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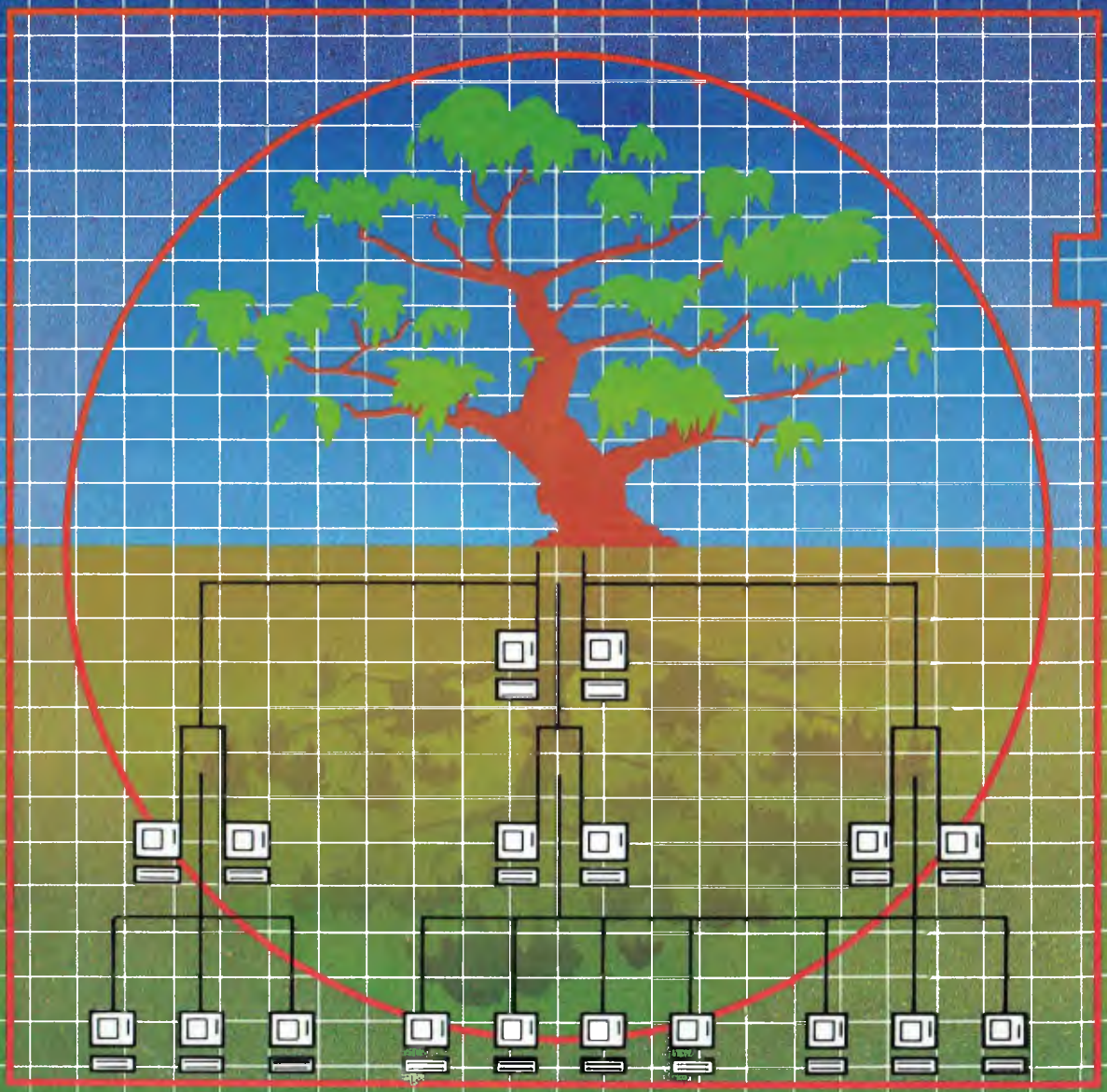

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Computers have started to make inroads into genealogy as an aid to doing away with all those mountains of paper and files the subject generates. NATALIE FILATOFF

HIGH-TECH HEALING **36**
Artificial intelligence and computer databases look like providing the first truly cost-saving advances in medicine for many years. DR. EUGENE SHERRY

COPYRIGHT SYMPOSIUM **52**
In the wake of the software copyright debacle, the Federal Government held a symposium for interested parties in both industry and user areas. The results of the discussion weren't quite what was expected. EVAN McHUGH

LEEWARD OF MOUNT CRISIS **80**
Our regular contributor, Frank Lee, took time off from his current software 'magnum opus' to write about five pieces of equipment that have stood up wonderfully to the use and abuse they're subjected to in his workshop. FRANK LEE

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GETTING FRIENDLY WITH BASIC — PART V **92**
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your computer MAGAZINE

FOR BUSINESS AND PLEASURE

PC OF THE YEAR AWARDS 9

*A look at the presentation of **Your Computer's** annual Personal Computer of the Year and Software of the Year Awards.*

INTRODUCING APPLE IIC 18

Apple's latest assault on the market is a portable, the IIc. Despite its size, it has more memory than its big sister the IIe, and lots of other features besides.

ROOTS 22

Trace your family tree using a computer.

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Next Month

The Great Database Search begins! dBase II has a large and enthusiastic following, but when all's said and done it's not the perfect database package. *Your Computer* sets out in this issue to examine some other database programs, and begins the search for the perfect database package.

Also in next month's issue is the second part of 'High-Tech Healing', covering the practical side of 'bionic' limbs, all our usual columns and reviews, and our bi-monthly edition of ***Your Business Computer***.

ARE 16 BITS BETTER THAN 8?

Are sixteen bits better than eight?

That's a question a lot of people have been asking themselves recently, and I guess a lot of people are asking the same question now as they decide what computer to buy. It's a question I'm frequently asked, and one I've been giving a lot of consideration to.

Right now, the computer world is word-length crazy. With most of the recent releases being based on the 8086 processor family, there is a definite trend towards the use of sixteen-bit processors. With the advent of the 68000 and its appearance in mass-market machines like the Macintosh, we're even being told that 32 bits is the way to go.

Frankly, I remain unconvinced. Although the 16-bit machines do have some advantages when used with sophisticated operating systems like Concurrent CP/M, their major benefit to date remains the ability to run some programs like Lotus 1-2-3 which are not available in eight-bit versions. If you need Lotus, the 16-bit is the way to go.

But in many applications we are dealing with text, which is usually stored one character per byte. Using sixteen-bit words provides no improvement here and may even prove a liability as each word has to be unpacked into two characters.

Furthermore, in many commercial applications the limiting factor on performance has proved to be the disk drive, and there's no reason why the disk drives on eight-bit machines shouldn't be as fast as those on sixteen-bit machines.

Again, sixteen-bit programs are generally larger than eight-bit equivalents, which means that not only may they run more slowly, they also take longer to load from disk. This is particularly obvious in programs which make extensive use of disk-based overlay files.

The eight-bit world has continued to evolve. Processors are faster than ever before, offering still higher performance. The new CP/M Plus operating system offers a friendlier user interface, more sophistication and much higher performance.

While IBM continues to provide a price umbrella in the sixteen-bit market, manufacturers of high-performance eight-bit systems have continued to slug it out in a price/performance war. Companies such as Kaypro and Morrow now offer 10 Mbyte hard disk systems with bundled software at less than half the price of, say, an IBM XT. I don't think such systems would suffer much in a performance comparison, either.

I was about to make a plea for readers to start putting the onus on dealers – and ultimately, manufacturers – to demonstrate why their expensive 16-bit hardware is such good value when I've realised it isn't necessary. At seminars where I have spoken recently, there has in fact been a slight resurgence of interest in the eight-bit machines.

Not only are private individuals still buying these 'obsolescent' machines, but I've detected a stirring of interest in the corporate market as DP managers realise that there are more cost-effective solutions than the 'mainframe name brand' machines they have been considering.

I'm not suggesting that sixteen-bit machines don't have their uses: before you dismiss my viewpoint as neanderthal you should know that I have three sixteen-bitters in the office.

Ultimately sixteen bits will win the day. But I'm beginning to realise that there is more life in the eight-bit machines than even I had suspected. So when you start selecting your computer, bear in mind that not only might an eight-bit machine prove an irresistible bargain, it might even work better! ❑

Les Bell

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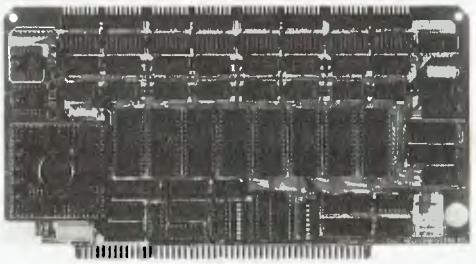

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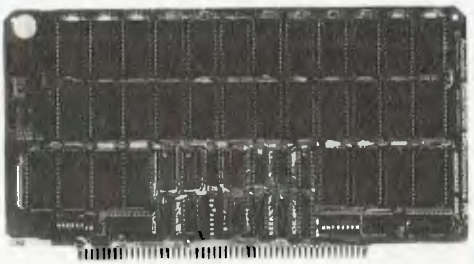

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It is very rare in the still-evolving world of computers to find a highly capable program accompanied by a set of instructions mere mortals can understand. MultiMate is one of those rarities. The manual is well designed and presented and generally well written. It appears to cover most questions that a first time or experienced computer user might ask.

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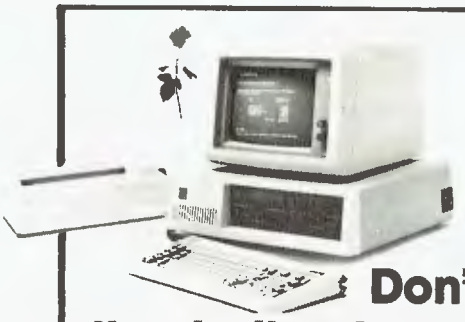

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Your Computer Presents Awards

Les Bell (left) congratulates David Strong of Apple Australia.

*The big secret was on again in the **Your Computer** offices while this year's judging of the Personal Computer of the Year Awards went on, but we managed to make it to the Award ceremony with no leaks – well, only one little one anyway!*

AS READERS of our April issue will know, on March 29 we presented our annual Personal Computer of the Year Award, which was won by the Apple Lisa for its technical and software innovation and impressive user friendliness.

This year we also presented a Software Product of the Year Award, won by Lotus 1-2-3, and two Special Commendations for Australian hardware and software (won, respectively, by the Microbee and the Zardax word processor).

With all these products around the place and many a frantic phone call between the judges, it's amazing the secret remained so well kept, but having threatened staff and judges alike with being pegged out in the desert and left to be eaten alive by ants if they divulged so much as a word of the winners, Award organiser Jan Mackey managed to keep everyone quiet – right up until the morning of the presentation.

Something had to go wrong; Murphy's Law dictates that. On the afternoon before the Award presentation, our circulation department had mailed out copies of the April issue to advertisers. Would you believe it, one of those copies was delivered at eight o'clock the following morning to one of the Award candidates? Trust Australia Post to do the impossible just when you don't want them to!

However, the candidate in question very sportingly did not divulge any winners' names before the presentation, although he gave us a few nasty moments when he first walked in brandishing his copy!

Ian Phillips of Computer Solutions, distributor of Zardax.

The Hon. George Paciullo (left) with Matt Whelan.

Doug Ruttan of Sourceware accepts the Software Product of the Year Award for Lotus 1-2-3.

Owen Hill of Applied Technology, delighted with the Microbee's win.

Minister's Encouragement

The Awards were presented this year by the Hon. George Paciullo, then NSW Minister for Small Business and Technology. The Minister expressed great enthusiasm on the NSW Government's behalf for the furthering of local high technology, as it has shown by its recent introduction of the Advanced Technology Assistance Fund. Both existing industries wishing to increase productivity and competitiveness through the introduction of advanced technology, and new businesses operating in new technologies can benefit from this fund.

We saw quite a few local industry representatives making a beeline for the Minister after the presentation to find out more details about this new fund!

This year's *Your Computer* Awards were heralded by the computer industry and the press as the 'Oscars' of the computer world and were greeted with great interest and a fairly fierce competitive spirit. In just two years the magazine has managed to establish its Awards, judged by a panel of independent computer experts, as *the* criteria by which new computers and software are judged in this country. Next year's Awards look like being even more exciting as this recognition heats up the competition even further! ❑

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your computer news

Personal Terminal Clears Your Desk

ANDERSON Digital Equipment has just started to distribute a portable personal terminal from Televideo, which will enable managers and executives to have instant access to all kinds of data without having their desk dominated by a normal-sized terminal – and for under $800.

The terminal will link into both company mainframes and commercial databases, providing access to all necessary information. A recent report established that 80 per cent of terminal use among managers and professionals is for data enquiry, and this mini-terminal is ideal for such use. It is also easy to tuck it under your arm and transport it home, where it can be connected via a modem to your home telephone, allowing you the same instant access to all the data you require.

More new products from ADE include the 20 cps Letter Pro 20 word processing printer, which is designed to allow users to upgrade from a dot matrix printer at a reasonable cost. The company is also distributing the Datavue 80 multi-user system, which can accept up to eight users, runs the CP/M operating system, can handle up to three disk drives (two Winchester, one mini-floppy), and provides 64K of memory for each user. It is compatible with all standard VDTs, and each user has access to an RS232 port for a plotter, printer, modem or other peripheral.

For more information on all these products, contact Anderson Digital Equipment, PO Box 422, Clayton 3168. (03) 544 3444. ❑

Case Dual Mode Printer

CASE Communication Systems has introduced a printer combining quality and high-speed draft mode printing, which means it can be used both to print letters and produce quick reports. The printer is the PT 930, which uses an 18-wire printhead. In letter quality mode it prints at 80 characters per second, and in draft mode at 200 cps. There is provision for friction and tractor sheet feeders, enabling the use of single-sheet and fanfold paper.

The 930 comes as standard with serial and parallel interfaces. Options include Epson emulation, and additional and downloadable fonts.

For further information contact Rick Rogers, Case Communications, 1-3 Rodborough Road, Frenchs Forest 2086, or phone (02) 451 6655. ❑

New Managing Editor for Your Computer

EARLY IN APRIL this magazine welcomed a new Managing Editor to the staff – Jim Rowe, formerly editor of *Electronics Australia* and more recently Marketing and Technical Director of Dick Smith Electronics.

As our faithful readers will know, *Your Computer* was founded back in 1981 by Matt Whelan, who's remained our Managing Editor ever since. The world of nitty-gritty computing is now claiming more and more of his time (he's in the process of computerising the entire company), and he's decided it's time someone else filled the busy role of Managing Editor.

Jim Rowe's background in electronics and technical publications goes back to 1956, when he started work as a radio engineering trainee at the AWA factory in Ashfield, NSW. Between that time and now he's gained Bachelor of Science and Bachelor of Arts degrees, written several books on electronics (two of which have sold over 50,000 copies), risen from technical writer to editor of *Electronics Australia*, designed and built a complete digital computer from scratch, and proved himself highly capable as both Technical and Marketing Director for Dick Smith Electronics.

This background in publishing, electronics and the retail electronics industry must be unique in Australia, and we're delighted to welcome Jim Rowe to our staff. His knowledge and experience will help make *Your Computer* a still better computer magazine. ❑

Productivity '84

HEWLETT-PACKARD held its own three-day computer show, 'Productivity '84', at the Sydney Hilton in March.

The show comprised a manufacturers' day, EDP professionals' day and a business management day, with a total of 16 free seminars being held on the three days.

Along with the seminars, Hewlett-Packard displayed its range of products, with the emphasis on applications rather than specific 'hardware' details. The products were grouped under their areas of use, and there was ample space and personnel for interested people to see the whole range in operation.

Several new products were on display for the first time, including HP's latest graphics plotter, the HP 7475A, and the recently launched HP 150 touch-screen personal computer. The HP 2225 portable ink-jet printer was also on show. It prints at 150 cps, has an extremely low noise level, and is claimed to have no moving parts to wear out or reservoirs to be filled. It retails for $775 including tax, and may be used with portable or desktop computers from HP, including the HP 150.

For more information on HP's new products, contact the company at 31-41 Joseph St, Blackburn 3130. (03) 895-2895.

TEAC Disk Drives

MULTITECH Computers has released the TEAC range of 13 cm disk drives. All use Large Scale Integration on one printed circuit board, said to ensure the highest performance of control and read/write functions.

There are three drives in the series, the FD-55B, FD-55F and FD-55G, which have capacities of 0.5 Mbytes, 1.0 Mbytes and 1.6 Mbytes respectively. They are double-sided, double density, with 40, 80 and 77 tracks per side.

For more information, contact Multitech Computers, 202 High Street, Northcote 3070. Phone (03) 489 0430. ❑

Sperry Previews PC

MAINFRAME manufacturer Sperry Computer Systems has made its move into the personal computer market with the Sperry PC, a 16-bit machine previewed at PC84.

The machine is largely IBM compatible. It can run all software designed for the IBM PC and is claimed to operate 50 per cent faster than the IBM PC or PC XT. It is also hardware compatible. It runs with 128 Kbytes of RAM, expandable to 640K, and has four screen resolution levels and 256 colours which can be displayed simultaneously.

The Sperry PC will cost 10 per cent less than the IBM PC and will be available to the public around July. Sperry is currently supplying its own user base and appointing a number of selected dealers.

For more information contact Robyn Sinclair on (02) 922 6662. ❑

Lanier Expands

LANIER has broadened its range of products with the addition of the range of Harris office equipment. Lanier has always been a major supplier of dictating and word processing systems, and the Harris products give the company a high-level entry into the data processing area.

Lanier is now able to offer systems right through from lightweight portable dictating machines, through centralised dictating systems, stand-alone word processing systems, network word processing, personal computers in both stand-alone and network mode, up to minicomputers and terminals.

The merger of Harris and Lanier combines the former's high-tech capabilities with Lanier's strong marketing and service capabilities. The merger concerns only the Harris office automation products; the well-known typesetting equipment remains in the hands of Datronics.

In line with its new attack on the office automation market, Lanier has coined a new term for dictating equipment that smacks of George Orwell's original 'Newspeak': thought processing. Apparently it's doing wonders for bringing the boring old dictating machine out of its obscure corner and into the minds of purchasing managers once again ...

For more information contact Dave Vucina, Managing Director, Lanier (Australia), 296 Burns Bay Rd, Lane Cove 2066. (02) 428-1233. ❑

Additions to Kaypro Line

PRESIDENT Computers' managing director, Tom Cooper, was recently in the United States at the Kaypro production plant, and on his return announced various changes to the Kaypro range and price structure.

The US company has just released the Kaypro 4 Plus 84, and is also introducing a series of educational software packages in order to aim the product at the growing education market.

For future release is the Kaypro Robi, which is a home or educational computer with an expected retail price of under $2000. Another product on the drawing board for 1984 is a flat-screen, lightweight briefcase portable, which will interface fully with the current product range.

President also announced a networking system for Kaypro, which will retail for approximately $500 per station. The web can run a network of up to 2000 feet, with a practical limit of 20 Kaypros on-line. Each computer will maintain its own intelligence or have the ability to share with others on-line, and can direct information to any of the remote printers on-line.

The Columbia product line has also undergone a new price structuring, and the parent factory has recently extended its manufacturing capabilities to keep up with world demand.

President has also just opened a new branch office in Brisbane under the management of Greg Freeman. The address is 220 Boundary St (entrance at 7 Mein St), Spring Hill 4000. (07) 229-0019.

For more information contact Tom Cooper on (02) 476-2700.

AED Expands Operation

WITH the recent winning of a major contract, AED Computers has been able to expand and enlarge its operation. It has opened a new factory at Prospect, NSW, a new sales office in Parramatta, improved the specification of the AED Universe Supercomputer and reduced its price – to name just a few of the changes.

The price drop on the Universe computers has been in the region of $2000. The lead time for delivery is also reduced from six to eight weeks to three to four weeks.

A new brochure is also out detailing the new arrangements and the AED operation as a whole. For more information contact AED Head Office, Unit 3, Prospect Ind. Centre, 2 Stoddart Road, Prospect 2149. (02) 636 7677. ❑

More Programs For Commodore 64

GS WEBBER and Associates, long-time distributor of Sinclair programs, is discontinuing its current range to concentrate solely on Commodore 64 software.

Said a company spokesman, "Negotiations are taking place with over fifty overseas concerns to obtain licence to manufacture and distribute a large range of '64 software in Australia. We intend to hold our prices down to a very reasonable level by using local printing and manufacturing concerns in as many areas as possible.

"Customs duty alone on imported programs is 35 per cent," he explained, "and sales tax of 20 per cent is calculated on cost, plus duty, plus a further 20 per cent primage. Local manufacture means huge savings in this area, and this will be reflected in our pricing policy."

The company has just released its first tape – a collection of twelve games, utilities and other applications – for ten dollars. For further information, contact G.S. Webber and Associates, 19/270 Kingsway, Caringbah 2227. Phone (02) 526 1267. ❑

The Tiger Bytes

THE occasion was Sydney's Business Efficiency Fair and among the displays was a real tiger helping demonstrate the Cado Tiger computer. Marketed by Remington Business Machines, these computers are capable of supporting between 32 and 64 machines in a unique tri-level architecture.

Transaction processors handle eight or fewer devices and run at 19,200 bps (twice industry standard). Control bi-processors interface with mass storage ensuring simultaneous accesses, and the 'intranet' processor handles overall device interaction.

The Tiger 32 is expandable from 256 Kbytes to 1024 Kbytes in 128 Kbyte increments, with maximum Winchester disk capacity of 60 Mbytes. The Tiger 64 has two built-in Winchesters and can take up to eight more. Depending on configuration, this can mean a capacity of 1.1 Gigabytes. There is also provision for various forms of back-up.

For more information contact Remington Office Machines, 175-183 Liverpool Street, Sydney 2000. (02) 269 0925. ❑

Rainbow Pot Of Software

DIGITAL Equipment is claiming that more than 1000 software packages are now available for its Rainbow range of computers — this apparently beats the number of packages currently available for the IBM-PC.

Approximately 450 of the 1000 Rainbow packages can currently be purchased in Australia and New Zealand, and Digital expects the full range to be available here soon.

For more information contact Digital Equipment Corporation, Northern Tower, Chatswood Plaza, Railway St, Chatswood 2067. (02) 412 5252. ❑

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Carpe Scales Up Operations

CARPE Office Systems, producer of accounting software, is expanding its operation both in Australia and overseas.

The Carpe General Accounting Package runs under CP/M and CP/M 86, and is available for many of the popular computer systems including IBM-PC, Columbia, Sirius and Kaypro. Carpe is also willing to modify the package to specific requirements.

Carpe recently released a new payroll package which includes Medicare deductions, and other systems are due for release later in the year.

You can contact Carpe Office Systems at 30 Fisher Rd, Dee Why 2099. (02) 981 2022. ❑

New For Apples And Apple Compatibles

SYSTEMS Peripherals has released details of two new products: the Dataline 200 software communications system, and the SP64 printer buffer card.

Dataline 200 allows the Apple II, II+, IIe and compatible computers to communicate with each other or with a database via a telephone line. To use the system you require either a UDM-1200 modem plus the Apple super-serial and parallel cards, or the Novation Apple-Cat II communications card.

Dataline is supplied with a manual, software protection device and two diskettes (a master disk and a file disk), and is self-booting so the user need not have the Apple II Pascal operating system to run it.

A phone directory system allows the user to create an unlimited number of phone directories, each of which can contain up to 127 entries. The user can then type in the name of a directory entry and the system will retrieve the number and dial it automatically. Access to each directory can be restricted by a password so an unauthorised user cannot read or alter the directory.

A command file system allows users to create a file of functions which will be executed when the file name is typed. This facility enables users to perform routine communications tasks – such as calling the source database – with a minimum of effort or error. Inexperienced users can perform complicated tasks with ease, provided a file for the particular functions has been created.

The SP64 printer buffer card is a Centronics-compatible parallel interface for Apple and Apple-compatible computers. It has adjustable margins, page length and so on, and also offers high-resolution dot graphics dump routines located in the firmware.

The SP64 will run a printer status check before sending a character to the printer. If the printer is not on-line or is out of paper, a warning will be printed on the screen and the Apple will beep accordingly.

The printer buffer also incorporates a built-in RAM diagnostic self-test. What's that? It informs the user of any abnormal condition related to the RAM chips.

The card, with cable and manual, costs $305 (excluding tax). For further information, contact Systems Peripherals, 210 Parramatta Road, Stanmore 2048. Phone (02) 568 3790. ❑

On-Board Navigation for Motor Vehicles

VDO is investigating the release of what would be Australia's first commercially available on-board navigation system for cars and trucks. The system is in the final stages of development in Germany.

Called VDO Citypilot, the device helps drivers plot the most direct route across cities, and warns when they are moving away from their destination.

The system uses a magnetically coded street directory to enter current position and destination in an on-board computer. A dashboard-mounted display then shows a constantly updated readout of the direction of travel and distance from the destination, and registers any variations from the course. The driver only has to pass a light cursor pen over the street directory co-ordinates at the start of the journey, and monitor the gauge occasionally to find the destination.

VDO's initial planning indicated Citypilot could be sold in Australia for several hundred dollars. Its introduction depends on street directory publishers joining the scheme.

Australia is considered a likely country in which to introduce on-board vehicle navigation because the relatively small number of cities which would require the system makes establishment costs realistic.

VDO Citypilot uses a geomagnetic fluxgate sensor coupled to a sophisticated evaluation program stored in a microprocessor.

The system is planned for introduction to the original equipment market in 1985. For further information, contact Paul Harvey, VDO Australia, 115 Northern Road, Heidelberg West 3081. Phone (03) 450 3209. ❑

IBM Graphics on Anadex Printers

DATASCAPE has brought out a new emulation diskette that lets an IBM PC or lookalike run IBM Graphics Printer software on Anadex DP9625A/B or DP6500 printers. The diskette comes free with every Anadex printer and allows you to use printers with higher speeds and better quality than the IBM Graphics Printer.

For further information contact Datascape International, 33 Grosvenor Street, Neutral Bay Junction 2089. (02) 909 1233.❑

Protect Your Software From Pirates

NOW seems a timely moment for someone to introduce a truly effective method of protecting software from pirating, and International Protection Systems claims to have come up with a completely uncrackable protection method.

Now, I know all you hackers out there are instantly dying to get your hands on this system so you can have a go at cracking it, but this method is not so easy to beat as the usual encryption techniques, nor as expensive as hardware security systems.

The Prolok system uses the magnetic disk itself to provide protection. By means of a special process, 'fingerprints' are imposed on the oxide of each blank 13 cm floppy disk. These fingerprints are *physically* imprinted, and each one is unique; there are more than three million combinations, each serving as a kind of hardware key that must be present before the protected software is able to run. So all a software producer has to do is to make sure his or her software is distributed on Prolok disks, and the company claims that software is totally secure.

Back-up copies of a program can be made from a Prolok disk, but will not run without the original Prolok disk also in the system. Bypass systems such as nibble and bit copiers, the most common methods used to copy software, are said to be completely ineffective.

The Prolok system currently supports a wide range of computers, including many general and specialised MS-DOS and CP/M-80 and 86 systems. For more details on systems and availability, contact Ross Macarthur, International Protection Systems, PO Box 116, Hurstville 2220. (02) 597 2538.❑

Silver Reed's EXP-500.

Flying High with Pacesetter

HERE at *Your Computer* we get plenty of invitations to press conferences, new product releases et al, but it's seldom an invitation is accepted as readily as Pacesetter Peripherals' recent one was.

Pacesetter was announcing its agreement to distribute the Silver Reed range of printers – and it made its official announcement at a riverside restaurant in one of Sydney's national parks, having flown a bevy of interested journals up there first by seaplane!

Once there, of course, the audience was captive, but nonetheless keen to see the range of Silver Reed printers now available. These include a new daisywheel which retails at the price of $734 (excluding tax), enabling a computer user to get letter-quality printing within the lower price range bracket.

The EXP-500 is also extremely quiet in operation — it hardly impinged on the silence of the national park at all! High-yield 375,000-character ribbons make for economical operation, while its compact 445 by 315 mm footprint means it doesn't take up too much precious office space.

For more information contact Jason Earle at Pacesetter Peripherals on (02) 439-4655.❑

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Apple's new Macintosh represents a revolution in personal computers and the way we work with them. It will change the way you think of computers — whether you're a novice or an old hand.

We can't describe why Macintosh is so radically different — you'll have to see for yourself. And we will be delighted to show you if you visit one of our stores.

IBM

We have everything for the IBM user (and prospective user), from top software like Lotus and Multimate to Tallgrass Hard Disks, printers and plotters, not to mention the best experience in Sydney.

NEC

We can supply the NEC Advanced Personal Computer with a full range of business and accounting software, plus specialist CAD, Fleet Management and other software.

EVERYTHING ELSE

That's the only heading that really covers our enormous range of printers, screens, software, disks and everything else that a computer user could want.

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PC Junior Software Here Already

IMAGINEERING is already importing software for the IBM PC Junior, despite the fact that this machine has not yet been released in this country!

Spinnaker Software has been working on translations of programs for the Junior for several months, and is well known for its extensive line of software for the IBM-PC. Imagineering distributes the full Spinnaker range in Australia.

The first Junior programs here will be 'Facemaker', 'Fraction Fever' and 'Kindercomp'. At least when the PC Junior arrives there'll be something to do with it!

For more information contact Phil Woolley, Imagineering, 579 Harris St, Ultimo 2007. (02) 212-1411. ❑

Sinclair Does It Again!

SINCLAIR has done it again – or should we say Sir Clive, since he's just been knighted? The Quantum Leap has just been launched with the boast that it will turn the market upside down as it halves computing costs.

The features are impressive: 128 Kbytes of RAM expandable to 640 Kbytes by use of a RAM pack; two built-in microdrives; and an integrated software package that permits multi-tasking and windowing. The stunner is the price, though. The QL sells in the UK for $638 and will sell for $499 in the States when it is released there later this year.

The range of peripherals supported is particularly impressive: RGB monitor or television, RS232C option, networking, joystick and further microdrive slot provision. There is also 32 Kbytes of ROM containing a new operating system and an enhanced version of BASIC. What sort of processor? – Motorola 68008 32-bit. Will the new software take advantage of this sort of power?

For more information contact Sinclair Research, 25 Willis Rd, Cambridge CB1 2AQ, England.

Mitsui's Desktop Sord

AT the 2nd Personal Computer Show, Mitsui launched a new desktop computer called Sord M243EX.

A multi-tasking, multi-language computer, the M243EX offers variable storage capacity, high-resolution graphics and can create a time-sharing system or be used as a host for Sord's local area network. It will carry up to 80 megabytes of optional hard disk capacity and can be expanded to suit the user's requirements with the connection of additional terminals.

The system also offers password-protected files, multiple directories, high-speed RAM 'files' and a powerful graphics language.

Using the PIPS software package, a variety of tasks can be performed without having to write a special program. These tasks include entering tabular data, performing calculations and sorts, drawing graphs, report generation, and creating spreadsheets and mailing lists.

For further information, contact Mitsui Computer Systems, 1-3 Rodborough Road, Frenchs Forest 2086. Phone (02) 451 7711. ❑

Spectrum Software From Omnisoft

OMNISOFT recently started distributing software for the Spectrum computer, and will be increasing the number of programs in its catalogue month by month.

The company is also offering a special prize in *Your Computer's* Pocket Programs section for the best Spectrum program published each issue. The prize is a copy of Omnisoft's flight simulation game, 'Seaplane', for the 16K or 48K Spectrum.

Programs at present in Omnisoft's catalogue include 'Albertstein Castle', a World War II adventure; 'Dr Omni', an artificial intelligence game; 'The Happy Programmer' alternative character set; 'Mathematical Hangman', which is an educational game to help students practise their mathematical tables; and 'Seaplane'.

For more information contact Omnisoft, 428 Nelson Rd, Mt Nelson 7007. ❑

New Imagineering Prices

IMAGINEERING has announced its corporate, government and education policy. This will enable volume purchasers to obtain discounts on software and peripheral lines when they buy through Imagineering dealers. Imagineering will not be direct selling in this area.

There will be provision made to allow dealers to demonstrate and train the customers taking large volumes. The corporate discount structure ranges from 15 per cent for orders of $10,000 – $25,000 to 35 per cent for orders in excess of $200,000.

Imagineering has also introduced a new price structure for microcomputer dealers and professional bodies running training courses. This will mean discounts of up to 90 per cent for software and peripherals to equip training rooms.

Prices will range from $75 for Wordstar to, say, $295 for the VisiOn Applications Manager, Calc, Graph and Word.

For further information contact Phil Woolley, Imagineering, 579 Harris Street, Ultimo 2007, (02) 212 1411, or Paul Dixon, Imagineering, 1-3 Arawa Street, Auckland, New Zealand; phone (09) 39 6266. ❑

Micropro Interfaces

MICROPRO Design has announced releases of a range of computer-to-peripheral interfaces. They are designed to permit utilisation of incompatible pieces of equipment. Several of the standard interfaces are supported: IEEE488(HPIB)-RS232, Centronics-RS232, RS232-Centronics, RS232-RS232 buffer, RS232-current loop.

All units are sturdily housed, have LED monitoring of interface functions and DIL switch selectable modes. There are also extensive self-test facilities.

More information is available from Micropro Design, PO Box 153, North Sydney 2060. (02) 438 1055. ❑

■ *Chinon Industries has developed two new disk drives. The CF-301 is a microprocessor - controlled 8 cm floppy drive. Measuring 90 by 150 by 40 mm, it provides 250K of storage per disk surface and is designed to meet the requirements of portable equipment manufacturers. The F-051APB is a single-sided, 40-track, double-density 13 cm disk drive. It features slimline construction, direct spindle drive and taut band head positioner. For further information, phone Philip Jackson on (03) 598 5622.*

■ *The Seventh International Conference on Computer Communications will be held in Sydney from October 30 to November 2, 1984. The theme is 'The New World in the Information Society', and the conference features Bob Hawke as its keynote speaker. Participants must register before May 31, and registration costs $335. For more information, contact C.C. Vonwiller, GPO Box 2367, Sydney 2001. Phone (02) 230 5210.*

■ *Datasolve has been appointed distributor of two new packages for the Wang Office Information System. Log-On is a security and statistics system, while List Management (which also runs on the VS 5.24) is a database management system offering integration with Wang word processing, calculation and validation utilities, and a flexible report generator enabling the production of mailers and totalled reports. For more information, contact Datasolve on (02) 232 6328.*

■ *NEC has released Concurrent CP/M-86, the single-user multi-tasking operating system by Digital Research, for its NEC Advanced Personal Computer. The company says it has also enhanced the system with additional programs that allow the user to output either the screen text or graphics display to a range of NEC printers; and to set up a Memory Disk in memory and a standard interface to the graphics system via GSX. For more information, phone (02) 438 5344.*

■ *City Personal Computers has changed address. It now occupies two new stores: one at 55 York Street, Sydney (phone (02) 29 2461) and one at 100 Mount Street, North Sydney (phone (02) 922 3600). Lunchtime seminars will be held daily at the new stores, with topics changing every week.*

■ *Auto CAD, a computer-aided drafting and design system which runs on the IBM-PC, will be distributed in Australia by Comprador Business Systems. A general purpose system, Auto-CAD is said to be suitable for architectural and landscape drawings, drafting for mechanical, electrical, chemical, structural and civil engineering, and printed circuit design. The ability to create user-defined screen menus via ordinary text files, and to define parts libraries by drawing them, makes it easy to gear the system to specific requirements. For more information, contact Comprador on (02) 681 4000.*

■ *The retail price on the entire line of Apple-Cat II communications systems has been lowered by the distributor, Novation. Cuts include a $70 reduction on the 300 baud Apple-Cat II, now priced at $319; a $40 drop for the Apple-Cat II 1200 baud upgrade, now $349; and a $130 decrease in the price of the 300/1200 baud 212 system, now $595. Contact Novation in California on (213) 996-5060, or at 20409 Prairie St, Chatsworth, CA 91311, USA.*

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7 & up	MATH BASEBALL (DB-4000) — Builds basic math skills. Several levels of difficulty	37.95
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10 & up	MULTIPLICATION AND DIVISION OF FRACTIONS (DB-4033)	37.95
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12—Adult	ANNUM (DB5036) A simulation in which you are the leader of a developing country. The fate of your small nation lies in your leadership and your ability to remain in control	44.95

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The latest Apple-portable!

By Evan McHugh

The line of development of Apple products in recent years has been most noticeable in the areas of spectacular personal computers such as the Lisa and the Macintosh. These have drawn far more attention than almost any other computer you would care to mention. Following on from the Lisa, ***Your Computer's*** *new Computer of the Year, and the Mac is the Apple IIc.*

The new portable Apple IIc, which should be available off-the-shelf by the time this article appears.

THE IIC IS an upward-compatible computer from the Apple II range; Apple believes it will run about 95 per cent of IIe software. It is aimed at the low end of the personal computer market as a competitor of the IBM PC Junior, which was recently released in the United States. The hope is that people interested in a serious computer will buy the IIc as a basic machine onto which they can build in the future. However, this leaves half the story untold. Here are some of the more exciting features of a machine that, while going under the guise of the Apple II range, has some aspects that set it a long way apart.

All the hardware to operate the mouse is already built into the IIc.

It's A Portable

The most innovative thing about the new machine – for an Apple – is that it's a portable. It weighs 3.5 kg, which means you can't easily pose pretty ladies in bikinis holding it on their shoulders unless they are champion shot putters. It is, however, perfectly easy to carry at your side. It has a handle on the back which doubles as a stand so you can raise and lower the keyboard angle.

When you carry the computer around you can carry it in the box it comes in, ▶

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The latest Apple-portable!

The IIc plugs into any colour TV set or can operate with a normal monitor, and is easily transportable between home and office.

which also has a handle, or there is an optional cover that you can put over it to protect it from getting scratched. When the computer is in its box it's about the same size as the Kaypro. When it's on its own you can fit the IIc into a briefcase and still have room to spare. It even fitted into my briefcase on top of all the rubbish that was already in it.

What Has It Got

The system specifications are what really sets the IIc apart from the rest of the Apple II range. The design philosophy of portability and Apple II compatibility has resulted in a few compromises, but the execution of the idea is, nevertheless, quite good. The machine has 128K as standard on a 65C02 chip. This is like the 6502 in architecture, but with the major advantage of being more readily available. An 80-column card is built in and can be flipped from 80 to 40 at the flick of a switch.

There is one built-in slimline drive with a capacity of 143 Kbytes. This represents one compromise. Apple would have liked to put in a microdrive but decided it was more important to maintain disk compatibility with the rest of the II range. There is a normal full-sized qwerty keyboard and a switch that changes the keyboard to another layout – perhaps the Dvorak standard? The keys can be swapped over to reflect the different keyboard layout.

Inside The Box

To better understand what is on the outside of the box you have to look inside it. Rule Number 1, for the Apple IIc, states that you must not open the box. To do so, as you can happily do with, say, a II or IIe, will result in the warranty being voided. Anyway, this journalist got to see inside with two Apple representatives present so I can tell you what is inside. Already, however, I can hear those Apple hacks saying, "What gives, an Apple II you can't open, what about plugging things into the expansion slots?" When you open the box you quite quickly discover that there *are* no expansion slots. In fact, unless you want to see what the disk drive looks like, there is not a lot to see. There are very few components in the box, testimony to the wonders of miniaturisation. The disk drive and the keyboard are really all there is. Let's get back to this slots question.

Apple has adopted the philosophy that most other manufacturers assume as normal. The box is sealed and there are no internal modifications. Therefore you get a 128 Kbyte machine that cannot be expanded internally. Provision for expansion is all external – and this provision is ample. There are plugs for a mouse and joystick (the mouse hardware is all inbuilt), modem, printer, extra disk drive, video (which means you can plug into a colour monitor or TV), standard monitor out, and power supply (an external pack).

The reasoning behind this standardised design is that it is cheaper to produce and it gives software designers a single environment in which to work. It means the IIc is aimed at a specific market; people requiring other facilities than those provided can purchase more powerful machines like the Lisa or Mac or more versatile machines like the IIe – albeit at extra cost.

Other Features

One stunning feature of the package is the inclusion of five diskettes full of tutorials. These take between 20 and 40 hours to complete and thoroughly cover all aspects of the operation of the machine and a considerable amount of the software packages available on it.

With the announcement of the IIc came another announcement of 21 packages that take full advantage of its features. These include packages for communications, education, entertainment, personal finance and business. About three-quarters of these packages utilise the mouse.

Some additions that have been mooted for the future are a flat screen liquid crystal display that will give full screen (80 by 25) resolution and a low-cost thermal printer.

The IIc Marketplace

The market Apples aims to address with the IIc is the top end of the home computer market, and the lower professional personal computer market. It will be a basic solution that has options to expand as the need arises. It will be useful for people who know they will be using computers in the office and want to start to get a feel for personal computing, and for those who use computers and want to take work home. It will also be useful as an educational tool, given the large amount of educational software that will run on it from the Apple II range. As well as all this, it can be used as a communications facility.

Availability

Available off the shelf. There may be some initial delays on the monitor but all distribution should have settled down by the end of this month. And the price? Around $1600.

After my brief preview of the IIc I had a few more questions that couldn't be answered yet, such as what languages the machine supports and which standard the 'second keyboard' would be. However, by the time the IIc is properly launched and *Your Computer* can get hold of a unit for a full review, I'm sure the answers to all these questions will be available. ❑

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ROL 792

'ROOTS'

Trace your family by computer.

Any area which generates and thrives on mountains of paper is a prime target for computerisation, so it should come as no surprise that genealogy — the searching out and tabulating of a person's family and ancestors — is rapidly moving into the age of the computer.

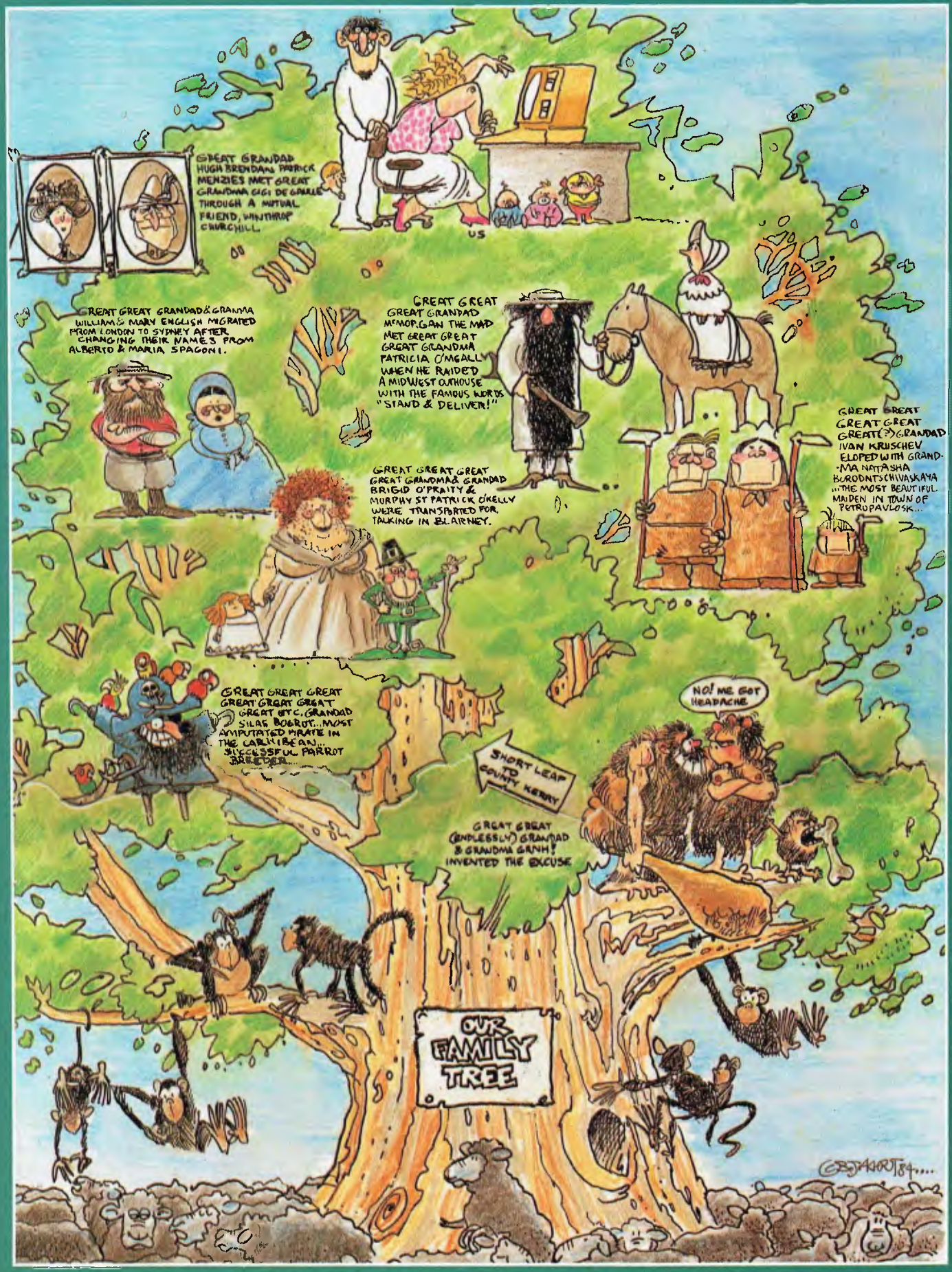
Natalie Filatoff looked at the state of the art, and at what's available for those interested in using their computers for this application.

YES, computers are finally penetrating the very roots of our existence. Literally. Their little phosphorescent characters have gained access to our past. Their internal circuits are sorting it into useful, easily accessed, alphabetically restrained files. Great great grandfather Ignatius Pug has found his place in dBase and is happily spilling the beans and bits on why you are what you are. Thankfully, Uncle Igor speaks no English so the spellchecker won't be able to make much sense of him – for the moment.

Genealogy is going through its computer infancy. No skeletons in the closet there – it's only just begun. However, despite their inexperience in the genealogical research process, the machines have deftly wriggled their way into the laps and onto the desks of people at all levels of information gathering. The family historian, the genealogical society worker scrabbling for snippets of information in the cemetery, the historical book publisher and original sources such as the registry office are all welcoming the disk as a compact alternative to the reams, the stacks, the tons of paper which have characterised the business of record keeping.

For those not quite sure what genealogy is, the Shorter Oxford Dictionary defines it as "the investigation of people's descent from ancestors, by tracing the intermediate ancestors". Nick Vine Hall, director of the Society of Australian Genealogists, regularly gives lectures on the subject, on which occasions slightly deaf members of the audience have been known to confuse his profession with gynaecology and approach him with requests for medical advice.

