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MAY, 1983 \$2.00* NZ\$3

FOR BUSINESS AND PLEASURE



Personal Computer Of The Year

NINE OF THE BEST EXAMINED - BUT THERE'S ONLY ONE WINNER! ★
SPECIAL FEATURE: DATA 83 ★ COMMUNICATIONS: THE CASE FOR A
MODEM ★ HOW TO GET SUREFIRE FILE TRANSFERS BY PHONE ★
ANOTHER GIANT POCKET PROGRAMS LIFTOUT ★ COMPUTER COURSES

DATA 83

AUSTRALIA'S BUSINESS COMPUTER EXHIBITION
SYDNEY CENTREPOINT
MAY 17-19, 1983



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inside your computer

Vol 2, No 10. May, 1983.

special

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Personal Computer of the Year

Giant steps in the personal computer industry, plus a wider interest in the market, were the inspirations for this award. Nominated systems were short-listed to nine, scoring points for design, user support, value for money and performance. Read about the winners, losers, and those who cast the judgements.

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Pocket Programs Liftout

This month we have yet another special 16-page pocket programs liftout. Games, home, business, and system improvements have all been included. Watch our upcoming issues for even more!

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Your Computer News

Our roundup of the latest in software and hardware, new and upcoming releases, and happenings in the world of microcomputers.

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Data '83 Showguide

Well, it's showtime again, and to herald one of Australia's most important computing events, we've written a special guide on what to expect at this year's shows in Sydney and Melbourne.

features

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Forget the Crosswords - Buy a Computer

How to transform a passion for crosswords, into a yen for computers.

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BASIC Statistical Analysis

Part 1 of a series on accurate analysis of data using BASIC.

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A bit of fun with the sound capabilities of the MicroBee.

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The Christensen Revolution

Details of transfer protocols used for downloading Your Computer programs from the Mi-Computer Club Bulletin Board.

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First Impressions - Apple's IIe

This upgrade of the Apple II has some significant attractions and detractors for the user.

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Basic/Z

Les Bell reviews a powerful new BASIC compiler which provides a complete program development system. He's impressed...

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Digitek's Apple Printmaster

Some glowing praise of Digitek's parallel printer card.

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Manual Labour

Constructive advice on how to avoid the black holes in Tandy's 'Going Ahead with Extended Colour BASIC' manual.

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WordBee

A review of this exclusive wordprocessing package for Applied Technology's MicroBee.

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The Magician Draws the Line

This three-part graphics package has been designed to enable the user to put high-resolution graphics into his own programs.

education

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Computer Courses Guide

A guide to those colleges, companies, and holidays which are offering computer training facilities and courses.

departments

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The Pain and Pleasure

That grand 'ol daddy of the computing world - Frank Linton Simpkins - gives us his unique outlook on the state of today's computer industry.

106-112

Popular Systems

Individual columns devoted to the more popular models, including the return of the MicroBee column.

PERSONAL COMPUTER OF THE YEAR

Who won it? What IS the Personal Computer Of The Year? Well, there were nine machines shortlisted, five made it as finalists, and the winners is...announced on Page 19.



By popular demand...the feature that made our December issue the biggest-selling ever, the 16-page Pocket Programs liftout, is back. And we plan to make it a regular feature of alternate issues from now on. It starts on Page 51.

next month

Spot the typesetting error in this box last month? Yes, we promised a "future developments" story for the May issue, when we meant June. Most of you would have realised that from the context, so we say again - watch for it, it should be interesting!

We'll also be looking at a couple of new machines, as well as the usual complement of news, reviews, and tutorials. If, as a prospective buyer, you find our owner reports useful you'll be glad to hear we plan to make more space available to readers' contributions in coming issues...

editorial



This issue marks a very special occasion in the history of both Your Computer and the microcomputer industry in Australia. Now that Your Computer is well established as the major personal computer magazine – in both sales and content – we are proud to announce the first Personal Computer of the Year Award.

At the time of writing, the winner has just been selected, and the Award is due to be presented on Wednesday May 4 at Sydney's Sebel Town House before an invited audience from the com-

puter industry and the press. So far, the result is a well-kept secret, but there is no doubt that news of the award has started to leak out and is arousing considerable interest throughout the industry.

We did not lightly undertake the responsibility of making such an award. In fact, planning for the award started several months ago, when it was decided that a panel of experts should be convened to consider on what basis an award should be made. In fact, when it came to the test, there is no easy way to compare personal computers – even with almost 30 man-years experience purely in personal computers to guide the panel.

