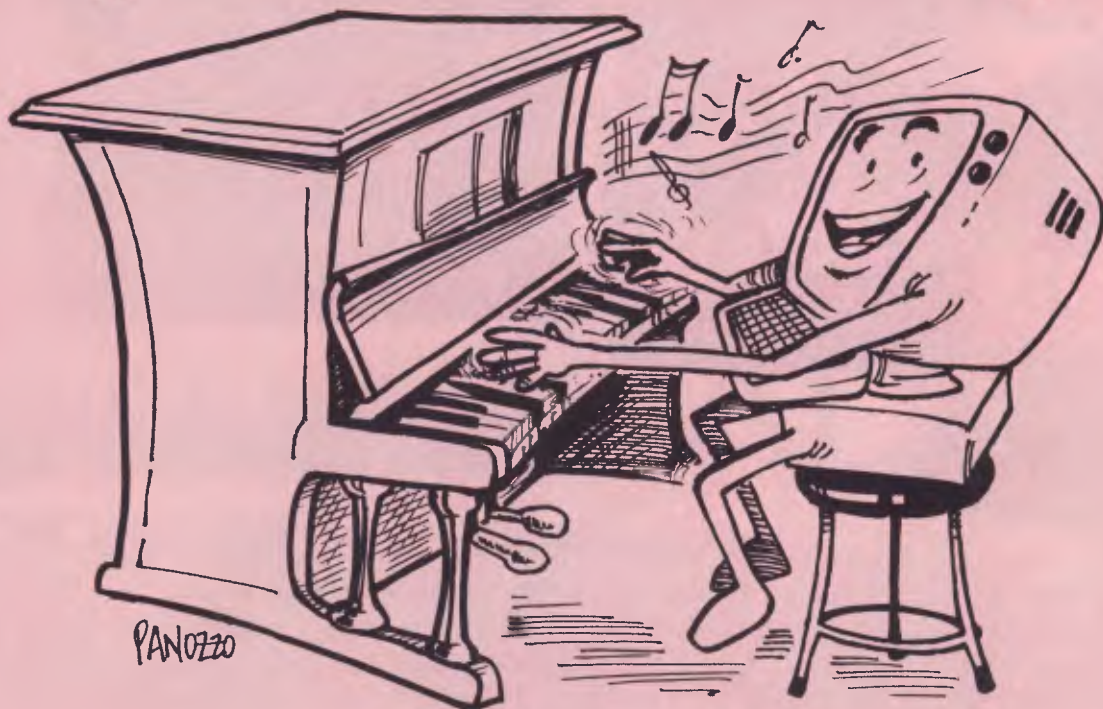
The only AT portable that I've reviewed is the Sharp PC-7221. Currently, its main competitor in this area is the Toshiba T3200, which is more portable. But, I'm told, the competition in the portable AT area is just about to really hot up. I hope to bring you a report soon on one of the first inexpensive AT lap-tops. □

Product Details

Product: T1000
Distributor: Toshiba (Australia) Pty Ltd, 84 Talavera Rd, Nth Ryde 2113 NSW (02) 887 3322
Price: \$1914
\$754 Memory expansion kit
\$133 Separate keypad
\$765 External 5¼ inch drive
\$590 External 3½ inch drive
(All prices taxed)

Product: PC-7000 Series
Distributor: Sharp Corporation of Australia Pty Ltd, Huntingwood Dr, Blacktown 2148 NSW (02) 831 9111
Price: \$3570 PC-7000A
\$7495 PC-7221 (20 megabyte hard disk and single floppy drive)
\$1490 expansion unit (4 slots; 2 full length 16 bit, 1 full length 8 bit, 1 half length 8 bit)
\$995 CE-700P printer (Available for all of the PC-7000 series.)
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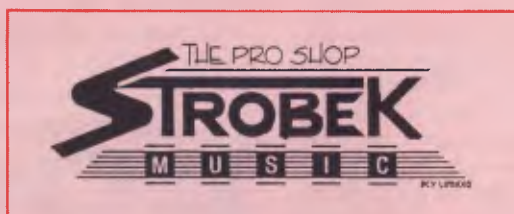
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NEWSMASTER

DTP for small businesses,
home and club use

Tim Hartnell has become quite an expert desktop publisher of late — he's found you don't need to spend a fortune if you're not producing BHP's annual report

Update News

YOUR COMPUTER SETS INCREDIBLE SALES RECORDS!

A previous article in our local newsletter made some entertaining points in a discussion of BASIC vs. PASCAL. If you're not a full-time professional programmer, the thesis ran it's absurd to put up with a language that requires you to enter: WRITELN("Hello"); just to print to the screen, when you can use BASIC to do the same thing with: PRINT "Hello". If you want to send the same thing to the printer, you discover in Pascal that 1) the language doesn't give you any simple function like LPRINT, so 2) you have to grit your teeth, sit down and write it yourself. You emerge 14 keystrokes, five semicolons, four parentheses, two quote sign pairs and a colon later, with "Hello" in print.

In defense of Pascal it can be pointed out that this is a character-building experience and ought to be encouraged since it teaches you structured programming; if you don't like it go learn COBOL. Nevertheless, if all you need to know is the time of day, it seems excessive to have to learn how to build a watch. Suppose there were an even simpler language than BASIC. Suppose you only had to enter 'Hello' to print to the screen. This would seem worth investigating! Well there is. Not enough people know about it and not enough people who do know about it know that its whole intent is to simplify

programming and let them get on with their application. It's called APL - A Programming Language. Let me introduce you to it. Let's start by comparing BASIC and APL. To get the answer to 2 times 3 enter:
BASIC: PRINT 2*3 APL :2x3

"BEST AUSSIE MAG!"

And while we're at it, let's look at a couple of the other math symbols.

The upward-pointing arrow is the function called 'take'. That's two keystrokes in APL and 15 in BASIC. It gets better. The "take" works just as well and simply on a string (or vector) of numbers as it does on characters. It will take the first N rows or columns out of a table (or matrix) too. Want the first two rows of a 5 x 5 table?
2 5 NAMEOFTHETABLE
What? No loops?

There's more juice to be squeezed out of this one little function. Suppose you wanted to right justify a string of text in a 72 character line by padding it out with blanks:
BASIC: PRINT SPACE\$(72-LEN(TEXT\$))
+TEXT\$
APL :72 TEXT

Try a book like "APL. An Interactive Approach" by Gilman and Rose.

Contents of this newsletter created with NEWSMASTER software!!!!!!!



Figure 1. This sample newsletter took about 70 minutes to produce from scratch using the program for the first time.

A DESKTOP Publishing (DTP) software package for the IBM PC priced at \$159.95? It seemed a little improbable, even though the developer had done well in the past with such products as NewsRoom and PrintMaster. After playing around with all the high end DTP software, I felt I just had to have a look at this latest, low price offering.

And how good is it? Can you pay such a small price and end up with software which is good enough for producing newsletters, annual reports, magazines and books? The answer, as expected, is 'yes' and 'no'. Needless to say, for your money you do not get Ventura Publisher or Page-Maker. However, with Newsmaster you *do* get an easy-to-use WYSIWYG package that is sufficiently flexible to produce newsletters and advertising material for schools, small businesses and clubs.

And, it's easy to learn! The sample newsletter in Figure 1 took me about 70 minutes to produce, starting from scratch, the first time I used the program.

The whole program is menu driven, with each menu page leading logically to those which you will need from that point. In addition, each set of icons is headed with an overall title so you know which general menu area you are in — see Figure 2. To make things simple for even dumbos like me, there is a help function which is triggered by holding down the Alt key and pressing the relevant function key. For example, in Figure 2 the left hand icon shows a magnifying glass and is headed F1. To use this to change the view of the page shown onscreen, just press F1, and a further set of icons appears to allow choice between four views of the page. For information on that function, just press Alt-F1.

The Whole Page view, chosen from the View Page option is shown in Figure 3. It also shows the text manipulation possibilities, from selecting text (F1) to Undo (F8).

The program is provided with a generous selection of type fonts and sizes that are chosen from a menu which you move through with the arrow keys (see Figure 4). The choice of font is made even simpler by the sample of the font that appears in the window.

Getting Started

The program is simple to use. It's provided on two non-copy-protected disks. You install it with a file called NMCONFIG which asks you to answer just three questions: one regarding the graph-

Text can be imported from outside word processors, so long as it has been saved in ASCII format.

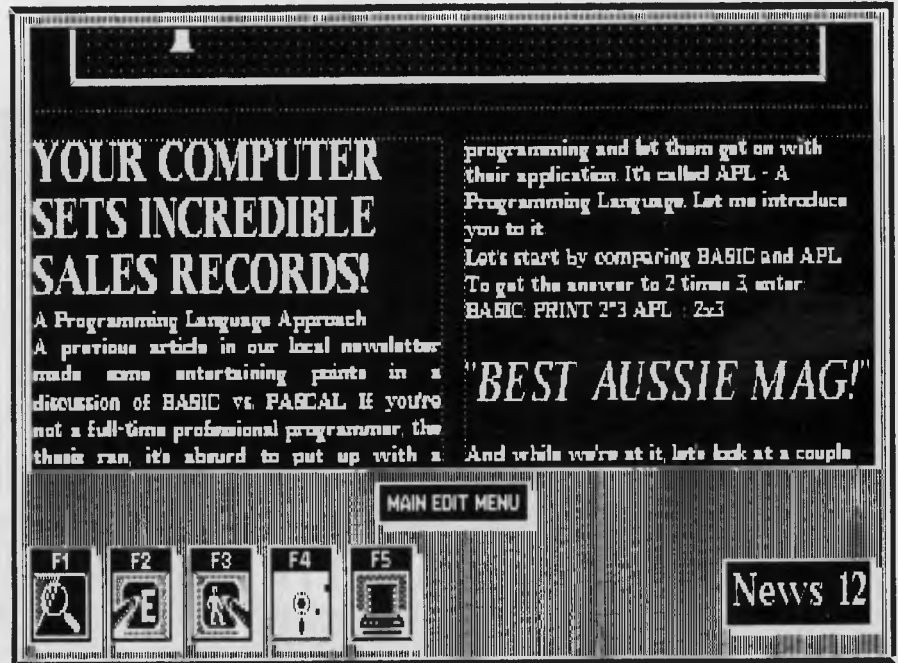


Figure 2. *Newsmaster's Main Edit Menu — the whole program is menu driven with each choice leading logically to the next.*

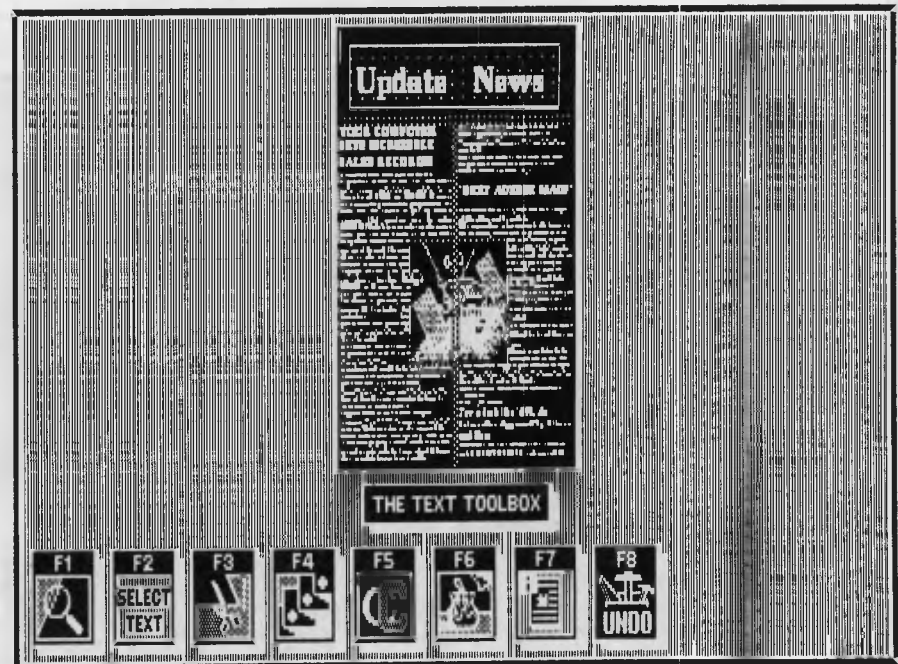


Figure 3. *The Whole Page view, chosen from the View Page option, showing text manipulation possibilities with the Text Toolbox.*

ics card you're using (NewsMaster supports the CGA, EGA and Hercules cards), and two on the printer you have (it includes HP Laserjet support and a wide range of dot matrix printers, with the sample output in this article being produced on an Epson FX-80). Once you've answered the questions, this information is

saved on your master disk, and is ready for use from that point on.

The well-illustrated instruction manual teaches use of the software by leading you through the production of a sample one-page newsletter. Once you've done that, you'll be able to create your own, far more elaborate newsletters with ease.

The Main Edit Menu

The master menu, from which you travel out along paths to subsidiary, specialised menus, has five options. The one you're most likely to use calls up the Edit Text choices, which includes choice of font and arranging text (ranged right or left, centred or justified).

Once you've worked through the sample newsletter, which will about an hour, you'll know almost intuitively how to operate the program without constantly referring to the manual, thanks to the clear icons and logical menu structure.

The program is provided with 100 pictures to choose from (Figure 5 shows the selection procedure underway), and these can be positioned and sized anywhere on your page. Text will automatically flow around, or to the right and left of these illustrations once you've decided where you want them on the page. Any of the illustrations in the PrintMaster series of software can be used, which means you can have 500 or more pictures to choose from. Having chosen the picture, you simply move back to the page you're working on and decide just where you want the picture positioned, and how big you want it to be (Figure 6).

Saving your work is simply a matter of selecting the relevant icon and typing in the name of the file. When you want to load in a page you're working on, all the relevant file names appear on the screen, and you use the arrow keys to highlight the desired file and then just press Enter for it to be loaded.

Text can be imported from outside word processors, so long as it has been saved in ASCII format. It flows automatically into the columns you've set up, and will follow on to subsequent pages if needed. Once you've chosen a format for your first page, the program automatically creates enough follow-on pages to accommodate the text you produce.

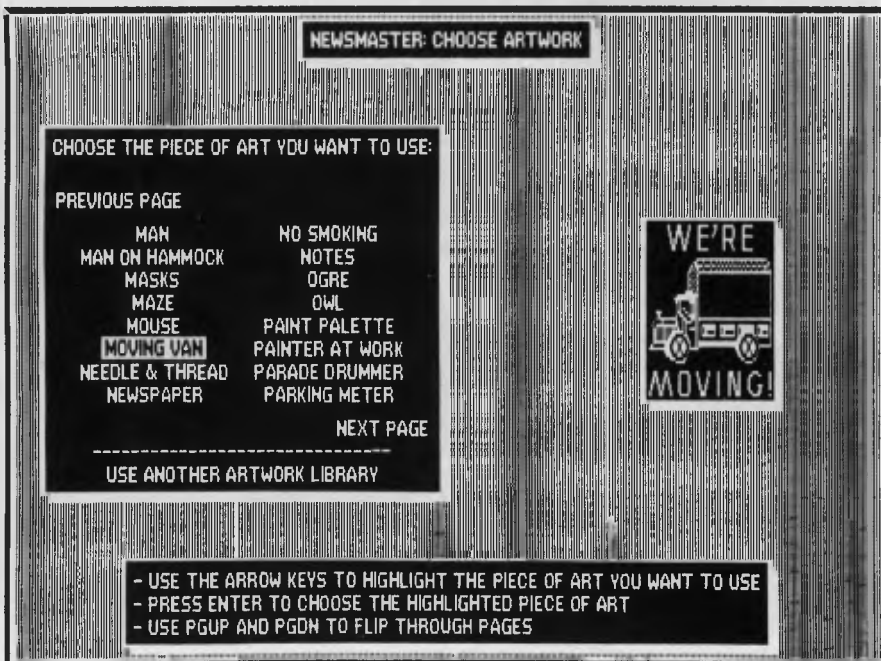
If you decide to add a headline, or change a font size, all the text automatically reworks itself right down to the end of the file, spilling over onto new pages if necessary, or drawing in text from a following page to an earlier page to make up for deleted material.

You can have from one to ten columns a page. There are more than 30 fonts in a variety of sizes. You can work with multiple-page documents and there are 20 fill patterns which you can put behind such things as the headline.

Figure 5. The Choose Artwork menu offers a library of 100 pictures to use.



Figure 4. There's a generous selection of fonts on Newsmaster's Choose Font menu.



As you can see from this description, the program does an awful lot of the work for you. It does not produce the world's greatest output (at least not on dot matrix printers, which is what most users of the program will probably have access to), but it is significantly better, in my opinion, than NewsRoom, and is streets ahead of some of the other 'toy' DTP programs around.

You wouldn't use it to produce BHP's glossy annual report, but for most small businesses, school, club and hobby use, it is ideal. Have a good look at the sample output given with this article (which has been reduced down from an A4 size original), and you'll quickly be able to decide if the program is suitable for your needs. □

Product Details

Product: Newsmaster

From: Unison World Inc.

Distributor: Dataflow, 134 Barcom Ave,
Rushcutters Bay 2011 NSW
(02) 331 6153

Price: \$159.85 taxed (IBM PC and compatibles), \$165.52 taxed (IBM IX)

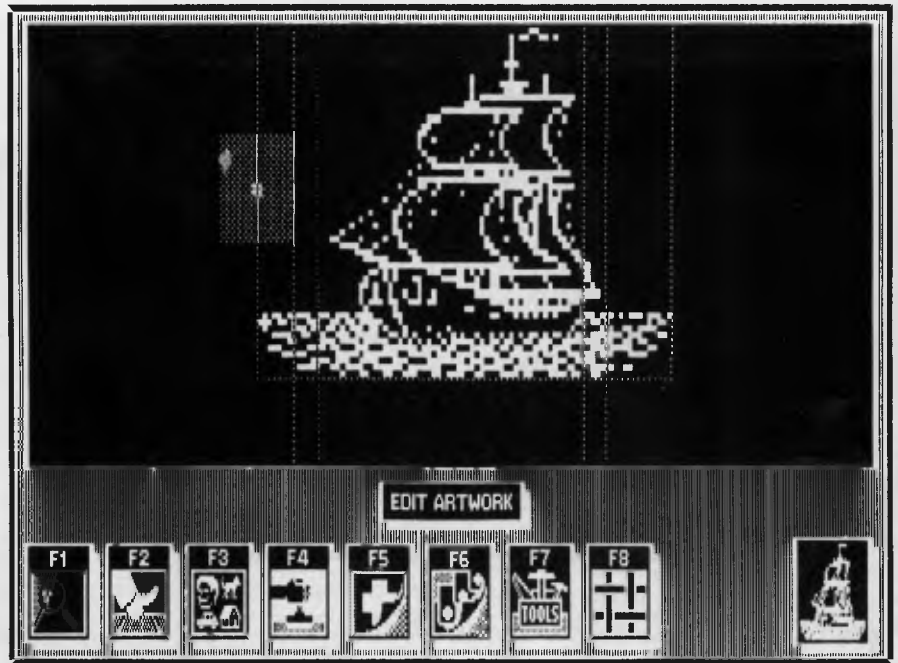


Figure 6. After the picture has been selected from the Choose Artwork, they are sized and positioned on the page. Text automatically flows around the pictures once they are in place.

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The history of DOS

The Disk Operating System for the IBM PC hasn't changed much since version 2.10 came out in 1984, right? 'Wrong!' says Chris Allen.

IN THE LAST three years DOS has quietly been growing into a monster of considerable size and power. Although it is actually a far more refined beast now than it ever was before. To give you an idea of the change, DOS 3.30 now uses twice the RAM and over twice the disk space that DOS 2.10 required. Of course, the average amount of PC computer storage space in both RAM and Disk would have more than doubled over the same period.

I would hazard a guess that the majority of users operate with version 2.10 even though version 3.20 has been in the field for the longest period of time of any version. Most software suppliers assume that 2.10 is the minimum level of DOS that a user is likely to have. That is probably why DOS 2.10 seems so prevalent.

There are a number of reasons for upgrading your operating system. The primary reason is hardware. Nearly every version since 3.10 onwards has introduced support for a new diskette format. This has led to the situation where DOS 3.30 supports seven (!) floppy diskette formats. Although hardly anybody needs to use more than two of them. The second most obvious reason for upgrading is to access the new commands and features that are available.

New Commands

SOME VERY powerful and useful commands have been added to the system, but most people tend to ignore them (probably because they haven't read the manual), and stick to the version 2.10 commands they're familiar with. Wake up

folks because there are some real goodies in the latest version(s).

Table 1 lists the new commands that have been added with each version and the file size and RAM memory requirements of each version.

Version 3.30 is the latest (released with the Personal System/2 range). Obviously the older your version the more differences there are going to be. For reasons of space, time (and interest), let's assume no one would want to update to a version prior to 3.30. Therefore, by briefly explaining the changes and additions in version 3.30 that have been added since version 2.10, everybody should be able to work out how an update would benefit their own system.

Note that this article refers entirely to IBM PC-DOS; the changes to MS-DOS are similar, but many manufacturers supplying a licensed version of DOS with their own machines include their own 'enhancements.' These versions of MS-DOS can usually be identified by a letter following the version number: 2.10a, for example. Now, let's have a look at these new commands —

Backup and Restore: If you have a hard disk it's worth upgrading your DOS just for the changes to these two.

The BACKUP command has been changed to work faster and smarter. On my system (AT clone) DOS 3.30 backs up files three times faster than earlier versions. If you have to backup significant amounts of information then this change in performance is fantastic. Two files are created on the target disk, BACKUP.XXX and CONTROL.XXX. The BACKUP file contains all your data in one large file and the CONTROL file contains details of how the data should fit together.

The BACKUP command now has an extra six switches which are —

/M — Files that have been modified since last backup.

Version	2.1	3.1	3.2	3.3
RAM used	25248	37040	44704	50576
Disk Space for DOS files	259,072	516,096	549,888	619,520
Release date (on files)	30/01/84	7/03/85	30/12/85	17/3/87
New commands		JOIN SUBST	REPLACE XCOPY DRIVER.SYS	APPEND FASTOPEN NLSFUNC CHCP
Enhanced		LABEL TREE	ATTRIB DISKCOMP SHELL SELECT DISKCOMP DISKCOPY FORMAT	ATTRIB BACKUP RESTORE MODE DISKCOMP DISKCOPY FORMAT

Table 1. The new commands that have been added with each version of DOS and the file size and RAM memory requirements of each version.

- /A — Add backup files to files already present on disk,
- /D — Files that have been modified on or after a specified date,
- /T — Files that have been modified on or after a specified time on the date specified,
- /F — Format the target disk before backup, and
- /L — Create a LOG file on the source disk detailing the time and date of the backup and the paths and files stored.

The RESTORE command has the following extra switches —

- /P — Prompt before restoring files that have been modified since the last backup, or are marked 'read only.'
- /B — Files on/Before the date specified,
- /A — Files on/After the date specified,
- /M — Files Modified or deleted since last backup
- /N — Files that No longer exist on the target disk,
- /L — Files Later than the time specified, and
- /E — Files Earlier than the time specified.

For example —

```
BACKUP C:\WP A:/S/A/L+WP.LOG/D:06/01/88
```

— will backup all files in the WP subdirectory and any directories below it, that have been modified since 06/01/88 (the date format depends on how you've set up your system). These files will be appended to any files already on the backup disks and a WP.LOG file will be created on the source drive.

```
RESTORE A: C:\A:06/15/87/S
```

This would restore from drive A: any files that have been modified on drive C: since the date specified. Note that in this example the /S switch means that files from any area will be restored if they meet the specified criteria.

Xcopy: This is a supercharged version on the COPY command. It's main advantage is that it selectively caters for lower level directories. You can think of it as just being the same as the COPY command except it has these switches —

- /A — Files with the Archive bit set,
- /D — Files with Dates on or after the date specified,
- /E — Creates subdirectories on the target disk even if they are empty on the source,
- /M — Files that have been Modified

- since the last XCOPY /M or BACKUP /M,
 - /P — Prompts before copying each file,
 - /S — Files in and below the directory Specified,
 - /V — Verify, and
 - /W — Prompts you to insert disks before copying starts.
- For example —

```
XCOPY C:\WP A:/S
```

— will copy all files in and below the WP directory to the same directories on drive A:. If the directories do not yet exist on drive A:, then they are created.

The XCOPY command is subject to a number of limitations, but you won't often run in to them. Refer to your DOS manual for more detail (XCOPY was released with version 3.20).

Format: The FORMAT command has been altered to support more diskette formats. The following switches apply —

- /S — Copy System files to target disk,
- /I — Single-sided format,
- /8 — Eight sectors per track,
- /V — Create Volume label on target disk,
- /B — Leave space on 8 sector disk for system files,
- /4 — Format a single or double sided disk in a high capacity (AT) drive,
- /S — Specify number of Sectors per track, and
- /T — Specify number of Tracks on disk.

These switches support the following diskette formats (5 1/4 inch floppies unless noted otherwise): 160 kilobyte single-sided, 8 sectors per track (original PC format, virtually redundant now); 180 Kbyte single-sided, 9 sectors per track; 320 Kbyte double-sided, 8 sectors per track; 360 Kbyte double-sided, 9 sectors per track (the standard for all PCs since DOS 2.xx); 1.2 megabyte AT standard (high density); 720 Kbyte Model 30 and several laptop compatibles (3 1/2 inch); 1.44 Mbyte IBM PS/2 Models 50, 60, and 80 (3 1/2 inch); Fixed Disk: hard disks up to 32 Mbyte (DOS won't recognize a partition any larger; a 40 Mbyte drive must be partitioned into at least two areas). For example —

```
FORMAT A:/4
```

— will format a 360 Kbyte disk in a high density AT disk drive, and —

```
FORMAT A:/N:9/T:80
```

— will format a 720 Kbyte disk in a Model 50, 1.44 Mbyte drive.

Note that 360 Kbyte diskettes formatted in a high density AT drive may not be used reliably in 360 Kbyte drives. The Model 50 has no such problems formatting a disk for use in a Model 30. The default format is always to the capacity of the drive in use.

The DISKCOPY and DISKCOMP commands have been altered to support the new disk formats, but the disks being compared must still be of like formats.

Label: The label command allows you to enter and change the volume label of a disk. For example —

```
LABEL A:DATA FILES
```

This will create a volume label DATA FILES on the disk in drive A: This label is displayed whenever a directory of the disk is performed or the VOL command is executed.

Tree: This command will display all directories on a disk and if they are specified, all the files within those directories. For example —

```
TREE C:/F
```

— will display all the files and the directory structures on drive C:.

Subst: The SUBSTITUTE command allows you to refer to another physical drive or an area of the disk by a single letter (different from any other drives in use). For example

```
SUBST G: C:\WP\DATA
```

This allows you to refer to the WP DATA area as drive G: This can be particularly useful if an application you're using doesn't recognize subdirectories.

Replace: Use this command to find and replace a given file(s) on a drive. The following switches apply —

- /A — Copies files from the source that do not exist on the target (new files are Added),
- /P — Prompts as each file is encountered,
- /R — Replaces files that are Read only on the target,
- /S — Searches all directories on the target for files that match the Specified name on the source, and replaces them,
- /W — Prompts for diskettes to be inserted before the command is executed (but why W?).

For example —

```
REPLACE C:\WP\DATA\LETTER.DOC A:\S/P
```

This will search drive A: for any instances of the file LETTER.DOC and then prompt you to indicate if it should be replaced.

This is handy if you have many old versions of a file which you want to update with the current version. It's just like copying the original file, except that you don't have to copy for every occurrence of the file to be updated.

For example, you could update all your DOS files (excluding system files) in this way. After booting with your new DOS in drive A:, the following command will search drive C: for any DOS commands and replace them with the new version of the DOS commands —

```
A:REPLACE A:*. * C:\S
```

Note that this will not transfer the new DOS system files. Use the SYS command to achieve this.

Append: This command could be thought of as a smart version of PATH, except that it is designed to search for files other than EXE, COM or BAT files. Many applications require access to overlay files (*OVL) and because of this the application can only be used in the directory that contains the overlay. WordStar is a prime example of this. The APPEND command will tell DOS to look in certain areas for such files, when DOS can't find those files in the current directory. The format of the command is

```
APPEND C:\WP /E /X
```

There are two switches —

/E — tells DOS to store append path information in the DOS environment area, and this information will appear whenever the SET or APPEND commands are issued, and

/X — prepares the APPEND command for certain DOS function calls (discussion of this could get rather complicated. If you're interested read the manual, otherwise just remember to use this switch).

Append: This will cancel any previous append calls (do this before using BACKUP or RESTORE). It tells DOS to search the WP area whenever the application looks for a file and cannot find it in the current directory. For example, I could store all my WordStar program files in WP, and still have three different areas for different

types of documents, say STORIES, LETTERS and ESSAYS. I can work with the STORIES directory and starting WordStar. Without the APPEND command this would not be possible. (Note that this assumes you know of the PATH command, which has been a part of DOS since version 2.10.)

Fastopen: The FASTOPEN command is designed to speed up the access to files. The command instructs DOS to remember the location (on the disk) of a specified number of files. A list of the most recently and frequently accessed files is kept in memory. When you ask DOS to access a particular file, and it's in the list, DOS will find it much faster because all the paths on the system won't have to be searched (normally they are). The format of the command is —

```
FASTOPEN C:=40
```

This will allow for 40 entries in the 'list.' The default is 34, and each entry takes up 35 bytes of RAM. Therefore, the above command would reduce your available memory by 1400 bytes. There is a price for everything.

Attrib: This command modifies the attributes of a given file or files within a directory structure. Previously the command could be used with only one file at a time. The following switches apply —

- +R — Set to Read only (file cannot be altered),
- R — Remove Read only attribute,
- +A — Set Archive bit (BACKUP also does this as it archives files),
- A — Turn off Archive bit, and
- /S — Process files in current directory and directories below.

Join: The JOIN logically connects a drive to a directory on another drive to produce a single directory structure from two separate directories.

For example, if you had a virtual disk drive G: on your system, you could join drive G: with the directories on drive C: . A DIR listing on drive C: may then appear as

```
Volume in drive C: is FIXED DISK
Directory for C:\

FILES <DIR> 01-10-87      2:10p
DRIVEG <DIR> 01-01-87     12:58a
```

This is the form of the command —

```
JOIN G: C:\DRIVEG
```

Code Page Switching: This is a new feature of DOS 3.30. It allows the screen, keyboard and printer devices of your system to be configured for different character sets (code pages). Australian users do not need to use code page switching (unless they're not using the English language characters), but non-English speaking countries will benefit from it. As the average user can ignore these features, so will I. Refer to the manual if you feel you could utilise this capability.

Mode: The DOS manual takes twelve pages to discuss the various uses of the MODE command, probably more text than for any other command in the system. The enhancement for DOS version 3.30 allows the MODE command to handle Code Page Switching. Here, I'm going to ignore the details of Code Page Switching (and therefore the details of the changes to the MODE command). Keep reading John Hepworth's 'Your IBM' column for details of the uses (and abuses) of MODE.

Shell: System programmers may develop their own enhanced versions of the COMMAND.COM file. The SHELL command will tell DOS where to look for an alternative to the standard COMMAND.COM file. Two switches apply —

- /E — sets the size of the environment space (in bytes),
- /P — causes COMMAND.COM to stay loaded and then execute the AUTOEXEC.BAT file

For example —

```
SET SHELL=C:\COMMAND.COM /E:200
```

This would instruct DOS to look for the COMMAND.COM file in the root directory and to allow 200 bytes for environment space.

Select: This command installs DOS and specified keyboard and country codes on a drive. All data on the target disk is lost as Select formats the disk before copying the DOS files. For example —

```
SELEC C:\DOS 061 US
```

— will format drive C:, copy all the DOS files into C: DOS and set the country code to Australia and the keyboard code to US (United States).

For Aussies, the country code determines whether date format is mm-dd-yy or dd-mm-yy. You may change the country code by including the COUNTRY command in your CONFIG.SYS file as in —

COUNTRY=061,, C:\DOS\COUNTRY.SYS

Where the country code is for Australia, no code page switching is used, and the COUNTRY.SYS file resides in the DOS area. In other words, this will make your file dates look fair dinkum (dd-mm-yy).

The BATCH file commands have also been enhanced. From inside a batch file, the CALL subcommand will call another batch file and upon completion, return to the original batch file. It is also possible to suppress the ECHO OFF statement.

Fdisk: The Fdisk command will create multiple logical disks on a single physical drive. Version 3.10 FDISK has a different set of options, but still allows you to create multiple partitions.

Now, you know what you've been missing out on with that DOSty old operating system! □

RIP's Poems XX

If computer languages had been studied by Freud, think of the illusions he might have destroyed.
His analysis of 'INPUT', 'LET', 'PEEK' and 'POKE', could puree Apple in one simple stroke. And I cringe in terror from the things he'd find in 'SYNTAX ERROR'.

RIP's Poems XXI

"You think it's tough out there?" My AI program wrote.
"You should try it in here with a moronic Operating System, and a subnormal BIOS.
There's zapped Aliens and spaced out Klingons.
and I just stepped in Wumpus poo —
Then it ran out of memory and forgot what it was going to say.

RIP's Poems XXII

It was way back, before your time, machines were slow and memory short. Ours was one of the earliest, two bytes of store and four op-codes, same model Van Diemen used. Of course, his was the laptop version, portable. It had cherubs to blow characters off the screen, a card for mermaids and sea serpents, and the Login message said: 'Here be dragons.'

RLP

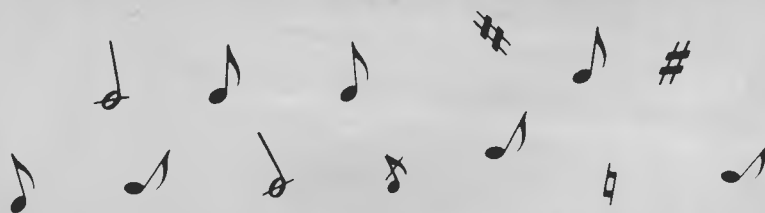
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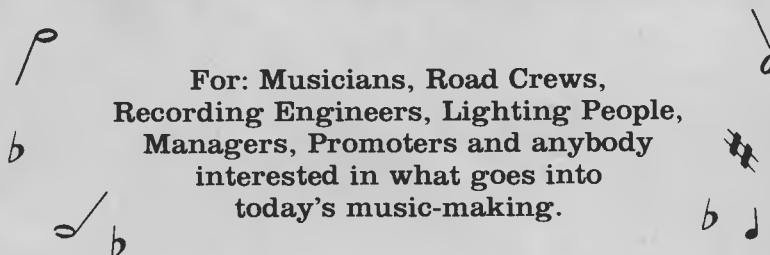
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The Cleveland 286

An AT is a '286 is an AT, so what *is* there to choose from? 'Locally developed' and 'reputation' are a good place to start . . .



NEAT IS THE first word that comes to mind when looking at the Cleveland 286 — it's clean and compact, especially to those of us who were raised with desk-hogging Compupros and the original PC. The monitor is actually wider than the small footprint system box. That 'system box,' the computer itself, was developed by the research and development (R&D) team at Cleveland's plant in Hendra, Qld, where they've been building a reputation for well-matched hardware and firmware for several years now.

But, neat doesn't necessarily a computer make . . .

The 286

CLEVELAND supplies its own 286 BIOS and Microsoft's DOS 3.20 and GWBasic 3.20. Manuals for the latter two appear to be taken straight from the Microsoft Master: they're well-written (and thorough enough to serve as an introduction to computing for any reasonably intelligent new user with a modicum of common sense).

The 80286 CPU runs at 8 MHz (switchable to 6), which is sufficient unless you fall into the power user category and have Desqview compiling, sorting and re-calculating all at once. Norton's SI gave a Performance Index of 5.8 (an IBM XT = 1.0), which is low-average for an AT, but this was dragged down by the hard disk with its *very* slow average seek time (from Coretest) of 72 ms; the Disk index was 2.0.

Speaking of the hard disk: the review machine had a 20 megabyte Miniscribe which chattered nicely when working; there's also a 40 Mbyte version available. It was re-configured and cleaned up a number of times using Norton's SD with nary a bad block to be found. While it may not be fast, it'll most likely be reliable — Miniscribe have a long-established reputation for producing workhorses.

The half-height Chinon 5¼ inch floppy drive leaves room for a second half-height drive below it. Note that this isn't just a



Checking the workmanship on a circuit board manufactured at Cleveland's Hendra, Queensland, plant.



A 48-hour test 'burn-in' with repeated inspections includes systems checks and formatting routines and stringent checks on the power supplies.

small footprint machine, it's a *very* small one, so there's not much room inside. In standard configuration the 286 has 6 expansion slots and one each parallel and serial (RS232) ports; there is a big brother with 8 slots.

Our review machine had a solid, 200 watt power supply that would cope with anything you'd care to add on. Power supplies are a Cleveland speciality — they make them to stand up to the continuous glitches and spikes of the Australian electricity supply.

We used the Cleveland for a number of



Figure 1. The 84-key layout is standard, with Caps Lock, Num Lock and Scroll Lock indicators in the upper right corner. Even though the cable plugs into the centre back of the computer, it's long enough to set the computer on the floor and the keyboard on the desk.

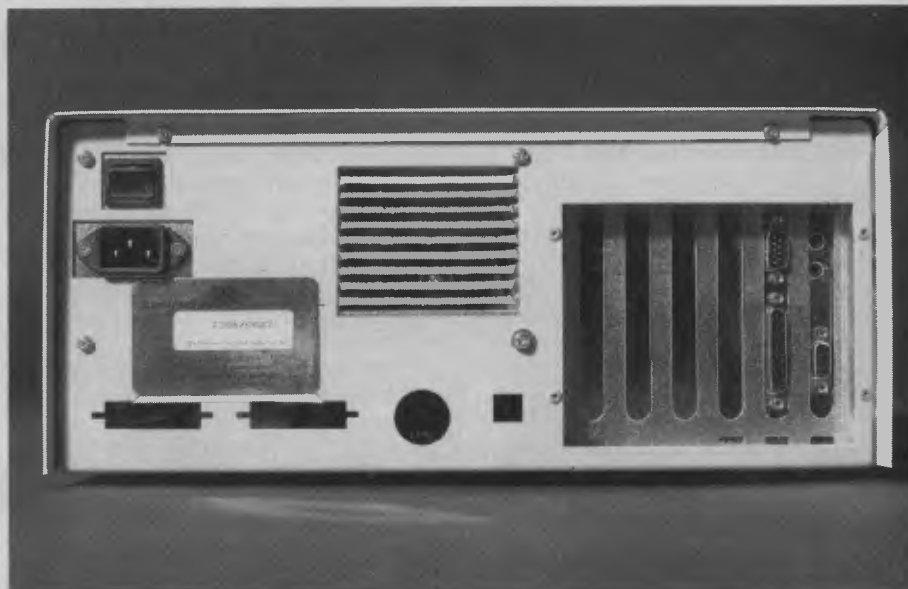


Figure 2. This isn't just a small footprint machine, it's a *very* small one, so there's not much room inside. In standard configuration, the 286 has 6 expansion slots and one each parallel and serial (RS232) ports. There is a big brother with 8 slots and Cleveland can supply virtually any configuration of ports and video cards that you might need (as the range of blank holes attests).

weeks with SideKick, Nortons, Telix, Speedstore, DisknDex, VP-Planner and Graphics, DesqView, SuperComm and a variety of wordprocessors and games without a hitch. Compatibility doesn't seem to be an issue with DOS-based computer systems any more: everyone's had plenty of time to test Flight Simulator on their system and get the bugs fixed.

In fairness to Cleveland though: its R&D section developed the BIOS in Cleveland's range. That's not really of much significance to an average user, *except* that it

means that the BIOS and hardware will be 'fine-tuned' to each other which can only help ensure long term reliability.

