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COMPUTER
MAGAZINE

GREAT
AUSSIE
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COMPETITION
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your computer

JANUARY 1985 MAGAZINE FOR BUSINESS AND PLEASURE



HOLIDAY
BOOK
SPECIAL!

COMPUTER SPEAK *Languages of the World*

POCKET PROGRAMS

THE GREAT DATABASE SEARCH — dBASE III

REVIEWS: POLAROID PALETTE • ROADRUNNER • HP-110 PORTABLE

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DXY 880 Control Panel



DXY 880 Plotter

DXY 800 Plotter

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SuperCalc³, The Lotus Eater

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Supercalc³ requires an IBM PC, PC-XT or close compatible running PC-DOS 2.0. Minimum memory is 96K. Neither colour nor graphics is compulsory although recommended.

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Staff Shortages

Recently, I've spoken to quite a number of people who were buying, or had just bought, personal computers. Some were pleased with their purchase; some were working hard to get it to work right; others were just plain confused.

Their experiences while trying to decide what to buy were varied. Some had thoroughly researched the purchase, while others had simply bought what the salesman recommended. Generally, they weren't too critical of the service they had received before buying.

But when it came to after-sales service, they were all unimpressed. The problem is simple; you only have to use a personal computer for a few hours to achieve a far higher standard of expertise than the sales staff. After all, they only have to sell the stuff, not use it.

The problem has been compounded by the dramatic growth of the personal computer industry. In the old days, the people who sold computers quite often built them, too (in their garages), and of course they could provide after-sales support - because they spent all their spare time playing with the damn things.

In those days, everybody in the micro industry was an enthusiast who ate, slept and breathed microcomputers. That's why there were rapid advances, that's why we have user-friendly software; because of individuals who just wouldn't stop tinkering. We used to call those people hackers, and it was a term of respect.

Today, there just aren't enough hackers to go around. And so the computer manufacturers and dealers are employing professionals (people who do it for money) who have neither the knowledge to provide good support nor the enthusiasm to gain that knowledge.

*The trouble is, the users are taking the machines back to the office, unpacking them, using them, learning and developing enthusiasm and tremendous knowledge. They start reading **Your Computer**, and next time they go back to the store with a technical question, they discover that they know far more than the supposed experts they bought the machine from.*

If you are able to buy a computer from a company trading out of a garage - especially if they build the computers there - I'd be inclined to buy it. You'll get far better support from people who know what they're doing, and are doing it (on however small a scale) because they enjoy it, than from a pin-stripe suited salesman who may have been selling used cars the week before and now is selling a machine he doesn't understand and is not interested in.

Les Bell

Twelve awkward questions that will tell you if a PC is productive.

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9. Does 'complete' mean the screen is included in the price, as with the AWA Corona?

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LABTAM COMPETITION – THE WINNER IS ... 14

Whew! After spending many absorbing hours hunched over a Labtam computer, our three judges have developed an even greater respect for local programming ability. Yes, and they chose a winner.

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Has dBest been bettered? Rose applied her magnifying glass to dBase III and found it to be not particularly fast or portable, but impressive in other areas. Akhurst has outdone himself on this one. ROSE VINES

PROGRAMMER'S WORKBENCH 69

MR ZARDAX 80

The Zardax word processor for Apple II computers has been a runaway success since the first copy was sold in 1980. Could any newcomer to the software scene do as well in 1984? We asked Mr Zardax. RICHARD WALDING

POCKET PROGRAMS 87

At last, some more programs for the late-night, two-fingered typists. This month we have several games, a program which does away with printer interfaces, and some other useful bits of code.

FRIENDLYWRITER 100

Ever wondered if a cheap, relatively full-featured word processor exists? Well, it does – give Friendlywriter a try. JOHN NICHOLLS

GETTING FRIENDLY WITH BASIC – PART VII 109

Has your version of BASIC seemed a bit aloof lately? Perhaps this dose of 'getting friendly' will improve your relationship. Howsabout some 'hashing', for keeping track of data? JEFF RICHARDS

BUYING A COMPUTER IN THE USA 113

There are both pitfalls and advantages to buying a computer in the US – Peter Phibbs highlights a few of them. PETER PHIBBS

SPECIALS

COMPUTER SPEAK 26

Computer languages are almost as diverse as those we use for speech. Here Les looks at the history of computer tongues and explains where to use and where to get everything from Algol to BASIC/Z. LES BELL

HOLIDAY READING 58

Poor Evan. He quickly regretted coveting the title of 'Book Editor', and had nearly vanished under the pile, when we proposed he make an informative list of all the books he'd received ...

EVAN McHUGH



your computer

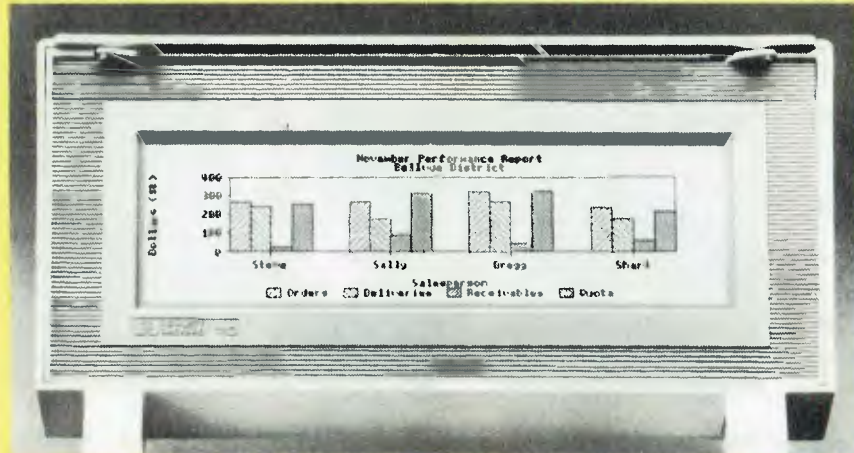


NEW MODELS

HP-110 PORTABLE COMPUTER

104

It fits in a briefcase with room to spare, has a bundle of software in ROM, its large LCD screen is something rare ... but it costs \$5000! EVAN McHUGH



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REVIEWS

PALETTE AND PRESENTATION MASTER

52

Capturing images from computer screens has long been an unrewarding task. Polaroid's Palette offers vastly improved results, and with Presentation Master you get DR Graph and Draw too. LES BELL AND JOHN NICHOLLS

BEEP BEEP!

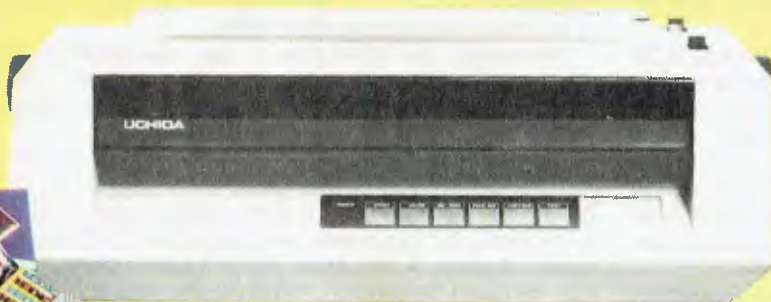
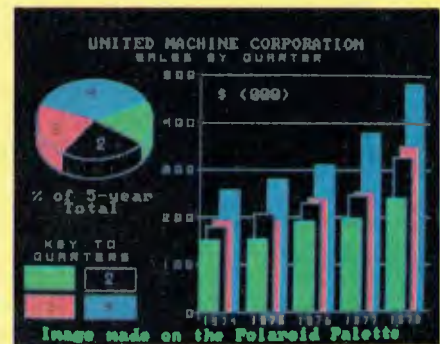
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It always frustrated Frank that the poor Coyote never actually caught the RoadRunner, but then he got his hands on a RoadRunner portable computer and found it was worth the wait. FRANK LEE

UCHIDA DWX-305 PRINTER

97

Letter-quality at half the price? This review shows there's nothing to be lost but speed. JIM ROWE



IBM Vice-President Visits Australia

Computer networking is providing a powerful means to reduce intellectual isolation . . . to accelerate the process of discovery . . . to eliminate wastefully duplicated effort. Networking can allow one or two specialists to enjoy the intellectual benefits — and the economies of scale — of a large research group.



THE VICE-PRESIDENT and Chief Research Scientist of IBM, Dr Lewis Branscomb, was in Australia recently to deliver the eleventh David Rivett Memorial Lecture.

The lecture, entitled 'New Directions in Computer Science and Computing', was first delivered in Canberra at the Academy of Science, and later in Adelaide and Perth.

David Rivett, in whose honour the lecture was delivered, was a head of the CSIRO and a major force behind its development. He died in 1961.

In the course of his lecture, Dr Branscomb discussed in detail many of the future trends of computing, and concentrated much of his attention on the nature of the computing environment in the near future. One of the features of this will be the increasing use of local area networks and high-powered personal workstations.

Key elements in future computing will be the enhanced versions of today's IBM PC. "Historically," says Dr Branscomb, "workstations have come in three varieties: general-purpose displays and other so-called 'dumb terminals', dedicated text processors, and stand-alone personal computers.

"More recently, the growing technical and end-use affinity among these three types of products has caused the distinctions between them to blur. People want to be able to perform all three tasks with one general-purpose workstation.

"By this is meant a low-cost desktop machine which has a 32-bit processor capable of more than one million instructions per second, with at least a million bytes of memory, and a high-resolution screen capable of displaying about a million picture elements," according to Dr Branscomb.

"A few such machines are already on the market, but at high prices and in limited volumes. They will soon achieve costs more like a personal computer than the mid-range computers they resemble."

As a consequence of this, companies like IBM are projecting a super workstation in the not-too-distant future.

Networking saves Dollars

On the subject of local area networking, Dr Branscomb outlined the work of some US universities in the development of networking systems, in order to illuminate where this technology is heading.

One such university is Carnegie-Mellon of Pittsburgh, Pennsylvania, where they have a goal that, "by the end of the decade all of the university's 5500 students, faculty, researchers and staff will have access to IBM individual computer workstations about an order of magnitude more powerful than today's personal computers — and to shared, central databases through a high-speed local area network.

"The first tier, or level, of CMU's network will be clusters of 50 to 100 workstations — for example, in a student dormitory or a classroom building.

"The second level is a backbone network that links the clusters together and to host computers. Eventually, up to 100 clusters of up to 100 workstations each will be attached.

"This backbone communications system would tie together all the buildings on the university campus and connect them to their large host computers."

One of Dr Branscomb's key points about the nature of computing today concerns the way in which you can save on the costs of hardware and printers as well as share resources in others areas.

"Computer networking is proving a powerful means to reduce intellectual isolation ... to accelerate the process of discovery ... to eliminate wastefully duplicated effort.

"Networking can allow one or two specialists to enjoy the intellectual benefits — and the economies of scale — of a large research group, without, in fact, having to put such a large group all in one place."

Fundamental Changes in Use?

While he spent much of his lecture outlining some of the research in computing that is currently being carried out, Dr Branscomb also looked at some of the areas where future research may be of use. He asked the question, "What other challenge can be defined that would truly make a fundamental change in the usefulness of computing machines?"

His answer? "It will be to focus less on whether the machine can think, and more on whether it behaves itself and has good manners." □

IBM Swoops on China

IN A MOVE which has alarmed the Japanese, IBM has announced the formation of IBM China, a wholly-owned subsidiary of IBM World Trade Americas/Far East Corporation, to conduct business in the People's Republic of China. The new company has offices in Beijing and Shanghai.

A number of Japanese companies have planned to enter the Chinese market – a market which they considered theirs for the taking, due to the similarity of their languages and the associated problems with hardware and software design – and thus the swiftness of IBM's move has taken them by surprise.

As part of IBM's push into China, the company is undertaking joint business and technical projects with the Chinese government. These include a data and education centre in Beijing, offering data services and customer education classes; an IBM 5550 production facility; software development projects and Series One demonstration installations, which will demonstrate industrial automation applications.

IBM came bearing gifts – the company has donated 100 high-function academic computing workstations to universities selected in co-operation with the Ministry of Education. The workstations include software and Chinese character support – an area which IBM has been researching for some time. □

Apple's Christmas Offerings

THIS news didn't arrive in time to make it into our December issue, but if your bank balance has survived the onslaught of Christmas, and you'd like a good deal on the Apple IIc, you've still got a chance to take advantage of the company's 'bundled holiday packages' which are based around the IIc with monitor and stand.

The Family Package consists of a mouse and five software packages: Mousepaint, a free-hand graphics program; Print

Shop, a stationery designing system; Bank Street Writer, a word processor; a graphics/topographic package; and 'How About a Nice Game of Chess'.

The Professional Package includes an additional disk drive; Mastertype, a typing tutor for the keyboard-illiterate executive; Appleworks, an integrated word processor/spreadsheet/file manager; and 'How About a Nice Game of Chess'.

The Family and Professional packages will retail for \$1995 and \$2550 respectively, and will be available from Apple dealers and most Grace Bros and Myer stores until the 8th February, 1985. □

Apple Universities Consortium Launched

IN AN EFFORT to increase the use of personal computers in higher education and to assist in the development of courseware programs for educational computing, Apple Computer Australia has announced commitments to supply large quantities of Macintosh and Lisa computers to several major Australian tertiary institutions. This move is an extension of the international Apple Universities Consortium, which is already strongly established in the United States, Canada and New Zealand.

Apple expects to supply systems worth over \$9 million to Australian tertiary institutions over the next three years. Other computer equipment suppliers, such as Microsoft, Imagineering and Compumusic, will also provide support to the Australian consortium activity.

Local members of the consortium include the universities of Wollongong, Tasmania, Western Australia, Adelaide and Melbourne and the Western Australian and New South Wales institutes of technology. Students and staff at Sydney University will be able to take advantage of the plan through the Co-op Book Shop, and a similar arrangement has been completed with ANUTECH to provide facilities for the Australian National University.

All consortium members have



Music Computer to Win

SONICS, Australia's magazine for music-makers, is running an interesting competition in its January/March issue. The prize is Yamaha's new MSX computer, the CX5M, plus a 44-note music keyboard, three software packages and a Taxan Vision-EX colour monitor, worth over \$1600 in total!

As well as being an MSX-standard computer with 32K ROM and 48K RAM, the CX5M incorporates Yamaha's 'FM voice generator' chip, which provides eight octaves of high-quality sound and the ability to produce eight different voices at once. In other words, this computer is a real music-making tool.

The accompanying software turns the keyboard and voice generating chip into an extensive synthesiser and composing system. The FM Music Composer allows you to write music onto onscreen staves, from either the typewriter or the music keyboard, in up to eight 'parts' with full control of time

and key signatures, tempo, dynamics and phrasing. Compositions can then be played by the CX5M, or by up to eight other instruments equipped with MIDI (the Musical Instrument Digital Interface) under the control of the CX5M.

An FM Voicing program allows you to edit and alter the pre-programmed voices or create totally new ones; and a Music Macro program adds a special set of commands to the MSX BASIC language, permitting control of the FM voice generator from within BASIC programs.

The Taxan/Kaga Vision-EX monitor has been donated by Colex Australia, and is an excellent medium for reproducing the CX5M's comprehensive 16-colour graphics, although a conventional colour TV can also be used.

Entry forms are to be found in the January/March issue of *Sonics* magazine, out mid-January in all newsagents. □

undertaken to become active in the development of joint software with local and international members, and each member automatically becomes a registered Apple Software Developer, eligible for further company support.

Individual members of the

consortium will be able to re-sell the Apple equipment to full-time students, faculty and administrative staff members at a substantial discount. Typically, a 128K Macintosh will be available on campuses for about \$1900 – a saving of about \$1000. □



Multi-Terminal Labtam

THE Australian company Labtam International has released a new five-user microcomputer system which will retail for \$8,600.

The 3003DT consists of a dual 8-bit/16-bit processor, 640K RAM, one 800K floppy disk drive, a 10 megabyte Winchester drive, ten I/O ports for device connections, a bit-mapped Regis graphics display terminal and 'ergonomic' keyboard. The operating system supplied is Concurrent CP/M. In a multi-user environment, the 3003DT allows an 8-bit job

to run at the same time others are running 16-bit jobs.

An interesting feature of the system is dynamic terminal allocation: when a user wishes to add terminals to an existing system, they merely plug the terminals into the Labtam back panel and depress one key on the keyboard. The system then reconfigures itself to optimise its operation for the number of terminals installed.

For more information contact Labtam: 43 Malcolm Road, Braeside 3195; (03) 587 1444. □

TI Gentlemen No More

TEXAS INSTRUMENTS has fired another salvo in the IBM-compatible price cutting wars. Announcing an average 20 per cent cut on the whole range of TI microcomputer products, the company's national marketing manager, Mr Ian Hawkins, said "We have been gentlemen too long and allowed other companies with lesser products to make the running. TI has been in the microcomputer industry

longer than anyone else - don't forget TI invented the chip that made it possible - and we intend to gain the market share that goes with that commitment."

The price cuts range from 14 per cent on the 10Mb, 256K Colour PC, to 25 per cent on the dual disk, 128K Monochrome PC. For further information contact Jim Wright at Texas Instruments, (02) 887 1122. □

AT&T and Olivetti Strengthen Ties

IN A BID to strengthen their alliance, the US communications giant AT&T and Italian manufacturers Olivetti have announced common marketing strategies in the field of personal computers and workstations.

The agreement aims to place the companies in a better position to 'withstand global competition' (who could they mean?) in these areas, and defines the respective roles of each in the design, development, manufacture and marketing of workstations and related equipment.

Olivetti believes the agreement will provide protection for its investments in the automation of its production systems, and will make the company one of the largest world producers of workstations. □

Spooler Unstops Printing Bottleneck

USERS OF small business computers - especially multi-terminal installations - frequently find information flow bogs down when it reaches the printer. The MicroSpooler is a stand-alone print spooler which helps to eliminate this bottleneck by accepting the computer's high-speed output, storing it and then onloading to the printer at normal print speed. Meanwhile, users can continue with other processing tasks.

The spooler is a buffer box (16 and 64 kilobyte versions are available) that plugs between the computer and the printer. It may be interfaced with Centronics parallel or serial RS-232 ports, with baud rates and handshaking independently selectable for each port. As it is not system dependent, it can be transferred from one system to another.

Prices start at \$390, and Datron is the distributor. For more information contact Nik Sellheim at Datron, 79-81 Regent Street, Redfern, 2016; (02) 698 8211. □

Today's Figures, Tomorrow

OUR NEWS item last month on the circulation figures of the various computer magazines caused a stir in a few circles.

For those who missed it, the item gave details of magazine sales figures quoted in the industry newsletter *Systems User and Management*; most showed sales of less than half *Your Computer's* figure.

We wouldn't have been surprised to hear from *Australian Personal Computer* - a late correction to their estimate was included in the sales graph, but not reflected in the story. Perhaps *APC* was just happy to see the figures which indicated the rest of the opposition has a long way to go to catch the two of us.

However, *Today's Computers* did react. The following protest arrived shortly after the December issue hit the streets:

We at Today's Computers enjoy a joke as much as the next person. That is why we had a good laugh at Your Computer's estimates and assumptions of Today's Computers circulation via Systems User and Management newsletter.

The estimate is entirely wrong. When Today's Computers becomes part of the Audit Bureau Of Circulations next year you will discover just how wrong you really are. Today's Computers will also be included in the Roy Morgan Readership Research next year.

We believe that competition is healthy in a positive sense - when publications such as yours become negative (stating incorrect facts) for their own personal gain it is disappointing. Today's Computers is the only Australian computer magazine that knows exactly where it is going - after the growth market of business, supported by government and education.

**Bina Gupta
Publisher**

Today's Computers

We look forward with great interest to seeing next year's official sales figures for *Today's Computers*. □

Will Adam Stand Alone?



A NEW VERSION of Coleco's ill-fated Adam Personal Computer has been released in Australia. Originally heralded as a major innovation in home computing, providing a complete system at low cost, the original Adam's US introduction was delayed a number of times, with the price increasing as the scope of the system decreased.

The new 'Standalone' Adam is aimed at the self-employed or small business owner, rather than the home market. The package includes processor, keyboard, printer and interfaces. The standard model has 80K of RAM and 36 columns on the screen (expandable to 144K and 80 columns), digital cassette drive and daisywheel printer.

The Adam 'Standalone' will retail for \$1299. For more information contact: Peter Loughman, Computer Distributors, 26 Cross Street, Brookvale 2100; (02) 938 1180. □

WordStar Done Over

THE WORLD'S most used word processing program, Micropro's WordStar, has been rewritten and released under the title WordStar 2000. The new version is intended as the company's answer to hosts of criticisms and complaints about WordStar during its long life, and will be the basis for future developments.

WordStar 2000 will cost about \$400, and WordStar 2000 Plus will sell for \$700. For this money, buyers will get interac-

tive onscreen tutorials, windows for moving text between three documents, an 'UNDO' command to restore text removed by mistake, format sheets eliminating the need to continually reset tabs and margins or re-type frequently used headings, a keystroke glossary for storing often-used text or common commands, typewriter mode for sending text direct from the keyboard for addressing envelopes or filling forms, onscreen boldfacing and underlining,

renumbering of footnotes to match alterations in text, and support for printer proportional spacing, colour printers and various fonts, including italics. MailMerge, with a limited SORT facility for postcodes, and Correctstar spelling checker, which were previously available as separate options, are included with the program as standard features.

WordStar 2000 Plus will have the features listed above, as well as telecommunications

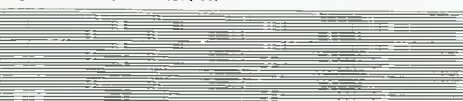
capabilities, a maths option for performing calculations in a document during editing, and several business correspondence modules.

There is no upgrade path for users of the eight-bit series, but a conversion disk will enable WordStar 2000 users to read data written by the Series 3.0 and progressive versions. At this stage, WordStar 2000 is for IBM PCs and compatibles. More information from: Im-

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GestetnerSX100 8" Honeywell OAS 5 1/4" OAS 8" SSSD or DSDD
IBM Displaywriter 1 or 2D (SSSD or DSDD) Office System 6 3730 3740 8" data exchange diskette 8110 PC MS-DOS WordStar, Multimate 2 Word-34 8" (SSSD or DSDD) ICL 7700 Wordskill 8" 8800 5 1/4" INTERTEC Superbrain 5 1/4" Jacquard J100, J500 Lanier NPET (LTI-3) Remington NBI 3000, 4000 levels C, E and G or 8.1 Olivetti ETS1010, TES501 8" Philips P5000 series Rank Zerox 850, 860 Ricoh TX330 Tandy TRS-80 Model I, II, III Script or Lazywriter Toshiba EW-100 Wang Archive diskette 8" OIS40-50 Archive diskette Archive diskette 5 1/4" Professional (PC) Wordplex Models 1, 2
WordStar and Spellbinder Standard 26 sector x 128 byte CP/M format, Data General LDC-1000 Archive 2 Datamax DEC Rainbow Heath H89 5 1/4" IMS8000 Intersec Kaypro MicroBee MicroMatron Morrow Munro NEC APC Otrana Osborne Pulsar 8" Sanyo MBC-1000 Sharp MZ-3500 Telexideo 802 Systral Zenith **MS-DOS Wordstar** IBM-PC (160K or 320K) Panasonic JB3000 8"

Beancounters Support Commodore

A RECENT survey in the United Kingdom found the Commodore to be the most popular micro in the accountancy field. The survey, conducted by Drakeford Survey Research, covered 582 British accountancy practices.

Sixty-five per cent of the firms surveyed had at least one micro, and of these, 30 per cent were Commodores. ACT/Sirius accounted for 16 per cent, followed by Olivetti, Apple, Texas Instruments and Wang.

The survey also found that three quarters of all accountants surveyed were able to use existing software packages, while the remaining quarter did at least some in-house customisation or development. □

IBM Speech Recognition

RESEARCH SCIENTISTS at IBM's Thomas J. Watson Research Centre have developed an experimental system which allows 'human voice' input (we can't wait to see the canine version) to create office documents such as letters and memos. It can recognise sentences com-

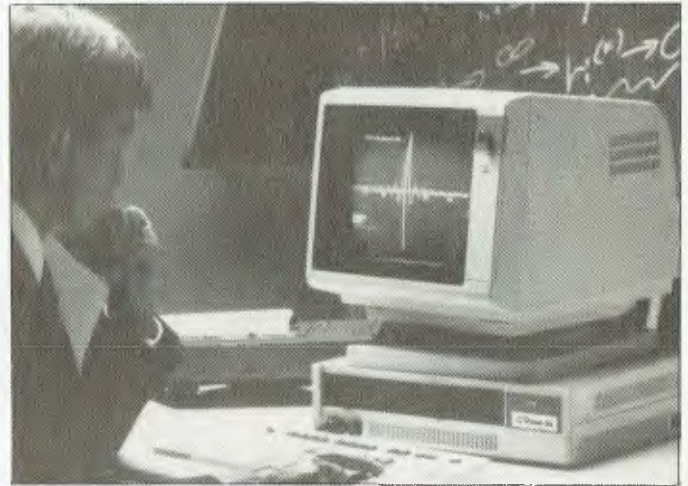
posed from a 5000-word business correspondence vocabulary, and recognises more than 95 per cent of the words in these sentences correctly.

Designed to adapt to individuals, the system 'trains' itself to recognise a person's voice by 'listening' to the user read a brief standard text. The system requires a short pause between words during both training and dictation.

Once the system is trained, words, phrases and sentences appear on a workstation screen as the individual speaks. The resulting letter or memo may be edited or amended by voice or keyboard.

The recognition technique used is statistical: it functions by determining the degree of similarity between the speech and the words in its vocabulary, as well as the probability they would be used with other words in the sentence. The system can distinguish between 'to', 'do' and 'through' because they are pronounced differently, and between 'to', 'too' and 'two' from the context.

Words not stored in the vocabulary can be used in documents by spelling them out, and new words that will be frequently used can be added to the vocabulary. IBM's next objective is to enlarge the vocabulary and make the system easier to use. □



Panafacom Duet

NATIONAL PANASONIC and Facom have combined forces to produce the Panafacom Duet-16, a 16-bit machine built around Intel's 8086 chip, designed for computer professionals, businesspeople or software developers.

Announcing the computer, Roger Bromley, managing director of Computer Enterprises — the Australian distributor — said, "It's easy to understand the comfortable feeling some people get from having three letters on the front of their PC. With the Duet-16, we are offering a different kind of comfort — capability. For only \$3890 we

will supply an MS-DOS and CP/M system with 128 kilobyte cpu, twin 720K floppy storage, a top quality dot matrix printer, and comprehensive accounting and word processing software".

Computer Enterprises claims independent benchtests indicate the Duet-16 operates up to 40 times faster than the IBM PC in I/O intensive tasks. Main memory is expandable to 512K and optional hard disks are available up to 60 megabytes. UNIX should be available for the system later this year.

For more information contact: Ken Greatbatch, Computer Enterprises; (02) 419 8577. □

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Revelation

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Briefly . . .

■ **Kmart** has opened specialist Commodore computer shops in 101 of its stores throughout Australia. The stores will carry a complete range of Commodore hardware, software and compatible peripherals at discount prices.

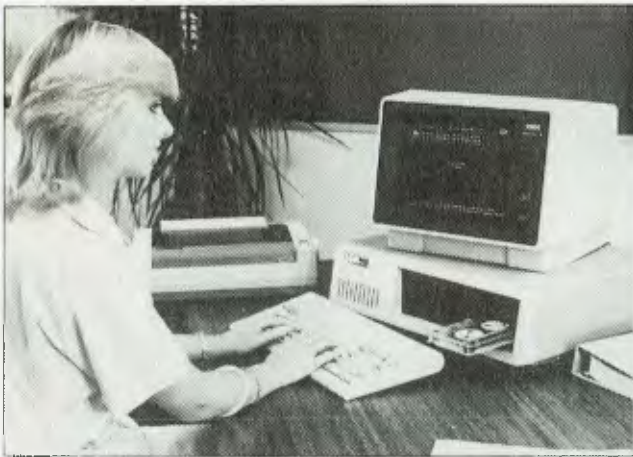
■ **The Queensland Education Department** has become the fourth state government to extend its range of contracted educational computers to include the Commodore 64.

■ **Modules from the integrated software package, Open Access,** are now being sold separately, with the manuals rewritten to make them more effective. Contact Software Suppliers for more information: (02) 888 1955.

■ **Hi Soft, the inaugural winner** ▶ of the IBM Dealer of the Year award, has moved. The company can now be contacted at 598 St Kilda Road, Melbourne; (03) 529 2333.

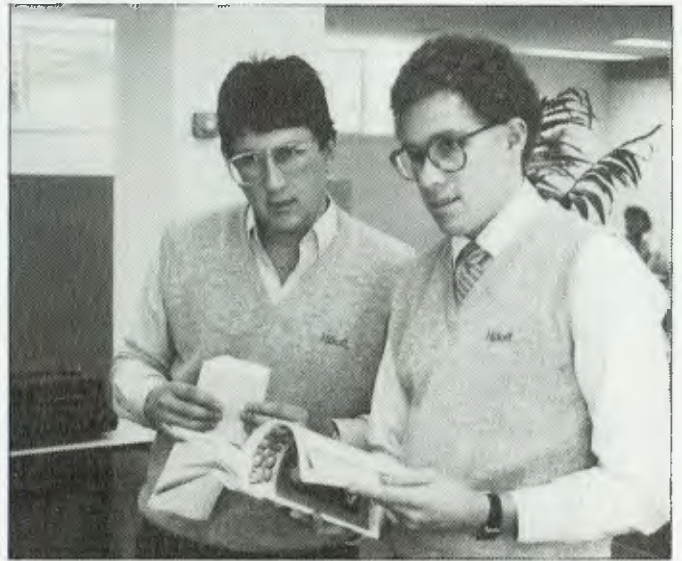
■ **Imagineering** has released the *Zork Trilogy*, an adventure game, and *Think Tank*, an ideas processor, for the Macintosh. *Think Tank* retails for \$210. Contact Imagineering for further details: NSW - (02) 212 1411, Victoria - (03) 529 3588.

■ **Shannon Robertson Systems,** a software company based in Nambour, Queensland, has combined with Sharp Corporation to distribute its extensive range of agricultural software throughout the country. More information from: Ralph Shannon, Shannon Robertson systems, 4 Carrol Street, Nambour 4560; (071) 41 3444.



■ **John Sands Electronics** has released the *Sega Steering Wheel controller*, which it describes as the 'ultimate driving

kit'. The controller is priced at \$39.95. For more info contact: Michael McClelland, (03) 645 3333.



■ **Datatel** has expanded its range of strict IBM compatibles, including one bearing its own badge. Operating systems available for the computers include PC-DOS, CP/M-86, Concurrent CP/M, Concurrent DOS, SMC, T/OS, Unix and Pick. For further information contact: Datatel, 19 Raglan Street, South Melbourne; (03) 690 4000.

■ **The Centre for Japanese Business Language** is offering courses in Japanese specifically designed for people involved in the computer industry. The language tuition is designed to provide a stepping stone to detailed knowledge of Japanese culture, lifestyle, business practice and etiquette. The Centre can be contacted on (02) 29 2323.

■ **Sanyo** has released a new colour monitor, the CRT 70, with a 2000-character display of 80 by 25 lines, and a colour graphics package called Sanygraf. Monitor prices start at \$399, and Sanygraf is priced at \$69. For further information contact: Mark Johnston, Sanyo Office Machines; (02) 929 4644. □

■ **ACT Winchester Disk Systems** has announced a complete line of hard disks for the NEC APC III. Also available are interfaces and software for users currently using ACT disks who wish to upgrade to the APC. The company may be contacted on (02) 439 6300.

■ **A genealogy program for the Commodore 64 (with disk drive)** is now available from Chambers Computer Supplies. Up to 575 names, plus notes, will fit on each disk, and easy screen editing is supplied. Features of interest to Mormons are provision for Baptism, Endowment, Sealed to Parents and Sealed to Spouse. For details: (03) 700 2451.

■ **Sharp's new 16-bit computer, the MZ5600,** comes with multi-windowing capabilities, an optional mouse and hard disk drive, and the MS-DOS operating system. A wide range of accounting and vertical market software is available for the machine. Contact: John Kouvelis, Sharp Corporation, (02) 728 9111. ▼





Graf-X D.A.G. L 1973.

**Which computer:
supports 5 users
incorporates 8 & 16 bit processors
800K floppy disk drive
10 meg Winchester
Concurrent CPM
640K RAM
has dual printer capabilities
is delivered within 30 days from order
and only costs \$8600*?**

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is a state of the art computer, ready to take one to five users as required. Another feature is that two key strokes is all that's needed to change from one terminal to a more than one terminal system. For the technically minded who also appreciate the value of the Labtam 3003, we offer a range of interesting options ie: Communications Networking, L.A.N., I.E.E.E. Interfaces, F.F.T.'s, Real Time A/D's.

Just think, for probably no more than what your current single terminal computer cost you, you can now have multiple terminals with the Labtam 3003 and more than likely be able to transfer your existing software.

Imagine word processing, commercial processing and spread sheet at the same time for a price that won't break your budget!



**The Labtam 3003
desktop computer**

For further information contact:
Melbourne: 587 1444, Sydney: 411 2588,
Queensland: 378 9877, Adelaide: 260 0133, Perth: 342 9721.

*One monochromatic terminal provided only.

THE GREAT AUSSIE SO

And the Winner is ...

YES, after weeks of reviewing thirty-seven software packages, most of them of extremely high quality, we finally have a winner of the Great Aussie Software Competition – it's Simon Hiscox of Wantirna, Victoria, with his program 'Report'.

Report is a program to enable teachers to write student reports with the aid of a computer. It sets up a database of the reports, allowing the teacher to add to and edit them by incorporating a word processor, and also provides for formatting and printing in a variety of styles.

Our judges – Matt Whelan, founder of *Your Computer*; Les Bell, consulting editor of the magazine, well-known software consultant and industry guru; and Dr Barry Thornton, dean of the Faculty of Mathematical and Computing Sciences at the New South Wales Institute of Technology – were particularly impressed when they examined the source code of this program. There are in fact two versions, one in MBASIC and an incomplete Pascal version, and the judges felt the writer had tackled a highly ambitious project for BASIC and brought it off with some extremely well-written and well-structured code. Altogether it is an elegant, well thought-out program with lots of attractive details like automatic wordwrap in the word processor – a refinement some commercial word processors don't have – and the way it draws up a box the size of a school report and automatically sets you in the right place to start typing when you enter the program.

So – congratulations to Simon, the deserving winner of the Model 3006 Labtam computer, plus a Mannesmann Tally MT160 printer (donated by Anderson Digital Equipment).

The Prize

The Labtam 3006 includes a 15-slot IEEE-796 multibus motherboard and switched mode power supply, and inside the cabinet are both a Z80A CPU running at 5 MHz with 128K of RAM and an Intel 8086 CPU running at 8 MHz, also with 128K of RAM.

Labtam is donating a further 128K RAM, bringing the total to 384K.

The computer's operating systems are CP/M-86 for 16-bit and CP/M-2.2 for 8-bit operation, plus MS-DOS. Labtam is including in the prize copies of WordStar Professional and SuperCalc 2, and battery back-up is supplied for the real-time/date clock and time counter.

The desktop console is Labtam's own high-resolution terminal and keyboard, which can support REGIS graphics. Storage is via a 1.2M 20 cm floppy disk drive plus a 10M Winchester. Together with the Mannesmann Tally MT160 printer, which offers both high resolution and graphics capability, the Labtam provides the winner with one of the most sophisticated and high-quality microcomputer systems available.

Runners-Up

Second prize in the competition – a Mannesmann Tally MT80 Spirit printer, also donated by Anderson Digital Equipment – went to Tim Tuxworth of South Perth, WA, for his program 'Notebook'.

The judges found Notebook a most ingenious program which allows the user to keep a set of notes on disk, of which up to 15 can be displayed on-screen at one time. It works as a sophisticated kind of memory-jogger-cum-diary, but with the novel variation that it incorporates a calculator which can be used within the note format.

Again, Notebook was extremely well-written, this time in C/80, and its clever combination of a memory-jogger with a calculator gave it high marks for originality. The judges felt it had good potential to be developed into a full commercial package.

Third prize – three boxes of Xidex precision flexible disks, donated by Magmedia – was awarded to C.G. Sieben of St Agnes, South Australia, for the program 'Family'. Family is designed to allow genealogical research using a computer, and fills a large gap on the Australian market for just such a program. (See our May 1984 issue for a special feature

on tracing genealogies by computer, and our remarks then that we couldn't discover a single Australian program for this purpose; all came from the USA or the UK, and therefore weren't ideally suited to the Australian background.)

The judges were most impressed by this "massive" and "ambitious" program, written in a combination of Z80 Assembler and BASIC, and particularly praised its excellent documentation, which gives a very good basis for any newcomer to genealogy to work from.

Fourth prize – two years' subscription to *Your Computer* – went to Warwick Wright of Bulleen, Victoria, for 'Golf', a comprehensive golf handicapping system – and this despite the fact that one of the judges claims never to have touched a golf club ("stick", he called it) in his life!

The judges described Golf as "a ripper", written in good, fast 8080 Assembler with plenty of quick single-letter commands, a built-in help function and an unobtrusive but efficient menu system. Once a user gains experience with this program, he or she would be able to use it to, say, handicap a golf competition in a really fast and easy manner; the program is a pleasure to use and would be eminently marketable in an area not generally served by computer software.

Fifth prize – one year's subscription to *Your Computer* – goes to Dr Grant Carter of West Pennant Hills, New South Wales, for his program 'ITU', an intensive-care-patient record system. Written in BDS-C, this is another massive undertaking that has resulted in a comprehensive and powerful package for maintaining a database of information about patients in intensive care.

An impressive number of details can be recorded in the database, from the sex of the patient through his or her medical history, number of, for example, heart attacks, details of the disease and its symptoms and much, much more. Using this information in the database, reports can be produced for such varied purposes as hospital administration records and documentation of intensive care procedures. The judges were impressed

FTWARE COMPETITION

with both the scope of the program and its programming structure and style – and with the fact that its writer intends to distribute it in the public domain for use by any interested doctors.

Congratulations to all our winners; they were the cream on the top of a generally excellent group of programs, and the judging was difficult. The judges were very pleased with the high quality of all the programs submitted, and found this high standard very encouraging for the future of Australian programming.

How the Judging Happened

The judges based their consideration of the programs on a system of points awarded for various criteria, such as originality, style, design, well-structured code, 'elegance', user interface, documentation and so on – in other words, they tried to take into account all the factors that go to make up a top-quality program, and awarded points accordingly. After this system had revealed the top ten or so programs, they then submitted these packages to more rigorous checking to eventually come up with the five winners listed here.

One factor which had to be taken into consideration was whether a program was already being marketed commercially. One of the stated aims of the competition was that the programs should be "original"; we defined this as meaning actually written for the Great Aussie Software Competition rather than obviously written some time before and simply submitted later to the competition. We didn't disqualify the commercial programs submitted, as the terms of the competition were sufficiently flexible to allow us to consider them despite their commercial background, but they did lose points on the 'originality' score.

A second problem with the commercial programs submitted was that all but one was copy-protected, which meant that the judges were unable to look at the source code and rate its structure and style. This was the biggest stumbling-block in judging the commercially available programs, and accounts for the fact that none of them reached the top five. However,

it should be stated that one of these programs, the 'Hi-Tech C Compiler' from Hi-Tech Software, was so good that it would have been one of the winners if the judges had been able to examine its code.

BASIC – in various forms – was, perhaps predictably, the most popular language of the entries, but it was interesting to find that C was the language used by the second-largest number of authors – and of those, BDS-C was easily the most popular. There were various entries in Assembler, a few in versions of Pascal, and even one in dBase II, but BASIC easily predominated.

We received several personal finance manager programs, and also a few disk editors and disk cataloguers, but these were rated low on originality, as in both cases there are already several good programs available in the public domain which perform those tasks quite adequately. Other programs were just too specific to one particular task to be useful to more than one or two users, for example a program to convert IBM

Examples of different report formats printed by Simon Hiscox's winning program.

Kingswood
Telephone: 890 0677

KINGSWOOD SENIOR COLLEGE
STUDENT REPORT

Name: Darren Pizzi
Year: 12
Term: 2
19 84

SUBJECT: English
RATING: F-
COMMENT: A B C D E F G H

Unfortunately Darren has not mastered this language and will have very little hope of achieving a pass. Even if he sits until the year 1999 and waits until the cows come home there is no hope of a pass.

NAME : Fiona Ure
YEAR : 12
TERM : 2
1984

SUBJECT : Pure Maths
RATINGS :
Term : A+
Option : A

COMMENT :
Fiona is an excellent student. works very hard and displays a understanding of the subject.
I am confident that she will be successful in the final exam in November.

disks to one specific CP/M format

the author uses; such programs are just too limited in application to win

So to sum up, the Great Aussie Software Competition more than fulfilled its goal of uncovering some promising Australian programming talent and "rewarding original Australian initiative in producing a well-written, well-structured, useful and innovative program ... reflecting an original approach to solving a problem by the use of a computer". For such a difficult competition we were surprised and gratified to receive as many as 37 entries, especially when we discovered the high standard of the programs. Labtam, which sponsored the competition and donated the first prize, was also delighted with the response and we're sure will already be planning to sponsor the competition again next year.

Once again, congratulations to all the winners, and in fact to all those who entered and produced such high-quality software. It's a pity you couldn't all win!



dBEST BETTERED

IT'S EASY to be enthusiastic about dBase III. Anyone who has enjoyed working with dBase II, despite all its bugs and limitations, is likely to fall readily prey to the lures of its successor. Merely reading a summary of the program's features was enough to get me itching to try it. However, I had to sit and itch for some time, waiting to get my hands on an IBM 'close compatible', before I could run it.

That's my first gripe about dBase III - Ashton-Tate's decision to adopt conservative marketing strategies and abandon the tens of thousands of faithful dBase II users who can't or won't upgrade (or downgrade, as the case may be) to an IBM PC or lookalike. At the moment, they're the only machines able to run the program, although versions for the DEC Rainbow and TI Professional have been released in the United States.

Great Database Search or not, most of our dBase II freaks have been experimenting with dBase III. Is it really dBase II with our wish lists added-in? Is it worth down/up-grading to an IBM PC to use it? Rose Vines thinks it's a great package, even if it doesn't quite cover all the ground it should have.

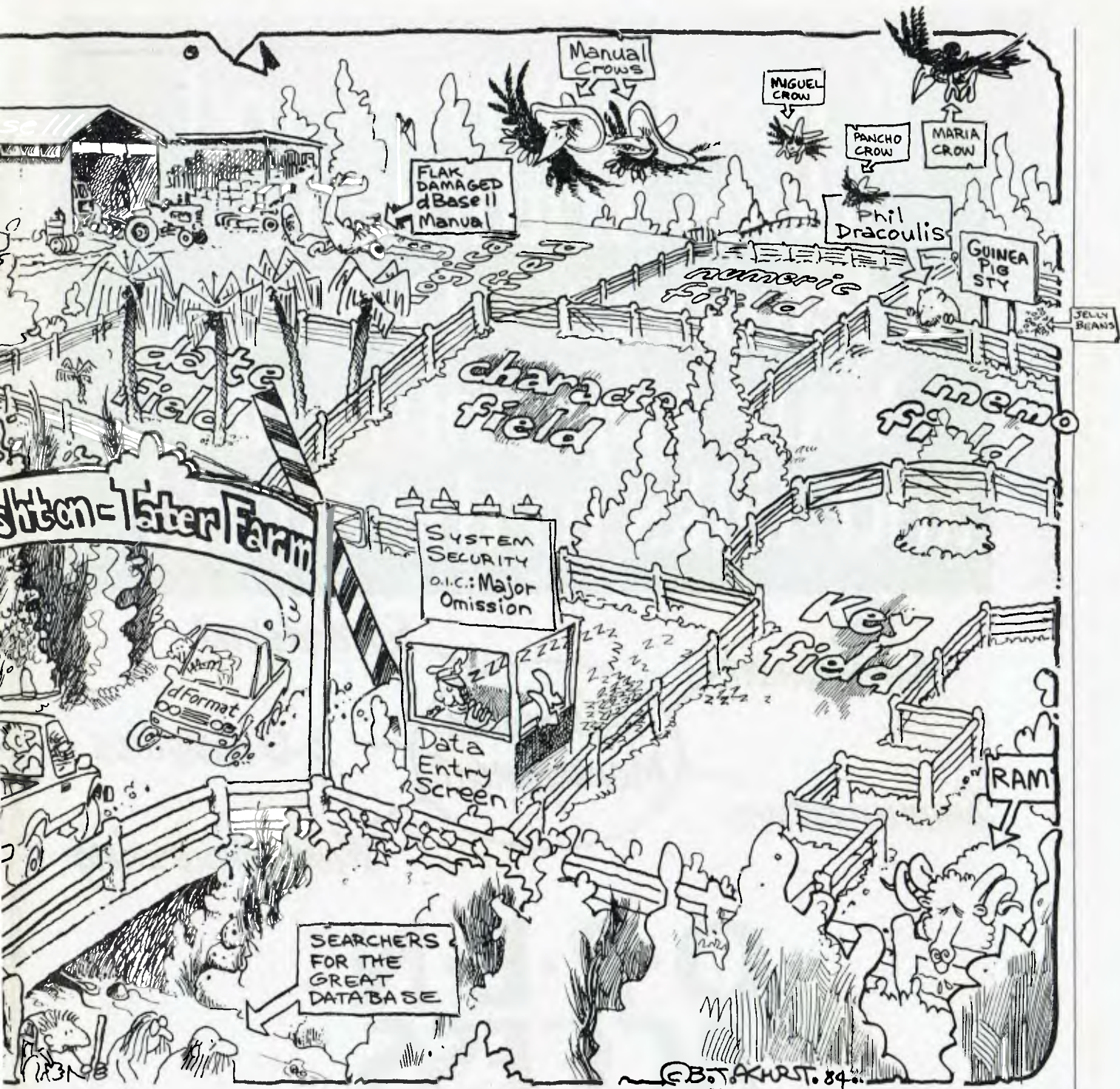
For anyone with an eight-bit machine, dBase II version 2.41 is the end of the line, while owners of 'non-industry standard' 16-bit machines will just have to wait and see whether Ashton-Tate releases a version they can use. I wonder why the program was rewritten in C when Ashton-Tate is obviously uninterested in portability.

My second gripe is that the program uses Prolok to prevent the making of unauthorised copies. To run a Proloked program, you have to place the original copy of the program disk in your drive before the system will start. It's possible to make copies of the program, but the system will not work without the original sitting in the drive. It is also not possible to write protect this disk. If you've learnt the hard way to *always* make back-ups and store your master disks in a safe place, tough; you'll just have to bite your nails and hope for



the best.

When our latest (and favourite) IBM compatible, an Olivetti M24, finally arrived, dBase III was immediately pressed into service by the people from *Sonics*, the music magazine which cohabits with *Your Computer*. This gave me the chance to use Phil Dracoulis from *Sonics* as a guinea pig novice user: it's easy to write about dBase III by comparing it with dBase II, but dBase III is not just a souped up version of its predecessor;



in many ways it is a whole new system, and it needs to be assessed both comparatively *and* as an individual system.

Getting to know dBase III

The obvious place to start assessing the system is with the manual. dBase II's manual has received lots of flak over the years; it's not a volume to evoke feelings of security and confidence in a beginner, and much of its most useful information is

hidden away in one-liners. I'm still finding things in the manual that I had no idea were there. dBase III's manual is a different creature altogether: it's based around a simple beginners' tutorial, with a thoroughly indexed reference section for advanced users. The beginners' section covers all the basics, from how to start the system to writing simple command files (dBase programs).

The last part of this section consists of a simple working accounting

system, with all the database and command files provided on disk and listed in the appendix. This system can be studied to give examples of the dBase commands in action, or modified to suit your own needs and used as a proper accounting system. Interestingly, it is a rewrite of the same suite of sample programs that has been supplied with dBase II for years, and therefore doesn't really use many of the new program's features.

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It Paints in 3-D, Keeps
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There is little to complain about in the beginners' tutorial, although there are a couple of slight errors which might faze a real beginner. Of course, Ashton-Tate *should* be able to produce a really good manual – it has had plenty of feedback from dBase II users, and writing a manual for a specific machine (the IBM) is easier than writing a manual which will be used on a variety of machines. One of the things I like about all the documentation is there is a multitude of ways of finding information about specific commands – through the tutorial, the reference section, the glossary, the keywords listing, the functional listing and the syntax summary. The index is also thorough, although there are a number of discrepancies in page references.

The reference section provides most of the information you'll need to do any task with dBase III. My one complaint is the lack of examples of commands and techniques in action. For those new to dBase, this creates quite a gap between the beginners' tutorial and the advanced reference section.

The final piece of documentation is a booklet entitled 'dBase Bridge'. This gem is written by Adam Greene, author of a couple of good books about dBase II, and it provides a description of dConvert – the utility supplied to enable you to convert your dBase II files to dBase III formats. Apart from describing this procedure, dBase Bridge deals with almost all the changes from dBase II, and thus gives experienced users a quick and convenient summary of what they'll need to know to get the most from dBase III. If you're familiar with dBase II, this is the place to start reading, before wading through the reference section for all

the details.

There is, in fact, one other piece of documentation accompanying the system, but it's hidden away on the disks. This is the dFormat Online Manual, which describes the screen editor program supplied with dBase.

Users of dBase II will be familiar with ZIP or Screen Editor (SED), the screen editors for the 8-bit and 16-bit versions of the program respectively. dFormat is the dBase III equivalent, and it's virtually identical to SED. The manual is online (that is, you can call up instruction screens from within the dFormat program itself) in order to enable it to reflect your system configuration and to give help at any time when needed.

That's the reasons *Ashton-Tate* gives for an online manual, anyway. I found it somewhat confusing and involved to use and ended up printing out the sections I needed. This is something the author suggests you'll probably do – "Try using the manual online before you decide on what to print" – so it seems like an online manual is a great thing for the manufacturer, while you end up paying for the paper.

Assistance and Help

Pleasant as it is to find documentation which is readable and comprehensive, many people new to dBase will find they hardly touch the manuals: built into the program itself are two systems which provide all the information necessary to perform most day-to-day tasks.

You enter the dBase Assistant by typing 'ASSIST' at dBase's dot prompt. The Assistant is a menu-driven system which guides you through the writing of dBase command lines; if you know *what* you want to do, the Assistant will show you *how* to do it.

In the process, you gradually learn how to structure your own commands, so you become independent of the Assistant.

If the Assistant is not enough, or you're trying to branch out on your own, descriptions of command usage and syntax are available through the help function. This function is 'context sensitive': for example, if you're trying to INDEX a file, and you type in an incorrect command, such as 'INDEX MYFILE BY LASTNAME', dBase offers you help, and if you accept you'll be placed in the help screen dealing with indexing. You can also request specific help by typing 'HELP <command name>', or general help by merely typing 'HELP'.

I found the Assistant a hindrance rather than a help, but that's probably because I already know my way around dBase, and using a menu-driven supplement seems to break up my normal rhythm. Phil, a newcomer to dBase, uses HELP and the Assistant all the time, and rarely picks up the manual. So they obviously do the jobs they were designed to do.

The Basics

For anyone who hasn't used a database before, it will probably take a long time to reach the limits of dBase III. It is a very extensive system. Leaving my dBase II 'wish list' in the back of my mind and treating dBase III as an entirely new system, I was impressed. It's not the fastest or most comprehensive system we've looked at in *The Great Database Search*, and it *certainly* isn't the most portable, but it caters for both beginners and advanced users in a way which is lacking in the other databases. All the basics can be quickly learnt using the onscreen help; it is only when you need to design extensive systems running automatically under program control that you will have to spend much time slogging away with the reference manual and other aids.