Despite the difficulties, the panel has chosen a winner, and you can read all about it on page 19. Now that the selection has been made, we are settling down to plan the next Award. Perhaps the major decision made so far is that there will be an Award for the outstanding software package.

We have so often said that software is the most important part of any computer system, that it is mandatory that we make such an Award. And with the wide variety of software available, there may even be more than one award category established.

And so we should like to thank the computer suppliers who were involved for their assistance in providing machines, answering questions and generally helping us with our testing.

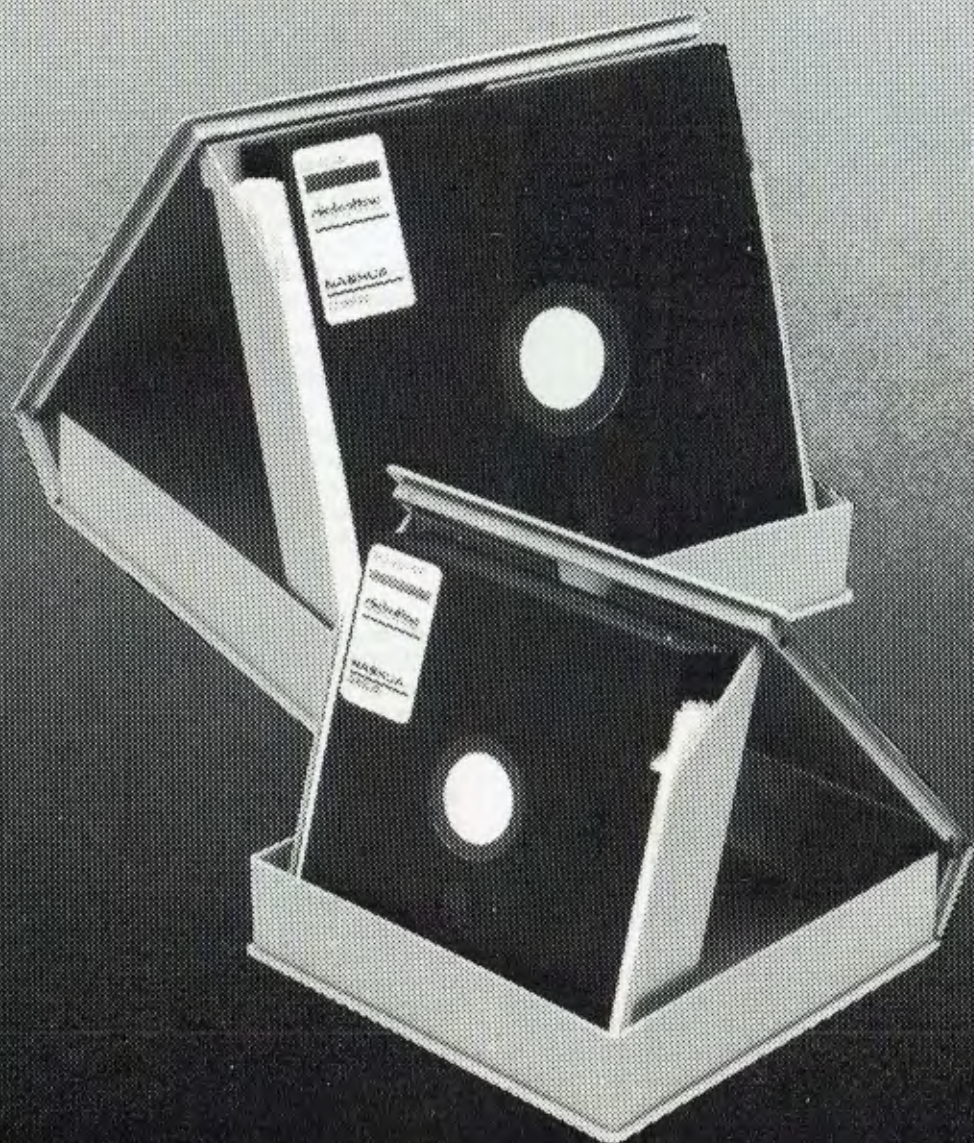
We also thank the members of the panel: Professor Phillip Grouse, Dr Robert Graham, Dr John Barrett, and Mr Len Rust, for their hard work in exhausting discussion and evaluation sessions. And, of course, congratulations go to the winner – but we won't spoil the surprise! ☐

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your computer news



Tandberg Data's TDV2200 ergonomic series makes computing far more comfortable.

All The Better To See You With...