Many of the criticisms here sound like petty nit-picking — and they are, because that's the state the art has come to. There are a wide range of keyboards, monitors, drives, whatever, that have been assembled into 'ATs,' but they all use essentially the same disk operating system, BIOS and chip set, to run the same range of (IBM compatible) software. And it's the software that interests most users; the hard-

ware side should be as transparent as possible. WordStar is still WordStar, whether it's on a well-engineered machine like the Cleveland or an unbadged, gone-tomorrow, red-hot special.

So the differences that will determine a buyer's choice and long term satisfaction tend to be personal (and often, petty) ones. Benchmarks are always of interest, but not many of us *need* a Maserati, especially if all we're going to do five days a week is drive it to work or take the kids to school.

Computer Corporation of Australia

THE COMPUTER Corporation of Australia, better known as Cleveland, has been battling quietly amongst the overseas corporate giants and a host of importers — and gaining ground. How has it succeeded while still keeping such a low profile? But first: where did it all start?

Computer Corporation marketing director Geoff Grantham: 'We started back in 1984 as a Taiwanese clone distributor, but in 1986 we began manufacture of our own computer systems and designing our own power supplies.'

Since those days of a tiny office and three staff — Grantham, managing director Ian Bennett, and general manager Mike Kidson — the company has since grown into three branches and a hangar-sized building at the Airport Industrial Estate, Hendra, Queensland.

Walking around that building, it's easy to see the commitment the company has made to developing its own range of PCs. The plant incorporates printed circuit board manufacture, automatic component insertion, dip and wave soldering machines, metalwork, assembly and, of course, packing. At the heart of it all is the production line for the computer mother boards and the PCBs for Cleveland's own power supply.

After assembly — still a labour intensive process — the computers are given a 48-hour 'burn-in' with repeated inspections. Testing covers systems checks and formatting routines through to stringent checks on the power supplies.

As a result of its rigorous quality control, Cleveland claims an 'infant mortality rate' that is one-third that of 'imported equivalents.' And, as Grantham

'Now the government is starting to help where it counts: in the purchase of machines made by an Australian company.'

noted: 'We used to have a dead on arrival [at the service department] rate equal to the clone manufacturer's of around 40 per cent, but that's now been reduced to 4. Like many companies, we replace the faulty machine on site and then work on the fault back in our offices.'

'We are as much interested in our reputation as in sales. We're proud of the fact that we'll be supplying the workstations for the new Parliament House and for use by the Commonwealth Electoral Office. And, both Honeywell-Bull and NCR are tendering our equipment for supply to Telecom and the Commonwealth Bank.'

Cleveland's approach is starting to pay dividends — its power supplies are establishing an international reputation for reliability. Plus: 'Even the Department of Defence is looking at our machines because they are rugged and can survive,' said Grantham.

'We have never had a government handout; we have paid our own way, and we are stronger for that. Now the government is starting to help where it counts: in the purchase of machines made by an Australian company.'

The Future

THE FUTURE of Cleveland, according to Grantham, is not in being a big-time razzle-dazzle computer company. 'We will never be as big as IBM — well, not in the near future, anyway — our main aim is to develop internal circuitry, circuit boards, and power supplies which every manufacturer will want in their machine because they are the best!'

'We have an R&D team that have taken on the challenge to develop the most advanced technology possible for reliable use in a working environment. One of the best things about working here, all together, is that they can talk to us directly, right now, and we can act on their suggestions quickly and they get instant feedback. We certainly don't take all their suggestions — no one could afford that.'

The R&D work encompasses the complete design of microprocessor systems as well as providing assistance to third party OEMs in the design and manufacture of their products. An area of major investment and research has been in the Cleveland BIOS which is constantly updated to handle new software and peripherals.

Cleveland hopes to be introducing its own OS/2 range towards the middle of this year. In the meantime, it is preparing a new range of computers — Grantham: 'We've worked hard to get the internals right: we've finished development of our new 16-bit CPU, the X2, which runs at 9.45 MHz, and now we've turned our attention to the cosmetics. We've had a reputation of being the ugly duckling, but our new machines will change that! □

The Keyboard

THE KEYBOARD is *much* wider than the computer (and it's the smaller, 84-key version). The keys have plenty of 'push back' which took some getting used to — it initially caused missed characters, particularly at the periphery of the qwerty keys. It's actually a less tiring keyboard to use than ones with easy travel and a solid bottom out.

One of the problems with the modern philosophy of 'smaller and lighter is better,' is the tiresome roving keyboard which wanders across the desktop with each keystroke. *That* is not a problem with the unit Cleveland is using — it's comfortably immobile.

As Figure 2 shows, the layout is standard, with Caps Lock, Num Lock and Scroll Lock indicators in the upper right corner. 'Standard' includes a shift key that unshifts with Caps Lock on — which can be either bane or boon, depending on your most frequently run applications. Even though the cable plugs into the centre back of the computer, it's still long enough for you to lean back in a chair and have the keyboard on your lap (or set the computer on the floor and the keyboard on the desk).

It's a shame that Cleveland hadn't dressed the keyboard up with a version of the good looking logo featured on the front of the box.

The keyboard documentation must be the prototype Jnglish Manual. While certainly informative enough, exact meanings were sometimes difficult to decipher — not that anyone who's ever seen a typewriter keyboard is likely to need a keyboard manual — unless they are looking for some comment on the accidentally discovered Ctrl-Alt-Caps Lock combination which causes a cold boot (there is none, but then there's no Reset button, either).

Monitor

THE MONITOR supplied with the 286 was the familiar offering from the Taiwan Video and Monitor Company (TVM) that seems to grace most compatibles we see (under a variety of badges). This isn't to knock it, it's one of the best, especially if you take the price into consideration. For the spec minded — it's a 14 inch colour monitor (640 x 400) running with a CGA. The Display is 'Multi,' giving a choice of an amber, green or 16-color screen.

Cleveland, rather, the Computer Corporation of Australia, might be only three

years old, but in that time it's built itself a good reputation. There are certainly less expensive and more fully-featured ATs in the market, but if you're looking for a machine that's proven its reliability, this one's short-list material (and, the company that built it is here in Australia with a national dealer network). □

Product Details

Product: The Cleveland 286
From: The Computer Corporation of Australia, Unit 3, Airport Industrial Park, Hendra 4011 Qld.
 (07) 268 7555

Price: Single drive floppy with colour card \$2395.20; single drive floppy with monographics card \$2432.20; single drive floppy with EGA card \$2785.20; 20 megabyte system with colour card \$3174; 20 Mbyte system with monographics card \$3213; 20 Mbyte system with EGA card \$3540.

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Part 2

Communications Software

Once John Hepworth started communicating, there was no way of hanging him up — now he's online with SideTalk, Carbon Copy Plus and Professional YAM.

THIS MONTH the overview of communications software continues with three quite different, and in their own ways, specialised, packages. First package off the rank is SideTalk, a communications package which can run in the background like SideKick, and/or in the foreground like most communications software; it allows for two copies to be simultaneously active with one talking to COM1 and the other to COM2. It also incorporates a programming language optimised for communications and aimed at end users.

Carbon Copy links together the screens and keyboards of two PCs, either side by side or half a world apart.

Professional YAM is a high powered communications package with a very extensive script language, and is suited mainly for very experienced users and applications developers. This is one of the most popular of the professional communications packages available on the market.

SideTalk

When is a communications package *not* a communications package? When it's a language!! There are a host of general purpose languages like Basic and Pascal, and there are some specialised

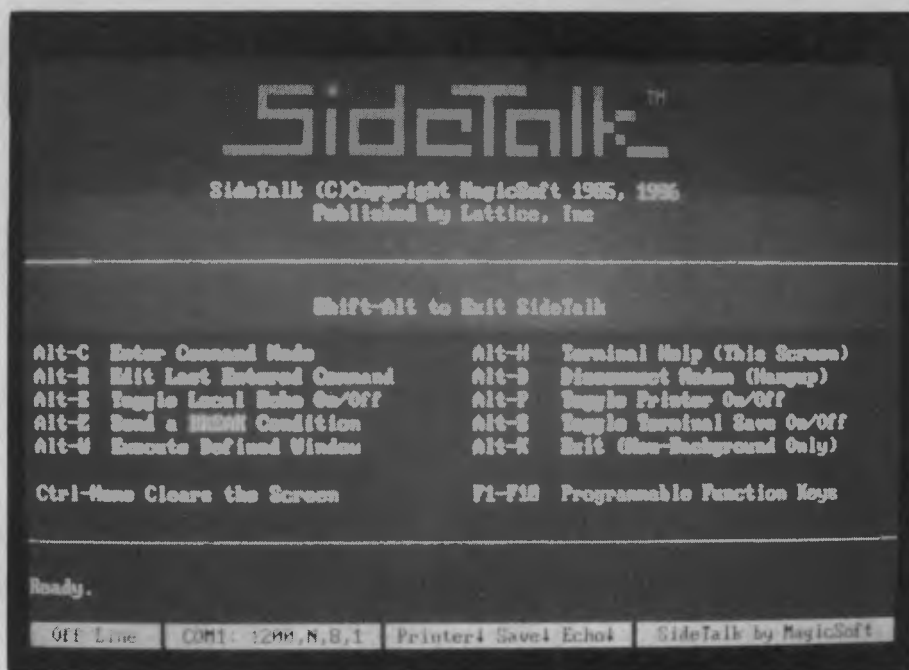


Figure 1. SideTalk is a memory resident or transient communications package. When resident it continues to run a communications link, while another application is running in the foreground.

languages — dBase immediately comes to mind as an interpreted language optimised for database management; likewise, SideTalk is an interpreted language optimised for communications.

The whole system is based on the program ST.COM, analogous to BASICA.COM, or DBASE.COM. All three can be driven manually or can read and execute user defined lists of commands — programs in other words. Driving Basic or dBase manually from the command line is unheard of. Almost without exception, users of both these packages create files with a series of the commands strung together, which the interpreter then reads and executes. SideTalk has the ability to read files of commands and execute them. It comes with a

suite of files all with .SCL extensions, which define the default configuration. They function much as batch files do under DOS, with significant extensions and the ability to call subroutines and nest other .SCL files.

SideTalk can be resident (like SideKick) or transient, like most communications software. When resident it continues to run a communications link, including reading and executing its command files, while another application is running in the foreground. The foreground application can be a communications program, such as a second copy of SideTalk running in transient mode, or could be almost any other software package.

I successfully had the background copy

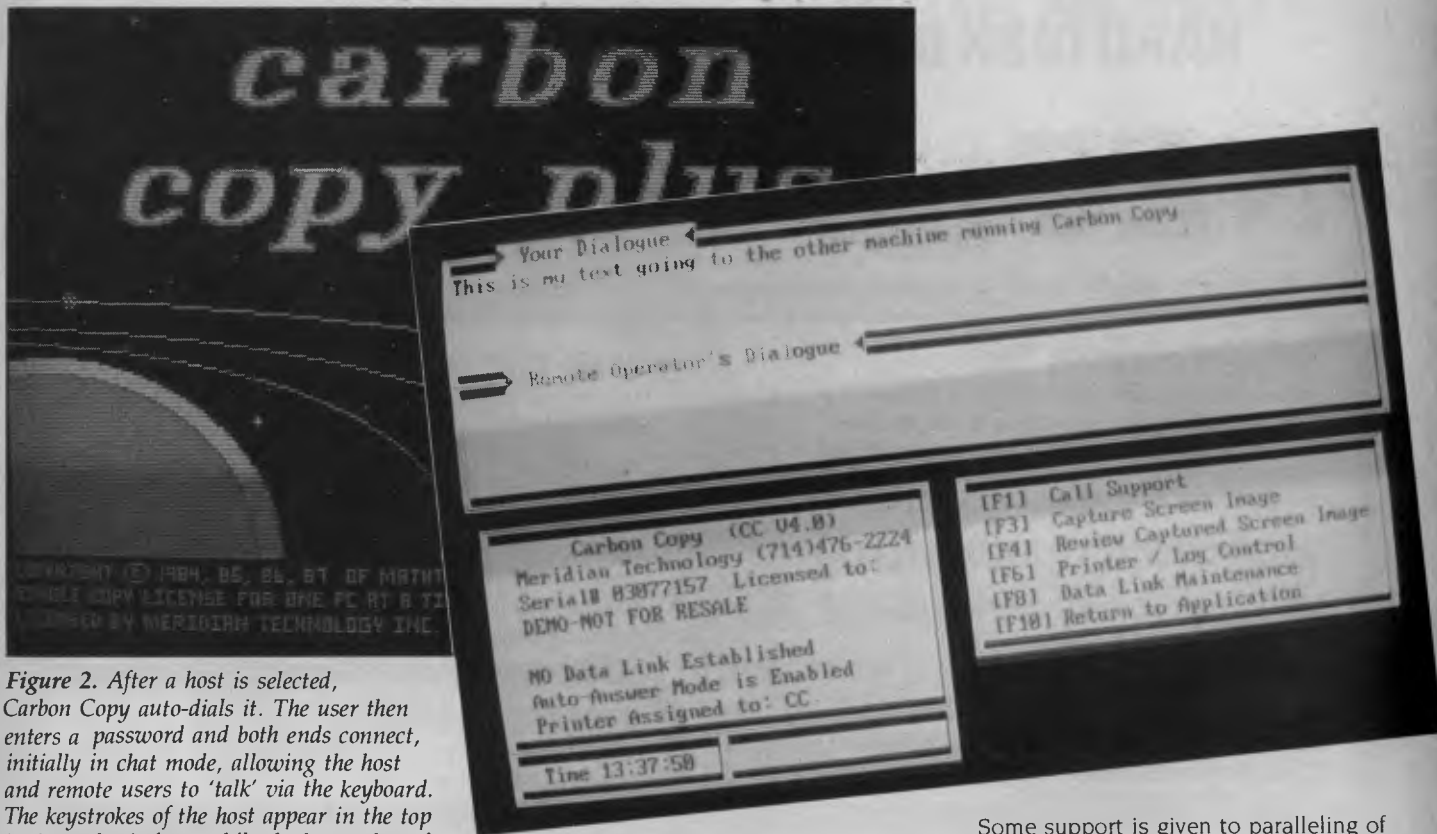


Figure 2. After a host is selected, Carbon Copy auto-dials it. The user then enters a password and both ends connect, initially in chat mode, allowing the host and remote users to 'talk' via the keyboard. The keystrokes of the host appear in the top horizontal window, while the keystrokes of the remote appear in the other.

of SideTalk downloading a file from a bulletin board while a second copy in the foreground was sending files over a second Comm port to another machine. A copy of SideTalk running in the background is 'popped up' by pressing Shift and Alt simultaneously, and while it is on screen the foreground application pauses.

When starting SideTalk, it looks for a file in the same directory called Config.SCL. This contains a number of commands in ASCII form which can be read and executed by SideTalk. If no Config.SCL file exists, SideTalk transfers directly to terminal mode and allows the user to drive it directly. While in terminal mode pressing Alt-C transfers to command mode and allows the entry by the user of commands.

ST.COM has a range of internal commands for direct execution, which may also be executed from a .SCL file. In addition, typing the name of a .SCL file on the command line will execute it.

The available commands which can be included in a .SCL file, or executed direct from the command line, number no less than 99. For example, when creating a command file, you can locate the cursor at any screen location, you can create popup

menu windows, carry out arithmetic operations, read the system time and date, prompt users for input and act upon the response, and control the serial port and modem.

String operations are supported, while all arithmetic operations are on long integers in the range $-2,147,483,648$ to $+2,147,483,648$. The language is quite extensive, and amongst the .SCL files on the disk are a couple of simple games, a bouncing ball and the word guessing game HangMan.

SideTalk works well as a resident and/or transient program. The command language is extremely powerful. It is acceptably fast even when running on a 4.77 MHz PC, amazingly so considering that it is an interpreted language.

Carbon Copy Plus

Carbon Copy has been around for a number of years and is aimed at the technical support person working on a software vendor's hotline, or in the DP department of major organisations. It allows the paralleling of the keyboards and screens of a remote computer with those of a host computer. Subsequently either can operate the host computer in any of its applications, and both can see the resulting screens.

Some support is given to paralleling of graphics as well as text, but this obviously depends on both ends having compatible display adapters, and mixtures of (say) Hercules with EGA can only be used for text applications under Carbon Copy.

The key addition to Carbon Copy in its transformation into Carbon Copy Plus is a simple general purpose communications package for access to host machines and bulletin boards which are not running Carbon Copy.

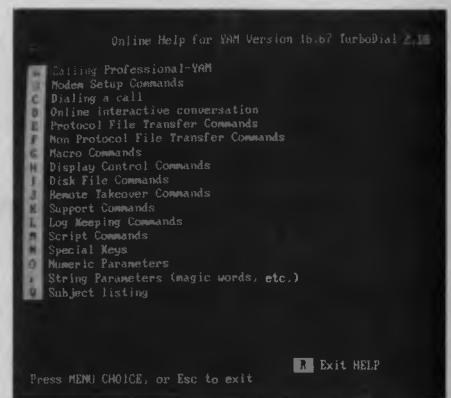


Figure 3. Professional YAM is a high powered communications package with a very extensive script language. It can handle a broad range of protocols under very trying and imperfect line conditions.

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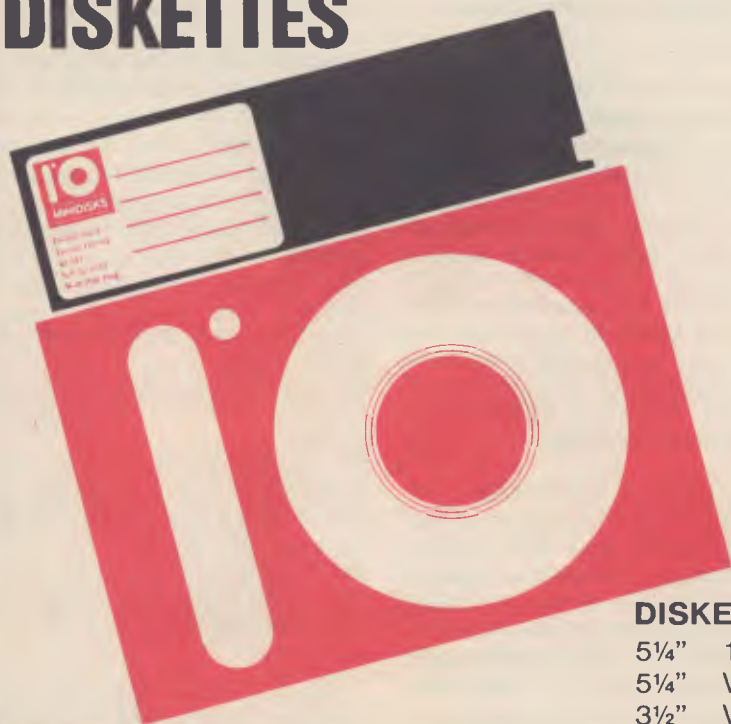
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There are many interesting features — A Log File maintains a comprehensive record of all transactions, complete with a full audit trail. Interactive Graphics are supported with both sides of the Carbon Copy Plus link seeing and interacting with the same graphics screen images. The Menu-Driven Control Screen allows access to all the key functions.

Password protection with dial-back security is included to prevent unauthorised access. When the host PC receives entry of a valid password by the calling PC, it can terminate the connection and call back a pre-defined number.

When two copies of Carbon Copy Plus are used at the different ends of a link, a powerful file transfer utility called CCDOS is used for DOS-like commands, including copying the contents of files from one PC to another. CCDOS also carries out a range of other DOS like activities. Under CCDOS, local drives have an L prefix, and remote drives have a H prefix, resulting in drive designations like LA, LB, LC, HA, HB and HC. The CCDOS commands are —

CHDIR — Changes the current working directory to the specified directory.

COPY — Sends and requests files from one PC to another.

DEL — Deletes the specified file.

DIR — Lists the current copy of the specified directory.

EXIT — Exits CCDOS and returns you to the Carbon Copy Plus joint session.

MKDIR — Creates a new directory or sub-directory.

PROMPT — Specifies which directory is displayed as the system prompt.

REN — Renames the specified file.

TYPE — Types or lists the current file.

I ran a range of software under Carbon Copy Plus, controlling it from the remote keyboard and seeing it on the remote screen. It seems to run most software quite well, including Lotus, SideKick and Microsoft Word. Just remember to have compatible graphics when non-text applications are used. Some programs which take over the keyboard from BIOS can have problems unless Carbon Copy Plus is started with an optional parameter. These include some versions of the Quickbasic compiler, PrintO, and IRMA.

Running Carbon Copy Plus

On the host type CC and press Enter. At the remote type CHELP and press Enter. After a copyright message the initial screen appears. In the top half are two horizontal windows, showing information from the host in one, and information from the remote in the other. Status information is in the bottom half along with a list of the function keys and their functions.

Pressing F1 on the remote initiates a call and the user is presented with the call table from which to select a host. After selecting a host, Carbon Copy auto-dials it. The user then enters a password and both

ends connect, initially in chat mode allowing the host and remote users to 'talk' via the keyboard. The keystrokes of the host appear in one of those top horizontal windows, while the keystrokes of the remote appear in the other horizontal window. The function keys are —

F2 — Indicates to the other user that you wish to go to voice, and returns from voice at the end of the conversation.

F3 — Initiates capture of a screen or session to a log file.

F4 — Reviews or replays a captured screen or session.

F5 — Switches to the file transfer module called CCDOS.

F6 — Controls use of the printer and spooler on both the local and remote machines.

F7 — Switches CHELP to terminal, emulation, and can only be used before a session with a host system running CC has been commenced.

F8 — Resets the data link and allows control of some communications parameters.

F10 — Returns the user to the previous application.

If a link is active between CC.EXE running on a host PC and CHELP.EXE on a remote PC, both users now see the screen image of the host system and the keyboards at both ends operate the application on the host. When CHELP.EXE is used as a terminal program talking to a bulletin board or similar, pressing F10 terminates the program.

Notes:

1. Maximum speeds depend on the computer used.
2. When used with the same product, it requires different serial numbers at each end of link.
3. Announced, but not in the copy tested.
4. A higher speed can be set, but the lower speed is maximum.

Product:	Crosstalk XVI	Mirror	Softerm PC	Access	Relay Gold	SideTalk	Carbon Copy Plus	Professional YAM
Version:	3.61	3.6.11	2.00.08	1.01	2.0	1.00	4.00	15.17
From:	MicroStuff	SoftKlone	Softronics	Microsoft	VM Computing	Lattice	Meridian	Omen Technologies
Copy Protected:	No	No	No	No	(2)	No	No	(2)
Number of Disks:	1	1	3	3	3	1	1	3
Documentation (pages):	345	350	653	430	650	148	120	154
Max Speeds:	38400 115200 (4)	38400 115200 (4)	9600 38400 (1)	9600	300 19200	5700	19200	57600
Background communications:	No	Yes	Yes	No	Yes	Yes	No	No
Disk tutorial:	No	No	No	—	Yes	No	No	Yes
Memory required:	NA	192kB	210kB	256kB	192kB	128kB	256kB	256kB
Network:	A (3)	—	Yes	—	—	—	No	No

Table 1. Except for Mirror and Crosstalk, these packages cannot be directly compared — their designs, aims and uses are radically different: Crosstalk is the industry standard of PC to PC communications, Mirror adds features to Crosstalk at a very competitive price, Microsoft Access makes corporate access to external data a breeze, Softerm PC has multiple emulations and (almost) multi-tasking external access in the background, and Relay Gold is unmatched for PC to mainframe communications — these packages were reviewed in our October issue. SideTalk uses its own interpreted language and can run either in the background or foreground, Carbon Copy Plus links together two PCs (whether both are running the program, or not), and Professional YAM is a high power communications program with its own script language (definitely not for beginners).

Carbon Copy Plus is a very worthy product, especially for those software developers who must offer more than superficial support to users many hundreds of kilometers away. One for the short list when a specialised communications problem is encountered.

Professional YAM

A taste of Sci-Fi, a hint of academia, a notion of Unix and a sense of the 60s, that's Professional YAM. Born of the original communications software in the CP/M world, YAM has steadily been upgraded and expanded into a high power, well respected communications package, aimed squarely at the experienced user and systems developer.

Beware, this is not a package for the novice or intermediate user unless a more experienced user has developed custom script files to run the package.

YAM eschews the use of menus as being an impediment to speed for experienced users. It relies on the entry of a range of hundreds of commands, either from the command line or from quite complex script files. The commands are quite unique, ranging from Alt-N for 'Nuke' which aborts any command or script, through other easy to recall commands like 'display warpdrive' for a high speed display mode, to ena, fget, fput, ls, rb, rc and many more.

A touch of sci-fi and nostalgia for sure, plus a preview of a script language with a hint of C. The hint of academia? There is a quick reference guide — called a Crib Sheet!

Professional YAM comes with an international reputation for its ability to handle an extensive range of protocols under very trying and imperfect line conditions, and simultaneously making no concessions to the novice. The manual supports this hypothesis, being printed with small and spidery characters in a greyish ink. It is quite hard to read, particularly in the odd light and visual conditions of most computer areas, where one's eyes must switch between displays using illuminated characters on a dark background on the screen and manuals with dark characters on a white background by reflected light.

There is no getting started section, though chapters 20 and 21 briefly cover software installation and interfacing with a limited range of modems. The organisation of the manual is very odd also, though it claims that the sequence is based on placing those portions most commonly referred to at the start of the

manual. This results in the manual being distinctly difficult to use.

Professional YAM is not copy protected, though it does use a system called Serial-Number/Password (SNP) to discourage piracy. Any time the user invokes the install program to change a default, the SNP is requested. In addition, if both ends of a communications link are using Professional YAM they must use different serial numbers.

The manufacturers also have a system called Demand Upgrade. Professional YAM is constantly having minor additions and improvements added to it. These are all put on a bulletin board run by the company and can be downloaded at any time and merged with the existing files to bring them completely up to date.

Professional YAM is not aimed at the typical home user wanting primarily to contact bulletin boards and similar. Applications developers who wish to create turnkey communications systems could find it invaluable. A comprehensive rewrite of the manual is long overdue, and is the one major impediment to Professional YAM's wider acceptance.

Conclusion

Professional YAM, SideTalk and Carbon Copy Plus are three more specialised communications packages. Use with bulletin boards might be overkill, except for the background communications capability of SideTalk. They each have their place in the communications spectrum and they all carry proven reputations as reliable and valuable tools. □

Product Details

Product: SideTalk Version 1.00
From: Lattice
Distributor: FMS, 95 Canterbury Road,
Middle Park 3206 Vic.
(03) 699 9899.
Price: \$356 taxed

Product: Carbon Copy Plus 4.00
From: Meridian
Distributor: Sourceware, 586 Pacific
Highway, Chatswood 2067 NSW
(02) 411 5711.
Price: \$451 taxed

Product: Professional YAM
Version 15.17
From: Omen Technology
Distributor: PCs Plus, PO Box 434,
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Trust Writer

A WordStar lookalike?

As Keith Mackay found, Trust Writer has a hint of WordStar mixed in with its own dash of wordprocessing prowess.

TRUST WRITER is a British WordStar lookalike, requiring a minimum of 128 kilobytes of RAM and one floppy drive to run it. The full package consists of three floppy disks containing, respectively, the wordprocessor itself, a spelling checker and a suite of Sidekick-like memory resident programs. Any of the modules may be separately purchased.

The documentation is well written, well organised and completely free of the now-children-this-is-the-space-bar approach, which is a welcome thing; although on the other hand (I am very hard to please), some sections might be slightly baffling to those not already familiar with wordprocessing and PCs. The wordprocessing disk also contains a short introduction to the program, summarising the main points.

The installation program Twinstall (the pun must be deliberate — WordStar's installation program is called Winstall) offers only nine options, three of them perhaps opaque to users without a sound understanding of DOS and RAM addresses and two of them offering the options of aborting the installation procedure or saving changes made in the program. The remaining options are: Screen mode, Word Wrap off or on, Indent mode off or on and Insert mode off or on. A number of other features can be modified from within the program itself.

The opening menu offers only three choices: E to edit a file, P to print a file

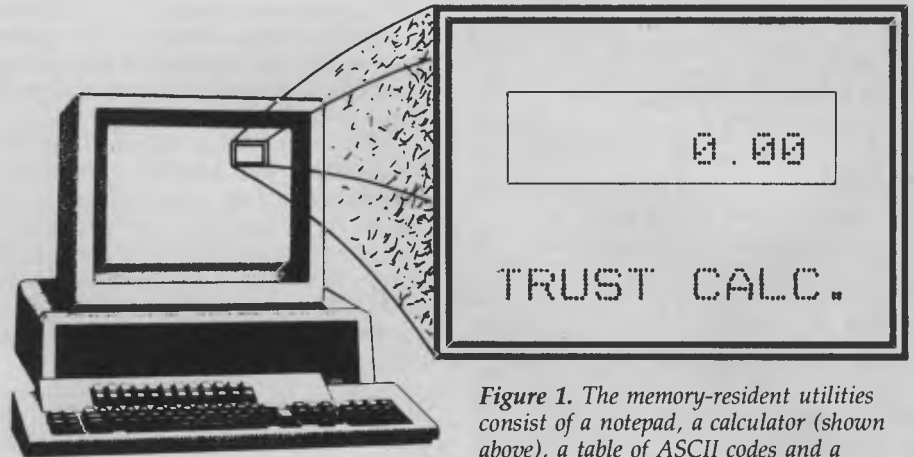


Figure 1. The memory-resident utilities consist of a notepad, a calculator (shown above), a table of ASCII codes and a calendar.

and X to exit to DOS. Selecting E gives a display similar to WordStar's, with a status line at the top of the screen and 23 lines of text displayed. The WordStar line at the bottom of the screen showing the current definitions of the function keys is absent, however, since the function keys have no effect in Trust Writer, other than to call the help screen. Scrolling — and all other screen operations — is perhaps faster than in WordStar, but rather less tidy; moving down the page has the effect simply of scrolling the lines one by one, rather than rewriting an entire screen.

Command Driven

ABRIEF description of WordStar's command structure is appropriate and is for the benefit of those who have not had the curious pleasure of learning the program. WordStar commands consist of combinations of the Control key and two other keys. With the help level at 3 — the highest setting — the Ctrl-key combination brings up a menu from which a selection may be made. Thus ^K, for example, invokes the Block menu and B marks the

beginning of a block. Setting a lower help level, however, suppresses the menu display — an experienced user knows that the block-beginning marker is on the ^K menu and simply hits ^KB. WordStar can thus be either menu driven or command driven.

Trust, on the other hand, is entirely command driven — it has no equivalent of WordStar's optional display of menus since it has no help levels. This would perhaps make Trust harder to learn than WordStar. WordStar's commands are logical once it is appreciated that they are all associated with certain menus, while Trust's commands may seem quite arbitrary to the learner. Trust does have a pop-up help file, which lists all the commands. The majority of WordStar commands are duplicated in Trust, although one or two features are missing: for example, search-and-replace will not operate backwards (there are few entry-level wordprocessors with this option), and the command ^Q^B to reformat an entire text is meaningless to Trust.

I did, unfortunately, find a bug in the

program: changing margin settings in a screen-justified text and then reformatting the paragraph will result in words becoming split both at the end of lines and within lines. It is surprising that the program has reached Version 2.4 without this having been remedied. However, the distributors assure me that they have brought the matter to the notice of the manufacturer and that when a new release is issued with the problem corrected, upgrades will be available free of charge.

The merge facility is integral to the wordprocessor, and dependent on dot and ampersand commands. It is extremely simple to learn, and sets no limit either on the number of records possible or the number of fields allowed within a record.

The memory-resident utilities consist of a notepad, a calculator, a table of ASCII codes and a calendar. For the most part, the utilities have been closely modelled on their SideKick counterparts, both in appearance and in operation, although the calendar does not have an appointments listing as SideKick's does. I have long wondered why Borland chose to include an ASCII table with SideKick — ASCII codes are not something about which the average wordprocessor user is consumed

Trust, on the other hand, is entirely command driven — it has no equivalent of WordStar's optional display of menus since it has no help levels.

with curiosity; on those occasions an ASCII code must be known, the values can always be checked in a reference book. A telephone dialer or a macro utility might have made better use of the RAM devoted to Trust's ASCII table. Trust will also run satisfactorily with other memory-resident software — I had no difficulty in using it with SuperKey, ProKey or SideKick.

Trust Speller is memory-resident and requires 256 Kbytes. Two dictionaries are available, one being a list of 7000 commonly misspelled words and the other having a vocabulary of 19,000 words. Either may be loaded from DOS before running the wordprocessor itself, and may be

invoked at any time by pressing Alt-P (not the most convenient combination, particularly for those with a short finger span). It is possible to add words to the dictionaries and to create customised dictionaries. Trust Speller is not a fully fledged spelling checker — it will check the spelling of individual words and offer automatic correction, but it cannot be used to check an entire document.

Trust Writer is a taste of WordStar — it has nothing like the power and elegance of the real thing, although one could hardly expect it to at the price. It does, however, have a number of features not often found in entry-level wordprocessors and once the text-deforming bug has been ironed out, Trust Writer will be an attractive beginner's package. □

Insert Characters

Ctrl-V Insert/Replace (Ins)
Ctrl-P Enter Control Characters

Move Cursor

Arrows or
Ctrl-D Right 1 Character
Ctrl-S Left 1 Character
Ctrl-E Up 1 Line
Ctrl-X Down 1 Line
Ctrl-R Up 10 Lines (Pg Up)
Ctrl-C Down 10 Lines (Pg Dn)
Ctrl-F Right 1 Word
Ctrl-A Left 1 Word
Tab Next Tab Stop
Ctrl-QR Beginning of File (Home)
Ctrl-QC End of File (End)
Ctrl-QE Top of Screen
Ctrl-QX Bottom of Screen
Ctrl-QS Beginning of Line
Ctrl-QD End of Line
Ctrl-QB Beginning of Block
Ctrl-QK End of Block
Ctrl-QP To Previous Position
Ctrl-QLnn To line number nn

Scroll Screen

Ctrl-W Down 1 Line
Ctrl-Z Up 1 Line
Ctrl-OP Up to Top of Screen

Find and Replace

Ctrl-QF Find
Ctrl-QA Find and Replace
Ctrl-L Repeat Last
Ctrl-U Interrupt Find/Replace
Options:
G Global Search
N No Verify
W Words Only
nn Number of Times

Block Commands

Ctrl-KB Mark Beginning
Ctrl-KK Mark End
Ctrl-KH Unmark
Ctrl-KV Move Block
Ctrl-KC Copy Block
Ctrl-KY Delete Block
Ctrl-KW Write to Disk
Ctrl-KR Read from Disk

Import Commands

F5 Save Screen Data
Ctrl-KB Mark Beginning
Arrows Expand Block
ESC Return to Notepad
F6 Import Block

Delete

Ctrl-G Character
BS/Del Character Left
Ctrl-T Word
Ctrl-Y Line
Ctrl-QY To End of Line
Ctrl-QDel From Start of Line

Undelete

Ctrl-U Undelete and Clear
Ctrl-KU Undelete and Retain
Ctrl-QU Clear Storage Area

Adjust Text

Ctrl-OC Centre Text
Ctrl-OW Word Wrap on/off
Ctrl-B Reblock Paragraph
Ctrl-QN Auto-indent on-off

Print Controls

Ctrl-KP Print Block
F7 Print Entire Document

Directory

F2 Display Directory
F4 Change Directory
Search Pattern

Figure 2. The majority of WordStar commands are duplicated in Trust, although one or two features are missing. This index shows the commands available on Trust Writer.

Product Details

Product: Trust Writer
From: Trust Software, Hampshire UK
Distributor: Software Wholesalers of Australia
PO Box 946, Crows Nest 2605 NSW
(02) 957 6686
Price: \$295 taxed

PC-Professor

According to Sid Morris, from AMSEC, PC-Professor, makes getting started with Basic child's play.

I LEARNED TO program in Fortran almost 20 years ago. I well remember the time as I bet a friend that my first program would run the first time I tried it. Of course it didn't, and so I had to buy her lunch. My program was actually quite correct, but in those days we used mark-sensitive cards, and I made an error marking one of the cards. Had I been using Basic on a PC it is likely that it would have been I who was treated to lunch.

Computer scientists insist that the first language you learn should be a structured one like Pascal or Modula-2. IBM, however, decided otherwise when it put Basic in ROM on their micros.

Basic is certainly very easy to learn and to use. If you want to start writing programs as soon as possible, Basic may be the language for you. Today, probably more people program in Basic than in any other language.

Basic Bad Habits

What are the arguments against Basic? Computer Scientists feel that programming in Basic teaches you bad habits, and in particular, encourages an unstructured approach to programming. You should sort out in advance how your program will work rather than just start typing. Also you should aim to write programs that are easy to read — specifically, avoid GOTO statements!

Including GOTOs in your programs makes the flow hard to follow and, as a result, the programs are difficult to debug (that is, find and remove errors). Equally important is including sufficient comments in your program so that you can come back to it in a year or so and still understand how it works. The arguments against Basic are weaker now that there exist structured versions of the language, like Turbo Basic and True Basic. Turbo Basic, like its stablemates Turbo C and the superb Turbo Pascal, is fast. As Borland puts in their advertisements 'If Basic

taught you how to walk then Turbo Basic will teach you how to run.'

But let's not run just yet!

PC-Professor is an unpretentious public domain program that sets out to get you started with Basic. And it succeeds! The tutorial is at all times gentle and, dare I use that overworked term, friendly. The first question is: why bother with a tutorial when you have a manual? There are at least three reasons. Not everyone is comfortable learning from a book. Also, by learning with PC-Professor you are actually using Basic! You are frequently asked to try an example of your own like the one the author just showed you. You can do this in a fuss-free fashion since you are already in Basic. Thirdly, you can watch a program being run line by line on the screen.

Getting Started

You get started by loading BasicA. To do this I put the disk containing BasicA in drive A, type BASICA and press return. Then put the PC-Professor disk in drive A, press the function key marked F3 and type INTRO and press the return key. You are then blessed with the computer giving a lousy rendition of Land of Hope

and Glory, from which you correctly deduce that the author is not a dinky-dink Aussie.

After a few seconds, a menu appears showing that the tutorial has five lessons, of which one is a rather good introduction to the keyboard. You see also that there is a good index and contents. The index is a nice feature: suppose you've forgotten what RND does, you can look in the index, find the term and then immediately go to the appropriate place in the tutorial.

Having spent 5 minutes on a revision of the keyboard we proceed to Lesson 1. This covers PRINT, LET, LIST and RUN. Also explained are variables, how to name them and line numbers. Explanations are clear and to the point and there are several worked examples. I found these ran a bit slow for my liking but I couldn't see how speed them up. There is no way you could feel intimidated by Lesson 1 — and this is very important. Indeed I enjoyed the 20 minutes it took to run through it.

Lesson 2 took a little longer, about 25 minutes, but was equally enjoyable. It introduces INPUT, SAVE, LOAD and NEW, as well as describing string variables. There are many worked examples, and you

The BASIC Prof. -- Beginning BASIC

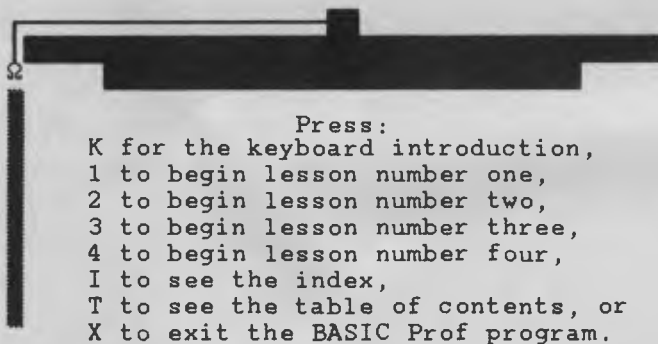


Figure 1: After you have loaded PC-Professor, a menu appears showing the tutorial's five lessons, the first of which is a rather good introduction to the keyboard.

are encouraged to try your own before proceeding. Throughout the tutorial, programs appear on the screen and you are asked to retype them and then run them.