Of the Society itself, Vine Hall says, "It is very rapidly becoming computerised, both in itself and in the way it assists its members." He explains that computers were an obvious step for the Society for three reasons: "First, to solve the physical problem of the weight of index cards. We have around half a million index cards upstairs, created by little old ladies over the past 50 years. These weigh 23 tons and are causing a large crack to appear in the wall where it shouldn't be. Second, index cards are expensive: you could buy a microcom- ▶


GREAT GRANDAD HUGH BRENDAN PATRICK MENZIES MET GREAT GRANDMA GIGI DE GAULLE THROUGH A MUTUAL FRIEND, WINTHROP CHURCHILL
US
GREAT GREAT GRANDAD & GRANMA WILLIAM & MARY ENGLISH MIGRATED FROM LONDON TO SYDNEY AFTER CHANGING THEIR NAMES FROM ALBERTO & MARIA SPAGONI.
GREAT GREAT GREAT GRANDAD MEMOR.GAN THE MAD MET GREAT GREAT GREAT GRANDMA PATRICIA O'MGALLY WHEN HE RAIDED A MIDWEST OUTHOUSE WITH THE FAMOUS WORDS "STAND & DELIVER!"
GREAT GREAT GREAT GREAT GREAT(?) GRANDAD IVAN KRUSCHEV ELOPED WITH GRAND-MA NATASHA BORODNTSCHIVASKAYA ...THE MOST BEAUTIFUL MAIDEN IN TOWN OF PETROPAVLOSK...
GREAT GREAT GREAT GREAT GRANDMA & GRANDAD BRIGID O'PRAITY & MURPHY ST PATRICK O'KELLY WERE TRANSPORTED FOR TALKING IN BLARNEY.
GREAT GREAT GREAT GREAT GREAT GREAT ETC. GRANDAD SILAS BOGROT... MOST AMPUTATED PIRATE IN THE CARIBBEAN... SUCCESSFUL PARROT BREEDER...
NO! ME GOT HEADACHE
SHORT LEAP TO COUNTY KERRY
GREAT GREAT (ENDLESSLY) GRANDAD & GRANDMA GRNH! INVENTED THE EXCUSE
OUR FAMILY TREE
GEOFF HURT 84....

puter for what it costs you to buy just one card file cabinet. Third, it's a very labour-intensive exercise creating the cards and sorting them.

"The computer system is still labour-intensive, in that we have to key the data in, but the sorting can be done by a mainframe computer."

The Genealogical Society's computer 'system' currently consists of an IBM-PC, an Osborne I, and what Vine Hall calls a mongrel — a computer built by one of the Society's 10,000-plus members.

The IBM-PC is used mainly for keying in new information which would previously have been entered on cards. Says Vine Hall, "We have about 400 voluntary workers and a lot of them have been trained as a sort of commando computer data entry group."

Information entered by this team is stored on disk until such time as a mainframe computer becomes available to sort and index it for processing into microfiche.

"We have many members working for big companies whose mainframe computers have slack time," says Vine Hall. "Because we're a non-profit organisation, a number of them have offered us some time, provided our technical guys can hook it all up.

"Our computer committee has designed an output format suitable for microfiche. The format allows for details such as surnames, given names, the place and date of relevant events (birth, baptism, marriage, death), a cross-reference indicator, source of information and catalogue number for that source."

Bamboozled Ladies

The Society did, at one stage, consider giving its members access to information via computer terminals, but, says Vine Hall, "We didn't think the population at large was computer literate enough yet to cope with that; a little old lady of sixty who's been inspired to find out about her family tree is going to be totally bamboozled by the idea of a terminal. However, she could manage to put a microfiche in and look at that."

Microfiche has also proved to be the favoured form of output from government departments. The New South Wales Government, for example, recently released all the pre-1900 indexes of births, deaths and marriages in New

GENEALOGY PROGRAMS DIRECTORY

This list was taken from the September 1983 issue of 'Genealogical Computing', an American publication. As yet we have been unable to locate any genealogical software commercially available in Australia, so if you want to get into this branch of computing, you'll have to write away to the States or England for more information and order your programs by mail.

Computer	Program listing number	Computer	Program listing number
Apple II and IIe:	6, 7, 10, 11, 18, 21, 27	Cromemco:	7
Apple III:	11	Dynabyte:	7
TRS80 Model 1:	2, 11, 13, 16, 19, 24, 33	Imsai:	7
TRS80 Model II:	7, 11, 12, 14, 15	Xerox 820:	7
TRS80 Model III:	1, 2, 4, 11, 13. 16, 19, 24	IBM-PC:	6, 11, 20, 22, 29, 30, 31, 32
TRS80 Model 4:	13, 24, 33		
TRS80 Model 12:	11, 12	IBM System/34:	5
TRS80 Model 16:	11, 12, 14	IBM Compatibles (MS-DOS):	20
TRS80 Color Computer:	3, 23	Kaypro II:	11
Northstar:	7	Commodore CBM:	11
Zenith/Heath:	7, 8, 25	Unnamed CP/M:	9, 14, 15
Osborne I:	7, 11	Epson HX20:	20
Vector Graphic:	7, 15	Atari 800:	26
Altos:	7	TI 99/4A:	17
		Sinclair ZX81:	28

Numbers in the above table refer to the programs listed below.
All prices quoted are in US dollars.

1. **Genesis-80**	$139 program and documentation; $2 for sample family history and pedigree. Anthony J. Skvarek, 1514 W. Mission #14, Pomona CA 91766.
2. **Generations — The Genealogy Program**	$26.95 + shipping/handling; disk or cassette. Micro-80 Inc, 2665 No. Bushy Grove, Oak Harbor, WA 98277.
3. **Family Group Sheet Program**	$47.50 disk or cassette; $3 sample printout. John A. Ashworth Jnr, PO Box 809, Matthews NC 28105.
4. **Genealogy Program**	$48 includes two disks, instructions and postage. Frank Lerchen, 2950 Espana Court. Fairfax VA 22031.
5. **Roots/34**	$250; $2 plus SAE for sample reports and screens. Gary Mokotoff, Northvale Systems, 507 Crest Drive, Northvale NJ 07647.
6. **Family Roots**	$185 plus postage; free brochure and printouts. Quinsept Inc, PO Box 216, Lexington MA 02173.
7. **Roots/M**	$195: demo disk and manual available separately: free brochure available
and	
8. **Roots/89**	$124.95
and	
9. **Rootswriter**	$295 (includes shipping in US: enquire re Australian price): enhanced version of Spellbinder word processing program; special genealogical templates for LDS Family Group Sheet and NGS MAC forms. All three (7, 8 and 9) available from Commsoft Inc, 665 Maybell Ave, Palo Alto CA 94306.
10. **The Family Connection**	$99.50: manual for $19.50. Discovery Software, PO Box 68821, Indianapolis IN 46268: PO Box 9336, Cincinnati OH 45209.
11. **Genie**	Inquire about modules pricing (range $195-$497): demo disk available. Central Research of Utah, 60 South 500 West, Bountiful UT 84010.

12. Genealogy: Compiling Roots and Branches and 13. Gensystems	$250 system; $2 descriptive booklet $128.45 system; $2 descriptive booklet. Both (12 and 13) available from Armstrong Genealogical Systems, c/- John J. Armstrong, R.Ph., 5009 Utah St, Greenville TX 75401.
14. Family Records File System and 15. Text Indexing System	$250; manual $20 $100; manual $12 Both (14 and 15) available from Hierarchical Systems Group, PO Box DB, College Station, TX 77841.
16. Your Family Tree	$29.95 tape or disk. Acorn Software Products Inc, 1945 Gallows Rd # 705, Vienna VA 22180.
17. Genealogy Workshop	$49.95 Tenex, PO Box 6578, South Bend IN 46660.
18. The Genealogist's Right Hand	$99.95 User Friendly Systems Inc,6135 Ross Rd, Fairfield OH 45014.
19. Ancestry I/III	$69.95 + shipping/handling. Soft-Gene, 11 John Swift Rd, Acton MA 01720.
20. Treesearch	$200; has portable unit compatibility. Array Systems, PO Box 295, Brigham City UT 84302.
21. Apple Tree III	$79.95 program and manual; sample and booklet $5. Cyber Services Inc, Attn: Risdon W. Hankinson, 701 Sooner Park Drive, Bartlesville OK 74003.
22. Genealogy Program	$30 disk and manual; sample pedigree chart for SAE. Lanco Genealogical Research, PO Box 3011, Farmington MI 48018.
23. Family For CoCo	$9.95. TWM, PO Box 232, Lititz PA 17543.
24. Geneas/Base	$89.95 + shipping/handling; sample reports and manual $3. Praxisoft Computer Enterprises, PO Box 1221, Muskegon MI 49443.
25. Genecom	$38 (for US purchasers; enquire re Australian rates). Ramon W. Martin, 23 Rosemoor Grove, Chandler's Ford, Eastleigh, Hants SO5 1TB, England.
26. Genealogy I & II	$69. Ronan, 5509 Camber Drive, San Diego CA 92117.
27. Fretware Family Tree System	$49.95 diskette and documentation. The Fretwells, 2605 Highview Ave, Waterloo IA 50702.
28. Your Ancestors	$10 (check re postage costs); cassette; sample for SAE. Ken Barber, PO Box 140, Great Falls MT 59403.
29. Family Reunion and 30. Family Tree and 31. Family Group	$99.95; includes Family Tree, Family Group (see below), demo program, samples and manual. Manual only: $14.95. $64.95 $39.95 All three (29, 30, 31) available from Personal Software Company, PO Box 776, Salt Lake City UT 84110.
32. Genealogy On Display	Must send two disks and postage-paid self-addressed return mailer; suggested contribution $35. Documentation on disk. Melvin O. Duke, PO Box 20836, San Jose CA 95160.
33. Indexing Program	$6 tape version for TRS80 Model I; $10 for disk version for Model 4; SAE for more information. Bryan D. Harney, Rt. 2 Louisville Rd. Frankfort KY 40601.

South Wales on microfiche. The Society has a set.

"Say you're trying to find out when your grandfather died," says Vine Hall, "you can look up his name on the fiche and find that date, as well as some other information and a reference number. You can then trot up to the Registry with that reference number and get a copy of his death certificate very quickly."

The Society's Osborne was purchased to be used in the field. So far such work has consisted of keying in data from parish registers where the vicar won't allow them to be taken from the church office.

The Osborne could, however, with the assistance of a Battpac (a portable power supply), also be put to use in projects such as the collection of information from graves in Rookwood cemetery. The Society's bicentennial project, this mammoth transcription covering about one million graves will be micropublished in sections of fiche, and copies will go all over the world.

Says Vine Hall, "A lot of the information on those headstones is the only surviving record of certain people. They can yield the person's place of origin, whether a spouse or children survived them and so on. A road was constructed through some of Rookwood recently and our teams were about ten minutes in front of the bulldozers, writing like mad."

Standardising

In all the Society's computerised work, it is setting up and adhering to what it hopes will become a standard code for handling genealogical information. Says Vine Hall, "We want to try to establish a computer system on correct genealogical and computer principles. We want to get it right first off so that other societies (of which there are around another 30 in Australia alone) and libraries and everything else can follow, and eventually our computer will be able to talk to theirs. Individual computer users will then be able to pay a fee to call up via modem and get answers to questions like 'Is Joe Bloggs in your data bank?'

"The exercise now," he continues, "is to find out how many of our members are using or would like to use computers to help them trace their families."

To assist these people, the Society is ▶

forming a computer users' group. Chairman of the group is Jan Worthington, who is also on the council (the policy/decision making body) of the Society. She is assistant librarian to the Society on a voluntary basis, and has completed the Society's diploma course in family historical studies. She also works as a market support representative for Parity Computers and contracts her services as a computer and genealogy consultant. Her expertise in both fields, a previous research trip to the United States and a similar excursion planned this month to the UK, well qualify her to lead such a group. Yet even she says, "It's such a new field and I really haven't had a vast amount of experience, but I've got more than most."

Ms Worthington has traced her own family, on her father's side, back to the late seventeenth century. She says, "I became interested in genealogical computing because I have my own IBM-PC and I began to look around for software packages available in Australia that I could use for genealogy. There just weren't any. So I started looking overseas and I found that the support in America for this sort of thing was much greater."

Computers are well-ensconced as genealogical aids in the United States. The table of 33 programs given in this article was published In the September '83 edition of *Genealogical Computing*, the field's own journal, and is believed only to represent some of the packages available.

When in America recently, Jan Worthington also visited the genealogical library of the Church of Jesus Christ and Latter Day Saints. The biggest library of its kind in the world, it is completely computerised and has a large staff of data processors.

Advice

Says Nick Vine Hall, "We're forming a computer users' group for our members, to provide them with advice on what gear to buy, what programs are available (both from the United States and new releases here) and how to use the computers to the best advantage. It's almost a reassurance committee. There are a lot of people out there who wonder about computers. The trick is to motivate them to actually go out and buy something."

For people who already have computers and genealogy packages, Jan Worthington says the group will "aim to provide a forum so we can assist one another in different ways.

"There are also a lot of people out there," she adds, "who have developed their own genealogy programs from dBase II, because basically genealogy software comes under the umbrella of database software; you can store a lot of information and retrieve it in different ways."

The group, which is planned to hold its first meeting this month, will have an element of 'you help us: we'll help you'. "Overseas user groups," says Jan Worthington wistfully, "have these weekends when everyone comes in with their computer under their arm; they all sit down and have a big fun gathering and attack one aspect of the records." With half a million index cards to be converted to computer output fiche, you can understand her and Vine Hall's enthusiasm.

In A Nutshell

Jan Worthington's nutshelled advice to people planning on buying a computer for genealogical purposes is emphatic: "You can forget about all the little computers. If you want to run a database program you have to have a substantial piece of equipment. I wouldn't settle for anything less than a Kaypro or an Apple, and if you can afford it, an IBM-PC. Otherwise you're wasting your money. You'll soon outgrow a small computer. You won't have enough disk capacity. You won't have enough anything. You need 48K to store your genealogical information."

In the United States, a survey of seven hundred readers of *Genealogical Computing* reported in the magazine's November 1983 issue that the most used computers in genealogical home computing, ranked in order of popularity, were:

- Tandy/Radio Shack
- Apple and workalikes
- IBM-PC and workalikes
- Osborne
- Heath
- Zenith
- Kaypro
- Commodore
- Atari
- Televideo.

Of genealogy programs Jan Worthington says, "To a greater or lesser degree, most of the genealogy software packages do similar things. I think the power of the packages varies and the number of records you can manipulate varies. You pay for what you get and there's a very wide price range: from about $50 to $500.

"Communications," she continues, "is also a vitally important component of the whole area. The networking concept – the link-up between computers and databases – is really coming to the fore. It's becoming a possibility for the average person, because the prices are coming down for the necessary equipment. Soon everyone with a PC and genealogy software will want to hook up to a central database or databases throughout the world, where they can retrieve or exchange information."

When asked whether such ease of obtaining information wouldn't reduce the sleuth-like satisfaction of researching your family tree, she scoffed. "It will make it so much quicker and easier. At the moment you've got to sit down and write a lot of letters and wait for replies. You've got to pay people to look up information for you."

Making Sense

So given that, for the moment, you still have to write to obscure parishes, less than eager overseas government departments, county courthouses, historical societies and so on, how can a genealogy program help you to make sense of the information you collect?

We were able to find a copy of the manual for Roots/M, an American-produced program which runs on the Apple II and IIe, TRS-80 Model II, Osborne I, Cromemco, Xerox 820 and other computers (see table). It also requires a video terminal with 24 by 80 display, a single disk drive, CP/M (version 1.4 or later) and a minimum of 32K RAM.

The manual best summarises what the program will do: "Roots/M puts the family tree on a magnetic disk. It will hold the identities of ancestors, and perform genealogical referencing tasks that would take hours of searching in loose boxes. Handling enough names to construct a family tree that can include as

many as 99 generations, Roots/M turns the video screen into a window with a view of every branch. A keystroke charts the growth and decline of families, showing how a single family grows into many. Roots/M calculates the relationship between members on the tree and keeps track of all anniversaries of births, marriages and deaths, as well as the places of their occurrence. Roots/M will print both filled-in and blank pedigree charts and family group sheets (provided you have a printer). These can be sent to other genealogists or members of your family who can assist you in your search."

Roots/M is designed to maintain a database called a basefile. You are prompted to enter data such as the person's name, date of birth, place of birth, sex, date of death, marital status, and date and place of marriage in the basefile.

There are then seven different routines which you can apply to the information in your basefile. You may edit; view all or a portion of the basefile and select individuals from the file to use in other routines; display the composition of a single family; construct a pedigree chart for any individual in the basefile; calculate the relationship and common ancestors of any two individuals in the basefile; display all the births, marriages and deaths that occurred on a specified day; and print 72- or 32-column width pedigree charts and family group sheets.

The program is not designed to store anecdotal information, which you are advised to keep separately: you might consider a word processing package. You are also advised to maintain your paper-based records because they will contain such information as what the source of each snippet was. Every item of data is important in genealogy, since you may have to check your sources, go back to them for more, tell them they've given you a bum steer or whatever. Any titbit can become a vital clue to, say, how many *Kinder* were produced by the marriage of Tante Ludmilla to her second cousin Ludwig.

Other genealogy programs, we've been told, do allow for reference information to be included in the basefile. However, this can then affect their capacity to manipulate vast numbers of generations.

Research Tips

No matter how efficient a program may be at plotting your family history or tree, it generally can't do much towards helping you get the information in the first place. The Roots/M manual does give some very helpful research tips, but most of it applies only to American residents or those whose families originally came from the United States.

The expertise offered by such local organisations as the Society of Australian Genealogists can only be described as indispensable to any budding genealogist.

Another project which will assist many Australian genealogical researchers is the Australian Biographical and Genealogical Record. A bicentennial venture, the final product will be a biographical dictionary of an estimated 150,000 people who either arrived in New South Wales before the end of 1841, or were born there during that period.

"Without computers, it would be impossible," says Malcolm Sainty, secretary of the project's executive committee. The project's two major sponsors are Computer Sciences of Australia and the University of Wollongong's computer section. Both are offering 'sorting' time on their Univac mainframes, and IBM is making an IBM-PC available for keying in data in the State Archives.

Says Sainty, "We're doing this from two major directions. One is by copying original source documents from the State Archives, and the other is by inviting the general public, mainly through historical and genealogical societies, to submit entries. Individuals can contribute by filling out a registration form and paying a small fee to cover postage. They list their ancestors on this registration form and we send them a biographical detail form for each person they've registered. These forms are filled in and returned to us. This information is then keyed into the University of Wollongong computer, where it awaits matching with the material from the State Archives.

"The IBM-PC," he continues, "is installed in the State Archives, where volunteers are inputting records like shipping lists, convict lists, early musters, and so on. Eventually the CSA computer will match all of these up, with one another and with the registration information, searching for common names and details which will finally form pocket biographies of each person.

"In the meantime we'll also be using the CSA computer to edit material as it comes in, because it will be input into the computer in its original form with all sorts of spelling mistakes in names, place names, ship names and so forth. The computer will produce various listings of the information which allow us to pick errors.

"For example, on the Wollongong computer we've put in about 400 of the registration forms, which amounts to about 5000 pioneers or whatever you want to call them. That's been transferred to the CSA computer which has done, among other listings, a match on year of birth and year of death. Out of the match we've got a list of about 25 people who supposedly lived to be 100 years or more of age. One worked out to be 7277 years old, so that's obviously a mistake, and someone's minus 25 years old! So we're able to check and edit things very quickly by getting the computer to sort for various things and look for peculiarities."

Ten-Volume Dictionary

The Genealogical Society is also a sponsor of the project and a beneficiary. All material, both used and unused, will eventually be inherited by it. The dictionary itself could finally be as large as ten volumes and will probably retail for around $25 a volume. Libraries and schools are expected to form a large proportion of its market.

Thus, while some people are using computers in genealogy to reduce their paper-based information, others are using them to create more. We can also assume that though computers will never be able to boast as many generations as their human operators, their increasing involvement in the researching of our family trees could soon make the task as easy as if each of these metaphorical giants of foliage were a mere shrub.

For Further Information ...

- The Society of Australian Genealogists, Richmond Villa, 120 Kent Street, Sydney 2000. Phone (02) 27 3953.
- Australian Biographical and Genealogical Record, PO Box 795, North Sydney 2060. ❑

commodore SX-64

Commodore easily dominates the personal computer market in terms of units sold, having moved 75,000 units in Australia alone last year. Les Bell examines the latest model.

COMMODORE REALLY hit a winning formula with the VIC-20. The combination of low component and assembly costs together with a colour display offered real value for money, and buyers took to it immediately. When the line was extended to add more memory with the C64, that was a great success too.

Now Commodore is out to continue the pattern of success with yet another line extension. When you're on a good thing, stick to it. The SX-64 combines the features that made the C64 popular with an integrated colour display and disk drive, all in one tidy package.

At just 420 by 370 by 130 mm (excluding the carrying handle), the SX-64 is a very compact package indeed. The external styling is smart, and is indeed a good deal better than earlier transportable computers, although with its silver-grey colouring, I'm surprised Commodore management wasn't a bit concerned that it might look too Tandy-esque.

Once the carrying handle has been swung round to act as a tilt stand, the top cover detaches to form the keyboard. It is attached to the main unit via a parallel cable, presumably to simplify the keyboard circuitry, although a serial cable with a couple of phone jack connectors would have been better.

At the rear of the unit is a cast heat-sink, which doubles as the base of the box when it is being carried. Also there are the various connectors for peripherals – although these are not labelled on the panel, and one has to refer to the manual for directions. There are ports for games joysticks and paddles, an audio/video connector, serial port and the 'user port', which allows further expansion. Also at the rear are the power socket, fuse and on/off switch.

On the top of the unit, hidden behind spring-loaded doors, is a cartridge port, which allows the insertion of game and application program ROMs. Naturally, we received a supply of cartridges along with the machine.

Under the front panel, you'll find a single disk drive, with a storage space above, and a 12.5 cm colour monitor. At ▶

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the right of the disk drive there's a door which conceals an array of knobs to control the display monitor.

Looking Inside

Inside, the machine is a further refinement of the 64 family. The processor is a 6502, a device which is getting a bit long in the tooth but has given good service over the years, and more to the point, is widely understood and used. The video signal is generated by the 6566/6567 video controller device, while sound is generated by the 6581 SID (Sound Interface Device). The machine has 64 Kbytes of RAM, plus BASIC in ROM, which should be adequate space for most programmers working on this size of machine.

The disk controller seems to be based on the traditional Commodore GP-IB interface (I hesitate to call it IEEE-488), as it is not exactly blindingly fast. I had hoped the SX-64 designers would take advantage of the integrated disk drive by designing a proper disk controller, rather than tolerating the slow transfer rates of the GP-IB interface.

The screen display is quite clear and steady, and a darned sight more usable than the 64's output on the average maladjusted colour TV. The default display is blue letters on a white background, which is about as readable as you're going to get, though anyone who's used to a proper 80 by 24 terminal will not be impressed.

Behind The Times?

The whole package is well put together and worked well for us. There were no hidden gotchas. The major drawback with the machine, we feel, is that its software – in particular Commodore BASIC – has not kept up with software technology. While other machines now have extended graphics and sound statements built in as standard, generally along the lines of the IBM-PC BASICA, the SX-64 still uses a version of BASIC that dates from circa 1978.

Commodore supplied an impressive array of software with the unit – so much, in fact, that we simply didn't have time to go through all of it! The SX-64 software base splits broadly into two categories: games and business. In our case, there's no doubt that the games software was easily more impressive.

'Le Mans' is a standard racing car simulation, played with the paddle controllers. The trick is to avoid the cars you are passing as they move from side to side across the road. An old favourite, but one that loses its appeal compared with more recent games.

A much better bet was 'Radar Rat Race', a solo game in which the player tries to steer a rat through a maze. I find it terribly amusing that computers have now got human beings running mazes, even if they have to avoid rats and sedentary cats while eating cheese. Nonetheless, this is a lively game and was our second favourite program on the SX-64.

Easily the best, however, was 'International Soccer'. In this version of the Bally arcade game, two players control seven-a-side football teams. At the opening of the game, the two teams run onto the pitch and then the whistle blows. The nearest man to the ball becomes a lighter shade of the team colour and is under direct joystick control, while the others follow. At half time, the teams change ends, and at the end, the winning captain is presented with a trophy.

This game is tremendous fun, possibly because it is a two-player game (although a solitaire mode is provided). Roger Keating says – and I agree – that most computer games are fundamentally unsatisfying because they lack the element of human interaction. This one certainly does not.

The movement of the players is extremely realistic, which all adds to the excitement of the game. In short, International Soccer disrupted the office far more than it ought.

Business Software

We also received a spread of business software with the SX-64, although we did not really have time to do it justice. However, we did give each program a brief once-over.

'Magic Desk' must be, I suppose, Commodore's answer to the Lisa. The initial screen displays a desk, filing cabinet and other office accoutrements, together with a moving finger/hand of the kind that usually points to public lavatories. By using the joystick to move the finger to a filing cabinet drawer and then pressing the fire button, one can examine a simple filing system. By pointing to the typewriter, one can enter a word processor that emulates a typewriter right down to – you won't believe this – the sound of the platen whirring across after you hit return!

Pointing to the wastebasket will trash the current document (again, with sound effects) and pointing to the calculator – does nothing. Neither does pointing to a pile of dollar bills. Pointing to the door doesn't exit from the program either. Presumably further extensions are on the way. The business executive who falls for this program is likely to be, at most, chief executive of the kindergarten playgroup. Not a serious program, surely?

'Superbase 64' is a screen-driven database manager with some interesting features. It seems to be a true relational database system, but we did not have time to try to implement any serious applications with it; we did decide it was worth investigation, however.

'Calc Result Advanced' is a VisiCalc-like spreadsheet calculator which has no outstanding features other than its integrated colour graphics, plus the fact that, being written by pragmatic Swedes, it is field installable for a number of different languages. If you want prompts in French – you got it!

EasyScript and EasySpell are a couple of standard Commodore word processing products. EasyScript is a fairly straightforward word processor; not over-endowed with features, but not hopelessly complex, either. I've spoken to users who swear by it. What happened to the version of WordStar we were told (over a year ago) was in development for the 64?

Good Documentation

The documentation supplied with the SX-64 was very good indeed for reference purposes. It included such details as system ROM addresses, pinouts of I/O connectors and other stuff which is of tremendous use to the hacker and certainly needs to be made widely available, but is probably just intimidating to ▶

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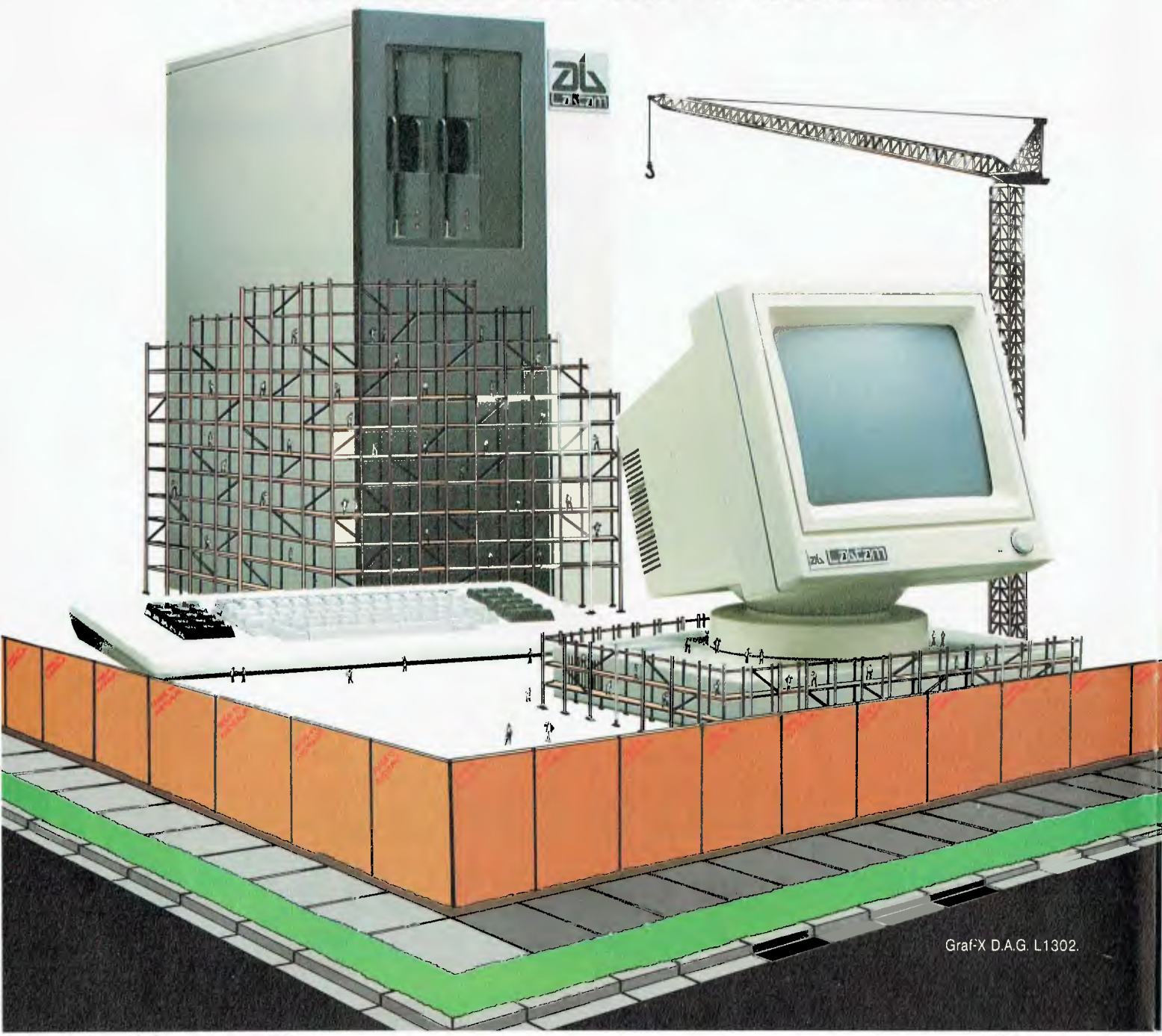

Graf-X D.A.G. L1302.

the beginner. However, it is well put together, and for the beginner who wants to spend some time working at it, constitutes a very good introduction to the machine.

All in all, then, we were very interested in the concept of the SX-64. Is it an attempt to legitimise the 64 for the business market, or just an attempt to catch onto the portable market? We are not quite sure. Certainly, the $1499 price tag is beyond most hobbyists, although we can expect some discounting before long (if it hasn't started already).

Thus we are caught in a cleft stick. We have to say that the SX-64 represents a fairly outdated style of machine, but one that consistently out-sells everything else on the market. Commodore can quite reasonably disregard what we say; after all, they're selling all they can get – but we're not certain the SX-64 will be as big a success as the 64 was. ❑

SPECIFICATIONS AND REPORT CARD

Unit:	Commodore SX-64 portable computer
Made by:	Commodore Business Machines
Processor:	6502
RAM:	64 Kbytes
ROM:	20 Kbytes
I/O:	Two joysticks, two paddles, serial port, parallel port, GP-IB
Languages:	BASIC
Keyboard:	QWERTY, slightly spongy feel
Display:	40 by 25
Graphics:	320 by 200, 16 colours
Peripherals:	Printers, disk drives
Expansion:	Through GP-IB
Best points:	Portable with wide range of software
Worst points:	No graphics commands means lots of POKEing

Ratings:	Excellent	Very good	Good	Poor
Documentation:			•	
Ease of use:		•		
Functionality:		•		
Support:		•		
Value for money:			•	

Extras included:	International Soccer: $30 Magic Desk: $60 Superbase 64: $180 Easy Script: $100 Easy Spell: $80 Calc Result Advanced: $200 Radar Rat Race: $30 Le Mans: $30
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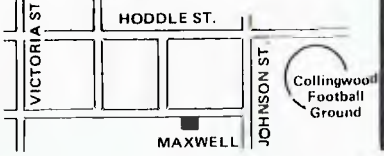

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  128K RAM + 8K ROM (MD II)
- 5¼" floppy disc drives (400K MD2, 800K MD3)
- 5¼" hard drive 11.0 MEG formated (MD II)
- 2x RS232 Serial and 1x Centronics (MD2, MD3) plus high speed port (MD II)
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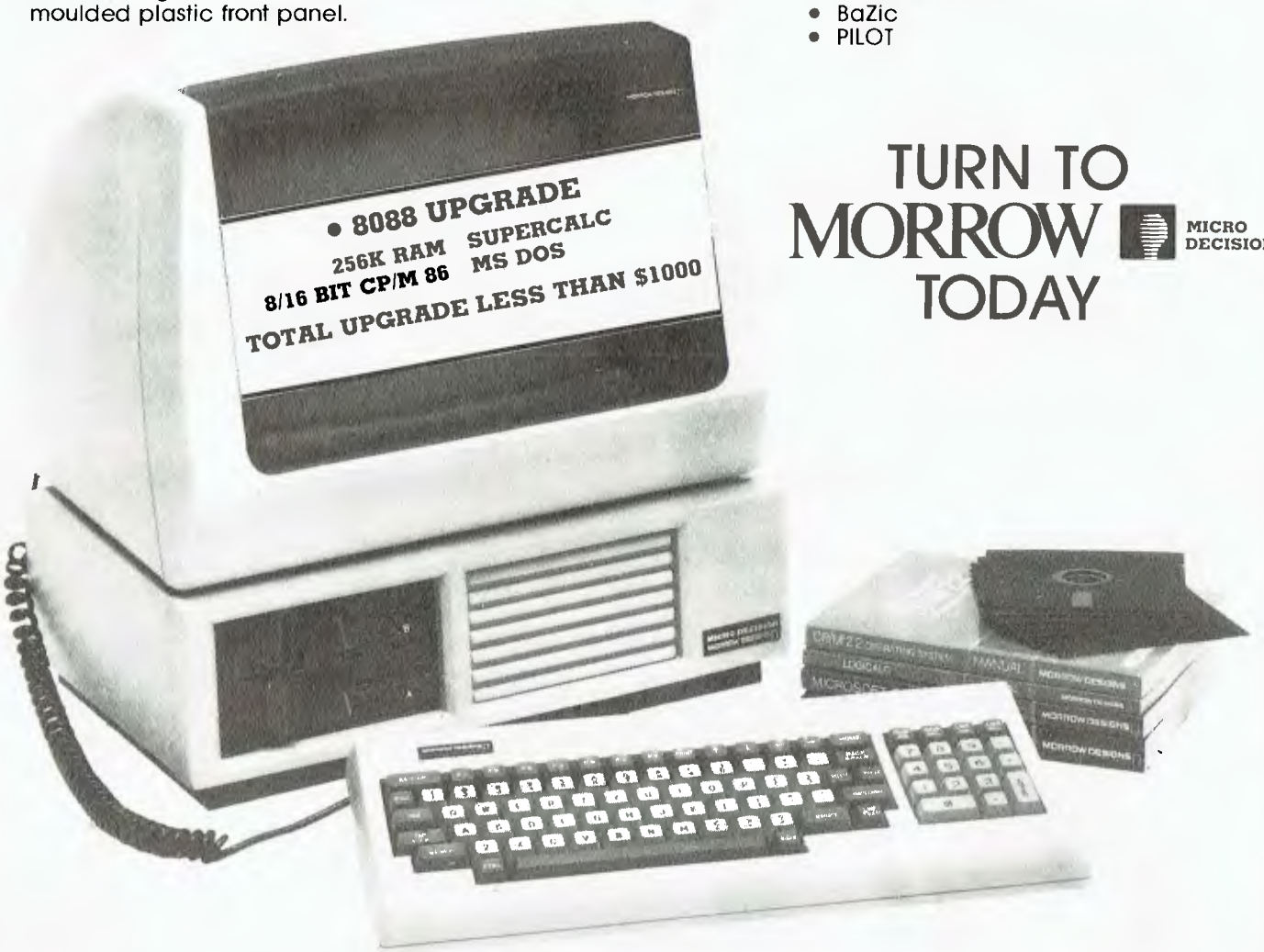
SOFTWARE SPECIFICATIONS

- CP/M 2.2 operating system.
- WORDSTAR — word processing
- NEW WORD — MD II
- CORRECT IT — Spelling checker
- LOGICALC — Electric spread sheet
- PERSONAL PEARL — Data base system
- QUEST — Bookeeper (not with MD 2)
- MICROSOFT BASIC
- BaZic
- PILOT



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Normal retail price: CP/M-80 — $500
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All prices include tax and air freight, and are for supply on 20 cm floppy disks; for 13 cm disks add $20 (this surcharge is necessary because the compiler occupies up to nine 13 cm disks!).

Janus/Ada is a subset of the Ada programming language developed by the US Department of Defense, and combines the best features of languages such as Pascal, Algol and PL/1. Being a direct descendent of Pascal, Ada is a very structured language, which enables programmers to achieve the modular construction that simplifies program development. Ada also facilitates program maintenance by emphasising program readability and incorporating full error messages in English.

The Janus/Ada compiler is a multi-pass compiler which produces relocatable files from source. Depending on CPU type, CPU speed, disk type and disk capacity, compilation speeds of up to 1000 lines per minute can be obtained.

The Janus/Ada linker is a full linker which allows the use of all Ada features across separately compiled modules. It is disk-based, allowing programs to be linked which use more than available memory, and the linker automatically finds and loads all modules necessary for a given linking.

The following Janus/Ada assemblers are available: Intel 8080/TDL8080; Zilog Z80; Intel 8086. The assembler is intended as a support tool for the compiler, allowing assembly language programs to be linked into Janus/Ada programs. Source lines are free format, allowing as many statements as desired to be placed on a single source line; identifiers can be of unlimited length, and all characters are significant.

The Janus/Ada disassembler is provided to allow the hand-optimisation of code produced by the compiler. It can be used to disassemble any output of the compiler, and will intersperse the program listing throughout the disassembler code, making it easy to determine which line is causing which code to be generated.

The Janus/Ada syntax checker provides a fast way to check the syntax of a program. It also finds undeclared identifiers and identifiers which are declared but never used.

The Janus/Ada compiler is available on disk formats for the following systems:

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Seattle Computer MS-DOS
IBM PC-DOS
8086/8088 CP/M-86 systems with 20 cm disk drives
Apple Softcard CP/M
North Star Horizon Double Density CP/M
Osborne Double Density CP/M
Victor 9000 MS-DOS (needs 256K RAM)
IBM-PC CP/M-86
Victor 9000 CP/M-86 (needs 256K RAM)
8086/8088 MS-DOS systems with 20 cm disk drives

Formats can be made available for most computers, so contact Ada Australia for more information.

Janus/Ada for CP/M (8080/Z80 versions) requires 56K of memory (standard 56K CPU system — 51K TPA). CP/M 1.4 or later, and two disks with a minimum capacity of 160K per drive, or one disk with 1M.

Janus/Ada for CP/M-86 requires 128K of memory (96K user memory). CP/M-86 or MP/M-86, and two disks with a minimum capacity of 160K per drive, or one disk with 1M.

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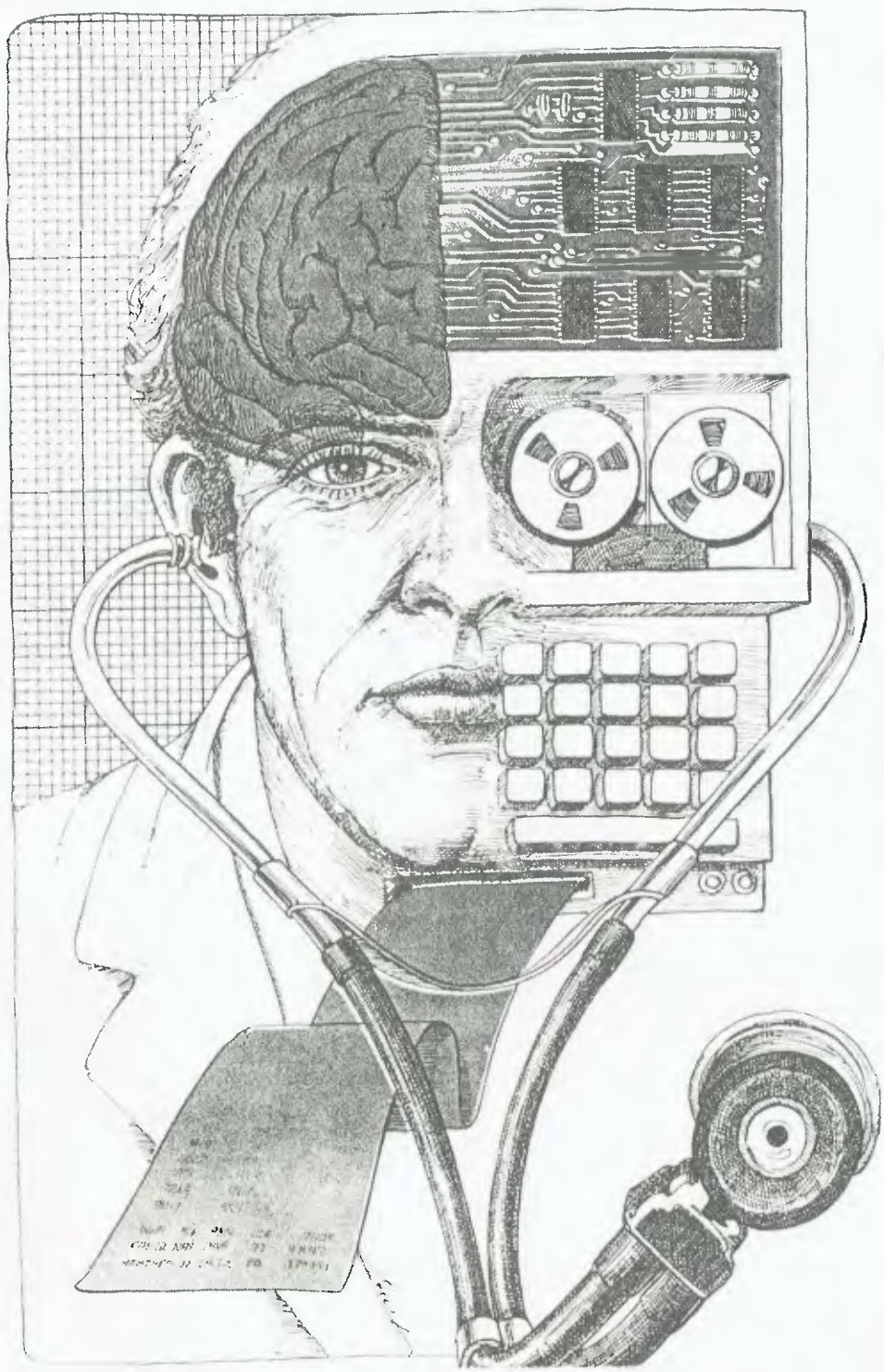
High-Tech Healing

It's 1984 and the practice of medicine is in a state of upheaval. Doctors are under siege on both the political front – with the introduction of Medicare – and the technological front. According to Dr Eugene Sherry, it's the technological offerings that prove the greatest challenge to the average doctor.



COMPUTERS have found their way into healing and the future looks good for computerised medicine. The new technology is not penetrating as rapidly as was predicted twenty-five years ago, when unrealistic projections were made as to the role computers would play in the practice of medicine in the eighties. In Australia less than five per cent of medical practices are computerised, for a variety of reasons: the relatively high cost (at present at least $10,000), combined with the recent economic downturn and uncertainties of the future under Medicare; and the failure of the Australian computer industry to follow through into the medical field. Doctors have been left high and dry, without the technical assistance required from the computer business community. In comparison, 25-40 per cent of private practises in the United States are computerised. It is estimated that the market in Sydney alone is worth $40 million, but there are no takers.

I want to describe what is happening in two important areas of computerised medicine, which I believe will have the greatest impact on the way doctors practise medicine in this country. The two areas are AIM (artificial intelligence in medicine), and medical databases.

Computerising Knowledge

Medical scientists at Stanford Medical School in California have formed a network called SUMEX-AIM, (Stanford University Medical Experimental Computer for Artificial Intelligence in Medicine). This is a nationally shared computing resource devoted entirely to designing artificial intelligence applications for the biomedical sciences. The objective is to design computer programs that capture the knowledge and reasoning processes of highly intelligent medical specialists. The practical goal of such research is to make specialist medical advice more generally accessible. To do so, researchers are attempting to understand how these experts go about acquiring and using their knowledge. Principles of how knowledge accrues and how it is retrieved in logical sequence are extracted, and are then programmed into the computer.

Within the SUMEX-AIM system, therefore, the reasoning processes of medical specialists are being analysed. At present, the ability of most programs is limited and much less flexible than the corresponding human intellect. The

premise of SUMEX-AIM is that human behaviour is based on a complex set of laws; if these laws are discovered and reduced to computer software, then machine intelligence comparable to man's will become a certainty in specific areas of expertise.

To capture these higher-level functions, AI researchers are developing a new approach. It is called symbolic computation, a set of methods by which abstractions can be expressed and managed in the computer to solve non-mathematical problems. They emphasise manipulations of symbolic rather than numeric information and they use largely informal or heuristic decision-making rules gained from real-world experience.

When used in AIM, heuristics focus attention on those parts of the program that are most critical and those parts of the knowledge base that are most relevant. The result is that these programs pursue a line of reasoning, rather than a sequence of arithmetic steps.

This is a long way from the earlier attempts to develop AIM methods, which were directed towards the invention of new powerful algorithms for general classes of problems. Often these algorithms were motivated by what could be accomplished efficiently on a computer and paid little attention to the way humans solved problems – for example, the way a specialist arrives at a medical diagnosis and decision on patient management. In essence, they tended to assign structure to a domain, using statistical techniques such a Bayes Theorem or formal decision analysis.

Now, the emphasis is on tapping the brain of the medical specialist and programming the computer to imitate the human method of decision-making and analysis, so that AIM will become a natural part of the clinical setting.

AI programs depend largely on these decision-making strategies composed of heuristics, or rules based on judgment and experience, which are expressed symbolically. However, algorithms are still relevant in the computerisation of medicine in areas such as record keeping and data banks, where patients' systems, names and histories are connected to numerical data that gives specific values to the information.

In statistical approaches to diagnosis, the decision criteria have been coded to a certain degree. Bayes theorem of probability is one example. Essentially, Bayesian analysis relates specific patient data to different diseases, using signs exhibited by selected groups of patients. In establishing these critical relationships, it is sometimes possible to compute the most likely cause for symptoms observed in a patient. Today many programs using Bayesian analysis are in operation.

Heuristic search techniques are used in all SUMEX-AIM projects, although each differs according to the purpose of the project. Doctors Jack Myers and Harry E. Pople, mentors of INTERNIST at the University of Pittsburgh, reasoned that the best way to design a computer program for solving difficult problems is to simulate the mental processes used by people. They are primarily interested in building a program that will aid skilled specialists in solving complicated problems concerning internal medicine. Spin-offs from the program might be used by doctors' assistants, or in the outback of Australia, in military outposts or spacecraft.

Myers and Pople analysed the diagnostic routine followed by the expert clinician and established a set of criteria:

1. Observations fed into the computer must evolve the appropriate hypotheses of disease.

2. Hypotheses must generate a list of manifestations that would be present in the patient if the diagnosis is correct.

3. The computer must be able to rank models of diseases according to their probability of being correct and must be able to decide when the weight of evidence is sufficient to permit reasonably confident judgment.

4. The program must be able to group hypotheses into mutually exclusive subsets corresponding to different diagnoses, to handle cases in which more than one diagnosis may be possible.

Since beginning their work in 1970, Myers and Pople have developed an operative system, and so have partially achieved their objectives. INTERNIST accepts descriptions of diseases in any order and asks for more information, such as laboratory data or further points of history. As facts accumulate, nodes of recognition are triggered and a pattern begins to develop. An interlocking web of programmed data is set up.