A RANGE OF ergonomic terminals, manufactured in Norway by Tandberg Data, has been released in Australia by General Technology. The Tandberg Data terminal is claimed to be the only terminal that meets the West German ergonomic standard, created by the Central Office for Accident Prevention and Industrial Medicine.

Tandberg Data's TDV2200 series, which features an anti-reflection 38 cm monitor that can be raised, lowered, tilted and swivelled, is designed with a light coloured background to surround the text on the screen. This achieves the correct relationship between the light output from the terminal's screen and the other elements at the work station.

For further information, contact Reg Mercer at General Technology, phone (02) 498-2826 Sydney. ☐

Apples For Healthy Children

THE ENDOCRINOLOGY Department at Sydney's Royal Alexandra Hospital for Children has networked six Apple II personal computers to increase the efficiency and speed of storing and retrieving patient information and test results.

The Apple IIs are individually used to collect results of hormone tests. The result are then keyed into another Apple, which stores the patient files and is easily accessed by the hospital staff.

Networking is achieved by using the Apple II linked through Omninet, a shared-access network that allows any of the Apple IIs to transfer data without needing a master network controller or a mass of wires. ☐

Software's DEAD-Easy System

SOFTWARE SOLUTIONS' new DEAD (disk editor and diagnostics) is designed to provide a relatively simple method of checking a disk for errors and hiding bad sectors and extending disk life.

For the more serious user, DEAD provides an integrated collection of essential diagnostic and surgical tools for operating on bytes, tracks, sectors, files or records within a file. Directories may be validated and erased files can be restored.

Access to any part of a disk is obtained by specifying track and sector numbers, block number, or file and record numbers. Random access files can be read in record number order and the contents dumped to the screen in ASCII and hexadecimal. DEAD is suitable for any CP/M system, especially with hard disks.

Software Solutions' OCAS (office costing analysis system) provides accurate records and reports, so that jobs going over time can be noted. Time spent for a particular client, or on a particular task, can be seen at a glance, and the productivity of each staff member analysed by client or task.

The prime purpose of OCAS is to provide an easy-to-use system of recording and reporting on staff, clients, tasks and costs. Outside disbursements and fixed charges are catered for, as well as time-related tasks.

For further information, contact Software Solutions, phone (03) 531-4607 Melbourne. ☐

And Now, The EI Cheapo Micro

A MICROCOMPUTER which sells for less than \$160 has been launched worldwide by Oric Products International, which is based near London. The 16-kilobyte machine costs the equivalent of \$159 and the 48-kilobyte model costs \$271.

A major feature of the new microcomputer, which measures 280 mm by 175 mm by 52 mm and weighs just over 1 kg, is its keyboard, which has 57 moving keys and tactile feedback. The 28 lines of 40 characters produce a display similar to Teletext and the RAM uses state-of-the-art dynamic memories for high-board density and low-power dissipation.

The Oric uses an internal loudspeaker and amplifier, and can also be connected to external hi-fi systems by using a DIN connector. A three-channel sound synthesiser can produce musical notes from subsonic to supersonic frequencies.

For further information, write to Oric Products International, Coworth Park, Ascot, nr London, England. ☐

The Ultimate VDU, Stage One

BRITAIN'S Pericom Corporation has developed a new VDU (visual-display unit) which it claims will signal the end of the single-purpose terminal.

Pericom has devised the technique of multi-host communication, which enables its 7800 range to be connected to a number of different computers without modification. While the concept of emulation of other manufacturers' terminals is not new, the Pericom system involves the use of software emulators stored within the device and selected by software commands.

Using this system, the 7800 can communicate both synchronously and asynchronously, act as a terminal, perform high-resolution graphics and may be used as a stand-alone microprocessor. The 7800 costs about \$4000; the basic price of the machine is about \$2400. ☐

How To Expand Your Memory

A MEMORY expansion board of 8-24 kilobytes is now available for the Commodore VIC-20 personal computer from TJ Peripherals.

The expansion board is designed to accommodate a maximum of 24-kilobytes static RAM on board and any two VIC-20 cartridges, such as Super Expander and Programmer's Aid (or a games cartridge), eliminating the need for a mother board. RAM cartridges and on-board memory can be used in any combination to achieve the required amount of RAM up to 24 kilobytes.)

The expansion board requires no extra power supply, and comes fully socketed with a minimum of 8 kilobytes of RAM and one cartridge socket for \$99. A maximum of 24 kilobytes and two cartridge sockets costs \$164. Extra RAM can be added at a later date in 8-kilobyte blocks (\$32 each) to the 24-kilobyte maximum, as the user's needs increase.