For a little while I felt this was a waste of my time. But of course it wasn't. Because I was typing the programs myself I had time to think about what they were doing. Without the compulsion to type them I would not have noticed the presence or absence of, say, a semicolon or comma, and hence would not have asked myself why they were written that way. In short, PC-Prof's approach is educationally sound.

The next lesson is much more meaty, and took me about 40 minutes. I learnt how to use DATA, READ, GOTO, and IF... THEN... ELSE statements. Finally, I felt as though I could conquer the world with my new knowledge.

Other topics covered were loops and the logical operators, AND and OR. With this lesson I appreciated the features PC-Prof had built in. If you want to look again at the previous page you can press F1. If you want to repeat the demonstration you have just seen on the current page then press F3. Some demonstrations here you could speed up or slow down by pressing the appropriate function keys. The animated displays in a couple of demonstrations are a real aid to understanding. A serious criticism however is the lack of warning about the use of GOTO. PC-Prof tells us that 'The GOTO statement is the simplest to understand, yet one of the most important statements in Basic.' But we are not warned that overuse of GOTO will make our programs more prone to errors and hard to debug.

The final lesson also takes about 40 minutes. It begins with REM, but doesn't take the opportunity of emphasizing how important it is to document your programs, that is, to add sufficient remarks so anyone can see how the program works (or is meant to work). After cursing the lack of an editing facility as time and time again I made an error when typing in a program, I am now introduced to EDIT and the other time-saver, AUTO which automatically numbers your program lines.

(I am reminded at this point of a little friend who had learned programming at school. I asked him to tell me a little of what he knew. The only thing he could remember was that program lines had to be numbered! Unfortunately this is *not* one of the most important concepts of programming, although I suspect that his teacher, who was untrained in computer science, thought that it was.)

AMSEC

AMSEC is a Melbourne based software evaluation group which has consultants in the workplace, in primary and secondary schools and in various tertiary institutions around Australia. AMSEC may be contacted at PO Box 360, World Trade Centre, 3005 Vic.

Educational Software

OUR SEPTEMBER '87 issue gave extensive coverage to educational software; the programs covered included those suitable for learning particular school subjects as well as self-tutorials on computers in general and a number of software products. Back issues are available — refer to the Services page. To help start the new school year, we'll be looking at educational software again in our February '88 issue.

Lesson 4 also covered RND, INT, and ABS and the briefest introduction to debugging using the tracing commands TRON and TROFF. Unfortunately the final example didn't impress me in the least. We were given a program to calculate the greatest common divisor of two numbers. It was pulled out of the air and no explanation of it was given, not even a reference to Euclid's algorithm. To add insult to injury, PC-Prof refers to greatest common denominator, rather than greatest common divisor.

Despite the rendition of Land of Hope and Glory, and the other weaknesses mentioned above, I do recommend this tutorial. It is a public domain shareware product, so you can quite legally get a free copy from a friend, a bulletin board, or Manacomm Pty, the Australian PC-SIG 'distributor'. If you like the disk, please send a donation to PC-Prof, who also has available another tutorial on Intermediate Basic. □

Product Details

Product: PC-Professor (PC-SIG #105)
 From: Public Domain
 Distributor: As PC-Professor is a public domain PC-SIG program; PC-SIG is a library of user supported software and is handled in Australia by Manacomm Pty Ltd, (02) 875 3538. (*Note that you can quite legally copy public domain programs from a friend or download them from a bulletin board.*)
 Price: Annual membership in PC-SIG costs \$28. A single disk costs \$13 (5¼ inch) or \$15 (3½ inch), plus postage and handling.

ABS Function.....	.....
AND.....	.....
Apostrophe.....	.....
Arithmetic Operators.....	.....
CONT Command.....	.....
Colon.....	.....
Comma.....	.....
Commands.....	.....
DATA Statement.....	.....
DELETE Command.....	.....
De-bugging.....	.....
EDIT Command.....	.....
ELSE Statement.....	.....
END Statement.....	.....
End of Lesson Four.....	.....
End of Lesson One.....	.....
End of Lesson Three.....	.....
End of Lesson Two.....	.....
Functions.....	.....
GOTO Statement.....	.....
IF THEN Statement.....	.....
INPUT Statement.....	.....
INT Function.....	.....
Illustrations.....	.....
DATA, READ, IF THEN.....	.....
DATA, READ.....	.....
IF THEN.....	.....
LET.....	.....
Variables.....	.....
Introduction.....	.....
LET Statement.....	.....
LIST Command.....	.....
LOAD Command.....	.....
Line numbers.....	.....
Logical Operators.....	.....
Looping.....	.....
Multiple Statement Lines...	.....
OR.....	.....
PRINT Statement.....	.....
Prompt.....
READ Statement.....
REM Statement.....
RENUM Command.....
RND Function.....
RUN Command.....
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SAVE Command.....
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Figure 2: PC-Professor's extensive index is handy for revision.

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Chapter 3 considers ways of testing the more common components such as resistors, capacitors, op amps, diodes, transistors, SCRs, unijunctions, etc., with the aid of only a limited amount of test equipment.

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BOOK WORKER

... makes it easy!

If you've been thinking of putting your accounts on computer, but were worried about how complicated it all might be, John Nicholls may have the answer . . .

BOOKWORKER
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HARDWARE CONFIGURATION

Quantity	Book Type	KBytes
0	SUPPLIERS.....	0
0	CUSTOMERS.....	0
0	LEDGER ACCOUNTS.....	0
0	INVENTORY ITEMS.....	0
0	TRANSACTIONS.....	0
	OVERHEADS.....	17
TOTAL DISK SPACE USED		17
TOTAL MEMORY REQUIRED		192

EPSON F/MX-80..
EPSON F/MX-100..
TALLY 1600.....
I.B.M. PC.....
MICROLINE 82...
MICROLINE 83...
MICROLINE 84...
NEC P2(80 COL).
NEC P3(132 COL)
ITOH (80 COL)..
ITOH (132 COL).
DAISY WHEEL....
OTHER MATRIX...

BOOK WORKER is an accounting system specifically directed at those who are converting from a manual bookkeeping system to a computerised one. To ease the transition, the program is designed to make the screen look like the pages of a book. This may seem naive, but it doesn't get in the way when you're using the program.

Of course, Book Worker can be used by anyone, whether or not they have used a computerised system, but if you haven't you could strike some problems. Get your dealer to install it for you if you have any doubts. The installation process isn't difficult if you know the answers to the questions you will be asked, but some of them assume a level of knowledge that comes only with experience.

Installation

The installation program is menu-driven. It copies the program's three diskettes — Startup, Operating and Samples — to the hard disk and changes your CONFIG.SYS file, if necessary, to set BUFFERS and FILES to at least 16. You are then asked to fill in a table which calculates the memory and disk space required for the database (Figure 1). As you enter each figure the system calculates the number of transactions, the total disk space required, and the total memory required.

RESTART HELP
F1 F3 F5 F7 F9 F2 F4 F6 F8 F10

MOVE UP OR DOWN TO THE REQUIRED BOOKS AND PRESS EDIT OR FINISH WHEN DONE.

Figure 1. Book Worker makes it easy, especially for the new user — during setup the program even calculates the disk space necessary for the number and type of accounts that are to be posted.

SALES BOOK

<p>A & R ENTERPRISES AJAX, INCORPORATED ASHLEY & PETERS ASSOC. AVERIES DISCOUNTERS BAKERS KITCHENWARE BANNER APPLIANCES BARBER & BRADFORD BATSTROM & YORK</p>	<p>CADBURY, INCORPORATED CASTLEMONT FREIGHT CENTENIAL FURNITURE CLARK AUTOPARTS COLE & JACOB ASSOC. C.S.S. ENTERPRISES D.A.A. SERVICES DANCE STUDIOS, INC.</p>
---	--

EXPORT

A-D
E-H
I-L
M-Q
R-T
U-Z

SCHOOLS
XMAS CLUB

REPORTS
JJ

VIEW	SALE	RETURN	RECEIPT	JOURNAL	HELP	MOVE	SEARCH	FINISH
INSERT			CHANGE			DELETE		
LABEL								

Figure 2. A sample 'page' from Book Worker's Sales Book. The list of options across the bottom of the screen corresponds to the function keys. F1, for example, gives a View of the account's current status.

The amount of memory required is determined by the total number of accounts — the total of the number of Suppliers (Purchase book), Customers (Sales book), Ledger (accounts) and Inventory (stock items). For example, if you have less than 2300 accounts, there must be at least 256 kilobytes available, while 8200 to 11,250 accounts requires 640 Kbyte.

The program will not accept more than 11,250 accounts. Should you have more you are advised to 'think about upgrading to the Sybiz Plus accounting system', but no details are given to indicate how difficult this might be. Book Worker does have the advantage that it starts at a preset size and expands automatically when it needs to, up to the maximum. The manual does indicate how you can calculate capacities manually, but the review copy lacked a 'factor' needed to do this.

The remainder of the installation procedure consists of choosing a printer from the 13 listed (also in Figure 1), stating whether you have a colour monitor, a hard disk, and what the ASCII code for the English pound sign (!) is. This last gets my award for the dumbest question asked in an installation procedure; 156 is probably a good answer. Then you have the choice of having invoices preprinted, using your own letterhead, or using plain paper. The same three choices are also offered for statements. Samples of invoice, label and statement forms are supplied with the software.

Function keys

Book Worker uses 'soft' function keys — a diagram of the ten function keys appears along the bottom of the screen (again, Figure 1) and the labels change depending on where you are in the program. This system keeps the screen uncluttered, although it is unfortunate that the layout used corresponds neither to the old vertical function keys nor the newer arrangement along the top of the keyboard. If the display is hard to read you can change the colours to any of the combinations available on your computer — some of the defaults are quite garish.

One of the soft labels is usually Help, which gives fairly rudimentary context-sensitive help.

Getting Started

Book Worker comes with a set of sample accounts so you can try out the program before you get serious. The exercises explained in the manual cover the usual functions: choosing a 'book', moving the cursor, viewing an account, searching for

an account, moving an account, performing transactions, printing reports, opening, changing and closing accounts, and exiting the program. The exercises are sufficient to give a good understanding of how the program works.

When you receive the program it is locked — you can use it to do everything except begin processing in a new period.

To unlock it you must call your dealer and ask for the code, which you should then receive 'within a day or two'. This is probably one of the least objectionable forms of copy protection. One point that I think needs emphasizing is that once a new period has been started, you cannot reverse it unless you have made a backup at the end of the previous period.

SAMPLE ACCOUNTS

SALES TAX REPORT PRINTED ON 31 JAN 86

CODE.....	RATE %.....	SALES VALUE.....	TAX COLLECTED.....	EXTENSION.....
1 QUOTE0	.00	245.00	.00	.00
2 EXEMPT	.00	453.50	.00	.00
3 HARDWARE	20.00	20.00	6.40	4.00
4 PAINTS	20.00	1407.10	10.00	281.42
5 WALLPAPER	20.00	590.00	4.80	118.00
6 TIMBER	20.00	1544.86	22.00	308.97
15 TRUCKS	15.00	111.60	11.60	16.74
16 CAR PARTS	27.50	111.60	33.33	30.69
TOTAL		4483.66	88.13	759.82

SAMPLE ACCOUNTS

SALES ANALYSIS PRINTED ON 31 JAN 86

CODE.....	RATE %.....	SALES VALUE.....	GROSS PROFIT.....
1 SUE	7.00	6976.23	1129.85
2 GEORGE	5.00	10462.00	425.23
3 MARILYN	7.00	256.44	53.50
4 RICK	5.00	121.76	47.40
64 TIM RONALO	10.00	6.92	1.16
TOTAL		17823.35	1657.14

SAMPLE ACCOUNTS

SALES JOURNAL TO 31 JAN 86.....PAGE 1

A/C. NO.	TITLE	DATE	REF.	DETAILS	EX. TAX	TAX	INC. TAX
2	AFRICAN AIDS CO.	1 FEB 86	AB1244	INVOICE.....	21.42	3.84	25.26
621	C.A.A. REAL ESTATE	31 JAN 86	AB1256	INVOICE.....	463.60	90.72	554.32
623	C.A. MOTORS	31 JAN 86	AB1257	INVOICE.....	19.06	.00	19.06
621	C.A.A. REAL ESTATE	31 JAN 86	KT1111	INVOICE.....	20.90	2.80	23.70
467	A B R ENTERPRISES	31 JAN 86	AB1258	INVOICE.....	221.06	40.61	261.67
575	DANCE STUDIOS, INC.	31 JAN 86	AB1259	INVOICE.....	134.56	24.91	159.47
22	A.B.A FIX TILING	31 JAN 86	AB1260	INVOICE.....	73.66	12.63	86.29
559	BATSTROM & YORK	31 JAN 86	12384	INVOICE.....	146.00	11.45	157.45
575	DANCE STUDIOS, INC.	31 JAN 86	12385	INVOICE.....	52.00	7.98	59.98
333	SEVER H K	31 JAN 86	12386	INVOICE.....	56.59	8.63	65.22
277	NELSON WHEELER	31 JAN 86	12387	INVOICE.....	342.00	22.00	364.00
271	HR SECURITY	31 JAN 86	12388	INVOICE.....	63.82	9.23	73.05
					1614.67	234.80	1849.47

SAMPLE ACCOUNTS

RECEIPTS JOURNAL TO 31 JAN 86.....PAGE 1

A/C. NO.	TITLE	DATE	REF.	DETAILS	GROSS	DISCOUNT	NET
467	A B R ENTERPRISES	31 JAN 86	6502	RECEIPT.....	250.00	20.00	230.00
261	JAM FACTORY	31 JAN 86	6503	RECEIPT.....	25.58	3.50	22.08
271	HR SECURITY	31 JAN 86	6504	RECEIPT.....	40.00	.00	40.00
329	SAVEL N N	31 JAN 86	6505	RECEIPT.....	25.00	.00	25.00
					340.58	23.50	317.08

Figure 3. Sample Sales Tax, Sales Analysis and Sales Journals generated by Book Worker.

Passwords

Book Worker has provision for two passwords, one for an operator and one for the supervisor. The operator is allowed to open and post transactions to general ledger accounts but cannot view the contents of the accounts or print general ledger reports. The supervisor can, of course, do all these things. Passwords are limited to three characters, which is not enough to provide much security. In addition, the system will reject any password which reads the same forwards as backwards.

Implementation

The manual rightly points out that the first few weeks of using Book Worker will be the most demanding, and suggests making a plan to avoid the temptation of being too ambitious. This is wise, as you have to set up your accounts and in addition enter a lot of information. I'd suggest you go through the manual carefully at each step, as it has a lot of information you might otherwise overlook. The program works in a straightforward fashion and allows you to keep separate books for

two or more companies. Book Worker allows you to perform all the normal accounting activities without too many problems.

Expansion

As mentioned, Book Worker will increase the size of the database as necessary. You can run a 'rebuild' program which runs through the database and reconstructs the book pages and the tables used by the system to access the items in the book. Each time a rebuild is done, Book Worker rechecks the capacity used. If it finds the data files are more than 80 per cent full, it increases the size of the files by 20 per cent. This occurs separately for the accounts and transactions.

When you enter the password and date when starting the system, Book Worker checks the account capacity and the transaction capacity, and if necessary, goes into an account rebuild before continuing. If there is insufficient space on the disk, Book Worker expands them as far as it can and displays a warning. This gives you an opportunity to remove from the hard disk

any software or data files that are no longer required.

Is Book Worker For Me?

You can run Book Worker using twin floppies and 256 Kbyte memory, but this will be slow and will suffice for only a small business. I'd recommend you think more of a hard disk — a modest size of, say, 10 megabytes would be adequate, and RAM of at least 256 Kbyte, but with provision for expanding this later (up to the maximum of 640 Kbyte) when needed. If you are going to run close to the limit of 11,250 accounts you probably should be looking at a larger system.

Sybiz Software has a good reputation, so if your business is of the right size for using Book Worker, you should certainly consider buying it. □

Product Details

Product: Book Worker
From: Sybiz Software Pty Ltd,
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The Witty Mouse

'To all those struggling to invent a better mouse trap: The mice are getting smarter.'

— Farquhar Cameron

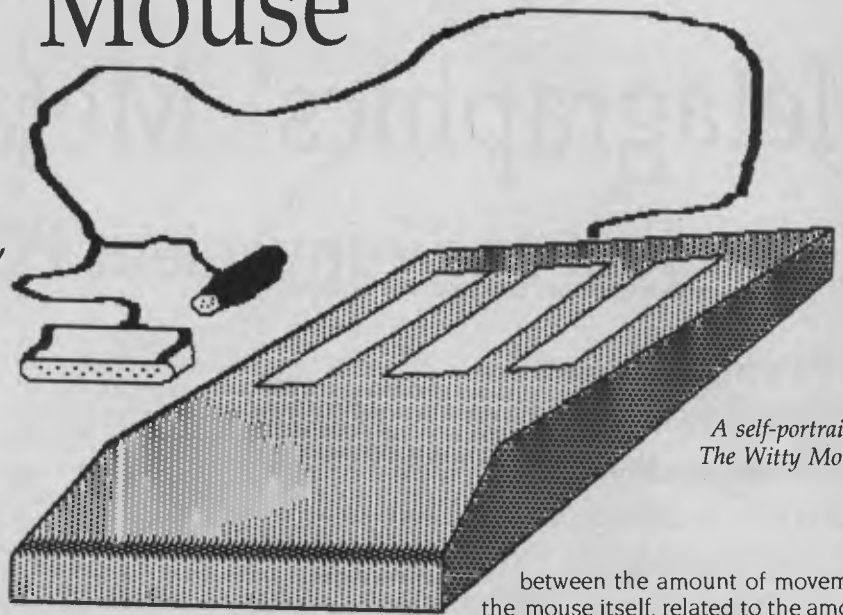
CALL ME A senile old journalist (*You're a senile old journalist: ed.*), but I remember when everybody's favourite mouse had skinny little black legs and spent his entire time outwitting Moggie. Now mice all seem to have silicone coated steel balls and their tails end in DB29s.

With the advent of the computer graphics revolution came an immediate need for an alternative to the keyboard for drawing on the screen. Many methods have been tried, but the favourite reasonably priced example is certainly the mouse. Light pens, digitisers, scanners and touch pads all produce similar results, but the humble mouse is easy to use, economical and versatile.

A mouse is simply a small remote device which plugs into your computer and gives you control over the cursor position. Keys on the mouse may be configured to emulate normal keyboard keys and with the right software, you can drive your computer through some applications without touching the normal keyboard. There are two main types of mice: the serial mouse and the bus mouse. The bus mouse requires an additional board in your computer and the serial mouse plugs into the RS232 port.

The Witty Mouse is of the serial type and has three control buttons on it. Many mice have only two buttons, but the third button is a real bonus. Unlike any other mouse I have seen, the Witty Mouse has an additional cable which intercepts the keyboard and gets the power requirement from there. There is 1.5 meters of light cable from the RS232 to the mouse which means you can use the mouse a reasonable distance away from the screen. The handpiece is about the size of a cigarette packet (that's 116 x 66 x 34 mm for non-smokers).

The top of the mouse is sloped with the



A self-portrait of The Witty Mouse.

keys situated on the longer front slope so the hand rests naturally on the beast with the fingers falling on the keys. Turning him over reveals his softer side (if you can call silicone coated steel balls softer). There is a plastic pad with a round hole in it through which protrudes the ball. As you move the mouse over any smooth surface this ball revolves and the movement is transferred to signals read by your software. Many application programs written for mice ask you to 'point and click'. With this type of program, an arrow replaces your normal cursor and you move it to a menu with the mouse and press a button to transmit your command.

The Witty Mouse is compatible with all the major mouse systems, for along with most aspects of computing, there have been parallel but not necessarily compatible development of this style of interface. Witty is compatible with Mouse Systems' PC Mouse, Visi-on Mouse, Logitech Logi-mouse and Torrington Manager Mouse. Software is not supplied with Witty Mouse, but most purpose written mouse applications contain their own driver software. Utility programs are available to write specific applications to suit your needs.

The difference between a good mouse and a poor one is simply the ease of use. How smoothly does the beast move across a variety of surfaces and perhaps, more importantly, what's the Mickey Ratio? (What, indeed, is the Mickey Ratio?) This is the name given to the ratio

between the amount of movement of the mouse itself, related to the amount of cursor movement it produces.

Too high a Mickey Ratio means you can't produce very fine movements of the cursor, and small drawings on screen become hard to handle. Too low a Mickey Ratio means that you need a large area to move the mouse about on. The Witty Mouse is close to ideal with the the ratio being 195 pixels onscreen for every inch the mouse is moved. I have a standard, old style office desk with a pull out shelf over the top drawer, and find the shelf an ideal place to use my mouse. The timber top is fine to work on although some prefer to use a mouse on a rubberised mat for more accurate movement. (A piece of wet-suit neoprene is ideal.)

Microsoft market perhaps the best known mouse system, the Microsoft Mouse, which costs from \$295 to \$375 depending where you buy it. I admit that this includes a nice software suite but Microsoft refuse to supply the hardware without the software. I tried once to buy a mouse as a spare part, claiming the cat had got mine, but was told I must buy the whole software/hardware package. The Witty Mouse with his the low, low price deserves to sell in quantity. □

Product Details

Product: The Witty Mouse

Distributor: Sancom Computers,
313 Harris St, Pyrmont 2009 NSW
(02) 552 1640

Price: \$95 taxed (plus mouse driver)

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Here's a high performance graphics system that gives drawing functions plus utilities for developing meta-windows.
(Even Peter 'Turbo' Hill thinks its quick!)

THE AVAILABILITY of graphics-oriented machines such as the Macintosh and the Amiga on the PC market largely divided PC users into two groups. The graphics-oriented users, with the support of graphic interfaces and object-oriented toolkits as part of the operating system, concentrated on art and desktop publishing (DTP) applications. The machine of choice was the Macintosh. The more traditional business tasks (financial modelling, wordprocessing and database management) tended to be the domain of the IBM PC with only its simple graphics driver to perform the most basic tasks, such as displaying graphs.

The EGA graphics display standard for the IBM PC, the release of Microsoft Windows and the emergence of DTP programs for the PC (or more correctly the IBM PC/AT) have blurred those boundaries, with the side-effect that IBM users are becoming more interested in graphics in general, and object-oriented graphics in particular.

A Dilemma

For the software developer this presents a dilemma; writing fast and robust graphics software is by no means a trivial task. The most minimal work requires an inordinate number of lines of code together with complex initialisation routines to determine the hardware details.

Published code examples are often machine specific, and the need for low level routines drives the writer into a combination of high level language and Assembly code. When this is all put together, a common result is that although the program does run twice as slowly as required, the rate of calls to the support hotline runs twice as fast!

To the rescue comes MetaWindow — a family of graphics routines closely coupled to a memory resident graphics driver. The routines vary from the primitive (straight line drawing) to the complex (bit-mapped text). MetaWindow is available in a wide range of flavours including: Turbo Pascal, IBM Pascal, C compilers (Microsoft, Lattice, Computer Innovations and Metaware), Microsoft Macro Assembler and Microsoft Fortran.

The latter is an interesting feature: there are many situations where Fortran is still the language of choice, especially in scientific applications; graphics support for Fortran is a rare and welcome addition. This review concentrates on the Turbo Pascal version of MetaWindow; there is no reason to believe that the results with other compilers would differ substantially.

These are the categories of functions provided —

Drawing Routines — routines for drawing, painting, filling and inverting various

shapes. Most shapes are identified by a rectangle which establishes their outer limits. Included in this group of functions are textdrawing routines for both bit-mapped and outline text, together with screen saving and retrieving procedures. Within a given region of the screen, these routines are the key to this graphics toolbox. The level and capability varies from line drawing up to inverting the pixels in a defined arc.

... the way in which two intersecting lines are joined can be specified as square, round or mitred!

Pen Routines — routines for establishing every aspect of the drawing 'pen' used in the drawing routines. In this category, it is possible to control the 'pen' appearance to the most minute level of detail; the way in which two intersecting lines are joined can be specified as square, round or mitred!

Windowing (Port) Routines — MetaGraphics refers to an area of the graphics screen as a 'port'. These routines allow the

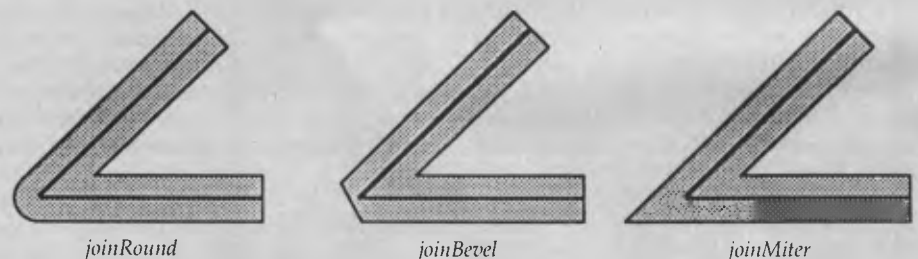


Figure 1. Pen Routines in MetaWindows can be used for establishing every aspect of the drawing 'pen'. Even the way in which two intersecting lines are joined can be specified as square, round or mitred!

direct manipulation of ports, including such features as clipping, colouration and moving. Having specified a port, all the other settings (such as pen width) are local to this port.

Computational Routines — this category covers a useful variety of calculations; rectangles can be moved and centred, points can be scaled and a full set of Boolean operators allow the user to determine whether a particular point is either within or on the boundaries of an object.

Mouse and Cursor Tracking — here we find routines to allow the tracking and manipulation of the cursor using either a mouse or the cursor control keys. Included are routines for selecting the shape and colour of the cursor (remember this is the graphics cursor not the normal text cursor) and even to redefine the shape of the eight standard cursors provided, which include the ubiquitous arrow.

Event Processing and System Utilities — these utilities allow the handling of multiple events in a stack; that is, these utilities allow events to be added to, removed from or executed from a queue where they are stored. The system utilities are a mixed bag of functions which are useful for determining the current operating environment; for example, routines to return the data segment of the current program, to perform file input and output and to determine the number of colours displayable on the machine are amongst this category.

Print Screen Utility — this is a memory resident program which allows high quality screen dumps to a graphics printer when the PrintScreen key is pressed. Additionally, a callable version of the trigger is provided, so that your own code can initiate a screen dump.

Shortcomings

Despite being a well-crafted set of routines, there are a number of imperfections in TurboWindow. Firstly, the accuracy of the routines which determine the type of display and the presence of a mouse is suspect. On a number of (highly compatible) PC clones, the result was incorrect. In particular, the demonstration program supplied had a tendency to detect non-existent mice (mouses? meese?); also, it identified an EGA card as a Hercules card and then failed to operate correctly. It would appear that this problem is acknowledged since there is allowance for specifying command line parameters to over-ride the measured results; whilst this provides a work-around, it is hardly a satisfactory result.

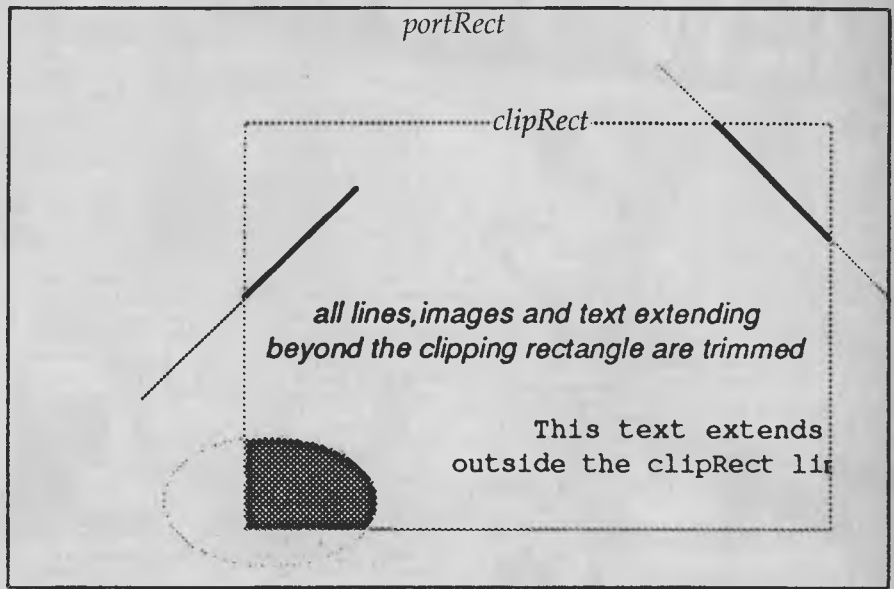


Figure 2. Windowing Routines allow the direct manipulation of ports (windows), including such features as clipping, colouration and moving. In the example above, note how all lines, images and text extending beyond clipRect are trimmed.

Whilst I'm whingeing about a thoroughly well-constructed product, I can't help adding my wish list; routines to support the more common flat-bed plotters would really enhance this software for the professional programmer.

Strengths

There are two outstanding strengths to these routines: flexibility and speed. The flexibility is shown in the very comprehensive range of functions available — round-cornered rectangles which allow the separate specification of the vertical and horizontal intercepts and the corner radius are an example. Even more remarkable is the speed of the primitive draw and fill functions. Clearly the routines for these tasks are highly optimised, and consequently it is possible to literally throw graphics up on the screen.

The user-written code is always in control of the process, largely due to the 'localisation' of selected characteristics to the current port. This is rather similar to the use of a local data structure within a Turbo Pascal routine; all the settings (such as pen width and pattern or port coordinates) are local to the selected port, and each port can have distinct settings.

Overall

If you are setting out to write a commercial quality program which uses graphics or simply want to add a graphic interface to your program, MetaWindow will pro-

vide you with two valuable productivity bonuses. First, the routines you need without the hackwork of writing them yourself. Second, optimisation; this is of significance since whilst drawing a rounded rectangle is a straightforward coding task, drawing it quickly can take ten times as long.

As a set of productivity tools, a substantial improvement to the organisation of the documentation, together with a thorough cross-referenced index, would top this product off, but even as is it will save many hours and generate a more professional result than most code cutters could ever hope to achieve. If your interest is graphics on the PC, Metagraphics Software Corporation can provide you the graphics toolkit that your Macintosh friends have always enjoyed! □

Product Details

Product: MetaWindows
From: MetaGraphics Software Corp., Mountain View, California
Distributor: MicroWay, 202 Chesterville Rd, Moorabbin 3189 Vic.
 (03) 555 4544
Price: \$544 MetaWindow; \$744 MetaWindow Plus; \$346 TurboWindow C; \$346 TurboWindow Pascal; \$346 LightWindow C; \$346 FontWindow (All prices taxed.)

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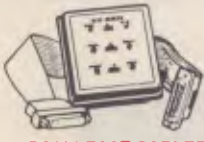
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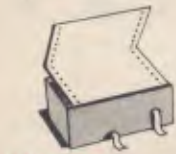
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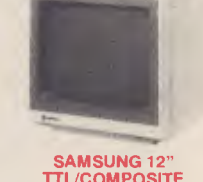
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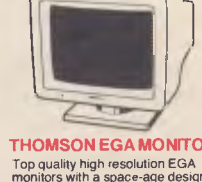
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Scanning frequency:
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Vertical: 0.1%/18.432KHz + 0.1%
Vertical: 47-63Hz
Video bandwidth: 20MHz
Active display area:
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Display character:
80 characters x 25 rows
input terminal: Phono Pin Jack, 9 pin D-Sub Connector.
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THE ENCODER

... keep it secret

Keep your data and text
files (and Basic programs)

safe from prying eyes

with Tim Hartnell's

Encoder program.

THE ENIGMA Machine, masterminded by Alan Turing, helped win the war by cracking Hitler's codes. Our Encoder program may help you win your own security wars. Instead of breaking other people's codes, The Encoder scrambles text, data and Basic program files so that they can't be read by anyone else.

Without both your encoding key, and your own particular version of the Encoder, others will have no hope of cracking your encoded files. To make the files even more secure, you can make tiny changes to the listing, which will ensure that even if someone manages to guess your key (and it can be up to 244 characters long, and these characters can be anything you can generate from your computer keyboard, including control codes) they will still not be able to read your text files.

The simplest form of encoding program would read each character in a file, add a number to it (such as 7), and then write the modified file back to the disk. You would end up with a file which, at first sight, would be gibberish, but would be extremely easy to crack. You could set your computer to try adding and subtracting numbers, and get it to print one sentence of the file on the screen in the preliminary 'decoded' form, and eventually, one of the sentences would be readable, and you'd have cracked the code.

```

10 REM CYPHER
20 REM.(c) Tim Hartnell, 1987
30 REM Interface Publications
40 CLS:PRINT
50 INPUT " ==> Enter cypher key";B$
60 B$=B$+"*"
70 Z=LEN(B$):DIM C(Z)
80 PRINT " ==> These are the cypher key numbers:"
90 FOR J=1 TO Z
100 C(J)=INT(ASC(MID$(B$,J))/2)
110 PRINT C(J);:NEXT J
120 C$=""
130 PRINT:PRINT:INPUT " ==> Enter text to be encoded";A$
140 KT=0
150 PRINT " ==> These are the numbers of the encoded text:"
160 FOR J=1 TO LEN(A$)
170 KT=KT+1:IF KT>Z THEN KT=1
180 Q=ASC(MID$(A$,J))+C(KT)
190 PRINT Q;
200 C$=C$+CHR$(Q)
210 NEXT J
220 PRINT:PRINT " ==> This is the encoded text:"
230 PRINT C$
240 A$=""
250 KT=0
260 PRINT:PRINT " ==> These are the numbers of the decoded text:"
270 FOR J=1 TO LEN(C$)
280 KT=KT+1:IF KT>Z THEN KT=1
290 Q=ASC(MID$(C$,J))-C(KT)
300 PRINT Q;
310 A$=A$+CHR$(Q)
320 NEXT J
330 PRINT:PRINT " ==> This is the decoded text:"
340 PRINT A$

```

Listing 1. Cypher — This simplified version demonstrates how The Encoder works. After you enter your cypher key, the program gets the ASCII code of each character in it, and stores these numbers in order within an array (C).

We use a slightly more sophisticated approach, in which a sequence of numbers is used to encode the text. As the sequence can be any length you like (to 244 characters), can contain control and graphics characters, and as the entered key is used backwards, the chance of it being crackable (even to someone who has also read this article), is minute. To add greater security to your files, as I suggested at the start of this article, you can make tiny modifications to your own program so that even if someone had your key, they would not know exactly how it was being used, so the chances of them breaking into your files would be diminished even further.

The Over-Achieving Student

I created The Encoder after receiving a telephone call from a lecturer at Sydney University. As part of his course, he had written a multiple-choice examination program, in which the core program read in text files of questions, the choice of answers, and the correct answer. He found that one student was getting 100 per cent correct results all the time. It didn't take long to realise that anyone could read the question/answer file just by using the DOS 'type' command. The lecturer rang me to ask how he could get around this.

The Encoder was written so that it, and the multiple choice program, were com-

bined, and then compiled. The data files containing the questions and answers were held on the disk in encoded form, so the 'type' command would only give gibberish, and they were decoded when the program was run.

To make it very clear how The Encoder works, I've written another, simpler program, Cypher (Listing 1). When you enter and run this, you'll see exactly how the process works. You'll be told, first, to 'Enter cypher key', and you respond by typing in your key, such as 'Password', 'Gemlock' 'Pass the salt' or whatever (and note that 'Password' is a different key to 'PASSWORD' and 'paSsword'). The pro-

gram will stop if you name a file which is not on the disk.

Then you're asked to enter your 'encryption code', and the name under which you want the new file to be stored. For security, the original file is not erased in this process. I very, very strongly urge you not to delete the unencoded form of files, just in case something goes wrong and you can't get your encoded file back as you had it originally. Keep a backup copy of the original file on another disk which is stored away from your computer, and delete the original file from the disk which contains the encoded form. The disk-handling commands in this section of the pro-

gram are designed to run on MS-DOS machines. You may well have to modify these to run on other computers. (Note the statement EOF(1) in line 300. This tells the computer that the end of the file has been reached.)

Making It Even Harder

The routine which changes your encryption code into numbers has been placed as a subroutine at the end of the program for one simple reason. This is the section of the program which you can modify to create a unique version of The Encoder. You'll see that an asterisk is added to the end of your entered key (line

Without both your encoding key, and your own particular version of the Encoder, others will have no hope of cracking your encoded files.

gram then goes through your entered key, and gets the ASCII code of each character in it, and stores these numbers in order within an array (C).

Next, you'll be asked to 'Enter text to be encoded'. You type in your text, it is broken down into its ASCII numbers, and the numbers from the C array are added to it. When the C array is used up, it simply starts the sequence again. The encoded text will be printed out (lines 220 and 230), and it will then be decoded on screen for you, and finally printed out in the decoded form.

Once you've run Cypher, you'll clearly understand how the process works.

The Encoder

The Encoder (Listing 2) uses much the same approach, but with a degree of sophistication which is not found in Cypher. You are given the option, at the beginning, of encoding, decoding, or quitting the program. If you decide to encode or decode a file (and any ASCII file, text, data or a Basic program saved using the ,A option can be used with this program), you are shown all the files on the current disk drive, and asked to enter the name of the file you wish to encode or decode. The

```

10 REM THE ENCODER
20 REM (c) Tim Hartnell, 1987
30 REM Interface Publications
40 DIM C(255)
50 CLS
60 PRINT:PRINT
70 PRINT "Do you wish to (1) decode text;"
80 PRINT "                (2) encode text; or"
90 PRINT "                (3) exit from program?"
100 INPUT J$:IF J$<"1" OR J$>"3" THEN 100
110 IF J$="3" THEN PRINT:PRINT "OK, 'bye":END
120 CLS:PRINT:PRINT
130 REM *****
140 REM Encode Text
150 PRINT "These are the files on your disk:"
160 FILES
170 IF J$="1" THEN PRINT "Please enter name of file to be decoded"
180 IF J$="2" THEN PRINT "Please enter name of file to be encoded"
190 INPUT N$:IF LEN(N$)<1 OR LEN(N$)>12 THEN 190
200 OPEN N$ FOR INPUT AS #1
210 PRINT:PRINT "Please enter encryption code"
220 INPUT B$
230 PRINT:PRINT "Please enter name under which file is to be stored"
240 INPUT S$:IF LEN(S$)<1 OR LEN(S$)>12 THEN 240
250 OPEN S$ FOR OUTPUT AS #2
260 GOSUB 420:REM Change code into numbers
270 PRINT "The process is underway ";
280 MK=0
290 L$="" :K=0
300 IF EOF(1) THEN PRINT #2,L$:PRINT:PRINT
    "It is finished":CLOSE:GOTO 60
310 A$=INPUT$(1,#1)
320 K=K+1:IF K>Z THEN K=1
330 IF MK=0 AND ASC(A$)=13 THEN PRINT #2,L$:PRINT "*" ;MK=1:GOTO
    290:REM End of first line of text
340 IF MK=1 AND ASC(A$)=13 THEN PRINT #2,MID$(L$,2)+PRINT "*" ;GOTO
    290:REM End of other lines of text
350 IF J$="2" THEN A=ASC(A$)+C(K)
360 IF J$="1" THEN A=ASC(A$)-C(K)
370 IF A<0 THEN A=A+128
380 IF A>255 THEN A=A-128
390 L$=L$+CHR$(A)
400 GOTO 300
410 REM *****
420 REM Change CODE into numbers
430 B$=B$+"*"
440 IF LEN(B$)>255 THEN B$=LEFT$(B$,255)
450 Z=LEN(B$)
460 FOR J=Z TO 1 'Step' -1
470 C(J)=INT(ASC(MID$(B$,J))/2)
480 NEXT J
490 RETURN
    
```

Listing 2. The Encoder — The subroutine which changes your encryption code into numbers can be modified to create your own unique version simply by changing the asterisk in line 430 to any character(s) you like.

430). This allows you to simply press the 'enter' key when asked for a code, and it will default to simply adding 42 (the ASCII code of the * character) to every file. The first, and simplest thing to do to make The Encoder your own, is change this asterisk to any other character, or characters you like. You could, for example, add your initials, and house number, at this point, or whatever you like.