So what *can* you do with dBase III? Starting the system deposits you at dBase's command prompt '.', indicating that dBase is ready to receive a command. Even before creating any files it is possible to do a variety of things at the dot prompt. To begin with, dBase has a built-in

SOFTWARE REPORT CARD

Program:	dBase III			
Made by:	Ashton-Tate			
Hardware required:	IBM PC or compatible, with 256K RAM and two 13 cm floppy disk drives			
Best Points:	Good documentation, combination of power and ease-of-use			
Worst Points:	Lack of portability and system security			
Ratings:	Excellent	Very good	Good	Poor
Documentation:	●			
Ease of use:		●		
Speed:			●	
Functionality:		●		
Value for money:		●		
Price:	\$795.			
Review copy from:	Arcom Pacific, 252 Abbotsford Road, Mayne, 4006; (07) 529522.			

DBASE III



calculator, allowing you to add, subtract, divide, multiply, exponentiate and find square roots. This works much like BASIC's PRINT statement. Type '? 27**4' (the ** signifies exponentiation) or '? SQRT(923)' and dBase immediately supplies the answer.

You can also define your working environment by setting a variety of control parameters: you can determine the default drive, screen colours, whether help menus will be displayed, the directory path for a file search, function key values, protection level for overwriting files and numerous other functions.

This can be done either with specific commands, such as 'SET MENUS OFF', or with the general command SET, which provides menu-driven control of the parameters. The current status of the working environment, including which files are in use, can be displayed with the LIST STATUS command.

When you get around to designing databases, dBase III allows you 128 fields/4000 characters per record, one billion records/two billion bytes per file and ten database files open at any one time. These are nice, big numbers and for most applications these limits will be no limits at all. However, one major qualification is only 15 files of any type may be open at any time: this includes database, index, command, and format files, and database files which include memo fields count as two files. There is also a warning in the manual against using database files with more than 20 fields, as this slows performance considerably.

There are five field types available – character, numeric, logical, date and memo. Character fields may be 254 bytes long, and numeric fields 19 bytes (numeric accuracy is 15.9 digits); date fields are eight bytes long, with dBase III storing them in

an internal format, allowing calculations and conversions.

Memo fields contain the same kind of information as character fields. The memo fields for each database are stored in a separate file (with a file extension .dbt), and each memo field may be 4000 bytes long. Each database record can have up to 128 memo fields, thus extending the actual maximum length of a record to 512 Kbytes.

Within the main database file, a memo field occupies ten characters (basically a pointer to the actual memo); in the memo file, space is allocated in 512 byte blocks, providing what I think of as semi-variable length records. For example, a character field defined as 100 characters long will be allocated 100 characters per record, whether this space is used or not; a memo field which contains 400 characters of data will be allocated ten bytes plus a 512 byte block in the memo file. If the memo field in the next record contains no data, ten bytes only will be allocated, and if the following record contains 250 characters, 2570 (10+512*5) bytes will be used.

Obviously, some care should be used in designing memo fields to ensure they save rather than waste space – sometimes concatenated character fields will be more efficient.

While memo fields are a useful feature, they can also be cumbersome to use. In order to edit a memo field you must position the cursor on the field pointer and then press <CTRL PAGE DOWN>. This places you in the dBase word processor, where you can append and edit the field.

The word processor is fairly basic, but certainly an improvement on the old dBase II model. Most of its enhancements use WordStar-like control sequences, but to exit and save your memo data you use Control W. Printing the field is possible using the LIST command or the REPORT FORM, but it is *not* possible to use @ SAY statements, which allow you to format the output.

In general, creating databases, adding information and organising it is very similar to dBase II, although more help is presented onscreen for the novice user. Databases may be sorted or indexed, with the SORT command working very much faster than its dBase II equivalent.

The manual crows a bit about the improvement in sorting speed, and then proceeds to advise you not to use it and use the index command instead! Indexing creates an index file

based on a key field (or combination of fields), and allows fast retrieval of data with the FIND command and the new SEEK command.

With unindexed files you must use the LOCATE command to find a specific record or group of records; this looks sequentially through the whole file, which can be a lengthy process. The FIND and SEEK commands search only the index file – a much faster process. FIND searches for the string or number specified in its argument; if the search string has been stored in a variable, it is necessary to use the macro expansion character '&' to signify to dBase to search for the *value* contained in the variable:

```
.STORE 'DUMMY' TO desire
.FIND desire
NO FIND
```

```
.FIND &desire
.DISPLAY
00004 DUMMY This is a dummy
record
```

The SEEK command assumes a variable as its argument (unless the argument is within inverted commas, when SEEK functions like FIND):

```
.STORE 'DUMMY' TO desire
.SEEK desire
.DISPLAY
00004 DUMMY This is a dummy
record
```

Information may be listed on the screen or printer using a variety of commands, which enable you to specify specific fields within specific records to be retrieved, and a range of output formats. The dBase II REPORT FORM command, used to design report formats, now contains graphic information which makes it much easier to use.

There is also a new command, CREATE LABEL, which is one of the little treats of the system. This command creates mailing labels for a file: you tell it the fields you want listed and the number of labels across, and it writes a .LBL file which will produce labels in the appropriate format. There's even a command LABEL FORM <filename> SAMPLE, which produces sample output so you don't waste labels.

New Playthings

As well as extended file limits, dBase III has many new commands and features which dramatically increase its power and flexibility, and place it

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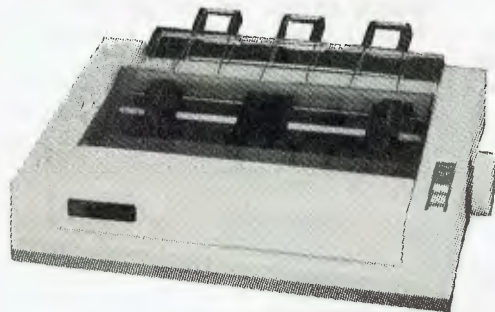
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New Commands

ASSIST	invokes the dBase Assistant
AVERAGE	computes arithmetic mean of an expression
CLEAR ALL	closes all database files, index files, format files and relations; Releases all memory variables; SELECTs work area one.
CLOSE	closes specified types of files
COPY FILE	duplicates any type of file
CREATE LABEL	creates and edits a label form file
CREATE REPORT	creates and edits a report form file
DIR	shows the names of the files on the currently logged disk drive
EXIT	escapes a DO loop without terminating program execution
LABEL FORM	prints labels using the specified label form file
MODIFY LABEL	creates and edits a label form file
PARAMETERS	specifies memory variables that use information passed by DO. WITH command
PRIVATE	hides memory variables in higher level programs
PUBLIC	makes memory variables global
SEEK	positions the record pointer to the first record with an index key that matches the specified expression
SET	menu driven: sets dBase control parameters
SET DECIMALS TO	sets the number of decimal places displayed in the results of calculations
SET DELIMITER ON/OFF	selects optional delimiter
SET DEVICE TO	sends the results of the...SAY command to the screen/printer
SET FILTER TO	filters out all records not meeting specified condition
SET FIXED ON/OFF	fixes/does not fix the number of decimals displayed
SET FUNCTION (n) TO	sets function key values
SET HEADING ON/OFF	displays/does not display field names above fields in LIST or DISPLAY
SET HELP ON/OFF	controls display of a help query
SET MENUS ON/OFF	controls the display of function key prompt menu
SET PATH TO	specifies a path for a file search
SET PROCEDURE TO	opens the named procedure file
SET RELATION TO	links two databases according to a key expression
SET SAFETY ON/OFF	sets the level of protection against a file being overwritten
SET UNIQUE ON/OFF	causes the first/all record(s) with identical keys to appear in an index file
TYPE	used to output the contents of any ASCII file to screen or printer
ZAP	removes all records from the active database file

in a category apart from dBase II. The SET RELATION TO command at last makes dBase a proper *relational* database (though it is still far less powerful in this respect than, say, KnowledgeMan or DataFlex). Using this command, a search of the primary database in use automatically positions the record pointer to the matching record in a database in another work area. This obviates the need to store search keys to variables and then look for the appropriate record, as indicated by the variable, in the secondary database.

The number of variables available to the programmer has been increased from 64 to 256, using 6000 bytes altogether. Variables may be private (hidden from lower command file levels) or public, and specific variables may be passed between command files using the DO <filename> WITH <parameter list> and PARAMETERS commands. Some of the problems which could possibly arise out of the 15-file limit will be alleviated by the use of procedure files, which may incorporate up to 32 command procedures.

Another new command which provides flexibility in retrieving and processing information is SET FILTER

TO <condition>. This command will cause dBase to ignore all records in a database except those which satisfy the condition, effectively hiding other records from the system.

An improvement to data entry is

New Functions

BOF()	beginning of file function
EXP(exp)	calculates the natural exponent of a numeric expression
LOG(exp)	calculates the natural logarithm of a numeric expression
ROUND(exp,dec)	rounds a number to a specified number of decimal places
SQRT(exp)	calculates positive square roots
CTOD(exp)	converts character-type date into date type
DTOC(exp)	converts a date-type date into character type
MONTH(exp)	returns the month (1 - 12)
DAY(exp)	returns the day-of-month (1 - 31)
YEAR(exp)	returns the year number (1900 - 1999)
DOW(exp)	returns the day of week (1 - 7)
CMONTH(exp)	returns the character month (Jan - Dec)
CDOW(exp)	returns the character day of week (Sun - Sat)

provided by a range check in the (@ GET RANGE command. For example, '@ 5,5 GET age RANGE 18,65' will only accept answers within the range 18-65. SET ESCAPE ON now causes program execution to pause, and the message 'Terminate command file (Y/N)' to be displayed, instead of the old dBase II method of dumping you at the dot prompt.

Other additions include eight date manipulation functions, a beginning of

file function (BOF()) and a number of arithmetic functions. Alterations have been made to some dBase II commands and functions to create consistency throughout the program (and with PC-DOS). Thus #, the record number function, is now RECNO(), EOF is EOF(), the substring function \$ has been replaced by SUBSTR() and *, the deleted record indicator, is changed to DELETED().

Utilities

dBase comes with two utility programs, dFormat and dConvert. dFormat lets you create pretty screens for data entry, without having to go through the tedious process of writing dozens of @..SAY..GET statements. You construct the data entry form onscreen, and dFormat writes a format file for you.

dConvert converts your old and cherished dBase II files and programs to dBase III format. This is a straightforward procedure with all files except command files (.cmd or .prg). dConvert will do all the simple changes, such as altering the names of commands, but quite often the program logic will need to be altered, and this dConvert cannot do.

On the whole, the program is fairly informative and it will insert comments to indicate lines where it recognises a manual change will be required.

Table 1 gives a listing of a simple dBase II file and its dBase III equivalent, produced by dConvert. With a bit of effort, it shouldn't take too long to change all your programs,

although making use of the advanced features of dBase III will probably require rethinking and rewriting.

It's possible to run both of these programs from within dBase using the RUN command. RUN lets you execute any DOS command from within dBase, providing you have sufficient RAM for the job. What constitutes 'sufficient' will depend on the program you wish to run, but it is certainly more than 256 Kbytes.

If you have the extra memory, one of the useful things you can do is use your word processing program instead of the internal dBase word processor. This will enable you to create memo fields *larger* than 4000 characters, a limit which is a function of the dBase word processor.

Problems

Not all is wonderful in dBase III. I started playing with it with a list of features I hoped to find, expecting it to overcome most of the much-touted limitations of dBase II. I guess it goes about 60 per cent towards fulfilling my wish list – on the whole, the critical deficiencies of dBase II have been addressed, but there are still shortcomings.

There's more room in which to manoeuvre and more ways to manipulate data, but the limitations are still there – unlike a system such as KnowledgeMan (reviewed in the September issue of *Your Computer*) in which most of the limitations are created by your hardware, and not by the program itself.

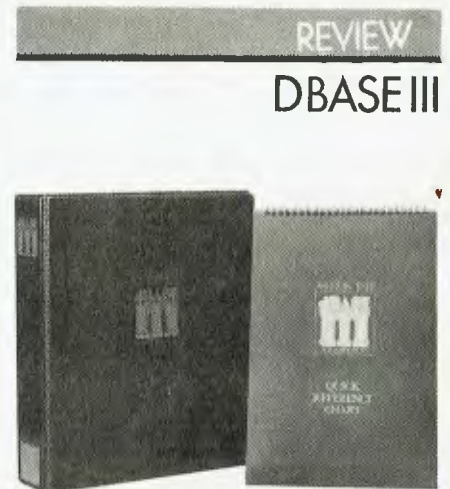
A major omission is any degree of system security. No passwords are required to run the system and no data encryption takes place. It is possible to write your own password routines into applications developed in dBase, and to include such routines in the CONFIG.DB file so they will be run as soon as dBase is loaded, but inherent system security is nowhere to be found.

Another problem is dBase III actually seems to be *slower* than dBase II in some areas. dBase II was written in assembly language, while dBase III is written in C, which accounts for some of the latter's comparative sloth. According to Les Bell (Programmer's Workbench, *Your Computer*, November 1984), in processor-intensive tasks the new dBase is no match at all for the old, although its performance picks up substantially in disk-based tasks. Considering dBase III is written in C, supposedly a highly portable language, the fact it is only available for the IBM-PC is a real failing.

The Final Judgement

How *does* dBase III compare? Well, it is certainly a vast improvement on dBase II. The real bugbears of the old dBase, such as the two-file limit and restrictive memory variable space, have been eliminated and there are a lot of features which make the system a real joy to use. But there's no way I'd change my hardware just to be able to use dBase III.

Comparing it with other 16-bit systems, dBase is outstanding in its beginners' features – Ashton-Tate has obviously benefited from the feedback from dBase II users, as it certainly ranks as the easiest system to learn. However, Dataflex and KnowledgeMan both offer more scope in extensive system design and have some features which place dBase III in the



shade. In a straight out power comparison, dBase is not the winner.

Whether dBase III is the system for you will depend on your background, requirements and hardware: if you're used to using dBase II you're bound to enjoy dBase III, and learning the new system should be a pleasure rather than a chore; if you're looking for a system in which the basics can be quickly assimilated, while there is still plenty of scope and complexity, dBase, once again, will be an attractive proposition.

As one who has liked dBase II from the start (even version 2.3 with all its associated pitfalls), I think I could quite happily live with dBase III for some time to come. Still, I've already started on my dBase IV wish list... □

Table 1. A simple dBase II file and its dBase III equivalent.

*Test program of dConvert	*** dBASE CONVERT - dBASE III File Conversion Aid
STORE ' ' TO datafile	SET HEADING OFF
STORE 1 TO row	SET SAFETY OFF
ERASE	*Test program of dConvert
@ 5,5 SAY 'Enter database name ' GET datafile	STORE ' ' TO datafile
READ NOUPDATE	STORE 1 TO row
SELECT PRIMARY	CLEAR
USE &datafile	@ 5,5 SAY 'Enter database name ' GET datafile
SELECT SECONDARY	*!! NOUPDATE modifier is no longer required
USE secfile	READ
SELECT PRIMARY	SELECT A
SET RAW ON	USE &datafile
ERASE	SELECT B
DO WHILE .NOT. EOF	USE secfile
REPLACE costs WITH costs*1.2	SELECT A
@ row,1 SAY costs USING '\$999.99'	*!! 'SET LINKAGE...' must be replaced with 'SET RELATION..'
STORE row+1 TO row	SET LINKAGE ON
SKIP	*!! 'SET RAW ON' is no longer valid
ENDDO	*!! SET RAW ON
RETURN	CLEAR
	DO WHILE .NOT. EOF()
	REPLACE costs WITH costs*1.2
	@ row,1 SAY costs PICTURE '\$999.99'
	STORE row+1 TO row
	SKIP
	ENDDO
	RETURN

Although, to our knowledge, the Scottish Education Department only taught him Latin and French, Les Bell claims to be able to converse in over a dozen languages. Here he provides a run-down on the most interesting ...

COMPUTER SPEAK

NO MATTER how much you pound on the keyboard and curse the inventor of microprocessors, there is only one way to get a computer to do what you want, and that's to program it. You give it its directions and turn it loose, and hopefully you will be pleased with the result.

The trouble is that, advertising to the contrary notwithstanding, microcomputers are not smart enough to understand simple English, even of the kind used to communicate with under-tens: 'Tie your coat up or you'll freeze', or 'Don't do that or I'll thump you'. Being a bit deficient in the brains department, computers force us to make some accommodations in their favour, so we must communicate with them in their particular languages, in much the same way as one does not throw the jargon of quantum mechanics into a conversation with a five-year-old.



LES BELL TIES UP
HIS COAT
& DOESN'T FREEZE

Computer languages are generally organised to be a sub-set of conventional English (although I once encountered an IBM 5100 which spoke BASIC with a French accent), so there are no new words to be learnt and the coding is not too mind-boggling.

Although English is a general-purpose language, most computer languages are designed to solve specific classes of problems. For example, COBOL is designed specifically for commercial accounting applications, while LISP is primarily a list processing language with strong ties to artificial intelligence applications.

The Genealogy of Languages

Take a look at the languages family tree (Figure 1), and you'll get some idea of the development of computer languages and how later developments derive from the earlier ones. At the root of the tree is assembly language, or assembler, which is a symbolic representation of the instructions actually executed by the computer CPU. There are, therefore, as many assembly languages as there are CPU designs.

Each line of assembly language is translated into one machine instruction. It follows from this that writing assembly language is a tedious and unproductive chore, since even the simplest tasks may require several hundred lines of assembler.

During the Fifties, programmers at IBM realised this and set about designing a better way of writing

computer programs. Since operations like addition were always performed the same way, they thought it would be possible to get the machine itself to translate a line like

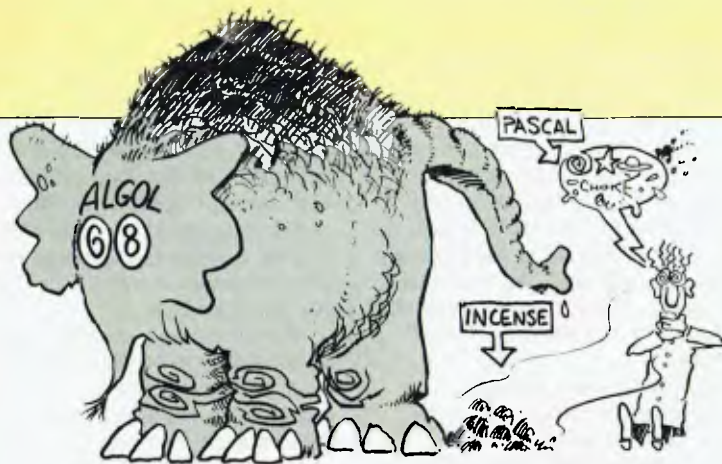
$$X = X + 1$$

into the appropriate assembly language code. Indeed, it was possible, and the result was Autocode, which was thought of at the time less as a language than as a way of pre-coding instructions. Autocode is now of historical interest; its main contribution was in supplying technology and experience to FORTRAN, which is generally regarded as the first real computer language.

FORTRAN (which stands for FORMula TRANslator) was developed at IBM by John Backus. At the time, computers were mainly used for number-crunching in scientific calculations or for very large commercial accounting tasks, and FORTRAN was designed to meet the needs of the scientific and engineering community.

FORTRAN still survives today; it's probably more popular than ever. Of course, it has been overhauled a few times since 1960, and the well-written programs coded in the latest FORTRAN-77 bear only passing resemblance to their earliest counterparts.

At the same time, the US Department of Defence was increasingly using computers for tasks like payroll accounting and quartermaster's inventories, and the specialists at DOD were concerned that every computer they bought came with its own language. As programmers went



INCENSED AT THE ELEPHANTINE CREATION OF THE COMMITTEE...NIKLAUS WIRTH WROTE PASCAL, A REMARKABLY EXPRESSIVE LANGUAGE.....

from project to project and machine to machine, they had to learn new languages. The search was on to design a new language.

The result was COBOL (Commercial and Business Oriented Language), which has become the standard for business data processing. The key designer behind it was Grace Murray Hopper, who as Commodore Hopper is the US Navy's most senior woman officer and its oldest serving officer, despite trying to retire several times. COBOL is a wordy language, but even novice programmers picking up a COBOL program can read it and quickly understand it, because of its self-explanatory nature.

For example, where FORTRAN would say

$$O = G - T$$

COBOL would have

SUBTRACT TAX FROM GROSS-PAY GIVING NETT-PAY which is less cryptic.

At the same time, on the other side of the Atlantic, the Europeans were also hard at work, and a committee of leading academics and representatives of leading computer manufacturers like Elliot and Ferranti was meeting to design a new language. This language was intended to be used for the expression of any algorithm – that is, any set of steps which lead to the solution of a problem. Its genesis was therefore more mathematical than pragmatic, as witnessed by the fact that the language has no input/output statements, while most real-world programs

actually spend most of their time doing input/output.

The language was Algol (ALGOrithmic Language) and while it became popular in Europe, it never really caught on in the US. That's not to say that US programmers did not see its advantages; within a few years they were happily incorporating its structured programming techniques into new languages of their own.

By 1961, it became obvious that programmers were having to learn one language for commercial programming, another for scientific programming and yet another for general work like writing compilers. There had to be some way of writing a language which would incorporate the best features of all languages, allowing programmers to use just that language for all projects they worked on.

IBM, together with the two IBM user groups, SHARE/GUIDE, set out to tackle this problem, and came up with the answer: PL/I (Programming Language / One). With features borrowed from FORTRAN, COBOL and Algol, plus more than a few of its own, PL/I proved to be too big a language for any mortal to possibly remember. Nonetheless, it is still popular inside IBM, and stripped-down versions are catching on with minicomputer and microcomputer companies.

Another language emerged from IBM in the mid-Sixties, which captured a specialised following. APL (A Programming Language) was designed

by Ken Iverson for timeshared number-crunching tasks, particularly those involving manipulation of arrays and lists of data. Rather than using English words, APL has its own character set, which makes it look rather intimidating, and its unusual syntax can be mind-boggling to those raised on more conventional languages. It makes firm converts, though.

Also developed in the mid-Sixties, and designed for timeshared use, was another language which has swept the world – well, the micro-computer part of it, at least. BASIC (Beginner's All-purpose Symbolic Instruction Code) was invented by Kemeny and Kurtz at Dartmouth College, for the use of engineering and other students who needed an introduction to programming for the solution of small problems which did not justify mastering the complexities of FORTRAN FORMAT statements.

BASIC inherits a lot of its design from FORTRAN, without some of that language's complexities – at its simplest level it is really just FORTRAN with the addition of line numbers. Over the years, however, BASIC has gradually been extended and given more power, with the addition of new statements, new functions and features such as graphics. There is, in fact, some merit to the argument that BASIC has gone the way of PL/I and the later Algol 68: it is too big for anyone to remember all of it, certainly in casual use.

In the late Sixties, the Algol Committee met again to update Algol. Wishing to correct for the over-simplistic (nonetheless powerful) nature of the earlier version, this time they threw in not only I/O statements but everything else they could think of, rather like PL/I. The result was Algol 68, a massive language with special statements for every circumstance.

While Algol 68 never really caught on, it is of vital importance to the micro community in one sense: one member of the Algol Committee consistently argued against the construction of a huge language, and in favour of a small but well-structured and consistent language that could be used to reproduce the special features of Algol 68. Incensed at the elephantine creation of the committee, this member determined to prove his point by writing his language. ▶

The man was Niklaus Wirth, the language was Pascal. Firmly based in Algol, with only a few carefully-chosen features of its own, Pascal has proved to be a remarkably expressive language, suffering only from deficiencies in the I/O and system manipulation areas, most of them inherited from Algol.

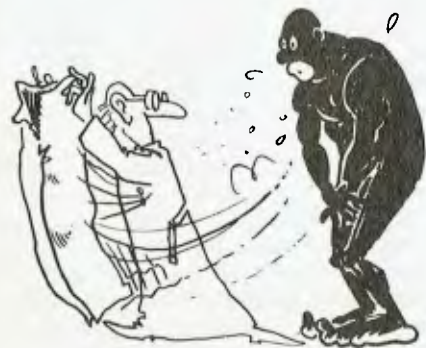
Pascal added a number of important concepts to the computer linguist's arsenal, but the most important of these was the idea that the compiler should catch as many errors as possible before the program is actually run. The result of this philosophy is a language that many find over-restricting: Marvin Minsky of MIT refers to Pascal as 'a voluntarily worn strait-jacket'.

While Pascal has now fallen out of favour, it has made a contribution to a number of other languages. Wirth himself has dropped Pascal and developed a further language called Modula II, which extends his concepts.

In the early Seventies, researchers at Bell Laboratories developed a



RESEARCHERS AT BELL LABORATORIES...



BELL LABS STRIPPED DOWN UNIX

couple of languages which have now come to a position of great influence. Based on the BCPL language developed at Cambridge University, B was a small language which could be used at a low level as a replacement for assembly language. Its successor, C, is a general-purpose language with the potential to replace FORTRAN and Pascal.

Just as Pascal was a reaction against another language, so is C. PL/I was used to write a large operating system called MULTICS, but at Bell Labs work was under way on a stripped-down operating system called UNIX. C was developed in the same spirit, as a stripped-down language that could be used in the implementation of the operating system, its compilers and utilities. The leanness of both UNIX and C reflect the small group of developers: Thompson, Kernighan and Ritchie.

Algol 68 is important in another way: as a precursor of a new language called Ada. Ada, Countess Lovelace (Byron's daughter) was an associate of Charles Babbage, inventor of the analytical engine, and is generally credited with writing the first computer program, in the 1830s. She is celebrated in the name of the US Department of Defence's new language. Ada follows in the footsteps of Algol 68 and PL/I as a large language, but it has a rather more modern style and a number of new twists of its own, particularly in the areas of modular programming and inter-process communication (multiple programs communicating with each other).

Two other outgrowths of PL/I are important in the microcomputer world: PL/I Subset G and PL/M. PL/M was in fact the first high-level language to run on a microprocessor; it was developed by Dr Gary Kildall for Intel Corp. While it is a cut-down derivative of PL/I, specifically designed for microprocessor applications such as traffic-light controllers, it is sufficiently powerful to allow construction of software tools such as the CP/M operating system, and the CBASIC compiler which was used to write some of the first commercial software for micros. Without PL/M, micros might never have got off the ground.

PL/I Subset G is the minicomputer subset (ANSI X3J1) of the mainframe PL/I. A lot of dead wood has been

cleared away, and what is left is a language remarkably like Pascal, but with none of the silly restrictions and with enough special facilities for real-world programming – like formatted I/O for commercial programming and double-precision hyperbolic functions for the scientists.

Also shown as derived from PL/I is a general box of database languages. This perhaps is not a direct derivation, but more of a philosophical contribution. Most special-purpose database languages require COBOL-like (hence PL/I-like) report formatting and string handling, coupled with modern control structures derived from Algol, via PL/I. Examples range from IBM's DL/I to dBase II.

Orphans?

While these languages have a well-defined place in the family tree, there are a number of other machine tongues which have no obvious ancestry.

FORTH, for example, was developed by astronomer Dr. Charles Moore for use in radio-telescope research. It bears little relation to earlier languages in either its internal operation or its external appearance. A FORTH system starts with a dictionary of approximately 140 elementary words, and the user proceeds to define new words in terms of the old ones. At the top level, words are entire programs. Like APL, FORTH can be mind-boggling to the initiate, but breeds converts stronger than any other religions.

Smalltalk has been developed over many years at Xerox's Palo Alto Research Center (XPARC), as part of the long-term Dynabook project. In Smalltalk, objects are collections of apparently concurrently executing subroutines, and are controlled by sending messages to them; for example

BOX GROW 5
sends a message to BOX, instructing it to run its internal subroutine GROW (called a method) with the parameter 5. The likely effect of this is that a box on the screen will grow in size by five units.

Related to Smalltalk is Logo, which was developed at MIT by Seymour Papert. Logo is best known for its turtle graphics, which use an imaginary turtle on the screen to draw shapes.

PILOT is another language developed

LANGUAGES

for educational applications, by Dr John Starkweather. It is a simple language primarily intended for drill and testing.

LISP (LISt Processing language) is an unusual language which views all data as lists of items. It is very simple, yet very powerful, and has attracted attention in the artificial intelligence community because LISP programs are simply lists of items and can therefore modify themselves. LISP is also known as Lots of Insane Stupid Parentheses because of its extensive use of brackets.

PROLOG is a logic manipulation language which is distantly related to LISP. It can maintain a database of data items and rules relating them, and can then answer questions about its database. Currently PROLOG programmers are in great demand in Japan, where it is a cornerstone of the Fifth Generation artificial intelligence project.

PROLOG (PROgramming in LOGic) is based on first-order predicate logic. The program starts with a statement which is to be proved, and continues with propositions which will be used to assert the truth or falsehood of the goal statement. It looks very strange to newcomers, but I guess we'd all better get used to it.

Where to Use Which Language

With so many languages to choose from, how do you decide in which circumstances to use each? The answer is not simple, and beyond a certain level it becomes a matter of personal taste.

For general messing about, trying out ideas and knocking together 'quick and dirty' programs the best language is generally BASIC. The major reason for this is that it is so prevalent: every small micro offers BASIC as standard. A micro programmer who does not know BASIC is not much use, really.

You can do just about everything you are ever likely to need in BASIC, with the assistance of some assembly language patches for some things like getting at special I/O ports and the like. There are only two problems: there is a diminishing rate of return in using BASIC for large programs, and the resulting program is generally slow.

The second problem can be fixed,

to some extent, by using a compiler on the finished program. But the first is more fundamental and is related to the lack of support for good structured programming practices within the language. Some versions, such as CBASIC Compiler and Waterloo BASIC, provide support for local variables, named subroutines and the like, but this poses the question: are such languages still BASIC or are they something new and different? Well-written CBASIC code, for example, looks more like Pascal than BASIC.

If we use cars as an analogue for languages, then BASIC is the family sedan. It's inexpensive, there are lots of models in the range, and the most popular models have all kinds of (previously optional) extras fitted as standard.

Ah yes, Pascal. I only ever wrote one major package in Pascal, and would never use it again if I could avoid it. Pascal is okay for academia, where all the people who will use a program are computer literate, familiar with the operating system, and so on. But in the real world, programs get used by office juniors, managing directors and other people who are completely fazed by error messages and who are liable to type the most improbable input string imaginable.

Real-world programs, therefore, have to have extensive input validation, and this turns out to be quite difficult in Pascal, as it is tediously unco-operative in type conversions. The Pascal programmer has thus to resort to all kinds of devious practices to get Pascal to work for him, which defeats the purpose of using the language in the first place. If you have to use sleight of hand so that the compiler can't understand what you're doing, there's a fair chance you can't understand it yourself.

The right place for Pascal, then, is where you have to write programs of moderate sophistication which you will only ever use yourself, and where you are sure that a straight solution will do. I know this is cruel and a bit over the top, but the best analogy I can find for Pascal is a trainer bicycle. You can't go far with it, you can't go fast with it, you can't carry much with it, it's not to everybody's taste, but at least you can't fall over while riding it.

FORTRAN lives on in the scientific

With so many languages to choose from, how do you decide in which circumstances to use each? The answer is not simple . . .

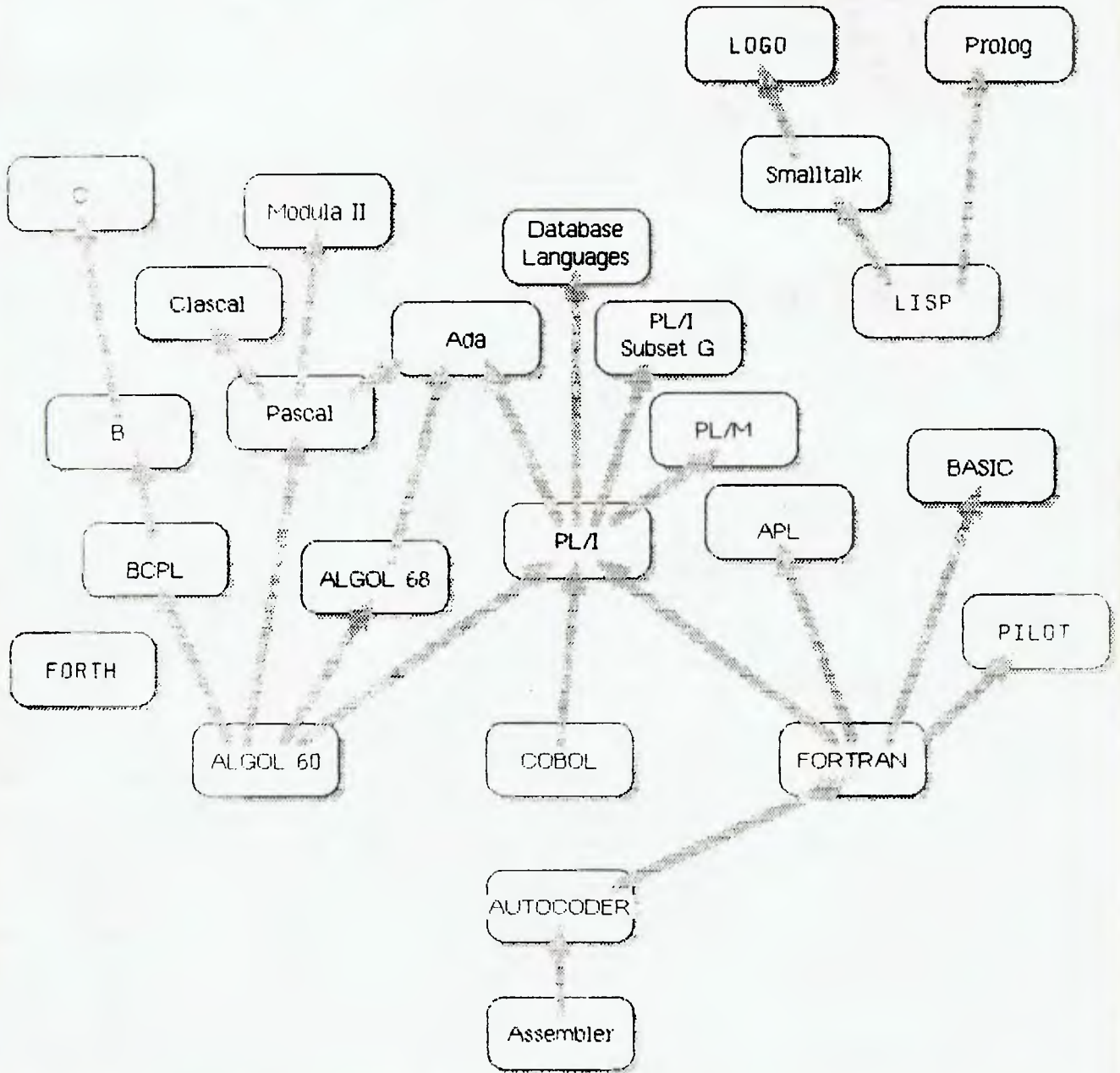
world; first of all because most engineers and scientists cut their teeth on it, so it is widely known. Second, it is one of the first languages every mainframe and mini manufacturer provides on their machines, so programs originally written on larger computers can be transported to micros and vice versa. The fact that it is well-standardised assists this. A third factor is the vast amount of FORTRAN software which has been published or placed in the public domain for all kinds of purposes.

The sheer inertia of the FORTRAN movement ensures it will be around for a long time, and a FORTRAN compiler is a must for every micro in a scientific or engineering lab. However, that's not to say FORTRAN is always the best tool for the job. Pascal can be appropriate here for simple jobs, or PL/I (with its superb double-precision arithmetic and hyperbolic functions) for the more complex ones. C is also an appropriate tool on occasions. However, those who own FORTRAN compilers should bear in mind that Real Programmers use FORTRAN.

FORTRAN is a bit like a Volkswagen Beetle; the design hasn't changed much over the years, and people wouldn't like it so much if it had. It's a very rational and appropriate design, with few concessions to style or fashion.

COBOL finds its metier in the commercial world where programs have long lives and may be worked on by as many as ten programmers during that time. Consequently, the requirement is not for flash, tricky code, but for code that your average commercial programmer can pick up, understand and modify or fix. While the previous generation of COBOL compilers acquired a reputation for being as slow as a wet weekend, the latest releases are much improved, making COBOL a viable alternative

Languages Family Tree



The 'Languages Family Tree' shows how today's high-level languages 'grew' out of Assembler, which is just a symbolic representation of the instructions actually executed by the computer's CPU. Since Assembler is somewhat tedious to write, many attempts have been made, working from different requirements, to create languages based on English yet structured efficiently for the computer.

LANGUAGES

for the commercial micro user or software house.

COBOL is like a half-ton truck: it serves the needs of commerce with little style. It can carry quite heavy loads, but will never turn heads as it passes.

PL/I – ah, now here's a language for Real Programmers. I turned to PL/I after my nasty experience with Pascal and have never regretted it. Block structures and structured programming statements like Pascal's, combined with sophisticated file handling and I/O, and the ability to do binary arithmetic for scientific applications and decimal arithmetic for dollars and cents, mean this is a language one can stick with. While the rest of the world follows fashions like Pascal and C, we PL/I programmers will be quietly getting on with the job.

If you're a COBOL programmer who wants to have some good structured programming support and less verbose code, PL/I may be for you. If you're a FORTRAN programmer who wants higher precision arithmetic, better string handling and structured programming support, PL/I is it. If you're a Pascal programmer who feels the need for the occasional goto – used with discretion, of course – as well as sensible file handling, check out PL/I. If you're a C programmer, nothing I say is going to change your mind anyway; but PL/I has pointers, structures, unions, functions, storage classes and all the

other things that make C such fun.

PL/I therefore emerges as a good all-round language with particular strengths for commercial software and scientific applications, though utilities compiled in it tend to be a bit large. It's a little like these new family vans with seats that fold, turn and twist: you can use it as a sedan, as a minibus, as a delivery van or as a camper. Bear in mind that, unlike those vans, it has a V12 under the bonnet.

C is a sports car in comparison. It's small, zippy and manoeuvrable, very light in weight, and when it crashes you're a gonner (due to the lack of run-time debugging facilities, you see). C is best used to write systems utilities such as archivers, macro processors, editors, compilers and the like. It can be used to write commercial or scientific programs, though its arithmetic and file handling let it down in the former area. If you build on its lower-level functions to construct nice string-handling and I/O functions, what you wind up with is very like PL/I, which would have made a more appropriate starting point.

The best feature of C is its portability. C programs can generally be moved from system to system with a minimum of effort, and this means that software authors can be assured of achieving the maximum return for their effort.

PROLOG is quite different from



PROLOG

most languages. At the moment it's still barely out of the research labs, and most users in Australia are in universities. I dare say PROLOG could be put to commercial use, particularly in bibliographic databases, small 'expert' systems and the like.

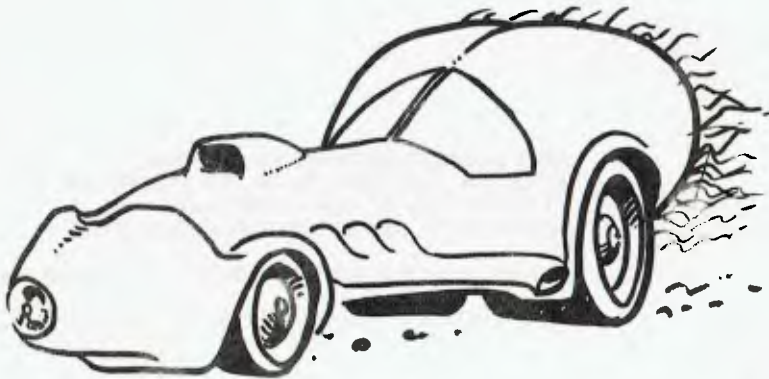
In the car metaphor, PROLOG is rather like those experimental designs manufacturers roll out every now and again, informing us that in ten years time we'll all be driving cars like these, with four-wheel steering and the like.

Ada is an armoured personnel carrier. It's designed to be reliable, carry all kinds of loads, be fast, and it has a radio built in so it can communicate with other carriers.

Ada directly supports a number of recent structured programming concepts. For example, the idea of separate compilation of modules has been around for a long time; many Pascal, C and PL/I compilers offer this facility. But Ada is the only language to date to support the separate compilation of modules (Ada calls them packages), as part of the language.

An Ada package comprises two parts – a specification part and an implementation part. Each is a unit (this will sound familiar to UCSD Pascal users) and can be separately compiled. Parts of a package specification can be made invisible, so users of a package can only deal with the logical interface of the package; other details are hidden.

Ada directly supports multi-tasking – that is, the ability to run several different program streams at the same time. A lot of thought has gone into the language's design, to ensure that Ada programs are less expensive to maintain, and are more reliable, than those in older languages. Ada is about the only thing that could tempt me away from PL/I ...



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SOFTWARE SURVEY



If we use cars as an analogue for languages then BASIC is the family sedan — it's inexpensive and comes with all sorts of optional extras.

BASIC

While we talk about BASIC as though it were one language, in actual fact BASIC is a range of languages. The trouble with the standard BASIC — known as ANSI Minimal Standard BASIC — is that it is just that: minimal. Every implementation has additional non-standard features, and we have to rely on the market to define de facto standards.

The best-known BASIC, and the de facto standard, is *Microsoft BASIC*. It originally appeared in 1975 for the Altair computer, and was known as Altair BASIC. Although the original version was supplied on paper tape, an extended version and a disk-based version soon followed, and the language was then made available for other computers.

What really made it the standard was its adoption by Apple and Tandy as the standard BASIC built into their computers in read only memory. Since then it has been the standard BASIC built into virtually all new personal computers including the IBM PC.

Microsoft BASIC extends the old standard with the addition of integer and double-precision data types, extends the string handling, and in its disk version provides both sequential and random access file handling. Versions implemented for specific hardware, such as the IBM-PC,

augment this with graphics instructions (for line drawing, plotting and painting), communications and I/O port support, and music-playing commands. The result is a versatile general-purpose language.

The major drawback to BASIC is the fact that it is, in its original implementation, an interpreted language. This means while programs can be written to do almost anything, they will often run too slowly for practical use. The solution is the Microsoft BASIC compiler (often known as BASCOM), which compiles the BASIC program down to machine code, with a consequent improvement in speed. The exact extent of the benefit depends on the nature of the code; programs that do a lot of floating-point arithmetic, for example, will not benefit much, because the interpreter and compiler use the same floating-point routines.

Microsoft's BASIC interpreter is supplied as standard with many machines, and is available in both eight- and sixteen-bit versions. The compiler is not quite so general, and does not usually support many of the graphics and other extensions built into the interpreter. Despite this it is still one of the most popular development tools for machines such as the IBM-PC.

Another popular BASIC for micro-computers is *CBASIC*. This is available for most processors, in two major forms. The original CBASIC ▶





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was a development of BASIC-E, a public domain compiler written by Gordon Eubanks at the Naval Postgraduate School in Monterey. This compiler processes a modified form of BASIC (no line numbers are required, for example), and outputs an intermediate code file which must then be interpreted by the run-time module, CRUN.

CBASIC achieved popularity for three major reasons: it was the only BASIC compiler available for some time; it uses decimal arithmetic, which eliminates rounding errors in financial calculations; and software developers could distribute runnable programs without releasing their source code, reducing the risks of piracy.

Despite being a compiler, CBASIC 2 is generally slower than Microsoft's BASIC interpreter, and so Digital Research (who purchased Eubanks' company) has released a true native code compiler called the CBASIC Compiler. This accepts CBASIC code directly, although it adds a number of enhancements such as named functions, super-long strings, local variables and alpha labels, and compiles to a relocatable file which is then linked to produce a runnable machine code program. The CBASIC Compiler generates some of the quickest code around.

CBASIC is available for all the CP/M family of operating systems, including CP/M-68K, and the CBASIC Compiler is available for CP/M-80, CP/M-86 and PC-DOS, making it a good choice for software developers (particularly those who have long written accounting systems in CBASIC).

Microsoft now produces a compiler called the *Business BASIC Compiler*, which is rather like a cross between CBASIC and Microsoft BASIC, and this may be a good compromise for those who see virtues in both schools of thought.

Realising that Microsoft's decision not to support its BASIC interpreter under CP/M-86 left that operating system without a simple interactive language, DRI has released *Personal BASIC*. This BASIC interpreter accepts Microsoft BASIC programs virtually without change; the major differences the user will see are in the system commands, which are more like those of DEC BASIC-Plus.

```
10 REM Guessing Game
20 REM Programmed in Microsoft BASIC
30 REM 9/21/81
40 LET N = INT(99*RND(1)+1)
50 PRINT "I'm thinking of a number between 1 and 100"
60 PRINT "You've got to try to guess it."
70 INPUT "What's your guess?";G
80 IF G > N THEN PRINT "Too high!"
90 IF G < N THEN PRINT "Too low!"
100 IF G = N THEN 120
110 GOTO 70
120 PRINT "You've got it!!!"
130 GOTO 40
140 END
```

Guessing Game in Microsoft BASIC (plain version).

```
REM Guessing Game Version 2.1
REM Programmed in CBASIC-2
REM 3/3/83
REM Execute an INPUT before RANDOMIZE
INPUT "Hi, there, what's your name?";NAME$
PRINT "OK ";NAME$; ", do you want to play a guessing game?";
REM PLAY$ controls the outer loop using WHILE - no GOTO
INPUT PLAY$
REM The RANDOMIZE statement uses your delay in answering \
the INPUT PLAY$ statement to seed the random number \
generator.
RANDOMIZE
REM We're only interested in the first char. of PLAY$ being \
"Y" or "y"
WHILE UCASE$(LEFT$(PLAY$,1)) = "Y"
NUMBER = INT(99*RND(1))
PRINT "I'm thinking of a number between 1 and 100"
PRINT "You've got to try to guess it."
INPUT "What's your guess?";GUESS
WHILE GUESS NE NUMBER
IF GUESS > NUMBER THEN PRINT "Too high"
IF GUESS < NUMBER THEN PRINT "Too low"
INPUT "What's your guess?";GUESS
WEND
PRINT "You've got it, ";NAME$; "!!!"
INPUT "Play again?";PLAY$
WEND
END
```

Guessing Game in CBASIC - fancier version.

For example, where an MBASIC user would type

```
LOAD "PROG1"
a Personal BASIC user would type:
OLD PROG1
```

Personal BASIC also assists those who would write programs at the terminal (tsk, tsk!) by checking the syntax of each line as it is entered. Thus, a sizable proportion of the debugging is done at entry time rather than at run-time.

While Microsoft BASIC and the DRI BASICs trace their ancestry to the DEC BASIC interpreters, there is another school of BASICs, based on the Hewlett-Packard way of doing things. *HP BASIC* has different array and string handling, and this style was adopted in *North Star BASIC*, which was very popular in the late Seventies but has since been displaced almost totally by MBASIC.

However, a variant of North Star BASIC lives on under CP/M on Z-80

machines like the Morrow Micro Decisions. *BaZic*, from Micro Mikes in Amarillo, Texas, is North Star BASIC for CP/M systems. Generally, several versions of the interpreter are supplied, one with eight-digit precision, one with ten, one with twelve and one with fourteen digits. All use decimal arithmetic, making them suitable for dollar and cents calculations, and the selection allows the user to trade off accuracy for speed.

BASIC/Z is a compiler for a similar dialect to Microsoft's. In fact, the system consists of an editor, syntax scanner and compiler with integrated run-time environment. The package has a number of extensions for screen-handling (including cursor positioning with a TAB (x,y) statement), file handling and variable precision arithmetic. It also runs pretty fast.

S-BASIC from Topaz is probably best known in Australia as one of the languages supplied with the Kaypro ▶

SOFTWARE SURVEY



computers. S-BASIC (which stands for Structured BASIC) is a compiler for a superset of standard BASIC, which adds a number of structured programming features, such as BEGIN..END blocks, declared variables, strong typing and so on. It allows recursive functions, chaining to external programs, assembly language subroutines and other nice features. It also allows the programmer to perform arithmetic in single- or double-precision floating point, or in fixed decimal. Although it is loaded with features and seems to work quite well, S-BASIC never really caught on.

Nevada BASIC is a low-cost (\$60 or so) CP/M BASIC interpreter which is broadly similar to Microsoft BASIC, but includes a full-screen editor, full matrix functions, and multi-line user-defined functions.

Waterloo University in Ontario, Canada, is well known for its mainframe language products. Now it has released a range of microcomputer languages, including the very fine *Waterloo BASIC* interpreter. This is the only BASIC interpreter on the market for 8086/88-based systems to offer 8087 support, and it has a number of other interesting features.

For those seeking a more powerful BASIC for 68000 processors under UNIX and related operating systems, *SVS BASIC Plus* is well worth consideration. This is a microcomputer implementation of the well-known DEC BASIC on the PDP-11 and VAX families of minis. I've never used it, although I know it's available for UniPlus UNIX on a variety of 68000 systems and for the Apple Lisa under UNIX or Lisa OS.

For those seeking to understand how BASIC works, a good starting point is the family of *Tiny BASIC*

interpreters published by *Dr Dobbs' Journal* back in 1975 (when it was actually known as *Dr Dobbs' Journal of Tiny BASIC Computer Calisthenics and Orthodontia*, or *Running Light Without Overbyte*). I actually cut my teeth on Dr. Dobbs' and spent many happy hours mucking about with the interpreters published there.

The very first version of *DDJ* contained the object code, and No. 2 the source of *Whipple and Arnold's Texas Tiny BASIC*. This was subsequently expanded by its authors to support floating point and a number of other tricks which made it a lot less tiny. It was then adopted by Applied Technology, which further expanded it into the Microworld BASIC that thousands of our readers KAL (Know and Love).

The *Tiny BASICs* – of which *Wang's Palo Alto Tiny BASIC* is the best known – served as inspiration for a number of other products. I suspect that most of the sophisticated products we use without a second thought today would not exist without the experience their authors derived from within the covers of *DDJ*. Hats off to the Dr!

A product that is to some extent inspired, though not derived, from the *Tinies* was Apple's *Integer BASIC*. This was replaced in most systems by *Applesoft BASIC*, which is of course Microsoft BASIC in another guise.

Now Apple has released the *Macintosh*, and we have a new BASIC to deal with. *Macintosh BASIC* is an interesting beast, geared as it is to business applications, with the ability to run more than one program simultaneously (shades of Ada!).

In the Commodore world, Commodore's BASIC is also from Microsoft, but PET fanciers should also check out the *PETSPEED 64 Compiler*.

Algol

Algol was never much of a hit on micros, but those who are interested can find a few. Vol 23 of the CP/M User Group software contains a complete Algol compiler and example software. It was written by one of Gordon Eubanks' pupils at the Naval Postgraduate School in Monterey, and works – although it is a pseudo-code

compiler. Just think, if he'd written a matching pseudo-code operating system, we could have had the NPSM system! In any case, this compiler is also referred to as *NPS Algol*.

For those seeking a commercial product, Research Machines Ltd in the UK produced a thing called *RM/Algol*, which runs only on Z-80s, but sounds not half bad.

For those who are wondering why I'm making so much fuss about Algol, I spent a large part of my spare time in 1975 in an abortive attempt to write an Algol compiler for the 6800. Some of us just never learn!

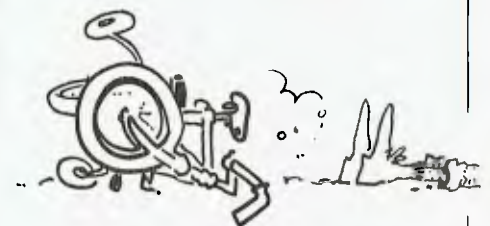
Pascal

There is one thing the world is not short of, and that is Pascal compilers. Good Pascal compilers are a slightly different proposition, although most are adequate.