For further information, write to TJ Peripherals, 9/140-148 Crimea Road, Marsfield, 2122. ☐

The Great Barrier Reef Competition

A COMPETITION for technical students is being held for the electronic design and construction of a prototype of a marine temperature sensor and recorder, for use in studies of the Australian Continental Shelf and the Great Barrier Reef.

The competition is being sponsored by Neil Brown Instrument Systems, the Great Barrier Reef Marine Park Authority

and the Marine Studies Centre of the University of Sydney; the latter two are also the joint organisers.

The competition is open to students who are residents of Australia, including all full- and part-time engineering students enrolled in educational institutions in Australia. Commercial organisations and Government agencies are not eligible.

The prize is a three-month work-study program at Neil Brown Instrument Systems in the United States, including travel, accommodation and a salary. The final acceptance date for entries is January 13, 1984.

For further details, contact Bruce Hamon, Marine Studies Centre, University of Sydney, Sydney, 2006. ☐

Basis Names New Distributors

MEDFLY BASIS, of Oakleigh (Victoria), and Data Universe, of Parramatta (New South Wales), have been appointed the Australian distributors for the Basis range of computers from West Germany and Hong Kong.

The Medfly is a dual-processor microcomputer system, compatible with a large library of microcomputer software and plug-in peripherals.

Standard features include 6502 and Z80 microprocessors, 128 kilobytes of RAM, 2-kilobyte system ROM expandable to 12 kilobytes, six-colour high-resolution graphics, eight-bit parallel output and built-in cooling fan.

For further information, contact Judi Baker at Data Universe, phone (02) 689-2599 Sydney. ☐

THE AFFORDABLE 64K APPLE IIe



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The Nucleus Code Generator

THE NUCLEUS System Generator, produced by Compact Accounting Services, of Britain, is to be sold in Australia by Software Solutions.

Nucleus is a menu-driven BASIC code generator that runs on CP/M, CP/M86 and MSDOS machines. It requires a CPU with at least 64 kilobytes of memory, and diskettes or Winchester with at least 350 kilobytes per drive capacity.

Nucleus is a program-generating system for data creation, retrieval, manipulation and reporting, which enables the production of new, customised applications, even by non-technical staff. Normally, the development of any application requires time-consuming planning, coding and debugging, but Nucleus by-passes this.

Programs are automatically built as the user responds to simple questions at the terminal. De-bugging is unnecessary as Nucleus produces executable BASIC programs from the outset.

For further information, contact David Gardner at Software Solutions, phone (03) 531-4607 Melbourne. ☐

Queensland's Booze Bus

THE QUEENSLAND Hotels Association has adopted a computer program developed by Brisbane-based Micol Management Systems, to help speed up its communications with members.

The program also frees staff members from long and tedious up-dating of price schedules that cover more than 4000 stock items for hotel liquor supplies.

Micol Management Systems linked the program to an Olivetti M20 microcomputer, which it distributes in Queensland.

Micol's program was developed on hard disk and resulted in a system that covered all 4000 stock lines, provided a facility for price variations, and enabled any change of the wholesale price to be listed directly on to the computer, with the Olivetti M20 making all other calculations.

Time spent in actual production of the schedules has been reduced from more than five days to less than two.

For further information, contact Micol Management Systems, phone (07) 221-6355 Brisbane. ☐

18 Megabytes For The APC

NEC INFORMATION Systems Australia has released a 9.3-megabyte Winchester hard-disk unit for its APC personal com-

puter. Two of the externally mounted hard-disk units can be connected to the APC — Advanced Personal Computer — for up to 18.6 megabytes of storage.

Correcting codes are used to ensure data integrity, and the intelligent drive controller uses a Z-80 microprocessor to control disk operations. Operating system support for the hard disk will initially be provided under CP/M-86, which will divide the physical disk into two 4.7-megabyte logical drives.

MS-DOS operating system support will be provided with the release of version two of MS-DOS. The 1-megabyte high-capacity floppy disks supplied with every APC computer will be used to back-up the hard disk.

The hard disk is expected to have a pre-tax recommended retail price of under \$4000.

For further information, contact Kate Castle at NEC, phone (02) 438-3544 Sydney. ☐

The Made-In-Japan Aussie Calculator

AFTER NINE YEARS as the sole Australian distributor for the Victor calculator range, Microelectronic plans to become the first Australian company to produce its own house-brand calculator.

To be marketed under the Microelectronic name, the calculators will be produced in Japan to Microelectronic's specifications. Several manufacturing companies will be used, each chosen for its specialist technology; this will assist in the production of calculators designed to meet specific user needs.