Now the loop from lines 460 to 480 read through your encryption key, assigning it in reverse order to the elements of the C array. This hides the code even more securely. There is no reason why you could not read them into the array in the correct order, or even use a 'Step' command to use only every, say, third character, further confounding the attempts of anyone to break your code. (If you decide to include a 'Step' stage, you could get the computer to ask the user to enter the 'Step' value while the program is running, adding a further level of security.)

Another idea has been used in the Cypher program which you can apply at this point. When changing the encryption key into numbers (line 100), the ASCII values are first divided by two and then INTed. So

even if you use an obvious code like your name, it will be rendered into a group of apparently random characters by dividing their values by two. As with the idea of asking for a 'Step' value, you can get the computer to ask for a value which is used to divide the values of the characters of your entered key, adding a further level of difficulty to the decoding process. There is no reason why it should be a whole number. You could get the computer, for example, to divide the numbers by something like pi, or 19/6.2. None would ever be able to guess *that* value.

You'll no doubt be able to think of other ways of further obscuring your trail, perhaps by adding a value to each character which is related to the value of the previous character, or to its position within the encryption key, or in some other way. As the routine which changes your code into numbers is a separated subroutine, and is used in both the encoding and decoding process, you can make as many changes as you like to this section, knowing that the computer will automatically use these changes for both processes. If your random number generator always produces the same sequence of numbers when

seeded with a particular value, you could ask for a seed and then use this to further scramble your code. This would give you a further 64,000 or so ways of confounding those who would dare to break your code.

Finally, however, I must add a warning. Although our 100 per cent student has not managed to get quite the same score in his multiple-choice tests as he did before The Encoder was put to work, at times his lecturer gets a trifle suspicious at all the hours which are being put in on the computer. Do not get too complacent. ASIO operatives, for example, who are reading this article with interest, and planning how our strategic secrets will be made safe from those who would bring our sun-burnt country down, should keep in mind Edgar Allen Poe's sombre warning: 'What Man can encypher, Man can decypher'.

Note that both programs can be downloaded from *Your Computer's Bulletin Board*, or you can get them on disk from me by sending \$5.00 (cash, Visa, Bankcard or Mastercard) to Tim Hartnell, Interface Publications, 34 Camp Street, Chelsea, Vic., 3196. The rest of the disk is filled with other interesting programs. Happy encoding. □

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Part 3

The Attainment of Assembly

In Part 2, John Summerfield showed us the programmer's view of the 8086; now we're ready to start stacking it on . . .

IN NOVEMBER I left you bemused with knowledge of the 8086 architecture: you know all about all the 8086 registers, about how memory is addressed. You will remember there are four pointers (called segment registers) to four 64 kilobyte windows in 1 megabyte of main storage.

We wrote a little program to copy data from an input file to an output file. By default, both files are the console, although you could change that by running it like this —

```
EX01 <EX001.BAK >PRN
```

That change would make it copy the file EX001.BAK to the printer.

In our program we had some separate areas called segments. We had one segment called *fred* which contains the machine instructions, and another area called *joe* which I said DOS would use for our stack.

The Stack

I didn't say much about the stack, did I? I did talk about PUSHing and POPping as operations that affect it, though.

When the 8086 reacts to an interrupt, it needs an area to save some of the machine environment. As part of the process of responding to an interrupt, the 8086 stores the flags and where it

Abb.

In discussing the operands of the various instructions it is convenient to use some abbreviations to reduce boring repetition. I will use these abbreviations —

- REG8 — Any 8-bit register
- REG16 — Any 16-bit register except the segment registers
- MEM8 — Any 8-bit storage location
- MEM16 — Any 16-bit storage location
- SEGREG — Any segment register
- REG — REG8 or REG16
- MEM — MEM8 or MEM16
- NUM8 — An 8-bit number
- NUM16 — A 16-bit number
- a/b — Either A or B: MEM16/REG16 means either MEM16 or REG16

was up to at the time (CS and IP registers). The interrupt service routine which handles the interrupt also needs to save some of the machine environment: for example, those of your program's registers that it uses.

The 8086 uses an area call the stack for this purpose. It uses the SS (Stack Segment) register to point to the area set aside for this purpose and the SP (Stack Pointer) register to keep track of where it's up to in the stack segment.

When MSLINK creates the EXE file, it stores information in the header to identify the stack segment you have reserved in your program. If you don't reserve one, MSLINK complains.

In your program, you normally access the stack by using PUSH instructions to put data on top of the stack, and POP instructions to take data off. You can also manipulate the SP register with ADD, SUB and MOV instructions, just as you can the other non-segment registers.

You can change from one stack to another any time you want, although you will rarely need to.

The stack is processed as a sequence of 16-bit elements. Thus when we access the stack with a PUSH or POP operation, two bytes, or an 8086 word, are transferred.

The stack can be visualised as a column of words. Low addresses are at the bottom of the column. The stack pointer moves down the column when we PUSH, and up the column when we POP.

When DOS loads the EXE file for execution, it uses information in the file header to set the initial values for SS and SP. From the description above, you can see that it makes sense for SP to point to the *top* of the stack.

The Flags

The flags register reflects many aspects of the machine status. Some of the flags are readily able to be manipulated directly. Table 1 shows their positions and uses.

FLAGS	Name	Tested with
1	Native mode (V20, V30 only)	
0	Emulation mode: executes 8080 instruction set (V20, V30 only)	
x	Reserved (Except V20, V30)	
xxx	Reserved	
x	Overflow	INTO, JO, JNO
*	Direction	n/a
*	Interrupt	n/a
*	Trap	n/a
x	Sign	JS, JNS
x	Zero	JZ, JNZ
x	Auxilliary Carry	n/a
*	Parity	JPE, JPO
x	Carry	JC, JNC, JB, JNB, JNAE, JAE

Table 1: The positions and uses of the flags register which reflects many aspects of the machine status.

Listing 1 was created by tracing a DEBUG session, and trapping the output with my glass printer. The lower case characters are the ones I typed; DEBUG did the rest. I fired up DEBUG which responded with its prompt character, a hyphen. I entered the command a100, telling DEBUG I want to enter assembly language statements and that they should be stored at offset 100. I entered my little program on successive lines and entered a null line when I finished.

```
C:\text\asm>debug
-a100
7E06:0100 mov ax,0
7E06:0103 add ax,7fff
7E06:0106 jmp 103
7E06:0108
-tf

AX=0000 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0103 NV UP DI PL NZ NA PO NC
7E06:0103 05FF7F ADD AX,7FFF

AX=7FFF BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0106 NV UP DI PL NZ NA PE NC
7E06:0106 E8FB JMP 0103

AX=7FFF BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0103 NV UP DI PL NZ NA PE NC
7E06:0103 05FF7F ADD AX,7FFF

AX=FFFE BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0106 OV UP DI NG NZ AC PO NC
7E06:0106 E8FB JMP 0103

AX=FFFE BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0103 OV UP DI NG NZ AC PO NC
7E06:0103 05FF7F ADD AX,7FFF

AX=7FFD BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0103 NV UP DI PL NZ AC PO CY
7E06:0103 05FF7F ADD AX,7FFF

AX=FFFC BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0106 OV UP DI NG NZ AC PE NC
7E06:0106 E8FB JMP 0103

AX=FFFC BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0103 OV UP DI NG NZ AC PE NC
7E06:0103 05FF7F ADD AX,7FFF

AX=7FFB BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0106 NV UP DI PL NZ AC PO CY
7E06:0106 E8FB JMP 0103

AX=7FFB BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0103 NV UP DI PL NZ AC PO CY
7E06:0103 05FF7F ADD AX,7FFF

AX=FFFA BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0106 OV UP DI NG NZ AC PE NC
7E06:0106 E8FB JMP 0103

AX=FFFA BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0103 OV UP DI NG NZ AC PE NC
7E06:0103 05FF7F ADD AX,7FFF

AX=7FF9 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0106 NV UP DI PL NZ AC PE CY
7E06:0106 E8FB JMP 0103

AX=7FF9 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0103 NV UP DI PL NZ AC PE CY
7E06:0103 05FF7F ADD AX,7FFF

C:\text\asm>
```

Listing 1: The result of tracing a DEBUG session, and trapping the output with my glass printer. The lower case characters are the ones I typed; DEBUG did the rest.

I then entered the command tf which means 'trace the execution of 15 instructions.'
 DEBUG did that, printing out the register contents and flag bits (shown in Table 2) at each step.

Table 2: The flag bits.

Flag	Set	Clear
Overflow	OV	NV
Direction	UP	DN
Interrupt	OI	EI
Trap	Not shown	
Sign	NG	PL
Zero	ZR	NZ
Auxiliary Carry	AC	NA
Parity	PE	PO
Carry	CY	NC

From the trace, you can see how the overflow, sign, parity, carry and auxiliary carry flags are affected. The zero flag is only set if the result of an arithmetic or logical is zero.

Listing 2 shows the effect of the SUB instruction on the flags. The overflow flag is set when the result of a signed arithmetic operation is invalid, such as the when the addition of two positive numbers produces a negative result.

```
C:\text\asm>debug
-a10D
7E06:0100 mov ax,0
7E06:0103 sub ax,7fff
7E06:0106 jmp 103
7E06:0108
-tf

AX=0000 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0103 NV UP DI PL NZ NA PO NC
7E06:0103 20FF7F SUB AX,7FFF

AX=8001 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0106 NV UP DI NG NZ AC PO CY
7E06:0106 E8FB JMP 0103

AX=8001 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0103 NV UP DI NG NZ AC PO CY
7E06:0103 20FF7F SUB AX,7FFF

AX=0002 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0106 OV UP DI PL NZ AC PO NC
7E06:0106 E8FB JMP 0103

AX=0002 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0103 OV UP DI PL NZ AC PQ NC
7E06:0103 20FF7F SUB AX,7FFF

AX=8003 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0106 NV UP DI NG NZ AC PE CY
7E06:0106 E8FB JMP 0103

AX=8003 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0103 NV UP DI NG NZ AC PE CY
7E06:0103 20FF7F SUB AX,7FFF

AX=0004 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0106 OV UP DI PL NZ AC PO NC
7E06:0106 E8FB JMP 0103

AX=0004 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0103 OV UP DI PL NZ AC PO NC
7E06:0103 20FF7F SUB AX,7FFF

AX=8005 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0106 NV UP DI NG NZ AC PE CY
7E06:0106 E8FB JMP 0103

AX=8005 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0103 NV UP DI NG NZ AC PE CY
7E06:0103 20FF7F SUB AX,7FFF

AX=0006 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0106 OV UP DI PL NZ AC PE NC
7E06:0106 E8FB JMP 0103

AX=0006 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0103 OV UP DI PL NZ AC PE NC
7E06:0103 20FF7F SUB AX,7FFF

AX=8007 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0106 NV UP DI NG NZ AC PO CY
7E06:0106 E8FB JMP 0103

AX=8007 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
OS=7E06 ES=7E06 SS=7E06 CS=7E06 IP=0103 NV UP DI NG NZ AC PO CY
7E06:0103 20FF7F SUB AX,7FFF

C:\text\asm>
```

Listing 2: The the effect of the SUB instruction on the flags.

We will discuss the direction flag when we deal with the instructions it affects.

The interrupt flag is set with the STI instruction to disable interrupts, and cleared with the CLI instruction to enable interrupts. This flag affects whether interrupts requested on the INT pin are recognised — typically, from the system timer, keyboard, disk drives and so on. It does not affect the Non-Maskable Interrupt requests which appear on the NMI pin — they should be used to signal catastrophic errors such as impending power failure, memory errors and such like. Neither does the flag affect software interrupts.

The TRAP flag is used by debugging software such as DEBUG. When the flag is set, the machine executes one more instruction and then executes a type I interrupt, which clears the flag. This is what happens when DEBUG is tracing a program —

- a) Debug issues an IRET.
- b) The machine loads IP, CS and flags from the stack this sets the TRAP flag.
- c) The machine fetches and executes one instruction from your program.
- d) Since the TRAP flag is set, the 8086 then executes a type I interrupt, clearing the TRAP flag. This is intercepted by DEBUG.

The SIGN flag reflects the sign of the most recent arithmetic operation. Auxiliary carry reflects the carry from bit 3, and is used by decimal arithmetic instructions.

Carry indicates the carry from the high-order bit, and you will use it to implement 32-bit addition and subtraction. It can also be set with STC and cleared with the CLC instructions.

Data Types

These are the types of data the 8086 can process —

- a) 8-bit fixed-point binary.
- b) 16-bit fixed-point binary.
- c) 32-bit fixed-point binary. Only processed directly as the result of a multiplication and used as the dividend in division. However, the carry flag can be used in conjunction with appropriate instructions to extend precision as required.
- d) Character. These are processed as 8-bit fixed-point binary numbers.
- e) String. There are instructions to process up to 64 Kbyte of consecutive bytes as an entity.
- f) Packed Decimal. Two decimal digits are stored in each byte.
- g) Unpacked Decimal. One decimal digit is stored in each byte.

Note that the 8086 follows the 8080 convention in storing 16-bit numbers low-order byte in the lower-numbered storage location. MASM hides this fact on the assembly listings; to my mind this adds to the confusion because the listed object code is not the same as the actual object code. For example, the number 1234h is stored as 3412.

Program of the Month

Before we go to the program of the month, here is the .BAT file I'm using to edit, assemble and link it —

```
if '%1' == '' goto noset
set apgm=%1
:noset
w %apgm%.asm
masm %apgm%
mlink %apgm%
```

Listing 3. Tracing the Execution of the HEX Subroutine. Data enclosed in /* and */ are comments added after the run.

```
C:\text\asm\exercise>debug ex002.exe
/* start DEBUG. The full file
name is required */
/* Unassemble, beginning at 02 */
/* This is the HEX procedure. I
found its address in the listing */
-082
7E20:0082 8AE0 MOV AH,AL
7E20:0084 25F00F AND AX,0FD
7E20:0087 B104 MOV CL,04
7E20:0089 02E8 SHR AL,CL
7E20:008B 0D3030 OR AX,3030
7E20:008E 3C3A CMP AL,3A
7E20:0090 7202 JB 0094
7E20:0092 0407 ADD AL,07
7E20:0094 80FC3A CMP AH,3A
7E20:0097 7203 JB 009C
7E20:0099 80C407 ADD AH,07
7E20:009C C3 RET
7E20:00D0 0000 ADD [BX+SI],AL /* Junk at the end of HEX */
7E20:00F0 0000 ADD [BX+SI],AL
7E20:00A1 0000 ADD [BX+SI],AL
-g82
/* Start execution at the location
given by CS:IP. Stop when and if it
gets to 02. This is how we apply
breakpoints. When it gets there, DEBUG
returns to command mode and we can
have a look around. Change things,
too, if we want to. */
/* At this time I typed a "Z". It was
not echoed to the screen, but we will
see it soon */
AX=0200 BX=0000 CX=0131 DX=7E0A SP=007C BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0082 NV UP DI PL ZR NA PE NC
7E20:0082 8AE0 MOV AH,AL
/* This time through it's got part of
the RBA which is printed at the start
of each line */
-t4
/* Trace the next four instructions */
AX=0000 BX=0000 CX=0131 DX=7E0A SP=007C BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=
0084 NV UP DI PL ZR NA PE NC 7E20:0084 25F00F AND AX,0FF0
/* It's a bit hard to see what's
happening. We can see where it's
going, though */
AX=0000 BX=0000 CX=0131 DX=7E0A SP=007C BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0087 NV UP DI PL ZR NA PE NC
7E20:0087 B104 MOV CL,04
AX=0000 BX=0000 CX=0104 DX=7E0A SP=007C BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0089 NV UP DI PL ZR NA PE NC
7E20:0089 02E8 SHR AL,CL
AX=0000 BX=0000 CX=0104 DX=7E0A SP=007C BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=008E NV UP DI PL ZR AC PE NC
7E20:008B 0D3030 OR AX,3030
-t4
/* some more */
AX=3030 BX=0000 CX=0104 DX=7E0A SP=007C BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=008E NV UP DI PL NZ NA PE NC
7E20:008E 3C3A CMP AL,3A
AX=3030 BX=0000 CX=0104 DX=7E0A SP=007C BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0090 NV UP DI NG NZ AC PE CY
7E20:0090 7202 JB 0094
AX=3030 BX=0000 CX=0104 DX=7EDA SP=007C BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0094 NV UP DI NG NZ AC PE CY
7E20:0094 80FC3A CMP AH,3A
AX=3030 BX=0000 CX=0104 DX=7EDA SP=007C BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0097 NV UP DI NG NZ AC PE CY
7E20:0097 7203 JB 009C
-t
/* One more */
AX=3030 BX=0000 CX=0104 DX=7EDA SP=007C BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=009C NV UP DI NG NZ AC PE CY
7E20:009C C3 RET
/* The final value is in AX. We're
about to return */
-g82
/* Go, stop next time we get to HEX */
00 /* <--- LOOK! */
AX=0200 BX=0000 X=0104 DX=7E30 SP=007C BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0082 NV UP DI NG NZ AC PE CY
7E20:0082 8AE0 MOV AH,AL /* The second half of RBA */
-t
/* Trace one instruction */
AX=0000 BX=0000 CX=0104 DX=7E30 SP=007C BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0084 NV UP I NG NZ AC PE CY
7E20:0084 25F00F AND AX,0FF0
-g82
/* Next time */
000 /* <--- LOOK! */
AX=0B5A BX=0000 CX=0104 DX=7E20 SP=007E BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0082 OV UP DI PL NZ NA PO CY
7E20:0082 8AE0 MOV AH,AL /* AL's got my Z in it */
-t
```

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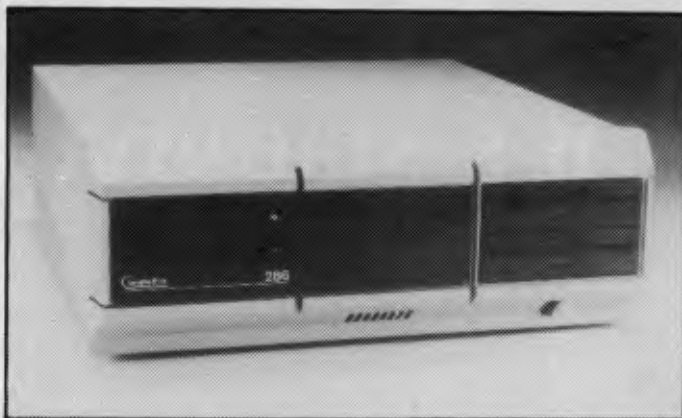
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INSTRUCTION SET • ASSEMBLY LANGUAGE

```

AX=5A5A BX=0000 CX=0104 DX=7E20 SP=007E BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0084 OV UP D1 PL NZ NA PO CY
7E20:0084 25F00F
-t
AX=0A50 BX=0000 CX=0104 DX=7E20 SP=007E BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0087 NV UP D1 PL NZ NA PE NC
7E20:0087 8104
MOV CL,D4
/* Cleared half of each register */
-t
AX=0A50 BX=0000 CX=0104 DX=7E20 SP=007E BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0089 NV UP D1 PL NZ NA PE NC
7E20:0089 02E8
SHR AL,CL
-t
AX=0A05 BX=0000 CX=0104 DX=7E20 SP=007E BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0088 NV UP D1 PL NZ AC PE NC
7E20:0088 003030
OR AX,3030 /* AL changed */
-t
AX=3A35 BX=0000 CX=0104 DX=7E20 SP=007E BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0088 NV UP D1 PL NZ AC PE NC
7E20:0088 3C3A
CMP AL,3A /*AL's ok, but AH isn't */
-t
AX=3A35 BX=0000 CX=0104 DX=7E20 SP=007E BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0090 NV UP D1 NG NZ AC PO CY
7E20:0090 7202
JB 0094
/* Testing the CARRY flag */
/* Note DEBUG called this instruction
JB, I called it JC, Don't worry about
it: they are the same */
-t
AX=3A35 BX=0000 CX=0104 DX=7E20 SP=007E BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0094 NV UP D1 NG NZ AC PO CY
7E20:0094 80FC3A
CMP AH,3A /* Testing AH now */
-t
AX=3A35 BX=0000 CX=0104 DX=7E20 SP=007E BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0097 NV UP D1 PL ZR NA PE NC
7E20:0097 7203
JB 009C
/* Carry flag isn't set this time */
-t
AX=3A35 BX=0000 CX=0104 DX=7E20 SP=007E BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0099 NV UP D1 PL ZR NA PE NC
7E20:0099 80C407
ADD AH,07
/* so we make our little adjustment */
-t
AX=4135 BX=0000 CX=0104 DX=7E20 SP=007E BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0094 NV UP D1 PL NZ AC PE NC
7E20:0094 C3
RET /* AH = 'A', AL='5' */
-s82
SA /* <--- SEE! */
/* I typed "=" here */
AX=0830 BX=0000 CX=0104 DX=7E41 SP=007E BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0082 NV UP D1 PL NZ AC PE NC
7E20:0082 8AE0
MOV AH,AL
-t
AX=3030 BX=0000 CX=0104 DX=7E41 SP=007E BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0084 NV UP D1 PL NZ AC PE NC
7E20:0084 25F00F
AND AX,0FF0
-t
AX=0D30 BX=0000 CX=0104 DX=7E41 SP=007E BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0087 NV UP D1 PL NZ NA PE NC
7E20:0087 8104
MOV CL,04
-t
AX=0D30 BX=0000 CX=0104 DX=7E41 SP=007E BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0089 NV UP D1 PL NZ NA PE NC
7E20:0089 02E8
SHR AL,CL
-t
AX=0D03 BX=0000 CX=0104 DX=7E41 SP=007E BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0088 NV UP D1 PL NZ AC PE NC
7E20:0088 003030
DR AX,3030
-t
AX=3033 BX=0000 CX=0104 DX=7E41 SP=007E BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=008E NV UP D1 PL NZ NA PE NC
7E20:008E 3C3A
CMP AL,3A
-t
AX=3033 BX=0000 CX=0104 DX=7E41 SP=007E BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0090 NV UP D1 NG NZ AC PE CY
7E20:0090 7202
JB 0094
-t
AX=3033 BX=0000 CX=0104 DX=7E41 SP=007E BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0094 NV UP D1 NG NZ AC PE CY
7E20:0094 80FC3A
CMP AH,3A
-t
AX=3033 BX=0000 CX=0104 DX=7E41 SP=007E BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0097 NV UP D1 PL NZ NA PE NC
7E20:0097 7203
JB 009C
-t
AX=3033 BX=0000 CX=0104 DX=7E41 SP=007E BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=0099 NV UP D1 PL NZ NA PE NC
7E20:0099 80C407
ADD AH,07
-t

```

```

AX=4433 BX=0000 CX=0104 DX=7E41 SP=007E BP=0000 SI=0000 DI=0000
DS=7E3F ES=7E3F SS=7E37 CS=7E20 IP=009C NV UP D1 PL NZ AC PE NC
7E20:009C C3
RET
/* I killed it. Q is for Quit */

```

C:\text\asm\exercise>

The first two lines test for a parameter, and if present, store it away for future use. The third line is a label. The fourth line invokes WordStar.

The final lines assemble the program and link it: I have renamed Microsoft's linkage editor to avoid confusion with the other linkage editors I have.

Back to our program, which is shown in Listing 4. This month I have shuffled the code I gave you in November to make some of it into subroutines and added a swag of new code. I am not going to give a line-by-line description of the program; I will just explain the new instructions and the additions.

This program can be used to dump files in hex. Each line contains a five-digit file offset (it overflows at 1 Mbyte) and four groups of four bytes. Since we cheat a little on file I/O, we can't detect end-of-file except by recognising some special character as EOF. We will continue to use ^Z or ^Ah as our end-of-file character as we did in November. Next time we will look at implementing file I/O more satisfactorily, and adding character data to the output.

The EQU directive assigns a name to a number. It is exactly equivalent to %REPLACE in PL/I and to #define in C. It does not reserve any storage locations. You can give a name to any 16-bit number. A number can be a character or two (A or BA) or an expression (1+fred).

When the program begins execution, ES and S are pointing at a DOS control block called the Program Segment Prefix, or PSP. We want it to point to our data segment. However, the 8086 has no instruction to load a number directly into a segment register: we must load it from a memory location or a register. In this case I use the register DX.

The instruction MOV DX,SEG ERIC loads the base address of the segment ERIC into the register DX. When DOS loads the program, as part of the relocation of our program it will fix up the address in this instruction to reflect the run time location of ERIC.

There are several different MOV instructions. They are —

```

MOV REG8,NUM8/MEM8
MOV REG16,NUM16/MEM16
MOV SEGREG,REG16/MEM16
MOV MEM8,REG8/NUM8
MOV MEM16,REG16/NUM16
MOV REG16/MEM16,SEGREG

```

In each case, the second operand is copied to the first.

I have defined a subroutine, or PROC called GETC. Its purpose is to read a character from the standard input (stdin) which is usually the console.

The CALL instruction is similar to the JMP instruction we used in November. It differs in two respects: it PUSHes the contents of IP onto the stack before jumping, and it uses a 16-bit displacement.

GETC sets the Carry flag if end-of-file is reached. EOF is considered reached if it reads a ^Z character, and so it can't read a binary file properly. It returns by issuing a RET instruction, which POPs the top word from the stack, and loads it into IP.

If you get your PUSHes and POPs out of step, your program can go anywhere, and probably will! In this program we PUSH and POP registers in various places. We could also PUSH/POP storage

locations (words). The various versions of the PUSH and POP instructions are —

```
PUSH SEGREG
POP SEGREG      ;but not CS
PUSH MEM16/REG16
POP MEM16/REG16
PUSHF          ;flags register
POPF           ;flags register
PUSHA         ;except 8086, 8088.
              ;Pushes all non-segment
              ;registers
POPA         ;except 8086, 8088.
              ;Pushes all non-segment
              ;registers
PUSH NUM16    ;except 8086, 8088
```

We could just about include the RETURN instructions here —

```
RET           ;pops IP
RET FAR      ;pops IP and CS
IRET        ;pops IP, CS and FLAGS
```

The instruction DEC COLUMN subtracts one from the variable COLUMN. In this program, COLUMN is defined as a single byte: it could also have been defined as a WORD. There is also a complementary instruction, INC, to add one to a byte or word location or register. The various INC and DEC instructions are —

```
INC MEMB/MEM16/REG8/REG16
DEC MEMB/MEM16/REG8/REG16
```

The DEC and INC instructions affect the Zero flag but not the Carry flag. When the variable COLUMN becomes zero, it's time to start a new line. The program starts each line by typing carriage-return and line-feed characters followed by the file's offset. COLUMN is preset to 1 so that we initialise the first line.

The subroutine HEX accepts one byte in AL and returns two printable characters in AX. These are the character representation of the input byte, and the high-order character is returned in AL.

There are two reasons for returning the high-order byte in AL: it's appropriate to print that one first, and if we stored it into a character string, the AH and AL registers get swapped around on us. PUTC sends the character in AL to the output file.

To print both bytes, we save AX on the stack, print the first byte, recover AX from the stack and exchange the contents of AH and AL. The various forms of the XCHG instruction are —

```
XCHG REG8,REG8/MEM8
XCHG REG16,REG16/MEM16
```

After printing the contents of RBA (for Relative Byte Address), we send an extra zero (because we count in units of 16 bytes), and a space for separation. Having done all that, we re-initialise COLUMN to count another 16 bytes, and update RBA for next time.

The instruction labelled ag20 is one of the shift/rotate instructions. We will have a closer look at them another day.

This ROL instruction rotates the contents of the word FLAGS one bit to the left. The overflow bit is copied into the CARRY flag, and into the low-order position. Therefore, after 16 operations the FLAG is restored to its initial state. The various forms of the ROL instruction are:

```
ROL MEMB/REG8/MEM16/REG16,count
```

Listing 4. The code from Part 2 shuffled to make some of it into subroutines and a swag of new code added.

```
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1          page 60,132
2          cr equ 13
3          lf equ 10
4          fred segment
5          assume cs:fred,ds:eric,ss:joe,es:eric
6          mov dx,seg eric
7          mov ds,dx
8          mov es,dx
9          again: call getc
10         done      ;it is End-Of-File
11         push ax   ;save the character
                    ;we just read
                    ;count column down
12         dec Column
13         jnz ag20
                    ; Column number became zero: start a new line
14
15
16         mov al,cr ;end-of-line
17         call putc
18         mov al,lf
19         call putc
20         mov al,byte ptr rba+1 ;high-order part
                    ;of file offset
21         call hex ;to hexadecimal
22         push ax ;save for a moment
23         call putc ;print it
24         pop ax ;get it back
25         xchg ah,al ;swap bytes of AX
26         call putc ;print the other one
27         mov al,byte ptr rba ;low-order part
                    ;of file offset
28         call hex ;to hexadecimal
29         push ax ;save for a moment
30         call putc ;print it
31         pop ax ;get it back
32         xchg ah,al ;swap bytes of AX
33         call putc ;print the other one
34         mov al,'0' ;a zero
35         call putc
36         mov al,' ' ;and a space
37         call putc
38         ag4: mov column,16 ;we print
                    ;16 bytes per line
                    ;add 1 to file's offset
39         rba flags,1 ;rotate my little bit-map
40         ag20: jnc ag40 ;if a bit falls out the end
41         mov al,' ' ;punctuate with a space
42         call putc
43         ag40: pop ax ;this is the
                    ;character we
                    ;are supposed to print
44
45         call hex
46         push ax ;save for a moment
47         call putc ;print it
48         pop ax ;get it back
49         xchg ah,ah ;swap bytes of AX
50         call putc ;print the other half
51         jmp again ;go and do it again
52         done: mov ax,4c00h ;"I have finished,
                    ;and the return
                    ;code is 0"
53         int 21h ;call DOS
54         ;DOS doesn't return
55
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56         ;Get a character from the console
57         ; INPUT:
58         ; None
59         ; OUTPUT
60         ; AL contains the character
61         ; CY 1 if end-of-file
62         getc Proc
63         mov ah,8 ;tell DOS "Read
                    ;a character from
                    ;the console"
64         int 21h ;call DOS
65         cmp al,lah ;is it an end-of-file
                    ;character
66         jne gc20
67         stc ;set the CARRY flag
68         jmp GC30
69         cld
70         ret
71         getc endp
72
73
74         ;Put a character on the console
75         ; INPUT:
76         ; AL contains the character
77         ; OUTPUT
78         ; None
79
```

INSTRUCTION SET • ASSEMBLY LANGUAGE

```

80 007F          putc   proc
81 007F B4 02    mov    ah,2    ;tell DOS "write
                        character on the console"
82 0081 8A 00    mov    dl,al   ;this is the
                        character to type"
83 0083 C0 21    int    21h    ;call DOS
84 0085 C3       ret
85 0086          putc   endp
86
87              ;Convert a number to printable hex
88              ; INPUT:
89              ; AL contains the character
90              ; OUTPUT
91              ; AX contains the result,
                        high-order byte in AL
92              ; Destroys CX
93
94 0086          hex     proc
95 0086 8A E0    mov    ah,al
96 0088 25 0FF0 and    ax,0FF0h ;bitwise and operation
97 008B B1 04    mov    cl,4
98 008D 02 E8    shr    al,cl   ;shifts contents
                        AL 4 bits to right
99              ;adds zeros in high-order positions
100 008F 00 3030 or     ax,'00' ;convert
                        numbers 0-F to 30-3F
101 0092 3C 3A    cmp    al,3Ah
102 0094 72 02    jc     hex10
103 0096 04 07    add    al,7    ;3A-3F to 41-46
104 0098 80 FC 3A hex10: cmp    ah,3Ah
105 009B 72 03    jc     hex20
106 009D 80 C4 07 add    ah,7    ;3A-3F to 41-46
107 00A0 C3       hex20: ret
108 00A1          hex     endp
109
110

```

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```

111 00A1          fred   ends
112 0000          Joe     segment stack
113 0000 80 [      db     128 dup(0)
114           00 ]
115
116
117 0080          Joe     ends
118
119 0000          eric   segment public word
120 0000 65 72 69 63 20 69   db     'eric is here'
121           73 20 68 65 72 65
122 000C 0000          rba    dw     0
123 000E 8888          flags dw     8888h
124 0010 01           column db     1
125 0011          eric   ends
126

```

The Microsoft MACRO Assembler, Version 1.25 Page Symbols-1
04-19-87

Segments and groups:

Name	Size	align	combine	class
ERIC	0011	WORD		PUBLIC
FRED	00A1	PARA		NONE
JOE	0080	PARA		STACK

Symbols:

Name	Type	Value	Attr
AG20	L NEAR	0051	FRED
AG40	L NEAR	005C	FRED
AGAIN	L NEAR	0007	FRED
COLUMN	L BYTE	0010	ERIC
CR	Number	0000	
DONE	L NEAR	006C	FRED
FLAGS	L WORD	000E	ERIC
GC20	L NEAR	007D	FRED
GC30	L NEAR	007E	FRED
GETC	N PROC	0071	FRED Length=000E
HEX	N PROC	0086	FRED Length=001B
HEX10	L NEAR	0098	FRED
HEX20	L NEAR	00A0	FRED
LF	Number	000A	
PUTC	N PROC	007F	FRED Length=0007
RBA	L WORD	000C	ERIC

Warning Severe
Errors Errors
0 0

Count is the number I, CL (the number of bits is taken from CL), or for CPUs other than the 8086/8088, num8. There are also equivalent ROR (rotate right) instructions.

Each time the carry flag is set, we send an extra space to the output file. This has the effect of breaking up the hexadecimal

data into groups of four with the value I used in FLAGS. By way of experiment, try setting FLAGS to some other values and see what effect it on the listing. 0CCCCh might be a good one to try.

You can set FLAGS from DEBUG with the command Ehhhh CC,CC. hhhh represents the address of FLAGS: you can find it by referring to the listing, and/or using the D command to display storage. d00,ff will display storage in the data segment from locations 00 to FF. Don't use it until DS has been established at the start of the program.

Each of the subroutines GETC, PUTC and HEX is bound by a PROC/ENDP pair of directives. These directives tell MASM that they are subroutines, and help it to determine the kind of CALL to generate when we code statements like CALL GETC. The only kind we have used so far is the intra-segment call: the called routine must be in the same 64 Kbyte segment as the caller. There is another variation of the CALL instruction which also loads a new value into CS to allow calls to routines anywhere in the 1Mb address space.

These PROC statements tell MASM that the procedure and its caller are in the same code segment. MASM reports on the lengths of the procedures at the end of the program listing.

The HEX procedure is worth looking at. Its input is in the register AL. Each hexadecimal digit is either numeric (0-9) or alphabetic (A-F). There are sixteen of them, and they each represent four bits.

What we need to do is, first, isolate each half of the input byte in the low-order four bits of a register; this gives us numbers in the range 0-15. Then, add a number to make the lowest value a printable 0; this gives numbers in the range 30-3F. The values 30-39 are okay, but 3A-3F need to be re-mapped into the range 41-46 (A-F).

If the number is greater than 39, add 7 (41-3A=7) to it. This is done separately for each digit. Listing 3 is the log of a session with DEBUG showing this routine in action. The first time through it was converting 00h, so some of the instructions didn't seem to do much. However, when it translated 'Z' and '=' you can see what happens. The new instructions in this program are —

AND This performs a bit-wise AND operation and stores the result in AX.

This performs a bit-wise AND operation and stores the result in AX. Other versions are —

```

AND MEM16/REG16,REG16/NUM16
AND REG16/MEM16
AND MEM8/REG8,REG8/NUM8
AND REG8/MEM8

```

SHR Shift Right.

The various forms of the SHR instruction are —

```
SHR MEM8/REG8/MEM16/REG16,count
```

Count is the number I, CL (the number of bits is taken from CL), or for CPUs other than the 8086/8088, num8. Low-order bits are discarded. In this particular case, register AH is shifted right the number of bits specified by register CL. Zeros are inserted in the high-order end of the register. The last bit discarded from the register is copied into the CARRY lag. There are also equivalent SHL (Shift Left) instructions.

The following performs a bit-wise OR operation and stores the result in AX. In this case, the value 0406h would become 3436h —

OR

Other versions are —

```
OR MEM16/REG16,REG16/NUM16
OR REG16/MEM16
OR MEMB/REGB,REGB/NUMB
OR REGB/MEMB
```

The following Adds the two operands and stores the result in first operand. In this case, 7 is added to AL —

ADD

Other versions are —