Currently, more than three-quarters of the knowledge applicable to internal medicine, one of the broadest specialities, has been translated into symbolic data structures and stored in the computer. Full clinical trials of INTERNIST and a second-generation program, dubbed INTERNIST-II, are underway. In two years Myers predicts that these two programs might be diagnosing diseases on a practical rather than an experimental basis. When completed, the system will be able to assist doctors working on a difficult case, as well as paramedics ▶

```
** HOW DO YOU USE THE TYPE OF THE INFECTION?

The following rules use:
    the type of the infection

154, 578, 574, 572, 570, 565, 564, 559, 557, 553, 551, 549, 547, 545, 543,
     541, 539, 537, 535, 533, 531, 529, 523, 520, 519, 517, 515, 513, 511, 507,
     300, 289, 288, 287, 280, 174, 167

Would you like a summary of all the parameters concluded by these rules?

** NO

Which of the rules do you wish to see?

**280


RULE 280
--------

IF:      1) The infection which requires therapy is meningitis, and
         2) The type of the infection is fungal, and
         3) Organisms were not seen on the stain of the culture, and
         4) The patient is not a compromised host, and
         5) The patient has been to an area that is endemic for
            coccidiomycoses, and
         6) The race of the patient is one of: black asian indian, and
         7) The cryptococcal antigen in the csf was not positive

THEN:  There is suggestive evidence (.5) that cryptococcus is not one of the
         organisms (other than those seen on cultures or smears) which might
         be causing the infection.

Author:  YU
Justification:  Dark-skinned races, especially Filipino, Asian, and Black (in
    that order) have an increased susceptibility to coccidiomycoses meningitis.
Literature:  Stevens, D.A. et al.  Miconazole in Coccidiomycosis.  Am J Med,
    60:191-202, Feb 1976.
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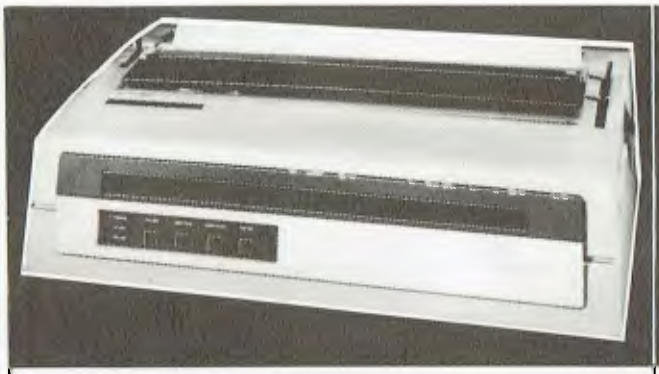

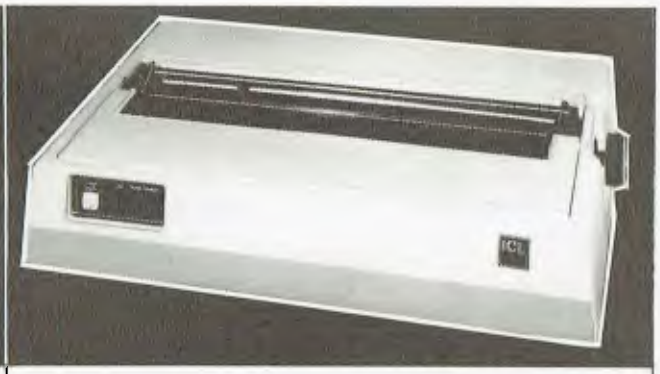

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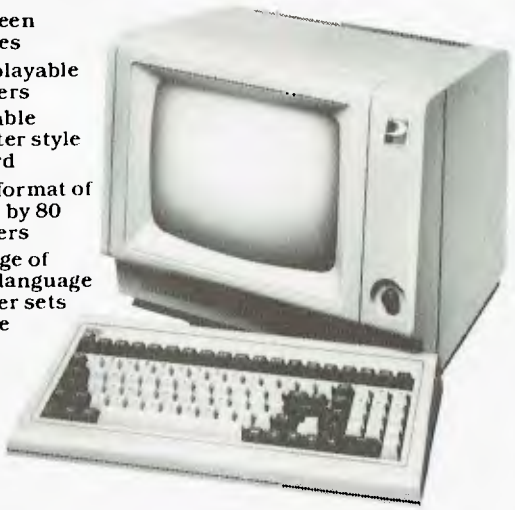

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Spate Of Systems

There is a spate of expert systems available that have performed well on initial clinical trials – for example, MYCIN, which specialises in diagnostic and therapic selections for patients with specific infectious diseases. Its knowledge base consists of some 500 rules in the 'If... then' mode. CASNET was developed at Rutgers University in New Jersey and is designed for opthalmology patients (particularly those suffering from glaucoma). PUFF is for use in interpreting a variety of signs related to pulmonary function.

An off-shoot of these systems is the design of a general EXPERT system, whose reasoning program can be adapted for other areas of medicine using the same principles to construct new consultative programs.

The SUMEX-AIM system is currently built around a time-shared Digital Equipment Corporation dual K1-10 computer and the TENEX operating system. Using a smaller computer, the DEC 2020, adminstrators hope the programs nearing completion can be tested without disrupting ongoing research. This new computer will be tethered to the main SUMEX-AIM computing and network facilities in Stanford and can then be scheduled for clinical testing at times convenient for collaborating doctors or other professionals.

Expert systems are the first major technological innovations in clinical medicine which promise to reduce the overall cost of health care.

Medical Databases

Medical databases have long been established in the US. The first and largest is MEDLARS, which is in Washington DC and is operated by the National Library of Medicine. It is a computerised production of the printed Index Medicus – the most extensive biomedical bibliographical retrieval system, available all over the world, which cites articles from 2600 biomedical periodicals published in 36 languages.

MEDLARS was established in 1964 by General Electric Corporation under contract to NLM. By 1968 MEDLARS II was built as an update, and has a complex multi-processing system that maintains data files, provides on-line retrieval services, and produces computer-photocomposed publications. It contains 20 databases, the largest of which is MEDLINE with 3.5 million records in its database. It allows for direct communication with the computer in an on-line, interactive fashion. Searchers formulate a search of the database with a knowledge of the indexing principles, the use of sub-headings, the MeSH vocab and Boolean logic. The computer searches the databases and produces an individualised bibliography. It uses the IBM 370/168 computer. MEDLARS II is available through all major medical libraries in Australia.

On October 1 1982, GTE and the American Medical Association pushed the start button on AMA/NET, a new nationwide medical information computer network designed to give doctors and other health care professionals instant access to current clinical and health-related socio-economic information at affordable rates.

The system consists of four databases, licensed and maintained by the AMA, and an electronic mail network called MED/mail. These databases provide current and concise information on the clinical use of drugs, descriptions of disorders and conditions (including more than 3500 identifiable diseases), a uniform coding and nomenclature system for 6000 medical services and procedures, and a bibliographic base for socio-economic citations on the non-clinical aspects of health care. It allows doctors in various cities to communicate with one another through their personal computer terminals. Plans are set for its introduction to Australia in 1985 via satellite, possibly through Aussat.

Impact On Medical Practice

SUMEX-AIM and personal medical databases are as foreign to the average Australian doctor in private practice as is ASIS to the staff of a Sheraton Hotel, but they promise to have as significant an impact on the way doctors practice medicine as the discovery of penicillin did forty years ago. ❑

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DRAW YOUR SORD

The Sord M68, with a closer view of its stylish and ergonomically designed keyboard.

Now that we are leaving the 8-bit world behind, how well do 16-bit processors stand up? ***Les Bell*** *investigates a new machine from a Japanese manufacturer, the Sord M68.*

THE SORD range of small business computers has been on the Australian market for a few years now, and it has stacked up a good reputation for hardware design and new features.

The latest in the line is the M68, which represents a leap forward in its use of an MC68000 microprocessor. I first saw the M68 at the ACS Terrigal conference, and was impressed by its potential. The burning question was: is that potential being realised, and what is the likely support for its fairly new CPU chip?

Although the 68000 has been around for quite a long time (since 1979, in fact) it is only now appearing in reasonable-cost computers like the M68. Most of the first generation of 68000 machines have been multi-user Unix-based machines like the Wicat, Plexus and others.

While the 8086/8088 family have had the advantage of easy conversion from the 8080 CP/M environment, the 68000 and other 16-bit processors have been sufficiently different to require complete software rewrites, so that there has been a dearth of suitable software, with the exception of systems which are easy to port such as UNIX and similar programs written in C.

To add to the confusion, a great number of what I refer to as 'chip jockeys' have been perpetually delaying commitment to one processor or another. They'd seen the 8086 in 1977, but then the Z-8000 was coming. By the time the Z-8000 was available, the 68000 looked like a better prospect. By the time that chip was out, the NS16032 looked so much better – and now it is available, they're waiting to get their hands on an Intel 80286.

So while the 68000 has been out for a long time, it's only now that a few development chickens are coming home to ▶

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roost as companies realise they've got to come out with something that's more powerful than an IBM PC – regardless of what processor is in it. In any case, the differences in theoretical performance between these later-generation 16-bit chips are generally insignificant compared to the implementation quality of the operating system, compilers and applications software.

So here we have the Sord M68, with a much more powerful processor than the average user has seen before – though not as powerful as the glamour chips the hackers tell of. Is the potential realised, or does the software let it down?

I should say at this point that Sord has traditionally been let down by its software. The machines have generally been well-designed and engineered, with additional features that are useful. It's just that like many Japanese companies, unable to use CP/M or other standard operating systems, they have generally produced their own non-standard operating systems and languages, or turned to Microsoft for a stand-alone version of BASIC with built-in disk drivers (you couldn't really call it an operating system). These have simply been unacceptable in the West.

Does It Work?

Enough of the background principles. Does the M68 work? The answer to that question, obviously enough, is yes.

The M68 is actually a dual processor machine; it has both a 10 MHz 68000 and a 4 MHz Z-80A as standard. Therefore, what you can't run immediately on the 68000 can usually be obtained for the Z-80. The trouble is that CP/M-80 is not supplied with the machine, and will have to be obtained separately.

The main CPU is a 68000 with 256 Kbytes of RAM (expandable to 1 Mbyte), while the Z-80A has access to 128 Kbytes.

The physical appearance of the M68 is not bad at all; it is a slimline dark grey enclosure with silver trim. It is only a few inches high, mainly thanks to the use of slimline 13 cm floppy disk drives. The rear of the unit is extensively studded with connectors, as befits a machine of this type. There are two RS-232C connectors, a parallel printer connector, GP-IB connector, external floppy and hard disk connectors, keyboard connector, light pen connector, green and colour monitor connectors, keyboard connector and AC power in and out connectors. The rear panel also carries the power switch, reset and interrupt switches and the speaker volume control.

Overall, the construction has a good, solid feel to it. On top of the enclosure sits a video monitor; either black and white or colour according to taste – in our case, B&W. A low-profile keyboard sits in front of the electronics box and has all the usual areas: QWERTY, numeric, cursor control, plus some definable keys.

Our first action, on getting the system set up, was to load up CP/M-68K and try it out. It worked, not surprisingly. While CP/M-68K looks, to the user, very like the other varieties of CP/M, internally it is quite different. For a start, it is written entirely in C, except for a portion of the BIOS, which is in assembler.

Most of the commands remain the same; the built-in commands are DIR, DIRS (displays system files, like CP/M-86), ERA, REN, TYPE, USER and SUBMIT, although SUBMIT now works automatically if the CCP can find a SUB file and no .68K (= .COM) file.

Sord has written a few special utilities to manage the I/O of the system. STSCON controls the I/O device parameters such as baud rates, I/O byte value, console colour and other parameters. FUNC allows function keys to be allocated, STDRCS defines the user-definable character set, and SYSGEN performs its usual CP/M function.

CP/M-68K is supplied with both an assembler and C compiler as standard. The BIOS is written for the most part in C (although Sord does not supply source code) so the C compiler is necessary to permit modification. The C compiler does not support floating point or a few other features of the Unix portable C compiler, but it is certainly adequate for writing system utilities and other programs.

We benchmarked the M68 against the Apple Lisa, the only other 68000 machine in the office, and the results were interesting. The Sieve of Eratosthenes benchmark ran in 6.13 seconds on the M68, against 7.42 seconds on the Lisa. Since the Lisa is running at 5 MHz, against the 10 MHz M68, we can only conclude that the Apple Pascal compiler generates rather more efficient code than the DRI C compiler.

Running on the Z-80, the results were also interesting: 8640.57 seconds running under the Sord BASIC, BASIC II. This BASIC is syntactically similar to DRI's CBASIC, but is in fact a self-standing interpreter with editor and operating system. Due to the non-standard (that is, non-MS-BASIC) syntax of this BASIC, we had to re-write the algorithm slightly, to get around the lack of a WHILE statement, for example.

However, for the most part we found the Sord BASIC to be sufficiently non-standard for beginners transcribing MS-BASIC programs to have difficulty with it. However, experienced software developers will find many of its extended features useful; in particular, its support for ISAM files is unusual.

Spreadsheet Supplied

The M68 is also supplied with the PIPS III spreadsheet calculator. This is an integrated spreadsheet, database and graphics system which is programmable. Although it is similar in capabilities to Lotus 1-2-3, it has a completely different flavour.

Like BASIC II, PIPS III has its own operating system; this means that all the software supplied for the machine is self-standing, possibly the greatest barrier to software integration one can conceive.

The major barrier to the sole support of the CP/M-68K operating system is the dearth of software. However, with the release of the CBASIC Compiler for CP/M-68K, a lot of software can now be ported onto the system by its original authors. This would include accounting packages (several in Australia are written in CBASIC Compiler), word processors and other software.

The other major source of software for the M68 is Unix. At present, work is under way at Melbourne University to port Unix onto the M68, though it should prove possible also to run a version of

UniPlus+ Unix on the system. With the addition of Unix, a whole new horizon will open up for the M68. This includes the availability of BASIC interpreters, database systems, word processors (including EMACS) and other quality software.

Yet another option for this machine is the UCSD p-system, which is already installed on a number of other 68000-based machines such as the Sage.

In summary, then, we found the M68 hardware to be excellent; it represents very good value for money, is well constructed and capable of very high performance. It's the software that lets it down, and that situation can be expected to change. Sord has never been too aware of the importance of standard software; this has limited their success in overseas markets, but by now they must be getting the message. ❑

SPECIFICATIONS AND REPORT CARD

Unit:	Sord M68
Made by:	Sord Computer Corporation
Distributor:	Mitsui Computer Systems (A'asia)
Processor:	MC68000
Clock speed:	10 MHz
RAM:	512 Kbytes
ROM:	Bootstrap
I/O:	Two serial, one Centronics, GP-IB
Languages:	BASIC, C
Keyboard:	QWERTY, good feel, function keys and numeric pad
Display:	Very good character set, long persistence green screen
Graphics:	640 by 400, optional colour
Peripherals:	Light pen, hard disk
Expansion:	Memory, hard disk
Best points:	Fast MC68000
Worst points:	Lack of software

Ratings:	Excellent	Very good	Good	Poor
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Ease of use:		•		
Functionality:		•		
Support:			•	
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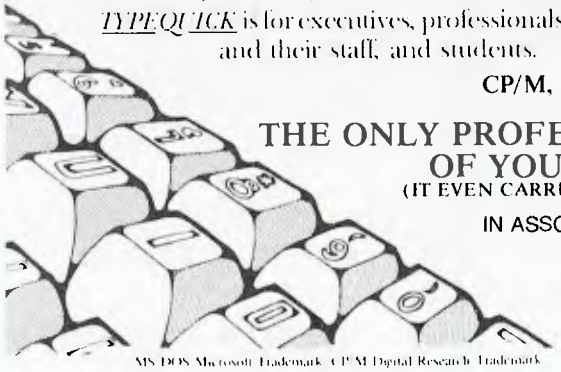

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Learning CP/M From Cassettes

By Evan McHugh

CP/M. You've read the manual. You've seen the prompt. Now, hear the tape. That's right – a set of training cassettes is now available, so you can learn everything about CP/M that your dealer was afraid to tell you.

HOW TO Operate Your Computer Under CP/M, published by Fliptrack Learning Systems, is an instructional aid that has something for everyone in terms of understanding and using CP/M. It consists of three cassettes and a booklet contained in a book-sized sleeve. The tapes tell everything you need to learn about CP/M and the book acts as a supplement to the tapes, so you don't have to go searching through the tapes to find out how to do some operation.

The tapes start with such things as how to cold boot your system and make sure that your operating system has loaded. It is here that you see the only major problem with the cassettes. Because it was necessary to take into account many different kinds of hardware configurations, boot operations and such, you find allowance being made for a whole range of possibilities. The effect may be confusing for some, frustrating for others and downright boring for the rest.

Once you get over the initial differences and into the hands of the operating system itself you find a good deal more fluidity of instruction, though you are never completely free of side-tracks to areas that are irrelevant to you.

The Basics And Utilities

The course is very thorough. It covers most if not all aspects of CP/M and its more common utilities. The first tape deals with the very basics: things like error correction, possible error messages, how to look at file directories, formatting diskettes and copying entire diskettes are explained.

The second tape covers the management of disk storage. It shows you how to obtain statistical information and interpret it, how to use PIP to copy single files, how to create command strings for PIP, how to name and erase files and how to use ambiguous file names to perform operations on several similar files or files for which you are not sure of the name.

The third tape goes into the more advanced CP/M features. Running programs using the CP/M Editor and batch processing are all explained.

Useful Features

You'll find two of the features of this teaching aid very useful. One is the Fliptrack option. This allows you to flip the tape over at a given signal and learn more about an aspect of CP/M that might be irrelevant to other users of the tape. You then use the tape counter (assuming your cassette deck has one) to find your place again on the other side of the tape. It may sound a bit fiddly, but it isn't.

The second feature is the use of another signal which allows you to stop the tape while you figure something out or wait for your machine to complete an operation. The benefit of such an operation is that you can take breaks and avoid becoming flustered by a ceaseless juggernaut telling you to now type ERA for the first three files when the fershlugginer directory hasn't come up yet. It goes without saying that if it starts to go berserk you can always stop the tape and get yourself sorted out.

The advantage of these tapes is that they are a well structured, personal learning system that is patient and well paced. This does not mean you can't get into trouble, but on the whole it will get you off to a good start when trying to learn how to use CP/M.

Your Computer's review copy was provided by Imagineering. ❑

Typequick — The Humble Keyboard Revisited

By Evan McHugh

In the age of the mouse, touch screen and voice synthesis we are seeing an increasing range of methods by which human beings can interact with that wonderful lump of metal, the computer. Nevertheless, most of the data put into to a computer is input through the humble keyboard, and this situation will continue for some time to come. So what help is available for all those 'hunt and peck' would-be typists out there?

MOST PEOPLE will probably continue to plod along using one, two or sometimes three fingers and wish they could type. "It's easy," said their friends as their fingers blurred over the keyboard. "Rubbish," you replied as you searched and searched for the letter *n*.

Typequick, a package from AID systems in Gordon, on Sydney's North Shore, can change all that. It can turn you from a three-fingered sloth into a touch typist within a couple of weeks.

The package works on the principle that it's easy to touch type once you know how. It gives details on touch typing and then builds on the skills with well-planned drills. The ten lessons start from teaching you the use of the home keys and proceed to the use of all keys, including the numeric and the shift keys.

How Good Do You Want To Be?

At the beginning of the course the program asks you what skill level you would like to achieve. You can opt for business or professional level at up to 20 words per minute, programmer or clerk at up to 40 words per minute, or secretary at above 40 words per minute. By making such a selection you can set the level of concentration on speeds you want to achieve. If you are completely new to touch typing you should perhaps select a speed that is slow and build up to the higher speeds.

The system keeps letter drilling to a minimum, preferring to keep you occupied with typing real words rather than groups of meaningless letters. This is a good approach, since for some unknown reason it is easier to type real words – or at least that's what I found.

One aspect the package does very well is to keep you driving towards a desired goal. This is supported with a report at the end of every exercise. The report gives the accuracy rate as a percentage and the speed achieved, plus details on which letters were typed slowly, which ones incorrectly and how often. Based on this report, the package will take you through further drills on the letters on which you are weakest.

As you progress through the lessons they begin to concentrate more and more on speed and accuracy. Once you have completed the ten lessons the package modifies lessons 9 and 10 so that you can use them to improve and practise your speed and accuracy whenever you like.

The system works by displaying text a line at a time. You then type exactly what appears directly underneath. If you make a mistake the bell sounds and the cursor stays in the position of the character you have typed wrongly until you correct it. The clock also stops until you correct the error.

Australian Product

The Typequick package was written in Australia to fill a need that no other package in the world fills anywhere near as well. There are other packages that teach typing quite well, but they are generally limited to a particular machine. Typequick can be used on a wide variety of computers.

The list of organisations that use Typequick is also impressive, including a number of universities and tertiary institutions, hospitals, oil companies and Government departments and authorities.

The package is now beginning a market penetration in the US, with a number of distributors handling the dealers. The producers, AID Systems, are running full display ads in *Byte* and *Personal Computing* and will soon start in the *Wall Street Journal*.

You are able to purchase Typequick under one of two Licence Arrangements:

1)You can buy Typequick and teach one student on one computer at a time. When the first student has completed the course you may restart the course for the next one. The cost of this agreement is $77 per computer.

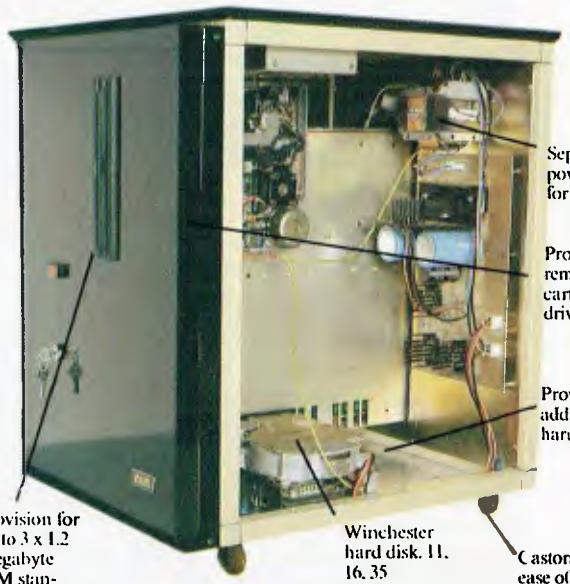
2)You can get a multi-user licence fee. The minimum Multi Licence fee is $500. For this you get eight master disks, from each of which you can make ten copies. Each master disk and copies can be used on one computer only. If you require further disks for more computers you can obtain them at $60 each. Additional copies for a particular computer will cost $5.

Your Computer Staff

Several *Your Computer* staff had a trial of Typequick. They all found it very effective and enjoyed its well-paced style. Some who had never been able to type found that, after half an hour every morning for a few days, they could type much faster and with fewer errors.

Typequick is a well thought-out, useful product that looks set to do well. It was conceived by a microcomputer owner who realised there was no similar viable product on the market and set about creating one. As such it is not just a product that may help you type well, it is also a product for budding software developers to study and seek to emulate. ❑

Universe Supercomputer Starts small, thinks big



We build the Universe Supercomputer for both large and small businesses. Using a totally modular design approach we build the computer right for your needs *this* year. Yet able to grow for *next* year.
While costing little more than many personal computers, the Universe has reliability, speed of operation and expansion potential these machines cannot offer.
Here are just some of the ways Universe is better:

1. Obsolescence proof. Because the Universe is S100 based it can be upgraded quickly and easily as new developments come along or as your needs change.

2. The biggest software base. At present much of the best software is 8 bit. Gradually this is changing to 16 bit. Your Universe can be bought as an 8, 16 or 8 plus 16 bit machine. We tailor the machine to you needs *now*.
Universe can run both 8 and 16 bit (CP/M 80 and CP/M 86) software *at the same time*. So it has access to over 75% of available application software. Most computers only run *one* operating system and give access to less than *one third* of available software.

3. Flexible storage capacity. Most personal computers use limited capacity (and lower reliability) 'mini-floppy' disks. The Universe uses high reliability industry standard 8 inch floppy disks and optional Winchester hard disks. As a result access to data is very much faster. Universe's high speed disk I/O processor further enhances the data processing speed.

4. Single or Multiuser. While many businesses manage with personal computers for a while, they eventally run into trouble when more than one person needs to use the computer at one time. A few PCs offer 'Networking' – several computers share data storage, usually on a common hard disk. This arrangement is *unworkably slow* in most business applications. Universe offers the much faster Multiuser system where several users share the main computer.

5. Unique Multitasking capability. Most computers only let you do one thing at a time. Universe's MPS (multiple program selection) facility lets you swap between up to 10 programs and sets of data almost instantly.

6. Higher processing speed. A slow computer can cost you time and money. So Universe is built for speed. On industry standard sorting tasks it runs 3 times faster than an IBM PC and twice the speed of an NEC APC.

Our customers have the last word. Perhaps the most telling point we can make is that every single Universe we have ever commissioned is still in use by the original puchaser and still doing the job every day.

Note: Special arrangements for consultants and dealer enquiries are welcome.

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Glover & Assoc AED/8

THE 1984 PC SHOW

The crowd was welcome company at the second Australian PC Show, since it signified the success of the event. For those of you who couldn't see over the shoulders, or didn't brave the scene in the first place, Evan McHugh gives his report (or shows how it affected him).

▲ 1. Apple's Macintosh, one of the new stars of the PC Show.

▶ 2. These mice get everywhere . . .

IT'S MAY. Autumn turns the leaves to gold and a journalist's thoughts turn to home, the farm and evenings by the fire, sipping well-aged Scotch and reminiscing on a misspent youth. His fingers drift across the keyboard recalling the ravages of times past: specifically, the Second Australian Personal Computer Show.

From the comfort of his study he recalls the frenetic four days that now seem to have lost their edge. In a way it was fun. There were product launches and press conferences, cocktail parties and breakfasts; all of which created an atmosphere of extraordinary energy throughout the computer industry.

The Second Australian Personal Computer Show, or 'PC84', as the industry with a penchant for jargon and mnemonics called it, was held in the Centrepoint Tower complex in Sydney. Its 76 stands occupied all four levels of the Tower's four-level conference facilities.

Within an hour of its commencement the remaining floorspace was crammed with people milling from stand to stand, dazzled by the latest in digital brilliance. Many bemused journalists scurried about looking at pocket watches and muttering, 'I'm late, I'm late.'

Meeow And Neeow

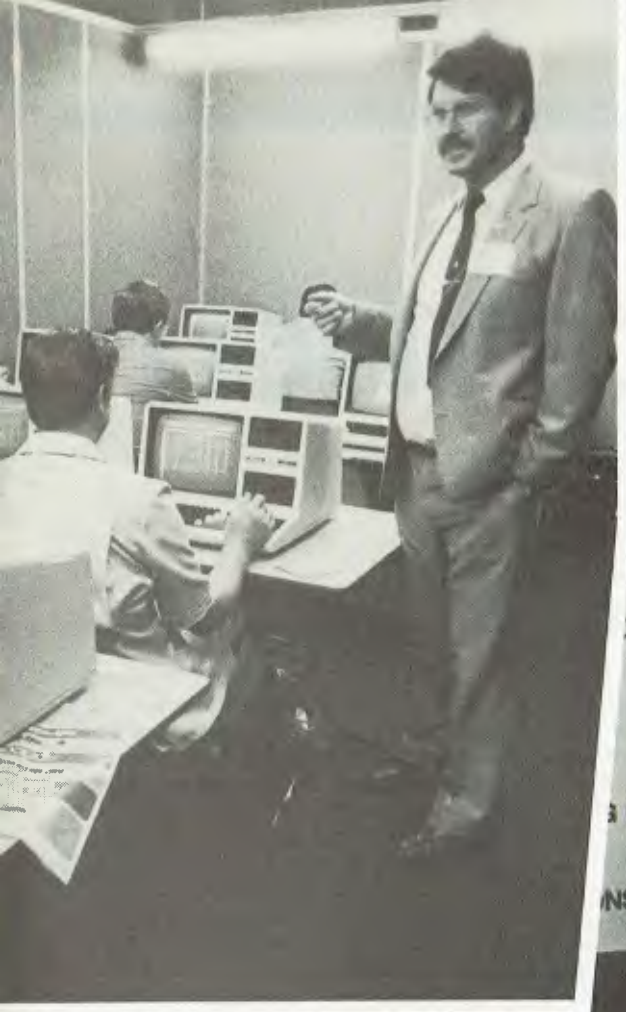
There was a huge amount to see, and some things just couldn't be missed – like the Cat. The Cat computer is the latest from Dick Smith and is aimed at the Apple/Microbee end of the market. The display featured a young lady, appropriately dressed as a cat, who threatened to eat any mice she saw.

The games stands were another surprise. Although it was a business day, I still expected to see a lot of action here. Not so. There were some good games, though, like Ozisoft's Cops and Robbers and African Safari for the Commodore.

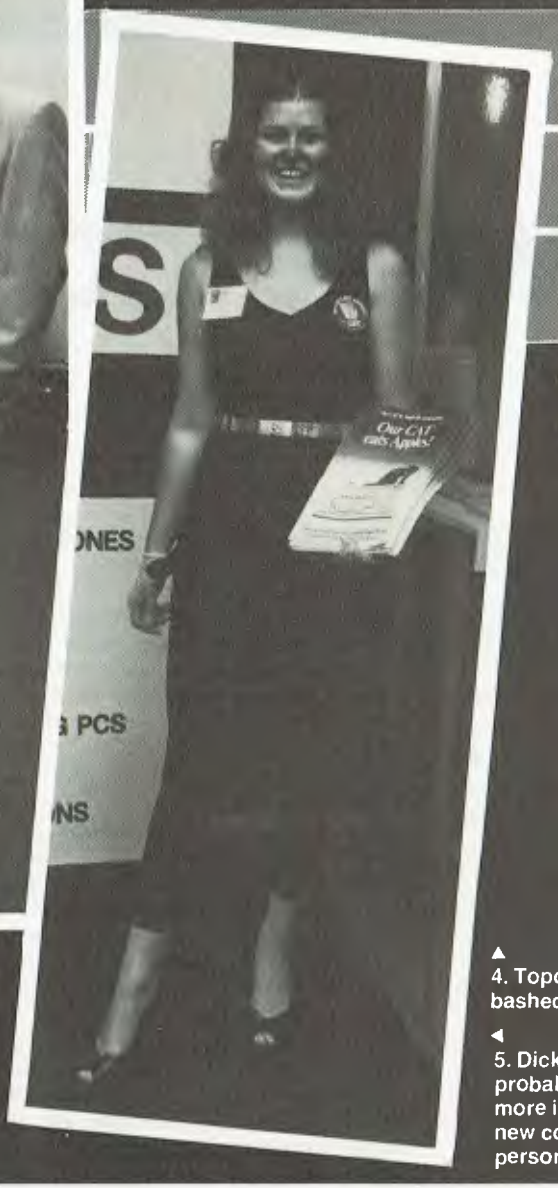
Lost In Space Revisited

There was the usual swag of robots: like Topo at the Futuretronics stand. This little ankle buster amused the crowds by blundering about bashing into people.

Other robots at the show were not as spectacular, but were more controlled and more practical. These included the Texas Instruments robots, which are like the Turtles in Logo. They make good learning tools for young people. They are easily programmable and permit beginners to give them instructions which the computer instantly turns into an observable action. Putting together a set of these commands – such as go forward, turn left and so on – creates a program that actually moves the robot through a



▲
3. Tandy gave free seminars to anyone interested in a bit of hands-on experience.



PC 84

▲
4. Topo, Futuretronics' 'Androbot', bashed a good few ankles at the Show.

◀
5. Dick Smith's live 'Cat' probably created even more interest than the new computer she was personifying!

set of manoeuvres. These robots were contained on a large table with barriers, so they couldn't career through the general public if incorrectly programmed.

You Could Talk To The Animals

Another Texas Instruments product was easily the most striking technical offering at the show. This was the voice synthesis unit, which sounds like a genuine tape-recorded voice until you're told it's synthesised and so start to listen more carefully. The computer talks to you in well-intoned, balanced sentences. That's impressive enough, but then the demonstrator at the stand puts a microphone in your hand and tells you that you can train the system to understand your own voice.

The voice synthesiser is quite expensive at present, but it should become common in the computer future. The TI machine just shows it can be done.

A Contact Sport

The most impressive computer at the show was the Hewlett Packard HP-150; I was, to sink to the vernacular, rapt. It was my first 'hands on' experience with this computer, and it struck me as the most obvious thing to point at the screen to say 'show me that'. Then, there was some impressively smooth scrolling to consider, high-resolution graphics, a delightful ergonomic keyboard ... The HP-150 makes you wish you had an Uncle Conrad.

The full range of computer requirements was covered at PC84. Although the emphasis was on hardware, the show also covered software, peripherals, data communications, word processors, ancillary equipment and supplies, services, publications and games.

Some computer clubs were also represented. These groups, which have grown rapidly in size and number, were given display areas for free.

Organisers estimated that the Second Australian Personal Computer Show would see 30,000 people go through its doors. Many of the vendors had special deals for the show, others had instant courses in computing, others showed films, and some stuck flowers next to their computers and sat on their reputations while the suitably impressed mere mortals filed past. The show was certainly a success.

At the breakfast held to open the show, Senator Button, Leader of the Government in the Senate and Minister for Industry and Commerce, said, "Personal computers are becoming the principle management tool. Shows such as PC84 serve to develop greater computer awareness which, ultimately, will lead to greater efficiency in industry." Judging from the many eye-openers at the show, awareness was the keyword❑

SOFTWARE COPYRIGHT

Not a simple case

Following the court case in which it was decided that computer software was not covered by copyright law, the Government has decided to review the law and take steps to protect Australia's interests. It held a symposium in Canberra in March to obtain the views of interested parties. There was considerable debate, which revealed that what many people might think a cut and dried issue has many different aspects to be considered. ***Your Computer's*** *Evan McHugh* covered the symposium.

"THE APPLE CASE did none of us a favour. It removed a doubt that was protecting us all." These words from David Walsh, a lawyer with Mallesons, a firm of Melbourne solicitors, accurately sum up the problem that faces the Australian computer industry, a problem that many believe is threatening its survival.

Walsh was speaking at the Software Copyright Symposium held in Canberra on March 15 and 16. It was organised by the Attorney General's Department to, in the words of the Attorney-General, Senator Gareth Evans, at the opening address, "... consider both domestic and international long-term policies for Australia and also to cover other computer-related copyright issues, such as the protection to be accorded to works stored in, or created with the aid of, computers."

The general view following the opening address given by the Attorney-General was that the case was an open and shut one. Industry and users had already been consulted and many people had (some thought for the first time in the Australian industry's history) reached a consensus on what should be done.

Presented with a set of options to choose from, most industry people opted for a short-term fix to the copyright law, with a long-term policy and special legislation to follow extensive consultation with interested parties.

As it turned out after more discussion, however, the situation was nowhere near as simple as some people thought.

What's the fuss?

The proverbial hit the fan on 7 December 1983 when Mr Justice Beaumont, in the case of Apple v. Computer Edge, held that certain categories of computer software were not protected as literary works under the Copyright Act (1968). Apple has since appealed the case to the full Federal Court and judgment has been reserved after completion of the hearing on 28 February.

Computer interests had thought, before the Apple case, that there was little sense of urgency in developing the law in the area of software copyright protection, since it was generally held that copyright law covered computers. One English copyright lawyer, Mr Stephen Stewart QC, is reported as saying in the 18th Annual Jean Geiringer Memorial Lecture at the New York University School of Law, "After intensive research and debate it has, I think, been agreed that 'software', that is the computer program, is a 'work' in the copyright sense and should enjoy copyright protection."

The Government has not been complacent, however, and discussions concerning intellectual property issues related to computers have been occurring, on the international level, for some time. The Government is aware that any law that is formulated must be substantially the same as those formulated internationally, in case we find ourselves poorly protected in other countries and losing possible export markets as a consequence.

On 21 December 1983 the Attorney-General, the Minister for Science and Technology and the Minister for Industry and Commerce announced that, "It is the Government's intention to promptly undertake such legislative action as is necessary to ensure that software is adequately protected." They noted the need to resolve many issues affecting long-term policy.

According to the Attorney-General, "We did stress that prompt legislative action would be taken in the short term if necessary, possibly by amendment of the Copyright Act, and stated that interested parties would be consulted. We also stated that there could be, if necessary, some backdating of the legislation."

Different Opinions

The symposium was opened by Robin Bell of the Attorney-General's Department, who urged that attention be given to long-term issues, as well as short-term ones.

The addresses from representatives of industry were described as 'hysterical', 'knee-jerk', and 'panic' by various speakers who followed them. To a man they urged that something be done immediately by Government to protect them from imminent doom. Once these emergency measures had be taken, the Government should commence the formulation of special legislation in consultation with interested parties towards the long-term protection of the industry. The industry representatives were accused of showing little or no imagination and absolutely no regard for the long-term solution. This was countered by the remark that the long term was considered but that was not the matter of urgency in the current debate.

One good suggestion was that there should be a sunset clause on the interim legislation to speed the long-term formulation to a deadline.

It was not until the user addresses were made that it became clear that there were some considerable problems ▶

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Sprite programming	****	****	*****	****	**	****
Keyboard input	****	**	*****	***	****	***
Misc input/output functions	*****	*****	*****	**	*	*****
Sound set up	*****	*****	*****	****	****	*****
Sound programming	***	****	*****	**	***	***
String commands	****	****	*****	***	****	*
Arithmetic commands	****	****	*****	**	***	**
Structured programming	****	*****	*****	****	*****	*****
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that had to be addressed before any legislation could be formulated.

Roland Everingham for the Australian Federation of Consumer Organisations said, "Our policy on the protection of computer software is that copying of computer software for domestic purposes should be legal as long as no money changes hands ... copyright law should not be enforceable against individuals acting non-commercially in the privacy of their own home.

"However, authors of software should be fully protected against unauthorised commercial copying. The full force of the law should be directed against 'commercial pirates' of computer software."

It was at this point that the debate began, further stimulated by the comments of the Software Liberation Organisation.

It was felt that there were distinctions to be made between software for large vendors and small vendors; that the real area of difficulty lay in the mass market. The point was made that large software packages were not really threatened by the present copyright situation because they were covered by contractual and licensing arrangements anyway. In the mass market it was felt more likely that piracy would occur. Consumer and user groups made the point that even if a law is formulated there would be little that could be done to enforce it. "Everybody is doing it," came the cry.

A further difficulty was found in defining the benefits of such legislation anyway. According to Everingham, "Software vendors are fond of 'guestimating' revenue lost through home copying. Such calculation is meaningless, since many people are willing to copy a program for free but very few would pay hundreds of dollars for it. Consumers would not buy, but simply do without, so in the end vendors would not gain from increased protection. On the other hand, the availability of cheap and accessible programs is a real stimulus to the hardware market."

The question that arises is, therefore, at what area should legislation be aimed so as to have maximum beneficial effect?

Legal Considerations

Many lawyers attended the conference, most of them expert in copyright law. Some of the points they made were opposed to the concept of short-term legislation. For example, even with the extension of the copyright law to say that software is a literary work, there remains a quite difficult question of definition that underpins the whole of the long term legislation: what is software and who is said to author it?

Is it programs, source or object code, is it in RAM or ROM or on a floppy disk, is it copied when it goes from floppy disk to RAM or typed in, when is it made, what if it is embodied in bubble memory or hardware or firmware or as VLSI? – the list goes on. All these questions, which can be summed up as: what are we protecting, when has it been copied, when was it made, by whom was it made (and it could be generated by a computer, but the law says that copyright must rest with a person, not a corporation. What of computers?) – will have to be answered before even the interim legislation is introduced. It will be very difficult to proceed with prosecution against so many ambiguities.

Another problem with interim legislation in copyright rests with the fact that it is 'only temporary'. Copyright currently extends for the life of the author plus 50 years. Will interim legislation that ends in two years protect software produced for the next two years for the author's life plus 50 years? Software produced after that time may have some other period of protection. Confusion may result. Or will interim legislation that protects software for the author's life plus 50 years be enacted, but in fact everyone will know that in two years' time this protection will be removed, and then it either won't be covered or it will have some new period applied to it. With the tortuous nature of law such ambiguities may, again, be very difficult to deal with.

Nervous Suppliers

Of course, industry has a case for getting legislation in quickly. Overseas interests are nervous about the situation here, as are many local producers. The consequences of uncertainty about the position may be harmful to the Australian software industry. A lethargic reaction to the present situation may be catastrophic.

The Government position has been considered, but one rationale for the long-term strategy is that it should be formulated in compliance with overseas developments – and that development may be a long way down the track.

A further complication is that patent law may be more applicable than copyright law.

The Japanese Question

Numerous references were made during the course of the symposium to the Japanese example in the software copyright debate. They are at present fighting American pressure to come up with a better solution since they have enacted a new law that specifically protects software, provided the software source code is held in confidence by the Japanese Government. The phrase 'Japan Inc' was coined to generate a picture of the way the Japanese work as an integrated industrial unit. David Walsh of Mallesons points out that, "Japan's national interest is in technology's ability to leapfrog on the efforts of other people." This, he says, raises the question, "Is protection a device for securing return or a tool for ensuring development through access?"

The point was made that Australia can afford some brief period of delay while legislation is formulated which, as Alan Coulter, President of the Australian Computer Society, said, "Does not block the exchange of ideas or domination of best ways by a few."

Likely Developments

Despite the obvious problems, which even industry spokespersons were aware of, the first thing that will be seen is a short-term extension to the existing law of copyright to define software as a literary work. The practicability of this definition, and its effectiveness, will almost certainly be nil, but it will have the desired effect of calming down those who feel that their software endeavours are threatened.

Having a definition such as the above has its inadequacies which, hopefully, the courts will be able to deal with. In the meantime work will go on to develop a policy and long-term body of legislation to fully resolve the problem. The important thing is that this body will, of necessity, be very complex, but must nevertheless be put into place very soon.

What is required, and this point was made by several people at the Canberra software symposium, is a realistic approach which will afford real protection in the area of most need. Further, the legislation must not be too restrictive. There must be ample opportunity for free flow of ideas and the development and exploitation of new techniques.

While the problem of software copyright has leapt into significance unexpectedly, the time may be right for a number of other issues to be covered. For example, there is probably a lot of ambiguity in the law concerning access to databases, corruption of systems and other general abuse. Who is responsible for a medical computer's incorrect diagnosis? Given the considerable interest it has generated, the software copyright issue may be the impetus for a general debate of all areas affecting or affected by computers.

CASE STUDIES IN SOFTWARE COPYRIGHT

Here are two scenarios of software copying that demonstrate the way available software can be used and abused. We don't offer any cut-and-dried solutions to the problems they raise, but they help to point out the difficulties inherent in finding any solution that is fair to all sides.

Scenario 1

The Computer Users Trading Large Amounts of Suspect Software are a non-profit, computer interest club. They buy a copy of a popular software package, supposedly to run their club list and mailing. Within about a month every member of the club has a copy of the program and relevant documentation. Club membership rapidly increases.

Club members justify their copying by saying there is no legal or moral case against doing so. "Everybody else is doing it so why shouldn't I? Why should I miss out?"

One club member thinks differently, however. He phones the Australian distributor, who offers him a reward for information leading to the conviction of those who have infringed copyright. The reward is $20,000 for every member of the club who loses his house in paying damages to the distributor.

The club member then supplies the distributor with a list of club members whom he knows have copied the manual and therefore infringed copyright. He also tells the distributor that they were supplied by the club at a small charge to cover costs.

The software distributor then takes every member of the club to court.

Scenario 2

Mr H. Acker works as a computer programmer for a large firm. During his spare time he develops programs on his microcomputer which he then sells to whoever will buy. He is not particularly bright when it comes to programming, but he has some good ideas on programs that people might like to buy.

Because he is not very bright when it comes to programming, he often modifies existing programs that do some of the things he wants to do but in far more elegant and effective ways than he ever could. Often the modifications are so extensive that the new program is unrecognisable. At other times it is obvious which are Acker's efforts and which those of the original programmers.

One day a software house discovers that Acker has based his latest program on one of its old programs and decides to take him to court for breach of copyright. The function of his program is nothing like that of the company's but it is obvious that it uses some of their code.

What Would You Do?

There are obviously no easy answers to cases like the two hypothetical ones quoted here, but such examples do serve to illustrate the complexity of the software copyright controversy. If you can find a formula that covers all the possibilities and ramifications of such cases, perhaps you should be one of the people advising the Government on the short and long-term treatment of computer software copyrighting! ❑

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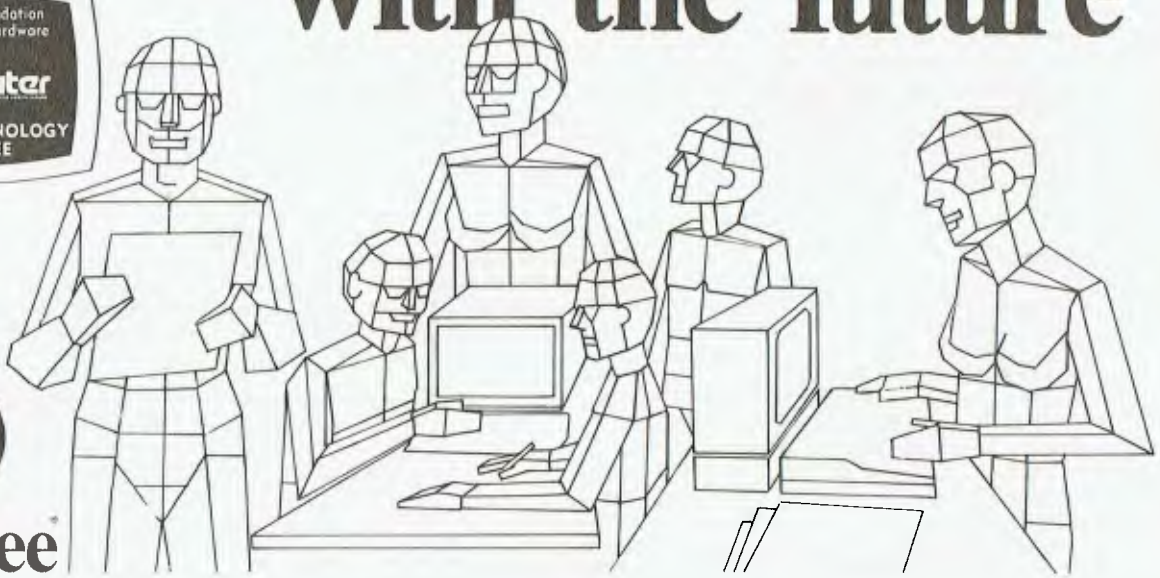

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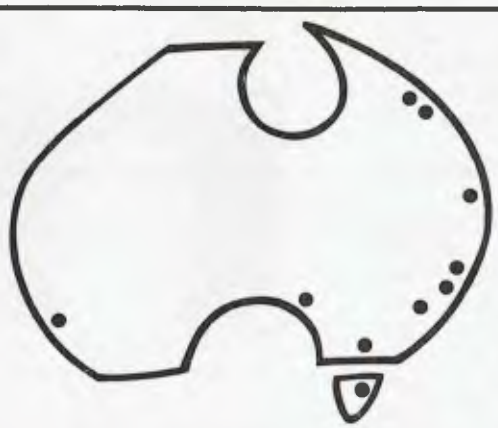

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Legacy of Llylgamyn

Possibly the hottest new Apple Adventure to hit the streets this year, according to Glen Thornley, is Wizardry Scenario No. 3, the Legacy of Llylgamyn. Here's what it's all about.

THE FIRST and greatest challenge of this game is to get hold of a copy. It seems to be almost unprocurable. One would hope that by the time this article goes to print the situation will have improved somewhat, but right now (early '84) one must place orders weeks in advance and sneak around behind tall dark display cases to find precious copies that have been hidden for favourite customers.

Having located a copy and read the sticker on the outside which states that opening the sealed pack indicates acceptance of the conditions on the inside, one is pleasantly surprised by the box. Sir-tech has gone back to packaging similar to that used for Proving Grounds of the Mad Overlord, instead of the flimsy packet used for Knight of Diamonds.

The third scenario departs from the tradition of the first two in several ways. Firstly, and most importantly, it was devised by Robert Del Favero Jr, Samuel Pottle, and Joshua Mittleman, all members of WARG (the Wizardry Adventurers' Research Group), rather than the designers of the Wizardry games system itself, Andrew Greenburg and Robert Woodhead.

The basis of the scenario is as follows:

Much time has past in Llylgamyn since the Staff of Gnilda was returned by a band of folk heroes. The city has regained its peace and prosperity. However, recently the good fortune of Llylgamyn has been disturbed by the forces of nature. Rumours of massive earthquakes, tidal waves and other freak changes in the weather have been running rife. Most ignored the accounts, at least until the prosperous island colony of Arbithea was devastated by a tidal wave. A short time later, Llylgamyn itself was hit by an earthquake so powerful that even the Temple of Gnilda was damaged.

All the greatest sages and wizards in the kingdom, although differing in their views of why nature is so disturbed, agree that the only way to determine the cause is with the mystical orb which is being held by one of the five children of the World Serpent, the great dragon L'kbreth. Legend has it that the dragon L'kbreth took the orb to her lair in the mountains, and invoked the powers of good and evil to guard it.

They now call on you, a member of a class of twenty-year-old graduating apprentice adventurers (being direct descendents of the legendary heroes of old) to locate, win, and return the mystical orb.

Spirit Of The Ancestors

Legacy of Llylgamyn requires the use of characters developed in the Proving Grounds scenario, but no minimum level has been specified. The characters are not actually transferred to the scenario, as they were for the Knight of Diamonds. Only their 'spirit' is transferred, and each new apprentice is linked to the spirit of his/her ancestor. This initiation takes place at the Training Grounds, in the form of the Rite of Passage.

After undergoing the rite, each apprentice bears the name of his/her forefather, along with any titles or honours he may have had, and is also credited with some or all of the ancestral skills, talents and abilities. Alignment is the only choice the apprentice is given: whether to be good, neutral or evil. This choice is subject to the same conditions as it was in the Proving Grounds.

Each apprentice is given a purse of up to 500 pieces of gold upon graduation, and sent out to obtain the orb with a warning: "The power of L'kbreth is the power of the planet itself!"

The disk is completely write-protected. Therefore, a scenario disk must be made with the Make Scenario option in the utilities section before the adventure can begin. This option has been updated to allow the use of only one disk drive. However, this does then require 'disk swapping' your way through 13 passes.

At last we get to play the game. Rather than an animated sequence (as in Proving Grounds of the Mad Overlord) or a high-res 'still' (as in Knight of Diamonds), booting the Legacy of Llylgamyn disk gives a 'slide show' sequence of high-res frames with text outlining the history of Llylgamyn from the return of the Staff of Gnilda to now. These frames were created using Penguin Software's Graphics Magician package, reviewed in May '83 *Your Computer*.

Leaving Llylgamyn

To leave the city of Llylgamyn, all the options are the same as in the previous two scenarios: that is, Gigamesh's Tavern, Adventurer's Inn, Temple of

Cant, Boltac's Trading Post, and Edge of Town. The process of displaying these options has, however, changed markedly. Everything is now done in high-res graphics – graphics which are presumably designed to emulate the screen output of the Apple Lisa. Pages of high-res text unfold over more pages of high-res text until, when several nested options are opened, the screen resembles a rather messy table-top with sheets of paper everywhere. Being a messy person at heart, I found the effect quite pleasing. The same display technique carries over into the maze itself, but more of that in a moment.

One option that has been added to the list is 'Pool Gold'. This causes all the gold being carried by all the party members to be given to one person. This is useful in, for example, Boltac's Trading Post when all bar one of the party members have bought their stock of weapons and armour, and the remaining member is short by a couple of gold pieces.

One option has also been removed. As the manual puts it, "The ancient maze option 'D', for Disband, has fallen upon disfavour and has been discarded. Too many ancient adventurers were eaten by dungeon denizens after the party disbanded."

The major change as far as the maze is concerned, other than the quest being directed upward rather than downward, is that the small 3-D maze in the top left corner of the screen has become a large 3-D maze image covering the whole screen. All other on-screen data can optionally be called up to cover the lower third of the screen. The only problem with using this option is that the 3-D image is not adjusted to compensate and you lose the lower third of the image, which makes it harder to see and understand what is going on.

One other change is that the high-res colour picture of an attacking monster is now superimposed on the maze, rather than replacing it as in the previous scenarios.

The manual that comes with the Legacy disk should be viewed as an addendum to the Proving Grounds manual, not a replacement for it. It is written in the now familiar storybook style, and apart from providing some good light reading for ten or fifteen minutes, it does cover the changes quite thoroughly – without giving anything away.

Proving Grounds holds first position on the list of the top Apple fantasy games of all time, according to *Softalk* magazine, April '83. And hot on its heels in second place is Knight of Diamonds. It is my honest opinion that Legacy of Llylgamyn will displace both these programs to be the leader.

If you are a Wizardry fanatic who insists on getting through each scenario in sequence before starting the next, you had better buy Legacy of Llylgamyn quickly because Scenario #4, Return of Werdna, is already in the works. ❑

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apricot —Pick of the Bunch

Following the difficulties recently experienced by Victor Technologies (makers of the Sirius) in the US, there has been considerable interest in the other string to the Barson bow, the ACT Apricot. Andrew Nicholson takes a bite of the Apricot.

The Apricot (above), with its microscreen shown in close-up below. To the right is the mouse soon to be available with the machine.

DESCRIBED BY ACT (its UK manufacturers) as a 'fourth-generation' computer, the Apricot is claimed to "provide a single environment, complete and ready to work, to improve the productivity and efficiency of executives and professionals."

Hardware

The computer looks very attractive and takes up very little room on the desktop – a big advantage in offices. It packs into a compact unit for easy transport, but the built-in handle could have had more thought put into it; although the whole computer weighs very little, the handle becomes hard to hang on to for long periods, due to its thin construction and sharp edges.

The monitor (250 by 200 mm) is separate from the main computer, and is another feature that adds to the Apricot's good looks. Its anti-glare screen is very easy on the eyes and provides very high resolution. The disk drives are single-sided 3.5 inch (89 mm for purists) microfloppies that will hold approximately 320K each (although double-sided drives are to be released later this year). They are easy to use: just push in the disk and the system identifies it.

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The computer comes with one drive as standard; two are available for a slightly higher price, and since this configuration is definitely more convenient, two drives will probably become the *de facto* standard.

The Apricot is based on the 8086 (at 5 MHz), plus lots of support chips such as the 8089 I/O manager. If you need a fast system for maths processing then an 8087 maths co-processor can be installed. This can speed things up dramatically – software that uses lots of floating point arithmetic will run anywhere from three to 100 times faster, after recompilation.

The computer has 256K of RAM as standard, with up to 768K optional. It has a full RS-232 (V-24) interface and a Centronics printer interface built in as standard, and software to take advantage of these is provided with the machine. An internal direct connect modem with auto dial and answer is available at extra cost.

Compatibility

The Apricot is claimed to be fully compatible with the Sirius and 90 per cent software-compatible with (you guessed it) the IBM PC through a software emulator. Of course, it will not accept the 13 cm disks from these machines, so software and data files will need to be transferred some other way.

Setting up this computer is a very easy task. It comes with the usual paraphernalia – monitor, keyboard, power cord, manuals, and of course the actual computer containing the disk drives. Once the computer has been unpacked you find a very attractive set of manuals. The most important to the first user is the Owner's Handbook; this is quite easy to read, unlike so many other computer manuals. It is a complete guide to setting up your new Apricot and getting to know your way around this machine. It really does this well – it assumes nothing about your knowledge and guides you around even the smallest problems possible to encounter. All photographs are in full colour and are extremely helpful.

The other manuals are the MS-DOS User Guide, a quick reference guide to the operating system; a BASIC quick reference guide; a Configurator Guide (so that you can tailor the computer to your needs); and a SuperCalc and SuperPlanner manual. All of them are well written and easy to read, except that the SuperPlanner manual didn't actually have any contents. It was probably held up somewhere.

Software

The Apricot is very well equipped with programs and utilities. Included in the basic price are three operating systems – MS-DOS, Concurrent CP/M-86 and CP/M 86+. Two versions of BASIC are included. There are also three optional operating systems available at this stage, with more on the horizon. I didn't get a chance to look at CP/M 86+ as DRI have not yet released the system – obviously ACT has made arrangements prior to its release.

ACT has provided MS-DOS with a manager to guide users around their system. It works by initially presenting a screen with boxes (five across and six down, with two others, one to finish and the other for help), called a 'ladder'. Using it is a simple task of moving the highlighted box around using arrow keys until the desired function is found, then pushing the RETURN key. The program will then load and a new menu ladder is displayed showing the new options available for use.

Concurrent CP/M 86 is just like normal CP/M with four screens. This means you can be performing up to four tasks at one time: for example, on screen one a directory of both disks could be displayed, screen two could be showing a continuous display of the status of every function the computer is currently performing, screen three could have a word processor running (which could currently also be in use), and screen four could be dumping files out to a printer or to another computer.

The Apricot also comes with lots of goodies for the programmer and for the user, to enable you to get the system working for you easily.

Usage

Using the computer with all its software is dead easy (in fact it can get quite boring if you're a hacker at heart). Once a disk has been put in, the system knows which disk it has and there is no confusion. If you don't have the right disk in place the system prompts you to place the correct disk in place.

The keyboard is very pleasant to use, with firm keys that any touch typist would find a pleasure to use. The 90-key keyboard has eight function keys and six touch-sensitive programmable keys.

There is also a micro-screen at the top of the keyboard that can display 80 characters in two lines of 40. This can be used as an alternative screen (if you're in the field and don't want to carry the monitor), or to display the clock contained in the keyboard (yes, in the keyboard). There is also a calculator built into the keyboard that can be accessed at any time through the micro-screen. Once you've worked out your calculation, you can simply send it to whatever you happen to be working on in the main monitor by pushing the send key.

I had one gripe about the keyboard – the control key is just beside the space bar. This made using things like Wordstar difficult as I was forever pushing the control key instead of the shift key. This, however, was easily fixed as the keyboard is intelligent. Using one of the provided utilities to change the configuration of the keyboard, I set up the control key to work only if the shift key had been pushed first. I set up all the other keys to act as quick access to Wordstar's functions; for example the forward arrow key is set up to send a ↑D, which is used to move one character, but when shifted it sends a ↑F (move to the next word) and when used with shift-control it sends ↑QD (moves to the end of the line). The other keys all reflect the same logic.

User Friendliness

The software used to drive the ladder scheme is sound and robust; I really tried to play havoc with it but it held up. Help can be gained at any point in the ladder – even if you remove the help files then the system just says it can't find the help you need and waits for you to acknowledge that you have read the message. Most of the software utilities like the keyboard configurator are driven through this ladder. This makes all software give the appearance of integration with the operating system.

For die-hards like me there is still access to the operating system; just tell the manager you're finished with it and you are returned to the operating system.

I believe a mouse is available which could be used to position the highlighted box just like using the cursor keys. Windowing is also in the pipeline to be run under MS-DOS.

The computer with one disk drive and all software comes for $4444.00 plus tax (with two drives it is a little under $5000) from Barson Computers and their distributors. Julian Barson swears there's no connection between the price tag and the term 'Fourth Generation', but we're not so sure ... ❑

DATA 84

The main event

The Sydney Computer Show or 'Data 84' is about to open once again and will be the largest of all annual computer and information technology exhibitions in Australia. There will be over ten million dollars worth of computers on display from all the major business computer manufacturers.

THE PREMIER of NSW, Neville Wran, will open Data 84 on Tuesday 22 May. Premier Wran has, for a long time, been a keen supporter of high technology industry, as recent government loans to the industry demonstrate.

The show will run for three days from Tuesday 22 May until Thursday 24 May, and more than 1000 products will be on display. Among companies which will be represented are IBM, Control Data, Hewlett-Packard, TNT Group 4, General Electric, Computerland, Commodore, Dick Smith, Telecom, Osborne, Apple and others. There will be a total of 101 companies represented at the show, which will cover all four floors of the Centrepoint complex in Sydney's city centre.

Among the main attractions will be the Apple Lisa, on the Apple stands, which was *Your Computer's* Computer of the Year, as awarded in the April issue. There will also be an addition to the Apple II range, with the Apple IIc on display at its first major Australian show (see article elsewhere this issue). This machine is Apple's first portable computer.

IBM has taken out the largest stand at the show, the largest since the show began in 1977. Rumours are rife at the moment that it will use the show to launch a new product or products in Australia. These will only be substantiated when the show opens.

Data 84 is sponsored by Graphic Directions and, according to Managing Director Kevin Rebbechi, will have extensive media coverage.

"Data 84 is supported by an intensive multi-media campaign aimed at giving exhibitors maximum exposure in the marketplace. We are already launching a drive to secure maximum news and advertising coverage on radio, TV, and in all sections of the press."

The show will cover a broad range of hardware, software and support services, and is basically aimed at the business market. Applications cover the full range of business from small to large organisations and government. One result of this orientation is that the younger members of the computing community won't be encouraged to wander round the show in search of games, preventing those with more serious intentions from getting a good look at the products they're interested in. (Which is not to say young people aren't welcome if they've a genuine interest in the exhibits; it's just that Data 84 is not aimed at people whose main interest in computers is finding out how to get to the next level of Zork.)

Admission to the show is $4.00. However, you will find in this edition of *Your Computer* a complimentary invitation to the show that will get you in for free. (This offer applies to NSW and Victoria only.)

Seminars

In conjunction with the show will be a series of day-long seminars aimed at various subject areas. These seminars are self-contained, with a different one each day. The first covers selecting the right computer, with information on choosing a system, case studies and the software perspective. The day two seminar covers the personal computer and you, giving an in-depth analysis of some of the major applications and uses of a personal computer. The third day presents the 'automated office', with case studies, analysis of major problem areas and the realities of implementing office automation.

The cost of each day is $110 and registration forms are available in the invitation leaflet contained in this magazine.

Data 84 runs from 22-24 May 1984 at the Centrepoint Complex, Sydney City. Admission without invitation: $4.00. ❑

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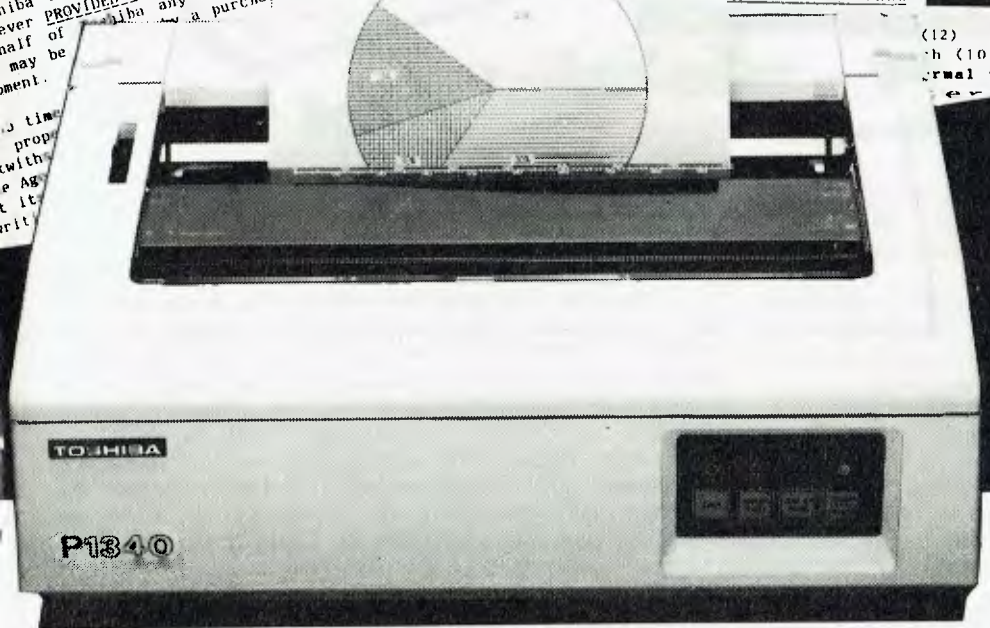

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Split-Screen Microbee

A USEFUL feature of the Microbee is its split-screen capability. Here's how to get it. This only works if the alternative character set is fitted. Type the following:

POKE 218,75
POKE 222,32

The screen is now divided in half. The top half retains all normal capabilities including graphics. The bottom half can only be used from BASIC via the POKE command. Two kilobytes of RAM have been set aside for the screen. The top half uses locations 61440 to 62463 and the bottom half uses 62464 to 63487. Simply POKE the ASCII code of the character required into the relevant location.

The following is a short machine code routine to clear the bottom half of the screen.

1. For I = 10000 to 10013
2. Read D: POKE I,D
3. Next I
4. Data 33, 0, 244, 54, 32, 17, 1, 244, 1, 255, 3, 237, 176, 201.

To clear the screen call the routine via K = USR (10000).

To clear the complete screen change the data statement to:

4. Data 33, 0, 240, 54, 32, 17, 1, 240, 1, 255, 7, 237, 176, 201.

POKEing graphics characters is also possible; they have ASCII codes of 128 to 255.

PETER BISSET,
Benowa Qld.

Over-Priced Dinosaurs?

IN THE CURRENT hiatus over software copyright, there is little, if any, discussion on who hopes to get what from what. With a few exceptions like Applied Technology and L & L Industries, the Australian computer industry is better described as the retailing of material developed abroad – usually in the United States. The result is that computers in Australia are more expensive than 'over there' – partly because of Government charges but also because of the high distribution costs.

I do not agree with Albert Langer's Software Liberation movement. Instead of using his unemployed workers to plagiarise other people's hard work, he would be more helpful to his fellow citizens if he were to write improved packages for the public domain.

I believe the cost of software in Australia is generally too high and is the direct cause of most of the pirating. The current system is selling high-priced packaging into a market which is generally interested in good but cheap generic products. It is like trying to sell hard-cover books when the readers are waiting to buy the paperback edition (or borrow from the local library).

If the customer wants the de-luxe glossy manuals and immediate support then he or she pays top prices. But if the manual is present as a disk/tape file then the buyer can opt for the copy to be generated at the point of sale and so avoid all unnecessary distribution costs and import charges and duties. There seems little reason why software should cost more here than 'over there'. The cost of software could be reduced to the media, any royalties, and point of sale margin – even after-sales support would be an optional extra. I wonder how much of the current fuss is about the 'value' added in the distribution chain.

Neither do I agree with Computer Edge importing pseudo-Apples – the Wombat could have been built here! It is a pity they did not devise a system so superior that even Apple could not claim it was a copy. At the moment US computers double in price across the Pacific – would Mr. Barson please explain the pricing policy for the BBC? Just what does the copyright system hope to achieve – is Australia to be the dumping ground for over-priced dinosaurs? It is good news that the IBM-PC and the BBC are to be made here, but does that mean that Australia makes Mk I versions while the rest of the world makes and uses Mk 2 and 3 versions?

The sooner the current confusion is cleared up the better. Is it too much to ask that the Government says what (if anything) it intends to do? As a start I suggest that we find out who is gaining and losing from the copyright system and where the money we all pay is going – how much actually gets to the program generators?

DAVE NOWLAN,
Hawthorn East, Vic.

In Defence Of The Z80

IN THE 'Understanding Assembler' tutorial (*YC* Feb. 1984), Les Bell is being both selfish and less than honest when he asks software writers to stick to 8080, and claims that the extra Z80 instructions rarely produce worthwhile improvements. Comparing the 8080 and the Z80 is rather like comparing a Fokker Friendship and a Boeing 727. Most people have bought Z80 systems for their speed and it is a pity that they are condemned to have them grinding along in second gear because they cannot buy properly written Z80 software. The Z80 instructions do offer very real advantages. For example:

1. In CP/M, just replacing jumps with relative jumps whenever possible would give about 500 extra bytes of usable memory.
2. It is possible (if difficult) to write relocatable code for the Z80. This is very useful for utilities such as file loaders, which must operate in several alternative locations. With the 8080 we are virtually compelled to have a separate copy of the program for each location.
3. Block Move instructions run almost 2.5 times as fast as 8080 code. It takes the Z80 40 ms to move 8K, compared with 100 ms for the 8080. This becomes very important in systems with extended memory.
4. The additional 16-bit arithmetic, and shifts and rotates, enable the experienced programmer to write significantly shorter, cleaner and faster procedures.
5. The additional register set can markedly simplify interrupt handling.

The availability of a 10 MHz 8085 is irrelevant (you can get a 12 MHz Z80 if you really want); the important thing is that all Z80 users are unnecessarily handicapped by sticking to 8080 code.

R. H. RIORDAN,
Technical Manager,
Cybec Electronics,
East Brighton, Vic.

More Gripes With Applied Tech

I READ with interest the letter published in February 1984 *YC* from Frank Hill.

I also have a gripe with Applied Technology. In March 1982 I ordered a Microbee, cassette recorder and tapes from Applied Technology. The Bee arrived in June/July but no tape recorder. I reminded AT of this when I returned my Bee for a 32K conversion and to take advantage of their 'we fit it' option supplied with kit Bees. The Bee returned quite quickly, but still no tape recorder. I await the tape recorder to this day.

I have also had problems with keyswitches but don't trouble AT about it. To combat heat exhaustion I found it necessary to relocate the regulators on the metal baseplate and then construct a more substantial power supply. Touched with a moist finger, my regulators on their flimsy heatsinks literally sizzled. The '1 amp' power pack would not supply a continuous 1 amp.

I have also fitted the 4 MHz add-on mentioned in various places. Using a Teac stereo tape deck with both channels in parallel and TDK cassettes I can 'load' and 'save' at 2400 band with 100 per cent reliability. 'Scotch' tapes are dreadful; approximately one-third will not work at all on my Bee. 'Audiosonic' and 'Rainbow' have a similar failure rate but due to their cheapness are well worth the risk, most of my saving being done with these last two.

Thank you for the magazine – it's simply the best one.

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RAM memory inbuilt	64K	64K
Maximum RAM possible	192K	128K
ROM memory inbuilt	32K	16K
Enhanced Microsoft BASIC?	YES	NO
Size of BASIC interpreter in ROM	24K	10K
Keyboard — number of keys	81	63
Numeric keypad	YES	NO
Function keys inbuilt	8	2
80-column text display inbuilt	YES	NO

FEATURE	CAT	Apple IIe
RGB colour output as standard	YES	NO
280x192 graphics: number of colours	8	6
560x192 graphics in colour	YES	NO
Sound channels	4	1
Disk drive capacity	140K	140K
Centronics type printer port inbuilt	YES	NO
Separate processor for keyboard	YES	NO
ROM cartridge slot	YES	NO
Cost of computer with 80-column text facility, RGB colour & printer port, floppy disk drive, controller & DOS and hi-res green screen monitor	$1485	$3170#

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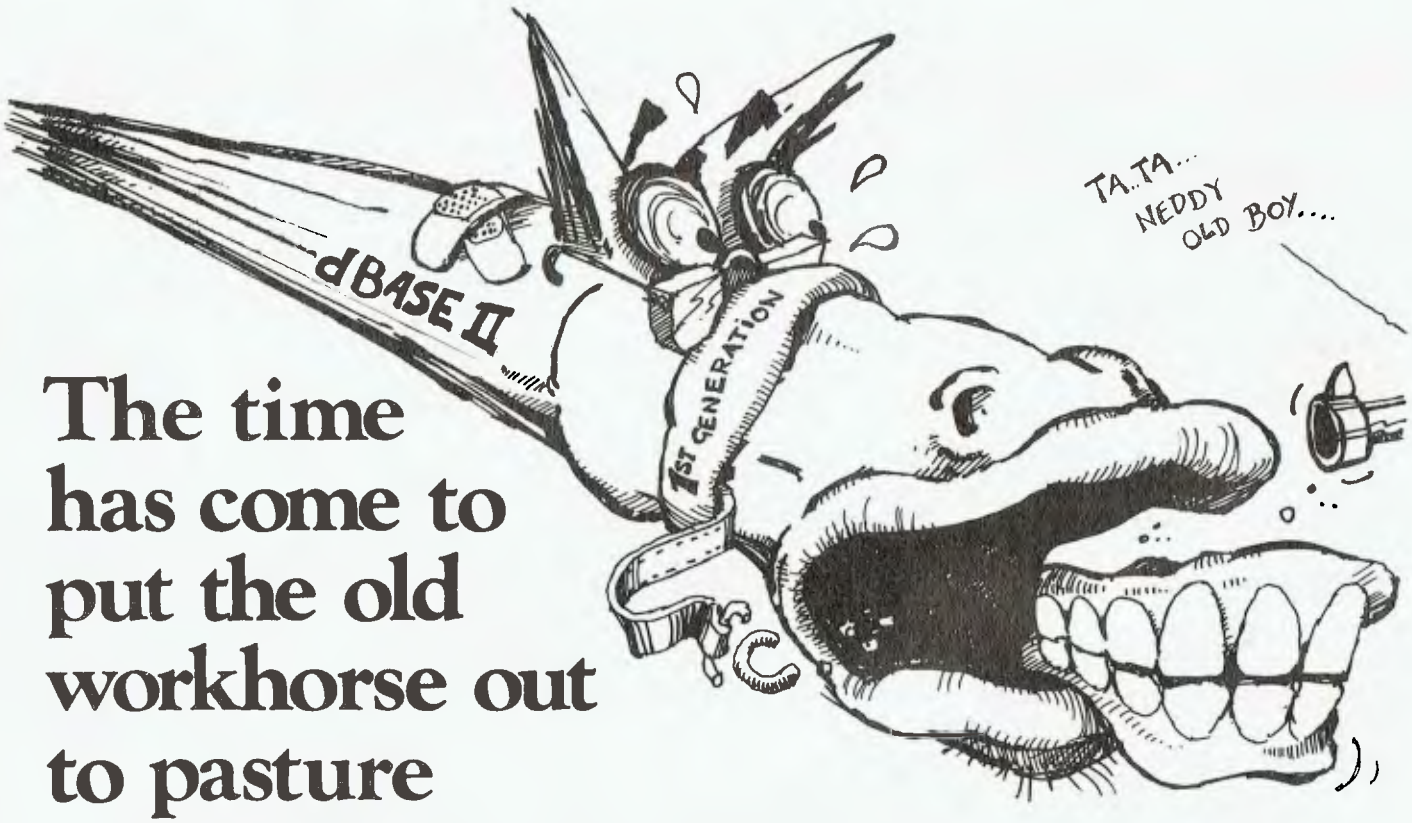

The time has come to put the old workhorse out to pasture

The days when dBASEII* stood all by itself at the apex of the database management pyramid are past. The old workhorse has been put out to pasture by a new breed of faster, easier, more powerful packages.

It's not that the old horse hasn't done its job: it has, gloriously. Those of you using dBASEII know that it has paid for itself many times over. In its time it was The Best. And now there's no denying that it's slow, it's cumbersome, it's difficult to live with — when you compare it with some of the newcomers on the market.

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We regard it as the most complete user-oriented database system on the market today and for the forseeable future. Delta caught our attention when it received the UK government's prestigious RITA award for "best software of its kind", followed closely by IBM UK's adopting it as their own distributed product for the IBM PC. Everything we have learned about it since working with it here has served only to increase our enthusiasm. Delta has so much to offer — and you don't have to be a programmer to get it all.

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$$$'s for your old nag.

So it's off to the glue factory with dBASEII. For a limited time**, Intelligence is prepared to help you with the cost of replacing your dBASEII system. If you turn in your old copy of dBASEII on a new Dataflex, we'll give you a trade-in value of $200. If you choose Delta, we'll make it $150.

(No, to tell the truth, we won't get a lot of glue out of the oldtimer. Our aim is simply to tantalise you into finding out just how good Delta and Dataflex really are.)

Place your bet on a winner.

Delta and Dataflex are available at leading computer stores everywhere. Ring up your local dealer and ask him for a demo. If he doesn't know about the product you're interested in, ring us. Or better yet, have your dealer ring us. It's time he got on the inside track.

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See you at Data '84 – Stand 328

C/80 Compiler

C is a language that's becoming quite fashionable these days, so Ross Lane thought it was time all our readers knew a bit more about what can be done with it.

FOR THOSE of you who haven't heard of it, C is a structured medium-level language used for systems work. Like Assembler, it allows the programmer to get his grubby little fingers on locations in memory and alter them to suit his taste. Disk files can be accessed a byte at a time, or a record at a time. The contents of the CPU can be shuffled with simple, terse commands, yet programs can remain quite readable, especially if the programmer takes time to comment his programs.

Les Bell wrote about C in the September/October 1981 issue of *Your Computer* (first issue I bought, as I recall). I was quite intrigued, but my time was then occupied with learning COBOL and basic business programming concepts, so I filed C away as a neat idea that was of no great relevance to me.

A year and a half later I purchased my own home computer and was perforce inducted into the realities of programming the Z80/8080 family of microprocessors. I found MBASIC-80 to be hard to structure and CBASIC to be slow. But programming in Assembler – that was a totally alien way of doing things. I found it hard to co-ordinate the single instructions of Assembler into a cohesive program that does anything useful in the way of manipulating files.

What I needed, I decided, was a fast, structured, semi-high-level language. BDS C immediately came to mind, but by then the price had risen from $135 to $180-$230. I started reading articles about C in *BYTE* and *Microsystems*. There was an article in *Microsystems* about two C compilers. One was a very complete compiler for US$200 (Aztec-C) and one was a compiler that was very fast and very compact for US$49.95 called C/80 from Software Toolworks. I liked the price, and the performance seemed good. I didn't want to write to the States, however, as importing software is an awkward exercise, fraught with difficulty.

Last May I obtained a copy of Small-C (C/80 is based on Small-C, which is a public domain version of C written by Ron Cain). I tried to write some utilities in Small-C but found it to have a very restrictive syntax for I/O, especially when dealing with files. What I needed was a version of C that paralleled what was in a book called *The C Programming Language* by Kernighan & Ritchie, considered the standard text on the C language.

I finally purchased a copy of C/80 version 2.0, to see if I could use it to compile a copy of XYAM (a communications program that is used by many RCPMs and is written in BDS-C). As I've since discovered, novices in C don't succeed in compiling XYAM for a new computer using a different compiler from BDS-C. (The Osborne 1 has some very interesting quirks for communication programs.)

However, I had plenty of use for the compiler. I wanted some utilities for writing purposes, especially word counters, so I started to write some of the programs that are listed in K&R. Surprise, surprise, they compiled first time, with no changes required to the listing. This is due to the fact that C/80 redirects input and output in the same way as Unix. This means you can write a program as though it takes all input from the keyboard and directs all output to the screen. The I/O can be reset to files at run-time. This has another beneficial side-effect. As C/80 is actually written in C/80, you can direct error messages to a file, or to the printer if you wish. This is very useful, as it allows you to use programs written in a Unix environment and run them on a standard CP/M system.

At first I just used the compiler to compile programs from K&R, but then I branched out into writing little utilities for my system that enabled me to dodge using Assembler. All in all, I've found it to be very useful, both as a learning tool and as a utility compiler.

Lots Of Files

C/80 comes on two disks and contains the following files. CLIBIO.C is a commented version of the runtime li- ▶

Software Report Card

Program:	C/80 version 3.0 compiler
Made by:	Software Toolworks
Hardware required:	Any 20 cm CP/M system; Osborne, HDOS and most other CP/M disk formats available
Best points:	Tight, fast code; low price; fairly good manual; availability of float and longs if needed (with optional Mathpak); redirectable I/O; Trace and Profile utilities

Ratings:	Excellent	Very good	Good	Poor
Documentation:		•		
Ease of use:		•		
Speed of running:	•			
Speed of compilation (with RMAC):			•	
Value for money:	•			

Price:	$69.95
Distributor:	Software City, PO Box 62, Blacktown 2148. (02) 671-6951.

C80 Compiler

brary which is called CLIBIO.ASM. There is a relocatable version of this called (unsurprisingly) CLIBIO.REL, which is used with MACRO-80 or RMAC. PRINTF.C and TPRINTF.C are printf routines that must be #included in any file that uses the printf function. TPRINTF.C is a stripped-down version of PRINTF.C and is supplied for compactness. There is also PRINTF.H supplied for use with a macro assembler. SCANF.C is the C source code for the scanf function which acts a little like INPUT does in MBASIC. (Although comparing scanf to INPUT is a bit like comparing a jumbo jet to a hang glider!) There is also a SCANF.H.

The file STDLIB.C contains many of the nifty little functions and utilities that you expect to find in a C programming environment, such as atoi, itoa, isupper, islower, isalpha, isspace, and so on. They are mainly string handling routines in common use. Many of them are described in K&R, so having them provided saves you an awful lot of typing. I started to type some out when I had ver 2.0 of C/80 and I soon became very tired of it. It was a great relief to see them in ver 3.0.

There is also SEEK.C which allows random file I/O. I haven't used this yet, so I don't know much about it. There are two handy utility programs called EXEC.C, which allows you to execute a transient command (like STAT *.*, for instance), and COMMAND.C which allows you to expand wildcard characters (like ? and *) in the same way that Unix does. (Very handy for writing system utilities.) All the C programs like SEEK or PRINTF that are usually part of the C library in Unix must be #included in a program before they are used. (Beware the monstrous intermediate assembler file!)

The manual is 48 pages long. It is in a loose-leaf format, suitable for punching for use in a three-ring binder or stapling together (which is what I do). It has a table of contents and (wait for it) an *index*!! The index is a boon. You can find most of what you need by turning to it. Actually, if this was a $200 compiler I'd consider the documentation to be a bit sparse, but, to tell the truth, everything is there that you need to use the compiler.

I find the compiler easy to use and convenient; I learned C using it. I'd recommend it as a first C compiler to anyone who wants to learn the language, as you can learn C without a big cash outlay, yet you'll not soon outgrow this compiler. With the addition of the MATHPAK and/or MACRO-80, you have a fully fledged production system.

To use the compiler you'll also need a copy of K&R. The compiler is based on that book. I'd also suggest a copy of the *C Programming Guide* by Jack Purdum, either as a supplement to, or a replacement for, K&R.

Compile Down To Assembler

The C/80 compiler compiles down to Assembly language. Software Toolworks provides an absolute assembler called AS with which to assemble the output code, or as an alternative, you can compile to a format compatible with the Microsoft MACRO-80 assembler or the Digital Research RMAC assembler. If you are doing any work that involves enormous programs or overlays, you'll need the MACRO-80 or RMAC assemblers and linkers. Otherwise you'll get swamped by the amount of assembly code that this compiler produces.

For example, a 1K C program produced 8K of Assembler that compiled to 2K of .COM file. As you can see, this sort of thing can get out of hand! The drawback to using MACRO-80/RMAC is the cost; $69.95 worth of C/80 plus $300+ for MACRO-80/RMAC adds up to a very expensive development system. BDS-C and AZTEC-C are both cheaper than this combination, and they include a linker that enables you to compile separate programs and link them together. (Of course, if you have MP/M or CP/M 3.0 you're set anyway, as these include RMAC.)

You can compile separate modules with standard C/80 – after a fashion. What you have to do is use the ability of this compiler to use in-line Assembler code. First you have to compile each C program with a –L switch; for example, C –L1000 PROGRAM. This causes the Assembler labels generated to start at 1000 down in the sequence that is gen-

MATHPAK

IN ADDITION to C/80 you can obtain a MATHPAK which can be linked into the C/80 compiler to provide the long and float data types. The distribution disk contains the following files:

CCONFIG.COM – This is the program used to patch the C/80 compiler to be able to use long and float.

FLIBRARY.ASM – This is the floating point library in Assembler form. It is also supplied as a .REL file for use with RMAC and MACRO-80.

LONGLIB.ASM – The long arithmetic library in Assembler form (also supplied as a .REL file).

FPRINTF.C – This is the printf routine with modifications to print floating and long numbers.

MATHLIB.C – These are a collection of mathematical functions. For instance, there are sin, cos, log, naperian logs, powers, square roots, and quite a few more (also supplied as a .REL file).

Installing the MATHPAK takes only a few minutes. You run CCONFIG and select 'Floats & Longs Available' from the menu. That's it.

The first drawback is the amount of Assembler code generated. The program opposite is a trivial piece of code that calculates the area of a circle from the radius. The AREA.ASM file that was generated was 44K in size! This compiled into about 10K of .COM file. The time taken to compile and assemble was seven minutes and 25 seconds. This gives you some idea of the overhead that can be caused by using floating point and long arithmetic. (Although I didn't use longs in the program, the use of fprintf.c caused the long library to be loaded.)

This program is only 35 lines long. When larger programs are written then the amount of overhead is proportionately less. (Note that I tried to make this program as greedy of memory as possible by using scanf.)

Now, having warned you about the main drawback to using the MATHPAK, let's talk about the benefits. The main one of course is the fact that you are no longer restricted to 32,768 as your maximum number. You have the breathtaking ability to count up to plus or minus 2,147,483,647. Note that C/80 doesn't support unsigned integers. With floating point you have a range of plus or minus two times 10 to the 28th power.

The double data type is allowed, but it is treated as a float (that is, it is still 32-bit, not 64-bit).

Unlike BDS-C, the long and float functions are integral. That is, you can declare a variable or function to be float or long. You don't have to call a special function from a library to handle floating point and long arithmetic.

The MATHLIB.C (MATHLIB.REL) files contain the transcendental functions. These must be declared in your program before use as a floating-point function. You can see how this is done in the area program with the pow() function. There is also a

Eratosthenes Sieve Program in C/80