For further information, contact Ted Tiltins at Microelectronic, phone (02) 92-0837 Sydney. ☐

Cromer's Big Deal

CROMER PROGRAMMING Services, the Australian distributor of Padmede microcomputer software, has signed an agreement with AY Systems, to be the major distributor of the Planfin and Profin financial software packages.

To "celebrate" the appointment of Cromer Programming Services, prices have been reduced for a limited period to \$195 for Planfin and \$295 for Profin. ☐

Computer Airwaves

A COURSE on BASIC programming is to be broadcast over the next three months by the University of New South Wales' Radio University. It will be hosted by Jim Murray, of the university's Computing Services Unit.

The three-part course, first broadcast in 1982, will run for 14 weeks, from May to mid-August. Each lecture is broadcast twice a week, at 8pm on Mondays and 7pm on Fridays.

Printed notes are provided, and students can test their programs through Radio University's own computing facilities. The fees are \$22.50 for parts one and two (five radio lectures each) and \$20 for part three (four radio lectures).

Radio University is accessible on station VL2UV, broadcasting in Sydney on 1629 KHz. Transistor radios modified to pick up this special frequency are on sale from Radio University for \$10 post paid or \$8 collected.

The courses also come on cassette following broadcast, at \$8 per radio lecture, and \$30 or \$50 according to format, for video lectures. For full details, contact Radio University on (02) 662-2691, or write to PO Box 1, Kensington, 2033. ☐

Wordprocessors make spelling correction easy. The WORD Plus finds the spelling errors!

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Most electronic dictionaries are around 20,000 words. The WORD Plus comes with a 45,000 word dictionary which has been produced by processing actual text.

The WORD Plus is compatible with practically all CP/M computers, running the vast majority of wordprocessors and text editors.

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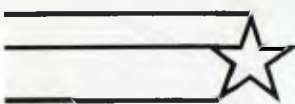
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"Is That Really You?"

A HUMAN VOICE digitised on to computer chips, and capable of interfacing computers or data networks to the public telephone network, has advanced voice-handling technology to the stage where computers are answering telephone calls in a way indistinguishable from humans!

The system of machine-made voice output, pioneered in Australia by the TCG Group and its research-and-development subsidiary, Hypercom Data Products, was recently granted Telecom approval.

Called VOM (voice output modem), the system has already achieved acceptance with users of portable data-entry terminals, also marketed by the TCG Group. It can be programmed to suit individual customer requirements.

For further information, contact the TCG Group, phone (02) 699-8300 Sydney. ☐

Added Sting For WASP

AN UPDATED WASP (Wang accounting system for professionals) range of software has been developed jointly by Wang and Solution Six.

WASP now includes systems covering client accounting, fixed assets, time and cost, debtors, taxation, insolvency and liquidation, investment portfolios, share registers, manufacturing costing, membership registers, and mailbox and diary.

All these WASP systems were developed with the use of a fourth-generation program language called Cheetah.

For further information, contact Wang Computer, phone (02) 436-3477 Sydney. ☐

The Decentralising Software

AN AUSTRALIAN-designed computer software, Micro-Conacs, has been released by Burroughs Ltd for small businesses or large companies that want to decentralise. The modules include costing, accounts payable and receivable, sub-contractors, general ledger, plant hire, purchasing control, spreadsheet analysis for estimating, and word-processing. ☐

Are You Being Serviced?

GRACE BROTHERS is the first major retailer in New South Wales to offer a rental service for microcomputers. The company is currently renting out the Osborne 1 computer, complete with the standard Osborne software, including word-processing, financial modelling, engineering and program development.

Rental can be taken over a 12-, 24- or 36-month period, and the costs are \$158, \$135 and \$113 per month respectively. Full servicing and maintenance costs are included. During the first two years of rental, the systems can be purchased, with 50 per cent of all rental payments made credited towards the purchase of the equipment.

"Some people are nervous about buying the wrong computer, as they're not always sure exactly what they want from it," said the manager of Grace Brothers' Parramatta Business Centre, Ken Morley. "They are, therefore, sometimes at the mercy of the computer salesman. In addition, they're also worried about obsolescence." For further details, contact Grace Brothers' North Ryde store, phone (02) 887-0133, or the Parramatta store, phone (02) 635-0366. ☐

Hewlett Packard chose Spellbinder over all other CP/M wordprocessors.

Why?

Hewlett Packard conducted exhaustive research before selecting a CP/M wordprocessor program to run on their HP125 business computer. The result? Spellbinder was judged superior in all key areas. Here are some of the reasons:

Spellbinder is fully customizable. Function keys and cursor keys really work on Spellbinder! This means faster training and more efficient use.