```
ADD MEM16/REG16,REG16/NUM16
ADD REG16/MEM16
ADD MEMB/REGB,REGB/NUMB
ADD REGB/MEMB
```

On lines 20 and 27 of listing 4 you will see the expression BYTE PTR RBA. This is necessary because the variable RBA is defined as a word (line 122: DW means define word), and I only want to access one byte of it.

The term BYTE overrides the definition given for the operand (in this case we defined it as a WORD). PTR tells MASM that we are overriding an attribute of the expression which follows (RBA is the expression in the first example, RBA + 1 in the second).

Line 38 shows the object code area as C6060010R1090. The R is present to inform you that the address (0010) is relocatable. MSLINK will fix it up. The interesting thing, though, is the last

byte of object code, 90. This is a NOP (No Operation) instruction, and it's not in our source program. This is what MASM has done.

On its first pass (it processes the source code twice) it examines the code and works out how much space everything will take. When it finds the symbol COLUMN, it doesn't know whether it's a byte or a word. Of course, if we defined it up front, it would. When this occurs, MASM reserves space for the worst case (a word).

On its second pass, when it's building the object code, it finds it has reserved too much space and so it fills in the extra room with NOPs.

If we coded MOV BYTE PTR COLUMN,16 MASM would have reserved the right amount of space in the first pass. This is the second use for the word PTR.

Before we leave this line: note that MASM has listed the address of COLUMN as 0010. If you were to inspect the object code (and when you list this instruction with DEBUG), you will find the address as 0100. The reason is that the 8086 stores low-order bytes of words first: the opposite way we think of them. MASM is trying to be friendly and lists addresses the way we think of them. It's a little confusing when you compare it with the actual object code though.

In Summary

This month we have found out how the stack works. We can now PUSH and POP with the best of them. We've had a look at the flags and seen them being modified while a program is running. Now we can use some of the facilities of DEBUG to observe our programs running. We have a useful program, so we can dump files in hexadecimal and we are now acquainted with most of the instructions we need to use (90 per cent of the work done with 10 per cent of the instructions).

Part 4

In Part 4 we will get the (figurative) knife out and carve our program up. We will create a library of subroutines we can call up when we want them. Also, we will make a couple of improvements to our dump program so it can dump any file, detect EOF properly, and ... it looks like another busy month. □

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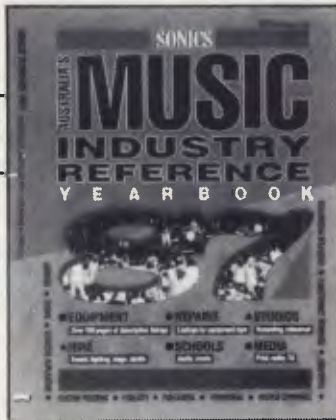
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Albury Wodonga Apple User's Group, Jenny Scott (secretary), (060) 24 3225 or Don McLennan (president), (060) 46 028; meets second Wednesday every month at Wodonga High School at 7.30 pm.

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 offices 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, Harry Cooper, 113 Owen Dixon Drive, Evatt 2617; 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, Mal

Smith, PO Box 173, Belconnen 2616; meets first Tuesday each month at Main Conference Room, CSIRO Headquarters, Limestone Avenue, at 7.30 pm. (062) 54 1614.

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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 (ACTKUG), 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

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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

Albury-Wodonga District Microbee User Group, Eric Eulenstein, 202 Kooba St, Albury 2640, (060) 25 1601.

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.

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ney Grammar School, Stanley Street, Sydney. (02) 520 0926.

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 Road, 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.

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.

Broken Hill Microbee Users' Group, Peter Cotter, 533 Radium Street, Broken Hill 2800, (080) 88 1621

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

USER GROUPS

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.

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.

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 Computer Club, Peter Christie, 9 Potts Street, Richmond 2753; workshops 7.00 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 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 Enthusiasts' 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, Pastoral 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.

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

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

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.

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, Janis Meyers, 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.

USER GROUPS

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.

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 Mannaz; 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 Wednesday of each month at the Abraham Mott Hall, Argyle Place, Miller's Point.

Sydney Fort 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, Box 152 Holme Building, Sydney University, 2006. Meets the last Tuesday of the month at 6.30 pm at 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 the assembly hall of Strathfield Girls' High School, Albert Road, Strathfield, (02) 810 4758 (after 7.30 pm).

Sydney Multitech Owners Group

(SMOG), queries addressed to Marcia Wilson, PO Box 312, Darlinghurst 2010. **Forming a Sinclair QL Users Group**, Vadim Kuchin, Box 729, Parramatta, 2150.

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.

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, D Halprin, PO Box 43, Forest Hill 3131, (03) 387 3221.

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.

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 Copiquet, 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.

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) 5 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.

IBM & Columbia Computer Users' Club, Giles Bray, 22/11 Auburn Grove, Hawthorn East 3123. Meets second Tuesday each month, 7.30 pm, at the Victorian College of Pharmacy, (03) 82 7632.

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. Essendon meeting last Sunday of each month except December. Phone (03) 763 5983.

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

USER GROUPS

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 fourth 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 Garry Bryant (03) 615 4844. Mail to PO Box 1728P, Melbourne 3001.

Melbourne Hitachi Users' Group, Branko Colavizza, PO Box 191, Rosanna 3084, (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 Balwyn Branch Library, 366 Whitehorse Road, Balwyn 3103.

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.

NEC Portable Users' Group, D Green; meetings second Wednesday of each month at Myers Computer Centre, Lonsdale Street, at 7.30 pm. (03) 611 3380.

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.

Sega Users' Club, Peter Lindeman, 6 Bay Street, Port Melbourne 3207.

Seymour-Pucka Computer Club, Garry Sutton, 25 Malaya Road, Puckapunyal 3662; (057) 93 1091.

Sharp Computer Users' Association, The President, 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. RCMP (03) 754 5081.

Southern Amstrad User Group, Bob Patterson, PO Box 100, Seaford 3196.

Meets third Thursday each month at John Paul College Senior Campus, McMahons Road, Frankston, at 7.30 pm.

TI-99/4A Users' Group Melbourne, Wayne Worlidge, 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 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.

Yarrowonga Computer User Group, Chris Younger, 10 Witt Street, Yarrowonga 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, Chermerside 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 Youth Computer Group, A Harrison, PO Box 396, Sunnybank 4109.

Brisbug, Sylvia Willie, 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 District Microbee Users' Group, Chas Eustance, 21 Marr Street, Edmonton 4869, (070) 55 4531.

Commodore Computer Users' Group, Mr NR Chambers, 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 Microbee User Group, Col McLaren, 1/100 Imperial Parade, Labrador 4215. Meetings first Sunday 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. (B) (07) 52 3662, (H) (07) 343 7680.

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 Old, 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' Group, Robert Horkings, PO Box 148, Fortitude Valley 4006, (07) 52 5603; meetings first Saturday of each month, YMCA Hall at 1 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 Microbee User Group (TMUG), Mannie Van Rijswijk, PO Box 5751, MC, Townsville 4810. Meetings 7.30 pm on second and fourth Mondays each month on the Ground Floor, St Margaret Mary's Secondary School, Crowle Street, Hermit Park 4812.

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, 36 Sturt Street, Adelaide 5000; for TRS80 and System 80 users.

Adelaide Osborne Group, Russell Bar-

ter, 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, Torrensfield 5031, (08) 260 6226. Subscription: \$5 pa.

Aquarius Users' Club, Benedict Sabel, 7 Duncraig Lane, 5152. \$5 membership fee covers the cost of a bimonthly 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, Torrensfield 5031, (08) 352 3296.

DEC Personal Computer Special Interest Group, see NSW entry.

Kaypro User Group, Ralf Engler, 16/34 John Street, Payneham 5070.

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. Meets on the first Friday of every month at the Prospect Town Hall.

South Australian Commodore Computers' User Group, Eddie Hann, Secretary, PO Box 427, North Adelaide 5006; meetings second Tuesday each month, 7.30 pm, at Royal Caledonian Hall, 379 King William St, Adelaide 5000. (08) 258 6367.

South Australian Foundation for Com-

USER GROUPS

puter 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, educationally 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/- 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, c/- PO Box 3230, Alice Springs 5750.

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/- 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 Nurses' Lecture Theatre of the Sir Charles Gairdner Hospital at Shenton Park. Write to 4 Gannkirk Road, Greenwood, WA 6024. (09) 294 1833.

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.

Sharp PC Users' Group, John Paulic, PO Box 79, Gosnells 6110, (09) 398 6303.

Sega Users' Group, John McClemon, 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.

TI Users Group of Perth, Nigel Mercer, PO Box 246 Mt Lawley 6050, (09) 409 9683. Meets on the third Saturday of each month.

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.

VIC-Ups, G. Padfield, (09) 451 4629. **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.

Tasmanian TI User Group, Co-ordinator, 1 Benboyd Court, Rokeby 7019. Meetings third Sunday of each month at University of Tasmania, room 373. (002) 29 4009.

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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3rd Prize: A Pioneer PD-M60 multiplay Compact Disc player, with 6-disc magazine, cordless remote control, random programming for up to 32 tracks, digital filtering, 2-speed manual search and built-in headphone amplifier. An excellent addition to any hi-fi system, and valued at \$899!



CONDITIONS OF ENTRY

1. The competition is open only to Australian Residents authorising a new/renewal subscription before last mail March 31, 1988. Entries received after closing date will not be included. Employees of the Federal Publishing Company, Pioneer Australia and their families are not eligible to enter. To be valid for drawing, subscription must be signed against a nominated valid credit card, or, if paid by cheque, cleared for payment.

2. South Australian residents need not purchase a subscription to enter, but may enter only once by submitting their name, address, and a hand-drawn facsimile of the subscription to The Federal Publishing Company, PO Box 227, Waterloo, NSW 2017.

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 into.

5. Description of the competition and instructions on how to enter form a part of the competition conditions.

6. The competition commences on January 1, 1988 and closes with last mail on March 31, 1988. The draw will take place in Sydney on April 4, 1988 and the winner will be notified by telephone, and letter. The winner will also be announced in The Australian on April 6, 1988 and a later issue of this

magazine.

7. The prize is: (1st) A Pioneer stereo hi-fi system; (2nd) a Pioneer car stereo system; and (3rd) a Pioneer programmable 6-disc compact disc player. Total value \$10,099.

8. The promoter is The Federal Publishing Company, 180 Bourke Road, Alexandria, NSW 2015. Permit No. TC/87/3356 issued under the Lotteries and Art Unions Act 1901; Raffles and Bingo permits Board Permit No. 87/2149 issued on 18/11/87; ACT Permit No. TP87/978 issued under the Lotteries Ordinance, 1964.

NEW PRODUCTS

Software

Advanced Revelation

Picksoft
Phone: (02) 908 4033
Price: \$1750 untaxed

The latest version of the Revelation database incorporates an application generator that has been optimised for non-technical people. Advanced Revelation now handles complex applications. It has a new menu and window driven application processor. Users are presented with a Macintosh-like graphic environment. Everything appears in windows — menus, data entry screens and so on. Other features include variable length fields with records up to 65,000 characters, multiple value fields and a data dictionary. Advanced Revelation runs on the IBM PC, XT, and AT range, the Personal System/2 range and compatibles.



dBase Mac
Imagineering
Phone: (02) 697 8666
Price: \$995 taxed

Ashton-Tate has released its first software product for the Apple Macintosh, dBase Mac, is a relational database management system. Features include extended use of the Macintosh's point and click mouse; applications development power through the inclusion of a procedural language; and direct access to dBase II, III and III+ data files. A Macintosh Plus with 1 megabyte RAM or a Macintosh SE is required to run the program.

Drawbase Engineering Computer Sales

Phone: (03) 209 9135
Price: Not supplied

Full 3D capabilities are now available for Drawbase, an integrated CAD and data management system. The 3D facility enables users to view drawings from any angle, rotate an object or 'fly' around it. Drawbase operates on the IBM PC AT, Personal System/2 Models 50, 60 and 80, HP Vectra, Compaq and other compatibles. The integration feature allows the user to create 2- and 3D drawings while tracking non-graphic information.

GEM Scan

MicroAustralia
Phone: (02) 809 6722
Price: \$179 taxed

GEM Scan is desktop scanner software utility for reading and editing scanned images created under GEM and Windows. It provides direct control of scanners to bring printed images, photographs or drawings onto the computer screen for editing. The resolution of the scanned image is 300 dots per inch. GEM Scan can be executed directly from DOS or from graphical interfaces. It supports the IBM PC, XT, AT range and compatibles. A hard disk is required and the program needs a minimum of 512 kilobytes of memory.

Questor

THE CHALLENGE CONTINUES

Gunship IBM
Questor
Phone: (02) 662 7944
Price: \$69 taxed

This latest game is an enhanced version of the helicopter simulation program, Gunship. It has now been released for IBM PCs and compatibles. The game simulates flying the Hughes Apache Helicopter on combat missions throughout the world. The IBM version uses a dynamic configuration system which ad-

justs the game automatically to take advantage of the computer's speed. The faster a particular machine operates, the smoother the flight and animation of graphics are, its claimed. Gunship IBM has an option that allows users to install the simulation on a hard disk.

Lottocheck

Solid Software
Phone: (03) 754 4377
Price: Not supplied

So you didn't win the big \$8 million Lotto draw in November or any draw since? How could you when you didn't choose your numbers logically (out of hat a is *not* logical!). Solid Software has a program that maximises your chances of winning Lotto prizes. In essence, it helps you search for the biases in the apparatus that is used to select the winning numbers. You analyse your chosen numbers and compare them with winning numbers that have come up in the past. Good luck in the Big One!

Macenhancer

PC Extras
Phone: (02) 319 2155
Price: \$622 taxed

The Macenhancer gives the Macintosh the ability to drive non-Apple printers as well as providing more communications facilities. It's claimed to be completely compatible with virtually all Macintosh software. The port speed can be adjusted up to 57,600 baud. A Macintosh 512K, 512K Enhanced, Plus or SE is required.

Map Master

Tech Pacific
Phone: (02) 319 2622
Price: \$1895

Ashton-Tate has released an Australian version of Map Master, to be distributed by Tech Pacific. The new version includes maps of Australia by country, state, statistical division or post-code. It also includes a database for the 1986 ABS Census information on population, housing, gender mix, total private dwellings and area in square kilometres.

Map Master enables users to analyse and present data in map form and produce full-colour maps on paper, slides or overhead transparencies. The program also offers advanced editing features which allow users to insert or change any map feature including symbols, labels, fonts and text.



SCO Xenix Release 2.2.2

Blue Sky Industries
Phone: (02) 419 5799
Price: See below

The SCO Xenix Operating System Release 2.2.2 is an implementation of Unix System V, especially adapted for IBM Personal System/2 computers. It contains the full set of Xenix utilities necessary to run applications, administer the system, edit files and send/ receive mail.

The operating system supports all of the IBM PS/2 hardware and peripherals, IBM multiports and VGA video adapter. The SCO Xenix Operating System Release 2.2.2. is priced at \$1308 for IBM PS/2 Models 50 and 60, and \$1536 for Model 80 (prices taxed).

Skill Evaluator

TypeQuick
Phone: (02) 498 7433
Price: \$495 per licence, untaxed

The Skill Evaluator is a PC based package to assess keyboard skills. It is fully automated and is designed to monitor every keystroke, stop the test after a set duration and score the input. An evaluation certificate can be printed.

It can be used to assess new or temporary employees, identify those in need of training and for testing students. The test conditions can be varied from word-processing to typewriter modes. Up to 100 different tests and 100 student results can be kept on one disk.

The Ancient Art of War at Sea

Questor
Phone: (02) 662 7944
Price: \$89 taxed

The Ancient Art of War is a strategy simulation for the IBM PC, Tandy and compatibles. It is a simulation game with several classic sea campaigns, so that players can learn from naval history or 'rewrite' it. The game includes an illustrated guide to naval strategy and tactics, plus *The History of War at Sea*. There is a game generator that lets users create advanced scenarios with an infinite number of variations.

Works

Microsoft
Phone: (02) 452 5088
Price: \$345 untaxed

Microsoft has released Works, a package aimed at small business, general business and education use. The package runs on IBM PCs and compatibles, as well as the IBM Personal System/2. It includes wordprocessor, spreadsheet, database and communications modules.

Users can easily copy and transfer information from one section to another. The spreadsheet includes a variety of graphing options. Works contains keystroke macros to record frequently used keystrokes and play them back with a single keystroke. Several communications features have been built in, including an auto logon feature and terminal emulation.

New Machines

ACER +500

Dick Smith Electronics
Phone: (02) 888 3200
Price: See below

The Acer +500 has 256 kilobytes of RAM expandable to 640 Kbyte. The +500 utilises an enhanced version of the NEC V20 microprocessor and is functionally compatible with the 8086 and 8088 microprocessors but DSE claims it offers speed advantages. It comes standard with a serial port.

The Acer is available in three versions: single 360 Kbyte floppy disk drive (\$995 including monitor), two floppy disk drives (\$1295 including monitor) and an enhanced version with a single 360 Kbyte floppy drive and a 5 1/4 inch half height, 20 megabyte hard disk drive (\$1995 including monitor). All prices taxed.

Acer PC-910 Series

Dick Smith Electronics
Phone: (02) 888 3200
Price: \$4795

A new range of Acer PC-910 computers has also been released by Dick Smith Electronics. The 910 offers both PC and AT compatibility. It has 512 kilobytes of

RAM expandable to 1 megabyte. A 40 megabyte hard drive and a 1.2 Mbyte floppy disk drive are standard. The 910 also has keyboard or software selectable speeds of 6 and 10 MHz and a 3 in 1 video card.

Archimedes 300 and 400 Series

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

The Archimedes is the latest computer from UK company, Acorn, to be distributed by Barsons. It is a 32-bit RISC PC. The series is aimed at schools, homes and small business — the 305 has 500K of RAM, while the 310 has 1 Mbyte, with both machines having 512 kilobytes of ROM and a 1 megabyte (unformatted) 3 1/2 inch disk drive. The 410 has 1 Mbyte of RAM and 512 Kbyte of ROM, while the



440 has 4 Mbyte RAM and a 20 Mbyte hard disk.

T3200 Portable

Toshiba
Phone: (02) 887 3322
Price: \$9495 taxed

Toshiba has released its latest portable computer, the T3200. It has 1 Meg of RAM and EGA graphics as standard and in-

cludes a 40 Mb hard disk, clock speed is 12 Mhz. An external keyboard and monitor can be attached so the computer can be operated in the closed position. A complete set of external ports including a bidirectional parallel interface are featured.



Peripherals

2600 Series Modems

J.N. Almgren
Phone: (02) 406 6177
Price: See below

There are five new modems in the 2600 series which incorporates VLSI signal processing combined with a Motorola 68000 microprocessor.

They use '8- or 64-state eight-dimension Trellis Coded Modulation' to provide error correction and improved performance at higher speeds. Two, four or six channel time division multiplexers are available as options. The five modems transmit at 4800, 9600, 14,400, 16,800 and 19,200 bps. Prices vary between models, according to specific requirements.

C.Itoh CIE3000S printer

Anitech
Phone: (02) 648 4088
Price: \$38,226 untaxed

Anitech's release of the C.Itoh CIE3000S uses a new technology called Ion Deposition (IDP). The IDP technology uses a user replaceable ion cartridge, unlike laser printers that require skilled technical adjustment. An IDP printer contains less parts than a laser printer and, Anitech claims, therefore requires less maintenance. The ion deposition cartridge is placed immediately above the drum cartridge and transmits the image to the drum directly, whereas laser printers use mirrors to direct the laser beam onto the drum cartridge.

The IDP paper path is simplified because of the use of a cold fusion process which obviates the need for separate heater and pressure rollers, as used in typical laser printers. This straight-through paper path reduces the chance of paper jams to an absolute minimum during high volume printing. The CIE3000S prints graphics and characters at 30 pages per minute with a resolution of 300 x 300 dots per inch. The printer has a 6 megabyte memory that allows users to store up to 6 pages of forms at one time. Features include the ability to print general ledger or debtors forms on A4 size

Brother M-2518 Printer ▶

Peak Pacific
Phone: (02) 290 1122
Price: \$1695 untaxed

Peak Pacific has announced the availability of the Brother M-2518 printer which features automatic paper thickness adjustment for printing on thick, multi-part forms. Rated speeds are at 360 characters per second in draft mode, 75 in near letter quality mode and 53 in letter quality mode.

The 'paper express' feature is claimed to speed printing and paper throughput due to the straight paper path. The M-2518 has front panel controls, prints bi-directionally, has an 8 kilobyte print buffer, RS-232C and Centronics interfaces and an optional colour printing facility. Other options include a dual bin cut-sheet feeder and font cards.

paper. The CIE3000S has a rated life of around 5 million pages. A mobile cabinet is included in the price.

PEAK ▲

Colorscan ▶

Peak Pacific
Phone: (02) 290 1122
Price: \$995 untaxed

A new monitor from Thomson is being distributed by Peak Pacific. Known as the Colorscan, it automatically switches between scan frequencies to provide a 640 x 200 pixel resolution at 15.7 kHz, or 680 x 350 pixel resolution at 22 kHz. The vertical scan frequency is 50 to 60 hz. Users have a choice of 16 colours from a total of 64 shades and can switch to amber, green or blue when working on text only. A tilt and swivel stand is optional.

Fortran Optimizing Compiler Version 4.01

Microsoft
Phone: (02) 452 5088
Price: \$881 taxed

Microsoft has begun shipping a maintenance release of the Fortran Optimizing Compiler Version 4.01. The latest version offers IBM and VAX(R) Fortran extensions and debugging with Microsoft Codeview.



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Our games disks have a CGA emulator so those with Hercules boards can also play.

MS-DOS GAMES

M1006: CHESS. Several extensive versions with graphics. Includes Mychess. Well written.

M1008: SELECTED FAMILY FUN GAMES (2). Flight Simulators, Music generator, excellent Pacgirl, Space Wars, etc. Some need Basic.

M1022: SUPER COMPILED GAMES (3). Arcade-type games. Includes Kong, Striker, Spacevax, Life2 and Frog.

M1041: GAMES OF STRATEGY (1). Match wits in a Naval Battle Simulation, Big Truck haulage Business, and the Stock Market.

M1046: SUPER COMPILED GAMES (5). With World Domination (Risk), Beast, Rockets, Sub-chase, etc.

M1051: 50 BASIC GAMES. Includes a Startrek, Swarm, Baseball, Hobbit, Blackfri, Anonyms, many more. Needs Basic.

M1068: STRIP POKER. An exciting way to pass an hour or two. If only you had partners like these! Needs Basic.

M1070: PROVOCATIVE PICTURES (3). A collection of glibbie pics with Mac-type graphics. Some animated. Not for children.

M1071: KARKOTH ADVENTURE. Sword and sorcery in a grand style. Lots of magic and dangers for the adventure fans.

M1072: LARIN'S ADVENTURE. Another good adventure epic in the Dungeons and Dragons tradition.

M1073: CARD GAMES. Sharpen your game. Play the computer at Bridge, Canasta, Draw Poker and Hearts.

M1074: SPACE CONFLICT. You versus the Labbits and Voldrons in outer space. Gallant Space ship security officer meets alien foes.

M1076: DICE GAME. An addictive, fun game that will enthrall groups as much as individuals who play.

M1077: BIBLICAL CHARACTERS. A guessing game that asks you to identify old testament characters from clues given.

UTILITIES

M2016: MENU SYSTEMS. Create your own menus. Contains Sysmenu, Automenu and EZmenu.

M2025+: DOS EXTENSIONS. Two disks of extensions for the command of Dos. Similar to your operating system, with more features. Eg, copy command accepts multiple statements on a line. \$24.

M2035: MORE HARD DISK UTILITIES. Super collection for optimising disk usage, undeleting, etc.

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M2059: NEW UNPROTECTION METHODS (2). Hints and procedures for backing up a variety of copy protected programs.

M2060: HARD DISK TESTING. Gives a hard disk a thorough look for unreliable sectors etc and reports.

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M3003: MULTIFONT WRITER. Gives on-screen scientific notation, Greek letters, gothic, bold, italics, etc. Recommended.

M3007: SPELLING CHECKER. Our 1988 version has thousands of new words added, incl business/computer terms. Works with most word processors (not Amstrad version of Wordstar).

M3014: SIDEWRITER. Generates printed output sideways to fit wide reports onto a page.

M3020: EXCELLENT WORD PROCESSOR. Compatible with Wordstar. Has clear, easily followed commands on screen.

M3021: QUALITY MULTI-FONT PRINTING. on dot matrix, incl Courier, Greek, Helvetica, Palatino, Roman, Italics, etc.

M3025: TOUCH TYPING TUTOR - PRACTICE AND EVALUATION. Lets you read text from screen, use own text, reports speed/accuracy.

M3031: SCREEN GRAPHICS FOR WORD PROCESSING. Does fancy borders and lines for screens, tables, charts.

M3032: MERGE FOR WORD PROCESSING. Controls small database for names, addresses, etc, which it adds to form letters to personalise.

M3033: SUPER FOG INDEX. Examines your text for readability and complexity. Helps you judge whether your talk or article is suitable.

M3034: VERSA TILE PRINTER SETUP. Printer controls can be configured for many printers, including

IBM, Epson, Okidata, Gemini, NEC, Laserjet, which are preset.

M3035: PRINTER UTILITIES for Epson compatibles. Produces justified copy on dot matrix, has memory resident setup utilities, multiple font printing, etc.

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M5039: FLOW CHART DESIGNER. Puts flow of operations on screen for system or program design.

M5041: TURBO PASCAL SCREEN GENERATOR. Includes source code. Helps you design menus and screens for your programs.

M5042: CROSS-COMPILER FOR APPLE. Lets you write programs on your PC that are ready to run on the Apple computer.

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Hyperace 286 Super Plus
Hypertec

Phone: (02) 819 7222
Price: \$1395 taxed

The Hyperace 286 Super Plus is the latest enhancement board from Hypertec for IBM PCs or compatibles. The board uses an 80286 processor and can run up to 12.5 MHz or 16 MHz. A megabyte of RAM ensures that speed is unrestricted by the slow byte-wide memory of the standard PC.

It is a short board, leaving long slots free for other enhancements. A pop-up menu allows the machine to be throttled back to PC speed via the keyboard without having to reboot or turn off the machine.

Maxwell 5 is AT command set compatible. It also has a battery backed storage memory for 10 phone number storage memory on board.

Megamodems

Avtek

Phone: (02) 712 3733
Price: See below

A range of Hayes compatible modems, known as the Megamodems, has been released by Avtek. They are available in either V21/V22 or V21/22/23 configurations. An internal modem is also available as a half card unit, suitable for IBM PCs or compatibles. They are priced at \$375 (taxed) and \$449 (taxed).



ICE 196PC Emulator

Total Electronics

Phone: (02) 808 3477
Price: \$7115 taxed

Intel has released an in-circuit emulator for the new 80C196 16-bit CHMOS microcontroller. It will be distributed in Australia by Total Electronics. The ICE 196PC emulator provides hardware-software integration and debugging capabilities that enable engineers to shorten 80C196 application development cycles, improve development productivity and produce more reliable applications.

This is the latest in Intel's family of PC hosted development tools for Intel microprocessors and microcontrollers. It runs on the IBM PC, XT, and AT or compatible computers running DOS 3.0 or later and is compatible with Intel's existing MCS 96 programming languages. It features 64 kilobytes of 0-wait state memory, mappable in 4 Kbyte increments, a 2 Kbyte trace buffer and 3 hardware breakpoints or 1 range break.

Optimum C

Microway

Phone: (03) 555 4544
Price: \$436 taxed

Microway, distributors of the Datalight compiler, Optimum C, claim that as it compiles from the command line, the resultant program executes faster than Turbo C. Optimum C uses two modes of operation: During development, when fast compile speed is needed, the compiler is run without global optimization thereby increasing compile speed; when a production version is to be produced, the application is recompiled using global optimization. Optimum C uses the EZ editor/environment to speed development of the individual modules.

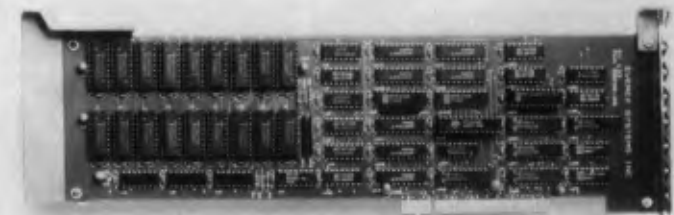
PC Series Tape Systems

Elmeasco Instruments

Phone: (02) 736 2888
Price: See below

The PC60Bi and PC125Fi are 60 and 125 Mbyte 1/4 inch tape systems for the IBM PC, XT, AT, Personal System/2 and compatibles. The tape systems are half-height internal drives and include mounting hardware, controller card, cable and user documentation. The PC Series

tape systems provide backup and restore, and data archiving. They also offer data interchange in desktop publishing, CAD/CAM, page imaging and other large database applications that require high capacity disk storage. The PC60Bi IBM version is priced at \$2000, Xenix version at \$1800; the PC125Fi IBM version is priced at \$2500, and the Xenix version is \$2650 (all prices untaxed).



PageLaser 12

Toshiba

Phone: (02) 887 3322
Price: \$7656

The PageLaser 12 from Toshiba is a 12 pages a minute laser printer. It has a duty cycle of 25,000 pages per month and an expected life of 600,000 pages, extendable to 1.2 million pages with a service kit. The printer holds 250 sheets of A4 paper in a single bin. Options include a dual paper bin, envelope feeder and output jogger/collater. The PageLaser 12 can emulate most standard printers including the Diablo 630 and the Qume Sprint II. Standard memory is 512 kilobytes expandable to 2 megabytes

RAM II 2000

Australia Everex

Phone: (02) 427 6111
Price: \$1239 taxed

A two megabyte memory expansion board for the IBM Personal System/2 Models 50 and 60, the RAM II 2000, has been released by Everex. The memory board is fully compatible with IBM's Memory Expansion Option and fits into one of the Micro Channel slots. Installation is simple, requiring only the insertion of the board. It has no jumpers or

dip switches and requires no ADF file since it is configured automatically when the Model 50 or 60 is powered up. The RAM II 2000 can co-exist with other Everex or IBM boards.

Maxwell 5

ABE Computers

Phone: (02) 288 2144
Price: \$845 taxed

The Maxwell 5 is a four speed modem which has auto dial, auto answer and auto speed selection. It can also automatically switch between tone and pulse dialling. Speed selection is for 2400 2400 baud, 1200/1200 baud, 1200 75 baud and 300 300 baud. The

Smart Image-60

Guardian Data

Phone: (02) 406 6144
Price: See below

Guardian Data has released the Smart Image-60, a 60 megabyte cassette tape backup system de-

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Each disk is \$10 for 5 1/4 inch format and \$15 for 3 1/2 inch format. Prices are per disk and include sales tax. Postage and Handling is \$3 per order.

MS500 SLIC WORKS: Excellent integrated Spreadsheet, Word Processor, database, and Communications package. easy to use and powerful.
TWO DISK SET

MSS02 PC-DESK: Great new program that allows you to keep addresses and use them for mail merge letters with its own built in word processor. Also includes calendar, dialler, and calculator!

MS510 COMPASS: Excellent integrated word processing, database, spreadsheet, and small accounting package, with interactive help! Great for home and business use!

MS1001 GALAXY: Fast RAM based word processor that has a wealth of features and is very easy to use thanks to its pull down menus.

MS1003 CHIWRITER: Excellent multi font word processor which allows you to view your fonts on screen and on your printer. Fonts include italics, script, greek, scientific, and mathematical symbols. Requires Epson or IBM graphics compatible printer.

MS1011 PAGEONE PUBLISHER: Great program for small desk top publishing needs. Allows you to format and print single page documents such as flyers, forms, etc.

MS1014 PCFOIL: Allows you to combine graphics with your word processing. Includes enhanced fonts, great for preparing any document were graphics can help get the point across.

MS1015 PC-OUTLINE: Excellent thought processing package. Allows you to outline and organise items and thoughts by constant rearrangement of items. Very useful for student and businessman alike.

MS1017 PC-STYLE: Very good writing style analysis tool. Determines the quality of your writing, and analyses it using a number of criteria. Great for students or anyone involved in any form of writing!

MS1018 EZ SPELL: New spelling checker program with its own large dictionary which can be added to easily.

MS1023 FREEFILE: Relational database management system which includes calculated fields, ability to import and export data easily, upto 10 indexes and 100 fields per database, online help, and more!

MS2025 SIDEFIL: Great new database/spreadsheet program with a million uses. Memory resident database allows upto 1000 record with very fast access. Enter data as database fields or free text. Allows you to perform spreadsheet functions on data easily. Includes sample files for chequebook and stock portfolio.

MS1043: ASEASY: Lotus compatible spreadsheet with very complete documentation on disk. Includes graphing, macros, financial and statistical functions, on screen help, and more!

MS1045: QUBECALC: Advanced spreadsheet for heavy users. True three dimensional spreadsheet with upto 262,144 cells! Very powerful.

MS2050 LOTUS BEGINNERS CLASS: Excellent tutorial on LOTUS 123 for new users. Includes number of sample files. Requires LOTUS-123.

MS1063 PC BOOKS GENERAL LEDGER: Easy to use menu driven general ledger program. Uses simple mnemonics for account codes instead of complicated numeric codes.

MS1069 MR BILL DEBTORS SYSTEM: Excellent debtors system for small to medium sized business. Capable of invoicing and statement generation, and wide range of reports on debtors.
TWO DISK SET.

MS1076 HOME ACCOUNTANT: Designed for the home book keeper who find a cheque book manager insufficient for their needs, but does not want to get involved with complex accounting systems. Very flexible package with upto 255 separate accounts. Perform a net worth calculation in an instant.

MS2065 COSTBUSTERS CHEQUEBOOK: Chequebook maintenance program with 22 element menu which is very easy to use. Also maintains bills as well as all cheques including cancelled ones. Even reminds you when bills are due.

MS1081 MORTGAGE ANALYST: Excellent financial analysis package that allows you to evaluate loans using a number of criteria. More than mere amortisation. Allows you to produce your own financial plans.

MS1083 MSAV FINANCIAL ANALYSER: Interesting program in which you enter data about your income, expenses, economic climate etc and it prints out a report simulating your financial future.

MS1091 PDS QUOTE: Prepare project quotations that can be expressed in terms of costs, including processing, materials, labor, and markup.

MS1097 PC-SELL: Point of sale system for retail outlets. Includes inventory, accounts receivable, and invoicing. Require hard disk for maximum effectiveness.

MS1100 RHM DESKTOP UTILITY: Excellent desktop utility, similar to sidekick. Memory resident. Provides appointment scheduler, text editor, DOS command interface, notepad, card filer and more all available from any program with the touch of a button.

MS1109 MAKE MY DAY: Great computerised time management system. Includes appointment calendar, job scheduler, time log, and expense account manager. Produces reports and worksheets.

MS1142 KWIKSTAT: Graphics oriented scientific statistical analysis program. Allows you to analyse data and produce it in text or graphical format.
TWO DISK SET.

MS2150 FONTASTIC: Great printing program, uses dot graphics on Epson or compatible printers to print text in numerous fonts and sizes. Includes Roman, Script, and Rotated fonts in sizes from 8 to 24 point. Use it as a mini Desk Top Publisher.
TWO DISK SET.

MS2151 SIGNSMIF: Sign printing utility to allow you to print impressive signs, transparencies, etc using upto four fonts on Epson or compatible printer.

MS2153 FLODRAW: Excellent graphics editor with what you see is what you get capabilities. Designed to handle symbols as well as function as a complete drawing package. Comes with a library of symbols for flowcharting, electrical design and more!
TWO DISK SET.

MS1176 EXPRESSGRAPH: Easy to use business graphics program. Numbers can be analysed easily, and then displayed in a variety of graphic formats, and printed.

MS2225 EZTREE: Excellent new menu and directory program similar to XTREE. Allows you to enter subdirectories easily, and use your hard disk effectively. Highly recommended.

MS1236 VERSATILE PRINTER SETUP: Great generic printer setup utility that can be used for almost any printer to easily configure it the way you want. Can be used as memory resident utility. Includes setup for IBM, Epson, Gemini, NEC and HP Laserjet.

MS1260 Z80MU CP/M EMULATOR: Great software emulator for CP/M 2.2. Well documented and on screen help.

MS1303 I-TEL VIATEL PACKAGE: Excellent Viatel communication package. Supports modems with and without baud rate splitters. Very easy to use.

MS1403 P-BASIC: BASICA compatible basic interpreter. Allows you to run all basic programs. Suitable for all PC including AMSTRAD.

MS1513 MONOPOLY: Excellent colour version of the classic board game. Upto four players.

MS1520 TRIVIAL TOWERS: Excellent Trivial Pursuit type game. Lets you write your own questions as well as use the large number of questions on the disk.
TWO DISK SET.

MS2510 TWO BIT POKER: Addictive copy of the arcade poker game seen at many pubs.

MS2520 DEFENDOR: Great new version of the arcade classic shoot em up game.

MS2522 STARSHIP: Action packed Star Trek type game. Command your starship and defend your base.

MS2525 GIN! Excellent computerised version of the old Gin Rummy game.

MS2530 NEBULA ADVENTURE: Great new space adventure game.

MS1637 PALM READING: Good program to help read your palm. With printout and graphics.

MS1640 ASTROVIEW: Excellent astronomy program which shows you to view the stars and planets on screen from any position on Earth, at any time between 1500 and 2500 AD.

MS1720 TYPING TUTOR: Excellent Learn To Type program for all levels.

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Commodore 64/128...\$8 Disk
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signed for IBM PC, XT, AT and compatibles. It features dual read/write heads for single pass data verifications, a dedicated high-speed controller and proprietary automatic backup called Smart Software. The Smart Image-60 has the ability to select the order of files to be backed up. The internal Smart Image-60 sells for \$2376 while the external model sells for \$2524.

resident font styles and RS232C, RS422 and parallel interfaces. Paper cassettes come in standard letter size, with legal, A4, B5 and Executive sizes as options. Each automatic paper cassette can hold up to 200 sheets. Print density is 300 dots by 300 dots an inch. The Star Laser can emulate the Epson EX-800, Diablo 630 ECS, IBM ProPrinter and HP LaserJet Plus laser printers.



**Starcard
Non-stop Fax Board** ▶

Unicomp
Phone: (02) 552 1800
Price: \$2695

The Starcard Non-stop Fax Board will allow PCs equipped with fax capabilities to communicate with any desktop fax machine. Starcard enables a user to directly transmit a document created in wordprocessing or desktop publishing programs. It will automatically keep dialling a busy number until transmission is successful.

Starcard fits inside a standard IBM or compatible expansion slot. Software disks are loaded to

hard disk and the Starcard is then used to connect the PC to a regular phone line. An optional

scanner for sending graphics or printed text for editing on screen is available.



Software Sentinel

Chan Computing Services
Phone: (08) 260 8278
Price: Not supplied

Chan Computing Services has released security hardware for the IBM PC, XT, AT or compatible systems. Software Sentinel connects to the external port of the PC and can be used in conjunction with software drivers and incorporated into a developer's product. The combination of Software Sentinel and the driver subroutines prevents execution of the software by anyone other than a licensed user.

When using Software Sentinel, the recommended protection scheme is for the program to issue a preselected sequence of characters to Software Sentinel and then examine the results returned from it. If the value returned is not valid, a predetermined program response will take effect, for instance, halting the program.



Furniture

Hydraulic Table ▲

Sylex
Phone: (02) 647 2888
Price: \$1440 taxed
Sylex has released the latest

product in its range of ergonomic furniture, the Hydraulic Table. It is a workstation with smooth height adjustment action, designed to accommodate the heaviest of computer systems. Measuring 900 x 1500 mm, the table will hold two monitors, a

keyboard, tablet and mouse. Monitors can be placed on clamp-on Monitor Arms, also from Sylex. It adjusts in height from 570 x 720 mm and has full length modesty panels at any height. The table is grey with grey toning



Star Laser

Star Micronics
Phone: (02) 736 1144
Price: \$5000 untaxed

The Star Laser from Star Micronics prints eight pages a minute and comes with 1 megabyte of memory as standard. It has four

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To get more information on Viatel phone 008 033 342 (for the cost of a local call).

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Stacker Stand

Sylex
Phone: (02) 647 2888
Price: \$115

The Stacker Stand from Sylex is a printer stand unit that provides space saving efficiency. Paper feeding and handling is also improved as the paper picks up

from the middle shelf of the stand, prints and then drops and refolds on the desktop. The Stacker Stand fits all desktop printers up to a maximum footprint of 520 mm wide x 340 mm deep. It is constructed from acrylic and laminated timber shelves and packs flat for shipment.



Miscellaneous

DataLifePlus

Verbatim
Phone: (02) 487 6477
Price: Not supplied

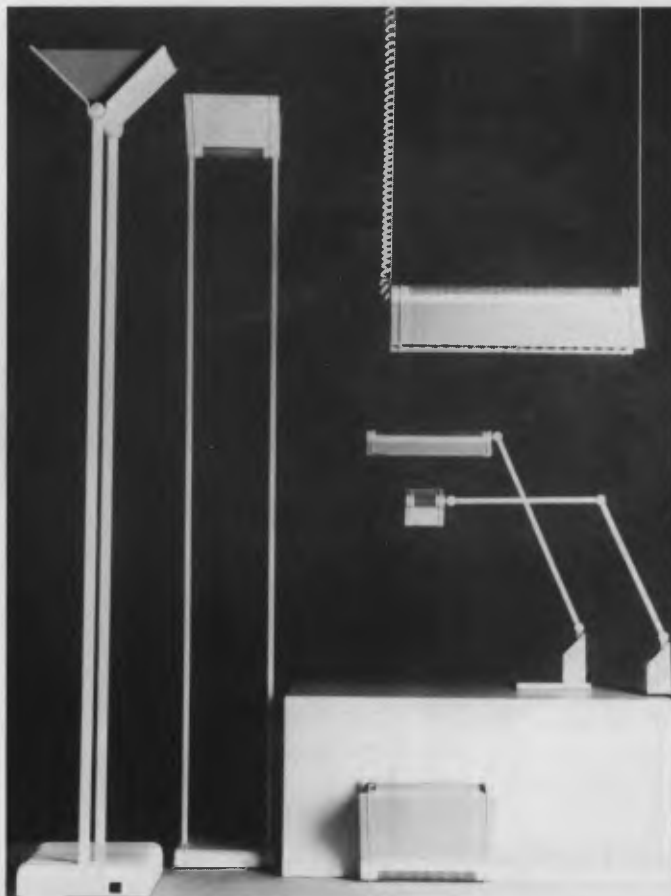
At last! A floppy that doesn't die a dim death when the coffee is spilled over it. Verbatim has come up with Datalifeplus, a Teflon coated floppy disk that offers greater protection against spills, smudges and fingerprints. The Teflon coating encases the surface of the disk with slippery sealants that resists coffee, cold cigarette ash, hand friction and a variety of other substances, including correction fluid. Most substances can be simply wiped off the surface — without removing data in the process! These

(data) life-saving disk will be packaged in boxes of 10- price and availability to be announced.

MIL

Concord Lighting
Phone: (03) 429 5166
Price: Not supplied

MIL is the latest range of lights from Concord Lighting. The seven major groups of products include free standing, wall mounted and ceiling mounted uplighters, desk and portable units, fluorescents, floodlights and spotlights. The desk and portable units are fully adjustable and include an on/off switch and three meters of cable with a moulded plug. Concord claims that the technical features of the range make it particularly suited to offices, shops, public buildings and hotels.



Panafax UF-150

National Panasonic
Phone: (02) 886 0205
Price: \$3295 taxed

▲ National Panasonic has released a compact, lightweight facsimile machine designed specifically for the needs of small businesses. The Panafax weighs six kilo-

grams, including paper, and measures 320 x 303 x 126 mm. It can transmit and receive documents up to A4 size and includes multiple dialling capability, 17 second transmission and 16 step halftone reproduction for photographs. A 24 hour timer enables the user to take advantage of changes in time zones around the world and off peak telephone rates.

Events

The First Computer Pals Across the World conference, hosted by the Alice Springs Educational Computing Association, will be held from April 7 to 8 at the Sheraton in Alice Springs. The organisers are seeking papers and workshops on the theme: 'Sharing in a Global Classroom'. Phone Ralph Czerniejewski (089) 525 044.

The EDP Auditors Association will be holding an international conference at Jupiters Hotel from April 27 to 29. Contact Lex Page or Tony Muston on (02) 250 0500.

Information Online '88. The third Australian online information conference and exhibition is to be held at the Sydney Hilton Hotel from January 19 to 21. Phone Andrew Mackenzie on (02) 235 8273.

Technology Event PC '88, Office '88, and Communications '88 will be the first major trade show at the Sydney Exhibition Centre, Darling Harbour, in February. Ring Janelle Schreiber (03) 267 4500.

The Fourth National Space Engineering Symposium will be held in Adelaide July 12 to 14. Papers dealing with any space engineering are invited. Contact (062) 73 3633.

Ausgraph '88 organisers are calling for previously unpublished papers dealing with Cad/cam animation, scene simulation and image processing. The show will be held in Melbourne from July 4 to 8 at the Hyatt on Collins. Details (03) 387 9955.

The Personal Computer Conference '88, run by the NSW branch of the ACS, will be held at the Masonic Centre, Sydney, from February 8 to 10. Contact Mary Jordan (02) 233 1011

Western Australia's Unix Sys-

tems Group meets on the third Wednesday of each month. Phone Sam Pascoe (09) 367 7999.

The Joint International Symposium on Information Systems is calling for papers for its meeting to be held in Sydney from February 29 to March 2. Details on (02) 697 4413.

Papers are being called for Forum '88, organized by the Honeywell Bull User's Association. It will be held at the Sydney Hilton Hotel from July 21 to 23. Contact (02) 218 9578.

The Fourth Mathematics in Industry Study Group will be held at the University of NSW from February 1 to 8. Contact Dr Barton on (02) 467 6702.

Special Interest Groups for PC Users: CONSIG meets on the first Wednesday of each month in Sydney; contact (02) 290 2655. The DTP Graphics SIG meets on the first Tuesday of the month in Sydney; contact Mark Richards on (02) 929 5855. PCWEST meets on the first Monday of the month in Sydney; phone Bill McEwen (02) 627 2488.

A Forth Symposium and Workshop will be held on the 18 and 19 May, 1988 at the NSW Institute of Technology. Keynote speaker will be Charles Moore, who invented the Forth language.

Overseas Exhibitions

The Pacific Telecommunications Council will hold its annual conference from February 15 to 18 at the Sheraton Waikiki Hotel, Honolulu, Hawaii. The theme is: 'Telecommunications and Pacific Development: Alternatives for the Next Decade'.

Electrex, a UK electrical and electronics exhibition, will be held in Birmingham from February 29 to March 4. Contact Keith Prowse (Australia) on (02) 953 8888.

The EDP Auditors Foundation Conference: The 18th Conference is to be held in Atlanta, Georgia, USA, from April 10 to 15, 1988. Write to The Program Chairman, The EDP Auditors Foundation, Box 88180, Carol Stream, IL 60188-0180 or telephone 312/653-0950. □

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INMOS transputers are available now and have already found their way into companies who are evaluating, prototyping and manufacturing transputer based systems. Applications include supercomputers, DSP, graphics, robotics, AI, distributed control systems, PC's, engineering workstations and many others.

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THE PROPHET

The Terrorist

ONE OF THE pleasures of running a Bulletin Board System is fixing all those little problems that crop up as you trek around the communications world. There are users to help, files to re-create, disks to backup — all sorts of exciting tasks that are a pure pleasure to perform.

Modems suffer random blasts of lightning, especially when the nearest storm is in Indonesia. Hard disks suddenly decide that they are out of warranty and simply stop without even a subtle warning but I am wandering. The greatest threat that has ever manifested itself on my computers is Pamela. No, not a new type of modem, drive, or even anything directly to do with the computer (except for the failures) — Pamela is my two year old daughter. She used to love watching me type away, and would wait patiently for me to put Bouncing Babies (the game) on for her to play — she loves it when they splat on the ground.

My little girl is totally unafraid of these electronic toys and she *knows* that they can play games, so she wants to use the machines every chance she gets. Trouble is, she can't understand why people get upset when she causes three users to get disconnected when the main BBS gets the 'treatment.' Ah, yes, the pleasures of running a Bulletin Board

PAMS News

BY THE TIME you read this, the Registry data should be available for use in ASCII format. This means that you can use it in your own programs to write dialling directories, special printing formats, whatever. The best way to get information on this new feature is to contact one of the State Co-ordinators or Prophet BBS on (02) 628 5222.

Please always grab one of the electronic listings from the Registry before going and dialling up all of those exciting systems you see listed. I say it again and again but the listings that are published are out of date and should only be used as a quick, first check. Publishing on paper takes time, and getting the finished magazine out into the world takes time. By the time you read it here, there would have been two new Registry releases done, so use the online list to update your own list — and check the date on the thing!

Just an example — The Manly BBS telephone number is (02) 977 6820 and that has been the number recorded in the Registry files since the 8704 listing. But some poor non-computer person is still getting calls on his number, with a slightly different prefix, and has been for at least eight months. Some system somewhere has a list with the wrong number and, worse still, it is being distributed to others — so, whoever you are with the wrong number: *Correct it!*