```
#include <printf.c>
#define true 1
#define false 0
#define size 8190
char flags[size + 1];
main()
{
register int i,prime,k,count,iter;
   printf("10 iterations\n");
   for(iter = 1; iter <= 10; iter++)  /* do program 10 times */
   {
       count = 0;
       for(i=0; i<= size; i++)
           flags[i] = true;
       for(i=0; i <= size; i++)
       {
           if (flags[i])     /* found a prime */
           {
               prime = i+i+3;   /* twice index + 3*/
/*             printf("\n%d",prime); */
               for(k=i+prime; k<=size; k+=prime)
               flags[k] = false;   /* kill all multiples */
               count++;        /* primes found*/
           }
       }
   }
   printf("\n%d prime.",count);        /* primes found on 10th pass*/
}

H
```

erated by the compiler. (The compiler generates labels like .a, .b, .c, and so on. This would cause two C programs to generate Assembler that would get very mixed up if they were assembled together.)

If you have still another program to use, then you compile it with –L2000, and so on. You then define each separate program as an external file in the beginning of the main C program. This is done by inserting EXTEXT pseudo-ops between #asm and #endasm statements in the C source code. The EXTEXT statements are the directives to include assembler files into the file that contains the EXTEXT statements. You can assemble an enormous program in this way (it will take an enormous time to assemble, however). If you're careful, you can use EXTEXT statements with PRINTF.ASM or SCANF.ASM files to increase the speed of compilation.

The classic program with which to test the speed of C programs is the Sieve of Eratosthenes program, which was given in the January 1983 *BYTE*. ('Eratosthenes Revisited, Once More Through the Sieve', by Jim & Gary Gilbreath.) This program finds all the prime numbers up to 16,861 (see listing).

The time taken for C/80 ver 3.0 to compile and assemble the Sieve program is 120 seconds. It takes 29 seconds to execute. (Incidentally, C/80 ver 2.0 runs this program in 32 seconds.) However, the object file is 12K in size, due to the fact that C/80 includes global arrays in the object (.COM) file. This is a distinct nuisance if you want small files and large arrays. However, there are ways around this if you want them. If you are careful to keep arrays within a function whenever you can, you can keep the size down.

For example, I moved the declaration of the 'flags' array to the inside of the ▶

```
/* Area.c                                */
/*   computes the area of a circle       */
/*   given the radius                    */

#include <a:fprintf.c>  /* These are the formatted input */
#define FLONG           /* and output routines for long  */
#include <a:scanf.c>    /* and float arithmetic.         */
#define EOF -1
#define PI 3.14159

main()
{
   float area;
   float radius;
   float pow();         /* pow() is a mathlib function */

   radius = 0;
   while(radius != EOF)
   {
       printf("\nPlease enter the Radius\n\n");
       scanf("%f",&radius);
       if (radius==EOF)    /* no need to print out a circle */
           continue;       /* with an area of + 3.1416      */
       else if (radius < 0){
           printf("\n\nCIRCLES DON'T HAVE A NEGATIVE RADIUS!\n\n");
           continue;           /* ignore the rest of the loop */
       }