The most useful and workable mailing list capabilities. Sort by post code then merge any individual information from a mailing list into text.

Powerful sorting facilities. Sort clients by income and then print out a list in order of income with telephone numbers. Sort alphabetically or numerically. Eg. Print up mailing labels for only NSW customers from an all states list and have them sorted by post code.

Note: These facilities are built in.

They are not expensive add-ons.

Boilerplating. The user can create entire documents by specifying the numbers of pertinent paragraphs on a master 'boiler plate' file and printing them in any order.

Advanced printing features. Includes the ability to print in two columns and to print multiple documents.

Forms generation facilities. Create a template that 'looks like' your invoice. Spellbinder will show you where to fill in the blanks - then print just the information on your pre-printed stationery.

Ease of use. The three interactive levels of help are fully customizable so they are right for YOUR system. You can even view other documents on your disk without disturbing your current text.

Arithmetical facilities are built in. Total your invoices, prices or statements automatically. Full 16 digit precision with up to 15 decimal places.

Full support. Software Source is dedicated to the support of this powerful package. A growing library of applications programs is available, from mail list entry to invoice generators.

Contact Software Source for further details and the name of your nearest dealer. Come and find out what real wordprocessing is all about.

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Huge discounts on Dick Smith's System 80.

Dickie Does It Cheaper...

THE COST OF the advanced Blue Label Dick Smith System 80 has been slashed from \$750 to \$499. Dick Smith Electronics says this is due to the initial development costs being absorbed, and new technology producing better-quality components at a cheaper price.

Meanwhile, Dick Smith Electronics has opened two new branches. The first is in Townsville (Queensland), at the corner of Ingham Road and Cowley Street, and the second is in Gosford (New South Wales), at 315 Mann Street.

For further information, phone Harold Ellison at Dick Smith Electronics, phone (02) 888-3200 Sydney. □

Software for Hardware

USING MICRONIC portable data entry (PDE) terminals, Mitre 10 hardware stores are improving their stocking system. The terminals are operating in 41 of the chain's Victorian and Tasmanian outlets.

The alphanumeric terminals have been programmed to perform three basic functions — order entry, special promotion ordering and stock take. Programs to operate these terminals were developed by the TCG Group.

For further information, contact the TCG Group, phone (02) 699-8300 Sydney. □

And Now, The Micro Floppy...

TABOR, AN AMERICAN company, has released an 8 cm micro-floppy disc drive, called the TC5000 Drivette, through its Australian distributor, Ampec Electronics.

The Tabor unit offers the same 500-kilobyte storage capacity of standard floppy-disk drives, but at a quarter of the size, half the weight, and 60 per cent of the power.

Meanwhile, Trilog has released through Ampec a new series of line printers, and the Archive Corporation has released the Scorpion, a 2 cm streaming-cartridge tape drive, in a 13 cm package.

For further information, contact Ampec Electronics, phone (02) 818-1166 Sydney. □

Merlin Without The Magic

A SOFTWARE game called Merlin, based on the legend of King Arthur, has just been released by Dreamcards. It is marketed as "a game without tricks".

The Merlin package includes a 54-page book with full listing details in MicroWorld BASIC, plus a detailed commentary, instructions for conversion to other BASICs, and notes on how to play.

The price is \$35, including postage and packaging, from Dreamcards, 8 Highland Court, North Eltham, 3095. □

OTC Buys A Crystal Ball

A "CRYSTAL BALL" computer has been developed for the Overseas Telecommunications Commission (OTC) by PA Computer and Telecommunications, so that OTC can forecast the changing demand on its telecommunication services.

The model is the result of a request from OTC for a problem-solving system which would help the commission offer the right service at the right time and at the right profit. It is described as a high-level management tool designed to guide strategic decision-making.

The model will predict the demand for such services as videophones, Telexes that can deliver a message worldwide in seconds, and voice mailboxes that enable a caller to send a message which is stored if the recipient is out.