If your regular Bulletin Board doesn't carry the Pams List, ask the Sysop to get it each month — nicely of course.

The listings are published at the beginning of each month and they are given a release number of the year and month, for example: 8801 is Jan 1988 — got it!!

If your regular Bulletin Board doesn't carry the Pams List, ask the Sysop to get it each month — nicely of course.

in rounding up before the changes, in the October issue an old version of the registration form was published, so I have included a current registration form and the help notes here for all you Sysops who I know are waiting with bated breath to complete.

The Registration Form

THE AUSTRALIAN PAMS Registry was formed to resolve the age old problem of obsolete Bulletin Board lists. Part of the philosophy of the Registry is to make it worthwhile for all operators to list their system and to make use of the listings.

One method of doing this is to issue the lists regularly — so, at the beginning of each (and every!) month, the Registry publishes a new version of the listing. Each version is clearly marked with the creation date and time, and it is given a unique release number. As an incentive for operators to register, *Your Computer* provides a free year's subscription for completed registration forms received by

the Registry. The subscription is renewed after the first year by returning the renewal notice to the Registry with a fresh registration form.

The magazine also helps ensure that there is a Registry by sponsoring the running costs, too — and that costs quite a few dollars on its own.

Completing It

IF YOU HAVE the Registry file on disk, complete the form with your wordprocessor. That makes it easier to read and there's a lot less chance of mistakes. If you have to print it out fill it in by hand, please fill it in legibly — you might be able to read it, but some of the forms I have been getting look like they've been compiled.

Either send the form as NetMail (not on the public conference AUST-PAMS since anyone can read it) to me at 712/606 or post it to PO Box E41, Emerton NSW 2770. You can also supply the information to one of the State Co-ordinators (their electronic addresses are in the October issue of *Your Computer*).

The Form

THE SYSTEM NAME is the name of your board, but try and avoid having 'The' at the front. Since I use dBase for sorting, The Glory Board will be listed under T, not G, as you probably would like. Another thing to avoid is putting the name of your BBS software in the name, since you may change software later. Try and keep your name reasonably short and, if it's a user group system, remember to add your region. We do have cases where user groups are known by the same name in different places.

The Board's Telephone Number: After you've filled it in, check it about 100 times — a few wrong numbers have gotten into the list — sometimes it's my fault, but it's often wrong on the form.

Online Sysop Name is the name you are generally know to your users by — Charles Willy might like to be Chuck Willy on his system. It's just your usual signature name.

Machine, Operating System and BBS Software are just for prospective users' information — keep it short (very short): for machine, just the type/style (IBM XT, Apple IIe); for operating system the same — something like MS-DOS, LDOS, and CP M80 are enough.

The BBS Software: I get some that say 'Opus/Seadog/Brinkers & Barf' — Opus, is all we want, in this case.

Hours of Operation: 24 hours or the times (in military time, 2400 style) that the system is available. If you are one of those systems that are available from 0900-1000 Mon & Tue, 0100-2200 Thur, don't be surprised if we are a bit unimpressed.

Modem type doesn't mean the brand, but the speeds (in CCITT & Bell) V21, V23, V22, V22bis, V23ORG (Back channel 1200 instead of 75), Bell 103, Bell 212, or others, like the Trailblazer.

User Access: you have the choices of Member (full access), Registered User

The greatest threat that has ever manifested itself on my computers is Pamela.

(registration required), Public (open to all), Visitor (has access to functions), and Limited Visitor (limited visitor access available). You cannot be all of the above!

The dreaded Other Information consists of things like packet radio information (see AMPAK in the Queensland list). We

don't want to have your latest system developments.

Fido Address: If you are part of the Fido network, make sure you put this information in — I don't reference the nodelist.

Confidential Information is for the Registry to use. The reason we ask for this information is so that we (the co-ordinators) can get in touch with you if we get a report about problems with your system. All we ask is your address and telephone number (*voice line, please* — the after hours one is the most important, since most of us work during the day and do all this at night). And don't forget your post-code! □

ACT

- ***Offline ***
- ACT Amiga BBS (line 1)
- ***Offline ***
- ACT Amiga BBS (line 2)

NEW SOUTH WALES

- ***Unknown ***
- Apple Users Group BBS
- ***Unknown ***
- Bert BBS (Videotext)
- ***Name Changed ***
- Club Mac BBS
- Info: Now called Club Mac Remote Maccess System
- ***Amended ***
- Club Mac Remote Maccess System
- Sysop: Iason Haines
- Phone: (02) 73 1992
- Baud: V21.V22.V22bis.V23
- Access: Mem.LVA
- Computer: Macintosh
- DOS: HFS
- BBSSoftware: Red Ryder
- ***Amended ***
- CommLink BBS
- Sysop: Nuggets
- Phone: (043) 41 3135
- Baud: V21.V22.V23.B103.B212
- Access: Mem.Reg.VA
- Computer: Commodore
- DOS: Basic IEEE
- BBSSoftware: Comtel
- ***Amended ***
- Down Under KBBS
- Sysop: Glen Myles
- Phone: (02) 674 6647
- Baud: V21
- Access: Mem.VA
- Computer: Commodore 64
- BBSSoftware: KBBS
- ***Amended ***
- EasyComm Opus
- Sysop: Michael Aldiholic
- FIDOnet: 712 505
- Phone: (02) 558 9620
- Baud: V21.V22.V22bis

- Access: Mem.Reg.LVA
- Computer: AT Clone
- DOS: MS-DOS
- BBSSoftware: Opus
- ***Amended ***
- First Nice MIDILine #2
- Sysop: Andrew Khoo
- FIDOnet: 711/805
- Phone: (02) 868 4836
- Baud: V22.V22bis.B103
- Access: Public
- Hours: 0000 — 0400 ONLY
- Computer: IBM XT
- DOS: PC-DOS 3.2
- BBSSoftware: Opus
- ***NEW System ***
- Freeze World
- Sysop: Ashley Irons
- Phone: (047) 33 3094
- Baud: V21
- Access: Public
- Hours: 2130 — 0730
- Computer: Commodore 64
- BBSSoftware: FRP
- ***Amended ***
- Idiom
- Sysop: Stephen Beeby
- Phone: (02) 438 4060
- Baud: V21.V22.V22bis.V23
- Access: Reg.VA
- Computer: XT-Clone
- DOS: PC-DOS
- BBSSoftware: RBBS
- ***NEW System ***
- Landover BBS
- Sysop: Lance Lyon
- Phone: (02) 550 1056
- Baud: V21.V22.V22bis.V23.B103.B212
- Access: Mem.LVA
- Computer: Amiga 1000
- DOS: Amiga DOS
- BBSSoftware: BBS-PC!
- ***Amended ***
- Lodestone BBS
- Sysop: Ian McWhirter
- FIDOnet: 711 407
- Phone: (02) 456 3264
- Baud: V22.V22bis.B103
- BBSSoftware: Opus

- ***Offline ***
- Microlink BBS
- ***NEW System ***
- NetComm Australia
- Sysop: Bill Bolton
- FIDOnet: 712/801
- Phone: (02) 887 3297
- Baud: V22.V22bis.PEP
- Access: File Server
- Hours: Weekdays: 1800 — 0800.
- Weekends: 24 Hours
- Info: Software support system for FidoNet SysOps — File Request ONLY Wazoo and Bark requests honoured
- ***NEW System ***
- New Frontiers CBCS
- Sysop: Howard Pew
- Phone: (046) 25 6954
- Baud: V21.V22.V23.B103.B212
- BBSSoftware: Opus
- ***Amended ***
- Omega Line
- Sysop: Geoff Arthur
- Phone: (02) 457 8281
- Baud: V21.V22.V23
- Access: Public
- BBSSoftware: Opus
- ***Amended ***
- Palantir C64 BBS
- Sysop: Steve Sharp
- Phone: (02) 451 6576
- Baud: V21.V22.V22bis.V23.B103.B212
- Access: Reg.VA
- BBSSoftware: Punter
- ***Amended ***
- Paragon Bulletin Board
- Sysop: Jennifer Allen
- FIDOnet: 712 502
- Phone: (02) 597 7477
- Baud: V21.V22.V22bis.V23
- Access: Reg.VA
- BBSSoftware: TBBS
- ***Amended ***
- RCOM C64 BBS
- Sysop: Simon Finch
- Phone: (02) 667 1930
- Baud: V21.V22.V23.V23ORG.B103.B212

- Access: Reg.VA
- Computer: C64
- BBSSoftware: RCOM
- Info: Needs Ultraterm on C64
- ***Amended ***
- Sci-Fi BBS
- Sysop: Greg Hope
- Phone: (02) 646-4865
- Baud: V21.V22.V23
- Access: Public
- ***Amended ***
- Shore BBS
- Sysop: David Kok
- Phone: (02) 59-3936
- Baud: V21
- Access: Reg.VA
- Hours: Weekdays: 1800 — 0730.
- Weekends: 24 Hours
- Computer: Macintosh
- DOS: HFS
- BBSSoftware: Red Ryder Host
- ***Amended ***
- SMUG Bee RCP/M
- Sysop: Paul Pinches
- Phone: (02) 520 5181
- Baud: V21.V22.V22bis.V23
- Access: Reg.VA
- Computer: Microbee
- DOS: CP/M80
- BBSSoftware: TBBS (PD)
- ***Online ***
- Sydney PC Users RIBM
- Sysop: Geoff May
- Phone: (02) 221 5520
- Baud: V21.V22.V23
- Access: Mem.VA
- Computer: IBM PC
- DOS: PC-DOS
- BBSSoftware: Fido
- ***NEW System ***
- Ventura Publisher BBS
- Phone: (02) 449 0463
- ***Offline ***
- Warringah BBS

QUEENSLAND

- ***NEW System ***
- Grenhorn Experimental
- Sysop: Mike Richardson

THE PROPHET

Phone: (07) 345 5010
Baud: V21.V22.V22bis.V23
Access: Reg.VA
Hours: Weekdays: 1600 — 0800:
Weekends: 24 Hours
Computer: IBM XT
DOS: MS-DOS
BBSSoftware: Opus

***Amended ***
Marlin-Coast BBS
Sysop: Ray Chalmers
FIDOnet: 640/501
Phone: (070) 51 7220
Baud: V22.V22bis.V23
Access: Reg.VA

Computer: Cleveland 286
BBSSoftware: Opus

SOUTH AUSTRALIA

***NEW System ***
Club Opus CBCS
Sysop: John Pride
Phone: (08) 263 5181
Baud: V21.V22.V22bis.V3
Access: Reg.LVA
Computer: IBM-Clone
DOS: PC-DOS
BBSSoftware: Opus
***Amended ***
Multiple System BBS

Sysop: Danny Vozzo
Phone: (08) 255 5116
Baud: V21.V22.V22bis.V23
Access: Reg.LVA
Computer: Apple //+
BBSSoftware: GBBS

***NEW System ***
S A C BBS
Sysop: Austen Evans
Phone: (08) 387 0249
Baud:
V21.V22.V23.V23ORG.B103.B212
Access: Mem.LVA
Computer: C-128
BBSSoftware: Blue Board

***NEW System ***
The Postie BBS
Sysop: Philip
Phone: (08) 347 1046
Baud: V21.V22.V22bis.V23

VICTORIA

***NEW System ***
Ballarat C.A.E.
Sysop: Paul Kelly
Phone: (053) 339 285
Baud: V21.V22.V23
Access: Reg.VA
Computer: IBM XT
DOS: PC-DOS
BBSSoftware: Opus
***NEW System ***
Crystal Palace
Sysop: The Outsider
Phone: (03) 725 1923
***NEW System ***
Soltec BBS
Sysop: Jim Tsorlinis
Phone: (03) 890 8166
Baud: V22
Access: Reg.VA
Hours: Weekdays: 1700 — 0900:
Weekends: 24 Hours
Computer: IBM XT
BBSSoftware: Opus
***Amended ***
Tardis RCPM
Sysop: Malcolm Miles
Phone: (03) 859 3109
Baud: V21.V22.V22bis.V23
Access: Public
Computer: PC
DOS: Concurrent DOS
BBSSoftware: CALLME/GOLIATH
***Offline ***
The Deepseas BBS
***NEW System ***
The Time Warp
Sysop: The Alien
Phone: (03) 813 1663
Baud: V21.V22
Access: Reg
Computer: IBM XT
BBSSoftware: Opus
***NEW System ***
The Twilite Zone
Sysop: Fearless Fred
Phone: (03) 562 0686
Baud: V21.V22
Access: Reg
Computer: IBM XT
DOS: MS-DOS
BBSSoftware: Opus

WESTERN AUSTRALIA

***Amended ***
Pegasus BBS
Sysop: Michael Rusell
Phone: (09) 242 2099
Baud: V21.V22.V22bis.V23
Access: Public
Hours: Weekdays: 1700 — 0900:
Weekends: 24 Hours
Computer: Epson AX
DOS: MS-DOS
BBSSoftware: Opus

Bulletin Board Information

Type: New System / Change

System Name: _____

Board Telephone number: (____) _____ - _____

Online Sysop Name: _____

Machine: _____

Operating System: _____

BBS Software: _____

Hours of operation: 24hours / _____

Modem Type: _____ [V21/V23 etc]

User Access: Member/Registered User/Public/Visitor/Limited Visitor
[Delete as required]

Other _____

Online Info _____

Fido Address: [_____/_____] _____

Confidential Information

Sysop Name: _____

Telephone BH: (____) _____ - _____ AH: (____) _____

Address: _____

Postcode: _____

Your Computer Subscription Required: YES / NO [Delete as applicable]

Please report changes or new listings to:

Australian PAMS Co-ordinator PO Box E41, Emerton NSW 2770

Electronic: Prophet TBBS (02) 628-5222 V21.V22.V22bis.V23
FidoNet [713/6D6]

L A S E R P R I N T E R

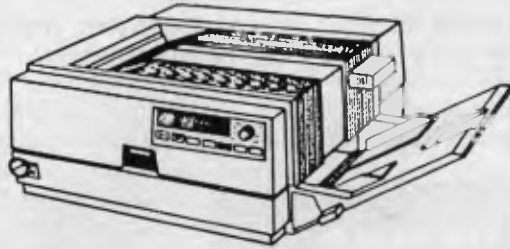
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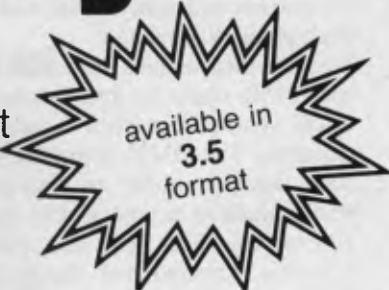
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**Javlelin	\$259	**Hilite for dBase 111	\$149	**Freelance Plus (desk	
Harvard Total Project	\$299	MS:Chart	\$269	top publisher)	\$399
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publisher)*****	\$499	Macros for Lotus 123	\$99	Macros for Symphony	\$99
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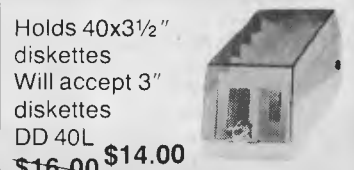
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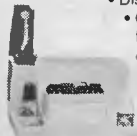
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MICROBEE FILE

A Fresh Start!

1988 COULD HERALD a fresh start for Microbee Systems and its range of computers. Late in 1987, Microbee was taken over by Impact Systems, an Australian company, noted for its laser printers and a recent buying spree of hi-tech companies.

Impact has made some very significant take overs of late, and has also introduced some solid management into its ranks from what has been described as the 'old

boy' network of hi-tech companies. What the direct implications for Microbee and its range is not clear, but it is certain that the lucrative education arm of Microbee will be augmented. It is not outside the realms of probability that through Microbee, Impact will build on the education section and possibly introduce a desk top publishing package for schools with a marriage of Microbee's computers and Impact's mainstream laser printers.

What of the rest of Microbee? There have been changes within Microbee but things are very low key at the moment.

What with the November stock market crash, and the promise of fresh ideas and incentives in our bicentenary year, one cannot expect too much action with regards to restructuring. January '88, however, will see Microbee Retail in South Australia and Victoria physically merge with Impact Systems. It is mooted that Microbee's diminished research and development team may find a new home with Impact in Chatswood, and be bolstered by mutual resources. Microbee manufacturing, on the other hand, is currently being subcontracted. □

AIDS — Resource Software For Schools

WHEN NEWS OF the AIDS virus hit the popular press, it was hard to open a newspaper or turn on the 6 o'clock news without hearing about more victims, tests or discoveries dealing with the 'epidemic of the Eighties.' The more information we had about AIDS, the less we seemed to clearly understand. As with anything dealing with sex, politics or religion, emotions ran high, leading to a plague of misinformation.

Indeed, AIDS is not an epidemic and it cannot be contracted by sitting on toilet seats.

But where do you find the right information and how do you present it to a class? Through a program by Margaret Denham, you may be able to break the ice and incorporate your Microbee in an AIDS awareness campaign. With more facts and the greater the diversity of mediums used to convey information, the better your chances of successfully conveying your message.

Load AIDS, the program, and the main menu provides you with 10 options. Each of these opens a section which covers different aspects of AIDS.

1. AIDS the disease — An introduction to AIDS outlining what the disease is and how it affects humans. The statistics on AIDS in Australia are also presented: 238 dead (as of 1987) and 50,000 estimated to be carrying the disease. You're also told about the three categories of AIDS — A, B and C — and shown a simulation of the

AIDS virus penetrating a T cell and subsequently reproducing.

2. Who gets AIDS? — The statistics for Australia are revealed, showing that 87 per cent of those who have contracted the disease so far are homosexual men, 9 per cent are recipients of blood products (no new cases since screening was introduced in 1985), 2 per cent are intravenous drug users, and 1 per cent are heterosexuals. Each high risk category is explained with details as to how and why AIDS is contracted and how it can be avoided. For

*But where do you find
out the right information
and how do you present
it to a class?*

homosexuals, it is stated that 'Homosexuals who have one faithful partner, and who practice safe sex, are in no danger of getting AIDS.'

3. AIDS around the world — This section covers the global statistics on AIDS plus details on the number of AIDS deaths and estimates of carriers in the USA, Australia, Europe and Africa. This allows for predictions of the spread of the disease and presents some chilling facts, such as the potential for AIDS to wipe out the 25-45 year-old age group in Africa due to wide

scale ignorance and the cost of implementing education and protection schemes such as we have here.

4. Where did AIDS begin? — A brief description of how the disease has spread from Africa through the world is presented. There is no attempt to pin-point the exact origins of how the disease was first contracted by humankind.

5. How is AIDS transmitted? — A frank and open presentation of exactly how AIDS is transmitted, whether through oral, anal or sexual intercourse, breastfeeding, intravenous drug use or from mother to child. Every possible avenue is explored and detailed clearly.

6. Myths about AIDS — A brief section which dispels many of the common misconceptions about AIDS and its spread. This is a handy reference for students to check any queries and fears they may have.

7. Test your knowledge — A series of multiple choice quizzes which allow students to test their knowledge about AIDS. If an incorrect answer is given to a question, a correct answer is presented on screen.

8. Case histories — This section is rather novel. It presents a series of case histories, such as: 'Gary has an enormous penis. Does this increase his chances of contracting AIDS?' Students are asked for yes or no responses.

9. How to avoid AIDS — This section explains how AIDS is best avoided. It discusses the use of condoms and safe sex but above all contains the optimistic

moral message that if we have one life-long marriage partner, then we have no risk of contracting AIDS.

10. Am I at risk? — This final section presents a series of questions which you can answer to find out if you may already have the AIDS virus, or if your lifestyle puts you at risk of contracting AIDS.

AIDS is an interesting program that presents the disease clearly and frankly. It makes explicit mention of human sexual practices and for this reason, the programmer suggests it is best suited to a secondary school audience. It covers most aspects of the disease in a clear and concise way.

AIDS (the program) could be criticised because it does not make good use of the computer as a medium — it contains only two interactive sections and one simulation, the rest of it takes the form of on-screen reading. Although I have never been in favour of programs which achieve no more than a pamphlet or booklet could, this is an exception. Because of the sensitive nature of the topic, an AIDS information program allows students to

It is difficult to accept computer programs of this nature because they touch on an area of teaching that has always been fraught with problems.

study the subject alone if they wish. Many will feel happier about asking an anonymous computer for information about the disease than they would asking their teacher or school friends. In the same way, teachers faced with a mass of sniggering thirteen-year-olds could present the program as an introduction to the topic to allow students to discover as much as they can about the disease for themselves before following up with class discussion. The program could well be made available in the school library for a week or so during an awareness campaign to allow as many students as possible a chance to explore the subject.

It is difficult to accept computer programs of this nature because they touch

on an area of teaching that has always been fraught with problems. AIDS has forced debate on certain issues in sexual education and brought out into the open areas such as homosexuality which have not always been made explicit. Because AIDS (the disease) is a killer, we owe it to our students to provide them with information — especially as it seems unlikely that we will have found a cure before today's students are out of their teens.

AIDS costs \$30 and is available from Denham Software 45 The Pinnacle, Willetton 6155 WA.

A Teacher's Computerised Rollbook

IF YOU'RE A secondary teacher looking for something a little more sophisticated than the traditional rollbook, then this may be the right program for you. It allows a maximum of 45 pupils per class and 20 marks to be set against each pupil. The class names have a maximum of 8 characters and the student names are limited to 14 characters. Highest possible mark is 100 and marks can be entered as whole or half numbers with A, Abs or a RETURN against a blank score for absent.

The program is very swift in all its calculations and provides every possible feature you could require.

A new command included is STANDAR-DISE. This provides an extremely useful way of manipulating and assessing marks. It allows you to standardise each column of marks, which means that students are not discriminated against for being absent for tests or (if you decide this to be the case) for a zero for non-submission of work.

Because this program is an extension of A Primary Teacher's Rollbook, it allows you to work to the same flexible system of recording, scaling and graphing marks. The commands are the same and allow you to state exactly what you want to do at any stage without going through a series of menus. This speeds you up — provided you know what you want to do at all times.

Included in A Teacher's Computerised Rollbook is an additional Rollbook Utilities program. It contains five programs which can be used in conjunction with the Rollbook. Scale To Common Test is the first of these; it can be used as a moderator to determine scaling appropriate for streaming or pupil reports. A multiple-choice testing facility is also included. It allows you to devise multiple-choice tests using up to 80 questions and then to test pupils automatically by direct input into

the computer. The computer will mark the test for you, then record the mark automatically in your roll, adjusting the scores accordingly.

Across The Form Mark Manipulator is another program on the disk. It can draw up a scatter sheet of marks for up to 10 classes, and enables you to manipulate those marks by specifying new averages and standard deviations for particular classes. Formbook, another program, displays or prints a list of up to 250 pupils in a form, either alphabetically or in merit order, showing positions in the class and in the form. The final program is called Teacher's Assessment Aid. It allows you, through the use of up to 26 programmable comment codes, to assess an entire form of up to 250 pupils, then print out an alphabetical list of all pupils in the form showing their class, mark, position in class and comments. Pupils are assessed a class at a time and positions are retrieved directly from the class rolls. Marks can be scaled in the same way as the Rollbook program.

Both of these programs come with a user friendly, well written, no-nonsense booklet which will lead you step by step through the program.

The Electronic Markbook

THIS PROGRAM ALLOWS up to 190 students in up to 10 classes. It permits a maximum of 40 marks per student from 0 to 1000. The first thing to do is to print out the document file contained on the disk which has all of the instructions on how to use the program. You'll definitely need it.

When you load the program you are given three choices: 1) Produce a new file, 2) Read a file from disk, and 3) Quit.

The first thing to do when producing a new file is to give it a name. Up to eight characters are allowed and they must be in capitals (if they aren't they are automatically changed to capital letters).

I set up a course called ART. I was then asked how many classes would be following the course (up to 10). I selected two and named them 1a and 1b, although up to 29 characters are allowed for each name.

You are then automatically taken into the VIEW FILE mode which is where you spend a lot of time in this program. It looks like an open markbook with names entered in the left-hand column, and there are up to 40 columns available for marks across the page.

You start by entering names. Once you've done this, you save them by pressing Ctrl-Q. They can be sorted alphabetically.

cally by pressing Ctrl-A. When you want to enter marks, press Ctrl-L, then select a column to place the marks in using the arrow keys or control commands, and then Ctrl-K to confirm it.

As you can imagine, it can get pretty confusing with so many control characters needed to operate this program (especially when they conflict with already established control commands in other programs like WordStar). However, the author has provided clear instructions in the documentation so you should soon get into the swing of it.

Entering marks is easy — once you've gone through the preamble of setting up the column and naming it and stating the maximum score. You simply enter each score next to the student and then, after the last score, the course mean and standard deviation are calculated.

You can rank the marks by using control commands or arrow keys to select the column of marks you wish to rank and then select in which column you wish the ranked positions to lie. Again, all this is achieved through numerous control commands, all faithfully carried out in the correct order. If you don't get the order right, type Ctrl-Q to exit from any part of the program. And if you lose your way, pressing Ctrl-T will display all the available commands.

The editing functions of this program allow you to change marks and names, add, delete and move students and sort names alphabetically. You can also change the course, class or test name if required and add or delete a class. You are able to organise the marks in several ways, combine, rank and weight them.

Printing is quite straightforward. You press Ctrl-P from the VIEW FILE mode and you are presented with a menu which asks what you want to print: 1) Class list, 2) Course list, 3) Roll sheet, 4) Marks sheet, 5) Course marks in rank order, and 6) Single student marks list.

When you make your selection to print, the program automatically prompts you with which class you wish to print by bringing up the names of classes you have stored in memory. You also have the option of printing out all the classes.

This program has one big problem, however. At this stage I decided I wanted to enter another course, as I would, say, if I were a teacher of English and History. I was unable to do this without reloading the disk and entering through the main menu again to set up my second course. Not even Ctrl-Q would take me back to the opening menu. This means that educators



who teach more than one subject might find it awkward to set this program up to meet their needs.

On balance it is the hardest to use of the four programs because of its reliance on so many control commands. It also offers fewer features than the other programs — but it *is* free!

Rollcall . . .

WHEN I STARTED this article, I intended to line up all the programs and do a blow-by-blow comparison, ending up with a neat 1st, 2nd, 3rd and 4th place ranking. For most types of programs that's easily done. Indeed, I can make a few points about these programs — I think GTMark's ready made report comments are fantastic and that the maximum of 14 characters per name in A Primary Teacher's Rollbook and A Teacher's Computerised Rollbook is very limiting. I found GTMark hard to use initially because of the control commands. And, the Rollbook Utilities has to have every angle of marking covered! I definitely put Electronic Markbook last because it offers less than the other programs and is far harder to use. In fact, price is a fair indicator of quality with these programs — the more you pay, the more you get.

If you are considering investing in a rollbook program, I suggest you pick either GTMark or A Teacher's Computerised Rollbook.

You see, what is at issue here is the programmer's mind. Each programmer sets out with a very similar task and each is achieved successfully. No particular program stands out as being vastly superior in any way. And yet, each program achieves its aims very differently to the

others — proving the diversity of the human mind when it has to come up with creative solutions to problems. As I reviewed the programs I got to know the programmers' minds quite intimately because of the different approaches they took. And in case you are wondering why that's important, perhaps the programmer who is most similar to you in mind, is the one who's program will suit you best.

G. Taylor, author of GTMark, is a methodical fellow. His documentation is clear, concise and extremely logical. It is full of lists. Everything has been placed in order. His program is the same. The order is clear and precise. In order to use this program you have to get yourself into his frame of mind. You are forced to be organised, to proceed logically through a series of menus which he has set up for you. The end result is clear, tidy perfection. If you are the clear-headed organised type, this program is for you. Even if you're not, it might help you sort out your house-keeping and end up with some very impressive looking work indeed.

G. Meale, author of A Primary Teacher's Rollbook and A Teacher's Computerised Rollbook, is a different fellow altogether. If GTMark is logical, then these latter programs are lateral. You can tell the minute you start reading his documentation. He chats to his readers on a step-by-step guide to a program, rather than telling them exactly how they should use it. Rather than organise your marking for you, his program leaves you as many options as possible to tailor it to your own needs. He has provided two programs that allow you to step into the driver's seat; while with GTMark you're definitely the passenger. □

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PROBLEM ONE: OUT OF ALIGNMENT. There are hundreds of circular tracks packed into every inch of your hard disk's magnetic recording media. They are *extremely* thin, about as thick as a single strand of hair. Perfectly aligned tracks on a new, out-of-the-carton hard disk look like those in **figure 1**. Your programs read, but *never* write, to any of the special Track and Sector ID areas shown in black.

When your system has been off and is cold — in the morning, for instance — head positioning mechanics shrink, causing heads to read and write towards the inside. As the unit warms they expand and tend to read and write towards the outside. Add friction, wear-and-tear, play, torquing, repeatability, vibration, irregular platter and surface expansion, etc. — and within a very short time your data, program and system sectors can go out of alignment like those shown in **figure 2**. This is a continual, serious problem: valuable data may be written so far off current head tracking that it is no longer readable, resulting in devastating errors and lost data.

Disk Technician™ Automatic AI Software System's early warning detection *must be used daily* to keep data, program and system sectors in perfect alignment. When even the slightest change is detected, Disk Technician safely removes any data and stores it in your computer's RAM, then restores perfect alignment by *rewriting the entire track, including the "read only" Track and Sector ID areas*, using Disk Technician's own *factory low-level, Real format*. This new track is then thoroughly retested, and *only if has been perfectly repaired*, will Disk Technician allow your valuable programs and data to use it again. If retesting reveals that any bit is not perfect, data is relocated to a good area and the bad area is safely blocked from future DOS use. When Disk Technician repairs an area, it *specialy monitors* that spot on all subsequent tests to make certain it *stays repaired*. *This is a totally automatic, unattended process.*

PROBLEM TWO: MEDIA AND DISTANCE. The typical distance between the head and the media is about 25 millionths of an inch. By comparison, a smoke particle is about 10 times greater and a human hair is over 100 times greater! Expansion and contraction caused by normal heating and cooling, wear-and-tear, media degradation, vibration, humidity, platter wobble and aging all cause this distance to vary (see **figure 3**). *Read and write quality varies directly with these distance changes.*

No matter how carefully the hard disk media was manufactured, there still will be variations in coating thickness, smoothness and magnetic density (see **figure 3**). Add aging and magnetic retentivity changes, and some spots may change from "good" to "unreliable" *overnight*. Magnetic hard disks act just like old photos: they fade away — along with your data! *Disk Technician is the only total solution to these problems.*

Disk Technician *reads, writes and tests every single bit on the hard disk, occupied or not*, using special proprietary testing and repair algorithms to check for soft error rate, magnetic retentivity, and the ability to read and write *perfectly*. If even the smallest marginality or error is found, Disk Technician will automatically proceed with its complete repair and restoration process. DOS and other programs can only tell you after 10 to 30 errors have been made. Our testing reveals that once a spot makes more than 3 to 5 soft errors, total failure is imminent. *Disk Technician's daily preventive testing, repair and recovery is the only real cure.*

PROBLEM THREE: POWER. Static electricity, turning power on-and-off, brownouts, surges, spikes and static electricity all can cause the heads to write meaningless "garbage" into whatever tracks they happen to be located over. Although hard disks and computers are designed to minimize accidental head writes, they *still* occur and cause devastating damage — often wiping out an entire disk. *Disk Technician takes a new approach to cure these problems.*

When Disk Technician is run, it automatically installs SafePark™ memory resident software program and creates a "safe zone" on your hard disk, safely relocating any data in this area. Then, whenever you boot from your hard disk, SafePark becomes memory resident and operates with all of your programs all of the time. When there is no disk activity for approximately 7 seconds (user adjustable), SafePark automatically moves the heads to the safe zone. Once the heads have been moved — which will almost *always* be the case — and there is static electricity or a power glitch, any damage will be confined to the safe zone: *protecting your valuable data and programs.*

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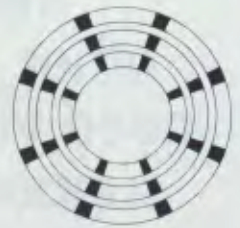
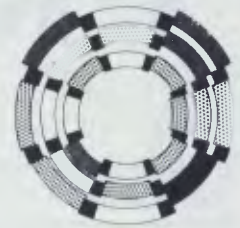


Figure 1* Perfectly aligned tracks. The black areas are "read only." These store *critical* track and sector ID information. The white areas are data sectors and store your system, programs and data.



Legend:
□ Good ■ Bad
■ Marginal ■ Clash!

Figure 2* Sectors out of alignment with the track. The most frequent cause of lost or unreadable data. See Problem One.

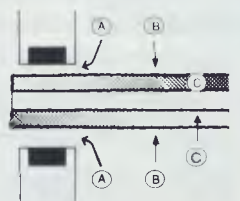
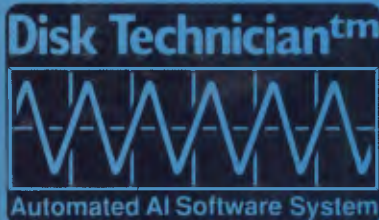


Figure 3* Heads, media and platter. A: The distance from the heads to the media continually changes. B: The magnetic coating varies in thickness and smoothness. C: Magnetic retentivity varies and decays. See Problem Two.

*Magnified and simplified for clarity.



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YOUR IBM

A COUPLE MORE software packages came my way this month which really deserve to be written about, but don't warrant the space that a full and comprehensive separate review would take. One of these is Cruise Control, a co-resident package which actively adjusts the auto-repeat rate of the keyboard, and DireLink is yet another 115,200 baud communications package for linking MS-DOS machines with incompatible disk formats.

Cruise Control

Have you ever tried to move around a Lotus spreadsheet by pressing on one of the cursor keys and watching the cursor move across the screen? It doesn't take long before the keyboard auto-repeat has filled the buffer with surplus keystrokes! Even more annoying is when the buffer fills up and the machine starts beeping at you to tell you that the software cannot accept keystrokes at the rate they are being entered. Then, when the cursor key is released, it keeps going across a dozen or so columns or rows. This can happen with cursor control in spreadsheets and many wordprocessors when using the auto-repeat to enter a line all of the same character.

If you ever have a machine beep at you because auto-repeat has filled the keyboard buffer, then Cruise Control could be the answer to your problem. It intercepts auto-repeated keystrokes and determines the rate at which they are being accepted by the program. Where a program can accept a higher than standard auto-repeat rate, Cruise Control increases the rate. If a program can only accept keystrokes at a rate lower than the standard auto-repeat rate, Cruise Control slows down the auto-repeat, so that when the key is released the repeat stops immediately.

In adjusting the speed of auto-repeated cursor keystrokes, Cruise Control is a boon to any user of spreadsheets, with no more run-on to an unwanted column or row. It can also adjust the speed of any other auto-repeated keystrokes in many other types of packages, ranging from cursor control within word processors to controlling the auto-repeat rate of Y responses when confirming global search-and-replace. Just how useful Cruise Control can be depends on the application program in use at the time. As an example, users of Lotus 1-2-3 will find it most indispensable, but users of WordStar 3.3 will find that it makes very little improve-

ment to the perceived cursor speed.

Cruise Control has many other features. It includes an auto-dimmer, safe for use with most display adapter/monitor combinations, including Hercules. (Some Public Domain dimmers can allow the horizontal oscillator of mono monitors driven by Hercules boards to operate at undefined frequencies, causing internal monitor damage.) The dimmer time-out can be set when Cruise Control is first loaded, changed at any time and disabled if desired.

Cruise Control defaults to using the 5-key on the numeric keypad as a hot key. Pressing 5 and T at the same time inserts the system time at the cursor position, in one of 6 user defined formats, while pressing 5 and D at the same time inserts the system date, again in one of 6 pre-defined formats. Pressing 5 and various other keys at the same time adjusts the speed of various functions, alters defaults, and can either deactivate Cruise Control or remove it from memory. Defaults can also be changed with the Install program as well as set from the command line or batch file when starting Cruise Control.

Unfortunately, the writers of Cruise Control elected to add one 'feature' which I would prefer not to have. Pressing 5 on the numeric keypad, releasing it and then pressing any other key causes that key to be repeated untouched until any key is pressed to stop it. This 'feature' is a bit of a nuisance, but most of the time it causes no problem.

Cruise Control gave me no compatibility problems at all, even when loaded with heaps of other co-resident software installed, including SideKick, print spoolers, mouse drivers, DosEdit and so on. It was of great use with most programs. Cruise Control is a product of Revolution Software of the USA. The review copy came from Micro Support Systems, (02) 439 7773; price is \$75 taxed.

DireLink

Over the last few columns I have covered, I thought, all possible ways of transferring files between MS-DOS machines with incompatible disk formats. Well, one more has arrived. Like Brooklyn Bridge and LapLink, DireLink is a 115,200 baud communications package that allows two machines to be connected via a simple serial cable (with a null modem adapter), enabling them to transfer files from one to the other.

All three packages do the actual file transfer at much the same speed, allowing for error checking and correction protocols, but all have a different approach to the user interface. Brooklyn Bridge links two machines together, makes one the host and the other the slave, and then allows the host to use the drives on the slave as if they are all built into the host. With Brooklyn Bridge, all control of the linked machines is from the host. LapLink divides the screen vertically; it shows the files in the default directory of one machine on the left and the files in the default directory of the other on the right. Either machine can control all functions when they are linked by LapLink.

DirecLink displays a visual diagram of the directory tree structure of each machine on its own monitor.

DirecLink displays a visual diagram of the directory tree structure of each machine on its own monitor. Normally, each machine is controlled from its own keyboard, though pressing the scroll lock key at one end allows that machine to operate both ends of the link. The default directory of each machine is separately selected on that machine by moving the cursor over the visual display of the tree and placing it over the name of the directory. A menu covers the lower part of the screen by default, though DirecLink can be configured for it to be normally off and popped up by pressing the /-key. DirecLink can be configured while running and the changes saved to disk. Context sensitive help screens are available, and directories can be created, renamed and removed. In addition, it's possible to create script files to automate file transfers, and it's also possible to add the name of a script file to the DOS command line or in a batch file for an even higher level of automation.

Files to be sent can be tagged, either individually or with wildcards, and sent simply from one machine to the other. Pressing F9 copies files from the directory under the cursor at the sending end to the directory under the cursor at the receiving end. Pressing F5 sends all files from any directory which match the user defined

mask. File transfers are initiated from the sending end.

One feature of DirecLink is that it 'maps' a disk the first time it is run, and saves a copy of the tree structure in a file DIRECTREE.MAP, allowing time to be saved that would otherwise require reading and re-reading the directory structure. If the tree has been changed since the last time DirecLink was run, and an attempt is made, say, to copy files to a directory shown in the .MAP file but subsequently deleted, the user is prompted to rescan the disk and thereby update the .MAP file.

DirecLink does not include the serial cable required to connect the two machines, but it does include diagrams required to make cables to connect almost any pair of machines. As a result, it's quite a bit cheaper than Brooklyn Bridge or LapLink. Many users will already have a serial cable with suitable null modem adapter anyway, and so the omission of a cable is not a problem. My standard null modem cable, mentioned in the August, 1987, 'Your IBM' column, worked without any problems. The manual also specifies a method of connecting two machines via their parallel ports for higher speed communications, but this wasn't tested.

The DirecLink manual is 44 A5 pages; it's *just* satisfactory as the sequence of material and clarity of expression could both be improved. DirecLink is one of those products which, unlike LapLink, is not intuitive in use and requires careful reading of the manual to fully exploit.

My Vote

Brooklyn Bridge allows the use of normal DOS commands for file transfer from host to remote or back, but at the penalty of requiring modifications to the CONFIG.SYS file on the host and also of not being usable with some hard disks. LapLink allows the transfer of all files in a directory, and in the subdirectories beneath that subdirectory, while maintaining the directory structure (though getting a feel for the directory structure can be a problem with LapLink). DirecLink gives that visual tree reminiscent of XTree, easing the conceptualisation of the directory structure of a large hard disk, but can only transfer to one directory at a time.

DirecLink is my favourite for copying one file or one directory full of files and LapLink for copying whole hard disks, though when the hardware is compatible, Brooklyn Bridge is fantastic. The review copy of DirecLink also came from Micro Systems; price is \$145 taxed. □

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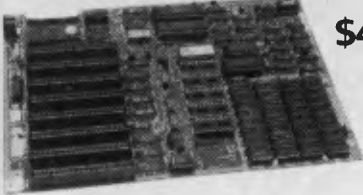


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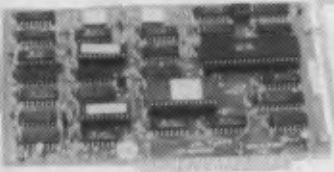
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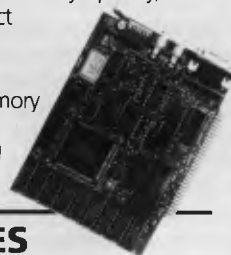


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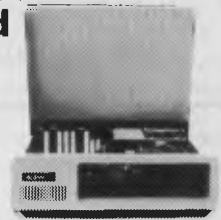
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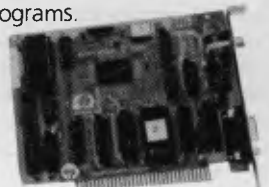
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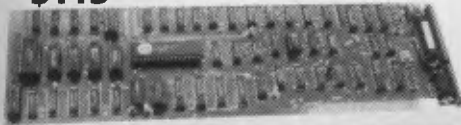
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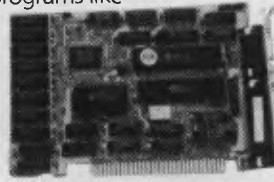
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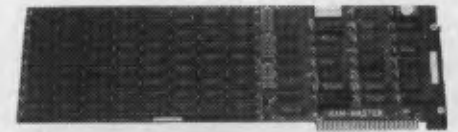


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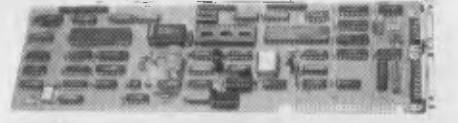
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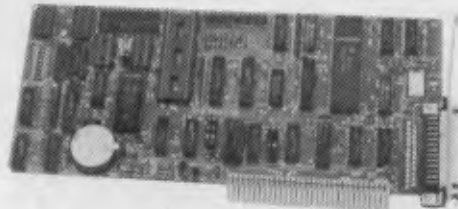
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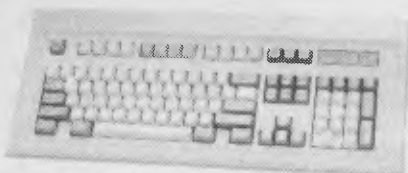
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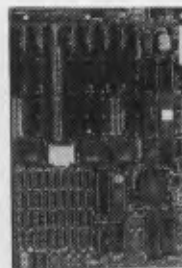
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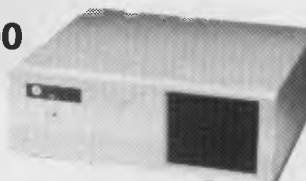


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IBM UNDERGROUND

WSS Index

OVER THE past few years my collection of disks has grown — alarmingly. Hundreds of disks are of essential Public Domain software. Around a hundred disks contain my writings over the last couple of years, and then there are all sorts of other disks. Which disk has that file I need? It would take forever to put disks into the machine and read the directory, and even then finding the latest version or a single file within an .ARC file would be impractical.

The Answer

WSSI is the answer. It is User Supported software, and the modest contribution of \$US25 is sought from satisfied users. WSSI stands for WSS Index, but don't ask me what WSS stands for, as the meaning of the initials is not explained anywhere in the documentation. WSSI is written by Robert W. Babcock, of Bedford, Maryland, USA. The copy of WSSI that I use is version 3.12 in WSSI312.ARC, available on many bulletin boards including the YC's. WSSI312.ARC contains WSSI312.EXE, plus a number of documentation files and utility programs.

When starting WSSI312.EXE, it looks for a file WSSINDEX.CNF in which configuration data was stored. It then looks for the default database WSSINDEX.DIR in the default directory. If the default database is not found, the user is prompted to enter the name of the database to be used. WSSI can use a database in any directory on any drive.

Options

From the main menu, a range of tasks can be undertaken by pressing a single key. *A* Adds disks, *B* lists files not Backed up, *C* adds or modifies Comments for files, *D* Displays statistics, *^D* gives a Directory listing, *E* changes prEdefined categories, *F* Finds a file, *G* Gets a database from disk, *I* changes Indexing disk drive, *L* Labels a disk on drive *A*, *N* reNames a disk in the database, *O* changes cOnfiguration information, *P* Prints (and sorts), *Q* Quits, *R* Removes disk from database, *S* Sorts without printing, *V* lists Volumes, *W* Writes database to disk and *X* toggles eXpert mode.

For the example explained below, the program has been configured to read directory information alternately from the *A* and *B* floppy drive. At the main menu,

press *A* to add disks to the database. WSSI prompts for the first disk to be indexed to be inserted into the *A* drive, and for the space bar to be pressed to continue. Pressing any other key returns the user to the menu. WSSI then looks for a volume label on the disk. If one isn't found, the user is asked to nominate a label, which can be written to the disk if desired. WSSI then reads the details of files on the disk. If the configuration so specifies, it also looks inside .ARC files and gets the details of subsidiary files within them. The process continues, alternately reading disks from the *A* and *B* drives and loading the information into a database in memory in unsorted order. Nothing is written to disk until the *W* option is selected.

*Now I can utilise
someone else's efforts,
and not re-invent
the wheel.*

The Database

So what information may be saved in the database? The filename and extension, creation date and time, the disk and directory in which it may be found, and the .ARC file in which it is contained.

The big bonus comes with the speed of use. Adding a disk to the database takes only a second or two, and indexing 50 or 60 disks is mainly an exercise of swapping floppies as the active time taken by the machine is so small. When changes are made to files on a disk, the Add option will update the details in the database, after checking with the user that the details in the database are to be replaced.

A couple of tips in the use of the program are in order. First is that the database is in memory while being processed and nothing is written to disk until the user so decrees. While the program won't allow you to exit accidentally without saving, should you get an Abort, Retry or Ignore message from DOS due to a disk read error, answering *A* will dump you straight out of the program. As a result it's prudent to save very often.

The second tip is that a methodical disk filing system is required to make full use

of the program. As an example, all my writings for *Your Computer* are on disks numbered and volume labelled from *YC 1* to *YC xx*, kept in numeric order separate from other disks, and indexed in *YC.DIR*. Likewise, my general Public Domain software is in *PUB-DOM.DIR*, which are numbered from *PUB-DOM 1* to *PUB-DOM xx*. Other groupings of disks are in different databases. The practical limit per database is around 10,000 files, and the number to be allowed for in memory must be preset using the configuration options. The same level of discipline is required to make sure that the database is updated every time a disk is altered in any way.

Comments and predetermined categories can be added to disk details. Printouts of database details can be made in almost any order desired by the user, and can be sent to disk, screen or printer. The Find files option lists to screen the details of files which match the user defined wildcard specification.

WSSI is good, but not perfect. The manual on disk is a bit obscure, but in general the system is self explanatory and little reference to the documentation is required. WSSI is one of those programs that I have looked for over the last couple of years, despaired of finding, and intended to create 'one day'. Now I can utilise someone else's efforts, and not re-invent the wheel.

Zmodem

Users of OPUS bulletin boards will be aware that there are a number of different error checking protocols used when uploading or downloading to ensure that the file is received without corruption from line noise or other causes. One of the first of these protocols was Xmodem; it sent a block of characters, then calculated a 'checksum' value from the characters transmitted. The checksum was then transmitted; the receiving end calculated its own checksum and compared the two. If the checksums agreed, the receiving end asked for another block. If they didn't agree, the receiving end discarded the block and asked for it to be retransmitted.

All this allowed accurate receipt of a file, but at high speed and over satellite links with a 1/2 second or so delay from end to end, an unacceptable delay was caused. Calculating a checksum every 128 characters caused enough delay, but that satellite link delay caused a 1 second

delay between blocks — a 1/2 second for the checksum to be received and another 1/2 second for the next block to be requested.

Zmodem overcomes this problem in two ways. Firstly, it has block sizes which adjust dynamically depending on line clarity. With a typical good line, block sizes of 1024 bytes are normal, while with a bad line they can drop down to 64 bytes. Secondly, the sending end does not wait to be told to send a second block after the first was received. It merely keeps sending them one after the other until the received end finds a bad block, and tells the sending end to go back and start retransmission from the bad block. Effective transmission over a satellite link can be improved by around 25 per cent at 2400 baud, compared to Xmodem and its close relatives.

DSZ, Telix and Protocol

So how can you add Zmodem to your present communications package? DSZ is a program from Omen Technologies (authors of Professional YAM), and can be called from other communications pack-

ages to handle a file transfer with Zmodem, with all the rest of the bulletin board session being handled by the host program. Some communications programs can call DSZ directly, while others, such as Telix, have to call a linking program or batch file which in turn calls DSZ.

I use Telix as my communications program of choice, and use ProtoCall as the link between Telix and DSZ. Telix Version 2.12 is in TELIX212.ARC, DSZ in DSZxxxx.ARC and ProtoCall Version 1.3 in PCALL.EXE in PCALL1-3.ARC on the YC bulletin board. Why DSZxxxx.ARC? New versions of DSZ appear every week or two, and the month and day of the version is specified in the xxxx in the .ARC file name. ProtoCall not only calls DSZ, but can be used to call up to 10 different external protocols. Telix, DSZ and ProtoCall are all user supported software with modest contributions requested from satisfied users.

Installation of DSZ and ProtoCall is easy, though the documentation is not much use. Get those three .ARC files and use ARC to extract the component files from them. Telix normally uses Alt-A to

call an external editor program, and can be customised by changing the TELIX.CNF configuration file to call PCALL.EXE instead. In the default TELIX.CNF file will be the line:

```
editor=""
```

Change it to read —

```
editor="drive:\directory\PCALL.EXE"
```

where 'drive' and 'directory' are the location of PCALL.EXE on your system. Now PCALL is run from Telix by pressing Alt-A, whereupon the PCALL screen pops up. PCALL defaults are changed by pressing F10, and uploads and downloads initiated by pressing PgUp or PgDn. PCALL can be configured for up to 10 external protocols, and default directories can be assigned for upload and download.

There are other ways of linking DSZ to Telix (and other communications programs lacking internal hooks for DSZ), but ProtoCall is the one that is the smoothest and nicest to use. □

Do You Sometimes Feel Like Joe ...

*Keyboard hangs-up
... why?*



*files corrupted
... why?*

Joe's got a real problem. Last week his keyboard just hung-up on him and this morning he found that the files he was working on yesterday were somehow corrupted.

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YOUR APPLE

Skimming The Cream

WE WERE arguing over lunch recently about what makes a great — as in 'classic' — computer program. What have the classic programs of the last decade got in common? Is it a mass of features? Or raw processing power? Or ease of use? Or is success due to marketing and PR hype?

If you look at the 'greats' there is almost no factor that you can single out and point to as the key. Conversely, it is hard sometimes to see why excellent programs have failed.

In making an analysis like this, WordStar and Visicalc go together in a category of their own because both were firsts in their respective areas. You originally bought Visicalc and WordStar because there was nothing else to buy if you wanted a spreadsheet or wordprocessor.

WordStar's continuing success owes more, I think, to the fact that people who had invested time and energy in learning it weren't likely to make light of their knowledge — and since these were the old-timers (the experts in their respective areas) — their recommendations were followed.

This doesn't explain why the well-written and powerful Visicalc was quickly superceded by Multiplan and a number of other spreadsheet programs up to the entry of Lotus 1-2-3, while WordStar kept on — and on — and on.

Multiplan became a success probably because the writers of Visicalc rested on their laurels. They thought they had the market locked up, but they didn't, and Multiplan appeared just at the time corporate financial whiz-kids were discovering the pleasures of playing 'what-if' games. Multiplan became the spade and bucket for making dream castles in the executive sand-pit.

Lotus 1-2-3 followed the same line by taking executive toys a step further, and grafting them onto MS-DOS machines — which had become the status symbol of the 'new executive.'

At our lunch everyone had minor variations on the list of 'classic' programs, but generally all agreed to a large extent — with one exception. Amazingly the top seller of them all — AppleWorks — wasn't on anyone's list but mine.

Such is the power of the MS-DOS push! If it isn't available on an IBM, to many people it just doesn't exist.

How can they ignore a copyable program, widely distributed throughout the depths of the pirate jungle, that has still sold over half a million copies and makes Apple \$20 million a year in clear profit? There must be well over a million copies of AppleWorks in daily use. In a real survey of users, I doubt whether Lotus would come even close.

Interestingly enough, AppleWorks does now exist in an MS-DOS environment. Microsoft has just ported its Macintosh program Works to IBM and Works was, of course, a straight steal from AppleWorks. The PC version apparently looks very much like the Mac program, and it is complete with optional mouse support and pull-down menus — although it uses a character-based (rather than a graphics) interface.

According to a US review, PC Works is integrated software, not for the power user but for the casual computer owner who needs a variety of different applications. It has integrated wordprocessing with mailmerge, a spreadsheet, a database, plus graphics and communications with a whole raft of features not found on the original AppleWorks disk.

The argument that eventually developed over lunch about AppleWorks and its supposed lack of features, is both interesting

and instructive. According to a couple of those more aggressively anti-AppleWorks, the program is a powerless mess, a cobbling together of a toy program and add-on features.

They make the charge that Appleworks needs a lot of gerry-rigging and plug-in accessory programs to upgrade it for any sort of serious applications — and it then becomes a hodge-podge of miscellaneous elements.

As evidence, they point to the flood of accessories — Pinpoint, AutoWorks, SpellWorks, MacroWorks, MoneyWorks, GraphWorks, CommWorks, ThinkWorks and FontWorks, plus RamWorks, Transwarp and Desktop Expander — all of which provide add-on services to make the basic program work better. This argument is hard to counter.

There's still little doubt that AppleWorks is a very basic program. It has a spreadsheet, but no graphics; it has a wordprocessor, but no communications. And you can't dispute that communications and graphics are now pretty essential accompaniments to wordprocessing and spreadsheets.

But on the other hand, you can't deny that this is the biggest selling program of all time. Is this an unresolvable paradox, or is there something wrong with the primary concepts?

Where the argument goes wrong is in its basic assumption that *better* necessarily means *more* in complexity. Microsoft's Word might be the most feature-laden wordprocessing program around, but that is no advantage at all to the vast majority of users who would never use these features.

AppleWorks is a top seller precisely for the reasons that it is degenerated: it has a basic spreadsheet, with a simple list manager, and a reasonable wordprocessor. It's integrated enough to perform most data exchanges required of it, and it can be customised by the addition of all sorts of plugin accessories.

Furthermore, AppleWorks probably has the best interface of any program that I've used — and that includes those on the Mac. Its interface is also consistent between the different applications within the integration.

I would suggest that AppleWorks' use of file card menus is a more intuitive way to work than even icons and pulldown blinds — and it doesn't require a mouse. Most people I know learned to use AppleWorks on a pirated copy without a manual, and this is one of the few programs that you can come to grips with just by experimenting and using it.

AppleWorks also allows 12 documents to remain on the desktop at a time which is exceptional by any standards, and this is all happening on an Apple IIe needing only 128 kilobytes of memory — half the size of the current Mac ROM!

Which Direction?

THE DIRECTION I WOULD LIKE to see AppleWorks take is to drop, rather than increase, its builtin functions. I rarely use the mailmerge, and only at taxation time do I get out the spreadsheet, so I would prefer a version of AppleWorks without these functions, but with the addition of communications (like Pinpoint) and simple macros (like those in AutoWorks).

I have no doubt that each reader would have different combinations of functional requirements. No two people want exactly the same combination of functions in an integrated program — and this, I think, is a clear indicator to the direction that integrated software must take. It should be plugin modular in form.

What we need is an AppleWorks 'shell' program with no functions at all in its basic form. It would sit in the system between a

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range of plugin application modules and the operating system. Its job would be to provide a consistent file card interface, file handling techniques and look after the exchange of data between applications modules.

In the ideal world, I should be able to buy a variety of modules off-the-shelf and plug them into this shell. There might be a choice of three or four wordprocessing packages ranging from the basic one we have now, through to desktop publishing. I can make a choice dependent on my needs.

Similarly, I should be able to choose from a number of list or database managers to suit my requirements, and decide for myself whether I wanted to have a spreadsheet or not on my working disk.

The major advantage from this arrangement is that disk and memory space could be freed for data and applications that I use. Instead of the present 55 Kbyte RAM limit, I might get 70 Kbyte or more, which would make all the difference. I'm not a fan of large memory — especially around the summer thunderstorm months — but 55 Kbyte is a fraction on the small side.

Presently, it is a real curse using Pinpoint's communications program from AppleWorks; I've got to go through a whole series of disk-swapping when it should be as simple as hitting a couple of keys.

Of course, it's always arguable that the direction we should take in computing is towards a megabyte or two of memory, a faster 32-bit chip to handle this increased capacity, and a graphics interface burned in to 256 Kbyte of ROM to make it all work. Then we can begin to use those big, full-featured integrated programs which aim to satisfy even the most power-hungry of power-users.

This is the way the Mac and MS-DOS world is going and the way the newly emerging OS/2 (Operating System/2) world has gone — they are all packing their programs with windows and icons and menus-within-menus to make it all comprehensible — and ending up with a five disk set, a manual as thick as your arm, and the basic necessity of a 20 megabyte hard disk.

But they've forgotten one of the basic tenets of the computer industry: KISS (*Keep It Simple, Stupid!*). With most of these integrated business programs most users don't need 90 per cent of the features provided, 99 per cent of the time.

With modular program design you would be able to keep special applications disks which include those special feature that you only used on occasions. Why clutter up the insides of the machine with unnecessary junk?

Apple has a problem here in that it needs to preach two contradictory philosophies — one which shouts 'More Power; More Speed and More Space' to support the Macintosh line, and another which takes the 'Small is Beautiful' line for the Apple II — with the GS sitting uncomfortably halfway between.

Apple also sees itself primarily as a hardware company. It sort of stumbled across AppleWorks accidentally during the Apple III days, bought it, and since that time has raked off \$20 million a year in software sales alone — let alone the additional IIe and IIc machines sold.

In return, Apple has put almost nothing back in. AppleWorks has had almost no technical support, and there is no planned development path. For a long time it was impossible to get a printer to work unless it was an Apple Imagewriter.

It is now almost two years since the plans for the 16-bit version of AppleWorks.

Now that Apple has sloughed off Claris as its independent software house we may get some action at last. AppleWorks must necessarily be the cash-cow that keeps Claris in cream for the next few years, but let's hope that they don't just keep skimming. Claris needs to put in some real development effort on a great piece of software. □

YOUR AMSTRAD

THIS MONTH I'LL be looking at both hardware and software for the Amstrad. The latest PC offering from Amstrad has arrived, the PC1640 ECD, and I have compared the speed of the Amstrad PC with the IBM PC. As well, I'll be discussing one way of sharing ASCII files between the 6128 and the PC. I'll be looking at software for the PCW, some thoughts on using operating systems on the PC512, a snappy graphics program for the 464/6128 and a new printer from Amstrad.

New Kid In Town

AMSTRAD HAS RECENTLY released a souped-up version of the PC, with more memory (640 kilobytes) plus a smashing monitor (the 'ultra-high resolution, enhanced colour display' as they say in the sales literature).

I've just spend a couple of weeks playing with the PC1640 ECD, and now I feel my old monochrome PC512 is a bit tame. The graphics are as good as any I have seen on any PC-compatible computer, and a great deal better than most. The PC1640's internal graphics adaptor is fully compatible with Hercules, MDA, CGA and the EGA, and provides 40/80 column text resolution (8x14 or 8x8 dot text characters in 16 colours) or medium resolution (320x200 lines in four colours), high resolution (640x200 lines in two or 16 colours) and extra high resolution (640x350 lines in 16 out of 64 colours) modes.

There are three versions of the PC1640 available: with a single floppy disk drive (around \$2499), twin floppies (\$2999) and with a 20 Mbyte hard disk and single floppy (\$3699). I've been using the hard disk version, and now I cannot believe I could ever return to using twin floppies, as has been my lot for the last five years.

In common with all Amstrad computer products, setting up the PC1640 is a breeze. I remembered that it took over two hours to get my original IBM PC up and running (which included a great deal of time trying to find a kitchen knife with a fine enough blade to undo some absurdly tiny and non-standard screws thoughtless engineers had provided to stop you actually working on your own machine), so I decided to time how long it took from starting with two sealed cartons (monitor in one, system unit, keyboard and mouse in the other) to actually having the computer up and running.

From the time I enthusiastically attacked the packaging with my Stanley

From the time I enthusiastically attacked the packaging with my Stanley knife to having that much-publicised tiger head showing in full colour under GEM Paint up on the screen took a shade over seventeen minutes!

knife to having that much-publicised tiger head showing in full colour under GEM Paint up on the screen took a shade over seventeen minutes! There is only one power lead; all the other sockets are clearly labelled, and it is impossible to put the plugs in the wrong socket, or in upside down. The longest step was to set some dip switches to tell the system unit which monitor I was using. Unlike the IBM PC, where the dip switches are mounted in an almost inaccessible position and where it is extremely difficult to tell which setting represents 'on' and which is 'off', the Amstrad PC dip switches are at the back of the system unit. They are visible without taking the cover off or anything like that, and with an instruction sheet which clearly shows the the on/off settings.

In addition, the real-time clock (to save you have to enter Time and Date each

time you power up) is battery-backed. The four 1.5 volt batteries needed for this are supplied, and can be fitted without removing any covers or anything else. These are all small points, but they show the great amount of thought which has gone into producing a product which is easy to set up and use. (The clock also tells you when the computer was last used, so you can check up to see if anyone else has been sneaking through your files.)

The PC1640 comes with three expansion slots, somewhat less than many other PC-compatibles, but as you do not need slots for colour graphics, for the mouse, a battery-backed clock and calendar, a separate standard joystick connector on the main keyboard, or for the hard disk controller, three is probably more than you'll actually need. As well, if you do decide to plug a new card in, you need only move the monitor off the top of the system unit and slide off the cover. (With my much-maligned IBM PC, I have to play satanic mechanics and undo screws and wrench off their massive metal wrap-around cover. This is so much hassle, I will do anything to get around the need to fiddle with my cards.)

The 8086 processor runs at 8 MHz, well ahead of the speed of the standard PC. The programs shown in Listings 1 and 2 will allow you to test your own PC — whether it's an Amstrad PC or another one — and to compare it with my computer. My 'real' IBM PC produced an average result of 14 seconds per run when running Version 2 of the program under Basic, while the PC1640 gave 2.3 seconds (when running version one, under Basic2), which

Version One - for the Amstrad PC under BASIC2

```
' BENCHMARK
WHILE INKEY$<>"" :WEND
CLS:PRINT CHR$(7)
FOR j=1 TO 4:PRINT "-----"
k=0:z=0
PRINT "Start: ";TIME$
WHILE k<1000
k=k+1:z=k/2*3+4-5
GOSUB test_subroutine
WEND
PRINT "End: ";TIME$
NEXT j:PRINT CHR$(7):END
LABEL test_subroutine
RETURN
```

Listing 1. The program given here will allow you to test your own PC — whether it's an Amstrad PC or another one — and to compare it with Tim Hartnell's computer. Version One — for the Amstrad PC under BASIC2.

Version Two - For non-Amstrad PCs, under BASIC

```

10 REM BENCHMARK
20 WHILE INKEY$<>"":WEND
30 CLS:KEY OFF:BEEP
40 FOR J=1 TO 4:PRINT "-----"
50 K=0:Z=0
60 PRINT "Start: ";TIME$
70 WHILE K<1000
80 K=K+1:Z=K/2*3+4-5
90 GOSUB 130
100 WEND
110 PRINT "End: ";TIME$
120 NEXT J:BEEP:END
130 REM TEST SUBROUTINE
140 RETURN
    
```

Listing 2. This also allows you to compare your computer with Tim Hartnell's machine. This is Version Two and is for non-Amstrad PCs, under BASIC.

is around 16 per cent of the time of IBM machine! The increase in speed is due to a combination of the faster processor and the more efficient Basic (GOSUBbing to a label should be faster than to a line number).

PC512 Hints

ANOTHER HINT from Kevin Mclean. He has spent a lot of time exploring the possibilities of the PC512 and been generous in sharing his discoveries. For first-time buyers and users, he suggests (from his own experience, as he previously owned a Dick Smith VZ200 and an Amstrad 6128) that you insist on the salesperson setting up your computer, in the store, in the exact configuration you will be taking it home, to make sure it all fits together.

Kevin also suggests that when you first start using the PC512 (or the newer PCI640), you stay away from MS-DOS for a while. The PC comes with three operating systems, Dosplus, MS-DOS and GEM. Kevin is not too hot on GEM.

'Originally I wanted to use GEM,' he writes, 'so the whole family could use the computer more easily, but the confusion concerning setting up a hard disk put me off, so I have stuck to MS-DOS. In the long run it is has proved to be much quicker anyway.'

'My tip to any user who intends to run popular software, such as Lotus, WordStar, dBase and the like, is to sidestep learning the intricacies of GEM. It may be handy for beginners to grasp the idea of directories and files but is far too cumbersome for serious use.' After pointing out that the manuals are pretty thin on giving advice on connecting a printer, or an additional disk drive, Kevin suggests: 'If you want to set up your drives efficiently, it would pay to spend a little time getting

acquainted with the following MS-DOS features:

```

COMMAND.COM
CONFIG.SYS
AUTOEXEC.BAT
    
```

'A quick explanation on these may help. As soon as the computer is switched on, instructions contained in the ROM (the chip inside the processor box) tell the computer to check the drives for inserted disks. If you have a hard disk, it will find it eventually. Having done that, it now looks for a file called COMMAND.COM which is the heart of MS-DOS, and contains all the internal commands. When COMMAND.COM is executed, it tells the computer to load a list of setup lines. These concern the configuration of the computer to be used, and reside in a file called CONFIG.S-

```

10 REM LISSAJOUX FIGURES
20 REM YOUR COMPUTER - TIM HARTNELL
30 REM CREATES RANDOM LISSAJOUX
40 REM FIGURES. PRESS ANY KEY
50 REM FOR A NEW DESIGN
60 REM
70 RANDOMIZE TIME
80 MODE 1:INK 0,0:BORDER 0:INK 1,2:INK 2,6:INK 3,24
90 IF INKEY$<>"": THEN 90
100 REM -----
110 WHILE NOT FINISHED
120 P=INT(RND*3)+1
130 LOZ=(INT(RND*3)+1)/0.8
140 GF=0
150 PLOT 300+120*SIN(GF),200+120*COS(GF*LOZ),P
160 REM -----
170 WHILE INKEY$=""
180 GF=GF+0.1
190 DRAW 300+120*SIN(GF),200+120*COS(GF*LOZ),P
200 IF RND>0.9 THEN P=P+1:IF P=4 THEN P=1
210 WEND
220 CLS
230 WEND
    