       area =(pow(radius,2.0) * PI);
       printf("\nThe radius is %f",radius);
       printf("\nThe area is %f",area);
   }
}
#include <a:mathlib.c>
```

pair of functions that convert a string to floating point and back, called atof() and ftoa(). These are the equivalents of atoi() and itoa() for the integer compiler.

Really, there's not much to say about using the Mathpak; it works invisibly, and just enhances the C/80 compiler. The only catch is the extra time required to assemble or link. I have my C/80 compiler set up on one disk with the floating point and long libraries and the compiler configured for floats and longs. If I don't need them the libraries are never called and it is as if they didn't exist. Yet, if I want to create a program using floats and/or longs, then I can immediately access them. All I've got to do is declare something as float or long in the program and #include the correct header files.

If you've got an interest in mathematical or engineering programs, and you're fond of C, (I'm an addict!) then this is a 'must have' package. ❑

first brace ({) in 'main' and the .COM file shrunk to 4K in size. This can also be accomplished with the functions alloc() and sbrk() which can allocate memory for arrays at run-time. Sbrk() is a built-in function and alloc() is to be found in STDLIB.C. Note that C/80 will initialise all arrays that are smaller than 256 bytes. You can cause all arrays to be initialised regardless of size by using a –Z command line switch when compiling.

The New Improved Version

For those people who have C/80 ver 2.0, I thoroughly recommend ver 3.0. It is a much more mature product. It is also optimised to some extent. C/80 version 3.0 is an upgrade of C/80 ver 2.0, which is the compiler I read about in *BYTE* and *Microsystems*. The rough edges of C/80 ver 2.0 are smoothed out in ver 3.0 and significant enhancements have been added.

The most obvious of these is an optional MATHPAK which allows you to use long integer (32-bit signed) and floating point arithmetic. (See the box on page 74 of this article.) Other improvements include the menu-driven configuration program (you used to need to use DDT to patch the compiler!) and the 24-line error display (after which you must type return to see any more errors). As well, STDLIB.C is only available under 3.0. Software City will upgrade compilers for its customers for a fee of $14.

To use the compiler, the easiest way is to type C<return>. The compiler will load and ask you for the name of the file to compile. After you give it the file name, you can go off and make yourself a cup of coffee while it compiles (especially if you've #included any files). After you've obtained a clean compile, you can assemble the program with the supplied Assembler AS.COM (or MACRO-80 or RMAC if you're lucky enough to have them).

If you get assembly errors you've got to go back and figure out what is wrong, then re-edit and recompile until you've got a working .COM file. As you can see from the time that was taken to compile and assemble the Sieve program, this can get tedious. It is, however, one of the faster C compilers on the market. The only one that is much faster in compilation is BDS-C, which is optimised for speed of compilation and linking.

The compiler can be run by typing C (options) <progname>. Some of the options are:

-T (Include C source code as comments in the Assembler output.)
-L (number) (Produces labels that start at the number specified.)
-P (Generates a runtime profile)
-D (Increases the size of the #define macro table.)

Many of these switches duplicate the functions of the configuration program (CCONFIG.COM); basically the switches allow you to reconfigure the compiler on the fly.

Profile Options

The profile options are a potentially useful set of utility programs. They are the two programs CPROF.C and CTRACE.ASM. When you use a –P switch on compilation, the compiler looks for a file named CPROF.ASM on drive A:. This is linked into the object program and is used to generate either a profile of the entire run (CPROF) or a real-time trace of each function as it is executed (CTRACE). You generate CPROF.ASM by either compiling CPROF.C or renaming CTRACE.ASM.

C/80 object files are typically very compact. The runtime overhead is very small compared to many other C compilers. The compiled code also seems to run very quickly. Whenever it's benchmarked in overseas magazines, it is typically in the first two or three places for speed of operation and is often first. The runtime library is only 1.9K in length, which is much smaller than most C runtime libraries. (The biggest I've heard of is Whitesmith's C, which has a runtime library that exceeds 19K in size!) Incidentally, this runtime overhead is a cross you have to bear when using the C language. Because C was designed to run under Unix, you have to duplicate the Unix features for the language to be standard under CP/M.

Addendum

I've just purchased a copy of Digital Research's RMAC. The improvement to C/80 has to be experienced to be believed. The Sieve program can be compiled, assembled and linked in 91 seconds, and the area.c program used in the MATHPAK test was compiled and linked in two minutes and 31 seconds. These times are a great improvement. There is a bug, however; the printf.c file is incorrect and requires modification.

For those who have C/80 version 3, the fix is simple. Load printf.c with a text editor, then change all occurrences of prnf__ to prnt__ . It seems that the code for the printf.c and fprintf.c modules became confused. The parent company in the USA can't detect a problem. The distributor and I have put the problem down to the fact that mine is one of the first version 3.0 compilers in Australia and so it may only be a problem in that first shipment. If you do have a problem then use the fix that I've given.

Conclusions

This is an excellent compiler. With the supplied Assembler it works perfectly, if a little inconveniently. With RMAC it is absolutely fantastic! I see Software Toolworks uses C/80 to write many of its programs; for example, LISP-80, Spell (reviewed in the September '83 issue of *YC*), TEXT (a text formatter) and Adventure are just a sampling of the Software Toolworks range written in C/80. The local distributor is very anxious to provide as complete a support as possible for the compiler. When a possible bug was found in the compiler, he rang the States for help and they immediately checked the problem out. This level of support for a low-priced compiler is impressive. ❑

Software Report Card

Program:	Mathpak
Made by:	Software Toolworks
Hardware required:	Any 20 cm CP/M system; Osborne, HDOS and most other CP/M disk formats available
Best points:	Ability to use floats and 32-bit integers; transparency to programmer
Worst points:	None, really, for this type of compiler

Ratings:	**Excellent**	**Very good**	**Good**	**Poor**
Documentation:		•		
Ease of use:	•			
Speed of compilation (with RMAC):		•		
Speed of running:	•			
Value for money:	•			

Price:	$59.95
Review copy from:	Software City, PO Box 62, Blacktown 2148. (02) 671-6951.

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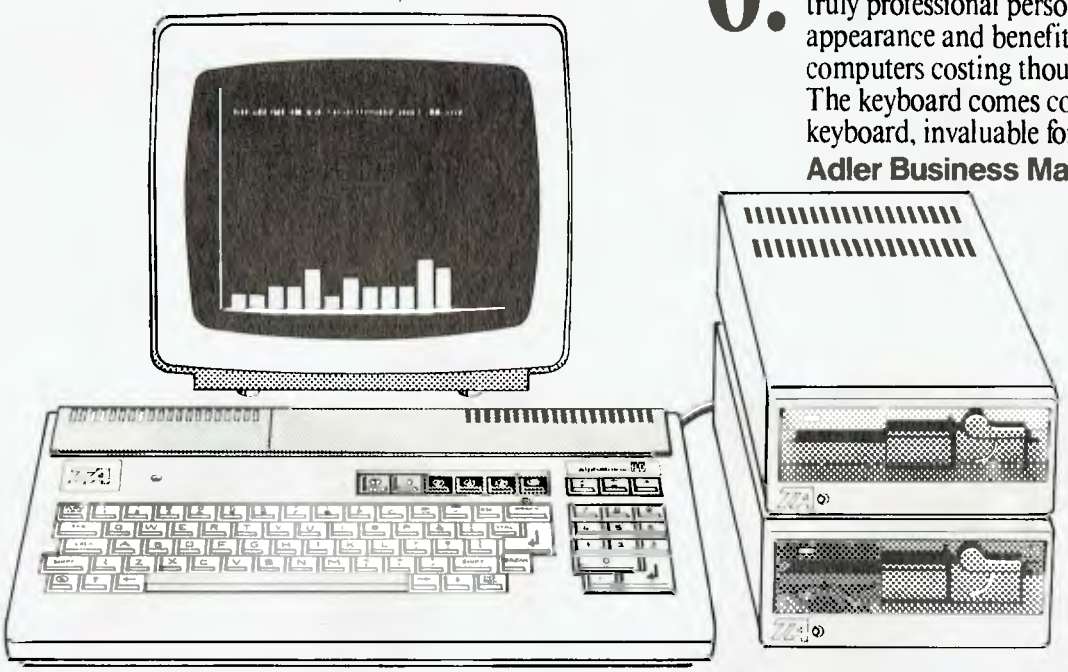

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Koalapad

We get many interesting articles landing on the desks at ***Your Computer*** *for review. A recent goodie was the KoalaPad Touch Tablet, which Jon Barnett looked at for us.*

THE KOALAPAD Touch Tablet *Your Computer* received to review was for an Apple computer. The first impression of the KoalaPad was the neatness of the packaging; unpacking it was another matter. It was sort of like Christmas – pretty soon there was mess everywhere, and that was with just the four basic items! In the box comes the KoalaPad itself, the stylus (the writing instrument for the Pad), the manual and a box with the software. Actually, according to the manual, there should have been another two pieces, overlays to mark regions on the Pad, but these were non-existent in our review box.

Taking my first look at the KoalaPad, I thought it was a light, deceptively simple piece of equipment. In fact, it reminded me of a desktop pad I once knew. Anyway, besides impersonating a notepad, what could KoalaPad do?

Consulting the manual (strange thing to do, I know!), I discovered the black surface was touch-sensitive. For the Apple, the tablet works from the paddle port. Each region of the touch-sensitive surface returns a corresponding co-ordinate pair. The co-ordinates are read using the PDL function – PDL(0) for the x co-ordinate and PDL(1) for the y co-ordinate.

On top of the Pad are two buttons. The status of these buttons (are they pushed or are they not?) is read in the same way as the paddle buttons, and the KoalaPad manual provides the information required to do this.

Installation

Installing the KoalaPad was simple. Following the instructions in the manual (which programmers are unaccustomed to doing), I plugged the KoalaPad in the paddle port of the Apple – and that was all the hardware hacking to be done. No soldered finger bridges, no fried components, nothing to go wrong. (Except the Apple disk system had a minor coronary but then again, that's not unusual.)

Sitting there with the Apple running and the KoalaPad in hand for five minutes, I discovered one thing. By itself the KoalaPad is pretty useless; although it doesn't need any software patches, it does require software to run with it.

The manual suggests the use of the KoalaPad for moving game pieces like those in chess, which would be a fair application for this piece of hardware. However, for fast-moving arcade games it is not designed! The response of the touch-sensitive area, although adequate for drawing, cannot cope with super-fast movements and control difficulties occur.

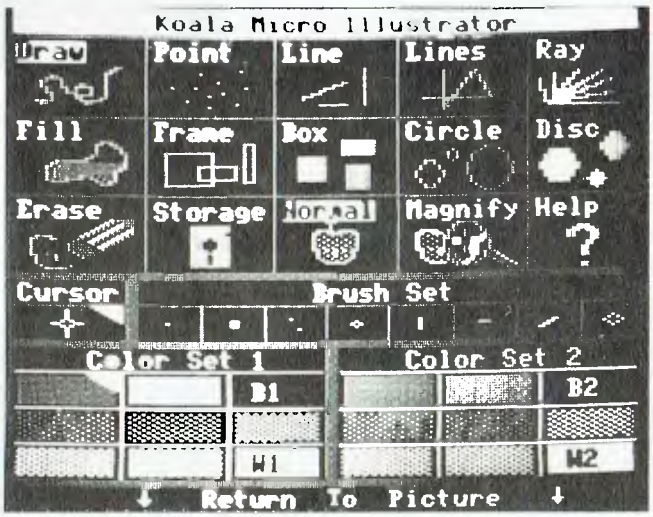
Useful For Graphics

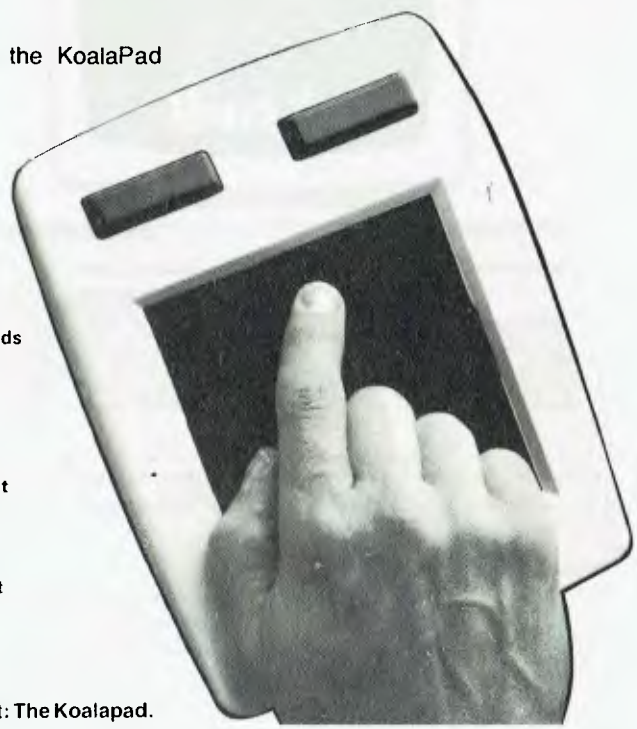
The main market for the KoalaPad would be in the graphics art department, and this is the market at which Koala Technologies Corporation is aiming the KoalaPad. It was by sheer intuitive brilliance that I deduced this ... and the fact that the software package supplied with the KoalaPad is a program for drawing.

The Micro Illustrator is a terrific program which displays (literally) the true potential of the KoalaPad on the Apple, running DOS 3.3. The most important part of the program is the menu, which displays all the options with a picture description to highlight each command.

The drawing facilities available are DRAW, POINT, LINE, LINES, RAY, FILL, FRAME, BOX, CIRCLE, DISC, ERASE, STORAGE, NORMAL, MAGNIFY and HELP. DRAW allows freehand drawing, while POINT drops dots on the screen. FRAME provides outlines of quadrilaterals and BOX places filled-in boxes on the screen. CIRCLE and DISC do the same, except with circles. ERASE wipes out the page of graphics. (Nice one, Rembrandt!)

STORAGE provides the means to save and retrieve pages of art from disk, and HELP supplies helpful information to the distressed operator. MAGNIFY is one of the most fascinating commands I found on the program. It 'blows up' the page to seven times its normal size, al-





Above: The Koalapad's drawing facilities, as displayed on the screen. Right: The Koalapad.

lowing detailed work to be done. NORMAL restores the page to normal proportions. RAY draws a family of lines which fan out from a single line, while FILL does what you'd expect, filling portions of the page.

Options

Other options open to the user are the Brush Set and the Colour Sets. The Brush Set provides a set of different drawing qualities such as single line, double lines, thick lines and thin lines. There are two Colour Sets available to the user so multi-coloured pictures can be built up.

All these options appear on the menu and can be selected by moving the cursor around with movements of your hand or the stylus across the Pad. The selection is then made by pressing one of the buttons on the Pad.

Once having selected the desired options, the user moves onto the drawing page and doodles away on the pad while the image appears (gee, it's magic!) on the screen. The program is so easy to use that even an idiot like me can operate it. The only time the user has to go back to using the Apple keyboard is when in the STORAGE mode. Other than that it's just plain doodling.

Supplied with the software (one disk in DOS 3.3 format) is a manual with helpful hints on drawing, an explanation of the menu commands and operation instructions.

Range Of Machines

Users of computers other than Apples, don't despair. Koala Technologies also supplies KoalaPad for the VIC-20, Commodore 64, IBM PC and the Atari's 400 and 800. (What? No Microbee?!)

KoalaPad can also be supplied in RS232C form or be custom-made on request. The manual for the KoalaPad provides extensive instructions on the installation and use of the Pad on each of the computers mentioned above. Technical specifications at the back of the manual claim the KoalaPad's resolution is only limited by the host computer's graphics capability.

One final point to make is that although the makers claim the KoalaPad is rugged and built to last, they warn the user not to throw the thing around or beat it against brick walls in frustration. The KoalaPad is not a Tonka Toy! The manual provides a list of Do's and Don'ts on caring for the new animal so the Pad doesn't go frumbumfe.

Incidentally, the Koala Technologies Corporation is not based in Australia, but is in fact an American company. Our review KoalaPad came from Ozisoft, 50 Clarence St, Sydney. ❑

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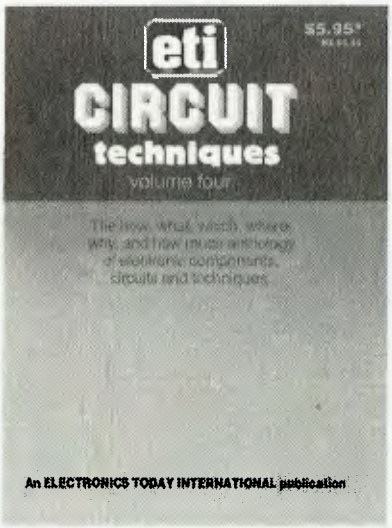

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Leeward Of Mount

Frank Lee has been investigating a variety of new hardware in the process of writing his latest masterpiece – "a program that Does Everything". He won't tell us about the program yet, but here's a rundown on equipment ranging from a mouse to an IBM-PC compatible computer.

CHRISTMAS has come, gone (I'm writing this in January), and taken with it an appropriately heavy toll at the Lee Corral. The Den has finally been restored to what may be loosely described as 'normalcy', and a proper division has been re-established between the area reserved for fun and games, and my 'work zone'.

Visitors are, of course, an integral (and welcome) component of the Christmas season. Since we live and work in the remoteness of the mountains west of Sydney's sprawl, we are a natural target for 'dropping in on' by the urban escapees. This Christmas has been no exception. There has, however, been one notable difference between this most recent holiday period, and those which preceded it: Apples and Apple-clones! No longer do the junior visitors gravitate to the train set, or to the lake. It's "What computer games have you got?".

The sight and sounds of the tiny-brigade as they trade disks the way their counterparts exchanged swap cards a generation or so ago charges the heart of this rather sensitive software author with fear and foreboding. Worse still, the little blighters have the gall (and intelligence) to pronounce that this friendly co-operation is all quite within the limits of the law!

Hopefully, by the time this article appears in print such activities will be thoroughly illegal.

Thus it was that the Most Junior introduced us all to Crisis Mountain. What a great game. What great graphics. And what a most apt appellation for Lee's hideaway.

So. Welcome to Mount Crisis, and in particular, The Den. Herein lie many marvels, not the least of which is Columbine, our newly acquired Columbia MPC.

The Columbia MPC

For any self respecting freelance bit-joiner to maximise his/her income, it seems self-evident that he/she must target the proposed product for the widest possible market. On one hand, a successful program should have a broad appeal, but it should also run on hardware which has the lion's (elephant's?) share of the market.

It scarcely requires a market survey to work out what that hardware is.

So why did I buy the Columbia in preference to the Real Thing? Elementary, my dear Watson – funds (or lack thereof). But, you ask, is it a True Compatible? And thereby, dear Watson, hangs a tale. Pull up a bollard whilst I spin you yet another yarn of adventures brave.

Buying any 'PC-compatible' is clearly an exercise in risk. After all, none of the (legal) clones are exact copies. For example, any attempt to copy the artwork of the motherboard, or to duplicate the firmware in the system ROM, would guarantee one's being stomped upon by a large blue elephant. There was a time when IBM was every man's legal butt. The tide has turned these latter days as Big Blue now boasts a tally of successful prosecutions to its record. 'Compatibility' should not therefore be read as 'identity'. The term 'clone' (at least in this context) should likewise not be understood to imply 100 per cent identity, as it does in its original biological meaning.

Much has been written recently about 'levels of compatibility'. Briefly, a 'true' compatible should be functionally as close as possible to the original. At the software level, a program which can be loaded and executed on a PC should load and execute on the clone in an identical fashion. At the hardware level, the clone should accept add-on cards designed for the PC.

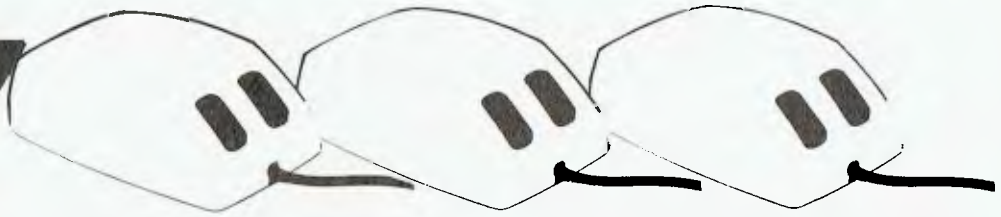
Apart from the ROM itself, the Columbia appears (so far) to be almost 100 per cent compatible.

Software Compatibility

With one exception, the operating systems which I have tried all work correctly. These include MS-DOS (and PC-DOS) 1.0 and CP/M-86 as supplied by IBM for the PC. We also found that both Digital Research's version of CP/M-86 (for the PC) and Columbia's own implementation of CP/M-86 also perform correctly. Unfortunately, although DOS 2.0 boots (and performs normally) on the Columbia, the BASIC interpreters supplied with that DOS refuse to load. Instead, the disk just keeps on spinning and spinning. I'm told that this is a common problem with most of the clones.

Apart from that one exception, not one package designed for the IBM PC

Left: The Datamax 8000 supports up to four terminals using MP/M 2.1. Above: Microsoft's mouse. Right: 'Columbine' — the Columbia MPC.



has failed to perform correctly. That list includes Lotus 1-2-3, WordStar 3.3, the new Microsoft Word, SpellBinder, Edix, dBase II, and a host of colourful games.

The fact that the games function correctly testifies to another level of compatibility: the screen management system. In an attempt to improve upon IBM's conservative screen resolution, some would-be compatibles have deliberately departed from the IBM structure. As a result, much of the graphics software written for the IBM PC simply will not run on those machines. An example of such a departure is the Panasonic JB3000.

The Columbia keyboard does differ from that of the PC, but the differences are generally improvements. In particular, the annoying (at least to me) clack-clack of the IBM keyboard has been neatly removed. There is an integral LED in two of the 'toggling' keys (the Caps Lock and Num Lock) which illuminates when the lock is selected. The layout is very close to the original (why oh why did IBM put the Enter key in such an awkward place?). The only 'defect' I could find was the absence of a slight indentation on either side of the function keys (useful for the overlay plate supplied with Lotus 1-2-3).

Physically, the Columbia looks very much like the original (not that that's a real requirement for a clone). The keyboard attaches to the main system unit via a coil which terminates in a standard IBM connector. We actually tried swapping keyboards between Columbine and a real IBM PC. Both keyboards worked just fine in their foreign environments.

To bring a PC up to the hardware level of a Columbia one would need to add one or more cards (consuming scarce slot-space). The Columbia sports as standard 128K of RAM, two double-sided double-density 13 cm disk drives, two serial ports and one parallel port. Although the ports respond normally at the software level, there are some physical differences for which I can see no real advantage.

For example, the parallel port on the Columbia terminates in a conventional Centronics female DB connector rather than the 25-pin version used by the IBM PC. Perhaps the idea is to prevent one from inadvertently plugging serial plugs into parallel sockets and vice versa. The two serial ports are configured as DTEs rather than as DCEs, hence cables supplied with IBM peripherals will need some reworking for the Columbia. With that proviso, I have used all three ports under the control of normal IBM-supplied drivers without problems.

Two particularly nice features of the Columbia are the way in which it boots up, and the presence of an external reset button. I've always complained about the primitive method for resetting the Apple (switching off the power for a few seconds), and blow me down if Big Blue doesn't do the same dumb thing. The effect of pressing the well-protected reset button at the rear of the Columbia is identical to powering down and back on again without doing nasty things to 240 volt switches and other goodies.

Users of the IBM PC complain about cooling their heels while the machine decides to boot the disk operating system. The more the memory, the longer ▶

it takes. It is, of course, simply checking main memory. Columbine gives you an option as soon as power is applied. If you haven't replied within five seconds, it boots the disk without further ado.

Columbine is also compatible at the system bus level. I have tried a number of cards designed for the PC, including a Vista Maxicard giving a total of 704K of user memory. All (with one minor exception) have worked just fine. The exception was Microsoft's card for the bus version of the Mouse. More of that in a moment.

In short, Columbine is close enough to being an IBM PC to enable me to write software targetted for eventual operation on a regular PC. It came with Perfect Software's bunch of goodies (Perfect Writer, Perfect Speller, Perfect Link, Perfect Filer and Perfect Calc) as well as MS-DOS 1.0 and CP/M-86.

The Datamax 8000

Bit-joining is part engineering, part science, and part art. The end result should be pleasing in all three areas. The environment in which this particular software author functions is similarly tripartite. Engineering considerations determine hardware systems, communications methods, software tools and the like. Science dictates my personal design methodologies and methods for testing and proving. Screen designs and the user interface should result from creative (artistic?) insights.

Pull up another bollard, clap yer ear to the wind, and hear yet another salty yarn: of Columbine and Harlequin.

Harlequin, it seemed, was the only proper name suitable for Columbine's companion. Together, this pair capture and process the ideas which eventually blossom into Saleable Software.

Harlequin is a Datamax 8000; hardly a newcomer on the scene, but a fair dinkum Aussie worker. The Datamax had its origins a few years back when Mr Chin Kwong, a graduate of Sydney University, and now managing director of Datamax, designed a single-board CP/M-80 computer based on the now very familiar Z-80A microprocessor. Many Datamax machines are now located in Australian universities, and are still giving stalwart service in spite of the rush towards 16-bit systems.

My particular Datamax sports 64K, two serial ports (one for the VDU) and a parallel port. It has two 20 cm floppy disks (double-sided, double density), providing a total formatted capacity of about 1.8M. Its BIOS (Basic Input/Output Subsystem) also allows it to handle disks in the standard IBM 3740 format. It is capable of upgrading to 256K of RAM for use with CP/M Plus. Another model is available with a 10M hard disk in place of the second floppy disk drive.

As a conventional CP/M-80 engine, Harlequin has few frills. It just works. And works. Why the disks have never packed it in, I do not know. In winter (and it's seen a few), the Franklin stove in the Den choofs out buckets of ash, guaranteed to work insidiously into sensitive disk drive mechanisms. Perhaps it's the YE Data drives used by Datamax, perhaps also because we regularly use head cleaning diskettes, but nary has Harlequin let me down. Never once a service. He's a real gem.

Despise not the humble Z80. It's as much 16-bit as the 8088 at Columbine's heart, and it zips along at 4 MHz. Indeed, in many a contest between Harlequin and Columbine, Harlequin finishes first!

Harlequin's VDU is a Case Volker-Craig 4404 with a trendy amber screen. The VDU runs at 9600 baud, quite fast enough to make WordStar's scrolling bearable. And it's WordStar which occupies most of Harlequin's time.

A word of explanation. The current Magnum Opus (a program which Does Everything) is initially targetted for a CP/M-86 (or Concurrent CP/M) environment. Unfortunately, the only word processor (or text editor) worth considering under CP/M-86 is SpellBinder. Ed-86 (DRI's little joke) is O-U-T. There was a time when, at least for me, SpellBinder was In. That was Before WordStar. I know – I just trod on a heap of corns. But frankly, I could never go back to SpellBinder. I tried, I really tried. But that crazy two-state (edit or command) system fools me every time. Its mnemonics are crazy. Yes, I know WordStar is a pain to learn, but I learned it, and I can use the help screens if I forget.

So, with this mental block against SpellBinder and Ed, and without a WordStar for CP/M-86, what to do? We have WordStar under MS-DOS, but would someone out there tell me how to make an MS-DOS document file available to a CP/M-86-based compiler apart from pumping it to a second machine then back again?

The long and short of it is that by giving up the idea of creating source text on the Columbia, I won in the productivity stakes. A simple cable strapped between Columbine and Harlequin provides me with a true multi-processing environment. Harlequin creates and edits source text, Columbine looks after the compilations, linkages and test runs. Source text is printed by whichever machine has the time available. Both have printer spooling software (standard with DRI's CP/M-86), so it's much of a muchness who gets the job.

As soon as a revised source text is ready for compilation, I start up a submit file on Columbine. This contains commands to read the file on the communications cable, to compile it, link, then execute the result. Because I use the SUBMIT feature so often, the file SUBMIT.CMD has been renamed to X.CMD, so a command like:

```
A>X CLG PRUNE
```

generates the sequence:

```
A>GET M:PRUNE.PLI
A>M:
M>PLI PRUNE
M>ERA PRUNE.PLI
M>LINK PRUNE,MYLIB.L86
```

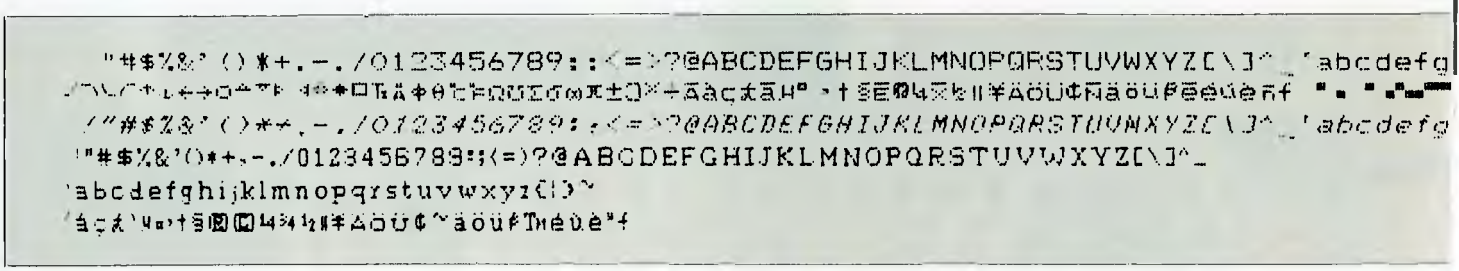


Figure 1. The self-test printout produced by the Star DP515 dot matrix printer. Note the italics and proportional spacing sets.

```
M>B:
B>PIP B:=M:PRUNE.CMD[VO]
B>PRUNE
```

all of which compiles, links and executes the program PRUNE. Incidentally, notice the M-drive. DRI's CP/M-86 has this as a built-in goodie. I have the operating system configured to give me 128K of user memory, with the balance of 576K working as drive M:. It holds DRI's PL/I-86 and LINK-86 systems quite comfortably. Needless to say, it runs like a bullet.

To someone with IBM experience (as in 370-type IBM) the above looks very much like a catalogued procedure. In an IBM mainframe environment, one would also be able to include steps which make, say, the linkage editor step conditional on a satisfactory compilation. In the CP/M system, the linkage operation simply fails because there is no PRUNE.OBJ available from an unsatisfactory compilation.

Harlequin Whispers To Columbine

There is quite a wealth of communications software available allowing the IBM PC (or Columbia) to talk to another computer. The most common protocol is the now almost standard Christensen protocol. Unfortunately, every single communications package which I have tested bombs out if the speed exceeds 1200 baud. This fault is common to the IBM PC as well as the Columbia.

Now 1200 baud is a wee bit slow for yours truly. Some of my source code modules are running around 50K. Allowing for protocol chit-chat, at 1200 baud, that could take around seven minutes. At 9600 baud (not an unreasonable request) the same file could be pumped in just under one minute – a real saving.

The listings appended to this article show how to beat the speed limit. I know, I know – the error checking/correcting protocol is a bit rough, but when the two beasties are within a few feet of each other, you just shouldn't get bit errors during transmission. The send/get combination shown checks well and truly, but there are some cases where a glitch could cause an unrecoverable situation (apart from a restart). In all the time that I have been using it, not one such situation has occurred.

SEND.COM runs on the Datamax. It is assumed that the Datamax serial port has already been set for 9600 baud, eight bits per transmitted character, one stop bit, no parity. The port drivers are contained in DIO.ASM, which could be used as a model for other types of serial port. DIO.ASM was assembled with RMAC (to give DIO.REL), and SEND.PLI was compiled with PL/I-80 to give SEND.REL. The two were linked using:

```
A>LINK SEND,DIO
```

to create the final object program SEND.COM.

GET.CMD runs under CP/M-86 on the Columbia. Although I tried to set the speed of the serial port in the initialisation section of the code, the program would not work unless the operating system had been set also for 9600 baud using one of the standard utility programs. Maybe some smart reader can spot why my attempt doesn't work. GET.CMD is the result of linking (using LINK86) the modules GET.OBJ and REC.OBJ. GET.OBJ results from compiling GET.PLI under PL/I-86, REC.OBJ comes from assembling REC.A86 with RASM86.

Both machines must be linked by a suitable cable. In my case, each end of the cable is a 25-pin male DB connector. Since the Datamax port is configured as a DCE (like a computer should be), and the Columbia as a DTE (like a VDU), we joined pins 1, 2, 3 and 7 on a one-to-one basis. An additional wire connected the 'clear-to-send' signal from the Columbia back to the Datamax's pin 20 (DTR signal). Unless the Columbia asserts its clear-to-send signal, the Datamax is unable to transmit (on its pin 3).

In use, start GET on the IBM (or whatever) with a command such as:

```
A>GET FRED
```

It will print an occasional *** TIMEOUT *** message until an ENQ has been received from the sender machine. Start SEND on the Datamax (or whatever) with:

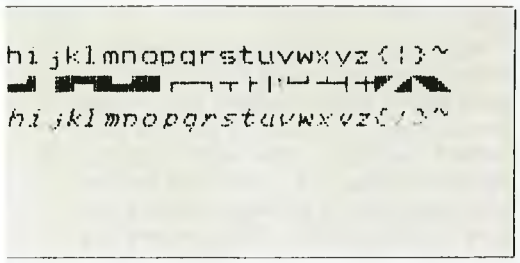
```
A>SEND FRED
```

Once the link is established, each machine will display a single dot (period) for each 128-byte packet successfully transmitted. Before transmitting, SEND measures the size (in sectors) of the file to be transmitted, then lets GET know how many sectors to receive. SEND performs this measurement using the steam-hammer approach of reading the whole file once until an end-of-file is detected. Rather blunderbuss, since we all know there are neat CP/M-80 calls just set up for this purpose. You're welcome to improve on it.

Please note that this is definitely *not* a substitute for MODEM7, or any other popular system. It is an unashamed kludge to meet my particular needs. It doesn't even allow Columbine to talk back to Harlequin. (No doubt we'll hear from the Anti-Discrimination Board). Nevertheless, it illustrates certain principles which could be applied in a full-blown Christensen-style system.

Two New Printers

Work at Mount Crisis demands two kinds of printer. Source listings require a fast, not-too-elegant dot matrix printer. ▶



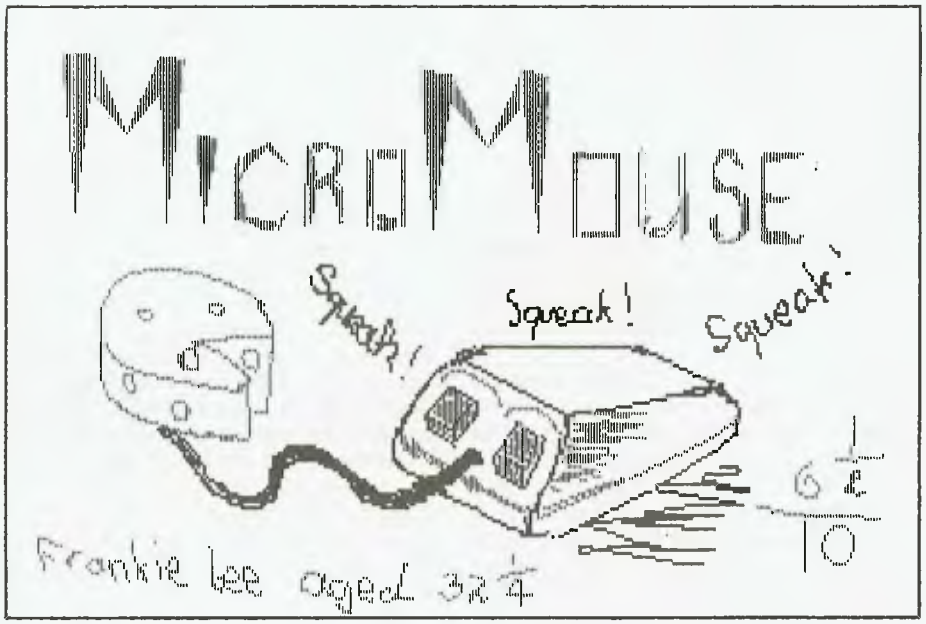
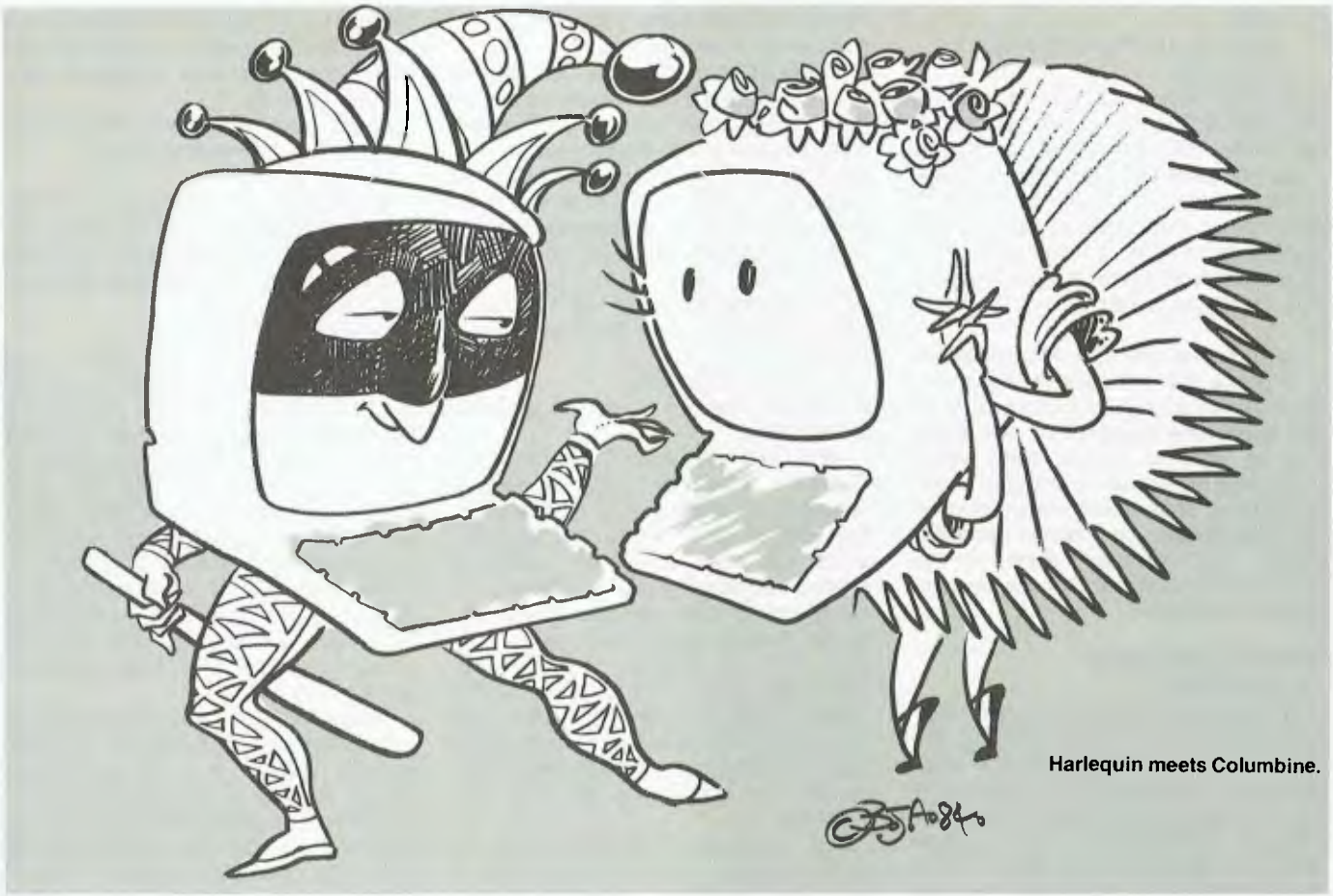


Figure 2. This sketch was prepared on the RGB screen of the Columbia using the Microsoft mouse and Doodle program. The printer is a Star DP515 dot matrix, and is connected via the single parallel port.



Harlequin meets Columbine.

Letters require a not-too-fast daisywheel. Our dot matrix is marketed in Australia as the Star DP515. It has a removable tractor feed, a Centronics parallel port, uses conventional typewriter ribbon and runs at 100 characters per second. Although it is Japanese in origin, the detailed instruction manual exhibits no trace of the 'Jinglish' so common amongst earlier product documentations from Japan.

Although it was bought just for its speed, it has turned out to be a most interesting product. Its ROMs contain a variety of fonts, and it supports true proportional spacing. The biggest surprise was to discover that sketches made with the Microsoft Mouse 'Doodle' program would print exactly as if we had a normal IBM dot matrix printer attached.

Unfortunately, the special symbols corresponding to characters with the high-bit set don't correspond to the IBM graphics. That's a real pity. My Magnum Opus uses the block-drawing graphic symbols on-screen in great profusion. If the IBM printer were attached I could get a true screen dump with SHIFT-PrtSc. The Star gives me a printout, but with the block-drawing graphics replaced with Greek letters and maths symbols. It won't be long before I take to the main circuit board looking for the culprit EPROM. Burning new PROMs is no big deal if you've got the right kind of friends. Figure 1 is a reproduction of a printout resulting from the self-test which is initiated by switching on power while depressing the Line Feed key.

The second printer is an OEM No Name, also manufactured in Japan. It is sold here by President as the VSP Printer. Like the other printer already described, this is very good value for money. The VSP behaves just like a Qume, but is rated at 16 characters per second (Shannon text). It is also equipped with a tractor feed (available as an option).

The VSP uses plastic printwheels compatible with the Qume and C. Itoh StarWriter. The ribbon cartridge is bulky and unfamiliar in appearance; however, it snaps apart quite easily to allow for reloading. So far there has been no problem with this machine, either in installing WordStar for its use, or in operation. It has bi-directional print, true proportional spacing with 1/120-inch increments and a minimum line feed pitch of 1/48-inch. Print hammer force may be controlled by software.

Say 'Cheese'

The good people from Microsoft recently forwarded to me an evaluation copy of their new word processor program 'Word' (see my article in *YC* July 1983). Originally dubbed 'Multi Tool Word', it is now simply 'Microsoft Word'. As I have the system for a few more weeks yet, a full review must wait until we gets our sea legs working with it. Have another bollard.

The supplied version includes a real live mechanical mouse, complete with its own little PC-compatible interface board and a swatch of demonstration programs.

Imagine the consternation in the Den when It Didn't Work! Was it the man or the mouse? Try as we would, Columbine completely ignored the presence of the mouse-board. So we began familiarising ourselves with Word *sans* mouse, a worthwhile exercise in its own right.

Help, however, was not far removed. Following a Mayday call to Microsoft, we were told to move a jumper plug on the mouse-board. Fantastic! It worked. Columbine suddenly took over from our Apple lookalike (a Fox 640) as the entertainment centre of Mount Crisis. Apart from a rather ho-hum (yet another) Life program, and a cute on-screen piano keyboard which you play by sliding the mouse up and down, there is Doodle.

Doodle lets you paint pictures on the screen. Since Columbine has a Kaga Vision II RGB screen, the effects are quite impressive. Indeed, it takes little imagination to conjure up a picture of high school art students creating frames for animated films via the Doodle. The individual frames could be captured on floppy disks for later recall and single-frame photography. That should read LOTS OF floppy disks. Or perhaps the skills of a gifted lightning artist could be captured on videotape.

The mouse itself is more the size of a small rat. A long black tail (the communications cable) winds back to a nine-pin sub-miniature connector on the mouse-board. Two green buttons (eyes?) are placed ergonomically just above the long black tail. (Real mice normally have their eyes at the other end of the system).

Movement of the mouse is sensed by two rotation detectors mounted at right angles. The shafts of the detectors are driven by the rolling movement of a heavy steel ball which rests upon the work surface. The two detectors relay two-dimensional movements to the computer in increments of a quarter of a millimetre ('mickeys'). The software converts the mickey count into scaled pixel movements on the screen.

The mouse has a close functional similarity to the light pen. The latter device has limited appeal due to the relative difficulty of keeping one's arm raised to 'draw' at the level of the video screen. The mouse supports the arm's weight comfortably, and responds positively to movements of the hand. The device has been tried on a variety of surfaces with equally good results, although the handbook warns that some surfaces may allow a build-up of fluff in the sensing mechanisms. Clear instructions have been included for cleaning one's mouse.

Sketching with the mouse is a breeze. When Doodle is activated, the colour monitor displays a 'canvas' beneath which appears a menu. The principal option is 'draw', allowing the user to create freehand sketches on the screen. If the left button is kept pressed, the mouse leaves a trail behind its path. The colour of the path, and that of the background (the canvas), may be selected from the menu. Other options include facilities for drawing lines, rectangles and 'starbursts'. Drawing lines is a little like working with elastic bands. You mark an anchor point with a button, then stretch the elastic-like line to the point where it should end. Releasing the button anchors the loose end.

Pleasing sketches may be saved on the disk, or be printed on the attached dot matrix printer. As mentioned above, this was a pleasant surprise. The printer output has sufficient resolution to suggest this as a means for creating masters for overhead projection transparencies.

Figure 2 is a sample printout from the Doodle screen using the graphics option of the STAR DP515 printer.

The separate documentation which accompanies the mouse is comprehensive and well written, although the presentation is a little reminiscent of earlier Apple documentation.

Using mouse software requires the loading of a mouse driver. The disk supplied with the mouse includes the file MOUSE.COM, which should be executed before using mouse application software. A short AUTOEXEC.BAT file will do this nicely. The mouse driver supplies 16 separate functions, such as setting the mickey/pixel ratio, imposing limits on the cursor position, reading the mouse position and button status, and so on. Calls are effected by setting the call number (0 to 15) in the AX register, various parameters in the BX, CX and DX registers, then executing an INT 55 instruction. Calls can also be made easily from BASIC programs. The documentation includes an annotated listing of the piano demonstration program as an illustration of mouse-programming.

Sadly, what is not included is a raw hardware description. The supplied documentation ensures that the mouse can only run under MS-DOS. The information needed to write a similar interface for a different operating system is just not there. I find this to be particularly frustrating, because my first reaction to the mouse was that it offered a first-class means for designing the graphic help screens which are an integral part of my current project. Since that project is presently targetted for CP/M-86, the mouse can not be used. Of course, if Microsoft publishes the technical details then another story may be told.

Applicards and Appliclones

Two more products pending a review are the Applicard (from Personal Computer Products Inc) and President's latest Fox 640Z. The Applicard is an Apple add-on which is essentially a self-contained Z-80-based CP/M machine, complete with its own 64K of RAM. Our particular model includes an additional 128K of RAM (using 64 Kbit chips) which may be configured as a separate 'M-drive' in a fashion similar to the method used by CP/M-86. Time and space forbid further comment at this stage, but this is a very fast CP/M machine in its own right. More on the Applicard in a future article.

The Fox 640Z is an interesting exercise in Apple-cloning. Although we have had it for only a few weeks, the impression is very favourable. It includes an integral Z-80A (which boots CP/M-80 disks), and an on-board disk controller. This unit also has an RGB card (for those rare times when Columbine can do without her Kaga Vision II), and a 'Software Automatic Mouth', this latter being a plug-in D/A converter with an integral audio amplifier and speaker. The software systems supplied effectively emulate the behaviour of the Votrax speech generator chip. Again, more on these goodies in my next article.

Items Reviewed

1. The Columbia 1600-1.
Dual 320K floppy disks, 128K RAM, two serial ports, one parallel port, colour graphics board, Kaga Vision II RGB monitor. Perfect Software package, MS-DOS 1, CP/M-86.
Supplier: President Computers, 100 George Street, Hornsby 2077.
Retail price: $5995 (inc. tax), $5230 (ex. tax).

2. The Datamax 8000.
Dual 20 cm double-sided double density disks (1M each, unformatted), Z-80A, 64K RAM, two serial ports, one parallel port. Requires an external display terminal. Supplied with CP/M-80.
Supplier: Datamax Pty Ltd, Datamax Building, 34-40 Central Avenue, Manly 2095.
Retail price: $4000 (inc. tax), $3335 (ex. tax).

3. STAR DP515 dot matrix printer.
Supplier: President Computers (as above).
Retail price: $790 (inc. tax), $706 (ex. tax).

4. VSP-1 daisywheel printer.
Supplier: President Computers (as above).
Retail price: $787 (inc. tax), $690 (ex. tax).

5. The Microsoft Mouse (bus version).
Supplier: Microsoft Pty Ltd, PO Box 98, Terry Hills 2084.
Retail price: $295 (inc. tax), $259 (ex. tax). ▶

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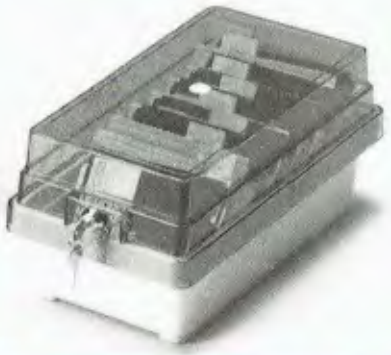

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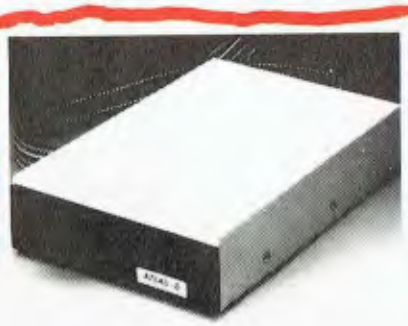

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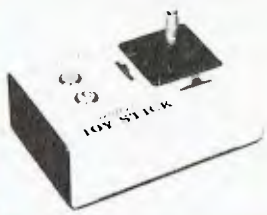

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******* PROGRAM LISTINGS ********

```
send:
        proc options(main);

/*************************************************************/
/*                                                           */
/*                      SEND.PLI                             */
/*                                                           */
/* This is a high speed file transmitter.  It will send      */
/* a file across a direct link between two computers.        */
/* The file to send is passed as an invocation parameter.    */
/* The protocol is simple:  Send initiates the link by       */
/* sending ENQ (05H) bytes at 1 second intervals until an    */
/* ACK (06H) is received.  It then opens the file and        */
/* tells the user that the link is established.  It sends    */
/* the first sector followed by a checksum word which is     */
/* the sum of all the bytes treating them as fixed(7).       */
/* The checksum word is transmitted in LO/HI sequence as     */
/* a fixed(15) value.  Send then waits for either an ACK     */
/* or NAK (015H).  If ACK, then the next sector is sent      */
/* as before.  If NAK, the same sector is transmitted.       */
/* The receiving program is GET.  This version  measures     */
/* the file size then sends that as two bytes which are      */
/* repeated for verification.  After receiving an ACK,       */
/* the procedure is as above. 3/1/84.                        */
/*                                                           */
/*************************************************************/

%replace
        ENQ     by      '^E',
        ACK     by      '^F',
        NAK     by      '^U';
dcl
        sendfile        file,
        eof             bit,
        z               char,
        checksum        fixed(15),
        del             fixed,
        cs(2)           char based(p),
        (p,q)           ptr,
        rec             char(128),
        recf(128)       fixed(7) based(q),
        conout          entry(char) ext,
        instat          entry ext returns(fixed(7)),
        lin             entry ext returns(char), /* serial port */
        lout            entry(char) ext,  /* serial port */
        i,j,k,
        id              fixed decimal(9,3);


put edit('Send Version 1.2')(skip,a);
put skip;
open file(sendfile) sequential keyed record env(f(128),b(8192))
        title('$1.$1');
i=0;  /* record counter */
on endfile(sendfile) eof='1'b;
eof='0'b;
read file(sendfile) into (rec);
        do while(^eof);
        i=i+1;
        read file(sendfile) into(rec);
        end;
id=i;
close file(sendfile);
revert endfile(sendfile);
put edit('There are ',i,' sectors in this file.',
        'Transmission will take about ',0.29*id,' seconds.')
        (skip,a,f(5),a,skip,a,f(6,1),a);
p=addr(checksum);
q=addr(rec);

checksum=i;

/* Clear any junk */
        do while(instat()^=0);
        z=lin();
        end;

 /* make connection */
z=' ';
        do while(z^=ACK);
        call clout(ENQ);
        call wait;
                do while(instat()=0);  /* nothing received */
                call clout(ENQ);
                call wait;  /* wait 1 second */
                end;
        /* expect an ACK */
        z=lin();
        end;
open file(sendfile) sequential keyed record env(f(128),b(2048))
        title('$1.$1');
put skip list('Link established');
put skip;
/* Send the sector count from cs(*). */
z='';
        do while(z^=ACK);
        call clout(cs(1));
        call clout(cs(2));
        call clout(cs(1));
        call clout(cs(2));
        z=lin(); /* expect ack */
        end;
on endfile(sendfile) eof='1'b;
eof='0'b;

read file(sendfile) into(rec);
        do while(^eof);
        checksum=0;
                do i=1 to 128;
                checksum=checksum+recf(i);
                if recf(i)|0 then checksum=checksum+256;
                z=substr(rec,i,1);
                call clout(z);
                end;
        call clout(cs(1));
        call clout(cs(2));
        /* wait for acknowledgement */
        z=lin();
        if z=ACK then
                do;
                read file(sendfile) into(rec);
                put edit('.')(a);
                end;
        else if z^=NAK then
                do;
                put skip list('Not ACK or NAK.');
                stop;
                end;
        else /* NAK */
                put edit('x')(a);
        end;

clout:
        proc(z);
dcl
        z char;
call lout(z);
end clout;



wait:
        proc;   /* wait 1 second */
do j=1 to 3000;
        do k=1 to 13;
        end;
end;
put edit('#')(a);
end wait;

end send;
```

********* LISTING NO. 2 **********

```
; Direct console input/output - generalised.
;
        title   'SERIAL PORT HANDLER FOR DATAMAX - 9 Dec 1983'
        public  conout
        public  lin,lout,instat
;
;
;
boot    equ     0
auxout  equ     0F612H  ;Datamax bios entry
auxin   equ     0F615H  ;Datamax bios entry
auxst   equ     0FB81H  ;    "
;
;
lin:
; Return a byte from the printer port
        call    auxin   ;-|A
        pop     h       ;rescue return
        push    psw     ;save char on stack
        inx     sp
        mvi     a,1     ;string length
        pchl            ;return to user
;
;
lout:
; Send a byte to the printer port
        mov     e,m     ;get parm to C
        inx     h
        mov     d,m
        xchg
        mov     c,m
        call    auxout
        ret
;
;
instat:
; Test printer port.  Return 0 if not ready, else -1
        call    auxst
        mvi     h,0
        mov     l,a
        ret
;
;
;
conin:  call    const   ;wait for char
        ora     a
        jz      conin
```

```
; Got one
        call    incon   ;read it to A
        ani     7fh
        pop     h       ;rescue return
        push    psw     ;save char on stack
        inx     sp
        mvi     a,l     ;string length
        pchl            ;return to user
;
;
conout: mov     e,m     ;get parm to C
        inx     h
        mov     d,m
        xchg
        mov     c,m
;
; Display and return
;
        lhld    boot+1
        lxi     d,9
        dad     d
        pchl
;
;
        end
```

********** LISTING NO. 3 **********