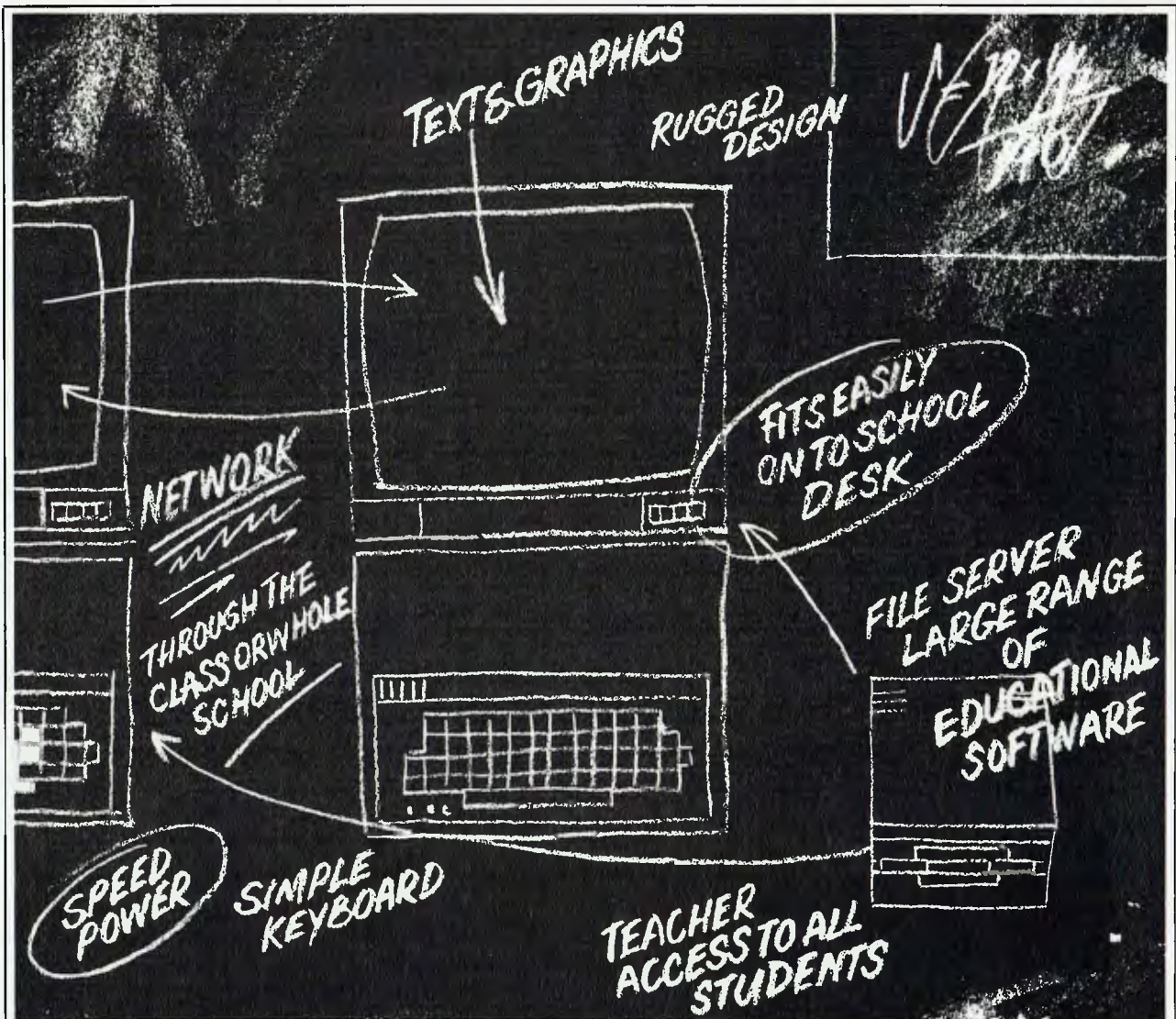
The best-known is *UCSD Pascal*, which is hosted by the UCSD p-system operating system. This is best known as the Apple Pascal system, which is actually version 2 of the UCSD system. However, Softech Microsystems has now released Version IV of the p-system, and this is the version found on the Sage, IBM-PC and a number of other machines.

Although an ISO standard exists for Pascal, and the Pascal User Manual and Report lays down another 'standard', UCSD is really the *de facto* standard in the micro world. Although the UCSD compiler produces p-code (with the performance limitation that implies), the code is linkable with assembly language produced by a matching assembler. That UCSD Pascal can be used for system programming tasks is clearly demonstrated by the fact that almost the entire p-system is written in it.

For the PC-DOS/MS-DOS world, ▶



Pascal



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SOFTWARE

the prevalent Pascal is *MS-Pascal* from Microsoft. This is a superset (as are virtually all Pascals) of the ISO Standard. This compiler can be operated (with inconvenience) on a single-drive PC with 100K of user memory. It supports the optional 8087 numeric data processor and generates very efficient code.

For CP/M-80, CP/M-86 and MS-DOS, *Pascal/MT+* is another high-quality, robust product. It has a number of syntactical differences from MS-Pascal, and the generated code does not seem to be as well optimised, but it is a good choice for operation with the Digital Research companion products Display Manager, Access Manager and GSX (the GKS graphics driver). Again, 8087 support is provided.

Pascal/Z, from Intersystems, is available for CP/M-80 and for the Intersystems Z-8000 system. It appears to be similar to the previous two compilers, but is less widely used.

Prospero Pascal is another high-performance compiler with 8087 support, long integer support and a number of other unique features which make it a good choice for professional software developers.

Turbo Pascal, from Borland International, has created quite a stir since its release earlier this year. Introduced in the US at the incredibly low price of \$49.95, it has achieved remarkable success and reaffirms the old adage that the quality of a software product is not necessarily directly related to price.

Turbo Pascal has a very few hidden gotchas – slow floating point, for example – but is in almost every respect a superb product. It compiles with amazing speed, produces fast, compact code and appears to be quite robust. Included in the package is a demonstration spreadsheet program, and a separate package of IBM PC utility routines – windows, clock access and the like – is also available. Eight- and 16-bit versions are available.

Nevada Pascal was recently released by Ellis Computing and is a similar, low-priced product. I suspect, however, that it is quite simply going to be overshadowed by Turbo Pascal.

SBB Pascal from Software Building Blocks Inc, for the IBM-PC and compatibles (under DOS, MS-DOS or

```
program g (input,output);

var
  number ,
  guess   : integer;
  name    : packed array [1 .. 30] of char;
  play    : char;
  gen     : real;

procedure random(var N : integer);

var
  temp : real;

begin
  temp := 9821 * gen + 0.211327;
  gen  := temp - trunc(temp);
  N    := round(100 * gen);
end;

begin
  gen := 0.1234;
  writeln;
  write('Hi, there, what is your name ? ');
  readln(name);
  writeln('OK ',name);
  write('Do you want to play a guessing game ? ');
  readln(play);
  while (play = 'Y') or (play = 'y') do begin
    writeln;
    random(number);
    write('I am thinking of a number between 1 and 100');
    write('What is your guess ? ');
    readln(guess);
    while guess <> number do begin
      if guess > number then
        writeln('Too high')
      else
        writeln('Too low!');
      write('What is your guess ? ');
      readln(guess);
    end;
    writeln('You got it , ',name);
    write('Do you want to play again ? ');
    readln(play)
  end;
  writeln('Good Bye, ' , name)
end. { g }
```

Guessing Game – Pascal version.

CP/M-86), is available in two versions. The \$US95 version includes the compiler, debugger, editor and the source code for the editor, while the \$US350 development package adds separate compilation, overlays, 8087 support, BCD arithmetic and sources for the run-time library.

Readers of YC will be familiar with *Gammon & Gobbett Tiny Pascal* for the Apple and Commodore 64 computers. This Pascal seems to get less and less tiny all the time, and the most recent versions have attracted the attention of some quite serious users.

Commodore markets this Pascal as *G-Pascal* for the C64 computer, and it is proving very successful.

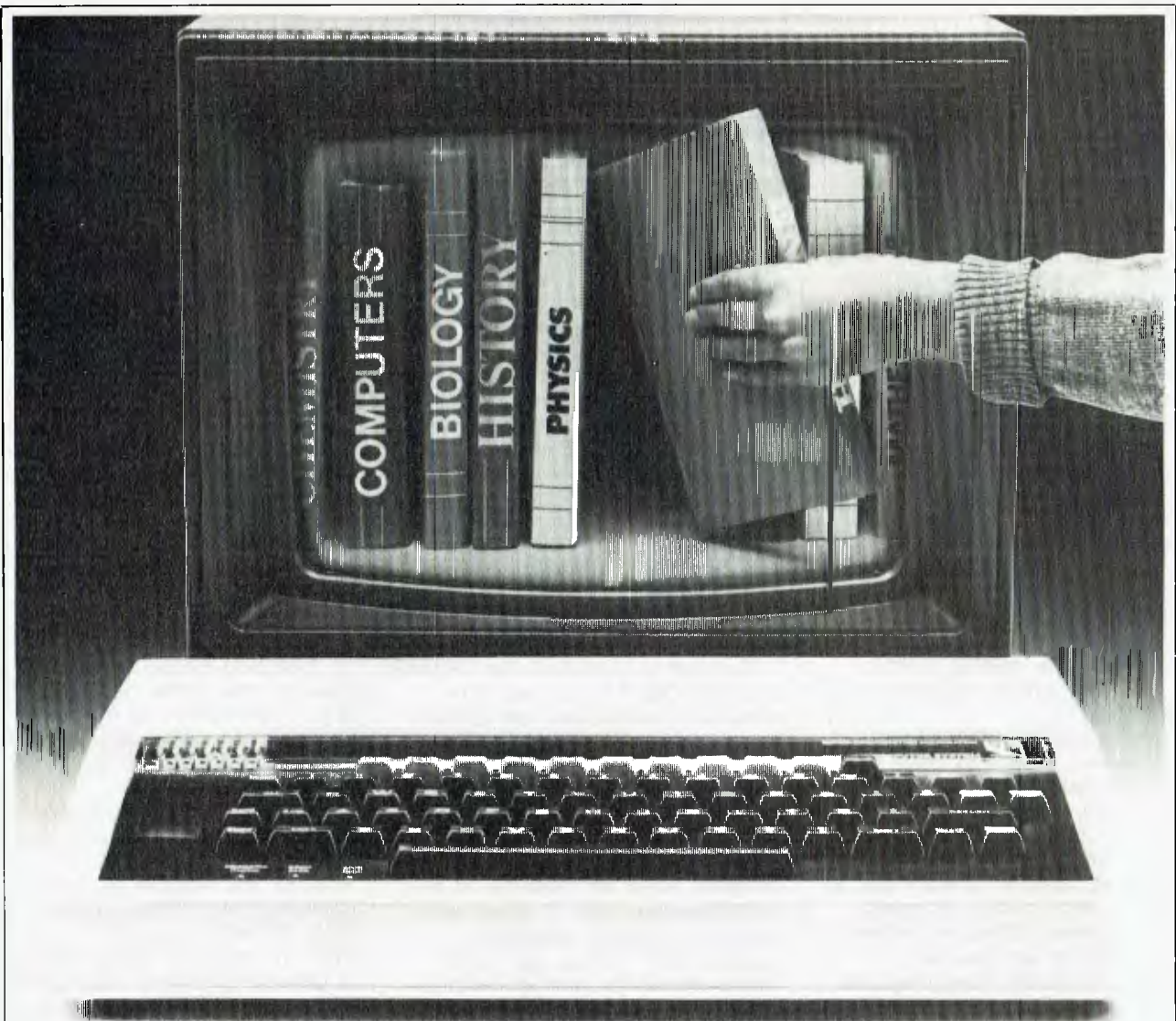
SVS Pascal is available for 68000-based UNIX machines running UniPlus UNIX, and I have been using it for some time on the Lisa. It's a three-stage compiler which produces very tight object code – in fact, it out-performs Digital Research's standard CP/M-68K C compiler.

Modula-2

Niklaus Wirth has himself abandoned Pascal as an incomplete language, and has developed a new language called Modula-2. This has a number of enhancements over Pascal.

The best-known company in the Modula-2 field is *Volition Systems*, which has versions of the language for the Apple II, Sage and IBM-PC. The company's latest version, for the XT, costs \$US395, and includes both Modula-2 and Pascal compilers, module library, Advanced System Editor, p-shell (a UNIX-like programming environment) and utility programs.

To give you an idea of the difference between Pascal and Modula-2, here are a few features of this implementation: RAM disk support, 8087 support, sub-program overlays, random and sequential file access, directory operations, concurrency and interrupt handling, strings and BCD arithmetic. ▶



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SOFTWARE

See (C) Si?

C compilers are available for just about every machine now, since C has achieved almost universal recognition as a system programming language. A computer that can't run a C compiler is destined to suffer a software drought, as much of the software now appearing on the market is written in C in order to achieve portability. dBase III, for example, is written in C, and this has provided an opportunity to finally correct the bugs that plagued dBase II.

Probably the best-known C to YC readers is *BDS C*, written by Leor Zolman. BDS is not a 'full' C – it lacks floating point, initialisation of variables and has non-standard syntax on some functions – but it provides the flavour of C sufficiently to have been the starting point for many of today's most successful C programmers.

Available only for CP/M-80, BDS C is inexpensive enough to make it worthwhile acquiring a copy just to play with. Its speedy and simple compilation is designed for exactly that purpose, although it is worthy of professional software development. In addition, a large number of public domain software utilities are written in BDS C, and the compiler will be necessary to modify these programs.

Lattice C (also sold as Microsoft C) is a very high-quality compiler for CP/M-86 and MS-DOS systems. It generates very fast code, is reliable and varies only a little from 'standard' C – if there is such a thing.

DRI C, from Digital Research, is also available for CP/M-86 and MS-

DOS, and is another quality product. Its major claim to fame is that it can generate code for the large memory model, allowing programs as big as one megabyte of object code! It's also probably the best compiler for 'getting at' the CP/M-86 and MP/M-86 operating system functions – after all, it's by the same company.

Computer Innovations Optimising C is another rugged, all-round compiler, and is probably the closest of those mentioned to the UNIX 'standard'. It was written by a Queenslander now resident in the US – George Eberhardt – and provides excellent support through optional libraries for accessing dBase II files, or the IBM PC hardware. It runs under PC-DOS and MS-DOS, and I believe an earlier version, which runs under CP/M-86, is also available.

Manx Aztec C is most notable for being available on a wide range of machines, from the Apple II upwards. It, and the remaining compilers, are not as prominent as the previous four.

Supersoft C is available for CP/M-86 and MS-DOS. It is claimed to be syntactically compatible with UNIX V7 C (the 'standard'), and to have a comprehensive library of functions.

Mark deSmet C is to 16-bit systems what BDS C is to eight-bit systems. It's cheap (\$US159), fast, comprehensive, quite reliable and allows quick compiles, which are essential to the learning programmer. It allows in-line assembly language statements, supports 8087 floating point and seems almost too good to be true – but it is.

Mark Williams C, from the Mark Williams Corporation in Chicago, is the standard compiler for its Coherent operating system, which is a UNIX look-alike. A version is available under CP/M-86, and is sold by DEC for the Rainbow.

A company called *c-systems* produces a C which can use the full 1 Mbyte address space (for code or data) of MS-DOS machines, and which supports all the DOS 2.0 and 1.1 function calls. Perhaps its best feature, however, is *c-window*, a dynamic debugger that displays source code, allows display and alteration of variables and lets the user set multiple breakpoints. This makes it a good choice for the beginning C programmer. It's \$US199.

What appears to be a combination interpreter and compiler for C is available as *Instant C*, from Rational Systems Inc. This optimising interpreter eliminates compile times and permits symbolic interactive debugging, and is claimed to execute up to 40 times faster than interpreted BASIC. A full-screen editor is integrated with the compiler so that syntax errors leave the cursor at the trouble area.

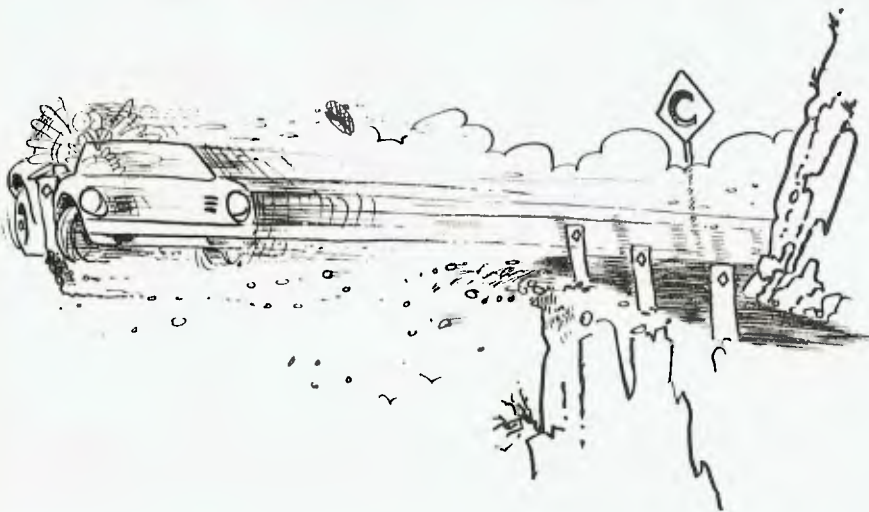
The compiler directly generates .EXE or .CMD files, suggesting that by bypassing the linking stage it gives up one of the major advantages of C – construction of libraries of debugged, re-usable, linkable modules. It's an interesting idea, though at \$US500 it's not cheap.

For those involved in development work for a range of target machines, *Telcon C* could be the answer. Versions are available for 6809 (Uniflex), 8080 (CP/M), 8086/88 (PC-DOS, CP/M-86) and PDP-11 (RT-11, RSX-11) machines, either running on or generating code for each of these. C and assembly language may be intermixed, generated code is re-entrant (allowing multi-tasking operation) and there are no royalties on generated code. Cross-compiler versions are \$US500, resident ones are \$US200 without floating point or \$US350 with.

Ron Cain's *Small C* compiler, which was originally published in Dr. Dobbs' Journal, has spun off a number of descendants.

Small C Version 2.1 for the IBM-PC, by Datalight, comes with complete source code for the library and the compiler itself, and is claimed to feature new 8086 optimisations and a standard library of functions – all for only \$US40! A further \$US40 will get you the CBUG source level debugger – in source code – allowing breakpoints, tracing and variable changing at the source code level.

C users also ought to know about the C Users' Group, which started life as the BDS C Users' Group but has now branched out. The group maintains a library of public domain software which is well worth knowing about. ▶



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YC 1.85



PL/1

PL/1

DRI PL/I-80. I find it rather uncomfortable, as a progressive 'Think micro/small is better' type of person, to be endorsing a 21-year old language that is famed for its hugeness. However, I find that PL/I gives all the structured programming tools available in the best languages, without restricting me to them when I know what I want. In addition, it has features such as choice of fixed decimal or floating binary arithmetic for commercial and scientific programming, together with a full range of functions such as SINH and others. Floating point is up to 53-bit precision in IEEE format.

The DRI compiler is a particularly high-quality compiler for the ANSI minicomputer Subset G implementation of PL/I. It generates fast code which is linkable to assembler and other languages, and is also linkable to the DRI Display Manager and Access Manager packages. It is one of only a few languages to support features on newer CP/M implementations such as passwords, file sharing/locking, and date and time functions.

The package includes the RMAC assembler, linker, cross-reference utility and librarian.

The documentation is particularly good, recognising the fact that most micro programmers will not have been previously exposed to PL/I, and includes comprehensive examples on disk, such as a network analysis program, chess game, text indexing program and others. This was the Infoworld software product of the year a few years ago, and one can see why.

DRI PL/I-86 is available for both CP/M-86 and PC-DOS, and is completely compatible with PL/I-80. A PL/I-68K version was planned for release late in 1984, and a version for 68K UNIX is in the works. ▶

```

/* Guessing game 8/25/84 */

#define LEN 30 /* Max length of name */
#define RANDOM 100 /* Maximum random number */

main()
{
    char play ; /* Control Variable */
    char name[LEN]; /* Name buffer */
    int number ; /* The number */
    int guess ; /* Your guess */
    int rand() ; /* The random generator */

    srand(0); /* Seed random generator */
    printf("Hi, there, What's your name ? ");
    scanf("%s",&name);
    printf("\nOK, %s do you want to play a guessing game ? ",name);
    while ((play = getchar() == 'y') || (play == 'Y')) {
        number = (rand() % RANDOM) + 1;
        printf("\nI'm thinking of a number between 1 and 100\n");
        printf("You've got to try to guess it.\n");
        printf("What's your guess ?");
        scanf("%d",&guess);
        while (guess != number) {
            if (guess < number)
                printf("Too low\n");
            else
                printf("Too high\n");
            printf("What's your guess ?");
            scanf("%d",&guess);
        }
        printf("You got it , %s \n",name);
        printf("Do you want to play again ? ");
    }
    printf("\nBye ... \n");
}

```

A C (BDS C, actually) version of the Guessing Game.

```

guess:
    procedure options (main);

    /*
    Guessing Game Version 2.1
    Programmed in PL/I
    7/21/84
    */

    dcl seed fixed decimal (12,10);
    dcl (guess,number) fixed binary (7);

    dcl name char (20) varying;
    dcl play char (4);

    put list ('Hi there, what's your name?');
    get list (name);
    put skip list ('OK',name,', do you want to play a guessing game?');
    get list (play);
    seed = 0.987654321;
    do while (substr(play,1,1) = 'Y' | substr(play,1,1) = 'y');
        seed = 29 * seed - floor(29 * seed);
        number = floor (99 * seed + 1);
        put skip list ('I'm thinking of a number between 1 and 100. ');
        put skip list ('You've got to try to guess it');
        put skip list ('What's your guess?');
        get list (guess);
        do while (guess = number);
            if guess > number then put list ('Too high!');
            if guess < number then put list ('Too low!');
            put skip list ('What's your guess?');
            get list (guess);
        end;
        put list ('You've got it, ',name, '!!!');
        put skip list ('Play again?');
        get list (play);
    end;
end guess;

```

PL/I version of the Guessing Game.

Enhancements for
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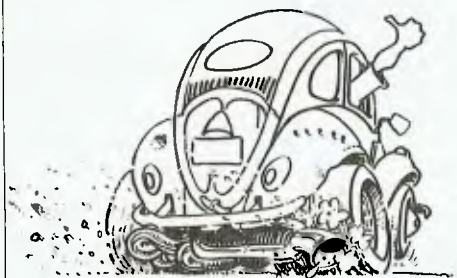
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SOFTWARE



FORTRAN...-

FORTRAN

The Microsoft FORTRAN compiler *FORTRAN-80* got off to a shaky start with some serious bugs and even today still has some bugs. This is a full FORTRAN 66 with only one omission, the COMPLEX data type. Despite the bugs, it is currently the only game in town.

MS-FORTRAN is a subset of FORTRAN-77 for MS-DOS, which supports double-precision and integer arithmetic using the 8087 numeric data processor chip. Looks good — also sold by IBM as IBM FORTRAN.

SuperSoft FORTRAN is again a full implementation, but I have no experience with it so can't say much about it.

p-System FORTRAN-77 is a pseudo-code compiler running under the p-system. If you use p-system, you have no choice anyway.

DRI FORTRAN-77 is a new

compiler, recently released in the US. It is the first of Digital Research's compilers to use the company's 'Common Back End' (CBE) technology and has been validated to ANSI standards — the only microcomputer FORTRAN so validated.

The *SVS FORTRAN* compiler is available for 68000-based UNIX systems, and for the Apple Lisa operating system.

Waterloo FORTRAN (WatFOR) is best known running on 370-family mainframes, but a version of this FORTRAN interpreter — notice it's not a compiler — is now available for the IBM-PC and the Commodore Super-PET. Excellent for education.

Prospero FORTRAN is a companion to the Prospero Pascal — nothing terribly special about it, it's just a good solid product.

COBOL

Microsoft COBOL-80 is an ANS Level 1 COBOL 74 with extensions which include much of Level 2. It requires CP/M or MS-DOS and has full sequential, relative and indexed file support with variable file names. It also has powerful screen formatting with ACCEPT and DISPLAY verbs. Although the compile/link process produces .COM files, these are actually p-code which is interpreted so that it is not as fast as is theoretically possible.

Programs are segmentable so they can be larger than the available memory, and a CHAIN command allows programs to transfer control with parameter passing. ▶

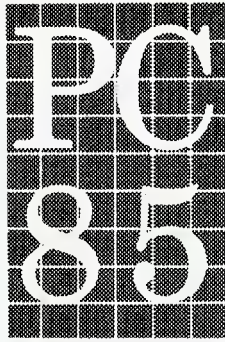
```

C    GUESSING GAME
C    PROGRAMMED IN FORTRAN
C    7/21/84

      INTEGER NUMBER,GUESS
      CALL OPEN (6,'CON:')

500  NUMBER = 99 * RAND(0) + 1
      WRITE (6,2)
2    FORMAT ('I am thinking of a number between 1 and 100')
      WRITE (6,3)
3    FORMAT ('You have to try to guess it.')
```

FORTRAN IV version of the Guessing Game.



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```

% Guessing Game 05/09/84
%

test(Try, N) :-
    Try = N,
    print('You got it !!!'),
    !.
test(Try, N) :-
    Try > N,
    print('Too high'),
    !,
    fail.
test(Try, N) :-
    Try < N,
    print('Too low'),
    !,
    fail.

game :-
    random(100, Number),
    repeat,
    ask('What is your guess ? ', Guess),
    test(Guess, Number),
    !.

continue :-
    ask('Play Again ? ', Play),
    (Play = 'N' | Play = 'n').

play :-
    repeat,
    game,
    continue,
    print('Thanks for playing').

play ! % Start game

% If prolog library doesn't include random function then use
%
% random(R, N) :-
%     retract(seed(S)),
%     N is abs(S mod (R + 1)),
%     NewSeed is (125 * S + 1) mod 4096,
%     asserta(seed(NewSeed)),
%     !.
%
% seed(13).
%
% If 'ask(Q,A)' missing use
%
% ask(Q,A) :-
%     prompt(Old, Q),
%     ratom(A),
%     prompt(_, Old),
%     nl,
%     !.
%
%

```

Prolog version of the Guessing Game.

```

* Guessing Game V 2.1
* Written in dBASE II/86 V 2.41
* 7/21/84

SET TALK OFF
ACCEPT "What's your name" TO name
? "Hi there, ",name,", do you want to play a guessing game?"
ACCEPT TO play
STORE .987654321 TO seed
DO WHILE !($ (play,1,1)) = "y"
    STORE 29 * seed - int(29 * seed) TO seed
    STORE INT(99 * seed + 1) TO number
    ? "I'm thinking of a number between 1 and 100"
    ? "You've got to try to guess it"
    INPUT "What's your guess" TO guess
    DO WHILE guess <> number
        IF guess > number
            ? "Too high!"
        ENDIF
        IF guess < number
            ? "Too low!"
        ENDIF
        INPUT "What's your guess" TO guess
    ENDDO
    ? "You've got it, ",name,"!!!"
    ACCEPT "Play again" TO play
ENDDO

```

dBase II version of the Guessing Game.

The standard package comes with the MACRO-80 assembler, linker and librarian, and can be used in conjunction with the M/SORT package to provide the Level 2 SORT verb. Sells for around \$800.

Cis COBOL is an ANSI Level 1 COBOL with extensions such as hex literals, lower-case characters, and runtime input of filenames. It runs in 48K of RAM under CP/M or the BOS operating system with two disk drives.

The package features interactive CRT handling, advanced screen formatting and data entry, line-sequential files, FORMS utility, interactive debugging and linkable subroutines.

Level II COBOL is available from Digital Research and others, and is actually the latest revision of Micro-Focus COBOL. It is the only Level 2 COBOL available and meets GSA specifications. It includes full Level 2 SORT/MERGE file description, including RELEASE and RETURN. It generates pseudo-code (sorry), although a source level debugger, called ANIMATOR, is available, and the pseudo-code can be converted into native code with an optional native code generator.

Nevada COBOL sells for just \$A49.95. Unlike other COBOLs, this one is a true native code compiler and is very fast, particularly on file access, which seems to be highly optimised. Not a full COBOL by any stretch of the imagination, but a usable subset and excellent value.

RM/COBOL holds the promise of software portability. It appears to be written in C (I could be wrong) and runs on TI and NCR minis, as well as under CP/M, MP/M, TRSDOS, OASIS and UNIX. It has established a very good reputation very quickly. A matching code generator for data



COBOL

SOFTWARE SURVEY



input, file maintenance and report printing programs is also available.

MS-COBOL is Microsoft's 16-bit COBOL compiler. It meets the low-intermediate level of the ANSI-74 specification, combining the most useful level 1 and 2 features, and has extensions for page-style screen handling, program chaining and file handling.

FORTH

MicroMotion MasterFORTH is claimed to meet all provisions, extensions and experimental proposals of the FORTH-83 International Standard. It runs under Apple DOS 3.3 or CP/M 2.2, using the host OS file system, and includes the file primitives described in the book 'Software Tools'. A full screen editor and an assembler are provided, and floating point and Apple hi-res drivers are available as options.

Logo

Logo is an educational language developed by Seymour Papert at MIT, and is best known for the 'Turtle Graphics' which are closely associated with it. For the most part, the bulk of the Logo interpreters available are just that - vehicles for turtle graphics - and no more.

Dr Logo is the only Logo we have in use at the moment. It is a comprehensive programming language, and this implementation has a full complement of functions.

Other versions of Logo are *Apple Logo*, *Terrapin Logo*, *IBM Logo* and *TI Logo*.

Ada

There are currently no full Ada

compilers available for micros, but *Janus/Ada* is the closest I have seen. Available for CP/M-80, CP/M-86 and MS-DOS, this is a fairly complete implementation of Ada, including packages, all data structures, and most other features. It certainly gives a feeling for the concepts of Ada, which is not just a souped-up Pascal.

The package includes a multi-pass compiler, relocating assembler and linker plus utilities, and is itself written in Janus/Ada. Remember that the US DOD is sponsoring Ada, just like it did for COBOL.

APL

I haven't seen this *IBM APL* myself, but I think I can safely assume it works. It runs on a PC, takes advantage of an 8087 if one is installed, and can apparently exchange workspaces with the mainframe APL.

I haven't run *STSC APL*Plus*

either, though I presently have a copy for evaluation. I promptly passed it onto an APL-speaking colleague for examination, but the documentation looked excellent, and the package has received very good reviews from the US press.

Waterloo APL comes from the University of Waterloo in Ontario. No real comments.

LISP

You'll find a *Stiff Upper LISP*, a *Software Toolworks' LISP*, *Supersoft LISP*, *Mu-LISP*, *IQ LISP* for the IBM PC, and *Waltz LISP*.

Waltz Lisp (which I presume was written by Walt) is claimed to be substantially compatible with Franz LISP (which runs under UNIX) and similar to MacLisp. It supports long integers (up to 611 digits), string functions, random file and CP/M directory access, splicing and non-splicing character macros and other goodies. There are over 250 functions in total, and the package comes with an extensive manual and sample programs (including grep and diff written in LISP).

PILOT

Starkweather PILOT, alias Nevada PILOT, sells for \$A49.95 and is a bargain. It contains additional commands to control a videotape recorder.▶