```

Listing 3. The plotted point in the program given in Listing 3 is for the 464 and the 6128; it traces out the path of the sum of period motions of particles under the action of periodic motion.

YS. After this, COMMAND.COM looks for a file called the AUTOEXEC.BAT file, which is a batch file that the computer now executes.'

AUTOEXEC.BAT is the ideal way to get your computer to automatically setup and run an application like WordStar.

Lissajoux Figures On The 464/6128

JULES ANTOIN LISSAJOUX, a French physicist who lived from 1822 to 1880, made a study of the movement of particles under the action of periodic motion, acting at right angles to each other. He discovered that bodies moving in this way trace intricate patterns as they dance around each other.

The plotted point in the program given in Listing 3 is for the 464 and the 6128; it traces out the path of the sum of these period motions. The figure can be used in a number of ways. One way is to compare two frequencies. If they are the same, the program will draw a circle. If they are different, the number of points where the curves touches either the vertical or horizontal edge is the ratio of the two frequencies. In this program, the two frequencies are generated at random (lines 120 and 130), with a new figure starting each time you press a key.

We'll be including Your Amstrad in future issues of the magazine. I'd be more than happy to share any of your discoveries, hints, tips, comments and programs with other users. Please send them to Your Amstrad, Tim Hartnell, Your Computer, Box 227, Waterloo, 2015, NSW. □

YOUR AMIGA

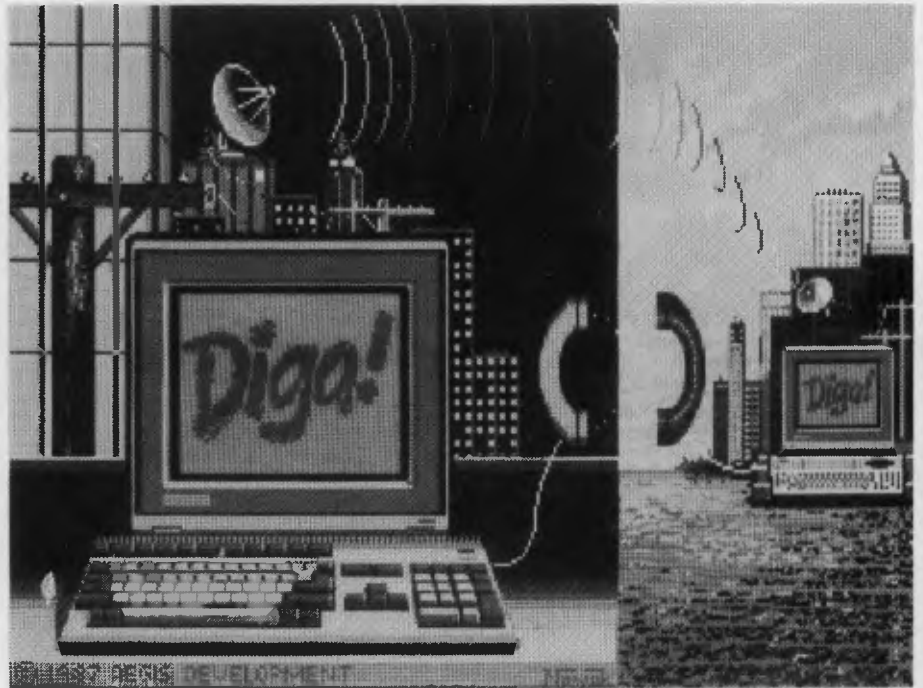
... if any other retailers would like a free plug, please let me know that you provide customer access to Public Domain material.

FINALLY, I'VE gotten around to putting words on paper (figuratively speaking, as I use WordPerfect to write this column on my Amiga 1000 and then transmit it via modem to *Your Computer*). For the past hour I've been pleasantly distracted by various display hacks which I've loaded onto my Utilities disk. A fellow in the USA by the name of Leo Schwabb, delights in producing little programs which don't do anything useful, but are fascinating time wasters.

Leo's latest offering is called Robotroff. When the program is initiated it appears to do nothing — but, after a random time between 30 and 120 seconds, a little robot wanders onto the screen and carries off the cursor. Just the sort of thing to slip into the S/Startup-Sequence file on a friend's disk to keep him wondering.

There are several other examples of Leo's work on various Fish Disks. My favourites are 'Sand' and 'Target'. On the subject of Fish Disks, I haven't exactly been overwhelmed by responses from retailers offering Fish Disk copying services for customers. I'm extremely fortunate in having Steve's Communications, here in Canberra, as my local Amiga retailer and Steve's provide a free Fish Disk supply for all their customers. Again: if any other retailers would like a free plug please let me know that you provide customer access to Public Domain material.

The *Your Computer* Bulletin Board is now available on (02) 669 1385 and there is a section for Amiga files as well as a very active messages section. Membership is open to all subscribers to the magazine and the Amiga section should soon become a very useful source of information, files and Amiga data. If you've written or



The title screen from Diga!, the communications package from Aegis. All the images on these pages were captured using Grabbit, a screen capture utility, and were printed on a Tektronix 4696 ink jet printer driven from an Amiga 1000.

come across any handy utilities or games — any type of program — that you think might be of interest to other Amiga owners, the Amiga Conference on the YC Board is carried by at least one Opus or Fido Bulletin Board in every state — so share them around!

Two other Bulletin Boards worthy of mention to Amiga owners are: the Lightning BBS in Perth (curse these STD phone charges) on (09) 275 7900, and the AmigaMan BBS in Glenbrook NSW, (047) 58 8006. Simon Blears is the Sysop of Lightning and he runs a very efficient and happy board which has a wealth of material for Amiga owners — nice one Simon! The Sysop of the AmigaMan board is Ron Carruthers and he must be congratulated on the quality (and quantity) of technical discussion and advice available in the messages section.

With decent 1200 baud modems now available for under \$400, anyone with an Amiga can gain enormously by using the resources of Bulletin Boards. Watch out for a beginners guide to telecomputing in 'Your Amiga' soon.

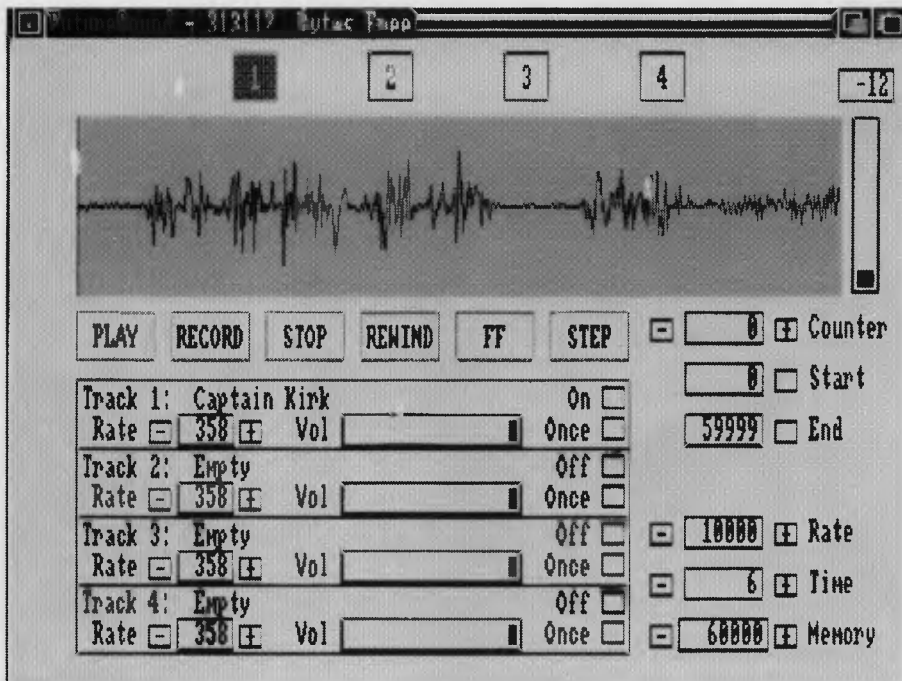
Diga!

This month I have three very different packages to review. The first (only because it's the one I've made most use of so far) is Diga!, a very nice communications package from Aegis.

My biggest problem with Diga! is how the hell is it pronounced? Is the 'g' soft as in rigid, or hard as in rugby? It's all very confusing, but happily it's about the only confusing thing about this excellent package.

I've used several comms packages but Diga! is tops on my list. Diga! lets you select the terminal type you want to emulate (VT-52, VT-100, ANSI and Tektronix among others), and the protocol (XModem, YModem, Kermit, ASCII and CompuServe-B) from pull-down menus.

Diga! allows you to create a buffer (from 16 kilobytes to 512 Kbyte) into which the complete session can be captured for later review, printing or saving to disk. This is a very useful aid in getting on, and in and out as quickly as possible — with Telecom charging like an enraged bull, every second counts!



The command screen from FutureSound, the sound digitising system for the Amiga.

All in all, I'm rapt in Diga!, and for the serious Amiga user it will open up a whole new world.

With a memory like mine (<2 Kbyte) the telephone book is more than useful, and so is the capability to define macros and scripts for often-used functions. In fact, I've been hard pressed to find fault with Diga!, it does the job very nicely and makes good use of the Amiga operating environment. About the only thing I didn't like about Diga! was the fact that the box didn't have a disk in it when I received it. Commodore came to the rescue quickly, but it would have been annoying for anyone in more of a hurry to get online.

Diga! has a couple of extra facilities which may be unique. Doubletalk is a Diga! mode which allows two Diga! users to chat back and forth while simultaneously transmitting files. The second feature is a Remote mode which provides a mini-BBS capability. All in all, I'm rapt in Diga!, and for the serious Amiga user it will open up a whole new world.

FutureSound

ACME Software in Melbourne has been good enough to lend me a FutureSound digitiser to play with and tell you about. As I am learning to expect from ACME distributed products, the packaging is very nice and the manual both easy to read and complete.

The device itself is a box about 13 cm square and 3 cm high, which sits nicely on top of the external disk drive. The lead supplied plugs into the parallel printer port and your printer lead is plugged into a socket on the back of the FutureSound box. For starters, it looks neat, which helps.

Input to the FutureSound digitiser can be by microphone (supplied complete with desk stand) or by an RCA type audio line connector. A pushbutton switch on the front of the box allows switching between FutureSound and your printer.

FutureSound fires up to produce a screen with controls for four sound tracks and an oscilloscope type display for the sound being manipulated. The controls are so neatly presented that the manual is almost superfluous and I could see easily how to operate the package.

After loading and playing the couple of demo sounds provided with the package I set about recording some 'Hellos' of my own. It's great fun to record a simple *hello* and then copy it to four separate tracks,

delay the playback by varying amounts, and create echoes worthy of the Grand Canyon. The variable playback speed allowed me to experiment with my voice. (I've decided that I like it slowed by about 5 per cent so I'm going to have my ROM adjusted ASAP.)

In order to test the package out, I recorded part of the Jennifer Rush song 'The Power of Love' from my CD player through the line input of FutureSound. At 15,000 samples per second the result sounded good through the Amiga's speaker. At 10,000 samples per second it wasn't too bad, but at 6000 it was a case of Jennifer Dalek!

A sampling rate of 10,000 seems to be about the best compromise between sound quality and memory consumption. This allows a recording about 23 seconds long maximum, as FutureSound doesn't seem to want to know about my Alegra memory expansion. The inability to use expansion memory is a major handicap for any serious use of FutureSound, as is the lack of an easy way to append sound samples to create extended effects.

One major capability which FutureSound does possess is to record sound samples in IFF three-octave format. Such files can be used as instruments in various Amiga music packages such as Sonix, Deluxe Music Construction Set and the like. As only short samples are required for this purpose, the memory limitations are not a problem.

FutureSound recorded samples can be replayed from C language programs or from Basic, so anyone can make good use of such things as verbal commands or comments in your own programs. I'm in the process of setting up a S/Startup-Sequence file which verbally tells everyone how the Amiga is light years ahead of the I*M 'Pissy two'.

I was impressed by FutureSound as an easy to use, flexible sound digitising system for the Amiga. But, I was disappointed by the lack of such capabilities as expansion memory handling, sound editing and stereo capability, but I guess all those are more likely in a more expensive package.

FutureSound is available from your local Amiga dealer for \$375 taxed, or direct from ACME Software: (03) 596 6732.

Aegis VideoScape 3D

Item number three is Aegis VideoScape 3D, 'a solid 3-D animation and rendering system' (to use their own description). Any package which contains three disks full of software, a 130 page manual, and even a fold-up three-dimensional pitch,

heading and bank protractor, has to be taken seriously. I certainly took VideoScape 3D seriously, and my review must be read with the awareness that I have not had time yet to become fully conversant with the product.

The first test of the purchaser's intelligence is to find the inevitable demonstration routines and to get them to work. I spent ages searching the manual for instructions on getting the demos to work and eventually gave up looking. Instead, I used my invaluable DirUtil3 to examine the files on the supplied disks and — lo and behold — found the 'showanim' file and 'triplanes.anim' and 'Boing3D.anim' and a couple of .doc files which explained the process.

Having found the demos the rest was easy. The command 'showanim -c20 triplanes.anim' from CLI produced a splendid demonstration of two WWI type aircraft flying around, behind and through the VideoScape 3D logo. In a similar way,

'Boing3D.anim' produces a red and white checkered beachball bouncing on top of a row of words rotating on a landscape. The animation is impressively smooth, and shading, hidden surface removal, and scaling are all impeccably performed.

VideoScape 3D is not a toy or game and it really takes some time to learn the package. The effort is rewarded with the capability to convert your imagination into moving graphics on screen. The behind-the-scenes computation must be fantastic in order to keep track of the positioning of various three-dimensional objects in a three-dimensional universe with light source and observer directions taken into consideration.

I'm still very much a beginner with this package and I feel that I haven't really scratched the surface yet. I'm looking forward to getting further into the capabilities of VideoScape 3D and using its full potential.

And Games . . .

I have Public Domain demonstration versions of two new games, both of which are very impressive. To say that Garrison is like PacMan would be to say that Disneyland is like a circus sideshow. In this game a character is steered around a maze on screen, all the time fighting off foes and collecting various items. The animation is excellent and so is the scenery scrolling. I'm looking forward to the commercial version which is to have more than 100 levels, great sound and even more action. A winner!



The title screen from VideoScape 3D, a solid three dimensional animation and rendering system.

City Defender is a re-make of the old arcade game which I remember as my first encounter with a trackball device. You have to defend your cities and missile sites from incoming enemy missiles by selecting aiming points for your anti-missile missiles to detonate, hopefully destroying the attackers. Put on your Ronny Raygun mask and get into it! The demo version has six levels with brilliant sound and graphic effects and lightning fast response. Very noisy, very violent and a lot of fun!

More Data!

Very often we Amiga users find ourselves wishing that we could fit a bit more data on a bootable (or WorkBench) disk. In this situation it is often helpful to examine the files on the disk and see what files are not needed. For example, often the Devs/Printers directory has drivers for a number of printers we'll never use. Deleting all the unnecessary drivers can free up 30 or 40 thousand bytes on a disk.

Similarly, on many disks we don't need all the fonts. In many cases only the Topaz font is really necessary and the others can be deleted. It is even possible to delete the Preferences file, freeing up about 59 Kbyte, but beware — deleting the Preferences file means that you cannot change date, printer settings or screen colours

from that disk. They will stay as they were before you deleted Preferences. The actual details of your setup are stored in a file called Devs/System-Configuration.

If you do delete the Preferences file and later want to change your setup, it's possible to copy a Devs/System-Configuration from another disk which has the required setup.

A great deal can be learned about the Amiga and the way it does things by experimenting. Make yourself a copy of your Workbench disk and use the copy to experiment with. Remember that the very worst thing you can do is to erase something important from the disk. There is no way you can cause damage to your machine by using wrong commands or any such process. Relax, and enjoy experimenting with DOS (CLI) commands.

In examining disks as part of my reviews, I use a bootable utilities disk which I have compiled from bits and pieces I've picked up all over the place. Copies of my Faulk's Fast Utilities disk can be obtained, complete with documentation, for \$10.00, postage included, from Compliteracy, PO Box 74, Weston 2611 ACT.

In coming columns, I'll offer a summary of software and hardware available in Australia for the Amiga as well as a list of the best Public Domain software and where you can find it. Cheers. □

YOUR MAC

Mac Colour

COLOUR HAS COME to the Macintosh with vengeance. For years the MS-DOS set's claim to superiority has been that the Mac lacked colour — but now with the new Mac II, we've got monitors every bit as good as Sun or Apollo workstations.

That's if you've got the money to buy a Mac II, plus a video card and high-resolution colour monitor. And the cost of these items isn't insignificant. You'll be paying anywhere from about \$1800 to \$8000 for a video card and monitor, depending on the resolution you want.

One of the nicest things about the Mac II is that it has restored old Apple II traditions that come with open architecture. We now have a range of alternative products, some made by Apple and others not. We are back to the good old days where 'yuh pays yuh money, 'n takes yuh choice.'

It seems that monitors and video cards for the Mac II will be sold as a bundle. The onscreen image is strongly influenced by both the card and the monitor, and since different cards use different handling systems you need a matched set to get the best results.

Packing the Pixels

Apple's present mono video card uses the standard form of packed-pixel architecture as distinct from the more recent planar (and 'chunky'-planar) systems. The distinction between these is mainly in the way in which the bits are stored — either in a direct linear line (as are the characters in a text file), or as a series of 'image-planes'.

When we are dealing with straight black-or-white screen graphics only one bit needs to be stored for each pixel — the pixel is either ON (binary 1) or OFF (binary 0). However when we begin to introduce shades of grey and/or colour to the screen we need to change the bit/pixel relationship.

If we use 8 bits for each pixel (as we do for each text character) we can provide up to 256 variations, and these can be used to control either colour or grey-shading. If we don't need this degree of control we can cut back to using bit/pixel relationships of 2 or 4.

If we were to look at the memory cells of a standard packed-pixel image, we would find a sequential series of bits which rep-

resent pixels, starting in the top-left of the screen and progressing in a series of scan lines to the bottom right. The series would start with all the bits that make up the first pixel, and progress to all the bits of the last — this is the packed-pixel approach.

This is the way Apple's new colour card works and also the system used by SuperMac's Spectrum colour card. The packed-pixel system is also used by the new high definition mono cards from SuperMac (Grafix), Sigma Design (LaserView), E-Machine (Big Picture), and Micrographic Images (MegaScreen) and also by all the MS-DOS colour systems.

A Planar Approach

The planar approach is different: it will store the first bits of all the pixels in a sequential line, then all the second bits, then the third ... and so on. Think of the memory as a series of planes — the first plane being entirely composed of first-bits, the second plane composed entirely of second-bits, and so on.

This approach is analogous to the way we print colour in this magazine. We print all the pixel/bits that represent the colour magenta, then all those that represent cyan, then yellow, and finally black. These are essentially different 'planes' of colour.

Planar architecture is said to be better for image-processing, and National Semiconductor have announced that they will be making a planar video card for the Mac II soon which will use the Advanced Graphics chip-set and display up to 32 bit-planes.

Whatever system is being used for organising the information, the pixel-bits need to be stored in an area of very fast RAM memory on the video card known as the 'frame buffer', and the size of this buffer determines the resolution of the image and the range of greys and colours you can have on the screen.

For instance Apple's new colour card can be configured to display 640 x 480 pixels in up to 256 colours (8 bits) — so (640 x 480 x 8 =) 300K of memory is needed in the frame buffer. You can buy this card off the shelf with only half the RAM (giving 16 colours only) and add the other bank later if you wish.

SuperMac's mono video card with a very high resolution of 1365 x 1024 pixels, only requires 170K bytes of frame buffer RAM because it only uses one bit per pixel (ei-

ther black or white), while their Spectrum colour card at 1024 x 768, needs a wacking 768K of RAM to handle the 8-bit pixels.

You can buy the Spectrum in three configurations — at the lowest level you get black and white only, then there's the intermediate step with low resolution colour, and then the full configuration with the top resolution and 256 colours.

The term 'resolution' is slightly misleading here; it seems to imply that the greater number of pixels on the screen will necessarily give you an image displayed in more detail — but that's not necessarily so. A figure produced on a normal-resolution screen of, say, 640 x 480 pixels is drawn with the same number of dots as it is on a screen having 1024 x 768 pixels. With the larger screen you just see more of the 'page' — if it's available.

More dots to the square inch of the screen obviously improves 'resolution' in one way, but it also results in a smaller image — to the point that it is often hard to see the cursor on Sigma's 37 cm screen.

The apparent 'sharpness' of the image is a subjective matter that depends partly on the image size (such as the pixels might be closer together) and other factors such as the scan rate and 'time-base' steadiness (do neighbouring lines jiggle sideways against each other?). Colour also plays a part — even a low-resolution television screen appears to have sharp images in colour.

Both the Apple and the SuperMac colour cards use 8 bits per pixel at a maximum, and can therefore only handle 256 colour on the screen, but they delight in claiming a 'palette of over 16 million colours'. 'Why is this so?' asks the Professor.

The answer lies in the use of colour lookup tables. You can specify any of 256 colours through your 8-bit number, but this number is used to index a table which specifies a separate 8-bit number for each of the monitor's red, green and blue electron guns. In other words, an 8-bit number is selecting a 24-bit number (actually three 8-bits) which is where the 16 million figure comes from (binary to the 24th power).

This sounds like a bit of a cheat, except for the fact that the entries in the colour table can be changed during the blanking period between video image frames — so a number specified in the first frame might result in a different colour to the

same number specified in the second.

The control of this table lies with the Palette Manager which is a recent addition to the Mac IIs system software, and this actually specifies colour using a 48-bit number (three 16-bits). Applications then call the Colour Manager to get the closer approximation to the 48-bit colour specified, and it is the Colour Manager that handles the lookup tables. It can use any video card that conforms to Apple's specifications and it can handle multiple windows.

One of the major reasons why there is now a tendency to bundle video cards with specific monitors, is that different manufacturers and different models handle the electrical (and physical) links between the two in different ways.

For instance, colour video cards put out three (RGB) analog voltages to drive the three electron guns in the colour monitor. Similarly Apple's grey-scale monitor requires an analog input, but most black and white video cards put out a digital signal with voltages conforming to the TTL-levels standard.

To confuse the issue further, the Laser-view and the Big Screen video cards use a much faster interface method (with lower voltage levels) called the ECL signal method.

Another major factor is defining screen sharpness is the monitor's bandwidth — the so-called 'dot clock-rate' — how fast the monitor can switch the electron gun on and off as it scans across each screen line. There is no point in the video card feeding varying pixel information to the monitor at a faster rate that it can handle — this mismatch will usually result in more patterns across the screen.

There are other factors as well; the luminance level of the pixels, the type of phosphore used, and the shape of the individual dots on the screen. In the final analysis there are so many factors that influence the appearance of a colour monitor screen that the only way to choose is by direct comparison. Try and get different card/monitor combinations up on twin Mac IIs in a retail store, and make your choice.

dBase Mac

There's a bush joke about the old timer who had cherished and preserved the same axe for a life time of logging and clearing. He'd had to renew the axe head a couple of times, and he'd replaced the handle whenever it broke, but that good old axe was as sharp today as it was when he bought it 50 years ago.

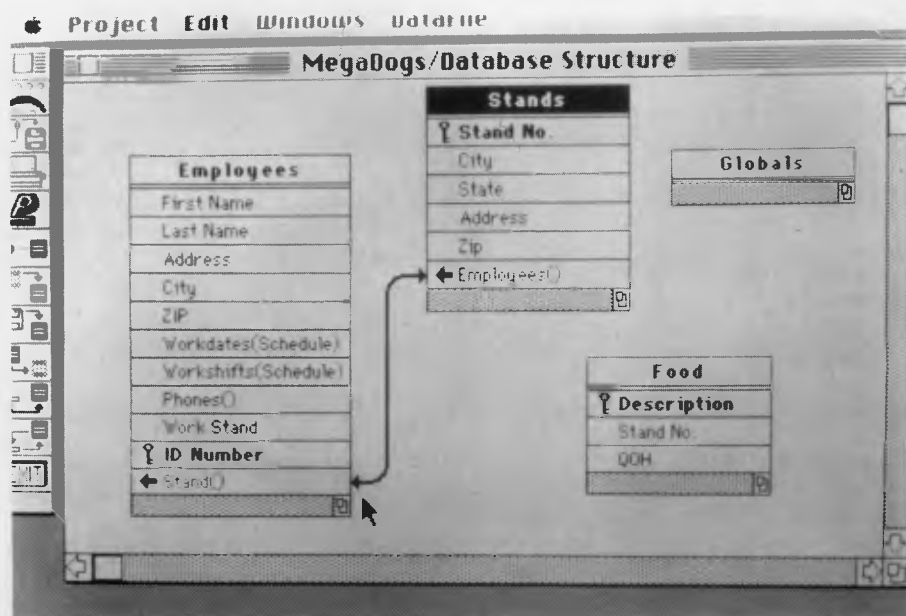


Figure 1. dBase Mac makes extensive use of 'views' for screen and print presentation.

They just don't make tools like that anymore!

For some reason I was reminded of this story in the middle of Launch Number 2 of Ashton-Tate's dBase Mac. The memory was triggered by the slide on the screen which said 'dBase Mac is not a port of dBase III' — they claim it is a complete rewrite.

The old adage: 'If it walks like a duck, squawks like a duck, and looks like a duck — then it probably is a duck' has a corollary in dBase. 'If it isn't written in the same language, isn't structured in the same way, doesn't have the same limitations, doesn't use the same interface and doesn't use the same procedural language — can it be dBase?'

I guess it can be if the marketing men say it is. But if you look for similarities between the old versions of dBase and this new one, there's only one that comes to mind — both are terribly slow. A 'sort' in dBase has always been an excuse for making the office coffee.

Fortunately, the slowness problem with this new product comes at the beginning of a session rather than while it is up and running. It needs to load everything off the disk and into memory before it does anything: a 10 record test file times out at a mind-numbing six seconds. Ashton-Tate's own people are talking about a minute of load time for a thousand record file and proportionately longer for more extensive databases.

With dBase Mac they've dumped the

old 'watch' symbol and replaced it by a moon which goes into phases as you wait for the program to load — and as someone said at the launch 'at least they're being honest!'

Before I make too much out of dBase Mac's apparent reluctance to wake up and start working, I should point out that the visiting American fireman for Ashton-Tate said that a new sped-up version would be ready 'Real Soon Now' — which is what they said about this version a year ago just after the first abortive launch.

But this time they apparently mean it. Along with the sped-up single-user dBase Mac, Ashton-Tate are promising a Runtime and a Multi-user version in about six months.

I haven't had a chance to sit down and hack away at the current release, but it was extensively demonstrated at the launch and I've had a quick try with it on the keyboard. It has some impressive features, but I thought that about Jazz the first time I saw it also, so I don't trust first impressions anymore — and this applies especially when programs are demonstrated by company representatives.

Database management programs place more pressure on their interface designers than word processors and spreadsheets because of their need to satisfy three quite different markets. If it is to be popular, a database manager must be easy for entry-level users; give the necessary range of controls and options to power users; while also providing access and the neces-

sary tools for applications developers.

In a company, you can swap to a more sophisticated word processor almost at any time without creating a major disturbance — but once you start on the path of building databases you want your simple-to-use flat-file manager to take you all the way along the yellow-brick road to automated stock-ordering systems with built-in accounting functions. It is the old problem of designing a turbo-charged Formula One racing car that grandma can use to go shopping. In this aspect, dBase Mac excels.

dBase Mac makes extensive use of menus, dialog boxes, and pop-up menus inside the dialog boxes. Each box asks intelligent questions in an intelligible way, and when you make a choice, the remaining questions in the dialog box usually reconfigure so that subsequent lines are also applicable. It is a good way of handling complexity.

Anyone could learn to use dBase Mac at the flat-file level in a couple of hours, and they could probably progress to the power-user level with a couple of weeks if the incentive was there. In many cases a new user could quickly go as far as developing full applications without ever needing to write code.

Easy Programming

For instance, if you want to make a conditional branch, you pull down a procedures menu from within a dialog box, and select the IF function. This immediately writes the command lines for you: IF, THEN, ELSE, END and places your cursor between the IF and the THEN, waiting for the appropriate operators and constants. You can't get programming much easier than this.

Mind you! A demonstration of how to write and position a user-defined Help dialog box threw up a frightening amount of cryptic code calling for X/Y co-ordinates of the box corners and a whole lot of other junk that would require a full chapter in a manual to explain. Whoever wrote this bit hadn't heard of a mouse, so everything isn't easy.

There also seems to be a bit of over-kill in providing various ways to issue commands. In most cases you will use the pull-down menus, but you can use keystrokes, or make a selection form a shiftable 'palette' which usually sits, MacPaint-like, in an icon strip down the left-hand edge of the screen. This palette has probably the most confusing set of icons ever to clutter a Mac — but I guess some people will use them sometimes.

Real Innovations

There are some real innovations in this program as distinct from these feature-facades. You can create and add your own menus to any applications you develop very easily, and you can make calls to Assembler, C and Pascal programs. If large reports turn you on, you can print wall charts of 96 by 48 inches (2.5 by 1.2 metres). Applications programmers will love these features.

Ashton-Tate also say there is a way of generating mailing labels without the need for programming, which is a major plus if it will handle three- or four-label fan-fold paper. Until now, label handling has been a rich source of revenue for dBase programmers, and a constant curse for users.

Again on the plus side: dBase Mac can handle an unlimited number of records — each up to 32K in size. They have also provided for seven different field types (including graphics) and there are over 50 calculation functions.

At the launch they had a map of Australia to demonstrate the graphics capability, and on the map were the names of the cities each with a live-area 'button'. Click on the button and you found information about the city.

To create this graphic database you need to import the map from a digitiser, then create different fields for each of the cities. (That's right, 'fields' — not records). I haven't had a chance to explore this aspect further, but it does seem an incredible way to go about constructing a graphics database — especially at a time when Apple are giving away copies of HyperCard free.

A Different View

dBase Mac makes extensive use of 'views' for screen and print presentation. When you attempt to establish a form on the screen or design a layout for a report you are presented with a MacDraw type grid on the monitor, and you can drag and stretch your field boxes and field-names to get the layout you want. You have all the normal range of fonts and point-sizes, as you would expect.

This screen-design process certainly beats writing multiple lines of code like: @12,3 SAY 'Name' GET name PICTURE '!!!!!!!!!!!!!!' which was the way we did it in the olden days.

If you think about the fact that dBase Mac uses MacDraw-like screens that can be meters wide, you can get some inkling of what makes the whole system so slow. The darn machine is running object-ori-

But if you look for similarities between the old versions of dBase and this new one, there's only one that comes to mind — both are terribly slow. A 'sort' in dBase has always been an excuse for making the office coffee.

ented code and bit-mapping enormous surfaces every time — instead of just updating the screen and worrying about the peripheral areas in user-downtime.

When asked about the utilities planned for database reconstruction after a crash, the US Ashton-Tate representative admitted that they 'Hadn't done a heck of a lot' — but he hastened to add that they didn't seem to be experiencing any problems in this regard. The program writes data to disk after each entry — so that could be right.

Also released last week in the States was the long awaited French Mac database program called '4th Dimension' (4D), which has long been rumoured as potentially dBase Mac's main competitor. It too has suffered from a prolonged gestation period while they ironed out the bugs, and from early reviews it appears that 4D could even be slower than dBase Mac.

It is doubtful whether it would ever be a competitor beyond the flat-file entry-user market anyway since it seems to require code-writing for anything more than this basic level.

Also about to be released is McMax which is described as 'the only dBase-compatible Mac database manager on the market' which appears to ignore dBase Mac, slightly! Someone's industrial espionage system isn't operating too well.

For the next few years I would guess that Omnis 3, and to a lesser extent Helix, are dBase's main competitors, and in the long-run the deciding factor could well be dBase's new flirtation with graphics. It could also be that Omnis doesn't have a problem — that dBase Mac is too slow, too complex and too late. As an old CP/M dBase II fan from way back, I'll reserve judgement for the time being. □

YOUR C64

This month I thought I'd have a look at a couple of the gems that you can find in the public domain. While public domain software is royalty free, it doesn't necessarily mean that it's inferior to the commercial variety. In fact both of the programs I'm going to talk about are excellent value by any yardstick.

Metabasic

Metabasic is a programming utility for the 64. It's designed to overcome many of the limitations of the 64's standard V.2 Basic. It's got features such as auto line numbering, line renumbering which works (including GOTOs and GOSUBs), an inbuilt DOS Wedge with superior commands and an M.L. monitor. It's also got a DELETE command which will delete whole blocks of code, a CHANGE command, which works a little like a wordprocessor's search and replace. It means you can easily rename variables and be sure you renamed every occurrence of that variable. Trying to do the same thing manually is asking for trouble!

Another useful command is FIND. If you've ever been in the situation where you need to create a new variable, but can't remember whether you've used a particular name already then FIND will allow you to quickly search the program for an occurrence of that name. It certainly makes life easier and reduces the likelihood of bugs creeping in! Also useful is the ERR command which is used for reading the disk error channel. With V.2 Basic you can't do this from direct mode, only from a running program. That's very annoying when your program has crashed and the red light on the drive is flashing. With Metabasic all you need do is type ERR and you will know why.

Metabasic had its origins with the US magazine, *Compute's Gazette*. It was first released a couple of years ago, but it's since been through several enhancements. The latest is Metabasic Plus which came out in February 1987.

One of the problems with a lot of public domain software is that the instructions often get separated from the program. Nowadays the trend is to package them together. My version of Metabasic came with a documentation file, but there are copies circulating about without instructions. Just in case you happen upon one of those, a summary of the commands and their syntax is shown in Listing 1. (Commands with an * before them are Meta-



basic Plus only. Parts of syntax that are optional are shown in brackets. Do *not* include the brackets when typing).

Speedscript

Also from *Compute's Gazette* is Speedscript. This is a wordprocessor which I would have to rate as being on a rough par with Easyscript. Again, there are several versions of it about. The one I looked at was the original 1984 version. It does all of the usual things you would expect from a wordprocessor, including wordwrap, search and replace, cut and paste, append and insert, headings and footings. I like the way the erase function keeps the deleted text in a special memory just in case you decide you didn't *really* mean to erase it after all. The editing commands include the ability to delete forwards as well as backwards. This is something you don't get with Easyscript (in fact, you don't even get it on Superscript 128), but it's extremely useful.

On the negative side I have only two complaints. One is that you can't preview a document before you print it. This means you can't check your page layout until you print it. The other is that Speedscript stores your documents as program files, not as sequential text files. I'm not sure of the reasoning behind this, but it makes it harder to import and export files to other wordprocessors. For most people that wouldn't be a problem, but it is for me as quite often I need to send files to other computers. There are Speedscript utility programs that will do the necessary conversions, so if your need to export and import is only occasional it's not a problem. Bear in mind that I'm talking about the original version of Speedscript. I

haven't had a good look at the latest one and both of these criticisms may have been addressed.

Still, Speedscript has a lot going for it. It's more than adequate for most people's needs, and best of all, it's free. If you're looking for a wordprocessor you should at least check it out before spending money on a commercial version.

Where Do You Get It?

There are really only two places to go for public domain software, and that's computer clubs and bulletin boards. As a rule very few shops have any sort of public domain library, and those that do only have limited libraries. After all, they are in business and need sales and turnover. Even if they sell you a disk and charge a small fee for the duplication, it's really not worth their while.

Clubs

Clubs are a much better bet, although the quality and size of their software libraries is quite variable. It really depends on the club members and the amount of effort they put into it. A few years ago it was quite common to find that half of the programs on any disk didn't work, and the other half had no documentation files. Now you find a lot of clubs are taking the trouble to properly filter the programs, and some have even developed special menu programs which head each disk. These menu programs will call up a documentation file explaining what each of the programs do, and will then load them for you as well. The Commodore Hornsby Users Group was a pioneer in this regard. Most clubs charge between \$5 and \$10 for each disk, and since the money stays in your club, it's quite a reasonable deal.

Bulletin Boards

The only trouble with clubs is that not everyone has access to one, and that's where bulletin boards come in. You'll need to spend a couple of hundred dollars to acquire a modem, and often they come with pre-packaged terminal software. If not, ask the store for a copy of some public domain terminal software. If they're just about to sell you a modem, it's a reasonable request. Don't buy any commercial terminal programs until you've had some telecomputing experience. There are stacks of public domain terminal programs around so wait until you've sampled them before you buy. All you need to get started is a simple terminal. It helps if it supports Xmodem or Punter transfer protocol, but don't worry if it doesn't. So long as you can read and leave messages you will be able to contact other users who can help you find terminals that support downloading.

Running a bulletin board is an expensive exercise, and it's quite common for sysops to restrict access to their file transfer libraries to users who are members. BBS membership is usually \$15 to \$25 per year, but for my money it's good value.

NetComm Modem 64/128 Update

A few months ago I reviewed the NetComm modem 64/128 package and said nice things about it. I'm sorry to report that I missed one very serious fault with it, one that particularly affects 128 owners. The modem 64/128 package implies that it is for both C64s and C128s. True, the hardware works on both machines, but the problem is with the software. When booted in 128 mode, it converts the computer into 64 mode and actually only functions as a 64 terminal. The problem with this is that a 128 in 64 mode cannot read the second side of a 128 double sided disk. Using your 128 disks with this software is asking for trouble, but nowhere in the documentation is this pointed out. I only discovered this problem when I attempted to upload an article which was on side two of my disk.

The only 128 terminal that I have encountered that I am fully satisfied with is Bobstern 128. This is a commercial package, but to date there doesn't appear to be any public domain terminal that truly supports 128 mode. Bobstern doesn't support Viatel, or 1200/75, but there is a patch program you can download from Palintir BBS, (02) 451 6576, which will make it support 1200/75 in ASCII (not Viatel). That's

quite useful because a lot of BBSs support 1200/75 and you get the speed benefits of 1200 baud without having to buy a 1200/1200 modem. Bobstern supports Punter and XModem protocols, plus it can emulate a number of different terminals including Digital's VT-100. It also has a special function for text file transfer which will convert a CBM ASCII text file into Standard ASCII as the transfer progresses.

I've used Bobstern with the Maestro

1200 Bit Stream Flyer modem to successfully log onto a number of bulletin boards, including *Your Computer's*, at 1200 baud full duplex in 80 column mode. When you're telecomputing at 1200 baud, an 80 column screen is certainly a lot easier to read! More on the Maestro Bit Streamer in another issue, but a tip for Bobstern users who want to use it at 1200 baud. Try altering the baud adjust setting to high = 1, and low = 143 or 144. □

COMMAND -----	SYNTAX -----
AUTO Escape:	AUTO (startline, increment) RUN/STOP & RESTORE
BSAVE	BSAVE "filename", start address, end address
CAT	CAT
CHANGE	CHANGE @OLD@NEW@ (, startline, endline) or CHANGE @"OLD"@"NEW"@ (, startline, endline)
*CURSORFREE	CURSORFREE
*CURSORPRINT	CURSORPRINT
DEFAULT Escape:	DEFAULT border, background, text, device# See MONITOR
DELETE	DELETE startline-endline
DLIST	DLIST "filename"
DUMP	DUMP
*END	END
ERR	ERR
FIND	FIND @string@ (, startline, endline) or FIND @"string"@ (, startline, endline)
*FREEMEM	FREEMEM
HELP	HELP
INT	INT
KEY	KEY function#, "command or string"
LLIST	LLIST (startline)-(endline)
*MAKEDATA	MAKEDATA startaddress, endaddress
MEMORY	MEMORY startaddress(-endaddress)
MERGE	MERGE "program name"
MONITOR	MONITOR
NUMBER	NUMBER \$hexnum or NUMBER decnum
*POINTER	POINTER address
QUIT	QUIT
READ	READ "seq filename"
RENUM	RENUM (startline)(, increment)
RESAVE	RESAVE "filename"
*RESET	RESET
SCRATCH	SCRATCH "filename"
*SCREEN	SCREEN
SEND	SEND "disk command"
SPEED	SPEED number
START	START "filename"
*SUPERPEEK	SUPERPEEK startaddress, number
TERMINAL Escape:	TERMINAL
TRACE	TRACE
*TRAP	TRAP
TROFF	TROFF
UNNEW	UNNEW
*UNTRAP	UNTRAP
VCHANGE	VCHANGE @OLD@NEW@ (, startline, endline) @ startaddress, number, number

*Listing 1. This is a summary of of the commands and their syntax for Metabasic. Commands with an * before them are Metabasic Plus.*

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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 acknowledgement. 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. □

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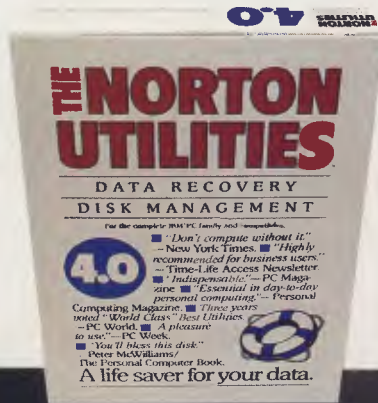
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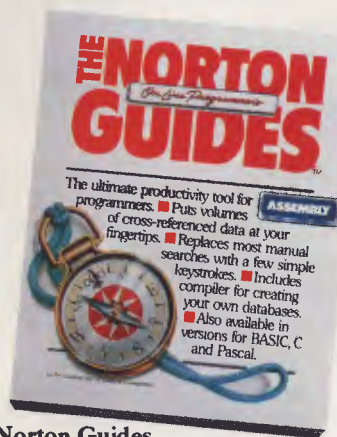


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CURSORY GLANCE

Had trouble getting disk labels off? The cheap 13 cm disks I buy come with labels which won't come off and write-protect labels which won't stay on. Which is contrary to my thinking on the subject.

Resorting to a fingernail is a little frustrating, and using a white-out or similar to change the name of the disk is risky — the stuff tends to end up on the heads, inside the disk jacket and anywhere else you care to name. Instead, I buy labels from Tandy. This is only for disks which might go through an identity crisis. Ones which will stay with that name get an ordinary label.

Tandy's labels remove easily, are large enough and come with write-protect tabs which work. However, if you still can't get a label off, try this method on a disk which is junk (it's not really all that good for the disk. I take no responsibility for the results).

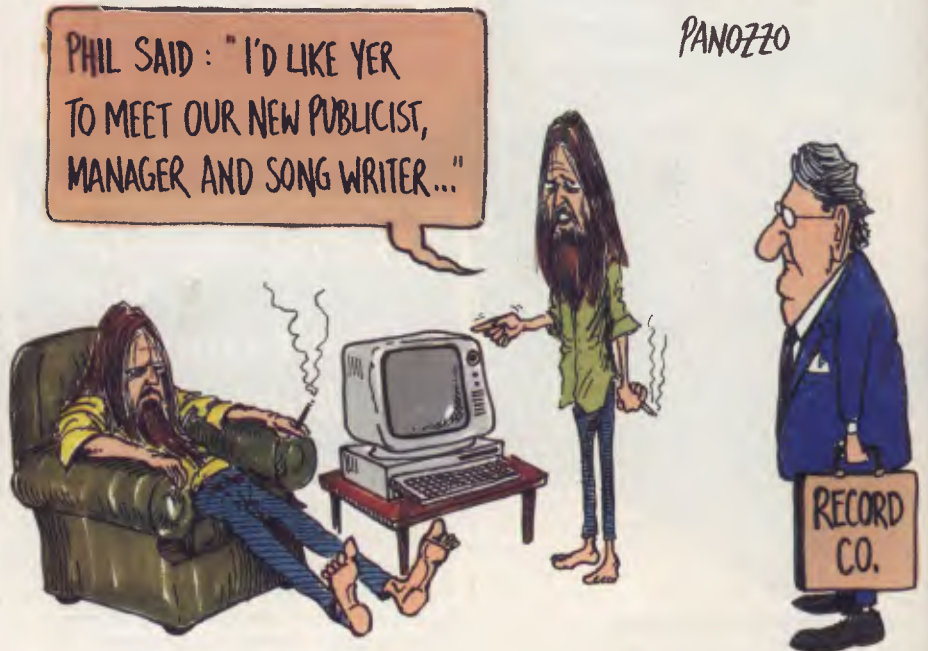
Marinate each disk in equal parts of red wine and disk cleaner with a dash of salt and pepper, a sprig of parsley, a token bay leaf and a clove of garlic. After about four hours in this, the label should come off (along with the magnetic material) and the disks should taste great lightly fried in a butter sauce. The texture's not the best and they're probably poisonous, but then again, what do you expect from cheap ingredients. Now you see why I buy removable labels.

■ The real meaning of 'user-friendly' — the attitude of the salesperson *before* the sale.

■ A lawyer told a recent Community Activities Network conference in Sydney how she prepared her case thoroughly for an increase in her credit card limit. She turned up at the bank armed with financial statements, dockets and her full assertiveness. She was most dismayed that the decision would not be handled by the manager. Rather, the bank would leave it to the computer which would look at her past transactions.

■ Want to get someone a little further down the track with computers? Try the new Time-Life series. So far they have produced books on 'Computer Basics', 'Software' and 'Computer Images'. They cost around \$25 and are excellent value. They use lots of diagrams, photos, extended captions and for those who want to know more, there is text. Most people will get enough from the graphics and captions.

They are not designed to take people to



an expert level. However for most computer users they will extend your grasp of the concepts involved, give you a good historical background and open up some possibilities you may not have considered.

They are aimed at beginners and tackle the problems most people face in learning about computers. You can buy by mail order or from bookshops.

The biggest market is apparently middle management — probably people who feel pressured to learn about a foreign subject and mildly terrified of the subject and their so-called ignorance. They are good — take a look.

Bootstrap

The latest gadget (and most expensive at \$US89,999.95 plus state and federal taxes) from Comdex US is Conception. The idea was developed by a Nashville record company trying to rehabilitate some of its less articulate pop stars who had spent too long on drugs and had been deafened by hype and Heavy Metal music. Some had also suffered brain damage from over-inflation of their egos, again, caused by record company hype.

To salvage them, the company developed Conception. It's a 'concept processor', a piece of software and specialised hardware which takes over from

where the wordprocessor and ideas processor fortunately left off.

The way it works is that you sketch, scribble, mumble, doodle, dribble, write or hum something into one or more of the infernal computation engine's multifarious and multitalented input receivers.

Conception turns anything at all into what it calculates you were trying to get across. The company then uses some staff writers — words, music or cheque — to take it the next step. This is turning it into something which can be printed on paper or pressed on vinyl. Then it's over to the marketing team. The program has three sections, named for the three steps described above. They are Receive, Conceive, Deceive.

The fourth stage is done outside the program by the record company and attendant pop stars. It's called Achieve. Apparently the program has proved so popular that the company has decided to flog it to other floggers of tripe. Perhaps we should ask Molly Meldrum to make an appearance on this page to review it — unless Bob or Joh beats him through the door. □

Michael Burlace is an independent computer consultant operating from the Sydney Information Technology Centre (Itec). He may be contacted by writing to PO Box 57, Broadway 2007, or by phoning (02) 281 2111. □

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