For further information, contact Peter Keesing at PA Computer and Telecommunications, phone (03) 699-1711 Melbourne. □

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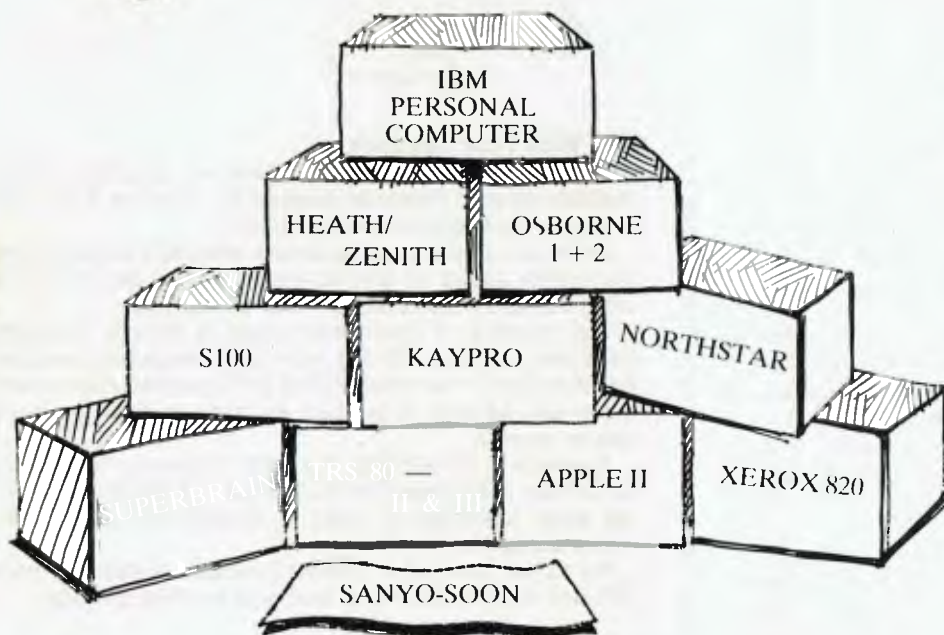
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All applications should be in writing, addressed to:

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PO Box 21 Waterloo 2017

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BIT STIK



Fun With Your Joystick

THE ROBOGRAPHIC BitStik interactive graphics system, available through Robocom Australasia, could be the solution to many professional drawing problems.

Aimed at designers, draughtsmen, architects and engineers, the system allows all graphic material to be stored on disk, using a simple visual index for recall as required.

The inputting of drawn information is through the BitStik three-axis controller with the minimum of keyboard instruction. All information is compiled, edited and amended electronically. It can also be used to produce as many multi-coloured originals as desired.

A sample of the BitStik's work, sent in to us by Keith Stewart at Camden's Seahorse Computers, proved the point as far as we were concerned...it really is spectacular, and certainly worth having a look at.

For further information, contact Robocom Australasia, phone (03) 645-3067 Melbourne or Seahorse on (046) 66-6406. ☐

Wang's Better Networking

WANG COMPUTER'S distributed-information processing capabilities have been further strengthened with the development of three enhancements to Remote WangNet (wide-area networking).

The latest refinements are expanded distributed computing methods, and resource- and information-sharing between large and small office systems in remote locations.

The enhancements are an increased number of secondary system workstations, document transfer capabilities between support systems, and extended low-end support capacity.

For further information, contact Wang Computer, phone (02) 436-3477 Sydney. ☐

How can I write better software, faster?

Write it in BASIC/Z!

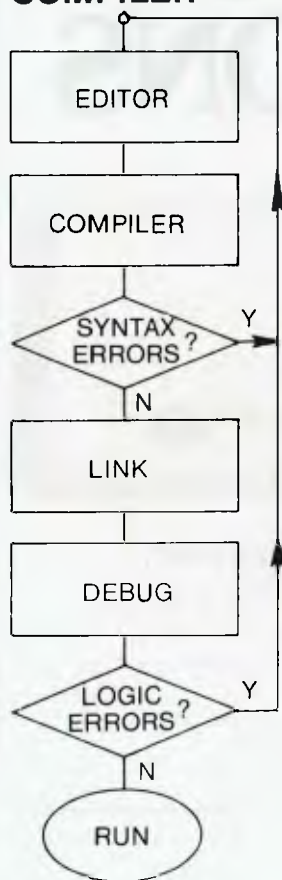
BASIC/Z. A new standard in compilers for the CP/M system.

BASIC/Z is the most powerful implementation of the BASIC language currently available. BASIC/Z generates executable machine code compatible with 8080, 8085, Z-80 under CP/M 80 and 8086/8088 processors under both CP/M 86 and MS-DOS.

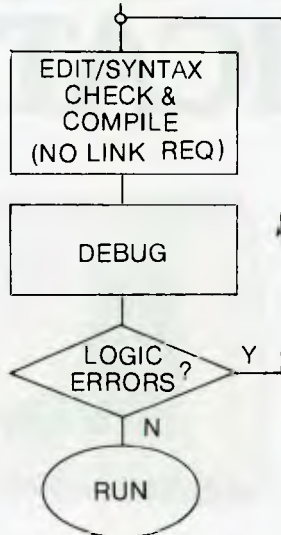
Syntax testing as you type. A BASIC/Z first!