```
get:
        proc options(main);

/*****************************************************************/
/*                                                               */
/*                        GET.PLI                                */
/*                                                               */
/*  This program enables the Columbia (or IBM PC) to receive files */
/*  from another computer at 9600 baud.   An external serial port  */
/*  driver (REC.A86) looks after the timing and interrupt          */
/*  controls.  This program is concerned with protocols.  The      */
/*  name of the file is passed as an invocation parameter.         */
/*                                                               */
/*****************************************************************/


dcl
        i,j,
        rec     char(128),
        recf(128) char based(p),
        f       file,
        (p,q,t) ptr,
        z       char,
        csum    fixed,
        csum2   fixed,
        cz(2)   char based(t),
        linstat entry ext returns(fixed(7)),
        lin     entry ext returns(char),
        lout    entry(char) ext,
        linit   entry ext,
        SectorCount;

%replace
        ENQ     by      '^E',
        ACK     by      '^F',
        NAK     by      '^U';

put edit('Get version 1.3')(skip,a);
p=addr(rec);
t=addr(csum2);  /* overlays cz(*) on csum2 */
open file(f) output sequential record keyed env(f(128),b(16384))
        title('$1.$1');

/* initialise the port */
call linit;
/* Await the enq */
        do while(linstat()=0);  /* nothing */
        call wait;              /* hang about */
        put edit('*** Timeout ***')(skip,a);
        end;

z='';
        do while(z^=ENQ); /* not enq */
        z=lin();
        if z^=ENQ then
           do;
           put edit('non-ENQ received (',rank(z),').')(skip,a,f(3),a)
           call lout(NAK); /* send nak if not enq */
           end;
        else
                do;
                put edit('ENQ received.')(skip,a);
                call lout(ACK); /* else send ack */
                end;
        end;
/* Get the sector count. It is sent twice.  If ok, reply ACK.  */
csum=1;
csum2=0;
        do while(csum^=csum2);
        t=addr(csum);
        cz(1)=lin();
        cz(2)=lin();
        t=addr(csum2);
        cz(1)=lin();
        cz(2)=lin();
        if csum=csum2 then call lout(ACK);
        else call lout(NAK);
        end;
put edit('Checksum received OK')(skip,a);
```

```
put skip;
SectorCount=csum;
t=addr(csum2);
/* now read sectors */
i=0;
        do while(i[SectorCount);
        call GetRec;  /* sets up rec */
        csum=0;
                do j=1 to 128;
                z=substr(rec,j,1);
                csum=csum+rank(z);
                end;
        /* get the two checksum bytes */
        cz(1)=lin();
        cz(2)=lin();
        if csum^=csum2 then /* send nak */
                do;
                call lout(NAK);
                put edit('x')(a);
                end;
        else  /* send ack */
                do;
                call lout(ACK);
                put edit('.')(a);
                i=i+1;
                write file(f) from (rec);
                end;
        end;


GetRec:
        proc;  /* set up rec */
dcl
        i;
        do i=1 to 128;
        recf(i)=lin();
        end;
end GetRec;

wait:
        proc;
dcl
        i,j;
        do i=1 to 10000;
                do j=1 to 15;
                end;
        end;
end wait;


close file(f);
end get;
```

********* LISTING NO. 4 **********

```
;                  **** REC.A86 ****
;
        cseg
        public  lout,lin,linit,linstat
; m/l version of get.pli designed to run at maximum machine
; speed (9600) by running with interrupts disabled.
;
; Refer to the IBM tech manual for details on driving the
; serial port.
;
port    equ     3f8h    ;base of serial port
rbr     equ     port    ;receiver buffer
thr     equ     port    ;transmitter holding register
```

Leeward Of Mount Crisis

Continued from page 89

```
speed   equ     12      ;divisor for 9600 baud
enq     equ     05h
ack     equ     06h
nak     equ     15h
;
linit:
; Initialise the com1: port for 9600 baud
;
; Initialise the 8250.
;
        mov     al,lcrinit+dlab
        mov     dx,lcr
        out     dx,al           ;allows dlr to be set for speed.
        mov     ax,speed        ;9600 baud
        mov     dx,dlr
        out     dx,ax
        mov     al,lcrinit
        mov     dx,lcr
        out     dx,al           ;resets dlab to 0
        mov     al,0
        mov     dx,ier
        out     dx,al           ;disable interrupts
; turn on dts and rts
        mov     al,3
        mov     dx,mcr
        out     dx,al           ;set both dtr and rts on
        ret
lin:
; read a byte (assumes one is ready).
;
        cli             ;disable interrupts
; turn on dts and rts
        mov     al,3
        mov     dx,mcr
        out     dx,al   ;set both dtr and rts on
; wait for a byte to arrive
        mov     dx,lsr
ier     equ     port+1  ;interrupt enable register
iir     equ     port+2  ;interrupt identification register
lcr     equ     port+3  ;line control register
mcr     equ     port+4  ;modem control register
lsr     equ     port+5  ;line status register
msr     equ     port+6  ;modem status register
dlr     equ     port+7  ;16 bit divisor latch register
                        ;must be 12 for 9600 baud
lcrinit equ     03H     ;8 data bits
                        ;1 stop bit
                        ;no parity
dlab    equ     80H     ;bit 7 of lcr must be set in order
                        ;to set dlr port.
linst:
        in      al,dx   ;line status
        and     al,1    ;mask/test the data received bit.
        jz      linst
; got one.  turn off rts
        mov     al,1
        mov     dx,mcr
        out     dx,al
; read the byte
        mov     dx,rbr
        in      al,dx   ;read it
        pop     dx      ;return value
valret:                 ;return value in al
        mov     ah,al
        push    ax
        inc     sp
        mov     al,1
        push    dx
        sti             ;restore interrupts
        ret
lout:
; send a byte
;
        mov     si,\bx)
        lods    al
        mov     cl,al   ;the byte to send.
        mov     dx,lsr
        in      al,dx   ;wait for THRE to go hi
        and     al,020H ;THRE is bit 5
        jz      lout
;THRE is hi, so can send the byte
        mov     al,cl
        mov     dx,thr
        out     dx,al
        ret
linstat:
; wait for a byte to arrive
        mov     dx,lsr
        in      al,dx   ;line status
        and     al,1    ;mask/test the data received bit.
        jz      nochar
; report one waiting
        mov     al,0ffh
        ret
nochar:
        ret
;
;
        end
```


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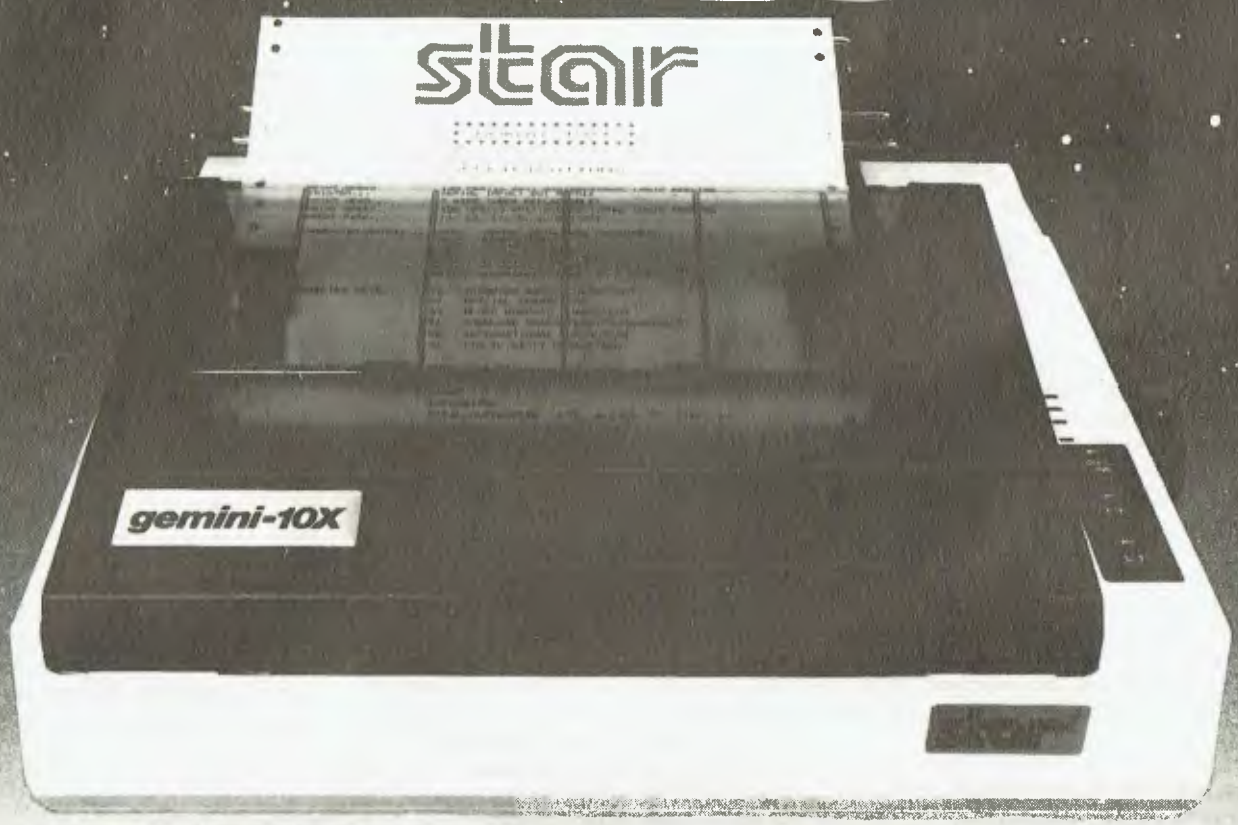

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CASE

Getting Friendly With BASIC

tutorial Part V

We've had a break in transmission of our series 'Getting Friendly with BASIC', but now we're back on line with the fifth part of Jeff Richards' tutorial.

SO FAR we have covered a technique for storing and retrieving data using a linked free list for allocation of new records and a memory-resident sorted array index for record retrieval. The actual data to be stored has been conveniently ignored. The time has come to consider the data items themselves in more detail.

The method of storing data in random disk files in Microsoft BASIC-80 provides a considerable amount of freedom for the programmer. Essentially, BASIC-80 provides a record buffer of nominated size into which data items are inserted at specified locations. String data is inserted as is, but numeric data is converted into a packed format for storage.

Commands are provided that will load data into the buffer without disturbing data previously entered (LSET, RSET and MID$), convert numbers to packed format (MKI$, MKS$ and MKD$) and convert the packed strings back to numbers (CVI(), CVS() and CVD()).

This buffer is defined in the FIELD statement. It can be less than or equal to the record size, and the FIELD statement can take a number of variable names as arguments. Specifying more than one variable in the FIELD statement has the effect of associating those variables with defined sections of the buffer. Data in a file is loaded into the buffer with a GET statement, and is written from the buffer to disk with the PUT statement.

The first point to appreciate about random records in BASIC-80 is that the FIELD buffer is not always the appropriate place in which to define the record layout. As individual segments of the buffer can be separately named, the temptation is to set them up in a format that matches the data to be stored. This is the approach that the manual advocates, but for certain data storage applications it is not the most convenient.

In many cases it is easier to establish the buffer as a single item with a length equal to the record length of the file. Individual items can then be loaded into the buffer at the correct location using the MID$ function. This approach avoids the complexity of the fully detailed FIELD statement and allows for flexibility in data storage without requiring multiple FIELD statements.

In this discussion the detailed form of the FIELD statement will be used only to distinguish between the status record of the master file (record 1) and the data records. All data records will be handled as a single string in an undifferentiated buffer.

The master file record defined so far has a length of 80 characters. This is probably inadequate for most practical uses, but will be retained for consistency. A suitable length for the record is 128 characters, as this corresponds to the CP/M record size, making disk accesses more efficient. Remember that if you want a record size greater than 128 then BASIC-80 must be started with the /S:<max record size> option.

Data to be stored can be divided into three major types – alphanumeric, numeric and logical. Alphanumeric data can consist of any characters at all, and is usually variable in length. Numeric data in BASIC-80 is either integer, single precision or double precision. Logical data is not a specific type recognised by BASIC-80, and can be stored as either alphanumeric or integer numeric.

The main consideration in respect of alphanumeric data is how much room to allow for each data item – allowing too much room is wasteful, while allowing too little may cause important information to be lost. If a number of alphanumeric fields are involved it is best to build them into a single string, using a delimiter to identify the substrings. This saves considerable space, as the total length of a name and address, for instance, usually varies much less than the total variation of the individual data items.

An alternative approach to delimiting fields within the string is to identify the substrings by setting the high-order bit of the last (or first) character of each substring. However, in this case special allowance has to be made for substrings of zero length.

An Example

Listing 1 shows a small routine to combine and then separate a typical name and address. In this example we will allocate buffer positions 11 to 60 to the name and address. Notice that the data is inserted into the buffer using the MID$ function rather than LSET or RSET. This is necessary because the FIELD statement has not identified positions 11 to 60 as the name and address data area.

This example uses the carriage return (CHR$(13)) as the delimiter, but any character that would not normally be entered from the keyboard will do. The routine assumes that the length of the data has already been checked to ensure that it will fit. The dissecting routine also assumes that four delimiters were added, even if one or more of the data fields was blank.

Notice that this procedure lends itself well to the use of string arrays for alphanumeric data. This is possible because the arguments to the MID$ function can be variables.

Dealing with numeric data is similarly straightforward. The data is first converted to packed string form using MKI$, MKS$ and MKD$ as appropriate, and then inserted into the buffer at the required location. Listing 2 shows how this would be done for a typical range of numeric data items.

The numeric data consists of three integers, a single precision number and a double precision number. The integers are stored at locations 63 to 68, the single precision number at 69 to 72 and the double precision number takes up locations 73 to 80. The integers have been presented as an example of the convenience of using arrays in this application.

Although the data in this example is simple enough to have been dealt with by named variables in the FIELD state- ▶

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ment, the technique presented here becomes more applicable as the number of distinct data items increases.

Selecting Correct Precision

In dealing with numeric data items in data processing applications, the most important step is to ensure that the correct precision for the item is selected. Because BASIC-80 single precision variables will only print to six digits, the usual choice to be made is between integers and double precision. Generally, all money values will have to be double precision, and it is probably worthwhile to make quantities double precision also.

A good rule is to make any item that will be part of a calculation double precision. Integers can then be used for status-type information and for internal program counters and flags. Notice that in the examples used so far all numeric items have been integer – because we have been dealing with items that relate to functions internal to the program we can be confident that integers will be adequate.

Many externally generated data items will also be integer or single precision, but the program should check carefully that the range is not being exceeded. BASIC-80 handles overflow problems in intermediate results quite well, but there is nothing it can do if you try to put a million dollars or 1.5 lb into an integer.

The third data type mentioned was logical data, and buffer positions 61 and 62 have been reserved for this. These will be stored as single-byte characters which will be interpreted as an 8-bit string of 1s and 0s. Thus 16 distinct pieces of information can be stored in just two bytes – provided the information is of the true/false, yes/no form. Listing 3 is the required routine to unpack each byte into an eight-element array, and to repack the array into a single character. Note that the array elements are stored in array positions 1 to 8.

Although this simplified example deals with the full range of items to be stored, further consideration of the actual data items involved is necessary before we can be sure we have an efficient, simple data set.

Consider the alphanumeric data – name and address. Part of it – the postcode – is actually numeric. If this is separately handled it can be stored as an integer in two bytes instead of a four-byte string. In addition, if we require the postcode to be input then we don't need to include the state in the address – it can be simply derived from the first digit of the postcode. A little bit of programming might save between three and seven bytes per record.

Similar considerations apply to other items – for instance the title (Mr, Mrs,

Listing 1. Stringing and unstringing alphanumeric data.

```
100 FIELD #1, 80 AS R$
110 I$=NAM$+CHR$(13)+ADDR1$+CHR$(13)
    +ADDR2$+CHR$(13)+ADDR3$+CHR$(13)
120 MID$(R$,11,60)=I$
130 PUT #1,RECNO

200 GET #1,RECNO
210 I=11:J=INSTR(I,R$,CHR$(13))
220 NAM$=MID$(R$,I,J-I)
230 I=J+1:J=INSTR(I,R$,CHR$(13))
240 ADDR1$=MID$(R$,I,J-I)
250 I=J+1:J=INSTR(I,R$,CHR$(13))
260 ADDR2$=MID$(R$,I,J-I)
270 I=J+1:J=INSTR(I,R$,CHR$(13))
280 ADDR3$=MID$(R$,I,J-I)
```

Listing 2. Putting in and retrieving numeric data.

```
100 FIELD #1, 80 AS R$
110 FOR I=1 TO 3
120  MID$(R$,62+I*2,2)=MKI$(A%(I))
130 NEXT I
140 MID$(R$,69,4)=MKS$(B!)
150 MID$(R$,73,8)=MKD$(C#)
160 PUT #1, RECNO

200 GET #1, RECNO
210 FOR I=1 TO 3
220  A%(I)=CVI(MID$(R$,62+I*2,2))
230 NEXT I
240 B!=CVS(MID$(R$,69,4))
250 C#=CVD(MID$(R$,73,8))
```

Listing 3. Character (L$) to logical array (A%()) and vice versa.

```
100 FOR I=0 TO 7
110 J=A%(I+1)*2^I
120 K=K+J
130 NEXT I
140 L$=CHR$(K)

200 K=ASC(L$)
210 FOR I=7 TO 0 STEP -1
220 J=K MOD 2^I
230 A%(I+1)=(J[|K)*-1
240 K=J
250 NEXT I
```

Listing 4. Date to sequential integer and vice versa.

```
9996 REM nnnn --| "DD MMM YY"
9998 REM input DN, return D$
10000 D$="          JanFebMarAprMayJunJulAugSepOctNovDec"
10002 DF=INT((DN-1)/365)
10004 DI=DN-365*DF-INT(DF/4)
10006 IF DI[=0 THEN DF=DF-1:GOTO 10004
10008 DJ=INT(DI/30)+1:DF=DF+13
10010 DK=DI-31*DJ+31
10012 IF DJ[3 GOTO 10018
10014 DK=DK+INT(2.2+DJ*.4)
10016 IF DF=4*INT(DF*.25) THEN DK=DK-1
10018 IF DK[=0 THEN DJ=DJ-1:GOTO 10010
10020 MID$(D$,1,2)=RIGHT$(STR$(DK),2)
10022 MID$(D$,4,3)=MID$(D$,7+3*DJ,3)
10024 D$=LEFT$(D$,7)+RIGHT$(STR$(DF),2)
10026 RETURN
10034 REM "DD/MM/YY" -| nnnnn
10036 REM INPUT D$, RETURN DN
10038 REM  OR DN=0 IF INVALID
10040 DN=INSTR(D$,"/"):DA=INSTR(DN+1,D$,"/")
10042 IF DN[2 OR DA-DN[2 OR LEN(D$)=DA GOTO 10066
10044 DI=VAL(LEFT$(D$,DN)):DJ=VAL(MID$(D$,DN+1,DA-DN))
10046 DK=VAL(MID$(D$,DA+1,2)):DK=DK-100*(DK[13)
10048 IF DI[1 OR DI|31 OR DJ[1 OR DJ|12 OR DK[13 OR DK|101 GOTO 10066
10050 IF LEN(D$)[|2+LEN(STR$(INT(DI)))+LEN(STR$(INT(DJ))) GOTO 10066
10052 DA=0:IF DK=4*INT(DK/4) THEN DA=1
10054 DN=DJ+(DJ|7):IF DN[|2*INT(DN/2) GOTO 10060
```

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Ms) might be abbreviated to one character. In all cases the possible savings must be compared with the additional processing involved and the resultant restrictions imposed on the nature of the data. In the case of replacing states with postcodes, for example, the system could no longer deal with overseas addresses.

One area where a little data manipulation can save both storage space and processing time is the use of a byte as a string of eight logical indicators. Any question that can be answered as a 'YES or NO' is a candidate for storage as a logical bit, and as soon as there are four or five such items then the extra work involved in establishing one or more logical bytes is worthwhile.

Processing The Date

Another item that deserves special processing is the date. Although usually presented as a character string, the date can be stored as a numeric item. If it is an integer it will take up two bytes of storage instead of eight or ten as a string. If the routine to convert the date to an integer generates sequential numbers for sequential dates, then calculations involving the number of days between dates and day of the week are greatly simplified.

Listing 4 is a subroutine to convert a date of the form 'dd/mm/yy' to an integer, and to convert an integer back to a date in the form 'dd mmm yy' (for example, 30 Jun 80). By using integers we are restricted in the possible range, and in this example it extends from 1/1/1913 to 31/12/2001. This will cater for the birthdate of anyone up to 70 years of age, and if they are still on the payroll after this then they can stay at 70!

The range could be extended by adding a little processing to convert a negative integer into a positive single precision number, although this slows the subroutine down considerably. The first subroutine (10000) accepts any positive number, but the second has a limit of 101 on the year to avoid overflow errors if the variables are defined as integer.

The routine is not original. It is adapted from the example supplied with dBase II, which in turn is adapted from a much earlier source. The day of the week can be easily calculated (using the MOD function) if you remember that 1/1/13 was a Wednesday. ❑

From page 94

```
10056 IF DJ=2 THEN IF DI|28+DA GOTO 10066
10058 IF DI|30 GOTO 10066
10060 DN=365*(DK-13)+INT((DK-13)*.25)+DI+31*(DJ-1)
10062 IF DJ|2 THEN DN=DN-INT(2.2+.4*DJ)+DA
10064 RETURN
10066 DN=0:RETURN
```


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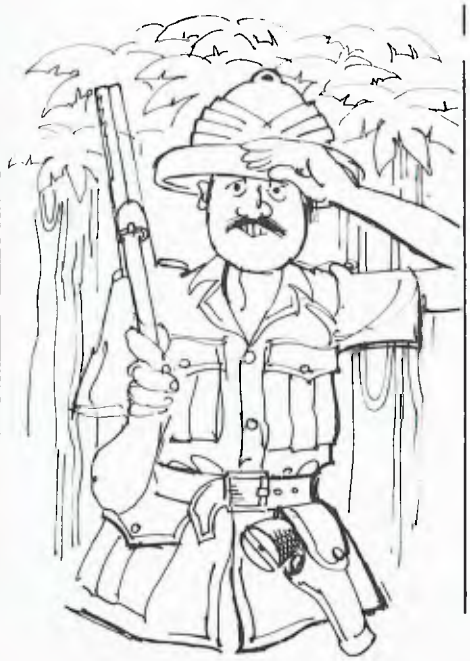

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By Rod Stevenson

I STILL can't offer a sure way for learning Assembly at a distance, so I provide the following as another aid I consider will help, along with the two books recommended earlier – *TRS80 Assembly Language Programming* by Howe, and *Z80 Instruction Handbook* by Wadsworth.

Grant Glastonbury, of P.O. Box 36, Langhorne Creek 5255, (085) 37-3181, has written a program called 'Logicon'. Its primary purpose is to show on the screen the operation of all the Z80 opcodes. For example, if you type in 45ADC9F you get a display of the hex, binary, decimal, and flags resulting, both as an eight and sixteen-bit operation.

Of even greater value is typing the rotate series of instructions to be able to see what happens to the bits and the carry flag. When I was battling with an understanding of the CP and the BIT instruction, I'd have saved myself a lot of re-assemblies with this program.

Grant intends the program to be used while writing in assembly; while not disputing this, I see it as a very valuable aid for beginners to achieve the necessary understanding of the whole Z80 instruction set. Certainly it's not a necessity for successful assembly writing; it should be a great help in the understanding process for those who find arrows and boxes hard to follow and have no-one to ask for a personal explanation.

Grant is not offering this as a money-raising concern. Sadly he has learned from others' unfortunate experiences in having their good offices just used without even getting postage repaid. So for $20 he will provide postage and media to send you the program on disk or tape (the same version works tape or disk Model 1 or 3 or System 80) with a text file of the instructions for you to print out for yourself. One reason for doing the instructions this way is that it allows constant updates as he gets inquiries about the using of the program.

If you'd like more information, Grant positively loves to talk on the phone! It may even be of value to hear how he taught himself Assembly in the far-distant wilds of South Australia!

Operating System Assistance

In addition to the earlier noted sources of John Ross and Ian Robertson for assistance with System 80s and Scripsit modifications, I can now pass on a source for assistance with disk operating system incompatibilities. I seem to be getting more letters of pleas for help, so I'm pleased to be able to tell you where to go for it. Frank Marten, P.O. Box 54, Bridgewater 5155, (08) 339-2220, has done battle with the various disk operating systems, and delights in fixing problems caused in programs that run quite happily under some other operating system.

He particularly delights in buying programs reputed to limit back-ups (such as the Melbourne House range) just to see if he can back them up. In doing so he has managed to amass a huge knowledge of operating systems. The relevance of this is that most programs are written to run under TRSDOS, which is itself a poor operating system; such programs may develop problems if run under LDOS, for example. There is also the problem of Model 1 programs that won't run on the Model 3, and tape programs that won't run under any DOS.

So if you have any of these requirements, or something that seems allied, you could do far worse than contact Frank. Those who've written to me lately I've just re-directed to Frank anyway, such is the confidence I have that he will be able to help.

Both Frank and Grant Glastonbury (mentioned above) are members of the Adelaide Users' Group, and have seen how mistreated are those offering their services free. So Frank also now asks a small fee, which in reality does not compensate for the time he spends, but does dissuade those who expect a total stranger to spend many hours on a problem which is not his own, and perhaps which he would not choose to pursue, and then to pay postage on perhaps a number of letters asking for information they've neglected to provide. So contact Frank and explain your needs; he will tell you what to do.

Like Grant, Frank is not in it to make vast amounts of money, so if it's only advice you're after because you'd rather have the fun of doing it yourself, a stamp or a phone call will be all that's required.

Gold Contacts

Most Model 1 owners with a disk system will know of the problems with the tin-plated edge connectors and the difficulties caused by oxidation of the metal even while in contact. A quick and easy way to determine if this is really the problem is simply to unplug and then immediately replug the offending connection. The wiping action will remove most of the traces of oxidation, and if that cures the problem all is well, since $25 spent on a strip of gold contacts will permanently cure it.

The contacts come in a strip of sufficient number to do the keyboard and expansion interfaces, and are available from Magmedia or other suppliers.

However, if the problem is not poor contacts caused by oxidation then this remedy will do no good whatever. Nor will the application of the jelly advertised in the American magazines – I don't like the thought of such a cure, particularly when every instance I know of has been totally cured by fitting the gold contacts, although this is admittedly more work than spreading jelly around!

Because I have the whole 48K of memory in my keyboard I'm not plagued by this problem of oxidation, since it's the refreshing of memory that seems to be so sensitive to poor paths between the CPU and the interface, if this is where your memory is. But I have found it fairly easy to damage the cables at the edge connector plug, because my particular plugs are quite tight and I'm usually tempted to pull by the cable instead of the plug. The obvious answer here is to re-terminate the cable, and although the hardwarians will insist a special crimping device is needed (there is one marketed with a range of heads for all the possible plug types), an ordinary vice seems entirely adequate.

The obvious way to test if this is indeed the problem is to arrange to swap cables with a fellow member of your users' group; either the problem will go with the cable, or it won't! I hesitate to advise you to wobble the cable fiercely where it goes into the plug for fear you may break it off altogether and have to do without for a time.

ROM Bug

Warwick Sands has sent me a package he's developed to provide many of the disk BASIC commands for tape systems (Models 1 and 3 and System 80), which looks very promising and which I'll be reviewing in a future column. The advantage of his package over the other commercial ones already in the marketplace is that it allows the user to select the particular modules applicable to the need of the moment.

Warwick also answered my question of an earlier column about jumping to a machine code routine from BASIC and disabling the interrupts. He advises there's a bug in the ROM that does an RST when it encounters an EI instruction prior to going back to BASIC from the machine language. So the obvious thing to do is to use the CMD"T" and CMD"R" instructions within the BASIC program. Thanks, Warwick. ▶

Logical Fault Tracking

It seems from conversations lately that some people have a basic lack of appreciation of the way to track program bugs, and particularly even to determine if it is hardware or software. Regular readers will know I'm the last to attempt to diagnose where the hardware problem lies, but I certainly do like to know if indeed it is a hardware fault.

As a wide generality I could say that software faults are consistent (given the same conditions and parameters), whereas hardware ones need not be – particularly the case of poor contacts mentioned above, which can be a real source of pain one day and give no trouble at all the next.

It seems to me that the hardware fault is often of a mechanical nature, rather than the electronic type, particularly with the Model 1 and System 80. That is to say, caused not by the electronic component failing, but by some mechanical cause like a bad solder joint, or a wire that has flexed too much and broken inside the insulation where it isn't obvious.

The software fault will have always been in the program, but the particular conditions may not have been present before, or indeed it may have been just overlooked at the time. A constantly recurring error message (for example, Sn error in 100) will almost certainly not be caused by hardware; it seems obvious, I know, and although I've used an extreme example here, the same applies to the more complex errors.

Even the false arithmetic encountered in some computations is not really hardware; nor is it software. Because the processor works in binary and there is no direct equivalent in binary for some numbers (such as 0.1), there must be an error generated. Often this is taken care of in later processing, and some other machines have ROM routines to correct it. For the same reason there's sometimes a problem in trying to get the square root of certain numbers; even if displayed correctly on the screen, the value need not be correct in memory.

I suppose as a general rule I could say the hardware problem is likely to cause failure of the system, whereas the software problem is likely to cause a bug which may make the program fail, but not render it unusable.

Another apparent software fault is produced by not reading the instructions. An example I recently had was a program that had been typed in with an input prompt wrong, resulting in input being rejected. Reading the operating instructions accompanying the listing in the magazine would have saved sending the program to me to fix!

Video Monitors

I hope what I'm about to say will not cause dissatisfaction where none existed before. Even using a TV set it is possible to bypass parts of the circuitry to produce a clearer picture, although the final result will always be limited by the actual picture tube itself. With the rather coarse graphics standard on the Models 1 and 3 and System 80 this will not matter as far as definition goes, but a clearer image is more restful when reading text (as in word processing). Again, you won't get what you don't pay for, so if you're prepared to spend $500 on a specially produced monitor the results must be better than the $30 TV you bought from the junk shop.

Depending on your electronic expertise, the results by circuit modification of a normal TV will vary proportionally with the effort you put in, from the easy level of going in after the tuner to the highly complex route of feeding the cathode direct. There was an article in the Adelaide Users' Group newsletter about this very subject, so if it interests you a stamp to 36 Sturt St, Adelaide 5000, will get you a copy.

The rest of the answer to the question is not so easy. A popular desire (I admit I too would like this) is to achieve the clarity and pleasing display of the Model 4. For all practical purposes it's not available; even the kit to upgrade a Model 3 to a Model 4 will not do it. As well as replacing the tube and its associated video driver and logic board, you'd have to change the character generator (the Model 4 has wider characters, which adds to the appeal) and who knows what else? If you haven't a Model 4 at hand just go into a Tandy store and examine what you can't have; even the green phosphor of the screen is a different colour green!

And just to confuse matters we're now being told that amber is a more ergonomically desirable colour anyway ...

Advanced BASIC

Having just told my readers I could not recommend a good book for advanced BASIC learning (I suggested doing it yourself as the best way to learn), I've found I was unintentionally somewhat untruthful. The Nov/Dec issue of the specialist TRS magazine *Micro 80* from Adelaide (not to be confused with the American *80micro*) had an introduction to beginning advanced BASIC, although that author too suggested the best way is to actually do it.

One of the topics covered was the converting of machine language into BASIC (and vice versa if required). My own view is that it's too complicated to do following instructions step by step unless you understand what you're doing; I do convert my machine language into BASIC, so I support the principle, but would rather see an appreciation of what's involved than a blind following of the steps presented.

If you'd like that particular issue, send $3.50 to *Micro 80* at P.O. Box 213, Goodwood 5034. If you've never read *Micro 80* I'd certainly recommend you get at least that issue; it is good to have so much about one topic (and an often requested topic) collected together. *Micro 80* will also send you a free sample issue on request, but it may not be that particular one. Generally the magazine aims at the beginner, on the grounds that not many others do; perhaps a good policy.

BASIC Arrays

I admit that our version of Microsoft BASIC doesn't have as many array handling facilities as do some, and I tend to use the string capabilities more because I find (for my specific uses) they're more appropriate. However, I still believe a good understanding of arrays will be of advantage, even if it allows you to decide you don't want to use them.

From the reactions from our Users' Group BASIC sessions, I see that the major problem with the use of arrays is the initial understanding; once understood properly there's never any problem. My own way of thinking is that in a two-dimensional array the first dimension goes down the page, the second across; the whole thing I picture as what used to be called a 'shadow box'. So A(1,4) refers (in my scheme) to the particular array element (or box if you prefer) in the top line fourth position from the left. In this specific instance of using arrays, for simplicity I ignore the fact that the computer starts counting from zero; I just accept that I've wasted a byte or two of memory!

A real-life example of a two-dimensional array is the telephone book. Note there are more than two items across for each entry down the page; it's easy to blindly assume that more than two dimensions are needed when they very seldom are. ❑

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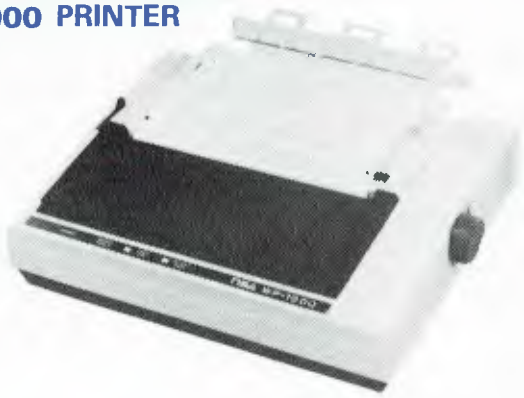

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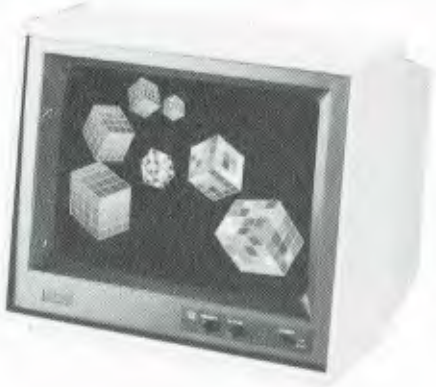

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By Bradley Thurkettle

EVER WONDERED how anyone could afford the price of the commercially available products for an Apple in Australia? Or how you'll ever afford an 80-column card? Maybe the answer for you is Hong Kong.

Recently I went there with high expectations, only to find small stores about the size of a milk bar, every 50 metres or so along the main roads, selling the odd 16K card amongst the cameras and Walkmans. It wasn't till I went to a place outside Hong Kong near the Chinese border that my hopes were realised.

The place was called the Golden Shopping Centre, and its address is 156 Fuk Wah Street, Kowloon (no kidding), although you may have trouble finding it even with the help of a taxi driver. It is easier to take a train and get off at the railway station nearby.

It's located right in the middle of a real Chinatown and at first glance you would expect this to be the last place to find computers, but sure enough, when you step inside the place is filled with electronic gadgetry. The shops are still milk bar size, but scattered throughout all of them, literally lying on the floor, are interface cards, floppy disks, disk drives, printers and of course the rotten Apples.

Although the quality isn't there, the prices will be enough to tempt anyone. The latest software, be it games, business, or whatever, can be picked up for around AUS$7 per disk. Interface cards are also very cheap: $25 for a 16K card, $30 for a wild card.

Printers are available either from Japan, where the higher-quality ones come from (Epson, NEC and so on), or locally at incredible prices. I picked up a genuine Epson FX-80 for about $550, whereas they retail for nearly $1000 here. It hasn't played up yet, but since the demo involved shoving the bare wires from the printer into an outlet I wouldn't be surprised if it did one day!

Rotten Apples were the main type of computers available, but there were a few fake IBMs and NEC originals.

Hong Kong isn't for everyone, but if you know of someone heading up that way it might be worthwhile to have them pick out something cheap. Failing that, Singapore has software and you could pick up most programs for the price of a disk (I found a place with Visicalc 3.3 for $3 instead of about $300).

Control-D Bug

Since DOS was written after the first BASIC on the original Apples, a system to allow programs to issue DOS commands needed to be invented. The way chosen to do this was to have DOS look at the first letter in a line printed by a program; if this letter was a control-D (CHR$(4)), then DOS would attempt to execute what followed as a standard DOS command. This system worked fine as it allowed all languages the benefit of DOS – not just the two BASICs, but machine language and any other program developed independently (LOGO, COBOL and so on).

The bug was that nobody was told about having to put the control-D in the first position, so many people couldn't understand why a line like:

```
10 ?"GETTING CATALOG ";:
?D$; "CATALOG"
```

wouldn't work, where D$ had been previously assigned by a statement like:

```
5 D$ = CHR$(4)
```

The reason is that the control-D is being printed in the 17th horizontal column and being ignored.

Kill the Bug

The way round this is to set D$ to make certain the control-D ends up in the first column position:

```
5 D$ = CHR$(13) + CHR$(4)
```

The CHR$(13) is equivalent to pressing the RETURN key, which brings the cursor back to the left side of the screen.

Be careful, though, as this cure for one bug can produce another. If you're using text files and instead of using control-D alone you use the above cure, when you attempt to CLOSE the file with a statement like:

```
50 ?D$;"CLOSE";FILE$
```

then your program will first issue a RETURN before performing the CLOSE. If you were writing to a text file at the time, the RETURN would create a blank record at the end of your file. If you experience this problem the solution is to put the control-D in the first column by some other means, the easiest being an HTAB 1:

```
50 HTAB 1:?"CLOSE";FILE$
```

where a control-D has been typed between the first quote and CLOSE.

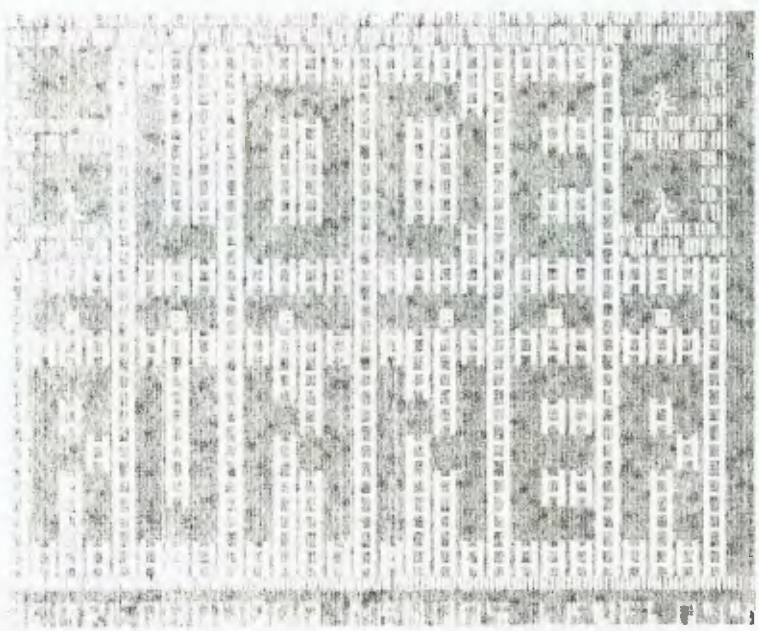
Lode Runner

Now and then an Apple Program comes out which surpasses all those before it. Raster Blaster was an early one, then came Choplifter and now Lode Runner. The basics of Lode Runner are similar to Apple Panic, but don't let that put you off.

Lode Runner has the ladders, and the floors which you can put holes in. But unlike Apple Panic you don't dig, you just point your pistol and blast. In addition, there are solid floors (so you can't trap your pursuers), traps which drop you down levels (without killing you) and horizontal ladders which you must go hand over hand across.

The big difference is that Lode Runner has 150 different and challenging levels. If that isn't enough, it also has provision for you to create your own screens, and allows you to start on any level, with as many runners as necessary.

After completing 130 levels I can highly recommend this game. ❑



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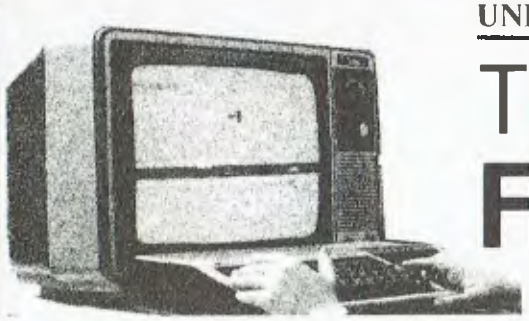

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your ATARI computer

By Ernie Sugrue

Atari's latest computer, the 800XL, which was described in a previous Atari column.

WELCOME AGAIN to Your Atari Computer. This month I shall review the new word processing program from Atari, AtariWriter, and also give you a short review of 'Preppie'.

AtariWriter

AtariWriter, as you no doubt know, is the new word processing program released through Atari. It was co-developed by Datasoft, who have previously released 'Text Wizard'.

The program itself is in the form of a cartridge, and comes in a (typically Atari) oversized box with the guarantee card (which is 'valid in US only'!), the very comprehensive instruction book and a handy quick-reference card that lists all the commonly used commands. There is also room in the carton for storage of two program cassettes or one diskette, on which you save your documents, letters or whatever.

After loading the cartridge, which takes 10-15 seconds, you are confronted with a menu that lists eight choices (in alphabetical order): Create File, Delete File, Edit File, Format Disk, Index of Print Files, Load File, Print File and Save File.

Quickly explaining the more obvious choices: Delete File mimics the same file in DOS, and after confirmation – Delete File: Are You Sure? – will dutifully delete your creation. Format Disk, as you might expect, formats a disk, whilst Index of Print Files performs a disk directory on that disk. Obviously, if you only have a cassette recorder for storage you cannot Delete File, Format Disks or Print the Index.

Load File and Save File are opposite commands, each one requiring confirmation if certain conditions exist. If, for example, a file is already in the computer, and you attempt to load another file, it beeps and asks: 'Erase File in Memory?', or if you attempt to save a file where a file already exists in that name you get: 'Replace Existing File?'. This happens a lot if you are editing a file.

Print File does just what it says. When you first attempt to Print or Print Preview (I'll explain that in a moment), you are asked to choose which printer you have: Atari 1025, 825, 820 or 822. If you have an Epson (like me!) or any other ... tough.

The manual explains that some printers may require a 'Printer Driver'. If you don't want to go to the expense of buying the driver, simply select choice 3 (Atari 820), and the program should print fine.

Next you will be asked if you wish to print the full document, and how many copies you require (maximum of 99). Then you can sit back and wait for your letters or whatever to be printed.

To create a file you literally sit there and type, pressing return when you want to start a new line. The Writer automatically formats the print, making it easier to read on the screen. The Formatting Block at the top of the screen and the command Print Preview tell you exactly how it will look on paper.

The Formatting Block lets you control such things as spacing (single, double and so on), justified print or not, page length, width of margins, paragraph spacing, top and bottom margins and print style. They are quite simple to set and change. If you're not sure how your combination of formats will actually look on paper, press <OPTION> P, for Print Preview. The result will show you what it will look like, including where and when the pages will end.

Then there is the 'new paragraph' command: <CTRL> P. This theoretically begins a paragraph automatically by spacing four lines, and indenting five spaces, but I can't seem to get it to work (but maybe it's just me!).

Less Obvious Features

Now, some of the less obvious things AtariWriter can do. Headers and Footers are as simple as <CTRL> H or F; your header/footer will print at the beginning or end of each page. Add an '@' to the end of your header/footer, and page numbering is done for you.

You can also block delete, duplicate blocks of text or move them, which is handy if you want to change the wording or format dramatically, as it saves a lot of retyping.

Page Wait allows you to print each page of your document on a separate sheet of paper: letterheads, bond paper and so on, rather than continuous. Page Eject stops printing before the actual page end, and advances to the beginning of the next page.

You may also head specific sections of your work, and subscript or superscript if necessary; and form print allows you to change the addressee's name, for example, but duplicates the rest of the letter.

The intricate details of what AtariWriter can do are too complex to explain fully here. In fact you could write a book on it – they have! It's called the instruction manual, and is excellent.

It is divided into four separate sections that guide the new user through the workings of the program, explaining all the commands used, how to use them and what each will actually do.

A quick reference card is also included that reminds you of the 70 most used commands.

The AtariWriter has too many features and good points to even attempt to discuss. I've used it continuously for about four months, and it's never faltered in operation, when using it for either pleasure or business.

Retailing for $119.95, it really is a good buy, and if you write even a few letters a week is well worth the cost.

The Adventures Of Wadsworth Overcash (Preppie!)

Preppie is released by Adventure International. The object of the game is to guide young Wadsworth across an almost unbelievable obstacle course, to retrieve golf balls. The screen and prem- ▶

ise are similar to Frogger, where the screen is divided into two: solid land, and a stream or river. You must move around golf carts and mowers on the land section and jump across the river section on canoes and logs or crocodiles.

The first screen has just one ball to collect, the second and third have two, and then the fun really starts.

In later screens crocodiles are introduced, which, if jumped on while their mouths are open, enjoy lunch... There's also a giant frog that jumps very slowly across the middle of the screen. So slowly, in fact, that if you get behind it and continue, you won't complete the screen in time, and yet another of your three Wadsworths will disappear (another 'man' is awarded at 8000 points).

The music to this program is quite stunning, and is both entertaining and catchy, though hearing it continuously for 20 minutes may leave you with a different opinion!

Preppie is for either one or two players with one or two sticks, and the program will retain the high score for that session. It is very reasonably priced, as are all Adventure International Games, and is available nationwide.

Zork I Hints

Problem: Can't stop dam flow.

Answer: Go below the dam to the maintenance room. Press yellow, brown, yellow. Take wrench from room and return to the dam console and 'Turn Bolt with Wrench'.

Problem: Can't enter Hades.

Answer: You need: Black Book, Candles, Torch and Bell. You can work it out from there!

Problem: Can't venture over Aargon Falls.

Answer: Wave Sceptre.

If you have any other specific problems with Zork I, please write. Also write if you can solve or are having problems with Starcross, Zork II, Suspended, Wizard and the Princess and Deadline.

String Manipulation Program

The following may be used to simulate string arrays in Atari BASIC. The author, Tim Buchalka, uses it in the accounting software he is currently writing. Thanks, Tim, for sending it to me, and I hope readers will find it useful.