```
*START
T:
T:Hi there, what's your name?
A:$NAME
T:OK, $NAME, do you want to play a guessing game?
A:
M:Y,y,Yes,yes,OK
JY: *DOIT
J:*END
*DOIT C:#N * RND(99)
T:I'm thinking of a number
*L1: T:What's your guess?
A:#G
T(G>N):Too high!
T(G<N):Too low!
J(G<>N):*L1
T:You got it!
:Want to play again?
A:
M: Y,y,Yes,yes,OK, Why not
JM: *DOIT
*END T:OK, Bye for now.
E:
```

Guessing Game in PILOT.

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SOFTWARE SURVEY

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Mt Waverley 3149.
Phone (03) 277 6003.

Micromotion FORTH:

MicroMotion
2700 29th Street,
Boulder Colorado 80301,
USA.

C Users' Group:

C Users' Group
Box 287,
Yates Center KS 66783.

Small C V 2.1 for IBM PC:

Datalight
11557 8th Avenue NE,
Seattle WA 98125.
Phone (206) 367 1803.

Telcon C:

Telcon Systems
1155 Meridian Avenue,
Suite 218,
San Jose CA 95125.
Phone (408) 275 1659.

Instant C:

Rational Systems Inc
PO Box 480,
Natick Mass. 01760.
Phone (617) 653 6194.

c-systems C:

c-systems
Box 3253,

Fullerton CA 92634.
Phone (714) 637 5362.

Mark deSmet C:

CWare Corporation
PO Box 710097,
San Jose, CA 95171-0097.
Phone (408) 736 6905.

Lattice C:

Lattice Inc
PO Box 3072,
Glen Ellyn IL 60138.
Phone (312) 858 7950.

Modula

Vollition Systems
Box 1236,
Del Mar CA 92014.
Phone (619) 481 2286.

SBB Pascal:

Software Building Blocks Inc
Box 119,
Ithaca NY 14851-0119.
Phone (607) 272 2807.

MBASIC

BASCOM

FORTRAN 80

Microsoft COBOL

MS-COBOL

Microsoft C:

Microsoft Pty Ltd
1/17 Rodborough Road,
Frenchs Forest 2086.
Phone (02) 452-5088.

CBASIC

CBASIC Compiler

Personal BASiC

NEVADA BASIC

DRI-FORTRAN 77

Pascal/MT+

Level II COBOL

Nevada COBOL

BDS C

DRI C:

Arcom Pacific
252 Abbotsford Road,

Mayne 4006.
Phone (07) 52 9522.

BASIC/Z:

Software Source
344-348 Oxford Street,
Bondi Junction 2022.
Phone (02) 389 6388.

BAZIC:

Micro Mikes
3015 Plains Blvd,
Amarillo TEXAS 79102.
Phone (806) 372 3655.

Janus/Ada:

Ada Australia
9 Morrow Road,
Christies Beach SA 5156.
Phone (08) 382 2806.

USCD Pascal:

Oxford Systematics
PO Box 304,
Mount Waverley 3149.
Phone (03) 277 6003.

Pascal/Z:

Ithaca Intersystems Inc
1650 Hanshaw Road.
Ithaca NY 14850.
Phone (510) 255 4346.

Whitesmiths Pascal

Whitesmiths C:

Fawnray Pty Ltd
Computer Consultants
378 Forest Road,
Hurstville 2220.
Phone (02) 570 6100.

Turbo Pascal

C/80:

Software City
1/27 Forge Street,
Blacktown 2148.
Phone (02) 621 4242.

Mark Williams C:

Mark Williams Company
1430 West Wrightwood,
Chicago IL 60614.
Phone (312) 472 6659.

Supersoft C

Supersoft LISP

Supersoft FORTRAN:

Imagineering
579 Harris Street,
Ultimo 2007.
Phone (02) 212 1411.

Computer Innovations C:

Computer Innovations
980 Shrewsbury Avenue,
Suite M,
Tinton Falls NJ 07724.
Phone (800) 922 0169.

IBM APL:

IBM Australia Ltd
168 Kent Street,
Sydney 2000.
Phone (02) 234 5678.

STSC APL*PLUS/PC:

Sourceware Pty Ltd
4/73 Albert Avenue,
Chatswood 2067.
Phone (02) 411 5711.

Waterloo APL:

HiSoft Pty Ltd
8-12 Alma Road,
St Kilda 3182.
Phone (03) 534 0383.

Apple Logo

Apple Pilot:

Apple Computer Pty Ltd
37 Waterloo Road,
North Ryde 2113.
Phone (02) 888 5888.

TI Logo:

Texas Instruments
9 Byfield Street,
North Ryde 2113.

SVS FORTRAN

SVS Pascal

SVS BASIC+

RM COBOL

SMC BASIC Four

Irvine ADA:

UniPress Software Inc
2025 Lincoln Highway,
Rt. 27, Suite 312,
Edison NJ 08817.
Phone (201) 985 8000.

and is a full implementation by the man who invented PILOT. It comes complete with sample programs and a simple authoring package, itself written in PILOT.

Apple PILOT requires a UCSD

Pascal/Apple Language Card to run, is written in Pascal, and seems to be quite good.

STOK PILOT is a CP/M PILOT incorporating all the features of the other PILOTs, but has an interesting

set of extensions which allow it to be used to create menu-driven shells around CP/M. It can run other programs from within PILOT and can generally be used to smarten up the CP/M user interface.

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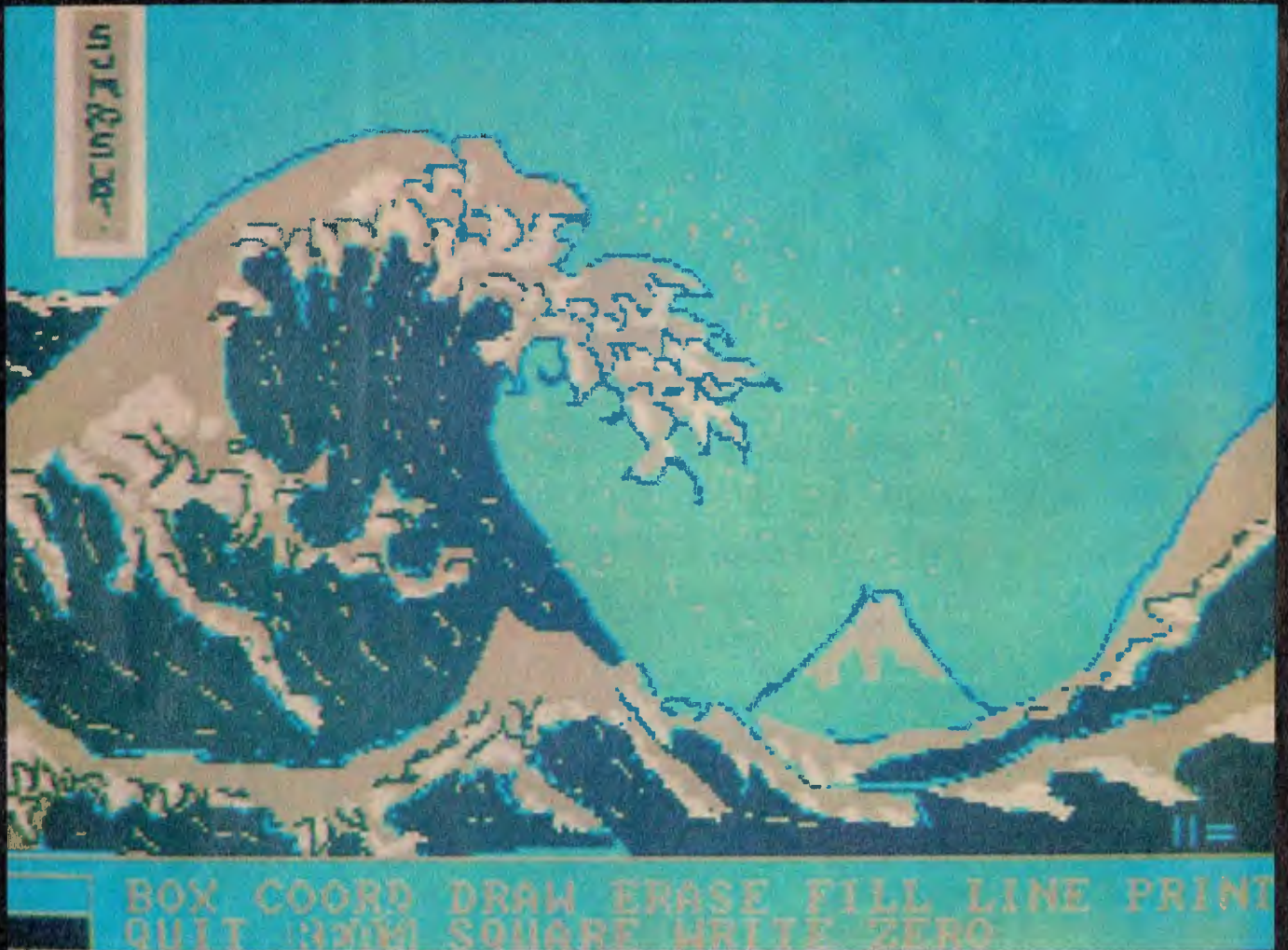
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Above: A sample drawing using the Polaroid Palette and the Microsoft Mouse kit.

POLAROID ColorKey:

Polaroid Type 669 (L8)



POLAROID ColorSets:

Polaroid Type 669 (L8)



Above: Polaroid Palette 'Colorkey'.

Right: Polaroid Palette 'Colorsets'.

THE POLAROID PALETTE



A common problem facing computer writers is photography of screens – it's never satisfactory. Here Les Bell looks at a new solution that offers vastly improved quality.

PEPPERED throughout reviews and articles in *Your Computer* you will see photographs of computer screens. As the old saw has it, a picture is worth a thousand words, and dry and dusty descriptions of computer software can be considerably enhanced with a few screen shots.

Capturing images from computer screens is not important only for computer journalists, however. Many business professionals need to make presentations to management, customers and others in order to 'sell' new ideas and projects. This frequently requires the presentation of complex financial data in graphic form – a

task which is ideal for a micro-computer.

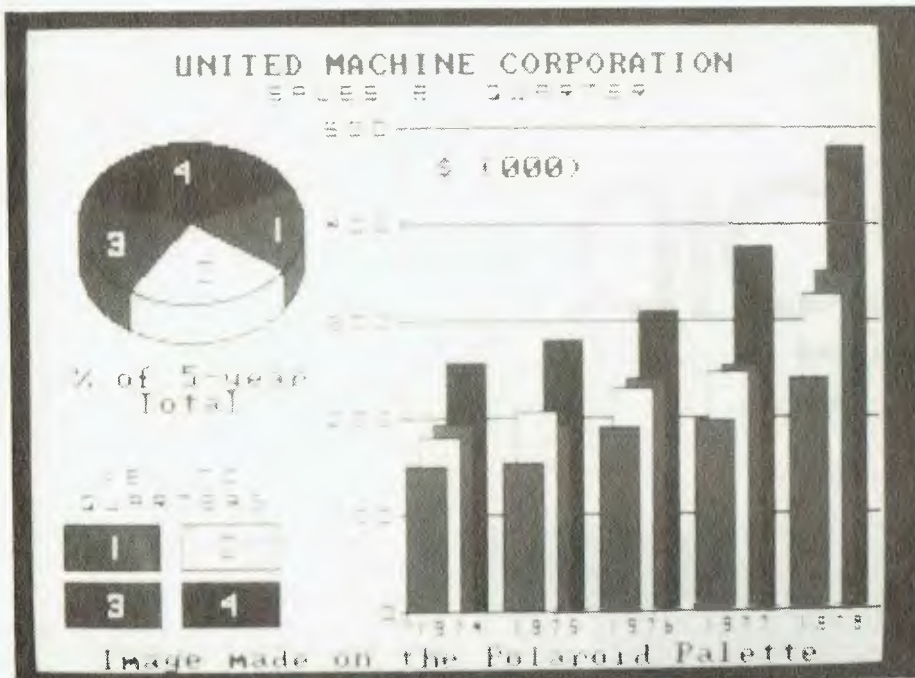
But the output of the micro is either only available on screen for a short time, or has to be printed or plotted. Dot matrix print output of graphics is adequate for 'what-if' games, but is not adequate for professional presentations, and plotters are slow and never seem able to achieve the striking colour saturation of the screen display.

For a long time, I got by with a simple, if barely adequate, solution – taking photographs of the screen directly. For this to work, you simply need a camera on a tripod, a dark room, a little thought about exposure times (they must be 1/30th second or greater) and a bit of patience. It works, but some computer displays and monitors are better than others, and it's not very good quality.

Recently Polaroid announced a new product called the Palette. This is a graphics imaging system specifically for use with personal computers, and capable of much better results than previous techniques.

The Palette works with the IBM-PC, DEC Rainbow and Apple II computers. We borrowed an IBM-PC version for review, which requires a minimum configuration of PC or XT with 128K memory, IBM Asynchronous Communications Adapter, and IBM Colour/ Graphics Monitor Adapter.

The Palette kit consists of the Model 72-10 recorder (the Palette itself), program diskette, video input/output cable, manual, RS-232C cable, power cord, 35 mm autowind camera body, adapter, control cable, viewfinder



cap, Polaroid 35 mm Autoprocessor, Polaroid 35 mm slide mounter, pack film holder/adaptor for Polaroid type 669 film and a 75 ohm terminator for the video cable.

The Palette itself is a small box containing a high-quality CRT display and some simple optics – basically three colour filters on a wheel. There's also some control circuitry to drive all this, of course.

At one end of the box is a hole where a camera can be attached. Two cameras are supplied as part of the kit: a Polaroid instant print film holder and a Minolta 35 mm SLR camera with motor drive. With the aid of an adapter in the case of the Minolta, these simply bolt in place at the end of the Palette enclosure.

The Palette links to the host computer through two cables. The first is a video cable, which carries the graphics image to the screen inside the Palette, and the second is an RS-232C cable for control signals. Also at the back of the Palette are video outlets for a monitor, and a connector for the remote control of the Minolta 35 mm camera.

How does it work?

The colour image you see on the screen of your PC is not filmed directly. Instead, it is 'grabbed' by the Palette software, which runs on the PC, and then broken up into its

primary constituents – red, green and blue.

Each of these three colour images is then sent separately to the Palette monochrome CRT and exposed to the film through the appropriate colour filter. For example, to make up an area of white in an image requires 203 units of red filter exposure, 204 units of green exposure and 233 units of blue exposure.

The amount of colour transferred to the film depends on the time for which it is exposed. Thus, where the PC displays only four colours at a time from a palette of 16, the Palette can be used to create virtually thousands of different shades.

The Palette software gives you 72 colours to choose from, of which four may be displayed at one time. Of course, when creating images using programs like Lotus 1-2-3, you can only see those colours available on the PC, and will have to visualise how the completed chart will turn out.

Using the Palette

The Palette is very simple to use. The first task is to assemble the unit with the required camera and make sure that all the leads are in position – this takes a couple of minutes at most. Then the unit is turned on and given twenty minutes to warm up.

Next the Palette software is booted. This comes up in the System Menu,

which allows the user to establish some defaults and set the Palette up. Before doing anything else, the system should have its video threshold adjusted.

This option is selected on the menu, and the software responds with a message that it is establishing communications with the Palette and rotating the filters out of the way. It is then possible to see the face of the Palette CRT and adjust the threshold control on the back of the unit so that four quadrants of the test display are clearly visible with no other lines on the screen.

Having set that up, we are ready to roll. The first task is to make up a sample 'colorkey' – a chart that shows the seventy-two colours that are available from the Palette driver software. This will enable subsequent selection of colours.

We select the colorkey and Color Set Menu, which allows us to edit Color Sets, move to the Edit Colorkey Menu, load a colorkey, save a colorkey, obtain a catalogue of colorkeys, move to the Colorkey/Sets Exposure Menu, obtain help or exit to the System Menu.

There is a colorkey for each film type:

- 1 Polaroid Type 669
- 2 Polaroid Polachrome
- 3 Ektachrome – ASA 64
- 4 Agfachrome – ASA 100
- 5 Fujichrome – ASA 100

and basically, the colorkey contains the colour exposure values for each film for the 72 different colours accessible from this software. We first load the colorkey for the appropriate film type – usually Polaroid 669 for setting up – and then move to the Colorkey/Sets Exposure Menu.

This menu allows us to turn Raster Fill off or on, turn the autowinder off or on and expose colorkeys and Color Sets.

Making the exposure is very simple. The correct option on the menu is selected, and the system then prompts you to remove the dark slide (effectively the shutter of the camera) and hit return.

The screen will display the messages

- RED exposure. Please wait. . .
 GREEN exposure. Please wait. . .
 BLUE exposure. Please wait. . .

and between them, you will see

POLAROID PALETTE

upside-down, back-to-front writing at the bottom of the screen, and a matrix of white squares flashing on and off the screen. This is the actual exposure taking place.

Once all this is over – it can take a couple of minutes, but this is the absolute worst case involving all 72 colours – you replace the dark slide and develop the film. This is simply a matter of ripping it out of the camera, waiting one minute and peeling it off the chemical backing. Lo and behold! – a completed colorkey, consisting of 72 colours numbered A1 to H9.

When using type 669 film, the image on the screen is upside down because there is a mirror inside the camera, but with slide film, it appears in the conventional manner.

Choosing your Colours

Color Sets are pre-selected sets of four colours which work well together. Up to eight Color Sets can be loaded into the software at a time, and while eight are supplied, you can easily create your own. You can go for strident reds, blues and black or opt for subtle pastels, whichever you prefer.

A similar process is used to expose a Color Set, so that you can see how the colours match, and produce your own swatch of Color Sets for use when setting up images.

The Color Selection Menu allows you to alter the background colour and the contents of the colour sets, as well as switching Raster Fill on or off. Without raster fill, solid areas of the image will actually have horizontal black lines in them, making it obvious that the image was prepared using some kind of video device.

From this menu it is also possible to display the current image, although the Polaroid software always displays images in black, cyan, magenta and white, and you will have to imagine the colours in the final slide.

Exposing actual images is done in exactly the same way. The image is loaded and then exposed from the single exposure menu. With the 669 film, the result is a print a minute later, so that you can confirm that what you got is what you wanted. Images are saved as two (or more) files; one for the shape itself, and one or more for the colours, distin-

SOFTWARE REPORT CARD

Unit:	Polaroid Palette
Made By:	Polaroid Corp.
Processor:	Alkali chemical-based
Clock Speed:	60 seconds/minute
ROM:	Presumably
I/O:	Serial RS-232C and video
Display:	35 mm slides or 82.5 by 108 mm prints
Graphics:	Yes, resolution dependent on host machine
Peripherals:	It is one!
Expansion:	–
Best points:	Superb images
Worst points:	Heavily hardware dependent

Ratings:	Excellent	Very Good	Good	Poor
Documentation	●			
Ease of Use	●			
Functionality	●			
Support	●			
Value-for-money	●			

Extras included:	35 mm camera with autowinder (buy your own lenses and photograph anything else)
Options:	Additional graphics software
Price:	\$2200 + tax (22.8%)
Review unit from:	Polaroid Australia Pty Ltd, Eden Park Estate, 31 Waterloo Road, North Ryde NSW 2113. (02) 887 2333

guished by their types:

.Pxx = image information

.PRM = colour information

Thus you can try different colour combinations with an image, until you get the right result.

Exposing slides is done in the same way. The 35 mm camera has a control lead which plugs into the back of the Palette recorder, and this automatically takes care of the shutter release for you. Since the camera has an autowinder, it also winds on, ready for the next exposure.

This is used to good advantage in the multiple exposure menu. Normally, you will work with one image at a time, setting them up for best results with the print film. But once you have selected the right colour sets and everything is fine, you can combine the images into a slide show, and set the slide camera running to automatically expose all the images while you do something else. Very nice.

Once you have exposed an entire film, you rewind it into the canister, remove it and process it. While conventional transparencies will generally have to be processed by an outside lab, the kit includes a Polaroid 35 mm Autoprocessor, which can be used to develop Polaroid 35 mm

slide film in just over a minute. You simply place the film and its developer chemical pack into the processor, close the lid, snap a catch and wait five seconds. Then wind the handle briskly until it binds, wait a minute (or more – it's not time-dependent), reverse the catch and rewind the film. Remove it, and you have a processed film ready for mounting.

The kit also includes slide mounts and a neat film cutter and mounter. Of course, being quite *au fait* with computer hardware, I was more fascinated by the photographic gee-whizzery – I find it hard to believe that there has been so much advance in photochemical technology!

The results are excellent, as you can see.

PSAVER

The one thing I haven't discussed yet is where these images come from. The answer is, if the PC can display something, the Palette can record it. This is done through a small program called PSAVER, which is invoked at the beginning of a Lotus 1-2-3 session or whatever.

The PSAVER program loads itself just above DOS and hangs around, waiting for you to capture an image. ▶

Then whenever you type Shift-PrtSc, it displays a window in the middle of the screen, asking you what you want to do:

- F1> Save image to file
- F2> Send image to printer
- F10> Return to program

F2 is the normal function of the Shift-PrtSc key, but F1 saves the image to a file of your choice in a format suitable for use with the Palette.

This scheme works remarkably well; we tried it with a variety of software, including Lotus 1-2-3, Open Access and the Microsoft Mouse drawing program. Any program that produces images on the IBM-PC colour graphics adapter should work with PSAVER.

However, this is only what Polaroid terms 'Phase One' software, based on the PC's colour 320 by 200 resolution. It is possible to go beyond that with other software drivers.

Other Software

It is possible to drive the Palette from other graphics software. Perhaps the best example of this is Digital Research's GSX (Graphics System Extension) package, which implements the ISO Graphical Kernel Standard for device-independent graphics. With GSX, using applications programs like DRI's DR Draw and DR Graph, it is possible to go to 640 by 400 resolution,

DR Presentation Master

DIGITAL RESEARCH'S Presentation Master is a package which includes two of that company's software packages - DR Graph and DR Draw - and Polaroid's Palette hardware, software and photographic equipment. As explained in the main article, installing this package on a personal computer allows you to draw graphs or pictures, and reproduce the images on either 35 mm colour slides or Polaroid instant prints.

DR Graph and DR Draw are still available separately, and of course you can also purchase the Polaroid Palette system separately. As is usually the case, Presentation Master is priced more attractively than the sum of individual parts of the package.

Unpacking Presentation Master is no small task; there seem to be endless small and large boxes filled with a bewildering array of equipment, mostly photographic. Fortunately, this apparent complexity is not carried forward to the documentation, which all fits into a reasonably sized slipcase. In the manual is a checklist for each item of equipment, and details of where and how to install it. The package is absolutely complete, right down to all connecting leads, a print film back, a 35 mm camera body, film, a 35 mm film processing kit, a slide-mounting device and the slide mounts themselves. This is a package you could take home on Friday night and be sure you wouldn't need to rush out and buy some forgotten part over the weekend.

Installing the Shoebox

The installation instructions start with a dire warning about how

you will damage the system or your computer if you don't proceed in exactly the order shown. Unfortunately, it is very difficult to carry out some operations in the order shown, and in one or two instances it is impossible. Nevertheless, the instructions are generally quite detailed and straightforward, although it helps if you have had some experience with 35 mm cameras, with any of Polaroid's cameras, and with computers. Certainly putting everything together becomes much easier the second time.

Some of Polaroid's advertisements for the Palette describe it as being of shoebox size, and this is a fair description. On the computer we were using, an IBM-PC, one cable attached to a serial port and another to the composite video socket. Plugging in a terminator plug and a power lead on the Palette completed the installation.

The Palette has a small video screen at the end opposite to the cable connections. To adjust its video threshold you peer into it and look for a pattern described as being like a tennis court (see main article). That is the only adjustment you need to make.

Creating With The Palette

A special film back for 8 cm by 10.5 cm prints is attached in front of the Palette's screen. Once you have the film back loaded and attached, the software allows you to transfer the picture to the film, which you develop in sixty seconds like most other Polaroid films.

For presentation purposes, this size print is probably too small for most people, but it can serve to

give you confidence that when you prepare a colour slide it will come out okay. The 35 mm film supplied is a twelve-exposure roll of Polaroid, though other films such as Fktachrome and Agfachrome can be used as well. Using 35 mm film, of course, you have to wait until you have finished the roll to see the result.

There are two ways to reproduce the image on film. The easy way, which will work with any graphic image you can display on your screen, is to copy the image as it appears on the screen. This limits the resolution to what your monitor is able to reproduce, and this may not be good enough. On our monitor, a Kaga Taxan II, a bar graph with ordinary-sized print was quite satisfactory, but smaller print produced by the graphics software we were using was not legible.

The other way is to bypass your display screen altogether. This gives excellent resolution, but won't work with all software. In particular, it won't work with Lotus 1-2-3, the producers of which are admonished by Digital Research in the manual for not filing their data in the standard way. With 1-2-3 you could convert the file to the DIF format first, but this is very tedious if your worksheet is of any reasonable size.

For 35 mm slides the high-quality Minolta camera body supplied with the package (no lenses are supplied) is attached to the Palette in a somewhat similar fashion to the film back. The 35 mm film supplied by Polaroid has a pack containing the chemicals for processing the film, and to produce your slide you simply follow the simple procedure de-

scribed in the main article. I was greatly impressed with the completeness of the Polaroid Palette and with its quality. All the Polaroid equipment worked flawlessly while I had it.

Documentation

The manual accompanying all this hardware and software is of quite reasonable size. It is divided into three sections: the first is a hodge-podge containing the Palette instructions and preliminary notes and tutorials for DR Graph and DR Draw; and the other two sections cover DR Graph and DR Draw individually. This arrangement is fine for anyone who reads the whole manual from start to finish, and who goes through all the tutorial steps - but who does that? I became impatient early in the piece and skipped most of the tutorials, but then the layout of the manual made it difficult to find elementary information when I wanted it.

DR Graph is a comprehensive graphics package, as you would expect from its price of \$355. It makes extensive use of menus and setting sheets, and once you learn the terminology and how to move from one to the other it is quite easy to use. It also provides for text-only screens, which can be a great help if you're putting together a slide presentation. The use of the Palette with DR Graph gives excellent results.

DR Draw is even more expensive at \$420, but is a more versatile product. It is also harder to learn, simply because of its great flexibility, and is menu-based. The common geometric designs are built in so to draw a rectangle you need only specify the location of any two of the oppo-

and this is noticeably better than the already high quality of the Polaroid software.

The DR Draw and DR Graph packages (see accompanying box) allow the preparation of text-oriented presentation slides and business/financial graphs respectively, and they are easy to use, producing high-quality output. Other packages which support the Palette include Graphwriter and Chart Master.

Other Details

The documentation supplied with the Palette is excellent. It is, of course, well illustrated, so that the physical operation of the equipment is easy to follow, but it also is well organised and presented, with a tutorial approach and reference material at the back of the book.

The Polaroid software is menu-driven, which makes it slightly cumbersome

to use, but this is an appropriate approach for this type of product. The PSAVER program approach to image capture is excellent and works well in practice.

In short, the Polaroid Palette is an excellent product, which will find ready acceptance among those who need to present information to any kind of audience. □

By John Nicholls

site corners. Text is also provided, with a much larger range of fonts than are available for DR Graph.

A Flaw

In its implementation on the IBM-PC, DR Draw suffers from one fatal defect. To select a menu item or to go forward the program requires you to 'PICK' (pick as in choose not as in pick and shovel) your program, and PICK has been allocated to the Space Bar. This is the largest key on the keyboard, and is easy to find; so far so good. The RETURN key works in its usual fashion to move you down a line, but it performs another role, as a key to indicate that you have finished the task you PICKed; in other words it functions as a DONE key, and moves you backwards through the menus. A few programs use one of the function keys to indicate DONE, but most use RETURN. So in DR Draw we have a program that works in a manner directly opposite to most others. In it RETURN moves you backwards; in others it moves you forward. Because of RETURN's dual role, reassigning keys doesn't offer a solution.

A less serious problem is that to move the cursor in the menus you don't use the cursor keys; you use TAB and BACKSPACE, an unusual but logical arrangement. DR Draw also supports a mouse using one key for PICK and the other for DONE, so perhaps this is the best solution. (A mouse is not supplied in the Presentation Master package.)

Comparing

What advantage does the DR Presentation Master have over



other methods of presentation? Other graphics packages allow you to output graphs to printers (dot matrix), to paper plotters, or to plotters producing transparencies for overhead projectors. The output to a dot matrix printer is adequate, but not particularly attractive – unless you use a colour printer – while plotters can produce good results either on paper or with transparencies.

The instant prints from the Polaroid Palette are adequate, provided you don't try to use small print, and could be passed around by hand to convey information more readily than a stack of figures, but as a presentation medium it leaves much to be desired. It is possible to do a kind of slide show by producing images on a computer monitor screen, but this really requires a

special program to make it a job of manageable proportions. Then, too, not all monitors are capable of good screen resolution.

There isn't a great deal of difference in quality between the output of plotters on either paper or overhead transparencies, or the colour slides from the Polaroid Palette. Nor is there a great difference in price. The difference is the use to which the graphs will be put.

A plot on paper or a colour print would be best for producing a permanent record, or if you want to supply information to people in widely scattered locations. An overhead transparency would be best when you want to illustrate some point in the course of a lecture, a seminar or other presentation, and you have ac-

cess to an overhead projector, a common piece of equipment. A 35 mm slide would be best where you have a projector available, and can load the slides in advance in a suitable slide carrier. Slide projectors are not as common in offices and schools as overhead projectors, and are not as standardised, either.

To sum up, the DR Presentation Master is a comprehensive package providing a real alternative to a colour plotter. As a package it is most attractively priced, compared to its individual elements. Because of its nature and scope, it will need a lot of persistence to master it – you wouldn't put it on a manager's desk – and you have to be able to cope with the eccentricities of DR Draw. But, with those reservations, it is a good solid package. □

HOLIDAY READING

By Evan McHugh

Some time ago, in my youth and innocence and during my early days with this magazine, I allowed myself to be bamboozled into the job of 'Book Review Editor', thinking it would give me a chance to keep abreast of all the nice new publications coming onto the computer market.

Now, several months later, I've realised why the job was up for grabs, and that if no other area of the computer industry is showing a consistently upward trend at least the computer book publishing trade is positively thriving. The last few months have regularly showered a dozen or more new books a week onto my desk, which has been steadily disappearing under the pile and showing a distinct tendency to sag in the middle.

Needless to say, even my thirst for new knowledge couldn't keep up with this steady deluge of information, with the result that we have fallen considerably behind in our reviews of books. However, we didn't want all these new publications simply to become lost in the mists of time just because there aren't 30 hours in a day, so we decided, in order to give you at least an idea of the publications that have recently become available in Australia, to list all the books we had on hand, giving relevant details and a brief description of each. This list, therefore, contains the bare details of nearly 150 books that you can add to your holiday shopping list, should you have more time than I to read them all.

In compiling this list we did introduce a light selection criterion, excluding books that discussed machines not available in Australia, or which were not suitable because they gave prices throughout that were based on overseas market prices. Some of these could almost be accused of having been dumped on the Australian market, but fortunately these were very few.

We also picked out a number of books which seemed to show such excellent promise that we will review them in more depth in the near future. (That means I'll be spending my holidays reading them just so I can tell you all about them.) It was going to be our Top Ten New Computer Books, but in the end we couldn't decide between so many goodies, so there are eleven:

- *Timex/Sinclair 1000: Astronomy on Your Computer*, by Eric and Howard Burgess
- *The Hacker's Dictionary*, by various authors
- *The RS-232 Solution*, by Joe Campbell
- *The Art of Computer Game Design*, by Chris Crawford
- *Proven Techniques for Troubleshooting the Microprocessor and Home Computer Systems*, by James Coffron
- *Using the 64*, by Peter Gerrard
- *Exploring Word Processors*, by Carl Townsend
- *Computer Language Reference Guide*, by Harry Helms
- *Micropuzzles*, by J.J. Clessa
- *Beginning Forth*, by Paul Chirlian
- *Computer Crazy*, by Daniel Le Noury.

As well as these, we have several detailed book reviews already that lack of space has prevented us from publishing for the last few months; you'll find them after the list, just to get the ball rolling.

One book that didn't arrive in our office but which we'd love to hear of being published in Australia is 'Computer Wimp' by John Bear, published by Ten Speed Press in the US. We'd like to hear from its Australian publisher, if there is one; we've seen a copy of it and it's definitely worth reviewing.

It seems that dozens of computer books are being released every week, and no doubt this boom will have increased (if possible) over the Christmas and summer holiday period. The shelves of the bookshops are bulging with new titles, which means a bonanza for the novice, the well-established programmer and the frazzled, information-hungry hacker alike. The books we've listed here may just be the tip of the iceberg – but I already feel rather like the captain of the Titanic must have done, and any revelation of the other seven-eighths still to surface might just have me reaching for a plane timetable to the far north of Queensland ...



General

The Art of Computer Game Design, *Chris Crawford*, Osborne/McGraw-Hill, \$25.45. The author of some of Atari's best games shares some tips on how to write a good computer game.

Proven Techniques for Troubleshooting Home Computer Systems, *James W. Coffron*, Prentice Hall, \$23.95. How to set yourself up to detect problems and eradicate them using advanced troubleshooting techniques.

Ciarcia's Circuit Cellar, *Steve Ciarcia*, McGraw-Hill, \$34.15. A collection of computer-oriented circuit projects for hardware hackers.

The RS-232 Solution, *Joe Campbell*, Sybex Computer

Books, \$30.95. An example of a technical area explained by someone who knows what he is talking about and how to say it.

Visicalc Worksheets, *Ted Lewis*, Dillithium Press, \$37.95. Commonly used worksheets are provided for games, business, and personal use.

Computer Power for Your Law Office, *Daniel Remer*, Sybex Computer Books, \$37.95. Considers the hardware and software useful to law practices. Includes word processing, accounting, spreadsheets, communications and databases.

The Beginner's Guide to Computers & Computing, *Peter Gerrard*, Gerald Duckworth & Co, \$19.95. For the complete novice. You get a history of computing, explanation of buzzwords and an introduction to programming.

Programming for Real Beginners, *Philip Crookall*, Shiva Publishing Ltd, \$12.95. Generalised instructions on programming in BASIC. Pitched at the novice.

Computers for Everybody, *Jerry Willis & Merl Miller*, ANZ Book Co, \$11.95. A book the authors admit was written to explain computing to people like their mothers. All the details you need with very little jargon.

The Personal Computer Guide, *Tim Hartnell*, Virgin Books, \$19.95. An introduction describing the world of computing and the available machines. Also gives a quick course in BASIC.

Easy-to-Understand Guide to Home Computers, *Consumer Guide*, Publications International, \$7.95. An introduction covering basic terms, how computers work, how to determine your needs and hence, how to choose the right computer for your purposes.

First Byte - Choosing and Using a Home Computer, *Mike Scott Rohan*, EP Publishing, \$8.95. A simple introduction to computing which explains some of the uses ordinary people can put computers to, and how to program them.

Get Started on Your Micro, *Ron Oliver*, Pitman Publishing, \$7.95. A beginner's guide for people who want to write their own programs.

Overcoming Computer Fear, *Jeff Berner*, Sybex Computer Books, \$7.95. An introduction to the world of computing which

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minimises the dazzle and mystery, and gives a lucid, gentle entry to the uninitiated.

The Colour Coded Guide to Micro Computers, *Arthur Godman*, BLA Publishing, \$19.95. A general introduction to the operation of computers and how different kinds of software run on them.

The Personal Computer Handbook, *Helen Varley/Ian Graham*, Pan Books, \$16.95. How it works, communications, education, games, creativity, buying a computer, and computer-controlled homes are the main topics covered by this book.

Computers for Everybody – 3rd Edition, *Jerry Willis and Merl Miller*, Dilithium Press, \$7.95. An all-purpose introduction to the principles of computers and computing, what's available and how you can use computers.

Micropuzzles, *J.J. Clessa*, Pan Books, \$8.95. Brainteasers that are done more easily with a computer. Tests programming skill.

Computer Crazy, *Daniel Le Noury*, Sybex Computer Books, \$11.95. A collection of computer cartoons, including some classic depictions of what computing is really all about.

The Hacker's Dictionary, *Guy L. Steele & Ors*, Harper & Row, \$8.95. If you thought you knew all the computer jargon, check this out. As the book says, "Glork! A Glossary of Gweeps!".

Computing – A Bug's Eye View, *Cosgrove*, Shiva Publishing, \$9.95. Light-hearted computing cartoons, in which the bugs are in charge.

The Penguin Book of Personal Computing, *John Graham*, Penguin Books, \$9.95. An "in depth" look at how computers work, what sort of equipment you can buy for them and how to choose the right one.

The Micro Maze – A Guide to Personal Computing, *Wynford James*, Micro Press. An introduction to the microcomputer market which considers how computers work and how they can be used. It also compares a number of popular machines.

Fifty Pascal Programs, *Bruce H. Hunter*, Sybex Computer Books, \$37.95. Pascal programs for business, personal, mathematics, machine shop, electrical, mechanical engineering, games and general applications.

Microcomputer Software Buyer's Guide, *Tony Webster & Richard Champion*, Computer Reference Guide, \$24.95. A comprehensive analysis of all the major business packages available on the Australian market.

Easy-to-Understand Guide to Word Processing, *Consumer Guide*, Publications International, \$7.95. Explains the basic system requirements for word processing, and considers some of the hardware and software options.

Everyone's Guide to BASIC, *Consumer Guide Staff*, Publications International, \$7.95. The fundamentals of all versions of BASIC are covered in this general introduction, along with examples and exercises.

A Parent's Guide to Personal Computers & Software, *Danny Goodman*, Publications International. A guide for parents trying to choose the right computer and software for their children.

Portable Micro-Computers, *Various*, Deloitte, Haskins & Sells, \$14.95. Checklists to help you shop, portables available in Australia, business-oriented equipment – all are covered by this locally produced book.

Computers for Everybody – 1984 Buyer's Guide, *Jerry Willis and Merl Miller*, Dilithium Press, \$19.95. Assesses the range of computers available and the software which runs on them.

The Best of CP/M Software, *John D. Halamka*, Sybex Computer Books, \$28.95. A guide to some of the best business and home packages running under CP/M.

Exploring Word Processors, *Carl Townsend*, Dilithium Press, \$26.95. Reviews of the ten best word processors running under CP/M, and evaluations of the hardware on which they run.

Computer Language Reference Guide, *Harry L. Helms*,

Howard W. Sams, \$9.95. Principles, keywords and features of ALGOL, BASIC, C, COBOL, FORTH, FORTRAN, LISP, Pascal and PL/1.

Beginning FORTH, *Paul Chirlan*, Matrix Publishers, \$30.95. Describes FORTH's relationship to other languages, how to debug and edit it, and, of course, how to program in it.

Portable Computers, Choosing One and Using One, *Sheldon Crop – Doug Mosher*, Sybex Computer Books, \$14.50. Includes a market guide, explanations of how portables work, and examples of real people putting them to real uses.

Personal Computers & Games, *Consumer Guide Staff*, Publications International, \$7.95. Introduction to the classics of each game genre, and details of the rest of the best. Covers adventure, educational, maze, and other themes.

Logo, *Anne Sparrowhawk*, Pan Books, \$16.95. Teaches the Logo language and concentrates on the application of the principles of the language in the classroom and beyond.

Real World Unix, *John D. Halamka*, Sybex Computer Books, \$32.95. An overview of the Unix operating system with special emphasis on its use on mini- and microcomputers destined for database management, word processing and electronic mail applications.

Introduction to C, *Paul M. Chirlan*, Matrix Publishers, \$32.95. Comprehensive instruction in the C programming language, with programming examples emphasising documentation and structured programming.

The Big Fat Book of Computer Games, *Tim Hartnell*, Interface Publications, \$19.95. A variety of games in BASIC that can be easily adapted.

Software for Microcomputers – A Businessman's Guidebook, *Deloitte Haskins & Sells*, \$12.95. Details of the most popular accounting, database, financial modelling and other packages, plus a section outlining how to go about choosing software.

The ABC's of 1-2-3, *Chris Gilbert and Laurie Williams*, Sybex Computer Books, \$23.50. An introduction to building a spreadsheet, database and macros – helps beginners to start creating their own applications.

Mastering Symphony, *Douglas Cobb*, Sybex Computer Books, \$49.95. An introduction for the beginner, which covers spreadsheets, word processing, databases, graphics and communications, including highlighted sections explaining the differences for previous users of 1-2-3.

The Word Processing Handbook, *Katherine Aschner*, Pan Books, \$8.95. The principles, problems, pitfalls and good points of word processors explained – plus a how-to guide on how to select the right package for your needs.

Electric Pencil, *Michael Shroyer*, IJG Inc, \$53.95. An operator's manual for the Electric Pencil word processor, including special tricks and tips.

Apple

The Penguin Book of Apple Games, *Rohan Cook and Tim Hartnell*, Penguin Books, \$12.95. An assortment of arcade, board and fantasy games.

Your First Apple II Program, *Rodnay Zaks*, Sybex Computer Books, \$24.95. An entertaining introduction to basic programming on the Apple.

The Apple II BASIC Handbook, *Douglas Hergert*, Sybex, \$26.95. The hacker's helper, this book provides all the necessary commands, plus some helpful tips and instruction on how to improve your programming.

The User's Guide to Apple IIe and II Plus Computers, *Consumer Guide*, Publications International. A description of how to set up and run your Apple computer.

The Apple Connection, *James W. Coffran*, Sybex Computer Books, \$26.95. Teaches the basics of interfacing the Apple with external devices, and how to improve your I/O processing techniques. ▶

HOLIDAY BOOKS

The Easy Guide to Your Apple II, *Joseph Kaszmer*, Sybex Computer Books, \$18.95. Introduces programming on the Apple IIe and II+, and explains the use of many commercially available software packages.

Presenting the Macintosh, *Merl K. Miller and Mary A. Myers*, Dilithium Press, \$9.95. Describes what a Macintosh is, what it does and looks at some of its unique software in action.

The Best Apple Software, *Consumer Guide Staff*, Publications International, \$10.95. Descriptions of the best word processing, business, home, educational, network, game and programming software available.

88 Apple Logo Programs, *Mitchell Waite, Don Martin and Jennifer Martin*, Howard W. Sams & Co., \$22.50. An introduction to programming with Logo, along with a collection of utilities, graphics, games, database and business software.

Apple II Basic Programs in Minutes, *Stanley R. Trost*, Sybex, \$24.95. Ready to run software for home finance, business, real estate, data analysis, record keeping and education applications.

Apple Pascal Games, *Douglas Hergert, Joseph T. Kalash*, Sybex, \$19.95. Entertainment with Pascal programs which not only cover a variety of playing styles, but also teach the fundamentals of Pascal programming.

32 Basic Programs for the Apple Computer, *Tom Rugg and Phil Feldman*, Dilithium Press, \$29.95. The title says it all.

An Apple for Kids, *Sharon Boren*, Dilithium Press, \$12.95. Written by a teacher, this book shows kids computer operation, and programming in BASIC using good structured techniques.

The Apple in Your Hand, *E. Floegel*, Hofacker, \$25.95. An introduction to the Apple with applications in BASIC, Forth and Machine Language.

Shake Hands with the Apple IIe, *Pam Kell-Hartley and Joy*

McKneil, Pitman Publishing, \$12.95. An Australian book that guides the first-time user in setting up and using the Apple IIe.

Atari

Your First Atari Program, *Rodnay Zaks*, Sybex Computer Books, \$24.95. Bright, entertaining instruction in BASIC programming on the Atari.

Mastering The Atari 600XL, 800XL, 400 & 800, *Darryl Severn*, Interface Publications. A guide to all the features of the Atari, covering graphics, games, and data handling with the inbuilt BASIC.

The User's Guide to Atari, *Consumer Guide*, Publications International. An explanation of setting up the computer, connecting peripherals and getting the whole system to do things.

The Atari 600XL Program Book, *Peter Goode*, Phoenix Publishing, \$19.50. Arcade, adventure and puzzle games, as well as catalogue and personal finance programs.

Atari Graphics, *Various*, Compute Books, \$20.00. Graphics-oriented games, tutorials and programs compiled by the staff of *Compute!*.

Atari - Basic Programs in Minutes, *Stanley R. Trost*, Sybex Computer Books, \$23.50. Programs for the home, business and education.

32 Basic Programs for the Atari Computer, *Tom Rugg, Phil Feldman, Timothy Barry*, Dilithium Press, \$19.95. A collection of education, games, graphics and mathematics programs.

BBC Micro

Let Your BBC Micro Teach You to Program, *Tim Hartnell*, Interface Publications, \$19.95. This book starts by giving instruction in the general principles of BASIC, and of programming as a whole, and then discusses the BBC's special features.

Exploring Adventures on the BBC, *Peter Gerrard*, Duckworth & Co., \$19.95. The theory of adventure programs and how to

write them. Includes some sample adventure scenarios and lists programs for three adventures.

Brainteasers for the BBC and Electron Computers, *G. Ludinski*, Phoenix Publishing, \$19.50. Test your skills in logic, general knowledge and mathematics with programs you type in from the book.

BBC Micro Assembly Language, *Bruce Smith*, Shiva Publishing, \$24.95. An earthy, friendly description of the principles and techniques of 6502 Assembler programming on the BBC.

Quality Programs for the BBC Micro, *Simon*, Micro Press, \$23.95. Eighteen programs covering education, games, graphics, and mathematics - complete with documentation explaining the techniques used.

The BBC Micro in Education, *Eric Deeson*, Shiva Publishing, \$19.95. Computing-and-education with a BBC slant.

Commodore

A Pet for Kids, *Sharon Boren*, Dilithium Press, \$12.95. Fundamental programming techniques are demonstrated by a teacher.

Commodore 64 Assembly Language, *Bruce Smith*, Shiva Publishing, \$25.50. Exploiting the capabilities of the machine through an easy introduction to Assembly language programming.

Exploring Adventures on the VIC, *Peter Gerrard*, Gerald Duckworth & Co., \$19.95. The theory of adventure games, example scenarios and programs are all included in this book.

Exploring Adventures on the Commodore 64, *Peter Gerrard*, Gerald Duckworth & Co., \$19.95. Adventure game theory is outlined, with some sample scenarios for you to program and three example adventure listings.

Key into Your VIC 20, *Albert Sickler*, W. Foulsham & Co. Ltd., \$17.95. Introduces the novice to general programming and then applies these lessons to the VIC-20.

Your First Commodore 64 Program, *Rodnay Zaks*, Sybex, \$22.50. An entertaining way to learn about programming your Commodore 64 in BASIC.

Brainteasers for the Commodore 64, *G. Ludinski*, Phoenix Publishing Association, \$20.95. Type in the program and get your grey matter working on the resulting questions.

The Penguin Book of Commodore 64 Games, *Robert Young & Paul Copeland*, Penguin Books, \$12.95. Pit your wits against a collection of imagination, board and arcade games.

Commodore 64 Games, *Kevin Bergin, Gerald Duckworth & Co.*, \$19.95. A collection of 21 games to type in - you can play golf, snake, air attack, draughts and others.

VIC BASIC - A User-Friendly Guide, *Ramon Zamora, Bob Albrecht, Don Inman & Dymax*, Reston Publishing, \$23.95. How to exploit the features of inbuilt BASIC on the VIC-20. Special attention is given to graphics, colour and sound.

Getting The Most From Your VIC-20, *Dennis Jarrett*, Penguin Books, \$10.95. Programming on the VIC, including special emphasis on graphics and sound, details of useful additions, troubleshooting, and getting the equipment going.

Using The 64, *Peter Gerrard*, Gerald Duckworth & Co., \$29.95. BASIC and machine code instruction sets, along with details of key processors in the machine.

Your First VIC-20 Program, *Rodnay Zaks*, Sybex, \$23.50. An entertaining approach to learning how to program in BASIC.

Easy Programming for the Commodore 64, *Ian Stewart and Robin Jones*, Shiva Publishing, \$19.95. An introduction to Commodore 64 BASIC programming with a variety of example programs.

Getting Acquainted with your VIC-20, *Tim Hartnell*, Interface Publications, \$19.95. A collection of over 60 programs which exploit the capabilities of the VIC.

HOLIDAY BOOKS

The Easy Guide to your Commodore 64, *Joseph Kasmer*, Sybex, \$18.95. An introduction to the operation and programming of your C64. Covers graphics, disk drives, forecasting and simulation, customisation and expansion.

A Pocket Handbook for the Commodore 64, *Peter Gerrard and Danny Doyle*, Gerald Duckworth & Co, \$8.95. All the little technical details collected in one place so you can get at them easily while hacking in the wee hours of the morning.

A Pocket Handbook for the VIC, *Peter Gerrard & Danny Doyle*, Gerald Duckworth & Co, \$8.95. Similar to the above, but for the VIC.

The Commodore 64/VIC-20 BASIC Handbook, *Douglas Hergert*, Sybex, \$26.95. Introduces the features of Commodore and VIC BASIC, and explains how best to utilise them.

More on the Sixty-Four, *H.C. Wagner*, Elcomp Publishing, \$19.95. An in-depth look at recursive programming, RS232 and Centronics interfacing, and analogue to digital converters.

The VIC-20 Connection, *James W. Coffron*, Sybex Computer Books, \$17.95. How to get the VIC to control a voice synthesiser, a home security system, a home temperature system and other home appliances.

Commodore 64 Tune-up, *E. Floegel*, Ing. W.Hofacker GmbH, \$25.95. Expansion, customisation and experimentation on a Commodore 64.

More Than 32 Basic Programs for the Commodore 64 Computer, *Tom Rugg and Phil Feldman*, Dillithium Press, \$29.95. Thirty-two-and-a-half (well, what else could it mean?) education, games, graphics, mathematics and miscellaneous programs.

The Best of VIC-20 Software, *Thomas Blackadar*, Sybex Computer Books, \$14.50. A collection of reviews of VIC-20 games, music, education, and home management software.

Commodore 64 Basic Programs in Minutes, *Stanley R.*

Trost, Sybex Computer Books, \$23.50. Ready to use programs for home finance, business, real estate, data analysis, record keeping and education.

The Best VIC/Commodore Software, *Consumer Guide*, Publications International, \$10.95. Reviews of programs for Commodore machines, including: word processing, business, home, education, networking, games and programming aids.

More than 32 Basic Programs for the VIC-20, *Tom Rugg, Phil Feldman and Clarence S. Wilson*, Dillithium Press, \$29.95. Thirty-two-and-a-third well-documented programs, from games to business applications, with suggested modifications.

The Great Book of Games, *Franz Ende*, Hofacker, \$19.95. This book has listings of 46 games, an introduction to graphics and sound, and suggestions for writing your own games.

The Commodore 64 Program Book, *Vince Apps*, Phoenix Publishing, \$15.95. Adventure and arcade games, including a flight simulator, and some utilities.

The Big Fat Book of Commodore 64 Games, *Tim Hartnell and Brett Hale*, Interface Publications, \$19.95. A collection of over 30 games for the Commodore.

The Bumper Book of Games for the Commodore 64, *William A. Roberts*, Interface Publications, \$9.95. Over 20 games for the Commodore 64, including Robots of Xerxes, Checkers, Demolition Derby and Karzalen Attack.

The Complete VIC ROM Disassembly, *Peter Gerrard and Kevin Bergin*, Gerald Duckworth and Co, \$19.50. A guide for the serious programmer, this book includes a memory map and covers memory architecture, disassembly and the 6510 instruction set.

IBM PC

Basic Exercises for the IBM Personal Computer, *J.P. Lamoitier*, Sybex Computer Books, \$23.50. Step by step in-

struction in BASIC programming, centred around 'learning by doing' exercises.

Science & Engineering Programs for the IBM-PC, *Cass Lewart*, Micro Text Publications, \$19.95. Examples of number theory, applied mathematics, probability and statistics, electrical engineering and operations research programs.

More Than 32 Basic Programs for the IBM Personal Computer, *Tom Bugg and Phil Feldman*, Dillithium Press, \$29.95. A variety of programs on all the usual topics, with documentation, suggestions of modifications and a separate diskette.

Sinclair

Exploring Adventures on the Spectrum 48K, *Peter Gerrard*, Gerald Duckworth & Co, \$19.95. Explains the theory of adventure games, and gives some example scenarios and listings of typical adventure programs.

Getting The Most From Your Sinclair Spectrum, *Anne Sparrowhawk*, Penguin Books, \$10.95. How it works, writing programs, choosing peripherals, buying software, troubleshooting, and screen and music programming.

The Timex/Sinclair 1000 BASIC Handbook, *Douglas Hergert*, Sybex Computer Books, \$14.50. A ready reference for BASIC keywords and function keys. Includes syntax examples and code optimisation suggestions.

15 Graphic Games for the Spectrum, *Richard G. Hurley*, Micro Press, \$21.95. Add the word 'good' and the title says it all.

Making the Most of your Spectrum Micro Drives, *Richard G. Hurley*, Micro Press, \$21.95. Software which takes advantage of microdrives on the Spectrum.

Instant Arcade Games for the Sinclair ZX Spectrum, *Jean Frost*, Pan Books, \$12.95. Not just a book of games to type in, this one also includes explanations of how programs fit together and how they can be

modified using a structured approach.

Your Timex Sinclair 1000 and ZX81, *Douglas Hergert*, Sybex Computer Books, \$13.95. A general introduction which covers setting up and running the machine, using the inbuilt BASIC, and using a number of programs listed in the book.

Control Things with Your Timex Sinclair, *Robert L. Swarts*, Dillithium Press, \$6.95. Explains how to interface your computer with the real world, and gives descriptions of clocks, temperature sensors and external device drivers.

Timex/Sinclair 1000 Basic Programs in Minutes, *Stanley R. Trost*, Sybex Computer Books, \$14.50. Numerous home applications programs to help with finance, real estate and education.

More Uses for Your Timex/Sinclair 1000: Astronomy, *Eric Burgess, Howard J. Burgess*, Sybex Computer Books, \$17.95. Time, Moon, planet and general utility programs for the astronomy enthusiast.

The Spectrum in Education, *Eric Deeson*, Shiva Publishing Co, \$19.95. Starting with an explanation of microcomputers, this book deals with using the Spectrum in the classroom, and general computing and education issues.

TI-99 4A

Mastering The TI-99, *Peter Brooks*, Micro Press, \$5.95. Covers TI BASIC and programming concepts, explains jargon, and gives special attention to file handling and graphics.

How to use the TI-99/4A Computer, *Bill Brewer & Jerry Wills*, Dillithium Press, \$11.95. Another source of information, other than manuals, on how to set up and understand the TI. Includes a quick tutorial on TI BASIC.

The User's Guide to Texas Instruments, *Brian Starfire*, Publications International, \$7.95. This book covers setting up the machine, connecting equipment, programming and running software packages. ▶

HOLIDAY BOOKS

Get Personal with Your TI-99, William A. Manning, Lon In-galsbe, Dilithium Press, \$9.95. An introduction to the basics of programming in TI99/4A BASIC.

How to use the TI-99/4A Computer, Bill Brewer & Jerry Willis, Dilithium Press. A guide to setting up the machine, typing in your own programs and running them.

The Best of Texas Instruments Software, Consumer Guide Staff, Publications International, \$10.95. Reviews of programs in the areas of education, games, business, word processing, and home and personal applications.

The Best of TI-99/4A Cartridges, Thomas Blackadar, Sybex, \$18.95. A guide to the selection of TI program cartridges in home management, education, games and programming.

Your First TI-99/4A Program, Rodnay Zaks, Sybex, \$24.95. An entertaining introduction to BASIC programming on the TI-99/4A.

Tandy Model 100

The Radio Shack Notebook Computer, Orson Kellogg, Sybex, \$16.95. Programming on the Model 100, and how to use it for communications and data transfer.



The 3-D Animated Apple – By Phil Cohen

Reviewed by
Darren Challis

WITH increasing emphasis now being placed on faster high-res (high-resolution) graphics for the Apple II family of computers, it is good to find a book which sets out to teach users how to make the most of the machines' capabilities. It is even more pleasing to find the author is Australian!

In the first chapter of this book, the author introduces shape tables in a simple but straightforward manner. The second chapter deals neatly with 'Figures in Two Dimensions'; in other words, Cohen shows how to plot the shape table's figures onto the screen. The final chapter cleverly introduces and develops the concept of displaying 'Three Dimensions' on a two-dimensional screen; it starts with the concept of vectors and how to project them, explains how to use these concepts in programs, and then proceeds to expand the user's perception of how to use three-dimensional shapes.

There are a few programs in the book. Most are shape

table utilities, one of which is very similar to 'Shape Editor' on the Beagle Brothers' 'Apple Mechanic' disk. All Cohen's programs are available on a disk from the publishers (Prentice-Hall, 7 Grosvenor Place, Brookvale 2100), for \$12. The book itself costs only \$14.95, at a time when most computer books cost over \$20.

I believe *The 3-D Animated Apple* effectively achieves what it set out to do. Virtually any Apple user should be able to use it, and gain significant benefit and knowledge in the process. This is one book which appears to be well worth the money and whose purchase I would recommend.

Graphics Guide to the Commodore 64 – By Charles Platt

Reviewed by
Andrew Farrell

THIS is an A to Z guide to graphics, which assumes you know nothing about programming. By the same token, it doesn't leave you feeling your intelligence has just been insulted – there's plenty of meat for the more experienced.

The first few chapters cover

exactly what graphics are all about, and how they're implemented on the Commodore 64. There are a few demonstration programs covering several vital principles of animating objects and controlling their direction. Chapter Six turns your attention to sprites, and from here on *Graphics Guide to the Commodore 64* leaves most other books for dead. The illustrations are especially well presented – not too busy to understand, and with simple labels.

The sample programs given all produce very realistic results. For example, say you want to design a spaceship: you'll need it to be able to point in several directions; and you'll probably want it to explode, which means you also need bullets and a tank. Where to put all those images and how to get them working together is very carefully explained by Platt.

One section which was of particular interest to me covered the generation of large headings. Two methods of creating them are explained: one uses the standard Commodore graphics set and another uses a redefined set. Once again a useful program is supplied, which is aptly named 'Headline Generator'.

To top it all off, there are some useful appendices and

a sprite editor, which make this a very pleasing book on all aspects of Commodore graphics. I would recommend it to anyone who wants to understand more about graphics, or to the absolute beginner who is still struggling with the user manual. Some of the best explanations I've read yet.

Graphics Guide to the Commodore 64 is published by Sybex and costs \$30.95. It is distributed in Australia by the ANZ Book Co, 10 Aquatic Drive, Frenchs Forest 2086 (phone (02) 452 4411).

The Australian Guide to Lotus 1-2-3

– By Owen Bishop

Reviewed by John Nicholls

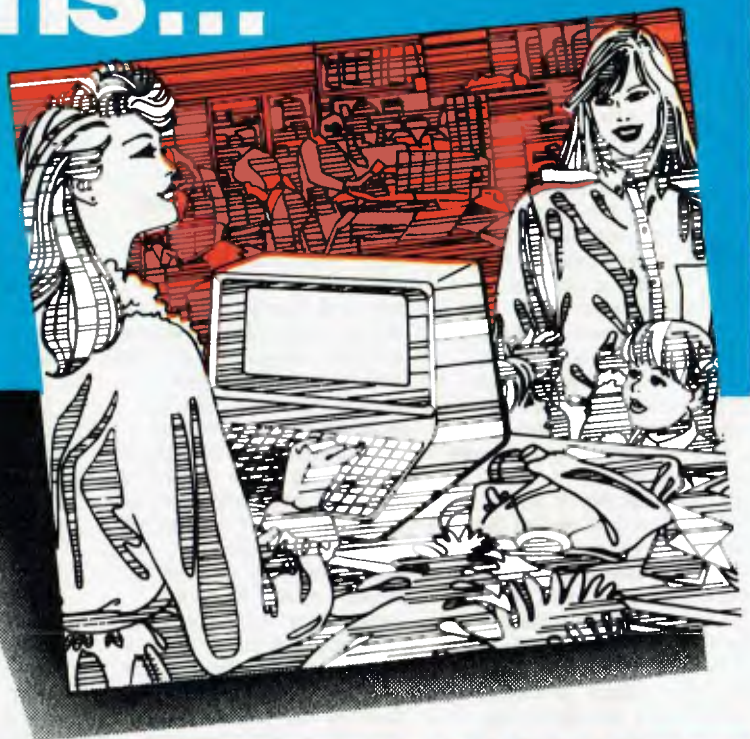
WHEN you buy Lotus 1-2-3 you get a wealth of training and reference material: a 'Getting Started' manual, a 360-page reference manual, a Tutorial Disk, a quick reference card, and more than 200 on-line help screens. Generally speaking, the tutorial gives a somewhat superficial view of the program, and the reference manual and help screens cover the fine points in great, even excessive, detail. Thus, ▶

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you may feel there is a gap between too little given information and too much. It is this gap that *The Australian Guide to Lotus 1-2-3* seeks to fill.

The Guide comes in a 90-page A4-size spiral-bound volume with an optional disk inside. The disk contains models in which parts of the exercises in the Guide are already prepared, so you can concentrate on the exercise without a lot of typing. The Guide is divided into six sections: Introduction, Installation, Moving Around a Worksheet, Creating a Worksheet, Advanced Concepts, and Practical Exercises. There is also an index of reasonable size.

Frequently throughout the text you are advised to do one of the exercises in Part Six. I found it somewhat irritating having to keep changing between one part of the Guide and another, but the format used here makes good sense for a reference manual. Further reference is made throughout the exercises to the numbers of a set of 35 mm slides which show exactly what you should see on the screen. Judging by the numbers, there are over a hundred slides in this set. I would expect these slides to be of limited value, and would prefer to see references to page numbers of the Lotus manual — in the same way page numbers are shown on all of the Lotus help screens.

The author has done a fine job in bringing the Lotus manual down to a more comfortable size, and it is only on some fairly minor points that I find myself in disagreement. He doesn't seem overimpressed with the Lotus Help facility, discourages the use of 'pointing' to specify a range, and doesn't mention how to select a menu choice by typing the first letter of a command until very late in the Guide. Printing is rather glossed over in the Guide itself, although it is covered in more detail in the exercises.

It's a pity the good quality of the writing is not reflected in the presentation of the manual. The whole book is

produced from the output of a dot matrix printer, and does not have a professional appearance. Most of the illustrations are from the Lotus manual and are quite good.

This book is a bargain at \$14.95 for the Guide alone, or \$24.95 for the Guide and diskette (IBM PC format). The book is obtainable from booksellers or from Computer Tutor, 17 Mountview Avenue, Parkdale 3195. □

Simple Interfacing Projects

— by Owen Bishop

Reviewed by Tom Moffat

REMEMBER the good old days, back about five years ago? We used to wait on pins and needles for the arrival of the latest overseas computer magazines and their descriptions of the new gizmos we could build to hook up to our computers. Well, things have changed now. Those same magazines exist, but now they seem to prefer reviews of commercial computer systems and accessories that most of us couldn't afford. As to the gentle art of 'home brewing', it's pretty well dead. Or is it?

Simple Interfacing Projects provides a series of satisfying fixes for the hardware junkie who has recently been so badly deprived. It's full of all sorts of gadgets of both entirely conventional and gloriously way-out design. You'll enter the world of address lines and data lines, and all those other little copper tracks inside your computer which you never knew the meaning of before. And in keeping with this spirit, even chapter numbers start with 0, instead of 1.

Chapter 0 gives a general overview of how you connect a micro to the outside world. There's a good description of how to arrange an address decoding scheme, if you choose to plant your new accessory directly into the computer's memory map. The book stresses the importance

of buffering to ensure proper logic levels; and of decoupling any new chips you might add, to prevent them radiating unwanted signals throughout the computer.

One of the projects shows how you can add a 6821 PIA chip, which could then be used as a parallel port to drive just about anything. Chapter 0 discusses the Z-80 processor's special IN/OUT features, which can also be used to provide parallel ports independent of the main memory map. But here the author appears to get slightly bamboozled. His description of how the Z-80 selects main memory or IN/OUT addresses does not agree with other published descriptions, including the one in the 'official' Zilog data manual. Anyone intending to use this book in conjunction with a Z-80 system should consult another text before they begin.

As to the projects in the book, it's unlikely many constructors will copy them exactly as they appear. This is not a criticism, it simply means that most people will pinch some of the ideas and then do their own thing. A case in point is an 'electric kettle controller'. Now there must be a better way of turning your kettle on than running your computer all night, every night. But what the project actually shows is a way of deriving a signal when certain address lines are active, and how to amplify the signal so it can do useful work. So it's really a multi-purpose project. For instance, it would make a highly original detonator for a nuclear bomb, if you happened to own one.

One project likely to be used 'as is' is a real-time clock, based on a MMS8174 chip. You send it certain commands and it returns the time, and the date, day of week, month and year. The project gives the full software details of how to drive the chip, and it looks like a very handy accessory indeed. Here's hoping the chip is available in Australia.

Back to the overseas

magazines for a moment: we've all seen those glossy ads for graphics tablets and digitisers — you draw on the tablet, and your efforts are converted to proper screen graphics. But once again they involve big dollars, duty, sales tax and so on. *Simple Interfacing Projects* has construction details for these gadgets, too, although they're somewhat down-market versions. In fact, the book suggests these devices could be built from such materials as wood! Well, what's wrong with that? Isn't it better to have a wooden graphics tablet than no graphics tablet at all?

We won't have enough space here to describe every project in detail, but there are a couple more that must rate a mention for sheer originality. One is a sound processor, a gadget using A to D and D to A converters, to let you store sounds in the computer's memory. Nothing unusual in that, but the project then sets out programming methods to make the device act as a digital delay line, an echo chamber, a digital filter, and how to make it perform Fourier analysis. Some really profound thinking has gone into this one.

The other project is a 'voice-operated controller'. It looks simple enough, but it uses an unusual method of breaking down sounds which, with a bit of development, could result in a speech recognition system that actually works.

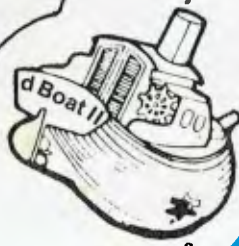
Simple Interfacing Projects opens up the world beyond the big plug on the back of your computer called 'expansion interface' or similar. The projects are simple, but you'll still need a bit of skill with a soldering iron to bring them to life. Perhaps a good idea would be to buy and build some small electronics kit, just to get your feet wet. That may be all that's needed to get you well and truly hooked on hardware.

This book, published by Granada (London), is distributed by William Collins, 55 Clarence Street, Sydney 2000; and retails for \$12.95. □

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1983: Universe introduces dual 8/16 bit processing. Development work on high speed Multiuser operating systems culminates in release of MP/M 8-16, catering for simultaneous use of 8 and 16 bit software by multiple users.

1984: Development work at AED on 80286 processor results in sub-mini performance from Universe. AED wins government grants for earlier MPS work and further grants for work on I/O/File processor. UNIX is currently being implemented on Universe.

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UNIVERSE SUPERCOMPUTER

This month, Les Bell checks out the latest on the operating system front with a look at DOS 3.0 for the IBM PC family and Digital Research's Concurrent PC DOS, and gives advance notice of the 'micro event of the year'...

PROGRAMMER'S WORKBENCH

PC '85

Make a note in your diary now for the 13th to 16th March 1985. Centrepoint, Sydney, will be the venue for the PC '85 Exhibition, with a parallel conference, organised by the New South Wales Branch of the Australian Computer Society, taking place at the Masonic Centre in Goulburn Street.

The conference is shaping up to be the micro event of the year, with a list of top speakers from Australia and overseas. Heading the list are US venture capitalist and chairman of Compaq Computers, Ben Rosen, and the founder of Micropro International, Seymour Rubenstein.

Australian speakers will include Gary Blom, of Attache Software on industry trends, David Angeloro on PC security and protection, and Roger Clarke of the ANU on system development aids. A speaker from OTC will demonstrate the latest in communications through networks, and yours truly will talk about PC selection.

Other topics to be addressed include small-user experience with PC's, micro to mainframe communication, graphics, managing PCs in the corporate environment and the software industry shakeout.

A major social event during the conference will be the delegates' cocktail party, sponsored by *Your Computer*, during which the Computer of the Year will be announced.

You can register for the conference by writing to the Australian Computer Society, New South Wales Branch, 1st floor, 72 Pitt Street, Sydney 2000. Early-bird registration (before 14th



Last year's Computer of the Year award was won by the Apple Lisa. This picture shows Les Bell presenting the award to managing director of Apple Australia, David Strong.

February) is \$360 for ACS members, \$395 for non-members; after that date it increases to \$415 for members and \$450 for non-members. For further details phone the ACS on (02) 233 7677.

The Exhibition, at Centrepoint, will be full of the latest hardware and software from the top companies.

Concurrent DOS

Concurrent CP/M has given birth to a successor: Concurrent PC DOS. Realising that the vast majority of IBM PC software packages are designed to run under PC DOS, Digital Research has set out to provide a means of running this software under Concurrent CP/M. The result is Concurrent PC DOS version

3.2, a new operating system which can run both CP/M and PC DOS programs.

Concurrent PC DOS can sense whether a disk is in CP/M or DOS format, and read and write appropriately. It can also distinguish between .COM, .EXE and .CMD files, and responds to the different sets of operating system calls appropriately. The result of all this is that, as far as the user is concerned, you can simply insert a disk and run the programs with no concern about which operating system to use.

Well, almost. Some programs – particularly those which are on copy-protected disks – will not run. Those which address the DOS buffers directly will not find them, and

PROGRAMMER'S WORK BENCH

programs which use the DOS 2.0 file handles will also run into difficulties. But the good news is that this version of Concurrent PC DOS recognises and uses hierarchical directories.

Digital Research has stated its intention of supporting the top 20 most popular PC applications, such as Lotus 1-2-3, dBase II and others.

Concurrent comes with a number of utilities, most of them versions of programs previously sold by other companies. For example, ED is gone (Hooray!). In its place is DR-EDIX, a full screen editor with much more sophisticated capabilities and of much more use to the average (particularly first-time) user.

For the user who wants some simple database capabilities, DR-CardFile allows the creation of simple files which can be searched and scrolled through, rather like a Rolodex. And since communications is increasingly important today, the package is supplied with DR-Talk, a modem communications program which bears a suspicious resemblance to PC-Talk.

A program called File Manager allows the user to clean up disks by moving files around, deleting them and backing up, all through a menu-driven user interface. In fact, this is the major difference between Concurrent DOS and PC DOS, from the user's point of view: most of the Concurrent Utilities are menu driven and make heavy use of the PC function keys.

All these utilities are a cut above the usual standard utilities supplied with PC operating systems in the past. But Concurrent still has further tricks up its sleeve.

A common requirement is to just have a quick look at a file while someone else is using the machine. On conventional single-tasking operating systems, this means the other person has to interrupt their work, close all files and give up their seat while you zip and check something, then resume again. With Concurrent DOS, this is not necessary, as a second terminal can be attached and used at the same time as someone else is working at the main screen. Of course, this second terminal will not support graphics, but it will run WordStar or dBase quite happily.

In many other ways, Concurrent is

quite similar to PC DOS; for example, there's an AUTOEXEC.BAT file which is executed upon startup. SUBMIT has gone, and is replaced by BATCH which is automatically invoked when required to run batch files.

Concurrent DOS is really not suitable for use on floppy-only systems; many of the commands which were built-in in earlier versions of CP/M and DOS (like TYPE) are now programs, and these have to be on-line virtually all the time. In addition, if you want to run four programs at a time, you will generally need to have overlay files or screen files available, and this is just not possible with floppies only.

DOS 3.0

The latest operating system for the IBM family of PC's has been released and I've had an opportunity to play around with it. DOS 3.0 adds a number of new features and can drive the new hardware features of the PC AT.

DOS has been given a major internal reorganisation in readiness for the introduction of networking. It still has no concurrent or multi-tasking capabilities, but has a new command, SHARE, which loads a file-sharing extension to DOS. Block locking provides the ability to restrict access to all or part of a file when the file is opened in a shared mode. The manual is not clear at all about how multiple users are supposed to share files on a single-tasking operating system, but the command is there all right. Maybe it's part of DOS 3.1 that crept in ahead of time.

Other new commands include ATTRIB, which is used to set and display the read/only status of a file; LABEL, which is used to set volume labels on disks; and SELECT, which allows you to set up the appropriate date and time format and keyboard layout for a particular country.

Some new options for the CONFIG.SYS file allow you to install a virtual disk drive in memory, specify the last disk drive DOS can access and specify the number of file control blocks that can be concurrently open. The virtual disk drive feature is particularly potent on the AT, since drives can be established above the bottom megabyte of memory, where they can be bigger and will not

interfere with operation of DOS programs in the bottom of memory.

DOS 3.0 also supports other AT features: the 1.2Mb diskette drives, non-volatile real-time clock, and the larger, 21Mb fixed disk. The BASIC interpreters now have additional commands to support the AT hardware, and additional access to device drivers and DOS from BASIC programs. A new large model linker can handle programs up to 1Mb.

A number of commands have been enhanced or fixed: for example, FORMAT (and the rest of DOS) now supports the 1.2Mb quad-density drives on the AT, BACKUP and RESTORE are more versatile than previously, and DATE now supports three different date formats. The GRAPHICS command now supports the full range of IBM PC printers, including the colour printer.

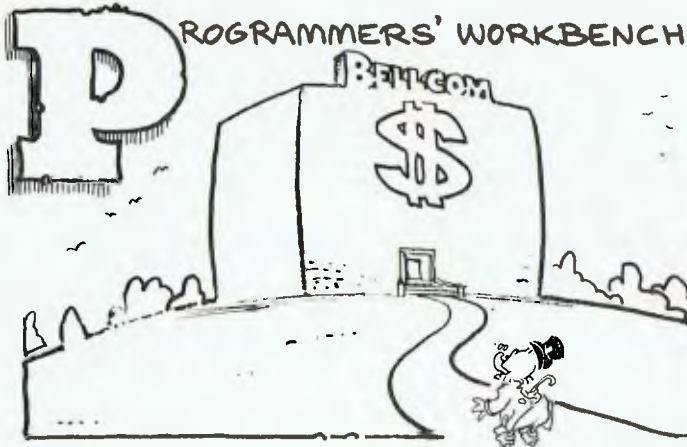
The DOS 2.1 PRINT command has been modified, and now supports path specifications and an internal programming interface. Additional function calls for interrupt 21H provide enhanced file management.

Overall, it is hard to see any difference, in practical terms, between DOS 2.1 and DOS 3.0. If you are currently using DOS 2.1, don't rush out and buy DOS 3.0; the chances are that you already have virtual disk through the software supplied with your multifunction card and can change volume labels using the Norton Utilities. IBM itself states that DOS 3.0 is not a replacement for DOS 2.1.

DOS 3.1 support code to be used by DOS 3.1 is present in DOS 3.0 and accounts for a significant portion of the storage increase from DOS 2.1. Because DOS 3.0 is bigger than DOS 2.1 (36K versus 24K) it will not fit on the reserved area of copy-protected disks and so should *not* be copied onto them (using the SYS program). No problem; just boot with DOS 3.0 first and then change disks to run the application.

However, in the US at least and possibly here, all DOS 3.0 users will receive an upgrade to DOS 3.1, the networking version of the operating system.

So, all in all, DOS 3.0 does not represent a great leap forward; it's just another step in the gradual evolution of DOS. □

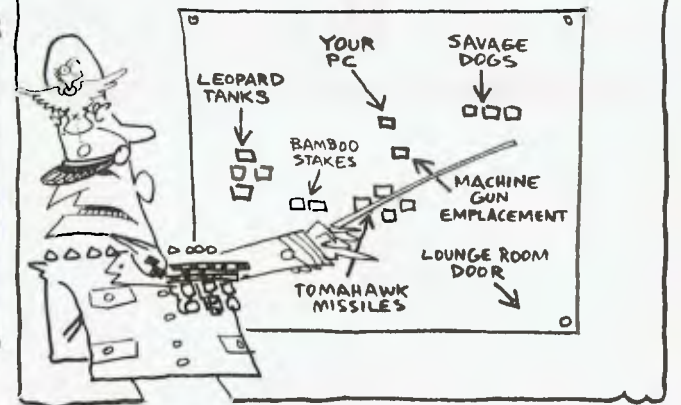


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BEEP! BEEP!

Watch out for the Roadrunner

AS A LONG-TERM user of micro systems with bells and whistles, it takes a lot to get me excited about Yet Another Micro. Yet this one has done just that. I have had my hands on this unit for less than ten minutes, and am already typing the first draft of this article – it's that easy to use.

Like most Australians, I have this unfortunate habit of lurching straight into the hardware, reaching for a manual only when the smoke starts to curl. Yet not too many micros, even ones with 'tailored personalities', let you get anywhere without an initial dose of indoctrination.

The RoadRunner certainly does have documentation (more on that later), but it has been so engineered that anyone with a reasonable amount of nous can dive straight in. The keyboard is clear and well laid out. Special keys are set aside for HELP, MENU, SAVE and EXIT, as well as eight function keys. The legends F1 to F8 appear just below the LCD screen to correspond with the displayed menu options. The designers have bypassed the normal Command Console Processor (CCP) without sacrificing any of CP/M's operational functionality. For each of

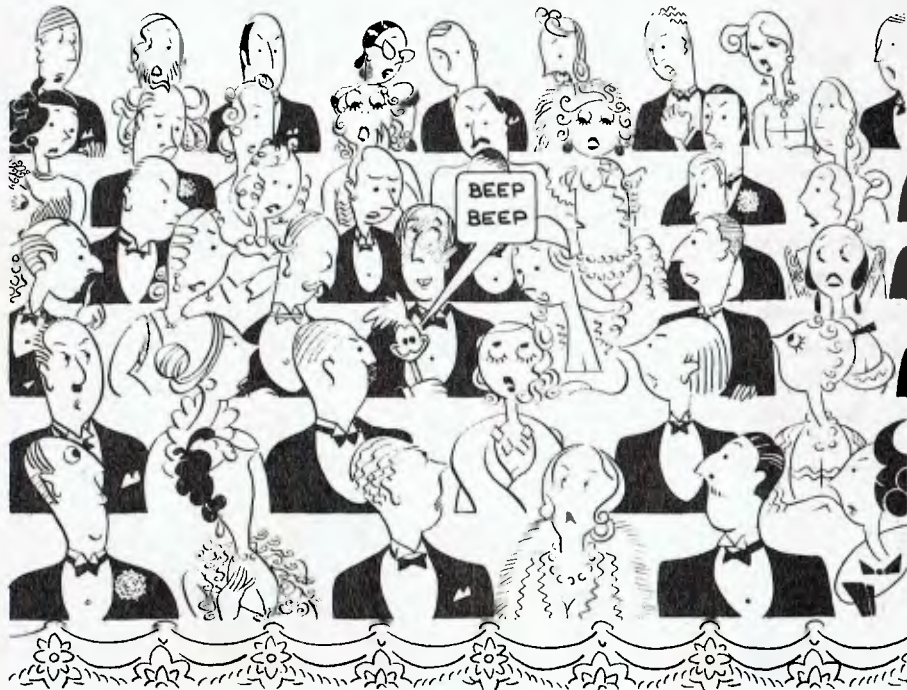
the regular CP/M resident functions there is a clearly labelled menu option. The novice user is therefore isolated from the cultic peculiarities of CP/M.

But I get carried away. First things first. The RoadRunner is a 'Real Portable'; or more properly, a 'lap computer'. It is battery powered, uses an eight by 80 LCD screen, and weighs just 2.3 kilos. An important feature of this machine is its use of removable battery-powered CMOS RAM packs for on-line storage, and similar ROM packs for distributed software.

First, the Bad News

First, let's be clear about what the RoadRunner does not offer. For a start, it (as yet) has no floppy disk option. It doesn't boast Gavilan's 'solid state mouse' (a touch sensitive screen which lets you reposition the cursor with a finger tip). But then it also doesn't carry Gavilan's price tag. Nor does it have a Gavilan-like integral printer, or micro floppy drives, or even a composite video output. Its screen has no bit-mapped graphics like the IBM-PC. It uses a plain vanilla Z80, burbling along at a mere 2.5 MHz with good ole CP/M-80. *But* it does just what I want it to do. And isn't that what computers are about?

Right now, and without reference to a manual, I've been able to find out how to do a backspace (both destructive and non-destructive), and how to jump around the text (by character, line, word and screen), thanks to the nifty HELP key which seems to know



just what I want. I can delete characters, words and lines at a keystroke, using the specially marked keys designed for just that purpose. There's even an undo key which restores deleted characters, words and lines.

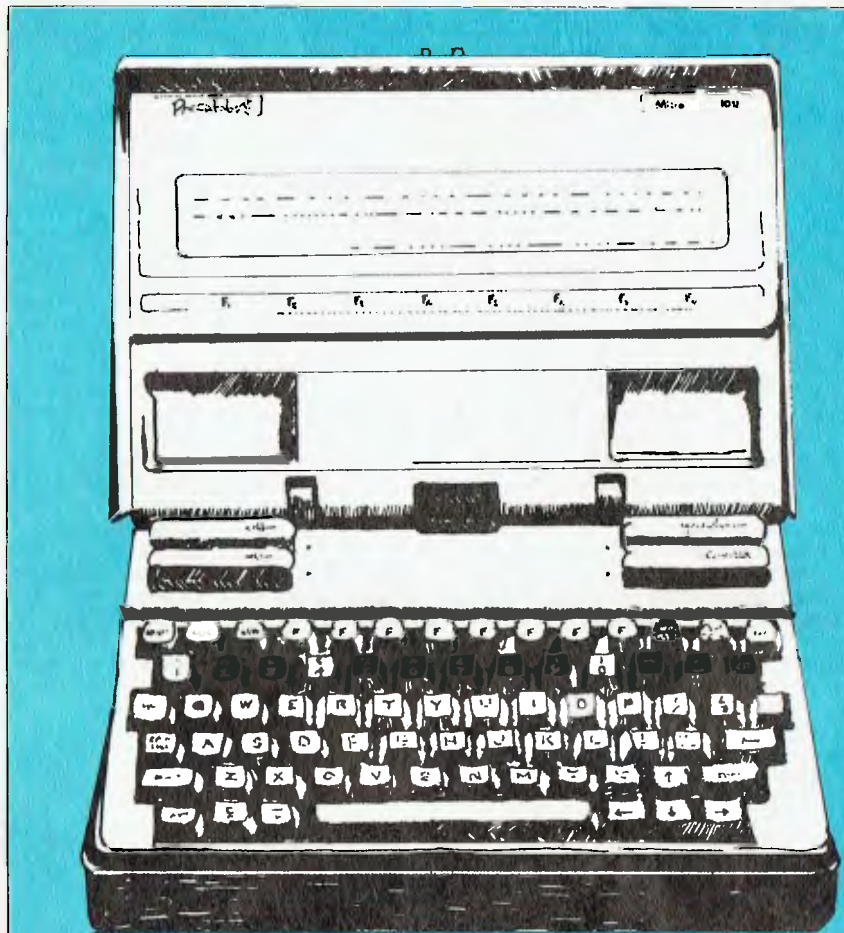
Beauty, it is written, is in the eye of the beholder. And one person's notion of the Perfect Computer will differ from another, so it is with that proviso that I offer my own notion, as a word joiner, of what the Perfect Portable Word-Joining Computer might be like.

(Incidentally, if one follows the reasoning of Anselm's ontological argument to its logical conclusion, then the Perfect Computer must indeed exist, for surely one of the foremost attributes of perfection is existence!) Perhaps the RoadRunner is not quite the Perfect Computer since it fails my fundamental requirement in that it should cost less than \$1000, but it's not bad for all that.

For someone who is on the move quite a bit (what with landlords chasing rent and all that); for the business person who needs to make memos, keep track of appointments, write lengthy reports and articles; for the user who needs to communicate with remote bulletin boards and write the occasional program, with the ability to run programs which can be bought at your local friendly Computer Shoppe, the Almost Perfect Computer should have the following attributes:

1. It should not cost an arm and a leg.

2. It should be battery powered using built-in rechargeable cells.



Did the RoadRunner leave a swirling trail of dust and feathers through your childhood? Well, here it is again, trying to win its way into your adult life – in another form. A bit of a wily coyote himself, Frank Lee tried to catch the RoadRunner computer out, but ended up being quite impressed with its capabilities.

3. The charging unit should be switchable for various foreign power supplies.

4. It has a HELP key which offers extensive, context sensitive help.

5. It should not require the user to take a three-year course before being able to use it.

6. It should be rugged enough to withstand the punishment of rolling around loose in a briefcase while its owner is on the move.

7. It weighs less than 1 kg.

8. It has at least one serial and one parallel port for computer-to-computer hook-ups and printing.

9. Its word processor should be easy to learn, and should not fall apart when I accidentally hit Wordstar-type control keys.

10. It must warn the user that

battery power is low before bombing out and losing its mind.

11. It should have removable storage modules, perhaps bubble-memory-based, for holding programs and data off-line.

12. It has built-in utilities to enable the user to transfer data and programs between storage modules and a computer with conventional disks.

13. One should be able to dive into the operating system and program at the assembler level without having to resort to disassembling bits of the BIOS to find out what's really going on inside.

14. It should have well-written, comprehensive documentation.

15. It should be well supported by its distributors and dealers.

16. Its keyboard should be well laid

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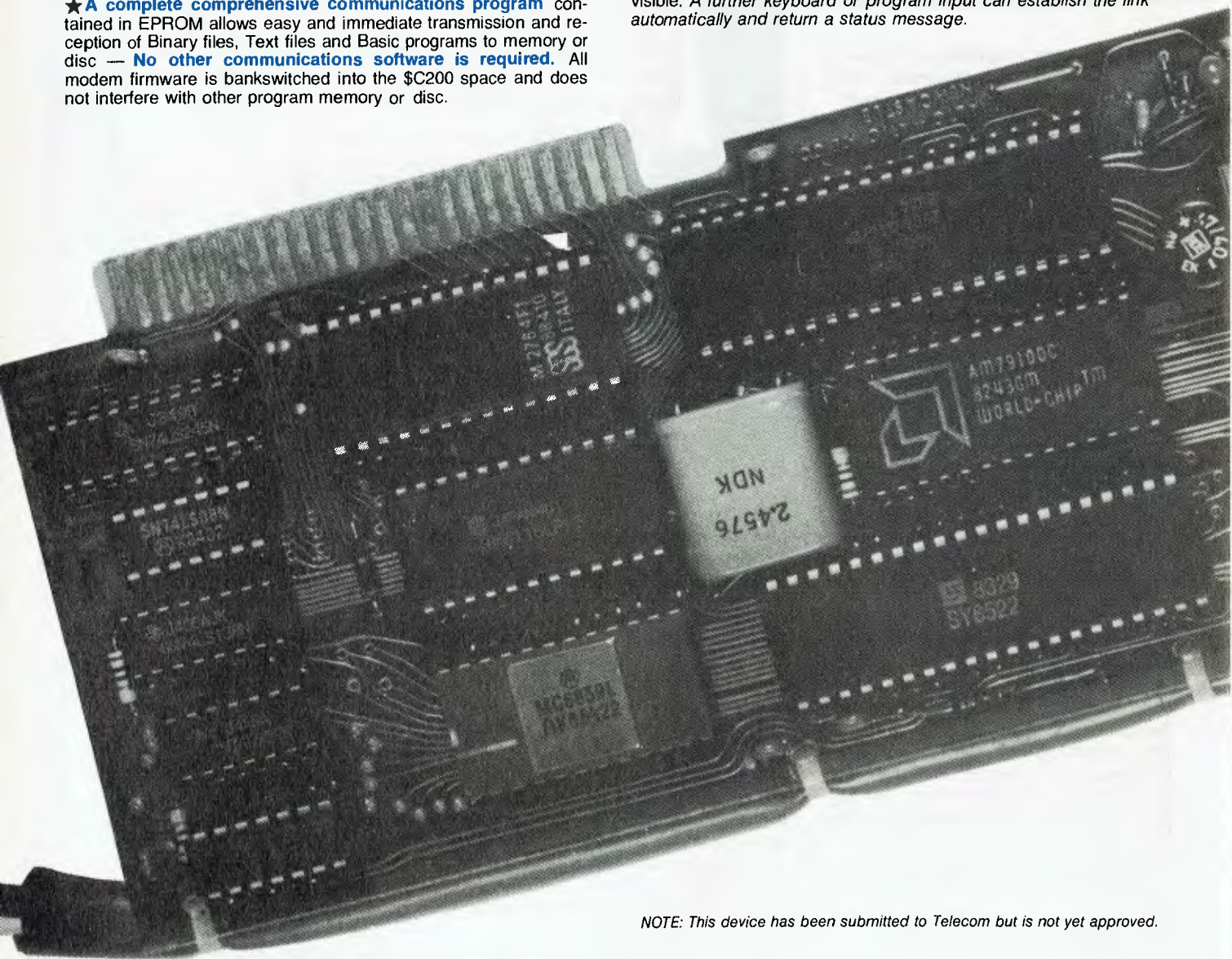
★ **A complete comprehensive communications program** contained in EPROM allows easy and immediate transmission and reception of Binary files, Text files and Basic programs to memory or disc — **No other communications software is required**. All modem firmware is bankswitched into the \$C200 space and does not interfere with other program memory or disc.

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★ **Auto Answer — Auto dial. Senses true dial tone, ring tone, busy tone** and acts intelligently, returning status messages. Automatically selects pulse or DTMF (tone) dialling. When used with DTMF exchanges the connection to the called party can be established in less than a second. On answering, it **automatically searches and sets** to the incoming baud rate and word format. It can act as an automatic telephone dialler with multiple redial and "dial alternate number" features. A software switched audio amplifier and speaker audibly monitor call progress. Programmable digital and analogue outputs are provided to interface to radio transceivers or other devices.

★ Can emulate Hayes Micromodem, Hayes Smartmodem, Apple serial card and Prestel terminal as well as its own modes. Conforms to the published "Firmware" standard for Apple peripheral cards and is compatible with Basic, Pascal, C/PM and machine language programs which obey the Apple standard. A fully transparent mode is available.

★ 2Kx8 battery powered CMOS RAM stores default parameters, phone numbers and log-on strings, allowing **single keystroke call establishment**. The full telephone list can be displayed from a program or the keyboard with logons/passwords selectively not visible. *A further keyboard or program input can establish the link automatically and return a status message.*



NOTE: This device has been submitted to Telecom but is not yet approved.

Modem For Apple IIe.

★ The Firmware is contained in a 64K EPROM. There is provision for an additional 64K for future expansion or special user-written routines.

★ **Onboard battery backed calendar clock** can time and initiate calls or keep an activity log. The clock is ProDos compatible and is automatically recognised. It is also accessible for other uses.

★ Optional standard telephone connection on the modem allows easy installation into existing phone plug. When the modem is not engaged the telephone acts in the normal manner.

★ Has socket for installation of DES data cypher chip for security, identification & EFT applications. *Permission is required from the American State Dept. for purchase of cypher chip.*

★ The modem contains three very sophisticated software programmable integrated circuits connected to all aspects of the hardware and a large amount of unused EPROM space. It is envisaged that additional features will be added to the firmware in future. The documentation is presently limited but the full operation of the hardware and firmware will eventually be documented.

★ **A mini word processor** in EPROM allows pre-composition of memos which can then be sent with a single keystroke entry.



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```

10 REM hex dump program.  Written in Microsoft Basic.
20 PRINT
30 INPUT "Hex starting address";START$
40 GOSUB 280 :REM set the numeric equivalent in START
50 LINECOUNT=6 :Number of lines on my screen less 2
60 WHILE LINECOUNT>0 :REM Real Programmers don't say FOR
70   N$="   "+HEX$(START): M$=RIGHT$(N$,5): PRINT: PRINT M$;
80   ROWCOUNT=16
90   WHILE ROWCOUNT>0
100     N$=HEX$(PEEK(START)+256):M$=" "+RIGHT$(N$,2)
110     PRINT M$;: START=START+1
120     ROWCOUNT=ROWCOUNT-1
130   WEND
140   GOSUB 180
150   LINECOUNT=LINECOUNT-1
160   WEND
170 GOTO 10
180 REM display same line in ascii
190 START=START-16
200 PRINT"  ";
210   FOR J=1 TO 16 :REM (can't be a real programmer)
220     Z=PEEK(START): START=START+1
230     IF Z<32 THEN Z$="." ELSE Z$=CHR$(Z)
240     PRINT Z$;
250   NEXT
260 RETURN
280 REM convert hex start$ to start
290 IF LEN(START$)=0 THEN RETURN
300 START=0
310   FOR K=1 TO LEN(START$)
320     START=START*16+INSTR("0123456789ABCDEF",MID$(START$,K,1))
330     START=START-1
340   NEXT
350 RETURN
360 END