```
10 REM String Manipulation
15 REM by Tim Buchalka
20 DIM DT$(1000),NULL$(50)
30 DIM START(100),FINISH(100)
40 ? "}Input string <cr> to end"
50 INPUT NULL$
60 IF NULL$="" THEN 1000
70 L=LEN(NULL$)
80 C=C+1
90 START(C)=LEN(DT$)+1
100 FINISH(C)=START(C)+L
110 DT$(START(C),FINISH(C))=NULL$
115 FINISH(C)=FINISH(C)-1
120 GOTO 40
1000 ? "Now type a number from 1-";C
1010 INPUT NUM
1020 IF NUM<1 OR NUM>C THEN 1000
1030 ? DT$(START(NUM),FINISH(NUM))
1040 GOTO 1000
```

Well, that's about if for another month. Next month, I'll talk about the Source, among other things. Till then, write if you wish to:

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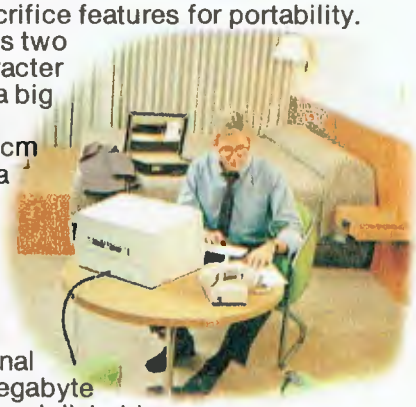

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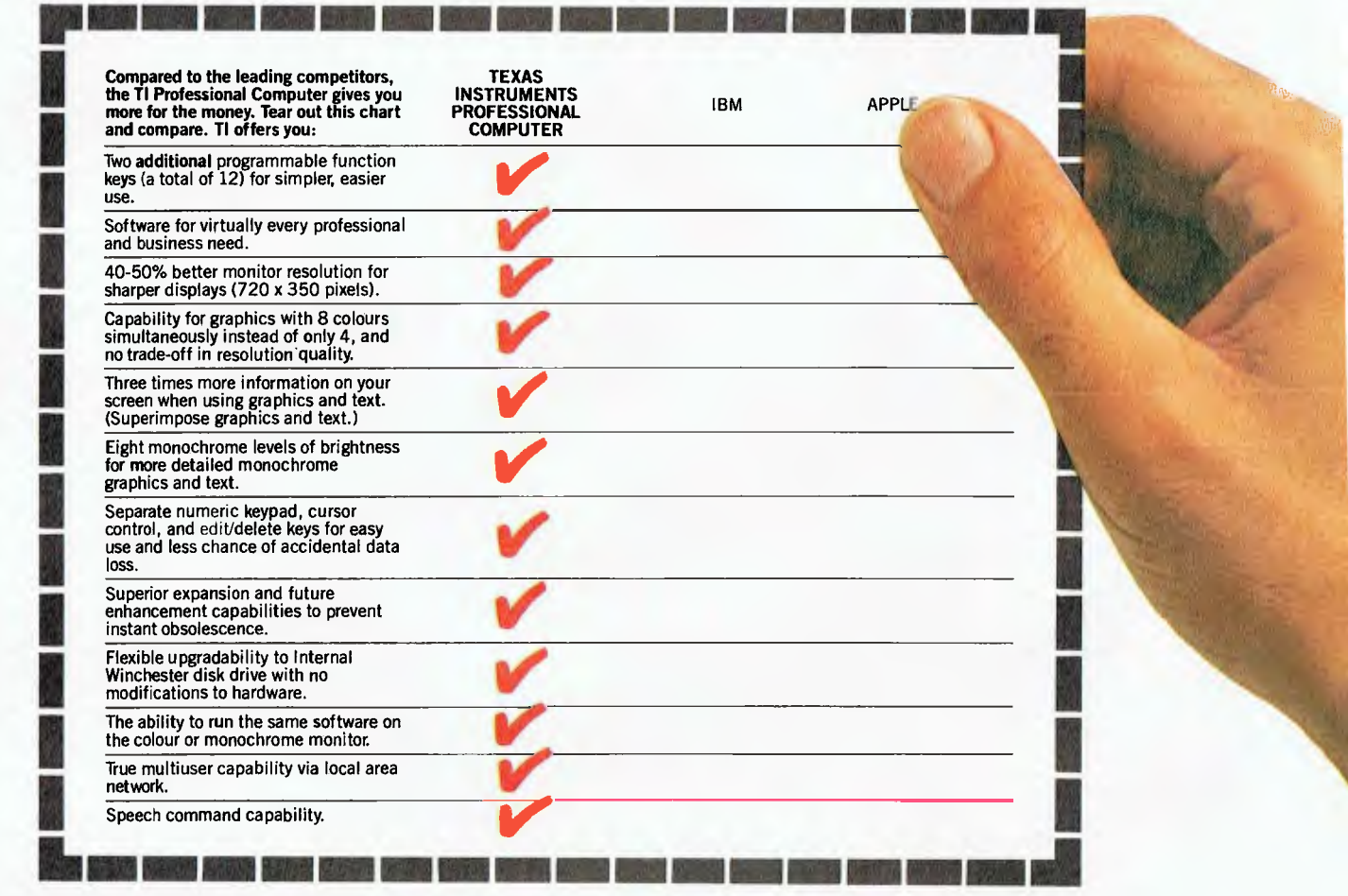

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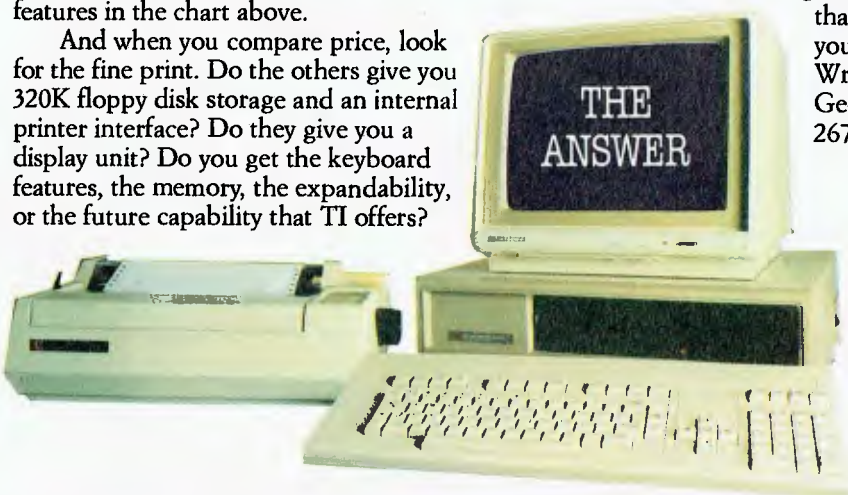

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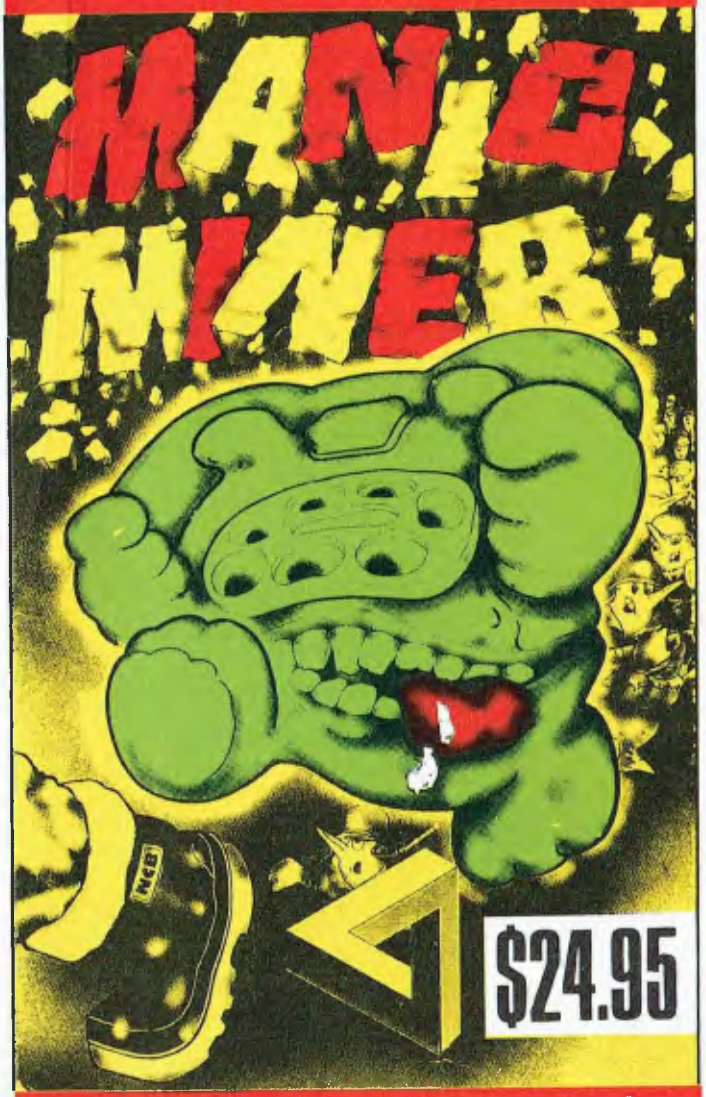

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your MICROBEE computer

By Mike Newnham

IT APPEARS that *that* court case has been followed by a marked roll-off in software sales – not a very inspiring situation for those individuals who have put their time and effort into writing a program and who might as well be giving it away for free.

It would be nice to think programs were only being copied for purposes of back-up, wouldn't it! Since this is not the case, the technique of copy-protection has evolved, with some writers going to great length and devious means to ensure the safety of their software. I point out, though, that these protective devices are seen as a challenge by most programmers, and represent a minor barrier to anyone worth his salt. The point is that protection should not be necessary (naive, you say), and there are those whose belief is that protection denies the purchaser the right to back up the programs he or she purchases. However, the fellow who puts weeks of effort into writing a program doesn't see it that way at all. He is only trying to protect his interests. The bald truth is that, due to a definite shortage of honesty, copy protection thrives.

BASIC Bugs

I've read a large number of letters from people who've taken programs from magazines, typed them in and found they would not run. The following may help some of those encountering this problem.

I've tried some of these programs on the basis of the letters specifying them and found them to be okay. One fellow sent me a tape, however, and it demonstrated an error which is mentioned in many of the letters. The error message 'MULTIPLE ERROR STATEMENT' was occurring whilst READ data instructions were being executed. It took me a while to twig to it (six months since I last wrote anything in BASIC), but all was eventually revealed.

It seems that some of the DATA statements had been edited after they had been typed in, and illegal characters had been left in the line. The illegal character that occurred most frequently was the 'UNDERSCORE', which will be left in a line during editing if both the CTRL and DEL keys are pressed simultaneously. You won't know it's there until the program crashes. Before giving up in frustration when these errors occur during the execution of READ statements, place each line of DATA statements into edit mode to find the illegal characters.

Worthy Cause

I hope there's a charitable streak in some of you, because I've a letter from a gentleman in Tasmania who is using his Bee to help disabled children to derive some learning and pleasure from life.

Mr Ogbourne modifies programs so that kids who can't operate a keyboard are able to respond to the computer by means of specially designed data entry methods.

What is needed, though, are programs that can be adapted to this purpose. Games, educational software, anything you think can be interesting or useful would be helpful, so if there are any altruists out there who would like to donate any BASIC programs, they can contact:

Mr N.J.J. Ogbourne
21 Guildford Rd
Launceston 7250.

Key Checking

From Patrick Schmitzek comes a quick method of determining whether or not a specific key has been pressed. When any key is pressed it will cause address 102'H' (258) to change from its default value of 0FF'H' (255) to a value in the range 0 to 37'H' (0 to 55). This value has nothing to do with the character represented on the key, but is simply a value generated by the actual key. If you run the following BASIC program you can see for yourself the value that each key will generate:

```
10 CLS
20 PRINT PEEK(258): GOTO 20
```

Just press each key in turn and its value will be printed on the screen. This permits keychecking to be implemented in a program simply by using code along the following lines:

```
10 K=PEEK(258)
20 IF K=1 THEN ... ELSE IF K=26
   THEN ...
```

where K is the value returned by a keypress. The numbers 1 and 26 are just examples. As soon as the key is released, the address 258 returns to its default value. For keychecking in BASIC, this method is faster than the KEY$ instruction.

Software

Microbee game software is evolving at a noticeable rate. The writers are realising that high-res graphics are better than low-res graphics, and that low-res graphics are better than no graphics at all.

I've been through about twenty different games programs from three different sources, and the quality of the material ranges from terrible to very good. Here is a pocket review of some of them.

First, from Dreamcards, there is an interesting program called 'Killerbees'. Various towns and cities throughout Australia (there's a map to display them) are under direct threat of attack by hordes of killer bees. The aim of the game is to eliminate the bees, by first evacuating each town under threat and then employing offensive measures against the bees.

The game is text oriented, except for the map, and is quite a good way to spend some time. Killerbees requires some thought on the player's part, and can keep you busy for some time.

If you're an avid game player, this is worth putting on your list. PRICE: $14.95

Also from Dreamcards comes 'Mine Drop', a maze game which has the player driving a tank, pursued by the dreaded Bingle. The player's defence lies in a supply of mines which can be dropped and detonated, one at a time. If the Bingle happens to be over the mine at the same time as you detonate it, then his destruction scores you points. Kids of all ages like this one. Price: $14.95

'Penetrator' from Dreamcards is a fast, real-time, shoot-em-up game where the player flies his craft over rough terrain and through caverns whilst fighting off attackers and bombing ground installations to rack up points. The action is fast and furious, but unfortunately the low-resolution graphics, accompanied by masses of screen break-up, detract from the game and make concentration somewhat difficult. At $19.95 I don't recommend it.

Computer Technics also supplied me with some material for review. The first I'll look at is a rather dreadful little program that tries desperately to be an adventure game. The game is called 'Amazon', and is *not* to be mistaken for 'Amazon Search'. The player wanders about in the Amazon jungle, constantly being confronted by nothing, and all output from the program consists of about four lines of text in the upper left-hand corner of the screen.

This program is dull and is one of those that should be steered away from. Price: $14.95. Written by Digital Concepts, supplied by Computer Technics. ▶

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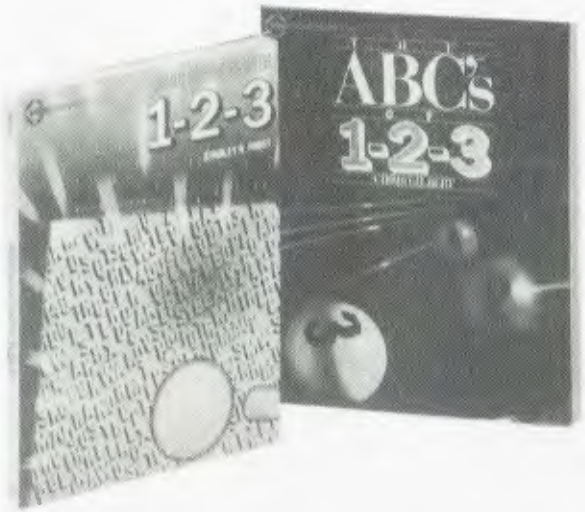

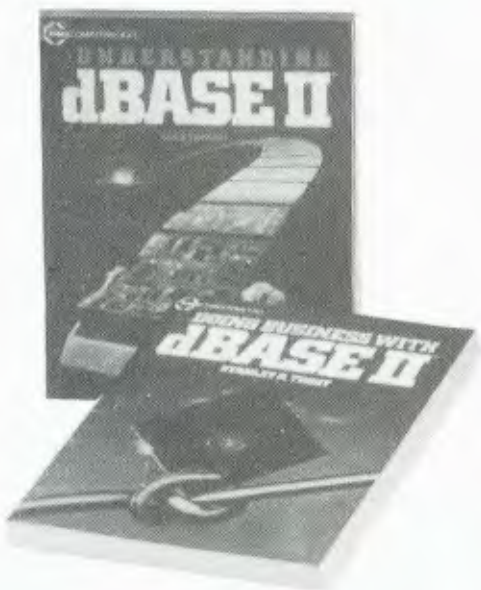

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'Pontoon', also from Computer Technics, is mainly text oriented, but has the playing cards produced in high-res graphics. You could do a lot worse. The game permits a number of players, with the computer as bank. It allows splitting of pairs and will recognise and pay on five and under wins by the player. An interesting program if you like to play Pontoon (Blackjack).

In contrast to Dreamcards' Penetrator, there is Applied Technology's version of this game. 'Scrambler' is the same style of game, but uses high-res graphics very effectively. There's a lot of work in this program and it's well worth the money. Price: $14.95 (tape) and $19.95 (disk).

Disk Controllers

Along with the Dreamcards disk controller I mentioned last month, there are others about to hit the market (as I write this in March). All of these provide alternatives to the outlay of a large amount of ready (?) cash for the AT system. If you plan to purchase one of these alternative controllers, and especially if you intend to run CP/M, then remember that any 2 MHz Microbees may need some modification. Specifically this involves changing the crystal and the character ROM. It involves the addition of a few jumpers to the motherboard.

Try to ensure that the company from which you buy your controller can advise you of the exact modifications required, if any. As soon as I can find out myself, I will publish them in this column.

Assembler

While a lot of Bee owners are interested in extending their knowledge of programming into the area of Assembly language, to do this you will need the backing of some well-written books on the subject. The first, which is virtually essential, is the Zilog publication *Z-80 Assembly Language Programming Manual*. This book clearly details the function of each instruction (not the hidden codes, though. Forget these if you are serious about Assembler) and its effect on each of the flags.

Some other texts worth getting hold of are as follows:

- From Tandy: *TRS-80 Assembly Language Programming* (Product number 62-2006). While this one is based around the TRS-80, it contains some very clear explanations of instructions both separately and when used in a routine. It is also very good in its description of the flags and their use.
- *Programming the Z-80* by Rodnay Zaks, published by Sybex. Generally available from Dick Smith stores. This is not a bad book and is quite good in some areas, but in others it presupposes more knowledge than the beginner has.

Most other books available for Z-80 Assembler are also very useful and can be purchased from most of the electronic component stores. One other book, while not Z-80 specific, does give some excellent treatment of the subjects of arithmetic techniques, base conversions and general program construction. It was last known to be available from Dick Smith stores, but you may have to hunt for it now. It is *Programming Microprocessors* by M.W. McMurran and is published by TAB books.

On a practical basis now, successful Assembler programming also requires a sound knowledge of the workings of the Assembler used in your machine. Each Assembler directive, excluding the actual instruction mnemonics for the processor, should be understood if you are to use the tool properly.

One directive which is least understood is the EQU or equate directive. This device is used to assign a numerical value to a label. When actual assembly of the source code occurs, any reference to that label will automatically substitute the value assigned to it in the EQUate table. EQUates can be used anywhere in the source file, each with its own line number, and if you read source listings of programs you will see that any regularly (or irregularly, for that matter) used piece of data can be assigned to an EQUate.

For example, the following are all valid uses of equates:

```
LOCN    EQU    0F000H
BYTE    EQU    58H
PORT    EQU    0DH
```

and the instruction to use them could be:

```
LD HL, (LOCN)    ;load HL from
                  location 0F000H
JP LOCN          ;program jump to
                  0F000H
LD A, BYTE       ;load accumulator
                  with 58H
IN A, (PORT)     ;input a byte to A from
                  port 0DH
```

Once you have an idea of the operation and use of any device the next step is to experiment with it to find out its operation and use, in detail.

Last month I showed how to convert a decimal entry into binary in HL, so this month the routine will take binary in HL and convert it to the ASCII representation of its decimal equivalent. Some basic principles need defining first. Remember that each digit position in a decimal number has a magnitude which is expressed as a power of ten, and as we move left through the digit positions, this magnitude increases by successive powers of ten. Thus any digit in a decimal number represents a value that is the product of the digit and the magnitude of the position it occupies. Learnt it in primary school, right! ❑

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MICROBEE

The above is the principle used in the routine given below, where successive subtractions of powers of ten are used to derive each digit of the resultant decimal number.

See Listing 1.

Use this routine in conjunction with the ASCII line entry routine from February and last month's ASCII to binary routine to demonstrate the behaviour of this routine. Type in the second routine below, followed by INASC, ASBIN and BINASC routines, assemble and execute at START address.

See Listing 2.

If you change line 100 of the BINASC routine so that DE is loaded with a screen address, then your decimal result will be placed on the screen by BINASC. Note that if the value in HL can be expected to be always limited below a certain power of ten, then alternative entry points into BINASC may be used. For example, if the contents of HL will never be greater than 999 the entry point TEN2 can be used (CALL TEN2) provided that DE is set up before CALLing.

Have fun, and what's more important, experiment.

New Products

Robotron, the company responsible for BeeThoven and BeeTalker is not one to rest on its laurels; I believe a project involving speech recognition is in the offing. The possibilities of such a device are interesting to consider. While speech recognition has been around for some time, one would hope that it has benefited from current IC fabrication technology to the same extent as the process of speech synthesis. A serious application of speech recognition could be to provide disabled people with a means of communicating with computers or other devices. Many of these people are, at present, denied access to or involvement with the benefits of our technology. ❑

Listing 1.

```
100 BINASC  LD    DE,ASLIN     ; point to ASCII line
110         LD    BC,10000     ; to count the number of 10000's
120         CALL  CVTBIN       ; go and do it
130 TEN3    LD    BC,1000      ;
140         CALL  CVTBIN       ; count the 1000's
150 TEN2    LD    BC,100
160         CALL  CVTBIN       ; count the 100's
170 TEN1    LD    C,10
180         CALL  CVTBIN       ; now the 10's
190         LD    A,L          ; remainder less than 10
200         JR    FIN          ; so just make it ASCII
210 CVTBIN  XOR   A            ; to initialise counter and clear carry
220 SLOOP   SBC   HL,BC        ;do subtraction
230         JR    C,RSTR       ; if HL was less than BC
240         INC   A            ; bump counter
250         JR    SLOOP        ; for next subtraction
260 RSTR    ADD   HL,BC        ; to restore HL
270 FIN     OR    30H          ; make contents of A into ASCII
280         LD    (DE),A       ; into ASCII line
290         INC   DE           ; point to next ASLIN location
300         RET                ;back for next or back to calling
310         END                ; routine if done.
```

Listing 2.

```
10 START  CALL  INASC          ; get a decimal number
20        CALL  ASBIN          ; convert it to Binary
30        CALL  BINASC         ;and back to decimal in ASLIN
40        RET
```

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IMAGOMAT 2032/1

your VIC/C64 computer

By Andrew Farrell

THIS YEAR'S APC Show was a big success for most exhibitors, with Apple dominating most of the stage. Perhaps it should have been called the Australian Macintosh Show? Change your life and learn to use a mouse today ... sad, isn't it? Well, we Commodore owners will just have to persevere with the better computer!

Commodore was well represented by software and hardware distributors. Computer Classics had a fully operational modem package on display, which happily coincides with the Australian Beginning getting its act together with software for the '64.

Imagineering also had several new packages, including a very comprehensive music development kit and an aerobic dancing program. Ozi Soft showed quite a bit of Australian talent with a new game called African Safari, which is a good attempt at changing the style of adventure games to some extent.

The game uses a mixture of smooth-scrolling graphics and sound along with the usual text descriptions, to provide an almost real-time environment. Commands may be entered from the keyboard as well as simple movements from the joystick.

Commodore was kept busy demonstrating Easyscript and the Magic Desk to potential buyers, whilst a host of cartridge games provided hours of amusement for the young and young at heart.

Daisywheel

Dealers doing a raging trade in RS-232 interfaces and the like will be pleased to know interfacing problems are over. Commodore has released a new daisywheel printer which is virtually fully compatible with the 1525. It uses a standard serial interface and prints at 30 cps.

Features include proportional spacing, bold type and negative line feed. It accepts Diablo-type printwheels and IBM golfball ribbons. Hopefully this is the answer small business users have been waiting for, especially at around $799.

Colour Printer

Along the same lines as the existing MPS-801, the MCS-801 uses a multi-colour ribbon with three primary colours

to produce up to seven colours using mixing. Colour printouts are great for high-res graphics dumps, typical of what were being printed out at the show.

The MCS has friction and tractor feed with an 8 by 8 character matrix, ideal for high-res graphics. The ribbon cartridges are re-inkable, if you like that sort of thing, and the whole lot should be available in a month or so for around $800.

Disk Drives

Admit it, Commodore, the 1541 ain't the fastest serial drive around, but for $399 I suppose it does the job very cheaply. Anyhow, if you really are tired of waiting, why not grab an IEEE interface and pick up the new one megabyte 1001?

I was lucky enough to get a 4040 while they still existed, as it is compatible with the 1541. However, if it is a serious problem the 1001 has plenty of speed and storage, using double-sided, double density disks.

The interface should become more readily available as demand increases, although there are plenty around in the US if you wish to buy direct. I'm using a C-64 Link, which also had DOS 4.0 on ROM, allowing commands such as BACKUP, COPY, CATALOG and SCRATCH.

Magic Voice

Also expected in a month or so is the new voice synthesiser, called Magic Voice, which will be available on cartridge. It has a built-in vocabulary of 234 words, spoken in an American female voice. Other inclinations are available through low-level programming of the driver routines.

Magic Voice adds two commands to BASIC. 'SAY' defines what will be spoken and 'RATE' the speed at which to say it. Output is sent to an RCA jack on the side which may be connected to a stereo or Commodore monitor.

The entire unit is similar to the SX-64 in style and colour and the cartridge port is reproduced on the top so that other cartridges may be operated simultaneously. Games such as 'Wizard of Wor' and 'Gorf' will make use of this facility by including voice output.

At the APC Show a nice demonstration showed off the capabilities of Magic Voice. Perhaps a lot of potential in educational programs, if the Teachers' Federation doesn't feel it's putting them out of work!

Menu

Here is a simple program for use with a disk-based system. It reads the actual blocks from disk where the file names are stored and then displays them in a menu-type format. To load and run the required program just press the corresponding number.

```
ready.

5 poke53265,11
10 open4,8,4,"#":open15,8,15:t=18:s=1:b=34
30 print#15,"u1"4;0;t;s
35 print"
(CLR)":for i=bto226step32
40 print#15,"b-p"4;i
50 n=n+1:gosub999:ifg<>130then110
60 get#4,g$:get#4,g$
70 forj=1to16:get#4,g$:n$(n)=n$(n)+g$:next
100 print:printn"
(CUR L).  "n$(n)
110 next:poke53265,27
150 print"
(CUR DN) 9.  (RVS ON)next page(RVS OFF)
200 poke198,0:wait198,1:getg$:g=val(g$):
    ifg=0thenclose4:close15:end
210 ifg=9then300
220 ifn$(g)=""then200
230 poke53265,11:close4:close15
240 print"
(CLR)(CUR DN)(CUR DN)load"chr$(34)n$(g)
    chr$(34)",8"
242 print"
(CUR DN)(CUR DN)(CUR DN)(CUR DN)poke53265,
    27:run
245 poke198,2:poke631,13:poke632,13:print"
(HOME)";:end
300 poke53265,11:print#15,"b-p"4;0:n=0:
    fori=1to8:n$(i)="":next
310 gosub999:t=g:gosub999:s=g:b=2:goto30
999 get#4,g$:g=asc(g$+chr$(0)):return

ready.
```

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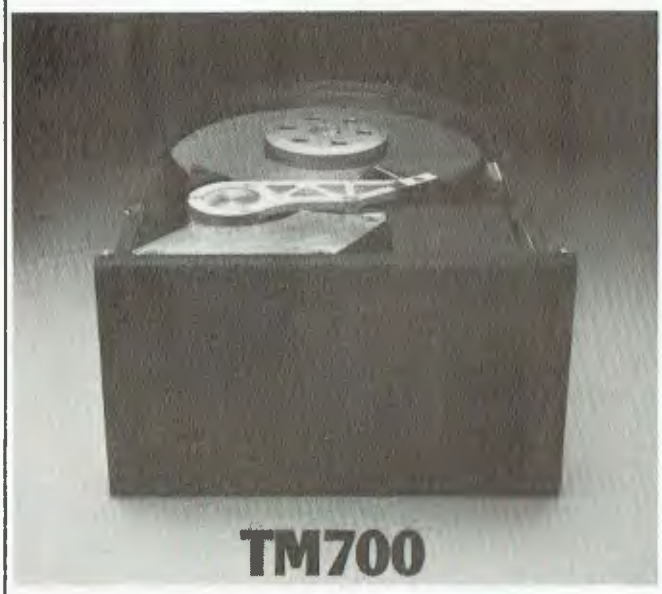

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Rasters: Part II

After last month you're probably wondering what this section is all about. Perhaps things will be a bit clearer if you can see it all in action. I have included several listings, one of which will make some sense; the rest will just look like mumbo jumbo.

For the time being, type in the BASIC program called Raster Interrupt Example. It contains some machine code which is listed in two forms elsewhere on this page for those who are really interested.

Now, when you type RUN the background should divide into two colours. If it doesn't, you may have one of three problems. If the screen says BREAK Error in 130 then you made a mistake in typing in the data. Recheck the numbers and try again.

If you're just getting a whole lot of flicker try either of these fixes:

- Press SHIFT and RUNSTOP, forcing a break error.
- Type POKE 53265, (PEEK(53265)AND127)OR128

If (fourth if!) it still doesn't work, give up, because something else is drastically wrong ... or go back to step one and try again. When you do get it working call me and tell me what I was doing wrong!

What we have in fact done is to turn off all the usual interrupts that occur and only allow raster interrupts. Since the screen is updated at almost the same speed as these normal interrupts we can call the usual interrupt routine from our raster interrupt routine only as required.

We know an interrupt is required whenever the first bit of location $DCOD is set to one; see the test starting at $CO18, which causes the usual interrupt routine to occur only after the time critical raster interrupt has been processed.

Next month I'll give a simple breakdown of the above and a few small modifications which may be made. Don't forget any questions and/or problems, or any thing I'm not explaining; please write and ask!

Glossary

To help the beginners who are more confused than most of us, here's a brief description of some of the names or abbreviations used in this column.

1001 – New one megabyte (1000K) disk drive, IEEE interface.

4040 – A dual disk drive compatible with the 1541, IEEE interface.

1541 – Standard Commodore disk drive, 170K capacity, up to five may be connected at once, uses serial interface (read slow).

IEEE – A standard of connecting various add-ons or peripherals for some Commodore systems. Uses parallel transfer of information. The standard 64 requires an interface to use any IEEE equipment.

SX-64 – Recently released portable version of the 64, also called the Executive.

```
.C000 A9 01     LDA #$01
.C000 A9 01     LDA #$01
.C002 8D 19 D0 STA $D019
.C005 A2 92     LDX #$92
.C007 A0 06     LDY #$06
.C009 AD 12 D0 LDA $D012
.C00C 10 04     BPL $C012
.C00E A2 01     LDX #$01
.C010 A0 00     LDY #$00
.C012 8E 12 D0 STX $D012
.C015 8D 21 D0 STA $D021
.C018 AD 0D DC LDA $DC0D
.C01B 29 01     AND #$01
.C01D F0 03     BEQ $C022
.C01F 4C 31 EA JMP $EA31
.C022 4C BC FE JMP $FEBC
.C025 EA        NOP
```

```
:C000 A9 01 8D 19 D0 A2 92 AD )AMYP"R
:C008 06 AD 12 D0 10 04 A2 01 F-RPPD"A
:C010 A0 00 8E 12 D0 8D 21 D0  @NRPM!P
:C018 AD 0D DC 29 01 F0 03 4C -M\)A.CL
:C020 31 EA 4C BC FE EA FF 8D 1.L<...
```

Raster interrupt example (below) with its machine code lists (above).

```
READY.


1 REM RASTER INTERUPT EXAMPLE
2 REM
5 GOSUB100
10 POKE56333,127
20 POKE788,0:POKE789,192
30 POKE56333,129:POKE53274,129
50 END
100 FORI=49152TO49152+36
110 READA:POKEI,A:B=B+A
120 NEXT
130 IFB<>4077THENSTOP
140 RETURN
500 DATA 169,1,141,25,208,162,146,160
510 DATA 6,173,18,208,16,4,162,1,160
520 DATA 0,142,18,208,140,33,208,173
530 DATA 13,220,41,1,240,3,76,49,234
540 DATA 76,188,254

READY.
```

Control Codes

Here is a simple way to include control codes, such as switching to upper case or disabling the Commodore key from a print statement, in programs. The trick is that these codes appear as reverse characters when placed in quotes.

We all use the obvious ones such as clear home and the cursor controls, but there are many others which may be utilised, although they cannot normally be produced by using several key strokes.

To enter the codes, type the following sequence:

Type the line number; PRINT ""

Then, press reverse on and backspace one character.

You are now in the correct mode to enter control codes according to the following chart:

H – Disable Commodore Key
I – Enable Commodore Key
Shft M – Produces shift return
N – Switch to lower case
T – Delete character

There are several others. See if you can discover a few of them yourself.

New Releases

Imagineering has released Multiplan for the Commodore 64, complete with a comprehensive manual of over 400 pages in length. The spreadsheet may be up to 255 rows long and 63 columns wide, and sells for around $149.95.

By the time you read this, several other new game titles will have been released by Imagineering, including Lode Runner from Broderbund. This game is disk-based and almost puts Jumpman to shame. There are 150 preset levels to play, and you can also edit and save your own designs.

Commodore has released several new cartridge games priced at $29.95, including Wizard of Wor, Blueprint, Frog Master and International Soccer. I mentioned the Soccer game briefly last month: the graphics are fantastic, so realistic you could easily be watching a real soccer match.

VIC-20s And Cricket

I recently managed to visit the operating room of the Sydney Cricket Ground's new scoreboard and was amazed to discover a VIC-20 seated precariously at the far end of the crowded control panels.

Next time the run-rate appears on the big TV screen above the hill you can thank the VIC-20 for calculating the amount with the precision of a ... well! If you've ever wondered how precise the VIC is, try the following short program for size. The results are very interesting:

```
10 FOR I=1 TO 10 STEP .1
20 PRINT I
30 NEXT
```

C-TECH pty ltd

SOFTWARE

CP/M 80 CP/M 86

MS DOS APPLESOFT

MICROSOFT COMMODORE

PC DOS MICROBEE

CP/M MSDOS

SPELLBINDER UPDATE NOW WITH ELECTRIC WEBSTER AND FOOTNOTING

A brand new version of this powerful word processor, with revised documentation and enhancements such as conditional mailmerge. (Remember Mailmerge is included in the Spellbinder price).

SPELLBINDER
LEXISOFT CP/M80 CP/M86 MS DOS

Many people have come to appreciate the versatility and ease of use provided by Spellbinder. In its simplest form, it is the best word processing package on the market for 8 bit and 16 bit computers. It features optional menu driven use for new users, flexible print formatting and output facilities, and a powerful macro capability which allows features to be added for the unique requirements of each user.

Full screen editing is provided. Corrections, insertions, deletions and block moves all take place before your eyes. Letter quality precision printers are fully supported, including Juki, Diablo, Qume, Nec and C. Itoh. Oversize files are easily managed by the operator. Mailing macro included. Automatic word wrap removes the need for the operator to enter carriage returns. Wide columns of numbers and tables up to 160 columns wide can be displayed using the horizontal scroll.

A full range of search and replace functions is provided, including wildcard repeat and case sensitivity. Printing is done directly from the screen without the need to write to disk. All formatting information can be saved within the text. True proportional spacing is provided with right justification that is much more elegant than character resolution spacing. **$645** inc. tax **$570** ex tax.

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SOFTWARE SOURCE CP/M80 CP/M86

Spellbinder is much more than just a word processor. The M-Speak development system will enable you to customize Spellbinder to suit many more applications than just wordprocessing. Custom modules to print files or set text in any format desired can be programmed so that non-expert users of Spellbinder will not have to learn all of its intricate details. Experienced users will be able to have complete sets of often repeated commands programmed in. **$149** inc. tax. **$133** ex tax.

KNOWLEDGE MAN
MDBS CP/M80 CP/M 86 MSDOS

Integrated software packages, such as Knowledge Man, are simpler and more efficient to use than the old style separate programs. Knowledge Man offers the capabilities data base management and spreadsheet in the one convenient program. The comprehensive facilities offered are:-

Relational data base. Full data base management facilities are provided. Ad Hoc Enquiries. for spur of the moment information, merely type in an English-like request.

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Statistical Analysis. The most common statistical functions are built into Knowledge Man, including mean, standard deviation and variance.

Printed Forms Management. Complete control over printed output is provided. Pre-printed forms can be filled in, disk output can be routed to the printer as well, text and titles can be defined anywhere on a form.

Functions and Procedures. Numeric functions such as exponentiation, random numbers, alpha-numeric conversion are built in.

All the preceeding functions can be used by people without programming knowledge. More advanced users can take advantage of the built in, fully structured programming language. Users of this package will find that many of the tedious chores in BASIC of file handling and screen formatting are managed automatically. **$745** inc. tax. **$655** ex tax.

THE WORD PLUS
CP/M 80 CP/M 86 MSDOS

Word processing is made really efficient when a spelling checker and dictionary is used. The Word Plus will note errors, in context, on screen, along with suggestions for the correct word from the built in dictionary. A 45,000 word dictionary is included and modifications can be made to customize if to suit your application. **$245** inc. tax **$220** ex tax.

WHOOPS

Our advertising in the March issue had several mistakes. The prices should be as follows:

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BASIC 2 Compiler	$490.00 Inc. Tax	$450.00 Ex. Tax
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Many reviews of this data base program have praised its innovation and usefulness. Put simply, what wordprocessors are to text, DBASE II is to data. Entire data bases can be manipulated at will to suit the requirements of the user. The power of DBASE II is derived from its use of a simple programming language to drive different applications. Menu driven programs with aesthetically pleasing displays are easily implemented using the DBASE II programming language. Because file and data handling are managed automatically by DBASE II, much of the time and programming effort needed to implement an application program in a language such as BASIC is eliminated. **$850 INC TAX, $760 EXT TAX.**

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This program is designed to enhance the Wordstar wordprocessor. Add a professional footnoting capability to enhance documents and wordprocessing capabilities. **$125 INC TAX, $110 EX TAX.**

A.L D.S.
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This assembler has become the de facto industry standard, and no wonder. It offers full macro facilities, relocation, Z80 or 8080 mnemonics and useful pseudo opcodes. Other programs supplied include an easy to use linking loader, cross reference utility and a library manager for building and listing subroutine libraries. A complete range of machine language programs can be put together using this assembly language system. **$325.00** INC. TAX. **$485.00** EX TAX.

SORT FACILITY
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This is a program for the professional computer user. A fast, efficient sort program can be difficult to write, even for a professional. This program will sort and merge files of up to two million characters using the binary insertion technique. It supports all Microsoft file formats and data types and is available as a standalone package or as a support for COBOL. The user supplies the required sort keys for the program to work with. **$315.00** INC. TAX **$277.00** EX TAX.

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SID
DIGITAL RESEARCH CP/M 80 CP/M 86

This 8080 Symbolic Instruction Debugger (also available in Z80 format) will set breakpoints and pass points that will interrupt after a predefined number of passes by the program. All registers and memory can be set and examined. Step by step tracing of the program is possible to allow the interactive debugging of assembly language programs. Assembly language can be directly entered into memory and run. The most powerful feature of this program is its ability to use symbols as operands. A symbol table entered with the program to be debugged will enable simpler tracing and comprehension of program flow. 8080/Z80 **$125 $110** EX TAX. 8086 **$175 $155** EX TAX.

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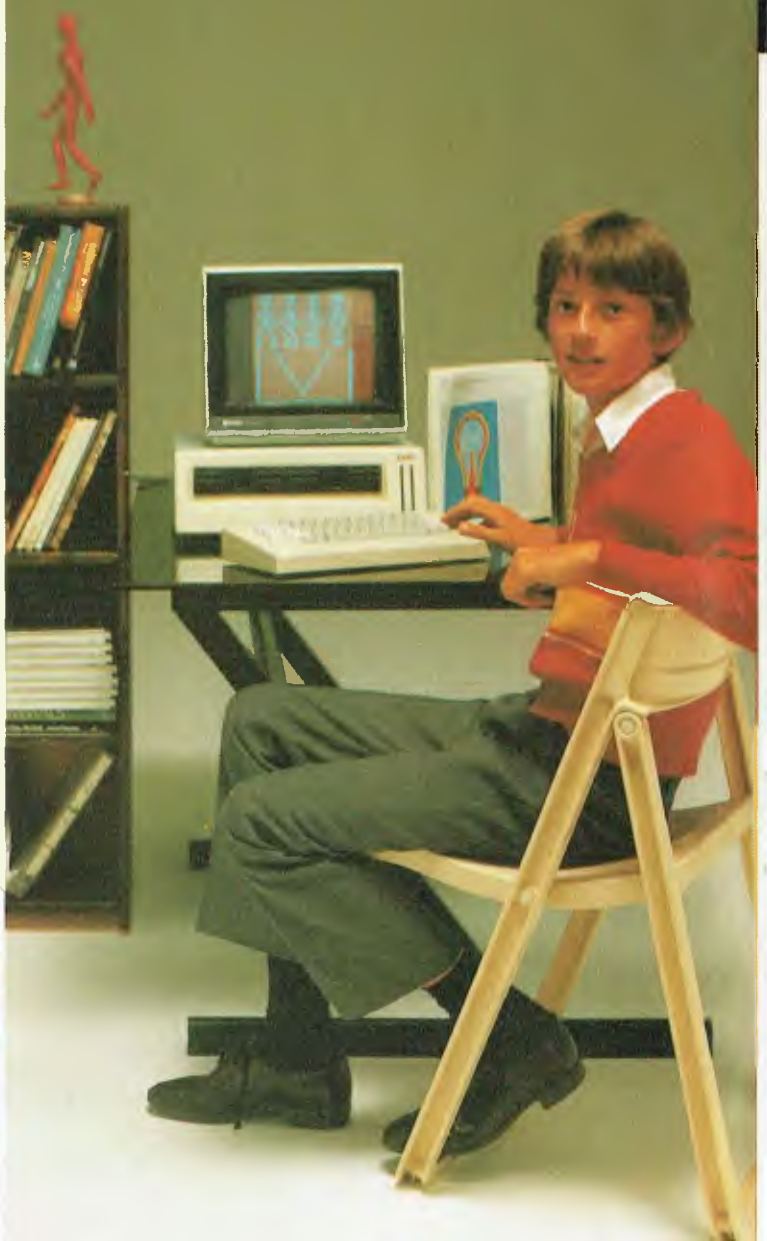

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By Bill Bolton

SEVERAL MONTHS ago I printed a listing for a C program to 'scrub' WordStar files to get rid of the odd characters that WordStar puts into files as part of its print control functions. This program attracted a lot of interest and many people are successfully using it for processing their WordStar files into standard ASCII text files.

One of the most frequent requests that has arisen out of the printing of the Scrub program is for a similar program to prepare an ASCII text file for processing with WordStar, an inverse of the Scrub operation. Well, here it is: Unscrub!

Unscrub removes hard carriage returns and extra spaces between words from ASCII text files. Two or more successive hard carriage returns (such as would occur at a paragraph break) are left intact. This means that in most cases a standard ASCII text file that has been processed with Unscrub can be read straight into WordStar and immediately reformatted with the WordStar Control-B (paragraph reformat) command. Only minor additional editing (if any) should be needed on the file to finish reformatting.

Unscrub is handy for preparing files from other word processors for use with WordStar.

The Unscrub program has much in common with Scrub; really it is only the unscrub() function that is markedly different. This is a good example of how easy it is to write and re-use modular code with the C programming language. Since I designed Scrub in such a way as to be as general as possible in most of its functions, it was very easy to re-use most of the functions with minimal changes in Unscrub.

This version of Unscrub is for the Digital Research C compiler, though it should work with any C compiler which adheres to the syntax described in the *C Programming Language* or the Unix V7 C compiler syntax. This version and a version for the BDS C Compiler is available for downloading from the Software Tools RCPM system. See Listing 1.

A Faster Scrub

While we're at it, there is a way to make Scrub run much faster with only a minimal program change. When I originally wrote Scrub for the BDS C compiler, all the counters were of type 'int' as this is the largest intrinsic data type that BDS C supports. This means that

LISTING 1

```
/*
        Program to 'unscrub' a ASCII text file for processing
        with WordStar.

VERSION LIST, most recent version first

18/Feb/84
        UNSCRUB adapted from SCRUB. UNSCRUB prepares an ASCII
        text file for WordStar. Based on an idea by Harvey
        Lord. New control logic and newline processing
        sorted out. Bill Bolton

12/Feb/84
        Compiled on first try under Digital Research C compiler.
        Overcame general speed problem first noticed with Computer
        Innovations C compiler version. It was in the scrub function
        and was solved by creating another integer variable to be
        the loop counter rather than using the long 'count' variable.
        I found out that the MOD operation on a long variable is a
        great time waster!
        Bill Bolton

15/Mar/83
        Massaged source to suit Computer Innovations C 86 compiler
        under CP/M-86 or MSDOS (should also work for other compilers
        using the K&R syntax such as Lattice C under MSDOS etc.).
        This mostly consisted of changing file I/O statements to
        agree with Kernighan and Ritchie syntax. Changed counter
        variables to 'long' so that large file sizes are reported
        correctly. Removed output file name check until I have time to
        do an extensive recoding. Bill Bolton

26/Sep/82
        Forces MSB of all characters to 0, then scans for control
        codes. TAB, CR and LF are passed unchanged to the output
        file. US (soft hyphen) is replaced by a hard hyphen.
        Checking for legal CP/M filename on destination file
        added. Expanded 'usage' message. Added 'working' messages.
        BDS C version for CP/M-80.
        Bill Bolton.