```

Listing of DUMP.BAS

This little offering helped me find my way around the RoadRunner's operating system (and a fat lot of good that did me). It should work on any system which supports Microsoft BASIC. The output looks like that of DDT's 'D' command, giving both the hexadecimal and ASCII representations. In the case of the RoadRunner, ASCII symbols with rank greater than 127 produce quite interesting graphics, including Japanese letters. If your display can't handle bytes with the high bit set, insert a line at 225 thus:

```
225 IF Z>127 THEN Z = Z-128
```

out for touch-typists and feature clearly labeled keys with assigned special functions.

17. Its CPU should be well represented in other microcomputers.

18. It should have a 24-line LCD (or better) screen. Colour would be nice, but not necessary. It should also support bit-mapped graphics, and have a composite video output so that one can use a conventional monitor. An RGB output would be just great.

19. It should let me get rid of the confounded left indenting which now seems to be permanent ever since I hit the TAB key at number 1 above.

Crying Wolf

A word of explanation. This article, unlike your average review, is an example of a real-time, on-line product evaluation. By the time, dear reader, when we both get to the end of this exercise, we should both be wiser in RoadRunning. It's now time for a little fiddling, to see just how good the HELP key really is ...

Bloomin' amazin'. After a couple of stabs at HELP, it told me that function key 2 un-indent a paragraph, and that I can use F3 to do indenting

of unindented paragraphs. When I press the MENU key, a set of labels appears at the bottom of the screen just above the legends F1 to F8. Of these, F5 is REFORM. So after un-indenting the previous paragraph, a stab at F5 does a Wordstar-like reform (control B to you Wordstar hacks).

(An hour or so later). The RoadRunner, of course, does not meet all the above specifications. I know of no micro which does. Nevertheless, as we shall see, it fares surprisingly well.

At this point, I have been contemplating the practicalities of getting this copy to the *Your Computer* office. Traditionally, the material for my articles is transmitted either by modem or on 20 cm floppy disk. The modem method is fine for short articles, but it means an STD call from Mount Crisis to Sydney. Either way, it has to go out via the serial port on the back of this machine since the RoadRunner, at least at this stage, does not support floppy disks. Instead, it uses non-volatile RAM cartridges, each of which holds up to 64K - not exactly what YC appreciates.

So, how to pump from cartridge files to the YC computer, or to Harlequin (my tame Datamax with 20 cm floppies)? The RoadRunner has a UTILITY function which allows you to configure the serial port for the usual parameters. There is also a communications utility built in for sending and receiving files. Unfortunately, the transmission so supported is without protocol (apart from an optional XON/XOFF). YC is not happy about unchecked transmissions, especially over long distances. No doubt the Datamax could handle protocol-less communications, but would it not make sense to have provided the RoadRunner with a utility like YAM or Modem7, or at least something which can make sense of the Christensen protocol?

(Thinks Frank to himself: this is a golden opportunity to see just how easy it would be to cobble up a utility to do just that. Alas! no assembler. Not even DDT. Just BASIC, this word processor, and SuperCalc. The manuals say nothing about programming the serial port, or how to input binary code from other machines. The communication utility supports only ASCII transmissions and a proprietary binary protocol for which the protocol specifications are not provided. A little research by the folk at President has revealed that it will talk to a host running Ascom (available on Kaypro machines), but at this point in time we remain slightly stymied.)

... But the Instructions

Here then is the only really negative comment which I can make concerning the RoadRunner: its documentation leaves a lot to be desired. Admittedly, it is a new product, and the good stuff is no doubt 'coming real soon now'. But there is at present nothing which could assist the third-party software supplier who intends to implement his wares on this machine. Clearly the documentation exists, otherwise how could Microsoft have implemented its tailored version of MBASIC (for which, by the way, the documentation is well up to standard).

The absence of immediate support for the Christensen protocol is just the sort of thing to whet this hack's appetite. One should, of course, wait until President's bright young men come up with an answer; however, this is real time/on-line journalism. No time to mess around. (Looks in the RoadRunner toolbox. Picks out Microsoft BASIC.) Since DDT we do not have, BASIC will have to do.

Listing 1, on the previous page, is a short and nasty BASIC program which duplicates DDT's D(ump) command. It should work for any system supporting this version of BASIC, not just the RoadRunner. DUMP produces six lines at a time (just filling the RoadRunner's LCD screen). The DUMP program enabled me to find the set of vectors at the start of the BIOS (which incidentally appears to be at D852H). Funny about that. The list is a bit short. Then I recalled that the operating system is described as being "CP/M compatible"; that is, it's not plain vanilla CP/M. Oh well. Nice try Frank.

Decision: pump text from RoadRunner to the Datamax using the non-protocol 'ASCII' option, and post a floppy disk.

On the Road

Time passes further, and the RoadRunner is now attending a 6.30 pm concert by the Sydney Symphony Orchestra in the Opera House. It is interval, and this is possibly the first time that anyone has actually used a personal computer in such surroundings. It makes a change from joining the *hoi polloi* scrumming for ice creams and drinks. Even though the lighting is somewhat diffused and dim, the LCD screen is still quite legible. Whoops, here they come. Schoolchildren reinforced with lolly water, chocolate and ice-cream. Excuse me, excuse me. Wonder what happens if I accidentally close the lid while all this is going on? Not game to try. Would probably lose everything I've keyed in so far.

Whoops! There's a nice feature. It appears that the editor limits an individual text to about 13K. As one approaches the limits of the internal buffer, a warning repetitive beep is heard, and a message temporarily obliterates part of the text advising that you have only 965 bytes (or whatever) remaining. In this case, I will need to save the text captured so far, and create a second file for the balance of the article. Pity it doesn't support virtual buffering (like WordStar).

Here we are again on the second text file. The file ported without problems at 9600 baud using Modem7 on Harlequin, and TERMINAL in TEXT mode on the RoadRunner. No protocol was used.

The Test

Well, how does the RoadRunner stack up against the 19-point checklist?

1. It retails for \$2099 including

sales tax. That's not cheap. The price is pretty much a reflection of the current cost of CMOS RAM and the other CMOS chips which are necessary to support reasonable battery life. Of course, one could use normal chips and have your 12-volt car battery on a small trolley. The RAM cartridges are also expensive; the 64K version will set you back \$624. Fortunately, the base price includes most of what you will need, namely the battery pack and charger, one 8K RAM pack, a user manual, an RS232 interface, a text editor ROM pack, plus some inbuilt utilities. These include a personal scheduler, name and address list, phone directory and communications.

2. The built-in battery pack keeps you on the air for around eight hours before needing a recharge – that's plenty. Recharging a flat battery takes around 14 hours. The charger will either run the RoadRunner or charge the battery; it won't do both at the same time.

Incidentally, as I write, there are threats of power strikes in New South Wales – a threat which strikes at the gut of every computerist. How comforting to know that one can still function – for up to eight hours – without fear of glitches, brownouts or just plain shutdowns.

3. The charging unit is similar to those used for hand-held calculators. It is not adaptable for foreign power supplies. Instead, one requires a charger to suit each potential situation.

4. The Help key is great for the Editor ROM pack. Unfortunately, it

REVIEW BEEP BEEP

tends to say "Sorry, help not available here – press a key to continue:" most other places. No doubt the producers (MicroOffice) will be extending this facility.

5. RoadRunner has been designed with the novice computer user in mind. It is distinctly easy to use, and is largely self-explanatory. A definite plus.

6. It is certainly small enough to fit in the average briefcase (see photo), with plenty of room left over. It measures 187 mm by 292 mm by 76 mm – about A4 size. The construction is of impact-resistant plastic. While I have not felt free to apply our normal test-to-destruction on this unit, it looks as though it could take quite a bit of punishment.

7. 2.3 kilos is still a bit on the heavy side, but nothing like the weight of most of the alleged portables.

8. The serial port it has. Parallel it has not. That's a shame, since both my printers are strictly parallel.

9. The word processor is a delight, although limited by having to dump at regular 12K intervals.

10. There is a low battery charge warning system which alerts the user in plenty of time before disaster strikes. Incidentally, even if the power pack is removed from the unit, the ►



BEEP BEEP

data for the Personal Phone List, engagements and so on remain alive for ten to 15 minutes.

11. The RAM and ROM packs are its strongest point. My review unit has Microsoft BASIC in one ROM pack, while two separate packs support the popular spreadsheet SuperCalc. These units are functionally equivalent to small-capacity floppy disks, but run at electronic speeds. The larger ones (and I could not live with one 8K module) are expensive. Let's hope for a price reduction in this area as more demand increases the productivity for CMOS RAM. The slots in the RoadRunner are just above the keyboard, and are labelled A, B, C and D. The packs can be installed in any of these, in any combination. There are also two internal 'drives', E and F. Drive E is a 'ROM drive' containing the standard utilities. Drive F is an 8K 'RAM drive' designed to hold the user's schedule, phone list, and communications set-up parameters. Each of the

drives loses 1K of overhead for its directory.

12. Although I've been critical of the communications system, the real problem is its documentation, not the software. The TERMINAL program supports a wide range of physical level protocols, as well as an auto-dial feature. A built-in modem is an option (although not yet suited to Australian conditions).

13. Again, my primary criticism relates to the inadequacy of the documentation; in this case, of the technical support necessary for the implementation of software.

14. The documentation is nevertheless well packaged. The documents prepared by Sorcim (for SuperCalc) and MicroSoft (for BASIC) are excellent. But the main *How to Use the RoadRunner* is still clearly in the preliminary stages of preparation. However, the 'average user' should not find this shortcoming an impediment.

15. The Australian distributor (President Computers, 100 George St, Hornsby 2077) offers extensive support, both for service and education.

16. The keyboard is unusually extensive, although it (necessarily) lacks a numeric keypad. It feels good to the touch, and features a trendy

'sculpted' design. The RETURN key is in the right place (at least for me), as are the other normal function keys. It has no annoying click (are you listening, Big Blue?) to tell everyone that you are working on a computer.

17. The CPU is the NatSemi NSC800 - functionally equivalent to the Z80, but which chews up fewer electrons in the process. This means (given the documentation) lots of application programs.

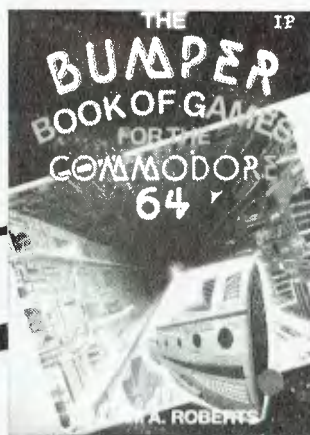
18. The LCD screen is quite reasonable, but I've been spoiled by 24-line screens. I understand that a 16-line LCD is in the works. It won't be cheap, but will make life a lot easier when it comes. There is, in fact, plenty of room in the lid to hold a full 24-line LCD display. In the meantime, a composite video output could please a number of potential buyers.

19. Mea culpa. I complained in ignorance.

By the time this is in print, the RoadRunner will really have been pounded in Fiji, Honolulu, New Zealand, the USA and Tahiti. Till then, cheers from here at Mount Crisis. □

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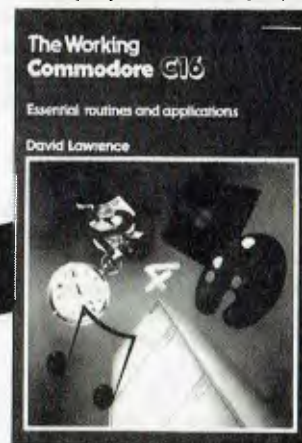


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A Way with Word Processing

IAN PHILLIPS

Richard Walding B.App.Sc, Grad. Dip. Tch, MSc, is a science teacher at Wynnum North State High School near Brisbane, and is currently undertaking M.Phil. research at Griffith University on the impact of computers on science education in Queensland high schools.

If only worldwide sales of 8000 units translated their retail value into profit, Ian Phillips would be a millionaire. Well, they don't and he isn't. In a tiny suburban Brisbane office, across the desktop holocaust, sits an Apple IIe with its el-cheapo disk drives and no-brand disks, all bearing mute testimony to this fact. The foyer has to be seen to be believed – it measures one metre by a half, and has no pot plants and no chairs, just a shoulder-high partition. But Zardax and its team are user-friendly, even if the reception room isn't.

Computer Solutions, then, reflects the style of Zardax – friendly, straightforward, no frills, no 'code tangled like spaghetti'. But 8000 copies is a lot of pasta in anyone's language.

In Australia alone, some 5000 copies have been sold, and earlier this year the package picked up *Your Computer's* 'Special Commendation for Australian Software'. It certainly has been an Australian software success story.

In the Beginning ...

Folklore has it that Zardax was created because no other Apple word processing program was around. This is partly true; in late 1977, Wordstar was just being released, Apple had only just brought out disk drives, and Easywriter was the only word processor for the Apple II.

Ian Phillips was writing authoring programs at Villanova College, to enable teachers to produce computer-

assisted instruction material. "I was convinced by 1977 that computers were great for schools. Rich schools were buying PDP-11s – we couldn't even think of that. My original intention was to get some Sol-20s – these were 8080-based computers using CP/M – but I ended up donating enough money to the school to buy an Apple, and in late '78 the School's Commission gave us two more."

The authoring programs he wrote were designed for teachers to write tutorial-answer material for classes. "They were useful enough – I've only just thrown my last Ancient History one out. The real problem was educating the teachers. Converting computer potential into a useful teaching aid was difficult – it required a change in teaching style, which doesn't come easy."

Essentially, these authoring programs were a text processing problem. "What I was writing was throw-away text editing tools. When Paul Rees from Computerland saw what I was doing he suggested I write a word processing program. I said 'No, there's other stuff around. What could one little guy do? It's just crazy.' He said that a little guy could take on the big American companies and beat them. He showed me a copy of Easywriter, which he called Hardwriter, which it was. It was appalling! It was his lever to get me interested."

Paul Rees confirmed that at the time, US software producers were turning out mainly games programs, and office software was non-existent. He added, "This was a window in history that has gone now. There is no way someone like Ian Phillips could now successfully produce and market a new general office program such as a database or word processor or spreadsheet. He'd need \$50,000 to

get started and distribute review copies to the thousands of dealers worldwide. That's what they did with Lotus 1-2-3. A team of programmers spent two years and unlimited funds producing it, and unlimited amounts were spent on marketing. A little guy would have no hope."

What Paul Rees admitted, though, was that to come up with a novel idea for a program was the best bet for an individual. He cites Sales Edge as an example. "A salesman answers psychological-type questions about both himself and his client, from which the program produces an approach suited to buyer and seller. No-one had thought of writing this before, and for one creative person it has paid off."

Ian Phillips concedes that *his* creativity lies more in a new approach to an old problem, rather than novel uses for computers.

Word Processing Model

I was curious to know how Ian Phillips approached the design of a text editor. Perhaps he consulted a human factors engineer; perhaps he took a theoretical model from the experts.

"For what I did you can't make rules," he said. "The art of creating anything, whether it's a painting, a novel or a computer program, is a sequence of judgements. I wasn't influenced much by other word processors – I hadn't used one. I only spent ten minutes with Easywriter to know I could do much better."

He does agree, though, that Zardax has grown by taking the best features of others. "When I read reviews that say 'one of the best features of this program is so-and-so', I think, that sounds useful."

But not all suggestions are taken up. In the beginning Phillips used to

To think a Brisbane high school English teacher could write a word processing program that would compete more than successfully in both Australian and overseas markets seems incredible, but that's what Ian Phillips did. In this interview, Richard Walding tries to find out how it happened – and whether you could do the same thing.

show the prototype to Paul Rees, who was familiar with Wang, Olivetti and IBM machines and often said some part of Ian's program was 'crummy'. "From the beginning, I always thought there was no point in having every bell and whistle because it becomes so complicated that it's unusable – there are too many things to remember. If you've got ten options, you've got ten single keys; for 100 options you need to devote double keystrokes. Most of the suggestions I reject are not abandoned because they're not good ideas, but because I've got a limited vision about Zardax. I'm not letting it get complicated."

Choosing a Market

One axiom of the marketing strategists is that no two users are alike. They vary in size, strength, acuity, intelligence, education and motivation. The general requirement, then, for successful software design is to define the market and recognise the needs of the users.

Ian Phillips defined his typical user as one with a 'mix of interests': one who would use a word processor for both two-page letters and ten-page reports. Finding a typical user was easy – himself. "I have been a touch typist since college, and I knew the sort of things I wanted my program to do. Of course, it's more useful than just this; I pitched it at the office market, where I knew an Apple and a printer for \$3000 were more attractive than \$15,000 for a Wang."

Getting Started

The bulk of the first version was written in December 1979 and January 1980, and it was first sold under the name Wordmaster six months later. Computerland decided

the best strategy was to bundle the program up with an Apple, a disk drive and a daisywheel printer for \$6000 to \$7000. Under this plan the selling price of Wordmaster was arbitrary, so \$700 was nominated. "It could have been \$500, \$700 or \$1000," Ian Phillips admits, "and within three months it was pulled back to its present price of \$300 or so." Some retailers, however, maintained the original price for many months.

Trying to patent the name was not easy. Wordmaster became Textmaster, which was accepted in all countries bar one. A trademark agent suggested he think up "a totally and utterly meaningless word, just as Kodak did." So Zardax was born one Sunday afternoon on the kitchen table at suburban Mount Gravatt.

Profitability

When I suggested that an apt sub-heading to this article might be 'Printing money with Zardax', Ian laughed. Eight thousand times a wholesale price of \$160 is well over \$1 million, but he was quick to point out that back-up service, advertising, staff wages, rent and a million and one other boring details take the edge off his return.

"I put an enormous number of hours into Zardax. I was teaching during the day and writing until one in the morning. At this stage I was selling one copy per week, which seemed like wealth beyond any imaginings. The workload increased to the extent that by the middle of 1981 I was forced to teach part-time, which lasted until the end of 1983 when I gave it away completely."

Ian openly admits that he only had to sell 100 copies to have his investment repaid, but in the same breath is adamant that there's more



Ian Phillips

Seven years after completing Year 12 at St Lawrence's College (Brisbane) in 1963, Ian Phillips was back there teaching. In the intervening period, he took religious and teacher training with the Christian Brothers in Sydney, and on completion taught there for three years, followed by a further three years in Brisbane at St Joseph's. His return to St Lawrence's only lasted a year, as he left the Christian Brothers in 1970 and took up a teaching position at Villanova, where he continued both full- and part-time until late 1983. He visits there frequently – in an advisory role.

From 1968 to 1974 Ian studied for his degree, part-time at Queensland University. The big surprise is that this degree was a BA in English Literature, rather than some scientific or computer-oriented subject. His only formal computing studies came after this in the form of a few odd undergraduate subjects in Computer Science. □

to business than that. "Software development is only a minor cost in the Zardax story, but it assumes major proportions because the \$50,000 comes at a time when you can least afford it. It's only been in the last six months that I could say that Zardax has well and truly repaid me above and beyond working hours I've put into it. It has now given me full-time employment and some more besides. It has earned its keep."

Sales

Australia is the best market, numerically, in terms of sales. Total sales of Zardax here to date are about 5000, and the program is now selling 100 copies a month.

"The *Bulletin* forecast Australian software sales recently, and besides predicting 15,000 for Lotus 1-2-3 and 17,500 for Wordstar, it estimated Zardax would sell 6000 to 7000 copies. One quarter of that would be more realistic, and as no-one from the *Bulletin* approached me, I assume the other figures are way out too."

Overseas sales have reached 3000 to 4000, most of which have been in the US through Action-Research, and the rest in Europe through Rocon. And what a headache that's been. Ian says that, given his time over again, he would accept royalties from a major publisher overseas rather than try to market it himself. Because of his basic lack of faith in Government assistance, he has sought and received none. "More paperwork and red tape don't exactly enthuse me."

Advice

Marketing software in Australia is different. Ian's advice to novices is: "Be canny. People will try to steal your product. They will say you'll be a rich man if you give them exclusive rights. I've had so many offers, not all of them pleasant, either. I can recall at least five occasions where I've been seriously badgered by someone wanting to be sole Australian agent, and from my viewpoint it is completely unsatisfactory. Usually, they will want to use Zardax to help sell their hardware, or to sell it in their market only, or even sell it along with competing products. There are too many holes in it. What one needs is a high degree of cynicism."

The second lesson comes from the teacher in Ian Phillips. "Teachers," he

claims, "are particularly unsuited to becoming businessmen, and it's not because they can't do accounting – it's because teachers trust each other. They are used to working in a world where what you say is what you mean – you do this and I'll do that. Businessmen often don't say what they mean or mean what they say, so you have to figure it out."

Distrust pervades the business; Government, dealers and users are all implicated. Copy protection is very secure on Zardax, although the lock has been broken many times.

"It's an incredible pain to prevent copying. I hate writing out \$15 receipts for replacement back-up copies, as it just adds unnecessary costs. It's a nuisance to the user as well. Once the volume of sales gets up, the price can come down. If you could buy Lotus 1-2-3 for \$50, no-one would bother making illegal copies. Friends who have tried copying Zardax even with something as useful as Locksmith 5.0 have found it didn't budge."

Ian Phillips is coy about who devised the Zardax lock; it's a friend who knows a bit about hardware, he says. "But who'd want to spend weeks unlocking it anyway ... only an idiot ... because they couldn't sell it."

Ian forgets those hardy souls who love a challenge in this intellectual game. I don't think he is much perturbed; after all, he makes quite a point of the issue in his ads that say "praised in England and pirated in Taiwan". He remakes his point of dishonesty in business and accepts that it is "inevitable", so he has no plans to upgrade the lock for the ProDOS version, even though he says it would be easy.

Prosecutions

There's little he can do about the \$5 to \$15 copies being sold in Taiwan, even with the Zardax brand, but in Australia it is a different matter. Three years ago a South Australian company was up against Ian Phillips' wrath.

"Financially, it wasn't worth the effort, but I went through the legal process to teach everyone a lesson. The company caved in immediately, and I was given a consent order. I had lawyers from all over the place talking about precedents, but no precedents were set because that's

the nature of a consent order."

The Apple case really annoyed Ian Phillips. A Sydney man had recently been caught red-handed selling illegal copies of Zardax. "I had cast-iron evidence and this guy all rolled up, and on the day I was to sign the affidavit the Apple judgement came out and the law was swept from under my feet. By the time it was fixed up – a few months ago – he had gone to the hills." When asked for names, he conveniently forgot. "I don't want to open old wounds."

Copyright Law

There can be no doubt, then, that copyright laws present Ian Phillips with a dilemma. "I can see reasons why some software could need copyright for 15 to 20 years – but life? There's no need for that. Most software would have a viable life of ten years at the most. But after all, it's not that hard to go out and write a Zardax work-alike and be free from copyright."

Sunrise Industries and all that

Much is being made lately of sunrise industries, venture capital and investment corporations. It would seem that Computer Solutions may be an ideal prospect; after all, many new products are on the drawing board.

One in particular seems a likely prospect for funding – an Apple-IBM network system Phillips has been working on all year. Ian Phillips admits it is going slowly, mainly for lack of resources, including time, but: "I don't like bureaucracy and forms. The Government may be encouraging investment corporations but they wouldn't be interested in a less-than-\$5-million company like mine, unless they can be satisfied that my proposed project is viable in the marketplace. But more than that – they would tell me I need a couple of hundred thousand dollars plus two engineers plus a programmer, so the job would be done in two months. Once finished, they'd say I need \$100,000 for marketing and \$100,000 for stock – total of \$300,000. 'We'll give you this and you give us 35 per cent. I don't want to be a manager. I'd rather do what I like: be creative and trust my own judgement. While my company is small I can do what I like."

Comparisons

If you believe the selected quotes in the advertising, Zardax is a "highly recommended, superb, quick, convenient, bulletproof piece of cake, in many ways better than a dedicated word processor". If you've ever used it you'd probably agree with most of the sentiments, but even Ian Phillips agrees there are some deficiencies.

"As I've said, the code is tangled because of the patches we've made over the years, but now it's set like concrete and there's no way we'll change the original Zardax."

On *Byte* magazine's 100-point scale for evaluating word processing programs, Zardax rates 79, just one point behind Wordstar; five points ahead of Tandy's Superscript and the dedicated word processor Wangwriter. Easywriter, as you might have guessed, struggles along on 35. At the top of the scale is the dedicated CPT 8100 at 95 points. What does it all mean?

Zardax loses a few points to Wordstar on 'editing power', but Ian

Phillips concedes that that's inevitable. "There are a hundred ways to delete with Wordstar, but my philosophy is to keep it simple. Who could remember all those commands, especially if you only use the package for a few hours every second day?" A valid point — and look where his package beats Wordstar: ease of use, by one point. The ProDOS version (Zardax II) has new code and new features, but the philosophy remains unchanged. Add a few points to the score.

The Future

ZardaxWriter was launched in late 1984 for the IBM; the ProDOS version is out for the Apple IIc and the 128K IIe; and Zardax III is out for the Apple III. What else is coming up besides the Apple-IBM network — maybe a MacZardax?

"I'd love to," says Ian, "but not until the Mac gets a bigger memory. It's a beautiful machine; I'm really impressed. It makes IBM technology look like it came from before the

flood. IBM's video board is bigger than an entire Macintosh, it does basically nothing, and it doesn't even do that very well." Zardax II features ideas from Apple's Lisa, which Ian Phillips had a play with a few years ago. Four menus (File, Edit, Print, and Main) are windowed in the text, along with things like 'clipboards' for temporary storage. For those whose mis-spent youth left them with eye problems, switching between 80 and 40 columns is at the press of a key.

If Paul Rees is right, the same opportunities for success with another word processing program may be limited, but Ian Phillips is sure going to give it a shot.

"Why don't you write a dictionary program that supports Zardax?" I asked.

"They're nearly all junk; I wouldn't use one, it'd drive me nuts," he replied, as he tipped his cold coffee down the sink. □

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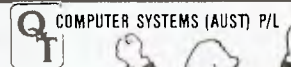
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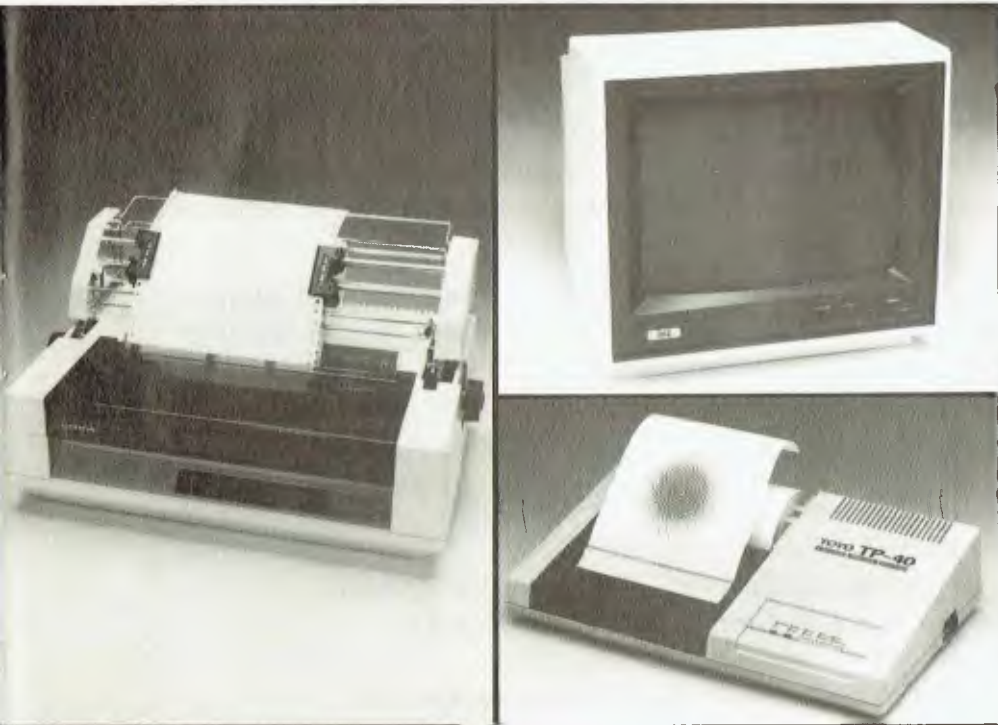
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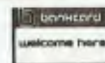


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Was Rembrandt really an Australian?

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- *"superbly easy to use, quick, convenient."* PCAL Report Dec 83
- *"in many ways better than a dedicated word processor."* The Australian 31/3/84
- *"if word processing is an art, Zardax is a Rembrandt."* In-Cider March 83
- *"highly recommended."* Softalk Jan 84
- *"Zardax wins praise for being well-nigh bulletproof."* Your Computer April 84

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POCKET PROGRAMS

Noughts and Crosses

Now you can play the old game of noughts and crosses (Tic Tac Toe) against the computer. It is very easy to play; you specify whether you want to start first or let the computer go first, and then press the keys from 1 to 9 to tell the computer on which square you wish to place your mark (the squares are numbered).

The computer always plays noughts, whether it starts first or not, and will play a near-perfect

game (the best you can hope for is a tie). After you have your turn, the computer waits for about two seconds before going into the 'artificial intelligence' subroutine to work out where it should go. If you press TAB during this time, you will be able to enter the computer's turn instead. This is probably the only way you will be able to beat it.

Artificial Intelligence

When working out where it

wants to go, the computer goes through a series of logical steps or rules:

- 0 - If it starts first, it will go into a corner.
- 1 - If it can win this turn, it will.
- 2 - If the other player can win next turn, it will block them.
- 3 - If the centre is free, it will go there.
- 4 - It checks for two special cases.
- 5 - If it can go anywhere to simultaneously make 2 potential

lines, where there are two noughts in line and the third square is free, it will go there. If the other player can do this, it will try to stop them by going there instead.

6 - It will try to make one potential line.

7 - It will try to go in a corner square.

8 - It will go in an edge square.

Tim Cooper
Eastwood NSW

```

00100 REM *** SUPERVISOR ***
00110 CLS: HIRES: PRINT TAB(20)"NOUGHTS &
CROSSES" TAB(32)"by Tim Cooper"
00120 PLOT 205,202 TO 205,52: PLOT 305,202
TO 305,52: PLOT 105,152 TO 405,152: PLOT
105,102 TO 405,102
00130 FOR R=1 TO 3: FOR S=1 TO 3: CURS S#I3
+1,R#3+2: PRINT CHR(R#3+S+45): NEXT S: NEX
T R
00140 DIM E(2,2)
00150 CURS 1,15:PRINT"Do you want to go fi
rst? (Y/N)"
00160 A1#="KEY: IF A1#="Y" OR A1#="y" THEN
170 ELSE IF A1#="CHR(9)": U=1 ELSE IF A1#="N
" OR A1#="n" THEN 580 ELSE 160
00170 GOSUB 430: CURS 1,15: PRINT TAB(40):
GOSUB 470: GOSUB [1] 220: GOTO D
00180 FOR R=1 TO 20: A1#="KEY: IF A1#="CHR(9
)": U=1 ELSE IF A1#="" THEN NEXT R
00190 ON U+1 GOSUB 600,430
00200 GOSUB 510: GOSUB [-1] 220: GOTO D
00210 REM ** CHECK FOR WIN/LOSE/TIE **
00220 VAR (P)
00230 D=0: FOR R=0 TO 2
00240 IF E(0,R)=P AND E(1,R)=P AND E(2,R)=
P THEN NEXT #R 340
00250 IF E(R,0)=P AND E(R,1)=P AND E(R,2)=
P THEN NEXT #R 340
00260 NEXT R
00270 IF E(0,0)=P AND E(1,1)=P AND E(2,2)=
P THEN 340
00280 IF E(0,2)=P AND E(1,1)=P AND E(2,0)=
P THEN 340
00290 FOR R=0 TO 2: FOR S=0 TO 2
00300 IF E(R,S)=0: F="1
00310 NEXT S: NEXT R
00320 IF F=0: D=410 ELSE LET F=0: IF P: D=
170 ELSE LET D=180
00330 RETURN
00340 IF P: D=380 ELSE LET D=360
00350 RETURN
00360 REM ** COMPUTER LOSES **
00370 CURS 1,15: PRINT"You win.": PLAY 161
1612012310:201231810,10: RUN
00380 REM ** COMPUTER WINS **
00390 CURS 1,15: PRINT"I win.": PLAY 161
16112191241121912410,10: RUN
00400 REM ** TIE **
00410 CURS 1,15: PRINT"Tie.": PLAY 1611611
4,214,210,10: RUN
00420 REM ** INPUT **
00430 CURS 1,15: IF U=1 THEN PRINT"Enter m
y move now": U=0 ELSE PRINT"E

```

```

nter your move now
00440 A1#="KEY: IF A1#="" THEN 440
00450 IF ASC(A1#)>48 AND ASC(A1#)<58: A=IN
T(VAL(A1#)) ELSE 440
00460 GOSUB 560: IF E(X,Y)<>0 THEN PLAY 23
: GOTO 440 ELSE RETURN
00470 REM ** PRINT **
00480 GOSUB 560: E(X,Y)=1: X=X#100+125: Y=
(2-Y)#50+63
00490 PLOT X,Y TO X+60,Y+30: PLOT X+60,Y T
O X,Y+30
00500 RETURN
00510 REM ** PRINT **
00520 GOSUB 560: E(X,Y)=-1: X=X#100+155: Y
=(2-Y)#50+77
00530 PLOT X-12,Y+15 TO X-30,Y+6 TO X-30,Y
-6 TO X-12,Y-15 TO X+12,Y-15 TO X+30,Y-6 T
O X+30,Y+6 TO X+12,Y+15 TO X-12,Y+15
00540 RETURN
00550 REM * CONVERT A TO X,Y *
00560 Y=(A-1)/3: X=A-Y*3-1: RETURN
00570 REM ** COMPUTER STARTS FIRST **
00580 A=INT(RND#5)*2+1: IF A=5 THEN 580 EL
SE 200
00590 REM ** COMPUTER'S TURN SUPERVISOR **
00600 A=0:K=0
00610 GOSUB 690: IF A>0 THEN RETURN
00620 GOSUB 710: IF A>0 THEN RETURN
00630 GOSUB 730: IF A>0 THEN RETURN
00640 GOSUB 750: IF A>0 THEN RETURN
00650 GOSUB 820: IF A>0 THEN RETURN
00660 GOSUB 850: IF A>0 THEN RETURN
00670 GOSUB 910: IF A>0 THEN RETURN
00680 GOSUB 940: RETURN
00690 REM * AI STEP 1 *
00700 GOSUB [-1] 960: RETURN
00710 REM * AI STEP 2 *
00720 GOSUB [1] 960: RETURN
00730 REM * AI STEP 3 *
00740 IF E(1,1)=0: A=5: RETURN ELSE RETURN
00750 REM * AI STEP 4 *
00760 IF E(1,1) THEN 790
00770 FOR A=1 TO 9 STEP 2: GOSUB 550: IF E
(X,Y) THEN NEXT #A 780 ELSE NEXT A: A=0: R
ETURN
00780 FOR A=1 TO 9: GOSUB 550: IF E(X,Y)=0
OR A=5 OR A=W#3+V: A=(2-W)*3+(2-V)+1: RET
URN ELSE LET A=0: RETURN
00790 IF E(0,0)=1 AND E(2,2)=1 AND E(0,1)=
0 AND E(1,0)=0 AND E(2,1)=0 AND E(1,2)=0 A
ND E(2,0)=0 AND E(0,2)=0: A=INT(RND#4)*2+2
: RETURN
00800 IF E(2,0)=1 AND E(0,2)=1 AND E(1,0)=

```

```

0 AND E(0,1)=0 AND E(1,2)=0 AND E(2,1)=0 A
ND E(0,0)=0 AND E(2,2)=0: A=INT(RND#4)*2+2
: RETURN
00810 A=0: RETURN
00820 REM * AI STEP 5 *
00830 GOSUB [-1] 1110: IF A>0 THEN RETURN
00840 GOSUB [1] 1110: RETURN
00850 REM * AI STEP 6 *
00860 Q=0: FOR A=2 TO 8 STEP 2: GOSUB 550:
IF E(X,Y)<>0 THEN NEXT A: A=0: GOTO 880
00870 E(X,Y)=-1: Q=A: GOSUB [-1] 960: A=Q:
GOSUB 550: E(X,Y)=0: IF K>0 THEN NEXT #A
900 ELSE NEXT A: A=Q: GOTO 880
00880 FOR A=1 TO 9 STEP 2: GOSUB 550: IF E
(X,Y)<>0 THEN NEXT A: A=0: RETURN
00890 E(X,Y)=-1: Q=A: GOSUB [-1] 960: A=Q:
GOSUB 550: E(X,Y)=0: IF K>0: NEXT #A 900
ELSE NEXT A: A=Q: RETURN
00900 A=Q: RETURN
00910 REM * AI STEP 7 *
00920 FOR R=1 TO 15: A=INT(RND#5)*2+1: GOS
UB 550: IF E(X,Y)=0 THEN NEXT #R 930 ELSE
NEXT R: A=0: RETURN
00930 RETURN
00940 REM * AI STEP 8 *
00950 A=INT(RND#4)*2+2: GOSUB 550: IF E(X,
Y)=0 THEN RETURN ELSE 950
00960 REM CAN SOMEONE WIN NEXT TURN?
00970 VAR(P): K=0: B=0: A=0
00980 FOR R=0 TO 7: GOSUB 1070: G=L: H=M:
I=N
00990 A=L: GOSUB 550: L=E(X,Y)
01000 A=M: GOSUB 550: M=E(X,Y)
01010 A=N: GOSUB 550: N=E(X,Y)
01020 IF L=P AND M=P AND N=0: B=1: K=K+1
01030 IF L=P AND N=P AND M=0: B=H: K=K+1
01040 IF M=P AND N=P AND L=0: B=G: K=K+1
01050 NEXT R: A=B: RETURN
01060 REM FIND L,M & N
01070 IF R=7: L=1: M=5: N=9: RETURN
01080 IF R=6: L=3: M=5: N=7: RETURN
01090 IF R<3: L=R#3+1: M=R#3+2: N=R#3+3: R
ETURN
01100 L=R-2: M=R+1: N=R+4: RETURN
01110 REM CAN SOMEONE MAKE 2 POTENTIAL LIN
ES IN NEXT TURN?
01120 VAR (P): C=0
01130 FOR J=1 TO 9: A=J: GOSUB 550: IF E(X
,Y)<>0 THEN NEXT J: A=0: RETURN
01140 E(X,Y)=P: GOSUB (P) 960: IF K>1: C=J
01150 A=J: GOSUB 550: E(X,Y)=0: NEXT J: A=
C: RETURN

```

Punch

Sock! Biff! Erk! Punch is a game for two players that simulates a boxing match. Full instructions are in the program.

Grant Rowe
Arncliffe NSW



```

1 REM PUNCH - BOXING GAME
2 REM ONLY JOYSTICKS NEEDED,
3 REM WITH BASIC VZ-200 CONSOLE.
10 CLS:COLOR8,0:PRINT:PRINT
11 PRINT"  ■■■■■ ■ ■ ■ ■ ■■■■ ■ ■"
12 PRINT"  ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■"
13 PRINT"  ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■"
14 PRINT"  ■■■■■ ■ ■ ■ ■ ■ ■ ■■■■"
15 PRINT"  ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■"
16 PRINT"  ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■"
17 PRINT"  ■ ■■■■■ ■ ■ ■■■■ ■ ■"
18 SOUND28,1:SOUND29,8
19 PRINT:PRINT"  LADIES & GENTLEMEN,"
20 PRINT"THIS IS THE MAIN EVENT!!"
21 PRINT"LEFT PLAYER(7-LETTERS)";:INPUTL
  $:IFLEN(L$)>>THEN21
22 PRINT"RIGHT PLAYER(7-LETTERS)";:INPUT
  R$:IFLEN(R$)>>THEN22
23 FORI=1TO16:PRINT:NEXTI
24 PRINT"PUNCH IS A BOXING TYPE GAME,"
25 PRINT"FOR TWO PLAYERS.EACH PLAYER"
26 PRINT"USES HIS JOYSTICK TO MOVE AND"
27 PRINT"PUNCH HIS BOXERS ARMS.TO PUNCH,"
  "
29 PRINT"A PLAYER PUSHES HIS JOYSTICK,"
30 PRINT"IN EITHER THE LEFT OR RIGHT"
31 PRINT"POSITION.TO MOVE HIS ARMS,YOU"
32 PRINT"PUSH THE STICK EITHER UP OR "
33 PRINT"DOWN!"
34 PRINT" PRESS S TD START."
35 IFINKEY$="S"THEN100ELSEGOTO35
100 CLS:PRINT@35,L$;:PRINT@55,R$;
101 PRINT@388,"BLOWS";:PRINT@404,"BLOWS"
  ;
102 COLOR5:FORI=355TO380:PRINT@I,"■";:NE
  XTI
103 PRINT@483,"1''5''10      1''5''1、
  0";
104 X=419:Y=435:V=0
105 COLOR2:PRINT@100,"■■■■"
  ■■■■";
106      PRINT@132,"■■■■"
  ■■■■";
107      PRINT@164,"■■■"
  ■■■■";
108 Q=0:FORI=1TO5:Q=Q+32:PRINT@164+Q,"HH
  HH      ■■■■";

```

```

109 NEXTI
120 F=200:F2=264:F3=215:F4=279:M2=0:N=0:
  N2=0:M=0:M3=0:M4=0:N3=0
121 N4=0
130 A=(INP(43)AND31):B=(INP(46)AND31):IF
  A=31ANDB=31THEN141
131 W=0:IFA=30ORA=29THENPRINT@F,"  ";:P
  RINT@F2,"  ";
132 IFB=30ORB=29THENPRINT@F3-2,"  ";:PR
  INT@F4-2,"  ";
133 IFA=30ANDN=0ANDN2=0THENF=F-32:IFF<20
  0THENF=200:W=3
134 IFA=30ANDW=3THENF2=F2-32:IFF2<232THE
  NF2=232
135 IFA=29ANDN=0ANDN2=0THENF2=F2+32:IFF2
  >352THENF2=F2-32:W=4
136 IFA=29ANDW=4THENF=F+32:IFF>320THENF=
  F-32
137 IFB=30ANDN3=0ANDN4=0THENF3=F3-32:IFF
  3<215THENF3=215:W=1
138 IFB=30ANDW=1THENF4=F4-32:IFF4<247THE
  NF4=247
139 IFB=29ANDN3=0ANDN4=0THENF4=F4+32:IFF
  4>352THENF4=F4-32:W=2
140 IFB=29ANDW=2THENF3=F3+32:IFF3>320THE
  NF3=F3-32
141 IFA=27THENF=F+1:M=M+1:N=1:GOSUB270
142 IFA=23THENF2=F2+1:M2=M2+1:N2=1:GOSUB
  280
143 IFA<>23ANDN2=1THEN145ELSEIFA<>27ANDN
  =1THEN144ELSE146
144 PRINT@F,"  ";:F=F-1:M=M-1:IFM=0THEN
  N=0:GOTO146ELSEGOTO146
145 PRINT@F2,"  ";:F2=F2-1:M2=M2-1:IFM2
  =0THENN2=0
146 IFB=27THENF3=F3-1:M3=M3-1:N3=1:GOSUB
  250
147 IFB=23THENF4=F4-1:M4=M4-1:N4=1:GOSUB
  260
148 IFB<>23ANDN4=1THEN210ELSEIFB<>27ANDN
  3=1THEN200
150 GOSUB500:GOTO130
200 PRINT@F3-2,"  ";:F3=F3+1:M3=M3+1:IF
  M3=0THENN3=0
202 GOTO150
210 PRINT@F4-2,"  ";:F4=F4+1:M4=M4+1:IF
  M4=0THENN4=0
215 GOTO150
250 IFPEEK(28669+F3)=159THENGOSUB500:SOU
  ND1,4:GOSUB300ELSEGOTO252
251 PRINT@F3-2,"  ";:F3=F3+8:M3=M3
  +8:B=31:RETURN
252 IFPEEK(28669+F3)=175ANDM3<-3THENSOUN
  D25,1:GOTO253ELSERETURN
253 SOUND27,1:PRINT@F3-2,"  ";:F3=F3+
  3:M3=M3+3:RETURN
260 IFPEEK(28669+F4)=159THENGOSUB500:SOU
  ►

```


POCKET PROGRAMS

```
ND1,4:GOSUB300ELSEGOTO262
261 PRINT@F4-2,"      ";:F4=F4+8:M4=M4
+8:RETURN
262 IFPEEK(28669+F4)=175ANDM4<-3THENSOUN
D25,1:GOTO263ELSERETURN
263 SOUND27,1:PRINT@F4-2,"      ";:F4=F4+
3:M4=M4+3:RETURN
270 IFPEEK(28674+F)=159THENSOUND1,4:GOSU
B400ELSEGOTO272
271 PRINT@F-8,"      ";:F=F-8:M=M-8:
RETURN
272 IFPEEK(28674+F)=175ANDM>3THENSOUND25
,1:GOTO273ELSERETURN
273 SOUND27,1:PRINT@F-3,"      ";:F=F-3:M
=M-3:RETURN
280 IFPEEK(28674+F2)=159THENSOUND1,4:GOS
UB400ELSEGOTO282
281 PRINT@F2-8,"      ";:M2=M2-8:F2=F2-
8:RETURN
282 IFPEEK(28674+F2)=175ANDM2>3THENSOUND
25,1:GOTO283ELSERETURN
283 SOUND27,1:PRINT@F2-3,"      ";:F2=F2-
3:M2=M2-3:RETURN
300 COLOR4:PRINT@X,"■";:PRINT@X+32,"■";:
X=X+1:IFX=429THEN302
```

```
301 RETURN
302 GOSUB700
303 PRINT@55,"WINNER";:FORI=1TO100:SOUND
RND(30),1:NEXTI:GOTO10
400 COLOR4:PRINT@Y,"■";:PRINT@Y+32,"■";:
Y=Y+1:IFY=445THEN402
401 RETURN
402 GOSUB700
403 PRINT@35,"WINNER";:FORI=1TO100:SOUND
RND(30),1:NEXTI:GOTO10
500 COLOR3:PRINT@F,"■■";:PRINT@F2,"■■"
;:PRINT@F3-2,"■■";
501 PRINT@F4-2,"■■";:COLOR2:PRINT@F,"■"
;:PRINT@F2,"■";
502 PRINT@F3,"■";:PRINT@F4,"■";
503 RETURN
700 IFY=445THENR=17ELSER=0
710 FORI=100TO324STEP32:PRINT@I+R,"
";:NEXTI
720 RETURN
```



One Use for the FN Definition

This program uses the FN definition for storage of short machine language routines within the BASIC program area. As the interpreter passes through the FNx definition, it stores a pointer to the byte following the equal sign in the table starting at 06E4 hex (1764 decimal), and then ignores the rest of the line until the function is called. (The pointer is stored in reverse; that is, with the most significant byte first.)

The bytes following the equal sign can be used for storing machine code, as long as enough bytes are reserved and the code is fully relocatable. Any program modification will change its location, but each new run will keep track of the entry point. Otherwise the principle is similar to storing machine code in REM statements. The definitions are reset

on exit to avoid editing problems with code 13 (CR), which is used as an end-of-line marker, unnecessarily in this case.

The demonstration routines are quite short, but could be useful to handicapped persons who cannot hold down two keys at the same time. Pressing SHIFT, then another key will produce the shifted character (unlike LOCK, it also works with non-alpha keys). CTRL followed by another key will produce a character with 128 added to its ASCII code (inverse or inverse graphic with CTRL held down).

The SHIFT and CTRL keys are not reflected anywhere in the scratch-pad, so it is necessary to use the ROM key-scan routines. SHIFT is at A4FE hex, CTRL at A504 hex.

**Petr Lukes
Toowoomba QLD**

```
01000 print"MicroBee LKS 840717"\Machine language in FNx : One-
finger typing.";clear;restore 1000
01010 poke 140,1;gosub 2000;rem disable BREAK and initialise
01020 inverse;print"\Routine running, press any key except RESET
; BREAK will exit" chr(7);normal
01030 G=usr(M(0));H=usr(M(1));rem flags: G=CTRL, H=SHIFT
01040 K=asc(key);if K<128 then 1050 else if G or H then 1040 els
e 1030
01050 if G : K=K+128 else if not H then 1060 else if K>43 and K<
49 : K=K+16 else if K<60 : K=K-16 else if K<64 : K=K+16 else if
K<97 : K=K+32 else let K=K-32
01060 print [A1 K];if K<>3 then 1030
01070 print"\Repair FNx, in case it includes code 13";for A=0 t
o 6:B=48+A;poke M(0)+A,B;poke M(1)+A,B;next A;poke 140,0;list 20
10,2020;end
02000 print"Code:"\CALL ... ;scan key - ROM routines"\JR NZ
, 1 ;jump if key not pressed"\DEC BC ;set flag if key p
ressed"\RET ;return"
02010 fn0=rem0123456: 7 bytes for this routine
02020 fn1=rem0123456: REM prevents case inversion
02030 dimM(1);M(0)=peek(1764)*256+peek(1765)+1;M(1)=peek(1766)*2
56+peek(1767)+1;print "M(0)="M(0),"M(1)="M(1);rem Note the msb,1
sb format
02040 A=2304;if M(0)<A or M(1)<A then print"FNx not registered"
[A9 7];end;rem FNx address must be assigned before storing m/1
02050 data 205,4,165,32,1,11,201
02060 for A=M(0) to M(0)+6:read D;print D;poke A,D;next A
02070 data 205,254,164,32,1,11,201
02080 for A=M(1) to M(1)+6:read D;print D;poke A,D;next A
02090 list 2010,2020;return
```

Electronic Typewriter

This program, when used with a cable between the computer and the printer, allows you to drive a centronics printer without paying for printer interfaces costing \$125 or more. It allows your printer to function as a correctable electronic typewriter.

A number of features included depend on the type of printer that you have connected to your system. If you have an MX/80, CX/80, EX/80, BX/80 or similar, then you should have no trouble with any of this program's features.

To activate the various features use the following keys:

F1 = Double width on
 F2 = Double width off
 F3 = Compressed width on
 F4 = Compressed width off
 F5 = Double strike on
 F6 = Double strike

F7 = Underline on
 F8 = Underline off
 Shift U = Superscript
 Shift L = Subscript
 Shift N = Normal height
 (HC) = Shifted home/clr
 (F1) = 'F1' key
 Same for keys F2 to F8
 (↑U) = Shifted U
 (↑L) = Shifted L
 (↑N) = Shifted N.

Before the program can be used you must first type in the program 'An Inexpensive Centronics Interface' from the book 'More On The 64' by H.C. Wagner. After running that program and 'NEW'ing the computer, load and run this program to start using your computer as a typewriter.

Paul Vandenberg
 Cabramatta NSW

```

1 PRINT "(HC)";
10 OPEN 2,2,2:ES=CHR$(27):POKE214,0
11 POKE207,0:POKE204,0:GETA$:IFA$="" THEN 11
12 POKE204,1:POKE207,1
13 IFASC(A$)=20 THEN PRINT A$;:PRINT#2,CHR$(127);:GOTO 11
14 IFA$="(F1)" THEN PRINT#2,CHR$(14);:GOTO 11
15 IFA$="(F2)" THEN PRINT#2,CHR$(20);:GOTO 11
16 IFA$="(F3)" THEN PRINT#2,CHR$(15);:GOTO 11
17 IFA$="(F4)" THEN PRINT#2,CHR$(18);:GOTO 11
18 IFA$="(F5)" THEN PRINT#2,ES;"G";:GOTO 11
19 IFA$="(F6)" THEN PRINT#2,ES;"H";:GOTO 11
20 IFA$="(F7)" THEN PRINT#2,ES;"-1";:GOTO 11
21 IFA$="(F8)" THEN PRINT#2,ES;"-0";:GOTO 11
22 IFA$="(^U)" THEN PRINT#2,ES;"S0";:GOTO 11
23 IFA$="(^L)" THEN PRINT#2,ES;"S1";:GOTO 11
24 IFA$="(^N)" THEN PRINT#2,ES;"T";:GOTO 11
25 PRINT A$;
26 PRINT#2,A$;
27 GOTO 11
  
```

Zardax to DIF

The Zardax utilities disk provides a program for converting a DIF file to a Zardax label file. This program is intended as an aid to Apple users who wish to perform the reverse procedure; that is, convert a Zardax label file into a DIF file so it may be included in a program such as DB Master. The names of the labels must be in upper case for compatibility with DB Master.

The program assumes that both the Zardax file and the DIF

file will fit on the same disk. The title of the DIF file produced is the label file name plus '.DIF'.

A general input routine is used at lines 6000 and 9030. Users can substitute their own favourite routine here.

An option is provided to indicate the presence of numeric fields when only numeric data is found in a particular field.

Anthony Barnett
 Prospect SA

```

10 REM *****
20 REM *
30 REM * ZARDAX TO DIF *
40 REM * BY A. L. BARNETT *
50 REM *
60 REM *****
99 REM INTRODUCTION
100 HOME : VTAB 10: HTAB 13: PRINT "ZARDAX-TO-DIF"
110 VTAB 12: HTAB 15: PRINT "TRANSLATOR"
120 VTAB 16: HTAB 13: PRINT "BY A.L. BARNETT"
130 GOSUB 20000
140 HOME : VTAB 5: PRINT "THIS PROGRAM WILL CONVERT A ZARDAX LABEL";
150 PRINT : PRINT "TEXT FILE TO A DIF FILE COMPATIBLE WITH"
160 PRINT : PRINT "PROGRAMS SUCH AS DB MASTER."
170 PRINT : PRINT "IT IS ASSUMED BOTH FILES WILL FIT ON"
180 PRINT "THE SAME DISK."
190 PRINT : PRINT "IF ANY FIELD ONLY CONTAINS NUMERIC DATA"
200 PRINT "YOU WILL BE ASKED TO VERIFY IT"
210 PRINT "AS A NUMERIC DIF VECTOR."
220 GOSUB 20000: REM KEYPRESS
300 REM INITIALIZATION
310 D$ = CHR$(4)
  
```

```

320 HOME : PRINT "INSERT FILE DISK IN CURRENT DRIVE."
330 INPUT "PRESS RETURN TO CONTINUE. ";A$
340 IF A$ < > "" THEN 330
350 PRINT D$;"CATALOG"
360 INPUT "FILE NAME = ";F1$
370 HOME : PRINT "FILE NAME = ";F1$
380 GOTO 9000: REM CHECK FILE VALIDITY
390 REM TEST ERROR CONDITION
400 POKE 216,0: PRINT D$;"CLOSE":X = FRE (0)
410 IF PEEK (222) < > 5 THEN 10000
420 PRINT "NO. OF FIELDS PER LABEL = ";F
430 L = (I - F) / F: PRINT "NO. OF LABELS = ";L
440 PRINT "IF YOU HAVE MADE AN ERROR, PRESS 'ESC': PRINT "PRESS ANY OTHER KEY TO CONTINUE ": GET A$: PRINT A$: IF A$ = CHR$(27) THEN RUN
450 ONERR GOTO 12000
460 HOME : VTAB 10: HTAB 15: INVERSE : PRINT "TRANSLATING": NORMAL
470 GOSUB 2000: REM TRANSLATE
480 PRINT "TRANSLATION COMPLETE."
490 END
  
```

```

1999 REM TRANSLATION ROUTINE
2000 F2$ = F1$ + ".DIF"
2010 DIM VE$(F)
2020 PRINT D$;"OPEN";F1$
2030 PRINT D$;"READ";F1$
2040 FOR J = 1 TO F
2050 GOSUB 6000:VE$(J) = G$
2060 NEXT
2070 PRINT D$
2080 GOSUB 5000: REM CHECK FOR NUMERIC FIELDS
2090 PRINT D$;"OPEN";F2$
2100 PRINT D$;"WRITE";F2$
2110 GOSUB 3000
2120 FOR J = 1 TO L
2130 T = - 1:V = 0:S$ = "BOT"
2140 GOSUB 4000
2150 PRINT D$;"READ";F1$
2160 FOR K = 1 TO F
2170 GOSUB 6000
2180 VE$(K) = G$
2190 NEXT
2200 PRINT D$;"WRITE";F2$
  
```

POCKET PROGRAMS

80-Column Hello

This little program will let you INIT your disks so that when they are booted, they will boot in 80-column mode. Any Apple fitted with an 80-column card, including the IIe, will run the program. Some of the cheaper Taiwan cards require the video-out cord to be switched manually.

**R. Chalmers
Inala QLD**

```

1 REM
2 REM
3 REM
4 REM
5 :
6 :
7 :
8 REM 80-Column card on boot up HELLO program for the APPLE
9 DATA 165,36,240,3,32,47,174,96
10 CALL 49920: REM Switch on 80-column card
11 CALL 1002: REM DOS subroutine which 'reconnects' the DOS intercepts to the
    keyboard and screen data streams.
15 PRINT CHR$(12): REM Same as HOME (on this 80-C card anyway) but also a FO
    RM FEED to the printer
16 :
20 PRINT "80 COLUMN CARD DEMO....."
25 PRINT "DISPLAYING 2 COLUMN CATALOG LISTING....."
26 :
27 REM The following POKE's place the 2-column format in DOS.
28 REM ember that if you INIT a new disk, this patch will be permanent.
30 FOR I = 45999 TO 46006: READ D: POKE I,D: NEXT I
40 POKE 44578,32: POKE 44579,175: POKE 44580,179
50 POKE 44463,4: POKE 44465,183: POKE 46007,174: POKE 46008,236: POKE 46009,239
    : POKE 46010,214
55 :
70 D$ = CHR$(4)
80 PRINT D$;"CATALOG"
90 :
100 REM a CALL 49408 will turn on the printer, then re-call the card & DOS to
    turn it off

```

R.CHALMERS
26 Bittern St
INALA 4077
BRISBANE.

```

2210 FOR K = 1 TO F
2220 ON NU$(K) + 1 GOSUB 2500,2600
2230 GOSUB 4000
2240 NEXT
2250 NEXT
2260 T = - 1:V = 0:S$ = "EOD"
2270 GOSUB 4000
2280 PRINT D$;"CLOSE"
2290 RETURN
2500 T = 0:V = VAL (VE$(K)):S$ = "V": REM NUMERIC
2510 RETURN
2600 T = 1:V = 0:S$ = VE$(K): REM ALPHANUMERIC
2610 RETURN
3000 REM WRITE DIF HEADER
3010 PRINT "TABLE": PRINT "0,1": PRINT F1$
3020 PRINT "VECTORS": PRINT "0,";F: GOSUB 3500
3030 PRINT "TUPLES": PRINT "0,";L: GOSUB 3500
3040 FOR J = 1 TO F
3050 PRINT "LABEL": PRINT J;"1": PRINT MID$(VE$(J),2, LEN
    (VE$(J)) - 2)
3060 NEXT
3070 PRINT "DATA": PRINT "0,0": GOSUB 3500
3080 RETURN
3500 PRINT CHR$(34); CHR$(34): REM TWO QUOTE MARKS
3510 RETURN
3999 REM WRITE DIF VECTOR
4000 PRINT T;"",V
4010 PRINT S$
4020 RETURN

4999 REM CHECK FOR NUMERIC FIELDS
5000 FOR J = 1 TO F
5010 IF NU$(J) = 0 THEN PRINT "IS RECORD WITH LABEL ";VE$(J)
    PRINT "NUMERIC? (Y/N) ";: GET A$: PRINT A$: IF A$ = "N" THEN
    NU$(J) = 1
5020 NEXT
5030 HOME : VTAB 10: HTAB 15: INVERSE : PRINT "TRANSLATING":
    NORMAL
5040 RETURN
5999 REM INPUT ANYTHING ROUTINE
6000 G$ = ""
6010 CALL - 662
6020 FOR I = 512 TO 736:X = PEEK (I): IF X = 141 THEN 6060
6030 IF X > 141 THEN X = X - 128

```

```

6040 G$ = G$ + CHR$(X)
6050 NEXT
6060 RETURN
8999 REM COUNT, VERIFY AND NUMERIC TEST
9000 ONERR GOTO 390
9010 PRINT D$;"READ";F1$
9020 I = 0:F = 0
9030 G$ = ""
9040 CALL - 662
9050 FOR II = 512 TO 736:X = PEEK (II): IF X = 141 THEN 9090
9060 IF X > 141 THEN X = X - 128
9070 G$ = G$ + CHR$(X)
9080 NEXT
9090 IF LEFT$(G$,1) = CHR$(123) AND RIGHT$(G$,1) = CHR$(
    125) THEN F = F + 1
9100 I = I + 1
9110 IF I = F THEN 9030
9120 IF I = F + 1 THEN DIM NU$(F)
9130 FI = I - ( INT (I / F) * F): IF FI = 0 THEN FI = F
9140 IF STR$( VAL (G$)) < > G$ THEN NU$(FI) = 1
9150 GOTO 9030
9999 REM ERROR ROUTINES
10000 ER = PEEK (222): PRINT D$;"CLOSE"
10010 IF ER = 6 THEN HOME : PRINT "THIS FILE IS NOT ON THIS
    DISK": GOSUB 20000: GOTO 320
10020 IF ER = 13 THEN HOME : PRINT "THIS FILE IS NOT A TEXT
    FILE": GOSUB 20000: GOTO 320
10030 IF ER = 120 THEN HOME : PRINT "THERE IS AN ERROR IN YOUR
    ZARDAX FILE": PRINT "PROBABLY A SPURIOUS BRACE IS EMBEDDED":
    PRINT "IN A FIELD SOMEWHERE": GOSUB 20000: RUN
10040 IF ER = 133 THEN HOME : PRINT "FILE IS NOT A ZARDAX LABEL
    FILE": GOSUB 20000: RUN
10050 IF ER = 11 THEN HOME : PRINT "INVALID FILE NAME": GOSUB
    20000: GOTO 320
10060 PRINT "ERROR ";ER;" OCCURRED IN LINE "; PEEK (218) + 256 *
    PEEK (219): END
12000 PRINT D$;"CLOSE"
12010 IF PEEK (222) = 9 THEN PRINT "DISK FULL": PRINT
    D$;"DELETE";F2$: END
12020 PRINT "ERROR "; PEEK (222);" IN LINE "; PEEK (218) + 256 *
    PEEK (219)
12030 END
20000 VTAB 22: CALL - 958: PRINT "PRESS ANY KEY TO CONTINUE:
    ";: GET A$: PRINT A$: VTAB 22: CALL - 958: RETURN

```

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Amaze

```

1 ;
2 ;
3 ;
4 ;   By Tony Hinde
5 ;
6 ;
7 ;
10 DEF CHR$(148)="00000000FFFFFFFF":DEF CHR$(150)="FFFFFFFF00000000"
20 CLS:CLR:COLOR 1,0,0,7:DEFINT X,Y,C,P,B,M:L=0:DIM MZ(50,50)
30 K=.6:PRINT "Press any key":' K sets the persPective
40 IF PEEK(1424)=0 THEN R=RND:GOTO 40:' Randomizes the Program
50 D=INKEY$:INPUT "What level of difficulty 'Hard 1 to Easy 9' :I:KU:IF KU<1 0
R KU>9 THEN 50
60 KU=.62+KU/100:' The '.62' can be changed to change the limits of difficulty
70 PRINT "WAIT JUST A MINUTE PLEASE":' Sets the maze in the array 'MZ' ↓
80 FOR X=1 TO 50:MZ(X,1)=1:MZ(X,50)=1:MZ(50,X)=1:MZ(1,X)=1:NEXT
90 FOR X=3 TO 49:FOR Y=2 TO 49:IF RND)KU THEN MZ(X,Y)=1
100 NEXT:PRINT "*"I:NEXT:' The '*'s are to Pass the time
110 XP=2:VP=2:D=31:GOSUB 190:' Input routine ↓ '1424' holds any key Press code
120 P=PEEK(1424):IF (P<28 OR P>31) AND P<>11 AND P<>104 AND (P<50 OR P>57) THEN
120:' 50-57 is the code for the keys '2' to '9', You can move ahead in jumps
130 IF P>49 AND P<58 THEN 550:' Codes for the arrow keys
140 IF P=104 THEN GOTO 580:' 'H' key
150 IF P=11 THEN GOTO 440:' 'HOME' key
160 IF P=30 THEN 170 ELSE IF P=31 THEN GOTO 390 ELSE 410
170 IF MZ(XP+X,VP+Y)=1 THEN 120 ELSE XP=XP+X:VP=VP+Y
180 GOSUB 190:GOTO 120:' Rutine to Print the 3D maze ↓↓↓↓↓↓↓↓↓
190 BL=0:BR=0:CLS:COLOR INT((X-1)/7)+1:LX=598:LY=199:XD=XP:YD=VP:IF D=31 THEN X
1--1:V1=0:K=0:V=1:X3=1:V3=0:GOTO 230
200 IF D=30 THEN X1=1:V1=0:K=0:V=-1:X3=-1:V3=0:GOTO 230
210 IF D=29 THEN X1=0:V1=-1:X=-1:V=0:X3=0:V3=1:GOTO 230
220 X1=0:V1=1:X=1:V=0:X3=0:V3=-1
230 FOR CN=1 TO 11
240 P1=MZ(XD+X1,YD+V1):' Right
250 P2=MZ(XD+X,YD+V):' Ahead
260 P3=MZ(XD+X3,YD+V3):' Left
270 IF P1=2 OR P2=2 OR P3=2 THEN 470
280 IF P3=1 AND BL=1 THEN LINE (340-LX/2,99.5-LY/2)-(340-LX/2,K,99.5-LY/2),PSET:
LINE (340-LX/2,99.5+LY/2)-(340-LX/2,K,99.5+LY/2),PSET:LINE (340-LX/2,99.5-LY/2)-
(340-LX/2,99.5+LY/2),PSET
290 IF P3=1 THEN BL=0 ELSE BL=1
300 IF P3=1 THEN LINE (340-LX/2,99.5-LY/2)-(340-LX*K/2,99.5-LY*K/2),PSET:LINE (3
40-LX/2,99.5+LY/2)-(340-LX*K/2,99.5+LY*K/2),PSET:LINE(340-LX*K/2,99.5-LY*K/2)-(3
40-LX*K/2,99.5+LY*K/2),PSET
310 IF P1=1 AND BR=1 THEN LINE (340+LX/2,99.5-LY/2)-(340+LX/2,K,99.5-LY/2),PSET:
LINE (340+LX/2,99.5+LY/2)-(340+LX/2,K,99.5+LY/2),PSET:LINE (340+LX/2,99.5-LY/2)-
(340+LX/2,99.5+LY/2),PSET
320 IF P1=1 THEN BR=0 ELSE BR=1
330 IF P1=1 THEN LINE (340+LX/2,99.5-LY/2)-(340+LX*K/2,99.5-LY*K/2),PSET:LINE (3
40+LX/2,99.5+LY/2)-(340+LX*K/2,99.5+LY*K/2),PSET:LINE(340+LX*K/2,99.5-LY*K/2)-(3
40+LX*K/2,99.5+LY*K/2),PSET
340 IF P2=1 THEN CN=11:LINE (340-LX/2*K,99.5-LY*K/2)-(340+LX*K/2,99.5+LY*K/2),PS
ET,,B:GOTO 360
350 LX=LX*K:LY=LY*K:XD=XD+X:YD=YD+V:' Changes the variables to down the hall
360 NEXT
370 LOCATE 0,0:IF D=31 THEN PRINT "South":ELSE IF D=30 THEN PRINT "North":ELSE
IF D=29 THEN PRINT "West":ELSE PRINT "East"
380 RETURN:' Reverse ↓
390 IF D=31 THEN D=38 ELSE IF D=30 THEN D=31 ELSE IF D=28 THEN D=29 ELSE IF D=29
THEN D=28
400 GOSUB 190:GOTO 120:' Right and left turn respectively ↓
410 IF P=28 THEN IF D=31 THEN D=29 ELSE IF D=29 THEN D=30 ELSE IF D=30 THEN D=28
ELSE IF D=28 THEN D=31
420 IF P=29 THEN IF D=31 THEN D=28 ELSE IF D=28 THEN D=30 ELSE IF D=30 THEN D=29
ELSE IF D=29 THEN D=31
430 GOSUB 190:GOTO 120:' Home rutine ↓ moves ahead until stopped by a wall
440 IF MZ(XP+X,VP+Y)=1 THEN GOTO 460 ELSE IF MZ(XP+X,VP+Y)=2 THEN 478
450 XP=XP+X:VP=VP+Y:GOTO 440
460 GOSUB 190:GOTO 120
470 CLS:COLOR 4:LOCATE 38,12:PRINT "You made it!!!!!!!"
480 FOR X=1 TO 21:Tone for 'ain't she sweet'
490 PLAY "T8B04L14N8P10N7P10N6P16L20N8N9N8L16N9P25N9P25N8P25N8P25N6P18"
500 PLAY "L20N6N6N7L16N10P20N10P20N9P20N9P20N7P25L20N9P48N7P20N3L14N2P14"
510 PLAY "L11N2P1003N12P10L14N10P5"
520 NEXT
530 PRINT "Would you like to play again?"
540 P=PEEK(1424):IF P=121 THEN RUN ELSE IF P=0 THEN 548 ELSE END
550 P=P-48:FOR Q=1 TO P:IF MZ(XP,VP)=1 THEN Q=P:GOTO 578
560 XP=XP+X:VP=VP+Y
570 NEXT:GOSUB 190:GOTO 120:' Rutine to Print etine maze for aerial view
580 CLS:FOR Q=1 TO 49:COLOR INT((Q-1)/7)+1:FOR W=1 TO 50 STEP 2:MI=MZ(Q,W):M2=MZ
(Q,W+1):LOCATE Q,(W-1)/2:IF M1=1 AND M2=1 THEN PRINT "■":ELSE IF M1=1 THEN PRIN
T "■":ELSE IF M2=1 THEN PRINT "■":
590 NEXT:NEXT:COLOR 4:LOCATE 67,14:PRINT "Hit any key":
600 LINE (XP+8+1,VP+4-3)-(XP+8+6,VP+4),PSET,7,B
610 IF PEEK(1424)=8 THEN LINE (XP+8+1,VP+4-3)-(XP+8+6,VP+4),PSET,0,8:GOTO 600
620 GOSUB 190:GOTO 120

```

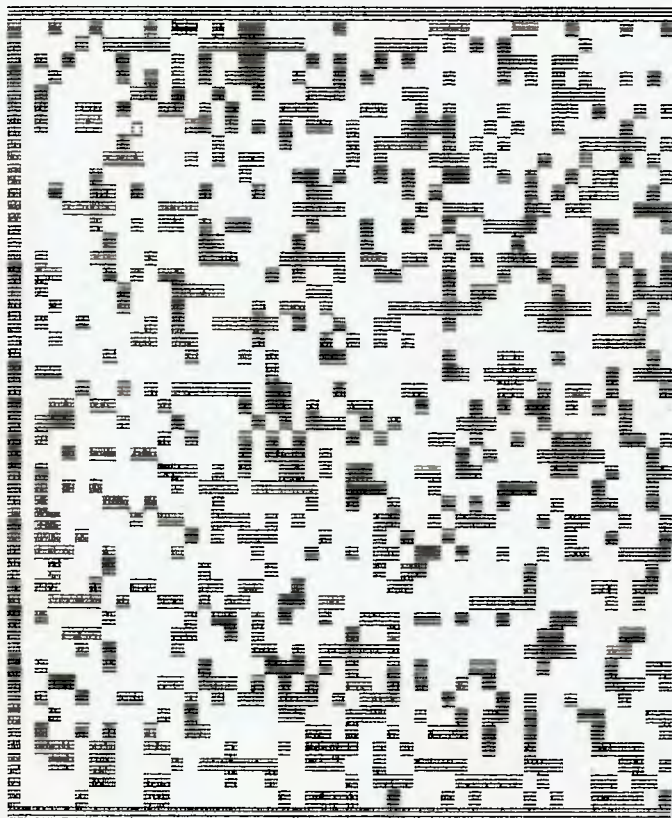
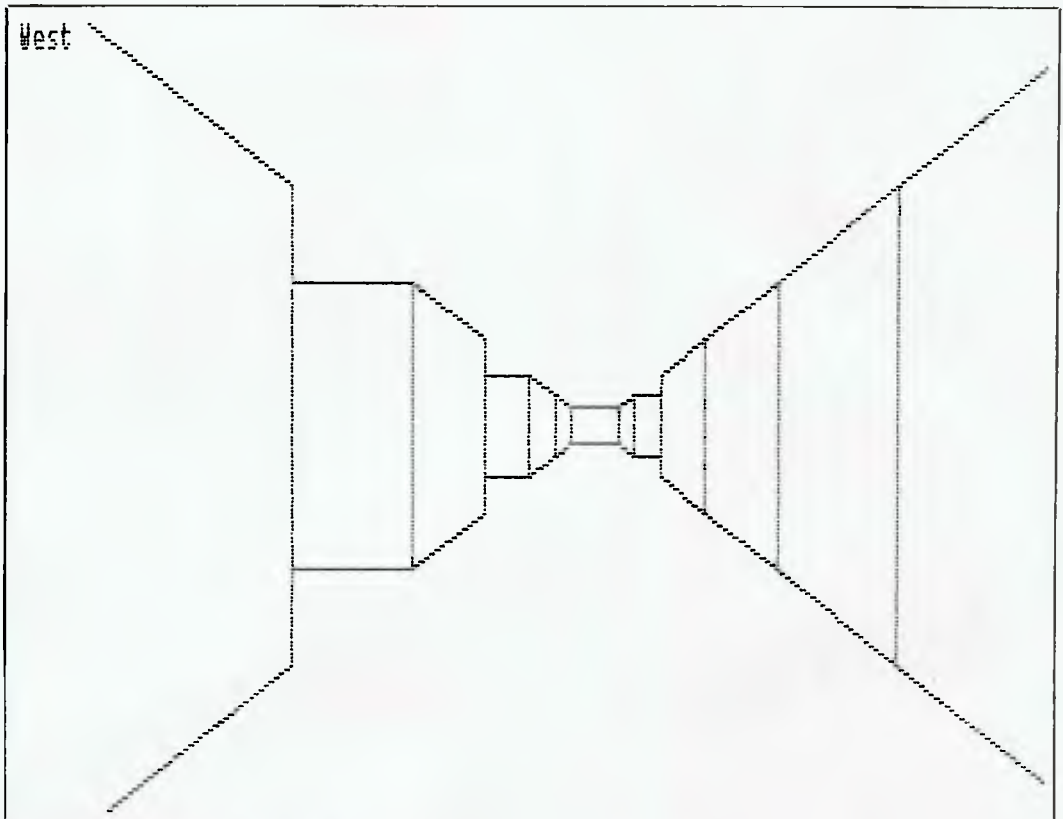
POCKET PROGRAMS

Amaze is a realistic, three-dimensional maze game. To escape you must travel from one side to the other by moving forward, left, right or by turning around. This can be a lengthy exercise, so you can move up to nine steps at a time, if the maze allows it, by pressing the numerical keys. The HOME key will move you as far as you can go in the direction you are facing.

You are given the option of cheating (a game with style!) with the H (for HELP) key, which will give you an aerial view of the maze.

Amaze was written on a Sigma/Oki, but will run without much adjustment on the Peach and on the Colour Computer with extended BASIC. It isn't a long program and it runs fairly rapidly.

Tony Hinde
Tarragindi NSW



Scissors, Rocks and Paper

In the traditional game, the players use their hands to symbolise either a rock, a pair of scissors or a piece of paper. A pair of scissors is dominant over paper because they can cut it, paper is dominant over a rock because it can wrap it and a rock is dominant over scissors because it can make them blunt. The player with the dominant object wins that round.

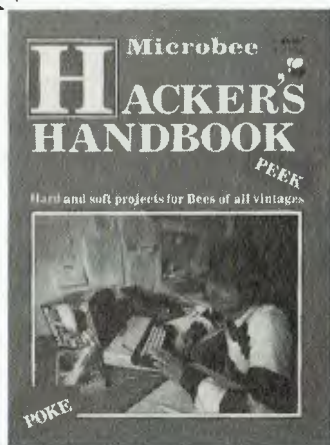
In this game you play against the computer. Your keys are ; @ and \ for a pair of scissors, a rock and paper respectively. When you press one of those keys your object will appear on the left-hand side of the screen. The computer will then randomly select and print its object.

Tim Cooper
Eastwood NSW

```

00100 POKE 220,39: F1#=CHR(10)+CHR(8)+CHR(
8)+CHR(8): F2#=F1#+CHR(8)+CHR(8)
00110 FOR J=-1520 TO -1425: READ A: POKE J
,A: NEXT J
00120 RESTORE: FOR J=-1377 TO -1424 STEP -
1: READ A: POKE J,A: NEXT J
00130 A1#=KEY: IF A1#<"*;" AND A1#<"@" AN
D A1#<"\" THEN 130
00140 CLS: PC6: B=INT(SGN(FLT(ASC(A1#)-64)
)))+2: C=INT(RND*3)+1: CURS 28,B: ON B GOSU
B 180,190,200
00150 CURS 33,8: ON C GOSUB 180,190,200
00160 NORMAL:PLAY 0,10
00170 IF C=B THEN 240 ELSE IF C=B+1 OR C=B
-2 THEN 220 ELSE 230
00180 PRINT"***" F1# "": RETURN
00190 PRINT"***&": RETURN
00200 PRINT" " F1# " " : RETURN
00210 PRINT"\" / F2# " " " F2# "/ / \"
F2# [A3 15]: PLAY 0,3: PRINT" : " F2#
CHR(10) " " F2# [A3 15]: PLAY 0,3: PR
INT" " F1# " " " F1# " \": RETURN
00220 CURS 28,7: GOSUB 210: PRINT"You lose
.": PLAY 16;16;12;9;24;12;9;24: GOTO 130
00230 CURS 33,7: GOSUB 210: PRINT"You win!
": PLAY 16;16;20;23;0;20;23;8: GOTO 130
00240 PRINT"\"Tie.": PLAY 8,10: GOTO 130
00250 DATA 0,0,0,0,0,0,0,0,0,0,56,70,129,128
,128,96,31
00260 DATA 0,0,0,0,0,0,0,0,0,0,1,134,152
,224,128
00270 DATA 0,0,0,0,0,0,0,0,7,24,96,128,0,0
,0,0
00280 DATA 0,3,15,15,63,127,127,127,255,25
5,255,255,127,63,31,15
00290 DATA 28,126,254,255,255,255,255,255,
255,255,255,255,255,255,191
00300 DATA 0,0,0,0,0,0,192,240,240,252,252
,254,252,252,240,0
    
```

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Meteor

This game uses the Commodore 64's sprite graphics, including multi-colour sprites and up-to-date sound effects.

The idea of the game is to destroy the meteorites as they fall towards the planet. If you hit them your score is increased, but if you let them past, they detonate against your planet and you lose points. You have only 3 lives, with bonus lives awarded for achieving certain high scores.

If you want faster meteorites,

change the 7 in line 135 to a larger number — if you make the number too large, the sprites will overlap and you won't be able to detect their collision. A good fast combination for line 135 would be `INT(RND(1)*8)+3:NEXT`. Lines 200-210 and 300-310 move your spacecraft, so if you want to change the speed of your craft, change the 5 in both cases to your desired number.