        This program was developed from a program called SCRUB
        on BDS 'C' User Group disk 'Utilities 2' (Volume 2 in
        the Software Tools RCPM BDSCAT.ALL).
*/
/*
        Macros for constant definitions
*/
#include <STDIO.H>

#define VERS 1          /* main version number */
#define REVISION 0      /* sub version number */
#define DEL 0x7F        /* ASCII delete character */
#define WORKING 1024    /* number of chars between progress markers */
#define NEXTLINE (WORKING * 32) /* number of progess chars on a screen line */
#define CPMEOF 0x1A     /* CP/M-86 end of file marker */
#define ERROR 0         /* Normal file error condition */
#define FERROR -1       /* Flush file error */

#define NO       0
#define YES_CR1  1
#define YES_CR2  2
#define YES_SP   3
/*
        Argument vector indices
*/

#define FROM_FILE 1
#define TO_FILE   2
/*
        main to open the files for unscrub()
        and handle invocation errors.
*/
main(argc,argv)
int argc;
char *argv[];
{
        FILE *fdin,*fdout;
        char buf[12];
        printf("\nWordStar file UNSCRUBher, CP/M-86 Version %d.%d\n",
        VERS,REVISION);
        printf("Bill Bolton, Software Tools\n");
        if( argc != 3 )
                        usage();
        else {
```

Continued on page 122

FINALIST

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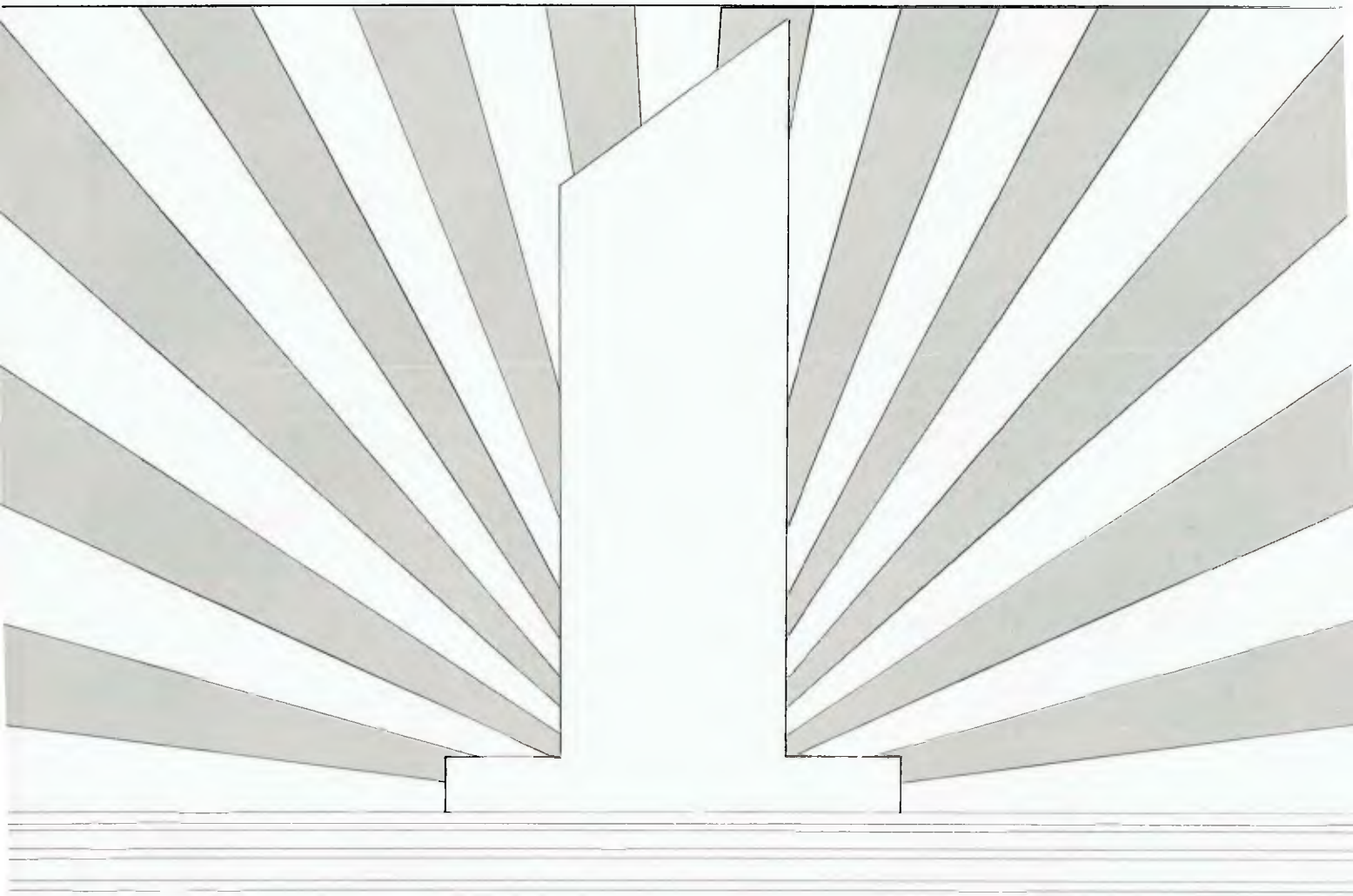

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if I processed a text file with more than 64K characters in it, the character count reported at the end was incorrect, as the counter had wrapped through zero.

Later, when I got hold of a 16-bit compiler, I immediately changed the counters to type 'long' to avoid that problem. While this still worked fine, I did notice that the 16-bit versions ran a lot slower than the BDS C version. At first I put this down to differences in compiler performance, but as I tried Scrub on more and more 16-bit C compilers I began to smell a rat.

While there wasn't a logical fault in the code, I had used a code construction which was inherently slow without realising it. The trap turned out to be in the code which controlled the printing of the 'confidence' stars on the screen. This code was performing a 'modulus' operation on the type 'long' counter variables.

It turns out that a 'modulus' operation on a 32-bit number takes quite a while on a processor that only has 16-bit registers to work with, and that was what was slowing everything down. The solution to the problem was to introduce a new variable into the program only to be a counter for 'confidence' display purposes and to make this counter of type 'int'. The 'modulus' operation was then done on a 16-bit number with a significant speed improvement.

A file that previously took over 27 seconds to process with Scrub now takes only four seconds. The start of the scrub() function is listed below. Lines which are new or have been changed are shown with a vertical bar (|) next to them.

See Listing 2 on page 125.

This modification has already been incorporated into Unscrub.

Software Tools RCPM News

Since moving to Brisbane I've had a chance to get stuck into making some long-planned changes to the Software Tools RCPM system. Some new hardware has been installed and many of the system utilities have been enhanced and rewritten in C, with a view to portability to a 16-bit environment in the future.

I have been busy cataloguing software that I collected on my last trip to the US, and the Software Tools miscellaneous software collection now stands at 44 volumes. Apart from the material in the miscellaneous collection which has already found its way into the SIG/M collection (up to volume 20 approx), this

LISTING 1 continued

```
                if( (fdin = fopen(argv[FROM_FILE],"r")) == ERROR){
                        printf("\nCannot find file %s\n",argv[FROM_FILE]);
                        usage();
                }
                else {
                        if( (fdout  = fopen(argv[TO_FILE],"w")) == ERROR )
                                printf("\nCan't open %s\n",argv[TO_FILE]);
                        else {
                                printf("\nWorking ");
                                unscrub(fdin,fdout);
                        }
                }
        }
        exit();
}

/*
        procedure unscrub -- copy file to file deleting unwanted control chars
*/

unscrub(fdin,fdout)
FILE *fdin;     /* the input file buffer */
FILE *fdout;    /* the output file buffer */

{
        int c;                  /* 1 char buffer */
        int loop;               /* a loop counter */
        long count;             /* count of characters processed */
        long killed;            /* numbers of bytes deleted */
        int cr_flag;            /* number of CRs, status flag */
        int space_flag;         /* number of spaces, status flag */

        loop    = 0;
        count   = 0;
        killed  = 0;
        cr_flag = NO;
        space_flag = NO;

        while( (c = getc(fdin)) != EOF  && c != CPMEOF )
        {
                c &= 0x7F;
                loop++;
                count++;
                if (loop % WORKING == 0)
                {
                        printf("*");            /* still alive */
                        if (loop % NEXTLINE == 0)
                        {
                                printf("\n\t"); /* new line every so often */
                        }
                }

                switch (c)
                {
                case '\n':
                        switch(cr_flag)
                        {
                        case 0:                 /* 1st CR/LF? */
                                putc(' ',fdout);
                                  /* replace 1st CR/LF with a space */
                                cr_flag = YES_CR1;
                                  /* reset 1st CR/LF flag */
                                killed++;
                                break;

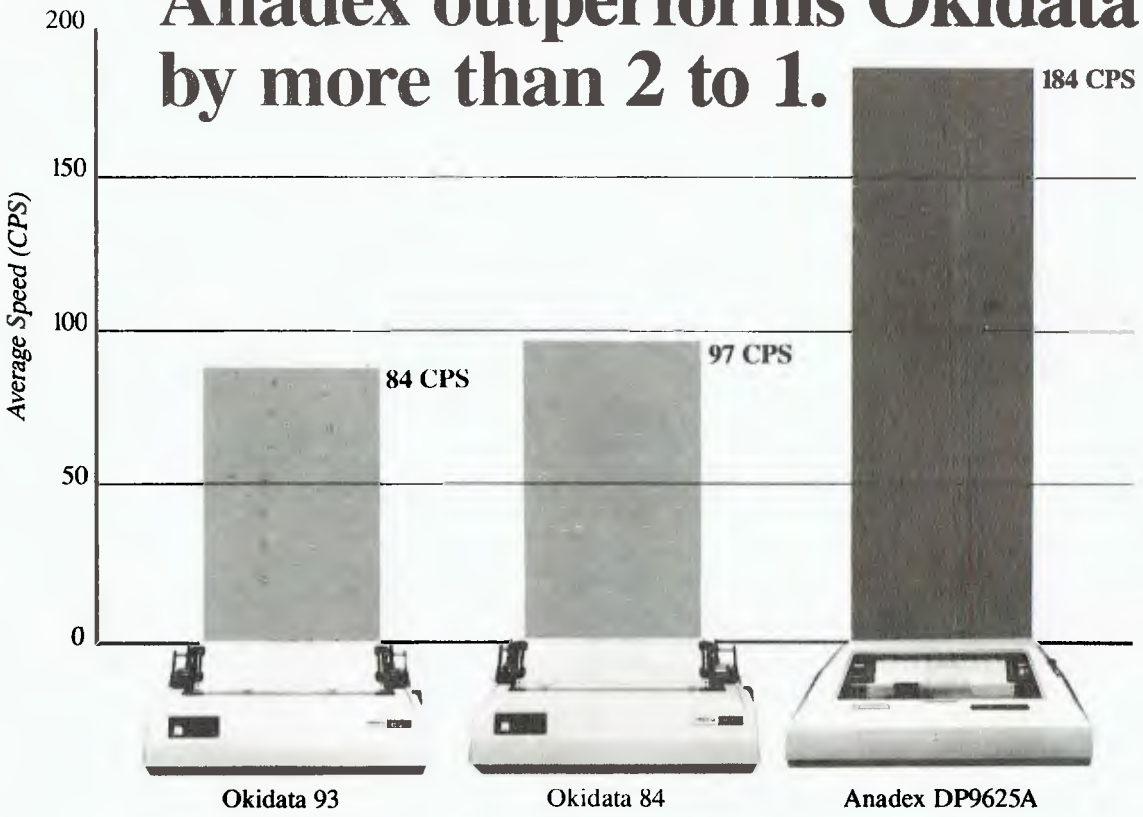
                        case 1:
                                cr_flag = YES_CR2;
                                        /* reset 2nd CR/LF flag */
                                putc('\r',fdout);
                                putc('\n',fdout);
                                        /* replace 1st CR/LF    */
                                putc('\r',fdout);
                                putc('\n',fdout);
                                        /* save other CR/LF     */
                                break;

                        default:
                                putc('\r',fdout);
                                putc('\n',fdout);
                                        /* save other CR/LFs    */
                                break;
                        }
                        break;

                case ' ':
                        if (space_flag == NO)   /* 1st space?       */
                        {
                                putc(c,fdout); /* keep 1st space  */
                        }
                        else
```

Continued on page 125

Independent lab tests prove Anadex outperforms Okidata by more than 2 to 1.



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All of the above programs are supplied free with each purchase of G-Pascal on disk. G-Pascal is available from your local Commodore dealer, Commodore Information Centre Pty. Ltd., or Gambit Games. Recommended retail: $79.50

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LISTING 1 continued

```
                        {
                                killed++;
                        }
                        space_flag = YES_SP;  /* change flag to discard
                                              subsequent consecutive spaces */
                        break;
                default:
                        cr_flag = NO;                   /* reset CR/LF flag     */
                        space_flag = NO;                /* reset space flag     */
                        putc(c,fdout);        /* write everything else to
                                                 the output file     */
                        break;
                }
        }

        putc(CPMEOF,fdout);                        /* sent textual end of file */
        printf("\n");
        if (fclose(fdout) == FERROR)
                exit(puts("\nOutput file close error\n"));

        printf("\n%ld characters processed\n",count);
        printf("%ld characters were deleted\n",killed);
}
usage()

{
         printf("\nUsage:\n\n");
         printf("\tUNSCRUB d:file1 d:file2\n\n");
         printf("Where:\n");
         printf("\tfile1 - source file, (* and ? not allowed)\n");
         printf("\tfile2 - destination file, (* and ? not allowed)\n");
         printf("\td:    - optional drive identifier\n\n");
         printf("i.e.\tUNSCRUB A:FOOBAR.DOC B:FUBAR.WST\n\n");
         printf("\tUNSCRUB  prepares a single-spaced ASCII file for\n");
         printf("\treformatting with WordStar by removing CR/LFs from the\n");
         printf("\tends  of lines within single spaced paragraphs and  by\n");
         printf("\tremoving spaces in excess of one from between words.\n\n");
         printf("\tTwo  or  more CR/LF combinations signal the end  of  a\n");
         printf("\tparagraph.  These paragraph terminators remain intact.\n");
}

/* end of unscrub */
```

LISTING 2

```
scrub(fdin,fdout)
FILE *fdin;     /* the input file buffer */
FILE *fdout;    /* the output file buffer */

{
        int c;                  /* 1 char buffer */
        int loop;               /* a loop counter */
        long count;             /* count of characters processed */
        long killed;            /* numbers of bytes deleted */
        long hyphen;            /* number of soft hyphens replaced */

        loop   = 0;
        count  = 0;
        killed = 0;
        hyphen = 0;

        while( (c = getc(fdin)) != EOF  && c != CPMEOF ){
                c &= 0x7F;
                loop++;
                count++;
                if (loop % WORKING == 0){
                        printf("*");            /* still alive */
                        if (loop % NEXTLINE == 0){
                                printf("\n\t"); /* new line every so often */
                        }
```

Australia

Software Tools RCPM (ST-RCPM): (07) 378-9530. 24 hours. EST.
Mi-Computer Club BBS (MiCC-BBS): (02) 662-1686. 24 hours. EST.
Micro Design Lab RCPM (MDL-RCPM): (02) 663-0151. 24 hours. EST.
Sydney Public Access RCPM (SPA-RCPM): (02) 808-3536. 24 hours. EST.
Omen RTRS (OM-RTRS): (02) 498-2495. 1600-0900 + 24 hours weekends. EST.
Sydney TRS-80 UG RTRS (STRUG-RTRS): (02) 332-2494. 24 hours. EST.
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Gippsland RCPM (GL-RCPM): (051) 34-1563. 24 hours. EST.
Adelaide Micro UG BBS (AMUG-BBS): (08) 271-2043. 1000-2200 weekends *only*. CST.
Outback RCPM (OUTB-RCPM): (089) 27-7111. 24 hours. CST.
Omen II RTRS (OM2-RTRS): (089) 27-4454. 24 hours. CST

New Zealand

Attache RBBS (ATT-RBBS): ISD 64 9 76-2039. 24 hours. NZT.
Domestic (09) 76-2039

material is only available by downloading from the Software Tools RCPM.

PAMS News

There are several new numbers in the PAMS list this month. Darwin has produced two remote systems: Phil Sampson has the 'Outback' RCPM on line, while Terry O'Brien has 'Omen 2'. The Omen systems are remote TRS-80 systems and are designated as RTRS systems.

There are also two RTRS systems on line in Sydney. The original Omen RTRS software was written by Peter McGrath and is running on the Darwin system and on Ted Romer's Omen 1 in Sydney. The Sydney TRS-80 users' group also has a system running, though there is only restricted visitor access for non-TRSUG members.

The Adelaide Microcomputer User Group has a system on-line on weekends only. It has restricted access for non-AMUG members and is a little hard to drive. Please carefully note the restricted hours of this system.

Another new listing comes from New Zealand. The Attache RBBS system is located in Auckland and runs on a Morrow Decision 1, IEEE-696 system. It appears to be a message only system. I had no trouble logging in via an ISD line from Brisbane. This system uses the same modem standard and data format as the Australian systems.

It seems the Perth RMPM system has died; it hasn't been on-line for a long time and I can't contact the SYSOP, so it has been removed from the list.

On-Line PAMS Lists

Several systems are now carrying on-line PAMS lists. There are two lists: the first is called AUSTPAMS.DOC and lists all the Australian and New Zealand PAMS systems, while the second is called EUROPAMS.DOC and lists all the PAMS systems in the 'rest of the world' which use CCITT V.21 modem standards and thus are potentially useful to Australian modem users.

These lists will be the most up to date source of PAMS system availability and can be expected to be the first place that new systems get listed.

I am particularly interested in any feedback on the EUROPAMS list, especially regarding its accuracy. I have also heard there is a RTRS system in South Africa using V.21 modem standard; does anyone know the details? ❑

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your IBM computer

By Lloyd Borrett

MOST PEOPLE in the computing community are able to recall the names of some of the more successful microcomputer software products. To many, a spreadsheet program is VisiCalc, not vice versa. When it comes to microcomputer database software, dBase II is the name they remember.

Ashton-Tate's dBase II is one of the success stories of the microcomputing industry. More and more software houses are realising that in dBase II they have not only a relational database, but also a fully-fledged computer language that programmers can use to write application systems. The market for dBase II compatible products has become an industry in its own right.

dBase II was developed for use on 8-bit CP/M machines, and was one of the first programs to be ported to CP/M-86, MS-DOS and PC-DOS when the 16-bit machines were released. The program remained functionally identical to the 8-bit version, and initially made little use of the IBM-PC's screen and keyboard features. Version 2.4 added some useful new features and fixed some of the more notable bugs found in previous versions, but it still did not make use of the extra power of a 16-bit machine.

Naturally, the competition realised this and lately more powerful database products have appeared. Some of these products are dBase II clones, others try to break new ground. As is often the case with new products, many have their own limitations. People have been reluctant to abandon dBase II.

Fortunately, Ashton-Tate does not intend to sit back and watch its market slip away. The company recently announced the development of dBase II 2.6. No public release date was given and it was made clear that certain features of version 2.6 were still tentative.

dBase II version 2.6 will only run on the IBM-PC and compatible machines; that is, it's exclusively 16-bit. It is estimated to be only 80 per cent compatible with current dBase II releases. Some of the features are:

- The ability to have four databases open simultaneously.
- Capacity for up to two million characters per record, and up to two billion records per database. (How many years would it take to back up such a database using floppy disks?)
- Memory variable space is increased to 6000 bytes and memory names to 256.
- Numeric accuracy is up to 15.9 digits, using the IEEE Floating Point Format Standard.
- The SET PATH command under PC-DOS 2.0 allows you to set the path to a particular directory or sub-directory.
- A TIME function to get the time of day.
- The STORE command has been changed to the equal sign (=), working from right to left as it does in most other languages.
- The new SEEK command will FIND on a substring of an indexed field.
- Square root, natural log, exponential notation, and Julian date to calendar date (and back again) functions are also included.
- There is also a new type of field called a text field. This field has an associated text file of up to 4000 characters, modifiable with a new streamlined word processor.

These are but some of many notable features announced. Ashton-Tate is also working on a multi-user version of dBase II 2.6. (No prizes for picking UNIX as the operating system.) dBase II is firmly established as the market leader in the mid-range of database product offerings. If Ashton-Tate can deliver the features announced, dBase II is likely to remain on top of the heap.

Back-Up Procedures

Diskettes (and all other computer storage media) are fragile. It's easy to forget that. You can use a diskette for months with no trouble, but once in a while, just when you least expect it, just when it's least convenient, a problem will occur.

However, you will probably be the cause of the majority of data losses. Many of the DOS commands (ERASE, FORMAT, COPY), if used carelessly, can destroy your data. It's so easy to create files that most people don't appreciate the value of the data until they lose it.

The answer is to make back-up copies. A back-up copy is the only form of insurance available. Take a look at your collection of diskettes now. How many hours have you invested in them? How would you like to have to reproduce them from scratch?

Unfortunately, past experience shows you're unlikely to do anything about back-ups until it's too late. Only when you find yourself in the situation where a file is permanently lost does this sink in. In the mainframe world people are employed to make sure the data is backed up. In the microcomputer world ▶

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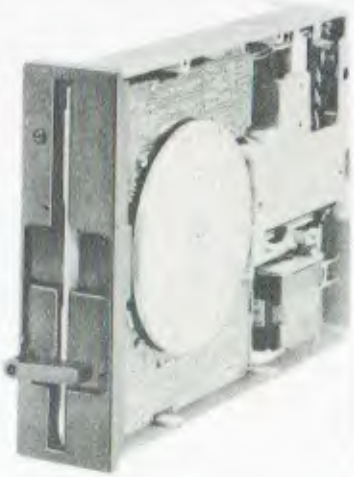

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there is only you. The importance of back-ups can't be overstated. So what do you do?

First, divide your diskettes into work, program and project categories. The work diskettes should contain no permanent files. Data on a work diskette is temporary, and doesn't need to be backed up. Any program files on work diskettes can be recovered from program diskettes.

When a new program is received, make a copy of the distribution diskettes. The distribution diskette is then archived and the installation procedures are carried out on the copy. When completed, yet another copy is made and labelled 'Working Copy'. This is the diskette that goes into use. The other diskette is labelled 'Back-up Copy' and filed away.

Should a working copy program diskette become corrupted, you can make a new one from the back-up copy without having to go through the installation procedures again. If both copies fail, make sure your hardware is in full working order before placing a distribution diskette at risk.

The files on project diskettes are related. These need to be backed up, but not always with the same frequency. Project diskettes that contain high-priority work, or current work that is changing often, can be backed up more often. Project diskettes that change little can be backed up less often.

For a simple back-up, the procedure is to:

- get the back-up diskette from storage
- copy the working diskette onto it with DISKCOPY
- compare the two diskettes with DISKCOMP
- return the back-up diskette to storage.

One diskette is always the back-up copy and the other is always the working copy. The working copy gets all the use, all the wear, and is exposed to all the hazards.

A rolling back-up allows the wear and tear to be shared equally by the diskettes. Each time you make a back-up copy, you put the copy back into use and the original is stored. You choose the period between back-ups – be sure to make it often enough.

This scheme creates a single level of back-up. You can expand a rolling back-up to have as many levels as you wish. A typical example for valuable diskettes is to have a diskette for each day of the week, thus giving four levels of back-up.

If you think this is overdoing it, then you haven't yet learned the lesson the hard way. Besides, I'm not finished yet. Remember earlier when I suggested the distribution diskettes should be archived?

If the back-up diskettes are kept in the same building with the computer, they are exposed to any disaster that destroys the computer itself. Hardware can be replaced easily, but data cannot. As this is a fairly unlikely situation, you can perhaps allow a disaster-proof back-up copy to be a bit out of date.

In other words, you should keep archived diskettes off the premises, or in a fireproof safe, and regularly take archival copies of your project diskettes. ❑

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By Jeff Richards

S-BASIC IS an implementation of the BASIC language that differs considerably from any other. It has been compared to C-BASIC, but there are actually more similarities to Microsoft BASIC than to any other. Originally written by Topaz Programming, it has been bought lock, stock and programmer by Non-Linear, and will be standard with Kaypros for some time to come.

The language is badly let down by its manual, which is one of the worst I have ever seen. The latest revision (the third) is a considerable improvement in layout, but the content still leaves a lot to be desired.

For those struggling with the language I present the following bits and pieces of information and experience.

The manual stresses the need for defining all variables before they can be used. What it doesn't mention is the need to define all procedures and functions before they are used. This means that procedures and functions must appear at the front of the program, before the main segment. With this in mind, the suggested program structure in the manual makes a little more sense. The use of the $INCLUDE compiler command to read in a standard set of utility programs at the start of a program means that programs can be kept small and simple, and don't have to be cluttered with code for all the housekeeping tasks at the front of the program.

The language lacks an EOF function. This should return a logical true if the last file access (read or write) referenced the last record in a file. The only way around this, for example to read an input file of unknown length, it to use the ON ERROR GOTO command. Put the command before the READ statement, and use it to jump to the usual END-OF-FILE routine. As there is no way to clear the error jump, the first statement in this routine should reset it. Point it off to a small routine that prints the error number and halts – the manual has an example in the section on ON ERROR. Note that taking the error exit resets all stacks, so this technique can only be used if the code to read the file is at the topmost procedure level.

The use of the DATA statement differs from most other BASICs. First, it is necessary to execute a RESTORE statement before the first attempt to READ some data – most BASICs only require the RESTORE after all the data has been read, and the data pointer must be set back to the beginning of the data items. Secondly, the acceptable forms in which the data items can be coded are identical to what would be acceptable input if they were being typed in at the keyboard. It appears as if the READ statement works by executing an INPUT command with the data coming from the DATA statement rather than from the keyboard. This allows some significant shortcuts in coding the DATA statement.

Although the manual does not mention it, it is possible to use RESTORE to reset the data pointer to a particular point in the DATA stream with the form RESTORE <line-number>.

The PRINT USING command gets very poor treatment in the manual. It is actually very similar to the Microsoft style. Plus and minus signs can be at the beginning or end of a format field – the position will determine whether the sign prints at the beginning or end of the data item. The '&' symbol prints the string as is, so the number of print positions occupied will be determined by the length of the string data item. If you are using the PRINT USING command then the fixed-length string field ('/') is a more convenient format for strings.

The format of the DIM statement for string arrays is incorrect in the manual. For ordinary arrays the command is DIM STRING:<max length>; <variable name> (<array size>). For example, DIM STRING:20; str$(10) creates a ten-element array of variable str$ with a maximum size for each array element of 20 bytes. If the string is to be BASE or COMMON, then add BASE or COM after DIM and leave out the semi-colon.

The rules for converting variables before they are used in mixed-mode expressions – for example, to compare a string with an integer – are well spelled out in the manual. These rules are very logical and apply consistently, making mixed-mode expressions quite useful. What is not made clear is that conversions of variables for evaluation in a mixed-mode expression in no way affect the value of a variable as it is stored in memory – any conversion that takes place is for the purpose of the comparison only and the variable is left undisturbed. Despite this, mixed-mode expressions are a good place to start looking when programs don't behave as they are supposed to.

The ON X GOTO and ON X GOSUB are not adequately described. They operate in the same manner as in other BASICs, with control passing to the next sequential line number if X is out of range.

Altering Loop Control Parameters

The effect of altering the loop control parameter in FOR/NEXT loops is described in one terse line. The loop control parameters are evaluated at the start of the loop, so it is legal to alter the parameters within the loop. For instance, if you say 'j = 20 / FOR i = 1 TO J' and then somewhere inside the loop use j = 10, the loop will still execute 20 times. If you want to exit a loop prematurely it is necessary to alter the counter (i) rather than the control parameter (j). Such programming is best avoided, especially with the additional loop control structures available in S-BASIC, but it is something to watch out for in programs converted from other dialects.

I have found 'device keyin (#5)' to be unreliable in detecting characters from the keyboard. It seems to be dependent on how well USERLIB has been implemented for a particular machine, although in theory all CP/M machines should appear the same to the compiler. I would recommend testing how well it works on your machine if you plan to use it extensively.

In the CONSOLE and LPRINTER commands the <integer const> referred to is actually the channel number described in the discussion of channel numbers at the beginning of the chapter. Console is, in this context, an output device. It would appear that CONSOLE 1 is exactly the same as LPRINTER, and LPRINTER 0 is identical to CONSOLE. This effect creates some interesting possibilities for run-time I/O redirection; however, the manual states that CONSOLE and LPRINTER are compile time statements. This implies that it is not possible to use a run-time variable as the <integer const> in these statements. If run-time I/O redirection is required then use INPUT #<exp> and PRINT #<exp> instead.

Note that the FILES statement defines files by implicit reference to the channel ▶

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number. The first file defined is assumed to be on Channel 0, the second to be on Channel 1, and so on. This is clear from a study of the examples, although the description is rather confused.

In order to comprehend the use of random files it is necessary to rearrange the layout of the manual. The section on READ with variable name should be studied first, comparing it with the ordinary sequential form of the READ statement. The effect of nominating different values for <exp> should be clearly sorted out. The form of READ with no variable name can then be considered as a special case. Note that both forms of random READ are discussed in two places in the manual – the two segments should be combined.

The XLATE built-in function deserves a better treatment than it gets. The description should read:

XLATE(s1,s2) returns a string in which the characters in s2 have been translated according to the rule expressed by the characters of s1. The function takes the ASCII value of each character in the source string (s1) and extracts the character from the table string (s2) at the position indicated by this value. These characters are appended to the result string until either all characters in the source string are processed, or a character in the source string has an ASCII value of zero or greater than the length of the table string. The result string will have a length less than or equal to the length of s1. Any character in s2 may appear any number of times (including zero) in the result string.

The function can be expressed in ordinary BASIC statements. The statement s3 = xlate(s1,s2) is equivalent to the program fragment in listing 1. For instance – if <n> means CHR$(n):

s1 <7><8><4><5><1><2>
s2 28/02/84
s3 840228

Something such as this date conversion routine is about the only use I can think of for it. The function is not commutative, so it is difficult to use in data encryption.

More Mistakes

POKE does not send data to an I/O port as the manual states. It puts a value into a memory location, as might be expected.

END does not return to the system. It may appear at the end of a program without causing a compile time error, and if the last executable statement is also the last line of the source code then the compiled program will return to the operating system.

STOP is not the same as END. STOP can be anywhere in the source code (even inside procedures, functions and loops). It causes the compiled program to return control the operating system, and is the preferred way of marking the logical end of a program. Note that as procedures and functions must physically precede the main section of a program, STOP will probably, but not necessarily, be the last statement.

I hope the above list is useful. If struggling S-BASIC programmers would like to send in their collection of useful information gleaned from experimenting, I would be happy to put together another collection of tips for a future column. ❑

Listing 1. Emulate the XLATE function.

```
        s3=""
        i=1
0loop   a=ascii(mid$(s1,i,1))
        if a=0 or a>len(s2) goto 0end
        s3=s3+mid$(s2,a,1)
        i=i+1
        if i<=len(s1) go to 0loop
0end
```

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your HITACHI computer

By Dom Swinkels

THIS MONTH we take a look at the 16-bit expansion cards for the 8-bit MB-6890 machine, and also at two programming problems I came across recently.

MB-1600 Cards

The MB-1600 cards are two cards for the MB-6890 machine to make it look like an MB-16001. Also known as the Level 5 expansion, they contain the 8088 16-bit processor and 128K RAM, which can be expanded on the card to 192 Kbytes. The cards are quite long and for this reason must be used in slots 5 and 6.

The operating system is MS-DOS V1.25, which comes with all the normal utilities. Although this is the same version as is used on the full 16-bit machine, the two are not compatible in every respect. For example, over half of the BASIC tokens are different, so that a BASIC program written for the MB-16001 and saved in tokenised form will almost certainly not run.

This is probably not very important since few users are likely to have both the MB-16001 machine and the MB-1600 expansion cards. But to transfer a BASIC program between systems you have to save your BASIC programs in ASCII format on one system, say the MB-16001 machine, and load the program off the same disk in the other system. Similarly, BASIC programs saved in ASCII format on an IBM machine on double density disks using PC-DOS 1.1 are likely to be largely compatible. With much public domain software becoming available for the IBM, this may form the basis for some useful software for the Hitachi machines. See some of Lloyd Borrett's IBM columns in *Your Computer* for details of IBM public domain software.

However, there are restrictions. Many of the BASIC commands available on the MB-16001 machine are not available at all in the level 5 expansion system. These are all commands relating to graphics, sound, light pen or the games port, since none of these are supported in the level 5 expansion mode. Function keys do not work any longer. Any software transported from other machines using these commands or function keys, or using machine-specific PEEKS and POKES or machine language routines, will therefore not function. Your MB-6890 machine will of course still support graphics, sound and so on in its normal level 3 mode.

With the level 5 cards and the necessary software, you now have a RAM disk capability, which can speed things up greatly when you have to access the disk often. The procedure would be to initialise the RAM disk using the special software supplied with the level 5 expansion. Assuming you already have two floppy disk drives on your system, the RAM disk becomes drive 2 and it will be necessary to run the CONFIG program to tell the system there now are three disks.

The CONFIG program modifies the DOS on the disk in drive 0. Before you can activate the RAM disk it is now necessary to reboot from the modified disk so that the three-disk version of DOS is loaded into memory. To establish the RAM disk and to FORMAT it, you now run the program supplied for this purpose. Then move the file(s) to be worked on to the RAM disk and treat it like any other disk drive. Thus FILES '2:' will give a directory listing of the files on the RAM disk.

A utility is supplied to move data files only to the RAM disk. It is not very convenient to use and probably will come complete with Japanese error messages.

When you have finished your work, remember to move the files you want to save back to your floppy disk, otherwise you will lose them when you turn the power off. In fact it is probably wise to save them several times during an extended session in case of a momentary power interruption or a hang-up of the system, from which you cannot recover easily.

The size of the RAM disk is about 12 Kbytes less than the amount of memory mounted on the level 5 cards. After allowing for the directory and the File Allocation Table, this leaves about 114K for file storage on the 128K RAM card.

If you feel you need some of these features then the level 5 expansion may be worthwhile for you, but remember, it does not give you a great deal of IBM or even MB16001 compatibility.

The Typing Error That Wasn't

After my column in the February issue of *YC* I received a letter asking, amongst other things, whether I knew about the typing error in line 540 of the Diskmap program. I had another look at that line and could not see any error. In any case, the program (like all programs sent to *YC*) was reproduced directly from a listing of the program as run and tested. This does not guarantee that all possible situations have been anticipated, but it usually avoids purely typographical errors.

In this case line 540 was essential to the running of the program and was used many times in every run. Therefore, I assumed that it was correct and that what had confused the reader was the backward slash.

The backward slash appears on most keyboards but not on the MB6890. It is used to represent integer division, which works like this: first the divisor and the dividend are rounded to the nearest whole number, then division occurs and then the result is truncated; that is, the fractional portion is dropped.

The key which provides this facility on the MB6890 is the top right-hand white key in the QWERTY section of the keyboard. Depending on the vintage of your machine the key may be blank or have the Yen symbol on it. In any case the Yen symbol appears on the screen when this key is used. If your printer prints Japanese characters it will no doubt print the Yen symbol as well, but most printers (such as my Epson) will print the backward slash for the corresponding code (CHR$(92)).

So, the backward slash is a common symbol for integer division, but on the MB6890 you must press the key described above and expect to see the Yen symbol on your screen. Sorry if I confused anyone else. Blame it on PP (Peach Peculiarities).

I have included another short program to illustrate the use of integer division and also its companion operator, the MOD operator, which gives the integer remainder after an integer division. Line 160 of the Calendar program uses integer division to find the number of weeks required in a month, and line 210 uses MOD to find how many days remain in the week to start the next ▶

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LISTING 1.

```
10 REM..."CALENDAR"...Draws a month per page...Dom Swinkels.
20 DIM D$(42)
30 S=1:REM...Sets the first day of 1984. (Sunday=1)
40 OPEN "O",#1,"LPT0:"
50 FOR M=1 TO 12:READ M$
60 REM...Print days of the week heading.
70 GOSUB 230:GOSUB 240:GOSUB 250
80 PRINT #1, "!  SUNDAY  !  MONDAY  !  TUESDAY ! WEDNESDAY";
90 PRINT #1, "! THURSDAY !  FRIDAY  ! SATURDAY !"
100 GOSUB 250:GOSUB 240
110 REM...Set strings for all the days of the month.
120 FOR I=1 TO 42:D$(I)="":NEXT I
130 READ D:X=1:K=S
140 FOR I=1 TO D:C=K+I-1:D$(C)=STR$(X):X=X+1:NEXT I
150 FOR I=1 TO 42:D$(I)=STRING$(3-LEN(D$(I)),")+D$(I):NEXT I
160 Y=(D+S-2)\7 +1:REM...Finds number of weeks required.
170 FOR W=1 TO Y:FOR T=1 TO 5:GOSUB 250:NEXT T
180 FOR I=1 TO 7:C=(W-1)*7+I:PRINT #1,"!
    ";D$(C);:NEXT I:PRINT #1,"!"
190 GOSUB 240:NEXT W:GOSUB 230
200 PRINT #1,CHR$(12)
210 S=(D+S-1) MOD 7 +1:NEXT M:CLOSE:END
220 REM...Subroutines for drawing standard lines.
230 FOR I=1 TO 7:PRINT #1,M$;:NEXT:PRINT #1:RETURN
240 FOR I=1 TO 7:PRINT #1,"+----------";:NEXT:PRINT #1,"+":RETURN
250 FOR I=1 TO 7:PRINT #1,"!          ";:NEXT:PRINT #1,"!":RETURN
260 DATA "  JANUARY  ",31,"  FEBRUARY ",29,"   MARCH   ",31,"
    APRIL   ",30
270 DATA "  MAY  MAY ",31," JUNE JUNE ",30," JULY JULY ",31,"
    AUGUST  ",31
```

month. By the way, if you have no printer or want to try the program without wasting a lot of paper, simply change 'LPT0:' in line 40 to 'SCRN:' and change line 200 to STOP. To fit a whole month on the screen also change line 170 to: FOR T = 1 to 1.

You may ask why bother to produce a calendar using your computer when you probably have several free ones from various business houses. Well, you can also write the calendar to a file. Pick up this file with a word processor and enter various appointments and reminders on the appropriate dates and then print it. Update it as often as necessary and you always have a neat calendar with all your commitments (and birthdays!) clearly marked. Try doing that with your Play Mates calendar.

❑

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Access or Atrix Users: Write to 'TAG', P.O. Box 943, Orange 2800 for details of informal User Group to exchange information, problems, solutions, programs etc. and maybe start newsletter. The more the better.

Hitachi Peach MB6890: 32K with expansion board, single disk drive, green screen hi-res monitor; assorted software plus 10 blank disks, excellent condition, 12 months old, $1800 the lot. Phone Damon on (07) 287 3426 (ah).

Morrow Computer: Anyone interested in forming a user group? Write to Phil Sefton, 2/473 George St, Albury 2640.

Wanted to Swap: TRS-80 LII Model I programs. Geoffrey Egel, 18 Sturt Street, Loxton 5333.

VZ 200: 64K Expander $200; VZ200 computer $140. Ian Webber, 92 Royal Parade, St. Johns Wood 4060.

Apple Games: Round the Square, Matches, Tower of Hanoi. All for $15. Write to S. Hilton, 9 Rowbotham Street, Toowoomba 4350.

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your OSBORNE computer

By Geoff Cohen

WITH SO many interesting things happening, I'm not exactly sure where to start this month's column; perhaps the best place is at Osborne in the USA.

To start off, here is a little background information. Most Osborne owners have heard that Osborne Computer Corporation in the USA experienced some financial difficulties late last year, and filed for a 'Chapter 11 of the Bankruptcy Code'. However, this doesn't mean the company has stopped doing business. Quite the contrary; it was an action which is available to American companies who encounter financial difficulties and allows them to remain in business under as normal as possible circumstances, while providing the company protection from its creditors' claims until it has resolved its problems. The process is known as 'trading out of your difficulties'.

After talking to Jim Schwabe at the Osborne factory in Hayward, I have (as the saying goes) some good news and some bad news. The good news concerns Osborne Computer Corporation in the US. It recently had its disclosure plan approved by the court, which is another step out of chapter 11. By the time you read this column, the process back to normal operation should be nearly completed. Secondly, the *Portable Companion* is once again being published, although initially only as a bi-monthly publication. Osborne owners who had subscriptions can expect to receive their magazines in the mail soon.

The bad news is that because of Osborne Computer Corporation's reorganisation, it can only send three issues to existing *Portable Companion* subscribers. Unfortunately, after that you will have to re-subscribe. It is a very useful magazine for Osborne owners (maybe even nearly as good as *YC*!), and its continued publication should interest many readers of this column.

(For the complete story of what happened to Osborne in the US, see Bill Bolton's article 'What *really* happened to Osborne Computer Corp' in the April '84 issue of *Your Business Computer*.)

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dBase II

The two most popular items of software must be word processors and database systems. With dBase II the most popular version of these microcomputer database systems, Osborne produced a special version which automatically scrolled the screen when the cursor was near the 52nd character. This was fine when there was only a 52-character display, but most Osborne 1 and all Executive owners now have 80-character displays.

Unfortunately, dBase is not smart enough to tell that the 80-column screen is fitted and still scrolls the screen. Full screen editing does some weird and wonderful things and the screen flicks all over the place. Obviously a fix for this problem is required, and here it is. This was supplied by OCC and first published in *Foghorn*, the newsletter of the First Osborne Group (FOG) in San Francisco. Gale Rhodes has kindly given us permission to reprint it here in *Your Computer*.

First, remember, **only work on a copy of your dBase II disk**, not the original. If you don't know how to use DDT, I suggest you contact one of your local Osborne user groups. (All the ones I know about are listed at the end of this column.)

Put a C/PM SYSTEM disk in drive A (with DDT.COM), and a copy of your dBase II disk in drive B, and boot up the system. Now follow these instructions. The keys you press are printed in **bold**, with the computer's replies in normal print. Note that <CR> signifies pressing the return key, and ↑C means control C.

A>**DDT DBASE.COM**<CR>
DDT vers. 2.2
NEXT PC
4700 0100
-**S130**<CR>
-0130 05 **01**<CR>
-0131 1A .<CR> (That's a period followed by a carriage return)
-**S154**<CR>
-0154 80 **50**<CR>
-0155 18 .<CR>
-**S395A**<CR>
-395A 3A **C9**<CR>
-395B 5A .<CR>
↑C
A>**SAVE 70 B:DBASE.COM**<CR>

While we're on dBase fixes, if you are using Quickcode, run SETUP to set both the logical and physical screen sizes to 80; this saves lots of problems.

For those people using the AVBIOS (and who wouldn't with 75 function keys?), there is a slight annoyance in using ESCAPE. As the AVBIOS uses the ESC key to get all those extra function keys, ESC has to be pressed, released and then pressed again to send the ESCAPE character to the computer. A much easier way is to run SETUPAV and define Control 1 as <ESC>. This lets you hold down the Control key and press 1 at the same time, and works a lot better.

Also, there was an error in some versions of dBase supplied in Australia. The problem was that STRING functions didn't work. Unfortunately I don't have the answer to this, and would appreciate help from someone who does know what's what.

User Groups

This is a list of the Osborne user groups that I know about. If you have details on more, please send them to me via COG or this magazine.

Adelaide Users' Group
Contact Jim Tucker (08) 278-7076 (home)
GPO Box 603, Adelaide 5001.

AUSBORNE User Group
PO Box C 530, Clarence Street, Sydney 2000.

Canberra Osborne Group (COG)
Contact G. Cohen (062) 54-7608 (home)
PO Box 136, Kippax ACT 2615.

First Osborne Group (FOG)
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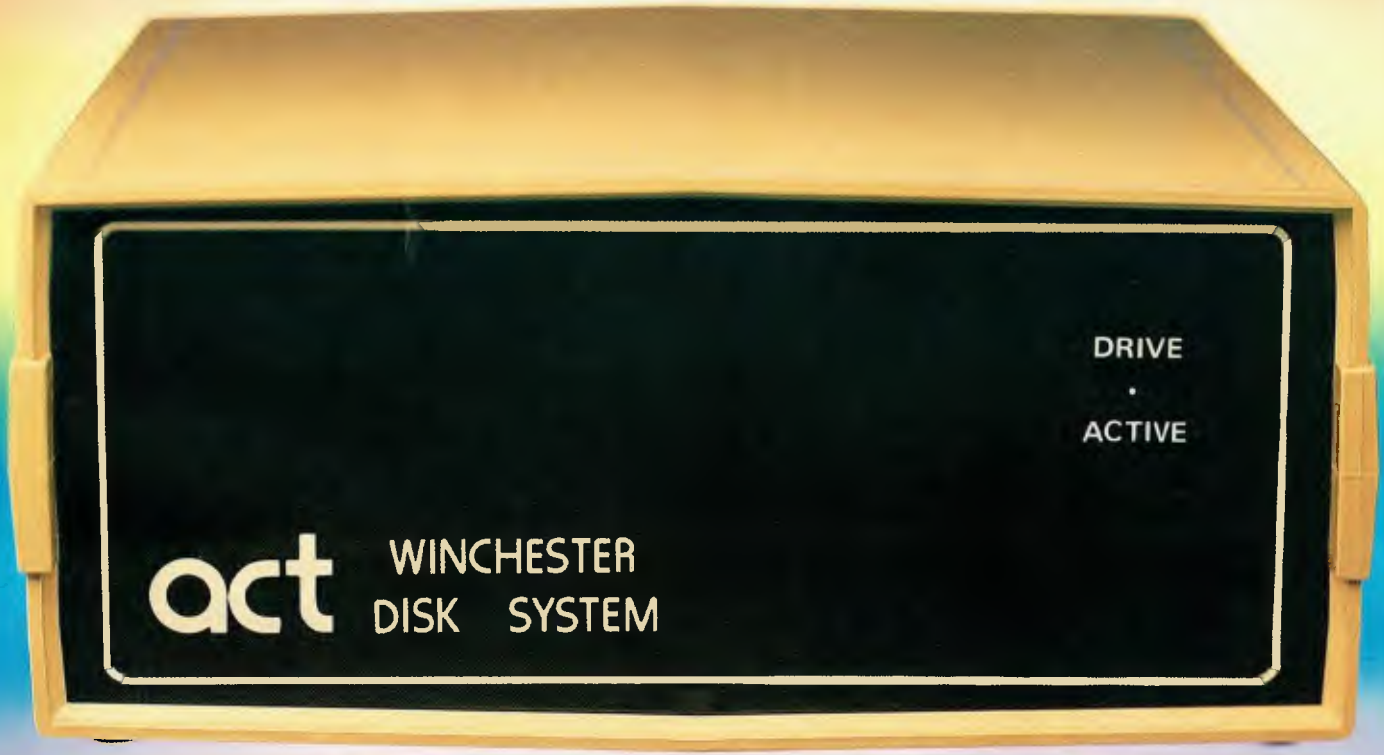

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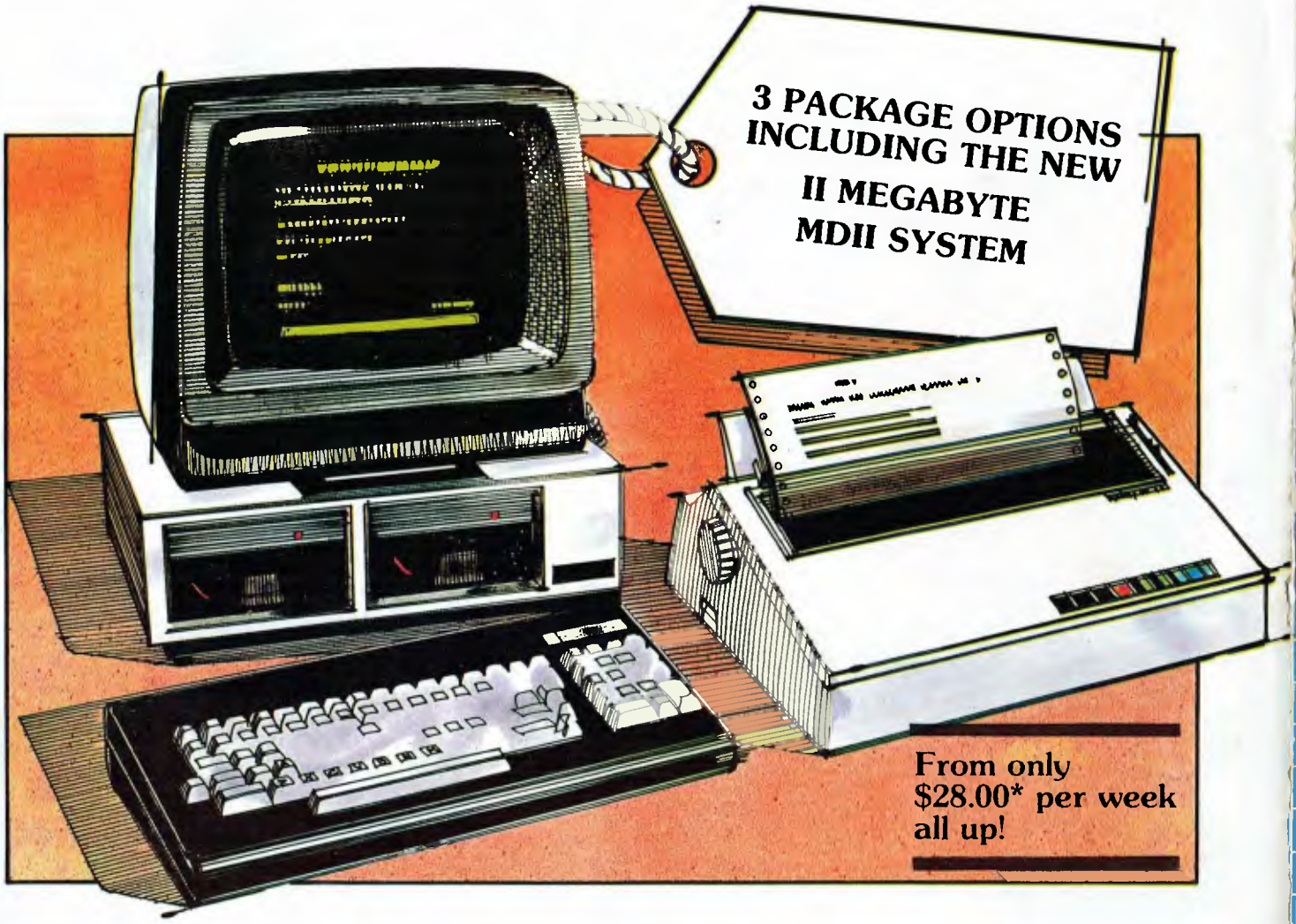

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