David Abram
Banksia Park SA

```

5 LI=3:H=2:SK=150:P(0)=1:P(1)=1:P(2)=1
10 V=53248:POKEV+21,255:POKEV+28,253
12 Q=192:FORL=2040T02047:POKEL,Q:Q=Q+1:NEXT
13 FORI=12288T012412:READD:POKEI,D:NEXT
14 ME=12416:FORI=12480T012542:READD:POKEI,D:POKEME,D:ME=ME+1:NEXT
15 ME=12544:FORI=12608T012670:READD:POKEI,D:POKEME,D:ME=ME+1:NEXT
16 ME=12672:FORI=12736T012798:READD:POKEI,D:POKEME,D:ME=ME+1:NEXT
18 POKEV+39,1:POKEV+40,8:FDRQ=41T046:POKEV+Q,3:NEXT
20 POKEV+37,2:POKEV+38,7:POKEV+1,230
29 POKE53280,0:POKE53281,0
30 PRINT"***** METEOR *"
31 PRINT"*****"
35 PRINT"THE GAME OF METEOR IS FOR THE SKILLED."
36 PRINT"IN THE FOURTH GALAXY FROM EARTH A BATTLEARISES,AND YOU ARE TOLD
TO FIGHT"
37 PRINT"FOR YOUR PLANET."
38 PRINT"BUT..... IT IS NOT A WAR AGAINST OTHER PLANETS BUT AGAINST"
40 PRINT"
42 PRINT"
44 PRINT"
46 PRINT"
50 PRINT"*****HIT ANY KEY TO START"
52 GETK$:IFK$=""THEN52
54 PRINT"*****CONTROLS"
56 PRINT"*****"
58 PRINT"***** + - LEFT"
59 PRINT"***** I - RIGHT"
60 PRINT"***** F1 - FIRE"
65 PRINT"*****METEORS ARE FALLING TOWARDS YOU AND YOU"
66 PRINT"HAVE TO SHOOT THEM DOWN. WHEN THEY GO"
67 PRINT"PAST YOU THEY SELF-DESTRUCT AND YOU LOSE";
68 PRINT"POINTS BECAUSE OF THIS."
69 PRINT"*****YOU HAVE 3 LIVES AND TO GAIN POINTS YOU"
70 PRINT"HAVE TO DETONATE THE METEDRS WHILE THEY"
72 PRINT"ARE STILL IN SPACE."
74 PRINT"***** WARNING *****"
75 PRINT"SOME OF THE METEORS ARE INDESTRUCTABLE"
82 PRINT"*****HIT ANY KEY TO START"
83 GETK$:IFK$=""THEN83
84 PRINT"*****:FORY=55296T056295:POKEY,INT(RND(1)*15)+1:NEXT
85 FORY=1T0100:POKEINT(RND(1)*800)+1024,46:NEXT
90 POKEV,SK
100 GOSUB5000:P=PEEK(197):POKEV+30,0
119 ME=5
120 IFPEEK(V+ME)>245THENSC=SC-INT(RND(1)*100)+1:POKEV+ME,0
122 ME=ME+2:IFME>15THEN130
129 GOTO120
130 FORME=5T015STEP2:IFPEEK(V+ME)<10THENPOKEV+ME-1,INT(RND(1)*205)+25:NEXT
135 FORME=5T015STEP2:POKEV+ME,PEEK(V+ME)+INT(RND(1)*7)+1:NEXT
140 IFPEEK(V+30)=5THENPOKEV+5,0:GOSUB1000
141 IFPEEK(V+30)=8THENPOKEV+7,0:GOSUB1000
142 IFPEEK(V+30)=17THENPOKEV+9,0:GOSUB1000
143 IFPEEK(V+30)=33THENPOKEV+11,0:GOSUB1000
144 IFPEEK(V+30)=65THENPOKEV+13,0:GOSUB1000

```

POCKET PROGRAMS

```

145 IFPEEK(V+30)=129THENPOKEV+15,0:GOSUB1000
150 IFPEEK(V+30)=6THENPOKEV+5,0:GOSUB900
151 IFPEEK(V+30)=9THENPOKEV+7,0:GOSUB900
152 IFPEEK(V+30)=18THENPOKEV+10,0:GOSUB900
153 IFPEEK(V+30)=34THENPOKEV+11,0:GOSUB900
154 IFPEEK(V+30)=66THENPOKEV+13,0:GOSUB900
155 IFPEEK(V+30)=130THENPOKEV+15,0:GOSUB900
180 IFF=56THEN300
182 IFF=4THEN400
184 IFF=57THEN200
190 IFSC>500ANDP(0)=1THENGOSUB3000
195 IFSC>1000ANDP(1)=1THENGOSUB4000
196 IFSC>2000ANDP(2)=1THENGOSUB7000
199 GOTO100
200 IFSX<25THEN100
210 SX=SX-5:POKEV,SX
215 IFPEEK(V+30)=5THENPOKEV+5,0:GOSUB1000
216 IFPEEK(V+30)=9THENPOKEV+7,0:GOSUB1000
217 IFPEEK(V+30)=17THENPOKEV+9,0:GOSUB1000
218 IFPEEK(V+30)=33THENPOKEV+11,0:GOSUB1000
219 IFPEEK(V+30)=65THENPOKEV+13,0:GOSUB1000
220 IFPEEK(V+30)=129THENPOKEV+15,0:GOSUB1000
299 GOTO100
300 IFSX>230THEN100
310 SX=SX+5:POKEV,SX
315 IFPEEK(V+30)=5THENPOKEV+5,0:GOSUB1000
316 IFPEEK(V+30)=9THENPOKEV+7,0:GOSUB1000
317 IFPEEK(V+30)=17THENPOKEV+9,0:GOSUB1000
318 IFPEEK(V+30)=33THENPOKEV+11,0:GOSUB1000
319 IFPEEK(V+30)=65THENPOKEV+13,0:GOSUB1000
320 IFPEEK(V+30)=129THENPOKEV+15,0:GOSUB1000
399 GOTO100
400 FX=SX:FY=200:POKEV+2,FX+5
402 FORX=1TO24:POKE54272+X,0:NEXT
403 S=54272:POKE3+24,15:POKE3+6,240:POKE3+4,17
404 FORA=1TO10:FORX=1TO255STEP25
405 POKES+1,X:NEXTX:NEXTA
406 POKES+4,32
422 IFPEEK(V+30)=6THENPOKEV+5,0:GOSUB900
423 IFPEEK(V+30)=10THENPOKEV+7,0:GOSUB900
424 IFPEEK(V+30)=18THENPOKEV+9,0:GOSUB900
425 IFPEEK(V+30)=34THENPOKEV+11,0:GOSUB900
426 IFPEEK(V+30)=66THENPOKEV+13,0:GOSUB900
427 IFPEEK(V+30)=130THENPOKEV+15,0:GOSUB900
450 POKEV+3,FY:FY=FY-5
460 IFFY<24THENPOKEV+3,0:POKEV+2,0:GOTO100
490 GOTO422
499 GOTO100
900 SC=SC+INT(RND(1)*100)+1:RETURN
1000 LI=LI-1:IFLI=0THEN2000
1010 FORX=1TO24:POKE54272+X,0:NEXT
1015 S=54272:POKE3+24,15:POKE3+6,240:POKE3+4,17
1020 FORA=1TO7:FORX=1TO255STEP5
1025 POKES+1,X:NEXTX:NEXTA
1030 POKES+4,0
1090 RETURN
2000 PRINT"Q":POKEV+21,0
2002 FORX=1TO24:POKE54272+X,0:NEXT
2004 S=54272:POKE3+24,15:POKE3+6,240:POKE3+4,17
2006 FORA=1TO20:FORX=255TO1STEP-15
2007 POKES+1,X:NEXTX:NEXTA
2008 POKES+4,0
2020 IFSC>750THENPRINT"!!!!!!!!!!!!!! EXCELLANT !!!!!!!!!!!!!!!":GOTO2050
2021 IFSC>500THENPRINT"!!!!!! WELL DONE !!!!!!!":GOTO2050
2022 IFSC>250THENPRINT"!!!!!! GOOD CHAP !!!!!!!":GOTO2050
2025 IFSC>250THENPRINT" NOT BAO":GOTO2050
2030 IFSC<0THENPRINT" KEEP TRYING":GOTO2050
2035 PRINT" YOU NEED LOTS OF PRACTICE"
2050 PRINT"YOUR SCORE WAS ";SC
2060 PRINT"DO YOU WANT TO PLAY AGAIN?"
2070 GETK$:IFLEFT$(K$,1)="Y"THENRUN
2080 IFLEFT$(K$,1)<>"N"THEN2070
2100 END
2999 END

```

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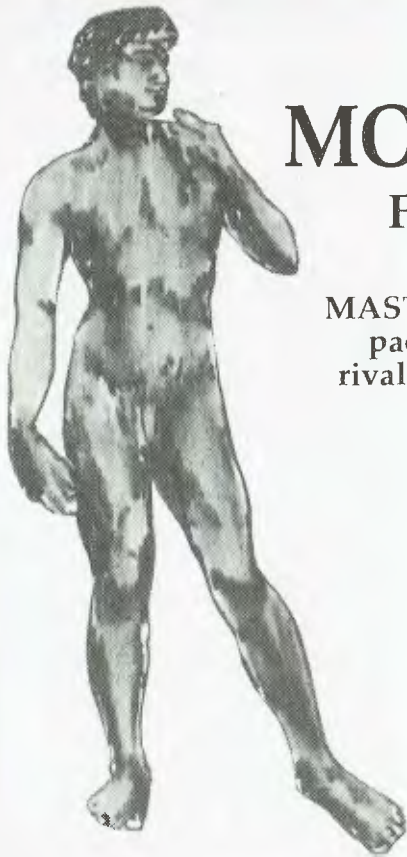
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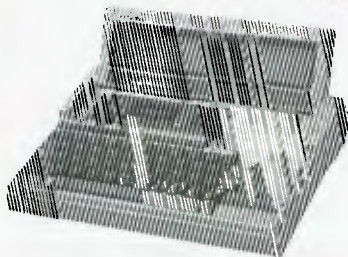
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UCHIDA DWX-305

Letter quality Printer

I GUESS most of us are spoilt nowadays. Letters and reports don't look quite right unless they're printed by a typewriter or daisywheel printer, preferably using a carbon ribbon. So if you're like me, and have got used to the speed and convenience of a word processor, there's not much choice. Dot matrix printers are fine for data printout and rough drafts, but they're just not good enough when it comes to things like correspondence.

A couple of years ago, I decided the time had come to buy a good letter-quality printer for home (my excuse was I had just started writing a book). After looking around, and at some strain to family finances, I finally splurged on a TEC F10-40. All things considered, it has turned out to be a pretty good choice: it belts along at an impressive 40 characters per second, its print quality is very close to the ubiquitous golfball typewriter, and so far it has been very reliable. But it also made a very big dent in two grand. In fact, it was considerably more expensive than the rest of my computer set-up at the time!

Needless to say, quite a few budgets won't really stretch that far. I found this myself when it came to organising a printer to go with the IBM PC here in the office. After plunking down the not-inconsiderable sum for the PC itself, the company was understandably a little unwilling to spend a further \$2000 or so on a printer. So, of necessity, I found



Traditionally, a good letter-quality daisywheel printer would set you back \$2000 or more. So what's missing on the new models which cost less than half that figure? Jim Rowe has been putting the Uchida through its paces, to find out ...

myself looking around for a low-cost alternative.

The Uchida DWX-305 is one of the new breed of low-cost daisywheel printers which have emerged from Japan in the last year or so. It is currently sold by a number of firms at varying prices which go up to about \$795. The machine we received for review came from Jaycar Electronics

in Sydney, which is offering it for the very attractive figure of \$599.

What Gives?

The obvious question to ask about this kind of low-cost printer is what you miss out on, compared with the more expensive models. Is it print quality, speed, features, reliability – or what?

UCHIDA DWX-305

Having used the sample Uchida for a while, it seems to me the main thing it sacrifices is speed. While advertised by some firms as capable of 20 characters per second, its actual print speed seems to be closer to 15 cps on normal text. This rises to about 18 cps when repeating characters. The 'carriage return' and form feed functions are also relatively slow, though in the case of carriage returns this is partly compensated for by the fact that this machine can print bi-directionally.

Of course, the average print speed is still about 40 per cent faster than all but the very fastest human typists, so it's not exactly crawling along. In fact, it's probably quite okay for most normal correspondence printing — particularly if your word processor has a print spooler of some kind. I suppose I'm just a bit spoilt by my F10-40, and I feel it especially when I'm trying to print out a long article or book chapter!

Comparable Quality

When it comes to print quality, reliability and features, the Uchida seems to compare quite closely with its more expensive brothers. Print quality with a standard multi-strike carbon ribbon is very crisp and even, though just noticeably lighter than the output from my F10-40 or a golfball typewriter. It seems to be quite sturdily made, and mine has hoofed out a lot of copy so far without missing a beat (that's a statement calculated to tempt fate, if ever there was one!).

The features it offers include a choice of either bi-directional logic-seek printing or proportional printing (standard 0.02 cm increments); a choice of three pitches (0.25, 0.21 or 0.17 cm); fractional line feed (0.05 cm increments) for superior and inferior figures; and a choice of four levels of print impression. The maximum paper width is 33 cm (13 inches). The Uchida also responds to the standard escape code control sequences.

The Uchida's 96-character print wheels are compatible with those for the QUME 'Sprint 3' printer, as are the ribbon cartridges (which are the 'Multistroke IV' type).

Feeding Type

By the way, the basic DWX-305 uses friction feed, and really handles only single sheets of paper. There is an optional forms tractor attachment, for continuous stationery, and also a cut-sheet feeder — though these may not be available from all suppliers.

The sample Uchida has a Centronics-type parallel interface, and I've been using it quite happily with the IBM PC and Wordstar. The latter was already configured to suit the F10-40, which configuration somehow works perfectly with the Uchida, without any modifications. This is ironic, because the same configuration doesn't actually work properly with the F10-40 itself! I'm still trying to get to the bottom of that one ...

Probably the only other comment I should make is that, like most daisywheel printers, the Uchida isn't exactly quiet. So unless you can place it well away from you, a soundproof enclosure is really very desirable.

All in all, the Uchida DWX-305 is a pretty solid little machine and good value for money. If you can't afford one of the faster daisywheels, it would make a good choice.



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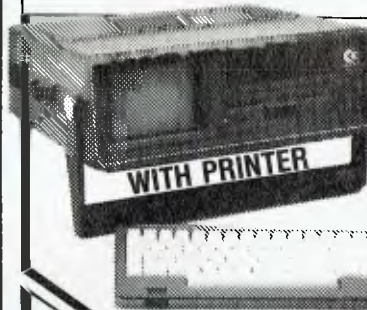
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FRIENDLY WRITER

By John Nicholls

COMPARE \$125 with the prices shown in the box. These are taken from ads in the last few issues of *Your Computer* and may vary slightly from one dealer to another. But the message is clear: to get a top-class word processor with a lot of features is going to cost a lot of money.

The product we are reviewing is FriendlyWriter with FriendlySpeller, which as we said costs only \$125. Don't let the price deceive you into

thinking the program can't have much to offer.

The company behind FriendlyWriter is FriendlySoft Inc, of Texas. It has produced two other programs, the FriendlyWare PC Introductory Set (a combination of education and fun for newcomers to computers) and PC Arcade (ten games on one diskette). Both these products have been bestsellers ever since they came out. So FriendlyWriter is the company's

first completely serious product, and an impressive one it is too.

Two Programs

The two programs come on separate disks, although both will fit comfortably on one double-sided diskette, and that is the way we have been running it. One feature that distinguishes FriendlyWriter from other programs is the use of IBM's function keys; it hardly uses anything else! F9 is the Help key and F10 is the 'finished' or 'Execute' key. The other function keys are 'soft' keys, the meanings of which change according to the context. The top two lines of the screen always show you, in reverse video, the current meanings of the keys. The leader in the use of soft keys is Hewlett-Packard, whose products have function keys in a row at the top of the keyboard, so the key meanings are just above the keys they represent. I have always thought this to be the ideal arrangement, but I find IBM's keys are somewhat easier to reach, especially F10, the one used most in this program.

FriendlyWriter uses only two menus, of which the first is called the Start-up or Main Menu (see list). It

Prices of WP packages for the IBM-PC.

The Word Plus	\$249	WordStar	\$666
Select	\$260	Spellbinder	\$695
Final Word	\$399	WordStar/Mailmerge	\$725
		WordStar/Mailmerge/SpellStar	\$1076

SOFTWARE REPORT CARD

Program:	FriendlyWriter 2.0			
Made by:	FriendlySoft Inc			
Hardware required:	IBM-PC/XT/PCjr, one disk drive, DOS 1.1 64K, DOS 2.0 or 2.1 128K			
Best points:	Easy to learn, uses function keys effectively, fine spelling checker/editor			
Worst points:	Limited formatting and printing options			
Ratings:	Excellent	Very Good	Good	Poor
Documentation:		•		
Ease of learning:		•		
Ease of use:		•		
Speed of running:	•			
Value for money:	•			
Price:	\$125			
Review copy from:	Computerland, Chatswood NSW			

offers the usual choices such as 'Write a new letter' and 'Select letter on file'. You select an option by pressing the function key shown alongside your choice. If you choose 'Write a new letter', you are presented with a screen with the top two lines showing in reverse video the current meanings of the function keys, and on the third line details of the page number, line number, character number, the number of lines left on the page and the number of lines 'free' (that is, the number you can use before you run out of space).

The reverse video lines cannot be turned off. I don't like having a reverse video panel displayed all the time, as it may eventually engrave its image permanently on the screen. To avoid this, I use a simple machine-language program which turns off the screen display if no key is pressed for a period of three minutes. (Alternatively, you can use a colour monitor, and then the program uses different colours instead of reverse video and blinking characters.)

Keys and Modes

The normal mode of FriendlyWriter is overstrike (meaning it writes over any text the cursor may be on). The INSERT key may be used to insert any amount of text, and as you do this the remainder of the text is still displayed and is shifted to the right and down as necessary. While you are in the insert mode a large block cursor reminds you of the fact. A second tap of the INSERT key restores the normal strikeover mode. No separate formatting after inserting or deleting is needed.

The DELETE and BACKSPACE KEYS work in the standard way: DELETE deletes the character under the cursor and BACKSPACE removes the character to the left of the cursor. You do have to be careful with backspacing, however, as the action of this key is extremely fast. As you delete text, reverse wordwrap occurs, so all subsequent lines are automatically adjusted. Whenever you're planning to delete anything, the text to be deleted is displayed in blinking reverse video. This is eye-catching, so it is difficult to delete something by accident!

Cursor keys work as expected, moving one line up or down or one



Psst! Wanna buy a cheap word processor for the IBM-PC? Want a program that'll do everything WordStar does at a quarter of the price? If you do you're out of luck because such a program hasn't been invented yet, but what we have found is a program that is a real bargain: a word processor and spelling checker for only \$125 the pair - Friendly Writer.

character to the left or right. PgUp and PgDn move the cursor twenty lines, CtrlLeft and CtrlRight move the cursor to the first character of the next word (not limited by line breaks), and CtrlHome and CtrlEnd take you to the start or end of your document. All these commands are logical and make editing a document very easy.

Moving, deleting, copying and underlining are just as easy. You use F2, F4, F6 or F7 to select these options, and you are then given the choice of performing that function on a word (F1), sentence (F3), or block (F5). With a word or a sentence you can position the cursor anywhere within the word or sentence, while with a block you mark its beginning and end. Pressing <Esc> will always abort the current command, a most useful and reassuring feature (although there is no 'undo' command.)

After you have finished your document the F10 key takes you (naturally enough) to the 'Finished Letter Options' menu. Here your choices are to check spelling, review (that is, edit), save, return to the main menu or use the printer functions. 'Save' offers you some unusual features. First you give your document

a 'user-defined description' which can be up to 25 characters long. If you've ever tried to come up with meaningful file names within DOS's eight-character limit you'll know how valuable this feature will be.

The system also allows for a 30-character 'in-context ID phrase', to provide additional identification. To select this feature, you move the cursor to the start of the phrase you want *before* you exit the document. Often when you go to save a document you are at the end of it, in which case the ID phrase will be blank (the documentation states that in this instance the program takes the first 30 non-blank characters of the document, but we found this doesn't happen).

In addition, the system stores and displays the date (but not time), and an identification letter (A-Z) called the Internal Filename. When you come to select a file from a diskette, FriendlyWriter displays all four identifiers. You can select the one you want by (a) typing its single-character internal filename, (b) moving the cursor and selecting by touching F10, or (c) using the SEARCH feature, which lists all documents containing the

search string anywhere in the four-part name.

A SEARCH command is also available within a document. It will accept a search string of up to 25 characters. It appears to ignore case but seems to get confused if you try to enter a leading or trailing space.

The two-menu function-key-driven system works well, and because choices are always displayed it's easy to learn. The only problem is it's sometimes not easy to find the command you want. To overcome this the program should have a Command Tree, similar to the excellent one in the back of the Lotus 1-2-3 manual. We have drawn up such a tree and you'll find it in the accompanying list (this gives a good overview of what the program will do).

Documentation

The documentation for our early version of FriendlyWriter was produced on a letter-quality printer rather than typeset (a typeset replacement is promised for later), but is quite comprehensive. It even offers some explanations on why particular choices were made in the design of the program. The manual is contained in an attractive three-ring binder. There is a good Table of Contents, but unfortunately no index. This omission means much searching is sometimes required to find a particular piece of information.

A comprehensive context-sensitive Help facility is available at all times, and FriendlySoft recommends first-time users read over the ten screens of write/edit information. I went further and made printed copies of these screens. They express some concepts in different ways to the manual, thus giving a clearer picture, and contain some useful information which does not appear in the manual.

FriendlySpeller

One of the highlights of this package is FriendlySpeller, which includes features missing from some much more expensive programs. When you run it, FriendlySpeller first counts the number of words in the document (useful for authors), and the number of unique words. While checking the main dictionary it displays the alphabet and a moving cursor to indicate how it is going; then it checks the user dictionary; and finally it displays the number of words not in the main dictionary and the number not in either dictionary.

To check the document, you can

COMMAND TREE

MAIN MENU

Write a new letter	blank write/edit screen
Search string	1-25 characters
Move text	word, sentence, block
Delete text	word, sentence, block
Copy text	word, sentence, block
Underline	word, sentence, block
Re-format	set or change margins, justification, paper size, etc. at any time.
Paper size	8 1/2" x 11" 8 1/2" x 14" 5" x 7"
Left/right margins	1/2" 3/4" 1" 1 1/4" 1 1/2"
Top/bottom margins	1/2" 3/4" 1" none
Line spacing	single, double
Justify	right justified right ragged
Line spacing	6 lines per inch 8 lines per inch
Character spacing	10 char per inch 12 char per inch
Finished letter options	display Finished Letter Options menu
Select letter on file	list files on diskette
Select	load file and go to Finished Letter Options menu
Charge drive	change data drive
Search string	1-25 characters
Load external file	load non-FriendlyWriter file
Load	load selected file and go to Finished Letter Options menu
Maintenance	copy or delete files, change monitor, set drive designations
Change monitor	IBM monochrome Color or RGB B/W or non-color
Change drive designation	Writer speller data target
Delete files	Search string mark/unmark mark all unmark all delete
Copy files to target drive	search string mark/unmark mark all unmark all delete
Help	Current options, how to execute options, how to get additional help
Return to DOS	Saves format settings, printer settings, etc. leaves FriendlyWriter and returns to operating system

COMMAND KEYS

<ESC>	aborts current command
<F9>	generates help screen
<F10>	finished/execute
<lft>, <rgt>	moves cursor one space or character to left or right
<up>, <dn>	moves cursor one line up or down
<home>	moves cursor to first character on a line
<end>	moves cursor to last character on a line
<pgup>, <pgdn>	moves cursor up or down 20 lines
<ctrlhome>	moves cursor to first character of letter
<ctrlend>	moves cursor to last character of letter
<ctrlift>	moves cursor to first character of word to left
<ctrlrgt>	moves cursor to last character of word to right
<bks>	deletes character to left of cursor
<tab>	moves cursor five spaces to right and inserts five marking characters in te;t
<enter>	allows partial line, inserts blank line
<ctrlbks>	joins sentences or paragraphs, deletes line
<ins>	toggles insert on and off
	deletes character above cursor

step through as it is displayed, a screen-load at a time, with words not in the dictionaries highlighted. Many other spelling checkers do not display words in context. If you choose, you can ask for a list of alternative

spellings. I was most impressed with this, as the number of times it produced the right word was remarkable. Any number of words can be added to the dictionary, depending on disk space.

FINISHED LETTER OPTIONS

Check spelling	total words, unique words, words not in the dictionaries
Previous word	returns to previous word flagged by speller
Next word	leaves word as is, does not add to dictionary
Add to dictionary	leaves word as is and adds to dictionary
List possible spellings	displays list of possible correct spellings
Change word	enter new spelling or new word; does not add to dictionary
Review letter	displays start of letter selected
Search string	refer to Main Menu/write a new letter description
Move text	refer to Main Menu/write a new letter description
Delete text	refer to Main Menu/write a new letter description
Copy text	refer to Main Menu/write a new letter description
Underline	refer to Main Menu/write a new letter description
Re-format	refer to Main Menu/write a new letter description
Printer functions	print letter or change printer specifications
Test printer	generate line of date to check margins, options, etc.
Change card	change printer interface
Device	LPT1: COM1: COM2:
Baud rate	110 150 300 600 1200 2400 4800 9600
Parity	Odd Even Not used
Stop bits	1 2
Word length	7 8
Change printer	select another printer
Bold print	displays options available for selected printer
Double strike	displays options available for selected printer
Italics	displays options available for selected printer
Multiple paper bins	displays options available for selected printer
Print	sends document to printer
Pause	causes printer to pause
Resume	causes printer to resume printing
Save to disc	file document for later recall
User-defined description	1-25 characters; can be 'searched' for
Change drive	from select in main menu change data drive (drive to which document will be saved)
Save external file	save non-FriendlyWriter file
Save	save selected file
Help	current options, how to execute options, how to get additional help
Return to Main Menu	return without saving file (Prompt reads "WARNING: Letter has not been SAVED. Strike <F6> if you wish to save this letter". Press <F10> again if you do not want to save file).

Limitations

It's in the formatting options that FriendlyWriter's limitations are most apparent. For the IBM or Epson printers only bold print and double

strike are available as options, and then only for the entire document. Paper size is limited to three choices and margin settings are also limited. Right justification is offered, but on my Epson this is done only by

adding full spaces between words. Even without right justification a 'justification' process is carried out which removes any extra spaces between words. If you are in the habit of leaving two spaces at the end of a sentence the program will accept this, but as soon as you come to the end of a line the extra space will be removed.

The position of page breaks is set by your choice of paper size and margins. On the screen, vertical lines appear on each side of the text to indicate margins; these contain breaks to indicate where page breaks will occur. Text can be moved line by line to vary page breaks.

The set-up for different printers is quite straightforward and gave me no problems. When a document has finished printing, an Epson printer performs a page feed and emits a loud, distinctive tone.

FriendlyWriter is designed specifically for "one to six-page business and personal letters" (which is what most of us use word processors for most of the time), and fulfils this function admirably. I can do no better than to quote from one of FriendlySoft's brochures: "In short, if you need a program to write a 125-page manuscript with automatic pagination and headers and footers and footnotes, you'll probably need one of those big, complicated (and expensive) word processing programs.

"But for normal, day-in and day-out business and personal letters, you won't beat FriendlyWriter for performance, price, and ease of use."

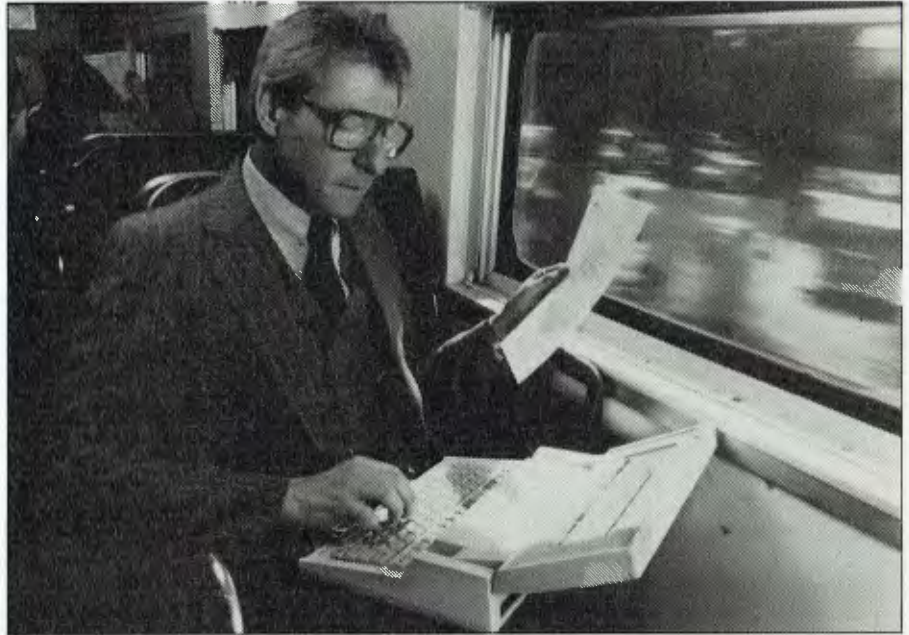
Our copy of FriendlyWriter came from Computerland in Chatswood, NSW, at a cost of \$125. It is available from all Computerland stores.

Needless to say, this review was prepared using FriendlyWriter.

Stop Press!

FriendlySoft has just issued a new manual and an updated program diskette. It is now possible to "indicate if you want a single or double space inserted after each period". The new manual is typeset, thumb-indexed, minor mistakes have been corrected and some points have been clarified. The penalty to pay for these improvements is that for DOS 2.0 and 2.1 128K of memory is recommended, whereas previously it was 96K.

Everyone is claiming that portables are the up-and-coming hot computer market, but no company has yet produced the definitive, good-all-round-but-not-over-priced portable computer. Hewlett-Packard, a company known the world over for its technological excellence, is having a crack at this market with its new HP110 portable. Evan McHugh takes a look at the result.



UNLIKE THE personal computer market, portable computers have not yet evolved an accepted formula that provides an environment for all manufacturers to compete in. A number of machines have crawled out of the primordial slime of marketing, but few, if any, have survived in a notably vicious market. All the machines released to date have had some major drawback which has denied them the crown of being a total portable solution.

The portable released recently by Hewlett Packard, the HP110, doesn't get the crown either, but it is a step, a big step, in the right direction. It offers real computing power and portability. While it has some drawbacks these are – other than its price – not major, in that there are many roles in which it can be a complete success.

Some of the machines that predate the 110 had varying degrees of problems, which, while not fatal, made them unattractive to many buyers. The Tandy Model 100, for example, offered good portability but very limited computing power. The Kaypro and Osborne machines were complete computers, but the description 'portable' should have been changed to 'transportable', since you wouldn't want to carry them far.

Truly Portable

The HP110 is a compact number, measuring 25 cm by 33 cm by 7 cm – about the size of a telephone book. It uses lead acid batteries that give continuous operation for up to 16 hours and which will hold the memory

for up to a month.

While there is no handle on the machine itself, the carry bag does have a handle and helps protect the machine from knocks and scratches.

One of the remarkable strategies of the makers of this machine was not to include a disk drive. The HP110 is not a cheap machine and one would expect this as a basic feature. However, considering the weight, size and power requirements of disk storage the designers opted instead for a large amount of memory which can be segmented to provide an 'electronic disk' and memory stack.

The machine uses a liquid crystal display to present 16 lines of 80 characters per line. While this is about 30 per cent less than the text display of a normal CRT, it offers savings in space, weight and power similar to those gained by not having drives.

As a result of all these factors the HP110 weighs only about 4 kg, but it is still able to operate in a stand-alone mode that doesn't require cables or AC power – which makes it a truly portable machine.

Personal Computer

The HP110 has been described as a portable personal computer. Considering most personal computers these days offer large memory, disk drives and powerful graphics via a high-resolution colour terminal, this really precludes the HP.

Nevertheless, it is still quite a powerful computer. Its processor is an 8086 running at 5.33 MHz, which

gives the machine the ability to run much of the software available for the IBM, at a much higher speed. Its memory offers further speed advantages: all of it is RAM or 'electronic disk' so there is a much shorter delay during data access.

The total memory is about 650 Kbytes of continuous memory split between 384 Kbytes of CMOS ROM and 272 Kbytes of CMOS RAM. The ROM stores the bundled software supplied with the machine, leaving the RAM for storage of data rather than the program being executed. There is also no need to load the bundled packages, as they are already in memory, so heavily disk-oriented packages run much more efficiently than on many other machines. The large RAM gives quite a considerable area in which to work and store data; 272 Kbytes should be more than adequate for most purposes.

The question obviously arises as to what you do when you fill the available memory. You are then face to face with the major problem facing the machine. If you treat this computer as an extension of another system, you could transfer your files to your major system for storage. Alternatively, disk drives are available for the HP110 which will let you store your files directly, the only drawback being reduction in portability of the machine.

The RAM can be reconfigured to vary the size of the electronic disk-to-user area ratio, depending on requirements. In an application program requiring a large amount of space,

HP110 PORTABLE COMPUTER

such as a spreadsheet, you can increase the user area at the expense of the electronic disk, and vice versa.

Expand Your Portable

Expanding a portable is, in some ways, a self-defeating exercise; the more you expand the less portable the machine becomes. Nevertheless, you have to be able to get your data out and to input from other machines or sources, so the necessary expansion facilities are provided on the HP110 to let you connect to a number of devices.

One of the key connections is the Hewlett-Packard Interface Loop (HPIL). This allows you to connect to other Hewlett-Packard computers, and devices such as printers and the HP150.

More standard is the RS232 connection, which appears as a nine-pin female socket. This lets you connect printers and modems that don't operate through the HPIL loop.

There is also a small plug which lets you connect a jack from an American telephone to the built-in modem. Unfortunately, Telecom will not permit the use of this modem with its equipment (it's Bell-standard gear anyway), so only a few early models will have this facility. Later models will not have modems built in, which means the RS232 port will have to be configured for communications. The disadvantage here is that you have to carry around some kind of modem if you want to transfer data.

Software

Fortunately, configuring the HP110 for functions like communications is greatly assisted by the menu-driven set-up functions, which are part of the software suite bundled with the machine and contained in ROM. The 372 Kbytes of programs are impressive. You get three main programs: Lotus 1-2-3, Memomaker and Terminal, plus a diagnostics package.

Lotus 1-2-3 is much the same as on all other machines except that the spreadsheet sizes are reduced to take account of the smaller screen resolution. Nevertheless, the package is still perfectly usable. The graphics for which the Lotus package is well known are not well supported by the HP110's monochrome LCD, but you can generate graphs that look presentable if you try hard enough.

Memomaker is a simple word processor that lets you easily create and edit files and do some file formatting. What it lacks in flexibility it makes up for in adaptability. The files created under Memomaker are in a format that can be picked up by Wordstar and re-edited with very little trouble.

The terminal program can be configured for use with the special built-in modem, or signals can be transmitted through the RS232 port. A menu-driven selection system supports all the set-up requirements in a fashion that is easily understood and implemented. The file transfer utility in the package uses the Christensen protocol (a widely used public domain file transfer protocol), and is a

version of Modem 7. The advantages of the Christensen protocol are that it is popular and therefore widely used, it is well-supported – and it's free.

The diagnostics package looks at the operation of the machine to test for any faults. Using a menu system you can select functions for the utility to carry out to test RAM, modem port and so on.

Ergonomics

Along with the usual aspects to consider under ergonomics, with the HP110 we must include those related to the portability of the machine. Clearly the less bulky and heavy a machine is the easier it will be to manage in transit. The HP110 scores in both these departments. It is compact enough to fit into a briefcase with room to spare, and light enough to be carried by anyone. In some respects it is too compact: had more space been used, a disk drive and a small power supply added, the whole lot could still have been contained in a briefcase-sized package which would have been a complete solution.

The liquid crystal display is another major point. It is one of the largest LCDs available, at 16 by 80 characters, and this seems to be enough display for most purposes. The main problem with the LCD is positioning it so the contrast is more acceptable. In a room full of fluorescent lights it is very hard to avoid getting bright reflections off the plastic cover of the

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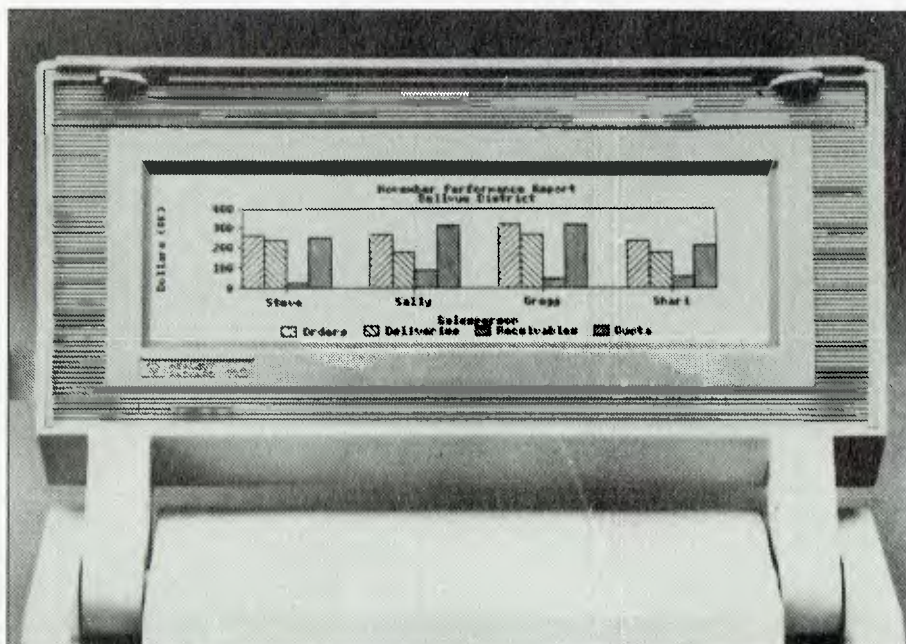
screen. The ideal situation is to get a strong constant light source behind you so the characters are clear but not lost in bright spots reflected from the lights.

The keyboard on the 110 reflects the approach of a number of portable manufacturers, which assumes there has to be a unique feel to a portable's keyboard which sets it apart from non-portable machines. The result is a keyboard which, while quite usable, is a departure from normal keyboard feel. The keys and key gaps are of roughly normal size; the main difference is in key travel, which is just a few millimetres and gives the user the feeling that high-speed input is not the machine's strong point. Perhaps the philosophy behind it is that the machine will generally be used by 'hunt-and-peck' general managers, so high-quality key 'feel' isn't necessary. Be that as it may, the keyboard could do with some improvement.

The 'user friendliness' of the HP110 is fostered by its comprehensive help system and the 'Personal Access Manager'. The help system covers all the inbuilt functions of the machine and its programs, and can be called on at almost any stage of any function.

Personal Access Manager is an interface between the inexperienced user and the operating system, which lets you select all the functions of the machine without using MS-DOS commands. Using menus it is possible to select applications and reconfigure the hardware without having to learn numerous commands. This utility makes the nitty-gritty of the machine transparent to the user and contributes greatly to its ease of use.

The manuals describe how to use the system at a higher level of detail. Two of these manuals – a quick beginner's guide and the user's manual – supply a short introduction to the HP110. The user's manual, while it goes into all the details of the various functions and utilities of the machine, seems at times to skirt the underlying whys and wherefores which make understanding a little easier. In an attempt to avoid confusing inexperienced users HP seems to have come out with documentation that is a little Mickey Mouse, and can leave you in the dark when when you most need it.



The little HP150 has a few big surprises; simple bar graphs, for example, come up with startling quality.

Conclusions

While the HP110 at first appears to be a really good machine, it does have a few weak spots that may prove its downfall. On the other hand, some problems, like the keyboard and LCD, may seem more or less cosmetic to some buyers and do little to detract from the major selling points of power and portability.

When viewed in isolation the HP110 is a powerful go-anywhere computer with applications potential that may go beyond any portable computer to date. However, this is still not enough to give the HP110 the accolade of the perfect portable. The key problem centres around line storage. The question: 'What do I do when I fill the memory?' has not been solved by HP without the necessity of investing in a disk drive, and is a severe limitation on the machine. The available disk drive costs around \$1200, and detracts greatly from the portability of the machine because it is not inbuilt. So you end up playing with cables to connect it and having to find a way to transport it, as there is no provision for it in the HP110's carry case.

The more workable solution for many people may be to use the 110 as an extension to an existing system; something they can take away from their main computer to

work on over the weekend and which they can reconnect to the main system to dump data upon their return to work. However, this solution detracts from the 110's ability to act as a stand-alone machine.

Finally, for Australia, the HP110 may be a salutary example of portables for many potential users, who may be put off by the incredible price tag. At \$5000 it is not likely to set the country on fire. Let's face it, most purchases will come from people who have a pretty dynamic view of the value of money, or who want a portable to interface easily with other HP computers. Unless you *really* need a portable to use out in the field where there's no power available, you could buy a normal-sized dual-disk-drive machine with a little less internal memory and a full-sized monitor for around this price, and simply transport it in a car if it ever needs moving.

The HP110 is a good computer, but at that \$5000 asking price it is much more an example of the marvels of technology than of computing for the people. When such machines fall in price and offer a greater degree of flexibility, the world will no doubt beat a path to the doors of companies like Hewlett-Packard. Until then most of us will just have to lick our lips and wait. □

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2. To compare results with budget and last year.
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 1. Manufacturing
 2. Trading
 3. Profit and Loss
 4. Balance Sheet
4. To transfer the totals from the various ledgers, Debtors, Creditors sales etc.

DEBTORS SYSTEM SYSTEM OBJECTIVES

1. Integrated with Invoicing/Stock.
2. Automatic Production of Statements.
3. Debtors Control by Aged Trial Balance.
4. Analysis of Sales Monthly & Yearly.
5. Analysis of Sales by Area/Salesman.
6. Calculate Salesman's Commission.
7. Uses Standard Stationery.

INVOICING/STOCK SYSTEM SYSTEM OBJECTIVES

1. To maintain and control stock inventory levels.
2. To produce a detailed invoice or Credit No. on-line.
3. To analyse the sales and profitability of all stock lines.
4. To produce a complete sales tax analysis.
5. To integrate with the Debtors system and update account balances at invoice stage.
6. To produce salesman and area figures including a commission statement.

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GETTING FRIENDLY WITH BASIC

WHEN DEALING with data items that were all of one length, a linked free list was a suitable device for keeping track of unused records in the file. Variable-length items that need a number of contiguous free records can be catered for by using a bit map to represent the free records in the file.

As for keeping track of the location of data items stored in the file, the memory-resident sorted array index served the purpose well, as long as the file was not too big. However, if some of the advantages of the sorted array index are not required there are simpler methods of keeping track of data items, and one such method also does away with the need to maintain a free list.

This method is known as hashing. With this technique the index we have been using is replaced by a hashing algorithm. Remember that the point of the index was to establish a correspondence between a particular key and a record number. The record number was the position in the file at which the data item corresponding to the key was stored. If we can use the key to generate a record number through some algorithmic process, rather than an index look-up, then we do away with the index and the need for a free list.

Let's take the simplest possible example. Assume we want to maintain details of each building along a particular section of highway. We know that there are about 120 buildings and that their street numbers

So far in this series, Jeff Richards has examined some of the techniques involved in dealing with random file data accessing. The procedures covered the two basic tasks of determining which records in the file were free and available for data storage, and using an index to keep track of the location in the file at which particular items have been stored. Now he turns to 'hashing' as an alternative method of keeping track of data.

range from 887 to 1018. Obviously, not every street number is represented, but we do have a basis for assigning each building to a record in a file. If we build a file of 1100 records, then we can simply allocate each building to the record number corresponding to its street number.

This procedure can be easily improved on, however. An 1100-record file to store details of 120 buildings is not very efficient – if we build a file of length 200 and then subtract 850 from the street number to obtain the record number, we have a system which is just as simple, but much more efficient. This rule – 'subtract 850 from the street number to find the record number' – is the hashing algorithm. It is simply a rule that permits us to convert a key value into a record number by calculation. This is in contrast to an index, which does the conversion with a table look-up process.

Now someone comes along and

complicates the process. They want details of each dwelling, rather than each building, to be maintained, and we know that No. 913 is a block of eight flats. How can a street number like 2/913 be converted into a record number?

It is not difficult to come up with a few simple rules, but two requirements must be met if the system is to be reasonably efficient. Firstly, the set of record numbers generated with the hashing algorithm must fall within a range that roughly corresponds with the number of items to be stored. In the case of the dwellings register we would require numbers that range from 1 to 200. Secondly, if we have to convert keys to record numbers we would want a rule that produces a unique record number for each key.

In practice this second requirement is usually impossible. What is done instead is to anticipate that some keys will hash to identical record numbers, and create additional

TUTORIAL GETTING FRIENDLY

procedures that will resolve such 'collisions'.

A typical hashing algorithm would use the ASCII values of the characters in the key. These values would be multiplied by a factor relating to their position in the string, and the resulting numbers added together. The result is divided by the number of records in the file and the remainder is used as the record number.

For instance, if the position factor was linear and the file size was 200 records, the key 'ABC' would be processed as:

A	65x1	=	65
B	66x2	=	132
C	67x3	=	201

			398
			398 modulo 200 = 198

and item ABC would be stored at record number 198. Now work out the hashing for key 'BB' to get an idea of the problems involved with hashing algorithms.

Some techniques used to minimise collisions involve carefully worked out

position factors (including fractional factors) and padding of keys to standard lengths. The complexity of the hashing algorithm is of little significance – once coded it operates so quickly that it can become extremely complex without interfering with efficiency.

The area in which efficiency is in trouble is in dealing with collisions. If we attempted to add item BBB in the above example we would find the location at which it is stored already occupied. In this case we would have to choose an alternative record number for the item. The rule we use to do this must be explicit and precise, as we will have to use the same rule when we come to try and retrieve the item, otherwise it will never be found again.

There are basically two procedures for selecting alternative record numbers. One involves altering the hashing algorithm – in effect, rehashing the key under a different rule. This technique is very useful, but the number of different rules available must be very large if we are to be confident of eventually finding a spot for every item. This usually means that the rule must be altered incrementally – that is, factors used within

the rule must be subject to repeatable mathematical processes.

In the simple rule used above the next hashing algorithm could be obtained by simply adding 1 to each position factor. This would give $66 \times 2 + 66 \times 3 \text{ MODULO } 200$, which is 130, and perhaps this spot will be free.

Problems

The problem with this procedure is that there is no guarantee that each possible record number in the file will eventually be searched. Also, incremental hashing rules have to be very carefully constructed to ensure that keys which generated the same hashed code under the first rule won't also generate identical codes under the second and subsequent rules.

The other procedure for dealing with collisions involves using an entirely different procedure to search for alternative free records. The simplest is to add an offset to the first hashed code to give a second record number, and keep adding the offset until a free record is found. If the offset is 1, then this is simply sequential searching of the file. This search must be designed to 'wrap around' at the end of the file to

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ensure that all possible record numbers are eventually searched.

Although this procedure is effective, it can be improved upon. A common characteristic of hashed files is that a small proportion of the records will generate most of the collisions. The corollary to this is that, for those records where collisions occur, there will be a number of keys that hash into that record number. This means that if our search procedure is the same for each key then a small number of keys will produce a search pattern that proceeds through the same large list of records.

What is needed is a search procedure that is different for each key. Thus when a collision occurs each key that hashes into that record number will cause searching to proceed in a different manner, considerably increasing the chance of finding a spare record. This procedure should be combined with one that ensures that every record in the file is eventually searched.

Taking the second point first, we noticed earlier that simply adding an offset to the hash code will step us through the file until a free record is found. If we ensure that the record number 'wraps around' at the file size then we can search all parts of the file. But with an offset other than 1 we can't guarantee that every record in the file will be searched. For instance, with a file size of 200 and an offset of 10, starting at record 198 we will search records 8, 18, 28, 38 and so on. This sequence would come back to record 198 having searched only 20 records in the file.

One solution clearly is to use an offset that is not a factor of the file size. An offset of 9 in the above example would be suitable, as 9 does not divide evenly into 200 and so all possible records in the file will be searched before returning to the starting point.

So the first requirement is for an offset for the sequential search that is not evenly divisible into the file size. The other requirement was that the offset be different for each key. We can calculate an offset for each key with a hashing algorithm, but how can we be sure that it won't be evenly divisible into the file size? The easiest solution is to make the file size a prime number and to ensure that the offset hashing algorithm returns a number greater than 1 and less than the file size.

As a prime number is only divisible by itself and 1, such a rule ensures that the search procedure will search all records in the file. In addition,

because the offset is calculated from the key there is a good chance that keys which originally hashed into the same record number will not follow the same search path.

The skeleton programs presented here demonstrate these principles. Listing 1 is a program to create an empty file. This is necessary because the add procedure needs to check that a record number is unused before storing an item away. 199 has been selected as a convenient prime number for the file size.

Listing 2 is an add procedure. The hashing algorithm used for the record number is the one described above, while the hashing algorithm for the offset uses the same procedure but applied to the key in reverse. These are just two examples of an enormous number of possible algorithms. The record at the hashed code is checked to see if it is blank. If not the offset is added to the original record number and the search proceeds until either the key is found to already exist in the file, or an empty record is located. The '+1' in the algorithm expressions is needed to avoid attempting to reference record number 0, which does not exist.

Listing 3 is the FIND procedure. It is also the basis of a DELETE procedure. It follows exactly the same process as ADD, except that it is successful on a key match and fails at the first empty record.

Note that if a DELETE procedure is developed it cannot simply write blanks back to the file to indicate a deleted record. It is possible that there are records with a search sequence that passes through the deleted record. Because of the technique used to generate a search sequence, the key of the deleted record cannot be used to indicate whether or not there are further records in the search pattern. For this reason dealing with deleted records in this scheme needs very careful attention. The easiest technique is to simply tag them to indicate that a record to be added can overwrite the data if it wants to.

There is, of course, no LIST procedure. Sequential listing has no meaning in a hashed file, as we have no list of keys to work through. If the file was dumped from the beginning the sequence of records would appear to be random.

For certain applications hashed files provide a simple and efficient way of saving and retrieving data. While they don't provide the same functionality as an indexed file, they are usually much simpler to create and maintain. □

TUTORIAL GETTING FRIENDLY

Listing 1. HCREATE. Create an empty file.

```
10 DEFINT A-Z
20 PRINT "Create Master File"
30 PRINT "199 is a suitable file size"
40 I=199
50 OPEN "R",#1,"MAST",80
60 FIELD #1,10 AS FREE$
70 FOR R=1 TO I
80     LSET FREE$=STRING$(10,32)
90 PUT #1,R
100 NEXT R
170 CLOSE
180 STOP
```

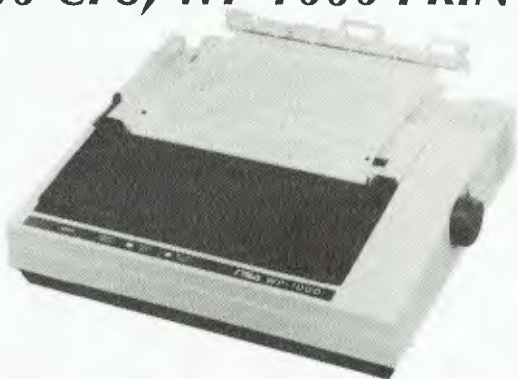
Listing 2. HADD. Add items to a hashed file.

```
10 DEFINT A-Z
20 OPEN "R",#1,"MAST",80
40 FIELD #1,10 AS FREE$
50 FIELD #1,80 AS REC$
150 PRINT "Adding Records"
160 INPUT "Key = ",I$
170 IF I$="END" GOTO 450
180 IF LEN(I$)|10 GOTO 160
190 J$=STRING$(10,32):LSET J$=I$:I$=J$
200 HASH=0:OFFS=0
210 FOR I=1 TO 10
220     HASH=HASH+(ASC(MID$(J$,I,1))*I)
230 NEXT I
240 FOR I=10 TO 1 STEP -1
250     OFFS=OFFS+(ASC(MID$(J$,I,1))*I)
260 NEXT I
270 HASH=(HASH MOD 199)+1
280 OFFS=(OFFS MOD 198)
290 GET #1,HASH
300 IF FREE$=I$ GOTO 380
305 IF FREE$=STRING$(10,32) GOTO 330
310 HASH=(HASH+OFFS) MOD 199)+1
315 COUNT=COUNT+1
320 GOTO 290
330 LSET REC$=I$+STRING$(70,I$)
340 PUT #1,HASH
360 IF COUNT=199 GOTO 450
370 GOTO 160
380 PRINT "ALREADY EXISTS"
390 GOTO 160
450 CLOSE
460 STOP
```

Listing 3. HFIND. Find items in a hashed file.

```
10 DEFINT A-Z
20 OPEN "R",#1,"MAST",80
40 FIELD #1,10 AS FREE$
50 FIELD #1,80 AS REC$
150 PRINT "Finding Records"
160 INPUT "Key = ",I$
180 IF LEN(I$)|10 GOTO 160
190 J$=STRING$(10,32):LSET J$=I$:I$=J$
200 HASH=0:OFFS=0
210 FOR I=1 TO 10
220     HASH=HASH+(ASC(MID$(J$,I,1))*I)
230 NEXT I
240 FOR I=10 TO 1 STEP -1
250     OFFS=OFFS+(ASC(MID$(J$,I,1))*I)
260 NEXT I
270 HASH=(HASH MOD 199)+1
280 OFFS=(OFFS MOD 198)
290 GET #1,HASH
300 IF FREE$=I$ GOTO 380
305 IF FREE$=STRING$(10,32) GOTO 330
310 HASH=(HASH+OFFS) MOD 199)+1
315 COUNT=COUNT+1
320 GOTO 290
330 PRINT "NOT FOUND"
340 GOTO 160
380 PRINT REC$
390 GOTO 160
```

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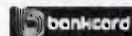
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Despite the tempting prices, buying a computer in the USA can be an enterprise fraught with pitfalls if you don't do your research properly and go into it with a good deal of knowledge. Peter Phibbs offers advice to would-be overseas purchasers.

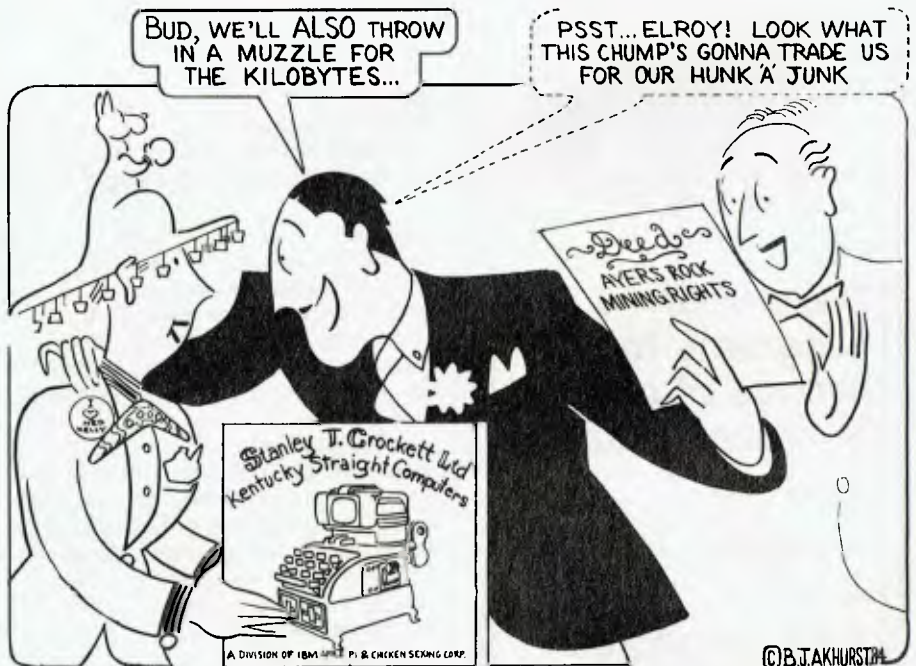
BUYING IN THE USA

RECENTLY, I had the opportunity to take a trip to the USA. Since I was in the market for a microcomputer at the time, it seemed to me I could kill two birds with one stone and actually purchase a computer in the US. (After all, a lot of them seem to be made there anyway). The resulting experience may be of interest to others who are contemplating a similar course.

The Advantages

OK, why should you spend good sightseeing time being harangued by computer salesmen and then have to cart your purchase all the way back to sunny Australia?

The answer is simple – dollars. The retail price of most brands of microcomputers (except Australian-made machines of course) is considerably less in the US than Australia. Let me give you an example. The Kaypro II is a fairly popular portable micro in Australia. It is currently listed for sale in Australia at \$3295, including sales tax. The US list price is US\$1695. However, since the US retailers will not have to provide you with after sales support, they will generally give you about ten per cent discount on the retail price. For example, I was offered the Kaypro for \$1450, but let's round the price up to US\$1500. Assuming you purchased the Kaypro in a State without sales tax on computers, the total cost of the Kaypro after you paid the Australian sales tax (20 per cent) and the duty (5 per cent) would be \$2148 – a saving of over \$1100 on the Australian price, or the approximate cost of the low season return APEX fare to Los Angeles. A similar story applies to a



number of other computers. (At these prices no wonder so many people are keen to sell micros in Australia).

Another advantage of buying your micro in the US is that new models of computers are usually released in the US well before they are released in Australia.

The Disadvantages

Like everything in life, this decrease in price does not come without some disadvantages to the Australian consumer. The most obvious of these disadvantages is the lack of support for your micro once you get it back to Australia. For example, if you cannot work out something about

your computer from the instruction manual, it's not just a matter of ringing up the dealer to get some advice. While the Australian retailers who sell your brand of micro will probably know the answer to your problem, they will certainly not be too keen to provide information for a machine which was not supplied by them.

A related issue is the question of warranty. The warranty you get on many computers purchased in the US is likely to be only valid within the US. Some computers have international warranties, but these are the exceptions. Moreover, service may be a difficulty on some computers that

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BUYING IN THE USA

have not established a presence in Australia.

Another disadvantage can be a lack of software for the machine. This can be particularly true of a machine that is not available in Australia. If the machine uses a standard operating system you will probably be able to read software formatted for other machines using a communications package, but this can be a time-consuming process.

Finally, there is the problem of actually carting your purchase around. Computers can be heavy and bulky items. While this weight is an inconvenience it generally won't cost you anything, since excess baggage on airlines is now usually based on the number of items you carry rather than the gross weight. Generally, economy passengers are allowed two items of luggage, so as long as you only have the one suitcase you will not be up for any freight charges.

Tips For The Purchaser

Before you go, it is crucial that you do your homework. Buy some American magazines (*Byte* is a good one) and look around the Australian market, in order to draw up a short list of possible purchases. Use the magazines to establish the price of the computers (do not forget to convert the US dollars to Australian dollars) and where they are manufactured. Next, find out if they are likely to be backed by an international warranty and if there will be any trouble in getting service or software for the machines in Australia.

When working out your travel itinerary in the US, allow plenty of time for making your purchase. In Australia you get the impression that in the US micros are sold in supermarkets, and as a result one store will have every possible brand of micro. Nothing could be further from the truth. If the machine you want is not in the top five best-sellers, be prepared to have to look around for it. If you know where it's manufactured, start in that area. By the way, if you think you might be travelling around a lot in the US it's a good idea to get an airline pass with a domestic airline - for example, a 14-day pass costs about US\$250. In deciding where to buy your machine, US sales tax laws are worth looking into. Some states do not charge sales tax on computers.

Others do not charge you if you consign your computer to an address outside the state, and go and pick it up there later. However, the level of sales tax is not exorbitant, usually around six per cent.

The other thing to be careful of is 'sharks'. No, not the 'Jaws' variety, but some of the salesmen. I had the misfortune to come across some that would make the worst of the purveyors of used cars on Parramatta Road look like angels. I was told more lies about the capabilities of computers in a week in the States than I thought possible (for example, one salesman in Atlanta told me Televideo only made colour TVs) and I noted a tendency for salesmen's eyes to light up once they found out (they usually guess from the accent) you were from Australia. They immediately think you are going to be easy prey, since they assume anyone from Downunder is likely to think Apples are things that grow on trees and K's are the things that come after J's in the alphabet.

Another thing to watch out for is voltage. US computers run off 110 V, compared to our 240 V. Many micros are convertible by means of a dip-switch, but others require more elaborate alterations. Do not take the salesman's word on this (and other matters) - ask to look at the user manual for the machine.

The last piece of advice is, once you have decided to buy your machine and before you hand over your travellers cheques (all the shops I talked to would accept \$US travellers cheques), haggle on the price. Dealers allocate part of their margins to after sales service and, since you are leaving their shores and won't bother them again, there is obviously some fat in their retail price that can be trimmed back by some prudent negotiating.

Conclusion

In summary, if you know enough about micros (or have access to someone who does) that you feel you will be able to work your machine by simply reading the user manuals, then buying a micro in the US may be an option for you. If after estimating the potential savings you still want to go ahead, go and do your homework. Try and select a machine that has an established presence in Australia, and make sure you allow plenty of time for shopping around in the US.

One more thing. The US is a fascinating country, so don't waste all your time poking around in computer stores - go out and live it up a little. □



IN A PREVIOUS column I mentioned how PerfectCalc data files can be edited with a word processor, to repair damaged files that refuse to load (see *Your Computer*, March 1984). I have now discovered another way in which a PerfectCalc data file may become corrupted and unreadable. If you get an 'Out of Memory' error and subsequently delete some of the spreadsheet to reduce its size, it is possible to continue working. If the spreadsheet is then saved there is a good chance some of the cells will be corrupted and will refuse to reload.

The best rule is to abandon the spreadsheet whenever you get an 'Out of Memory' error. Even if you do manage to reduce the size and keep going, you will find that the program has become corrupted and will slowly destroy the spreadsheet. Watching this gradual disintegration is fascinating, but not if it represents quite a few hours work! The safest rule is to save often, and this applies particularly when working with large spreadsheets.

There is also a bug in PC. If you use associated files you will not be able to reference cells in another spreadsheet beyond row 127. Sometimes the program will reject your formula, sometimes it will simply enter incorrect values. If anyone knows of a fix for either of these problems I would be grateful if they would send it in to me.

Restrictive Configurator

The PerfectCalc configurator program

supplied with the latest versions of the Kaypro software does not permit alteration of the terminal configuration. Such a restriction is not only a challenge to the dedicated hacker, it is a nuisance if you want to reconfigure Calc to run on a terminal attached to the Kaypro serial port. The changes listed below were provided by KUGVIC, the Victorian Kaypro Users Group. They proved effective in converting my version of PCCONFIG to bypass the trap and permit alteration of the screen control parameters.

This version of PCCONFIG was supplied with revision 1.10 of PerfectCalc, so these changes may not work for the configurator supplied with earlier releases - at the moment I do not know if different versions of the configurator accompanied different revisions. If you have a good back-up copy it may be worth a try to see what happens. If you don't get the 46 1A 01 data bytes at address 1B44 there is no point in proceeding - it will not work.

Start by getting DDT.COM and PCCONFIG.COM onto one disk (the example assumes drive A) and type in the underlined lines in Listing 1. Note that the last line before exiting from DDT is G-zero, but CONTROL-C would work as well.

For those who are not familiar with DDT, it may be worthwhile referring to the manual to see how the different commands are used to patch a .COM file. The commands in order are

1. Load DDT and read in PCCONFIG.COM
2. Display memory from 1B44 to 1B46
3. Enter assembly language code at location 1A46
4. Exit DDT
5. Save the patched version of PCCONFIG.COM

When you run the patched configurator be sure to take careful note of the existing configuration before changing anything, in case the changes don't work and you have to restore it. While in the configurator you may wish to change the printer initialisation and de-initialisation strings to something suitable. Initially it is set for a 20 cm printer that can print 132 columns, so the strings are used to switch it into and out of compressed mode. For printers that can handle 132 columns without alteration a suitable initialisation string would be hex OC (form feed), while de-initialisation really requires nothing at all.

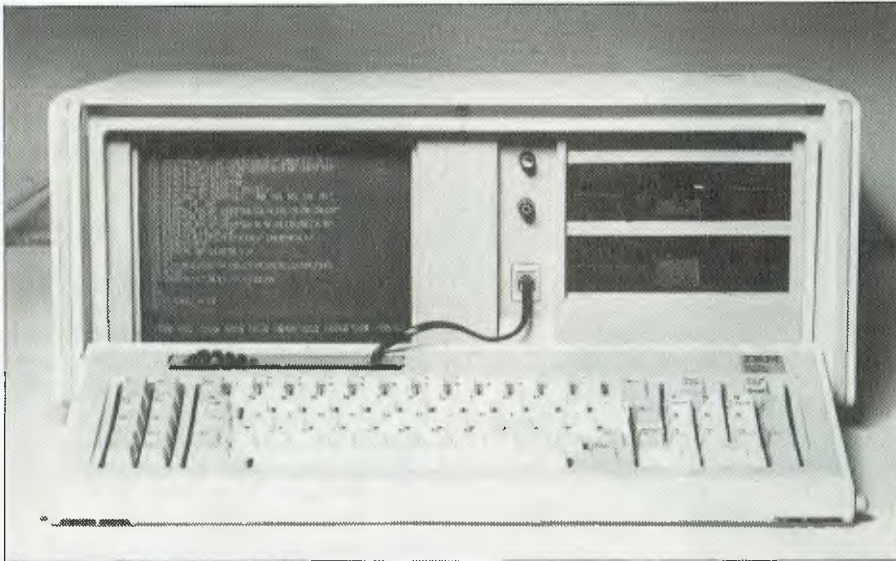
If Calc is printing vast amounts of blank paper at the beginning and end of each printout, the initialisation strings definitely need changing.

Just in Passing

On a different topic: in the discussion of SBASIC in the May column I said the ON ERROR command cannot be reset. It has been pointed out that the addendum to the manual describes the command ON ERROR OFF which cancels the ON ERROR COMMAND. Now, if someone could find the EOF function ...

Listing 1.

```
A>DDT PCCONFIG.COM
DDT VERSION 2.2
NEXT PC
4A00 0100
-D1B44,1B46
1B44 46 1A 01 F..
-A1A46
1A46 CALL 1D2B
1A49 JMP 1B5D
1A4C .
G0
A>SAVE 74 PCCONFIG.COM
A>
```



WOW, there have been some exciting hardware products coming my way lately. The IBM Portable PC (XT), the Data General/One, the Hewlett-Packard 110, the Sigma Design Streaming Tape unit, and the IBM PC-AT are but a few. Then there are all the rather interesting new rumours.

I don't know whether it's because I've been so swamped with new hardware, or if it's just that not much is happening, but there seems to be a lack of exciting software releases in recent months. Perhaps the barrage of software announcements by IBM in the US has caused software manufacturers to stop and rethink their position. I only wish IBM Australia would get its act together and release some of them here.

Let's not forget the world of user groups, bulletin boards, and public domain software. As I plod through the vast collection of public domain software that's accumulating I always seem to find a few pleasant surprises.

With so much happening centre stage and behind the scenes it can be quite difficult choosing what to report on, and how to link it all together. Since there is so much to talk about I'll have to cover half this month, and leave the Data General/One (an exciting new portable), the tape back-up for hard disks, and the IBM PC-AT for February.

More Bulletin Boards

As of November '84, there are four bulletin board systems on line using the same software as my IBM PC-based bulletin board (03) 528 3750.

Computers Galore, in Melbourne, has a BBS running on an IBM compatible (03) 561 8497. Apple, CP/M, and PC/MS-DOS users will all find something useful on this system. The sysops are Bob Cooban and Martin Scerri.

Dick Smith Electronics, in Sydney, has set up a BBS using a Dick Smith Challenger (02) 887 2276. This system has information of special use to owners of the various computers sold in Dick Smith Electronics stores.

HiSoft, in Melbourne, has an IBM PC with Sysgen hard disk unit, accessible on (03) 799 2001. The sysop is Richard Tolhurst. HiSoft occasionally announces special hardware and software offers via this BBS.

All these systems have hard disks, which means lots of files for downloading, and fast access. If you haven't ventured into the world of bulletin boards yet, then you are really missing out on access to helpful information and valuable software.

Kitchen Sink Programs

There are now about ten new 'super integrated' programs on the market. I've had the opportunity to look at a number of them and I'm amazed at what the program developers have achieved. Somehow these guys have got everything but the kitchen sink to fit into one program. I can't wait for some smart marketing type to realise this. Can you imagine the impact of a program called 'Kitchen Sink', packaged to look like a kitchen sink, and advertised as having everything *including* the kitchen sink?

But do we need these 'super integrated' programs?

I've all but written off Symphony. Boy did Lotus blow it. 1-2-3 is easy to use, integrates a few key functions, and comes with an excellent tutorial. Symphony is big, cumbersome, complicated and difficult to learn. Many worksheets are too large for Symphony, and the program's advanced features can only be used on small worksheets. As one user put it, "This runs against the nature of things, for it ignores the tendency for larger models to require more sophisticated approaches, and for larger applications to be modelled as more sophisticated packages appear capable of describing the problem." I don't intend to 'downgrade' from 1-2-3 to Symphony.

Ashton Tate's Framework looks the best of those I've seen, but I just can't see why existing PC users would want to change over to these new programs. Most newcomers quickly become lost amongst the multitude of options. If these programs catch on, the ones who will really benefit will be training centres and user groups.

There is no such thing as a free lunch. You can't buy one program and expect it to replace a string of programs dedicated to specific tasks. The program developers need to step back and take a second look at the way people work. A series of programs with effective links and a common interface would be far better than one 'super' program. Recent announcements by IBM and others in the US would seem to highlight this.

IBM has been showing off Topview, a windowing environment for PC applications. It has also announced enhanced versions of PFS File, Report, Write and so on, under the title of the Assistant Series, as well as another set of programs that will run under Topview. The new wave of 'super integrated' programs has all but crashed on the shore. This year will see Topview become an industry standard, and the software developers will either be writing programs to run with Topview, or to emulate those that do.

Absolute Reference

Those of you who use 1-2-3 and/or Symphony should consider a subscription to *Absolute Reference - The Journal For 1-2-3 and Symphony Users*, published by Que Corporation. A year's subscription to this monthly magazine costs US\$80, and is available from:

Absolute Reference
PO Box 50507,
Indianapolis, IN, 46250.

The magazine has been expanded from its original 16 pages to 24 pages, to include an eight-page section devoted entirely to Symphony. Absolute Reference carries no advertising and is packed with useful tips.

Que Corporation publishes a number of excellent books on the IBM PC and Lotus 1-2-3. One I've used a lot is *1-2-3 For Business* by Douglas Cobb and Leith Anderson, which is a book of sample applications rather than the usual tutorial/reference publication. I'm told *Using 1-2-3* by Douglas Cobb and Geoffrey LeBlond, and *1-2-3 Tips, Tricks, and Traps* by Dick Anderson are also quite helpful.

Public Domain Software

The collection of public domain software now held by the Melbourne PC User Group is growing fast. Recent editions are Volumes 41 to 71 of the PC/Blue Library collection, and volumes 1 to 54 of the Boston Computer Society IBM Special Interest Group library.

PC/Blue volumes 1 to 42 are now distributed on doubled-sided diskettes, with two consecutive volumes per disk. Volumes 43 to 71 are double sided, and have one volume per disk. The Boston disks are a mixture of one and two volumes per double-sided diskette.

The most difficult job the user group has is cataloguing and evaluating the programs. A catalogue of the PC/Blue Library and some other volumes is now available on diskette. Some of the important discoveries made recently are:

PC-FILE III An improved version of this excellent data management program.

LETUS A set of PC-FILE database files that allow the use of keyword searches to find PC articles from *BYTE*, *PC Magazine*, *PC World*, *Softalk*, *PC Age*, and *PC Tech Journal*.

PC-WRITE A good word processing program.

PC-CODE A file enciphering system.

123PREP Prepares ASCII files for 1-2-3 import.

EPISTAT 3.0 A statistical package.

Utility 1-2-3 A programming tool for users of 1-2-3.

FIG-Forth A rather different programming language.

FreeCalc A simple spreadsheet program.

I seem to find some great new program every time I start looking through the collection. The latest was Utility 1-2-3, a collection of 1-2-3 worksheets that make up a great tutorial on how to use ASCII text and graphics, the printer, Prokey macros, and 1-2-3 macros to improve your use of 1-2-3. You've got to see this one to believe it.

MELB-PC now has over 100 double-sided diskettes full of software, with still more on the way. The Sydney and Perth PC user groups are getting together with MELB-PC to share the 50-page newsletter and the software collection. Can you afford not to join your local user group and gain access to this software?

IBM Portable PC (XT)

In my last column I mentioned some problems with the IBM Portable PC running Lotus 1-2-3. I stand corrected. We took delivery of a portable recently and I had a chance to experiment with setting up 1-2-3 on it. If the colour drivers are installed, the problems I experienced with an evaluation unit are duplicated, however, if the black-and-white drivers are installed it runs just fine. Unfortunately, some other software packages are not as well thought out as Lotus 1-2-3. Their screens are unreadable on the

Portable PC, and no alternative is offered.

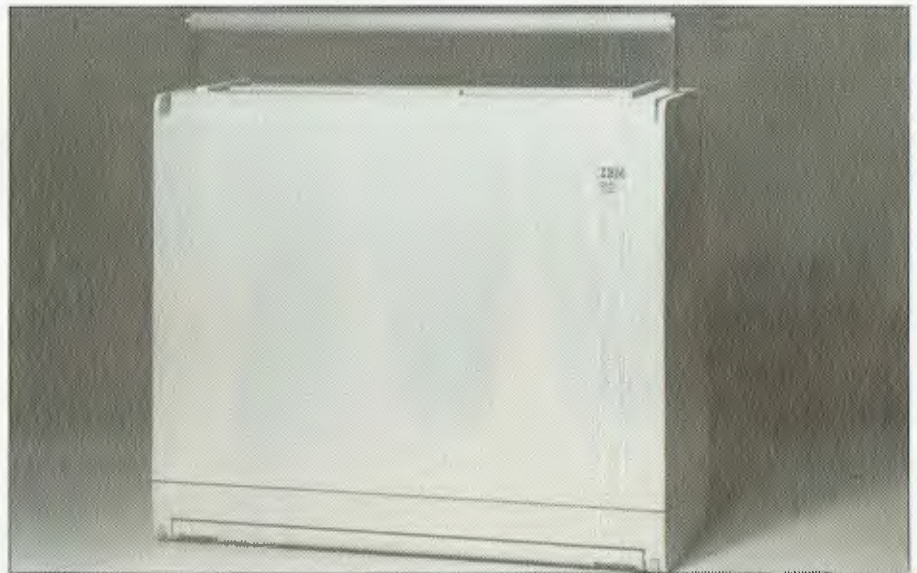
From what I've been able to gather, installing a 10Mb hard disk with the IBM Portable has become quite popular. The set-up we have uses a Sigma Design 10Mb half-height hard disk and full-length controller card. Sigma Design also has a 20Mb half-height drive available which could be used.

With the hard disk controller card taking up one of the two full-length slots available in the Portable and the IBM colour graphics card taking up the other, at first it looked impossible to get in extra memory, serial ports, and a clock. Fortunately, Hercules recently released a short colour graphics board which is fully compatible with the IBM colour graphics card. It also has a parallel port — out goes the IBM card and in goes the Hercules card.

Now a full-length slot is available to take a multi-function card. We used the Sigma Design Maximiser because it allows full memory expansion, two serial ports, one parallel port and a calendar clock. It's a tight squeeze, and a few pieces of cardboard were required to stop cables rubbing on circuit boards, but the result is well worth it.

We now have an IBM Portable PC with one half-height 360K floppy disk drive, 640K of memory, two serial ports, two parallel ports, a calendar clock, and a 10Mb hard disk. In other words, it's a Portable PC XT.

I know I said in my last column that I wouldn't buy a Portable. Well I didn't, my employers did. □



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WELCOME back – I hope you all had an enjoyable Christmas break, and have now recovered sufficiently from all the New Year celebrations to be able to locate your Bee under the piles of used wrapping paper.

I thought it might be a good idea to start the year off with a host of useful bits and pieces. To this end I've scrounged in a number of different places and have even prevailed upon the Sydney Microbee Users' Group to let me use the odd tidbit from its newsletter, *The Beeline*, which means some of the more useful items of information can find a wider audience. Thanks to the SMUG committee for that.

A small outfit at Penrith called J and H Beesware has given me two of its programs to look at, the first of which is called 'Engine'. This is a program with a difference. The player is a machinist who must duplicate a metal plate created by the computer. You achieve this by designing a machine which will execute the operations of punching, drilling, and rotation of the workpiece in a sequence that will result in a match with the computer's piece. High-res graphics characters are used to represent the machine parts and come up quite well. This program is obviously aimed at the education market, and is designed to test the student's grasp of shapes and angles. Varying levels of difficulty; good value at \$12.

The second program from J and H is a maze escape program called, not in the most inspired fashion, 'Maze'. It's much the same as other maze programs, except this one uses high-res graphics to represent the walls, and it certainly beats some of the low-res programs I've seen around. There are three levels of difficulty and a map is provided for the desperate. If you want to see life from the point of view of a white rat and would like to try out your right-wall-hugging theory, then pick this program up, also for \$12. Sorry, no cheese at the finish.

Beesware produces a catalogue which lists some very interesting software, aimed mainly at the educational market. The two fellows who write the material are both teachers themselves and know their material very well. If you're interested, you can obtain a catalogue and any other information by writing to J and H Beesware, 221 Fragar Road, Penrith 2750.

MWB Disk Menu

Alan Goodison, of Goodison Software, has sent me an article on the use of disk-based Microbees. To quote Alan, the article "describes a method used to create a menu program which allows programs on the disk to be run by simply pressing a particular key." There is a complete listing of all the necessary software and full details of how to install it on your disks. Hopefully, this will be featured in this magazine in the near future.

Binary Display

The short routine in Listing 1 was part of a program I once used to show someone how registers operated. It simply displays the binary form of any eight or sixteen-bit data on the Microbee screen. The routine is fully relocatable.

Sixteen-bit data is passed to the routine via the DE register pair and displayed, commencing with the location initially pointed to by HL. If you only want to display 8-bit data, place it in the A register and enter at the label LOW8.

Interference

How many people, I wonder, have been moved out, along with their Microbee, to the farthest corner of the backyard because the radio frequency interference (RFI) emanations from the Bee make TV viewing for the rest of the family very difficult? That many, eh? Well, fret no longer, because a technique to reduce

this RFI was recently published in *The Beeline* by SMUG. Just remove all the electrical bits from the case and spray the inside of the Bee's case with aluminised paint. That's all, although it's recommended that non-technical persons seek assistance. Reassemble the whole lot and your machine should now not make you unpopular with the spouse and kids.

Restoring BASIC Programs

This is an eternal question, and various routines, both in BASIC and machine code, have surfaced to minimise grief. If you inadvertently 'NEW' or cold start a BASIC program, all is not lost. The following method first appeared in this column in March 1983. While it may not be the most elegant, it is universal; it works at 3.30 am, and you do not need a machine code monitor, an assembler or technical back-up. I won't go into the technical operation of the routine (you can see March 1983 for that), but in the interests of newcomers I will reproduce the routine itself. Type in the following BASIC code in DIRECT MODE (do not use line numbers), hit RETURN and your shattered world should once more be whole.

```
POKE 1758,0:POKE 1759,63:POKE
2304,0:POKE 2305,1:FOR X=2307 TO
16384:IF PEEK (X)=255 AND PEEK
(X-1)=255 THEN POKE 2259,X/
256:POKE 2258,X-256*(X/256) ELSE
NEXT X.
```

```

BINCVT XOR A
        LD HL,SCRN ; screen location for display
        LD A,D ; enter here with DE holding 16 bits
        CALL CBIN ; convert 8 bits - upper
        LD A,E
LOW8 CALL CBIN ; enter here with A holding 8 bit data
      RET ; conversion complete
CBIN LD B,8 ; count 8 bits
LOOP RLA ; move bit into carry flag
      JR C,ONES ; if carry (and therefore, bit) is 1
      LD (HL),30H ; else show a zero bit.
NXBIT INC HL ; next screen location
      DJNZ LOOP ; for next bit
      RET ; with 8 bits done
ONES LD (HL),31H ; bit is a 1
      JR NEXT
```

Listing 1

The above is for a 16K Microbee. On a 32K change the POKE 1759,63 to POKE 1759,127 and change 16384 to 32768.

Register Multiplication

The microprocessor cannot multiply; the only way in which a micro can make big numbers from little ones is to use successive additions. In fact, if one wants to be pedantic, even humans really add in order to multiply; they just express it differently. There comes a time in every Assembly language beginner's life when he/she wants to make his/her Z80 multiply a number without having to write a long routine. Provided a watch is kept on the carry flag for overflow, the following technique, while obvious in hindsight, is not always apparent to the beginner.

A register can be multiplied by successive additions using the following methods. For example ADD HL,HL will double the contents of the HL register pair (multiply by two). If you had previ-

Listing 2

```
LD HL,nnnn ;for multiplication      ADD HL,HL ; *4
PUSH HL ;save it                    ADD HL,HL ; *8
ADD HL,HL ;*2                       ADD HL,DE ; *10
LD D,H                               POP DE ; retrieve original nnnn
LD E,L ; save HL*2                  ADD HL,DE ; *11
```

ously saved the contents of HL, in DE for example, then the instructions:

```
ADD HL,HL ; *2
ADD HL,DE
```

will result in the original contents of the HL pair being multiplied by three.

The code in Listing 2 will result in the multiplication of HL by eleven. You should clear the carry flag before doing this and test it afterwards to make sure there is no overflow.

So you see that BASIC functions are not as difficult as they seem at first. There is, naturally, a point at which a proper multiplication routine will be a better proposition, but for simple manipulations, the above process fits the job nicely. Just remember that any multiplier

can be broken down into powers of two, the multiplications carried out, and the partial products added to produce the final result. In Listing 2, for example, the multiplier, 11, is broken down into 2 to the power of 3, 2 to the power of 2, and 2 to the power of 1. The value, nnnn, is then multiplied by each of these to give three partial products, which are then added to give the answer.

By the way, the competition I am running has been swamped by three entries so, to induce more of you to enter, the closing date has been extended to the end of February. Come on, surely there are more than three capable individuals out there!

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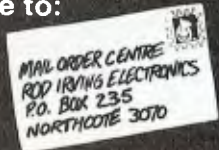
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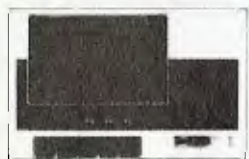


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Errors and Omissions Excepted

IN THE LAST column I mentioned the importance of ensuring that what comes into the computer from the keyboard is what the machine really needs, and gave a couple of simple examples of input routines. This month I'll describe a more ambitious routine which also demonstrates the usefulness of the AND function. It isn't perfect, but it is easy to adapt to your own needs.

FNinput (x%,y%,len%,char%) returns a string and needs four parameters (see Listing 1). The first two, x% and y%, work as TAB (x%,y%) to place the cursor where required, and len% defines the maximum length of the string returned. The last parameter, char%, is the most important as it is used to describe the kind of characters to which the keyboard will respond. There are eight sets of characters available:

- Digits 0 to 9 (1)
- Capital letters (2)
- Lower case letters (4)
- Decimal point/full stop (8)
- Maths operators (16)
- Punctuation marks (32)
- Dollar sign (64)
- Ampersand and per cent (128)

The numbers in brackets must be added to char% to indicate which sets are to be 'legal', so that if the function is required to return only the digits 0 to 9 make char% = 1. If only capital letters are to be permitted then char% = 2. If digits, capitals and lower case letters are to be allowed then char% would be set to 7 (that is, 1+2+4). The other sets of characters are allowed through this 8-bit filter in the same way, so that when char% = 65 (1+64) the digits 0 to 9 and \$ are legal, or when char% = 25 (1+8+16) a mathematical expression containing real numbers could be entered, perhaps for use with EVAL.

These sets of characters are quite arbitrary and can easily be altered in PROClegal (char%). You'll notice that in line 1180 if char% = 0 then all printable characters are legal. PROCbuild (s%,e%) simply builds a string called legal\$ which contains all characters between ASCII s% and ASCII e% inclusive. This string is checked in line 1110 using the INSTR function, and if the key pressed in line 1070 is included in legal\$, it is added to string\$.

The most likely place you'd make changes would be in 1220 to 1260, so that you could tailor it to your own requirements. More sets could be included, using 256, 512, 1024, and so on

added to char% (the limit would be 30 sets).

A few other points: the cursor and COPY keys are disabled by *FX4,1 in line 1020 and might need to be re-enabled after performing FNinput (using *FX4,0). A warning buzz sounds if an invalid key is pressed, or if the user tries to exceed the maximum length allowed for the input string.

Using the BASIC assembler

Newcomers to the use of assembly language often find the User Guide instructions on how to use BBC BASIC's built-in assembler rather tricky to follow. Although they tell you everything, it isn't very clearly explained, so I hope the following hints make it a bit clearer.

The first thing your machine needs to know is where to put the code when it has been assembled. You can let the machine decide for you by using a statement such as:

```
90 DIM code 255
```

at the start of your program, and the BASIC interpreter will allocate 256 bytes of free memory somewhere above TOP, but below HIMEM. Later you can set P% = code (see below).

The alternative is to set P% yourself. If you'd like the code kept somewhere

out of the way to give yourself more workspace, you could locate it in an unused buffer area, perhaps &A00 if you're not using RS423 or cassettes, or &C00 if you're not using speech or sound either. To do this you must set the system variable P% to the address at which the code is to be assembled; for an example, see Listing 2.

Important: P% must be reset before each pass through the assembler, so it needs to be inside the FOR ... NEXT loop used around the assembly language section of your program, itself surrounded by square brackets []. Another thing to note is that the labels on assembler sections are BASIC numeric variables and they must be preceded by a dot to function properly as labels. Thus, the variable 'begin' will have the value &A00 because it is at the start of the assembled code.

In the first pass through the assembler code OPT code is set to zero, so error reports on what the assembler thinks are errors (such as forward branch instructions) are suppressed, while when OPT is set to 3 on the second pass you get a listing of the assembled code on the screen. After everything is running you can prevent this listing by setting OPT to 2 on the second pass. □

Listing 2. Setting the system variable P% to the address at which code is to be assembled.

```

1000 DEF FNinput(x%,y%,len%,char%)
1010 LOCAL length%,key%,string$,legal$,s%,e%
1020 *FX4,1
1030 PROClegal(char%)
1040 length%=0 : string$=""
1050 VDU31,x%,y%
1060 REPEAT
1070 key%=GET
1080 IF key%=127 AND length%>0 THEN VDU8,32,8:le
length%=length%-1:string$=LEFT$(string$,length%):GOTO
1130
1090 IF key%=13 AND length%>0 THEN GOTO 1130
1100 IF length%=len% THEN SOUND 0,-15,2,1:GOTO 1
130
1110 IF INSTR(legal$,CHR$(key%)) >0 THEN string$
=string$+CHR$(key%) ELSE SOUND 0,-15,2,1:GOTO 1130
1120 length%=length% + 1:PRINT CHR$(key%);
1130 UNTIL length%>0 AND key%=13
1140 =string$
1150
1160 DEF PROClegal(char%)
1170 legal$=""
1180 IF char%=0 THEN PROCbuild(32,1261:ENDPR
OC :REM All
1190 IF char% AND 1 THEN PROCbuild(48,57)
:REM Digits 0 to 9
1200 IF char% AND 2 THEN PROCbuild(65,91)
:REM Capitals A to Z
1210 IF char% AND 4 THEN PROCbuild(97,122)
:REM Lower case a to z
1220 IF char% AND 8 THEN legal$=legal$ + ". "
:REM Decimal point
1230 IF char% AND 16 THEN legal$=legal$ + "+-*/ (
):REM Maths operators
1240 IF char% AND 32 THEN legal$=legal$ + "? , ;
":CHR$(34):REM Punctuation
1250 IF char% AND 64 THEN legal$=legal$ + "$"
:REM Dollar sign
1260 IF char% AND 128 THEN legal$=legal$ + "%"
```

Listing 1. A more ambitious input routine.

```

100 FOR pass=0 TO 3 STEP 3
110 P%=&A00 (or P%=code, if
you used line 90 above.)
120 I OPT pass
130 .begin LDAB0
: (code goes here)
400 RTS
410 ]
420 NEXT pass
:
590 REM Now invoke the code:
600 CALL &A00
610 (remainder of program)...
```

THE REASON I confine my writings largely to the earlier models of TRS-80s is that this is where there seems to be the demand for knowledge — and the models other than the I, III and 4 seem not to be hobbyist machines anyway.

When the Model I was released in 1977 there was very little known about it, or for that matter about this kind of ready-built hobby computer generally. Much of what was of interest then (and of course still is) was information about how to make it do things it wasn't intended to do at all, and about how to modify the early programs to do more than they were meant to, written as they were very quickly and simply to fill a hungry market.

For example, today the Scripsit you can buy is still basically in its original form, but has been so much modified by various enthusiasts for their particular needs that some versions to be seen at Users' Group demonstrations bear little resemblance to the original. It has been modified to work with most of the DOSes available today, to utilise the advanced capabilities of today's printers, as well as a host of other things seen by some as necessary.

My own version of Scripsit is modified to run under LDOS (which gives it several useful features, one being the facility to print to the screen and allow checking before committing to paper), to underline, to overstrike, to slash zeros, to pause while printing (so I can talk on the phone, or change daisywheels), and to reset the margins on my Olivetti typewriter, which I use for a good-quality printer. It seems there is little our Users' Group's word processing expert cannot do, so if you have a requirement I suggest you contact him (enclosing return postage): Ian Robertson, 23 Hilary Crescent, Modbury North 5092.

The articles that used to appear about the System 80 were almost solely concerned with making it more like the Model I it was supposed to copy; this is still the main problem stated in the System 80 letters I get now. Having been encouraged with success in these attempts, there is now a bewildering array of add-ons and improvements for both the Model I and the System 80 offered by these experimenters. The people involved don't offer these services as a profit-making concern (I think a nobly admirable situation given that

there is now no commercial support for these machines), so don't expect the prompt reply you'd count on from a commercial organisation (often to be disappointed!), but it's still worth \$1 in stamps for a batch of information about what's available: John Ross, 2B Green Road, Woodville 5011.

The other great topic for the earlier magazines was how to convert Model I programs to run on the (then new) Model III. This need still exists, of course, particularly as some of the companies that supplied the early Model I programs are no longer in the hobbyist market, or indeed no longer in business. The good news is that because of the constant need, such conversions are no longer a job for the experts. I suspect these experts became tired of being asked to convert, and have put together a program to do such things as converting Model I or Model III programs to run on DOS. This has appeared in many Users' Group Newsletters (yet another reason for joining your local User Group!), together with a detailed explanation of what's being done and why. Briefly, what they do is to restore the Level 2 vectors from 4000H to what they were before DOS overwrote them.

Help

I've had a number of letters asking if there's a TRS-80 Users' Group in Melbourne. Is there? As well as allowing me to pass on queries from that area, my own Users' Group would like to swap newsletters. So please tell me!

Another request is for a tape copying utility program which works the same as TRCOPY. This is not convertible to the Model III (at least not without a lot of re-writing), and doesn't work on the later Model IIs with their modified keyboards. The great advantage was in being able to see what came off the tape as it was loading in; many troublesome tapes were salvaged by this utility. Certainly there are plenty of tape-copying utilities, but those I've seen don't display the data as it's coming in. I'd appreciate being told if a reader has one such; I can then spread the word.

The need still exists for a good tape-based Editor Assembler. Although I've looked at some available, I've yet to find one to replace Microsoft EDTASM+, which is no longer marketed since Microsoft left the TRS-80 market. For a

disk-based Assembler I can recommend EDAS, which runs under LDOS; I do know that there are a lot of very keen assemblers (like me, for instance!) who enjoy writing assembly for its own sake rather than to achieve some masterpiece, and therefore have no need for a disk system. Again, I'm waiting to be told! In the meantime, I understand the Tandy original EDTASM is still available on order from Sydney.

Model 4

With the encouragement of the deals offered by Tandy, quite a number of people who were previously battling along with something else have been induced to buy a Model 4 or 4P. But I've noticed most of them choose to run in the Model III mode (at 4 MHz) because there is little software for the Model 4 mode if one doesn't want to run CP/M (and I find it hard to see why anyone would want CP/M when there is LDOS!); there is still a lot of software for the Model III.

There is even a number of 80-column drivers to give the best of both worlds, although sadly these don't work with all programs. So again I'm asking for readers to tell me what they do with theirs, and why. I can then pass it on to others in this column.

Change of Emphasis

I've noticed that the emphasis within the computer hobbyist field seems to be turning more to applications and usage, as opposed to 'raw' programming as it used to be. I think those of us who've been with the computing hobby since it started in Australia have gone past the early stage of excitement with the logic of programming; we now actually use our system, whereas earlier we were disappointed when the program finally ran bug-free because there was nothing more to fiddle with!

This might be somewhat disappointing to the newcomer to a Users' Group when (s)he finds no-one appears to be at the level of an interest in programming for its own sake. Just remember that most of us have 'been there, done that'; we've moved on, not from a lack of interest, but as part of our development.

A technique we've tried successfully within our own Users' Group is to abandon the idea of trying to cater for the

newcomers with some sort of formalised (to a greater or lesser degree) class or course. Instead we've found a few hours spent with a more experienced member in either's home have been mutually rewarding, particularly for a newcomer to a disk system. It seems a great many beginners in the computing hobby are buying whole systems on the second-hand market, rather than buying the basics and adding peripherals and extras to them as funds allow; their need for assistance is therefore greater as they're jumping in at the deep end!

Another benefit of attending meetings of your Users' Group is being able to confront the enthusiasts of different DOSes with each other, let them argue it out, and derive the benefits yourself! I've come to the conclusion that it's the DOS you start with that you put the most effort into learning, and thus have the most success with.

NEWDOS80 seems to me to be a DOS very much for the advanced programmer, although its aficionados deny this! Version 2 is quite incompatible with a number of other DOSes. DOSPLUS was regarded as a good successor when one tired of the failures of TRSDOS, and had a good extended BASIC with very useful commands for the serious BASIC programmer. But now with the release of the 3.5 version we see yet another area of incompatibility emerge, so I wonder if DOSPLUS will remain the favourite it has been.

There remains LDOS - which is the one I chose originally, so pardon my smugness. I must point out that it's the one Tandy chose to offer as an alternative on the Models I and III, and of course is known as TRSDOS on the Model 4. Consequently there remains compatibility between Models I, III and 4. I must admit, though, the BASIC does not have the attractions of the DOSPLUS BASIC.

Old Discounts

I've had word that there exists a (perhaps unintentional) trap when buying from the discount houses advertising in the American specialist magazines. It is that the program you buy may not be the latest version, therefore understandably cheaper than buying from the original source. I can't offer any answer to it, beyond asking for details of the version before parting with money. Of

course, with many programs it won't matter, since the new version is generally only to supply enhancements rather than fix up basic flaws. I pass this on as just something to be aware of when snapping up an apparent bargain.

Correction

In my September column I advised that it was easier to zero the INKEY\$ contents by assigning a null string (" ") to them before using them, so that any previous unwanted contents will be disregarded. I should have said the technique is:

A\$ = INKEY\$:A\$ = "".

Thank you to the reader who pointed this out; of course it is what I do, it won't work otherwise (Sn error) - I just didn't explain it properly!

Discount Disk Drives

With the number of competing companies offering an ever-increasing range of competing disk drives, it's difficult to advise in favour of the purchase of used drives, unless of course these come as part of a whole used system. While I personally have not had any trouble with drives (I've had Tandy drives both on my Model I and Model 4), I have heard many reports of less satisfaction. Admittedly a lot were against MPI drives, but there was a proportion of complaints about other brands too.

Not only is it the standard drives that are offered at discount prices; there are also slimlines, and double-sided drives in 40- and 80-track.

I have heard of some dissatisfaction with the slimlines, but I expect that as these are in use in greater numbers the minor problems will disappear. Certainly there are quite a number installed in Model IIIs and 4s, in banks of four to replace the two standard drives. Strangely, the complaints have come from those using a single slimline; if there is to be a heat problem I'd expect it to be when there are several installed.

The problems of some years ago with 80-track double-sided drives seem to have become a thing of the past. Now many people are happily using 700+K storage on a single drive, although this is really more relevant with applications such as databases.

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PCG

I DON'T think I'm unusually stupid, and I thought I had a reasonable grasp of the Lotus programs. My associate has been using computers for only six months, but is usually able to work out intuitively how to operate a program. However, we came to grief on Symphony's graphics program, on a pie chart of all things.

Let's look first at 1-2-3's pie charts. Only one range of figures can be entered with a pie chart, and this would be entered as Range A. The labels for each slice of the pie are entered as Range X. Titles are entered the same way as in other graphs. If the result is printed on a dot matrix printer the pie may not come out as a proper circle, but it should on a plotter.

The program enters the labels, and after each one shows the percentage of each to the total, rounded off to one decimal place. This adds to the value of the chart. On the other hand, the pie is shown only as an outline; you cannot add any colour or hatching to any of the slices, as you can with other programs. Hence the standard of presentation is not as good as the other types of graphs produced by 1-2-3.

Lotus overcame this defect in Symphony by making provision for you to select different hatching for each slice in monochrome, or different colours in colour. In colour the same hatching is used for each slice. When we printed our first pie chart we didn't worry about colours too much, reckoning on fixing that with the second chart. But when we came to do that we couldn't see how to select each colour. One of the manuals does offer the comment that you can set one colour for the outlines of the pie slices and another for the titles, labels, and percentages. But it does not tell you how!

With the use of the three Symphony manuals plus the Help screens it still took us two hours to solve the problem. Are we that dumb or could it be that the Symphony manuals are obscure and parts of the program are counter-intuitive? I've heard all three suggested. (Before you decide, have a look at the answer to the problem; it's at the end of this column.) The next time I hear a program described as 'user-friendly' I'm going to blow my top.

1-2-3 on DEC computers

Imagineering has announced two updates for DEC users of Lotus. To find

out whether you need the update, check the file dates on your disks. If they are before March 2, 1984, and you are experiencing printer problems, you need an updated file called PR.DRV, obtainable for \$6. If your system disk is dated before March 2, 1984, and you are running DOS 2.01, you can update to DOS 2.05 for \$25. To find out more, ring the Lotus Hotline on (02) 211 4462.

Print Spoolers and RAM disks

Does 1-2-3 support print spooling and RAM disks? Lotus' answer is, "Release 1A does not officially support these programs." (A print spooler sets aside part of the computer memory. Normally when you send something to the printer it can only accept the data at its slow print speed; if you have a print spooler it can accept the data at electronic speeds and then make the computer available to you. A RAM (random access memory) disk stores the program and data in memory, where it can be accessed somewhat more quickly than from a hard disk and much more quickly than from a floppy.)

Despite this statement, you can certainly use a print spooler and a RAM disk with 1-2-3. A print spooler can save a lot of time when you have to print large amounts of data. Because 1-2-3 stores its programs and data in memory, a RAM disk offers no advantage while running the program. However, it offers significant advantages if you have to leave 1-2-3 frequently to access other programs. The same applies to Symphony, except that you will find you don't have nearly so much surplus memory to play with.

Installing Symphony

When you install Symphony you have to set it up to work with your particular hardware. The terms used by Lotus may not be immediately intelligible, so we'll try to explain them here. The terms are dual mode, shared mode, and toggle mode.

If you have an IBM monitor and an IBM monochrome card you cannot display graphs (but you can print or plot them). With any other set-up you can display graphs and spreadsheets, either alternately or at the same time. 'Dual mode' refers to the situations where you have both a monochrome monitor and graphs at the same time on the graphics monitor. 'Shared mode' is where you have a single graphics monitor on which

you can display text and graphics simultaneously. 'Toggle mode' is where you have a single monitor and can switch back and forth between text and graphics. One thing to note is that you cannot readily change between toggle and shared mode; you have to exit Symphony and change the driver.

A problem has been encountered by some people when using the dual mode. This is that the program will not load; it hangs after leaving the Access menu and before the rectangle containing the serial number appears. You can overcome this problem by switching to the graphics monitor and straight back again, either by the DOS mode commands ('mode co80' followed by 'mode mono') or by the public domain program FLIP.COM. If you put the two 'FLIP' commands ('flip color 80' and 'flip mono') in your AUTOEXEC file anywhere before ACCESS, you don't even have to have the colour monitor switched on. Imagineering has issued a helpful list of Epson printer codes; it would be of even more help if they were to send to registered users information about such things as the problem we have just described and the one mentioned later under the heading of embedded printer codes.

Printer Codes

Provision is made in 1-2-3 and Symphony for you to enter printer control codes. In 1-2-3 this is described as a set-up string. You enter the command /Print Printer Options Setup and then enter the string. An example for the IBM or Epson printers is \015 for condensed print.

In Symphony the string is called an init-string ('init' standing for initialisation) and you enter it through the sequence Print Settings Init-String.

Some strings require three sets of figures; for example, the same printers require the string \027\045\001 to set underlining and \027\045\000 to turn off underlining. This example works with 1-2-3 but not with Symphony. With some printers you can use \027\045\049 and \027\045\048 respectively (48 is the ASCII code for 0 and 49 is the code for 1). On other printers this won't work; for these I don't have a solution.

Embedded Print Codes

Symphony's document mode is used for text. You can use the init-string referred to above to enter print settings for the

whole document, but you can also insert them on a non-printing line anywhere inside the document. Page 35 of the 'How-To' manual describes the process, but omits the vital information that to enter or amend these strings you must go to Sheet mode.

Answer: How to set colours in pie charts

In the spreadsheet, you need three columns: for the X range, A range and B range. The labels go in the X range, the values in the A range, and in the B range you put the numbers for the colours you want for each slice of the pie. The numbers to use are shown on page 223 of the Reference Manual. An example of what the spreadsheet looks like is on page 224 (Fig. 8-6).

To set the colours for everything else, you go to the 'Graph Settings 1' page and enter the numbers of the colours in the Hue column alongside Range X and Range A. X is for titles, labels and percentages; A is for the outlines of the pie slices. It doesn't seem to matter what you put in the Hue column for Ranges B to F.



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IN EVERY haystack there's at least one needle. In every 1541 there's a fast disk drive trying to get out. Indeed, it appears there is a growing number of people preoccupied with speeding up the 1541 disk drive and the humble Datasette. Since the idea was originally conceived almost one year ago, the results of this small crowd's efforts have been most encouraging.

In fact, most software released on cassette is 'turbo loaded'. Disks look set to follow suit following the release of a Turbo Disk Operating system by Cockroach Software. In order to avoid any further confusion, let me explain what these fascinating systems actually do.

Firstly, there are two common types of system which speed up the operation of disks or cassettes. One is known as a Turbo Loader. This is a short program which is loaded before the main program. It temporarily takes control of the LOAD process to allow the main program to be LOAded at high speed. This is usually employed on cassettes where the main program is stored at a far greater density than usual, which has several advantages. More information may be stored in less space, and therefore it is possible to get better-quality programs than were previously practical on cassette.

A Turbo Operating System is quite different from a Turbo Loader. This is usually a program placed on cartridge and may even involve some hardware modifications or additions. An example of such systems are the 1541 Express and Arrow. As these are operating systems, they allow the complete process of LOADING, SAVEing or whatever function you may require to be carried out at a far greater speed than usual. So that's the difference; which one is better?

1541 Express

This cartridge, along with its Australian competitor Speed Load, is proving to be very popular. The Express plugs into the expansion port and also requires the connection of two leads inside the 64. A daunting task? I found the manual's explanation was most helpful. The leads are well labelled and actually grab hold of the pins they must be connected to. Once everything is in place, disk access is increased by a factor of two to three. Compatibility is maintained with most commercial software, although I found

some compiled programs would not LOAD.

Speed LOAD is similar in its operation, but does not require the connection of any leads. Both these systems come under the category of turbo disk operating systems.

Arrow or Rabbit

Cassette users have not been forgotten. Both the Arrow and the Rabbit cartridge, although not readily available, are most useful. Apart from speeding up cassette operation by a factor of five to six times, they also add extra commands. ACOS is a similar system, but it comes on tape and resembles a disk operating system complete with directory.

As there is an exception to every rule, there is also a system that is really neither one nor the other. Cockroach Software produced a fast disk back-up program called 'Turbo Roach' around the middle of this year. Since then nothing has stopped the company's progress. I recently had a chance to see its latest invention in action; officially it was called a Turbo Disk Operating System, although it wasn't quite what you might expect. To start with, it's stunningly fast – so fast you can miss things if you're not watching.

Turbo-DOS allows you to convert disks to a new format which will then allow programs to LOAD five times faster. A typical example would be a 68-block program, which normally loads in around 45 seconds, loading in just under nine seconds – far more acceptable. Once the format of a disk has been modified, it is booted or started by typing LOAD "0:*,8,1. Within moments a technicolour directory appears, with all the usual information. This custom screen may be modified and allows a total of 20 titles to be displayed, each preceded by a letter of the alphabet. To RUN a specific program, just press the corresponding letter – simple and efficient.

A utility program also allows you to add files to a turbo disk, create a new disk, rename files, delete files, print a copy of the directory or change the colour scheme.

Music, Music, Music

You've probably seen the ads in nearly every computer magazine across Australia, although you would probably

never own up to reading them. You may have even heard the sound, penetrating the still night air at two in the morning. Alternatively, you may be one of the calm, sensible, well-informed buyers who charged into the nearest participating store and purchased one the day after its release. I am referring, of course, to the fabled Kawasaki Music Synthesiser. And if you believe I'm being bribed by the distributor to say all these nice things, I can only say that I wish I were!

Speak not until you see, or rather hear. This little device is not without its minor bugs, but overall it works very well. The synthesiser is every man's answer to what else can you do with your Commodore 64 – apart from play games. You don't have to be a musician to use it, or a programmer to understand it. You do need to know how to read, and which way is the right way to place a disk in the disk drive. Apart from that, it's all very simple.

Commodore endowed the 64 with one of the most powerful sound chips ever placed in a personal computer. The Kawasaki lets you put that silicon marvel through its paces. There are several programs available that let you compose or listen to the music it can produce. Since this is not a review I will say no more, except that I was most impressed, in case you haven't already gathered that. Do yourself a favour and at least go and look at what you're missing.

Names and Numbers

To save you a phone call or two, and to save me several thousand hours, here are all the names and numbers of the people and products mentioned this month.

1541 Express – Cybex Computing, (08) 267 5855.

Speed Load – Eureka Software, P.O. Box 310, Niddrie 3042.

Arrow – Interfaceware, (02) 467 1933

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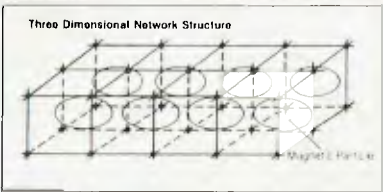
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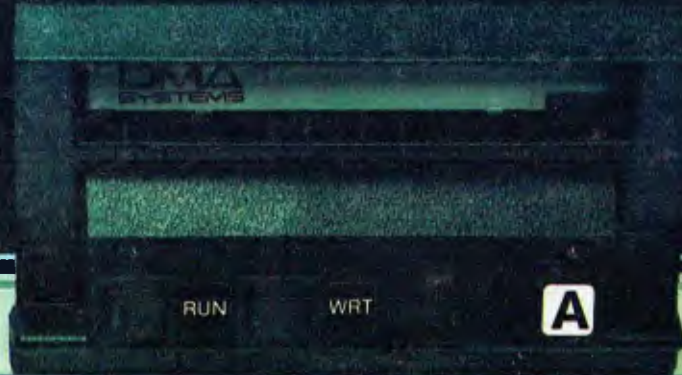
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