BASIC/Z has a powerful programme editor with built in syntax testing as you type. Time saving features include global search and replace, fifteen local edit commands and extensive debugging facilities. Line trace, error line retention, and the unique ability to 'single step' a program with a continuous display of selected variables are just a few of the features which will save you time.

CONVENTIONAL COMPILER



BASIC/Z



BASIC/Z produces direct machine object code, NOT P-CODE. It is better and faster than CBASIC or Microsoft BASIC.

Multitiered error handling allows your program to trap logical errors, including previously fatal BDOS errors. Only BASIC/Z can trap that 'BDOS ERROR ON A: READ ONLY' before it happens.

Printer/terminal customizing is built in.

The runtime library of BASIC/Z (included in the package) includes installation routines for the majority of CP/M machines on the market. Your software will have near universal application without further modification. Just one set of programs will run on practically any hardware.

Unsurpassed accuracy

BASIC/Z gives you the precision you need for scientific and business applications. Floating point numerics with a range of 1E-61 to 1E+61, with a choice of precision from six to eighteen digits. All floating point maths are performed in decimal (BCD), avoiding rounding off errors.

Powerful executive functions aid programming. Using SORT, it can sort 2,000 elements in two seconds. User defined functions are fully recursive, support multiple arguments and may contain an unlimited number of statements.

No Royalties

BASIC/Z has absolutely no royalties nor runtime charges of any type. The BASIC/Z license agreement confers the right to distribute support software such as the BASIC/Z runtime module and the installation hardware configuration utility, subject only to specified copyright acknowledgements.

What does it all cost? BASIC/Z documentation & Software: \$495*inc. tax. Available from your computer supplier or from Software Source direct. Available on 21 days approval (if software seal not broken). Or clip out the coupon and send in for further details.

*RRP

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344-348 Oxford Street Bondi Junction PO Box 364 Edgecliff
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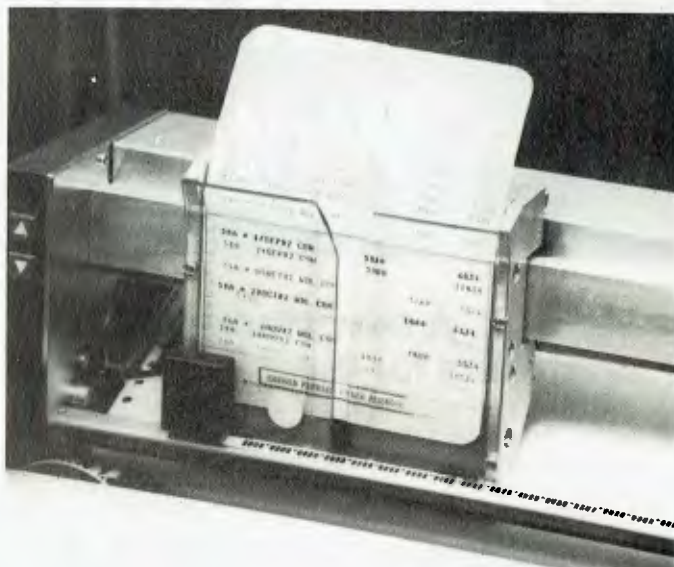
Keeping Up With The Dogs

AN AUSTRALIAN-developed PDE (portable data entry) application, pioneered by the greyhound racing industry, has been acclaimed as a world first.

The PDE operation, developed by the TCG Group, is part of an overall system designed to channel comprehensive race information from all tracks throughout New South Wales, through one central point. It enables the fast and accurate assessment of dog forms, it sorts and provides race and betting details and results, and it produces a racebook for each day's racing at each track.

Two back-to-back Onyx computers installed at the Defax office in Sydney form the core of the system, processing the information which is fed from microcomputers installed at TAB courses and the Micronic portable terminals located at non-TAB tracks.

For further information, contact Pat Gallagher at the TCG Group, phone (02) 699-8300 Sydney. ☐



Anadex's 3070-1 with WordStar emulation.

Anadex's Latest Front Inserter

DATASCAPE, the Australian distributor of Anadex printers, has released the 3070-1 front inserter for the WP3000 dot-matrix word-processing printer.

The WP3000 offers draft printing up to 180 cps and true-letter quality (with proportional spacing) up to 110 cps. Full WordStar emulation is built in. ☐

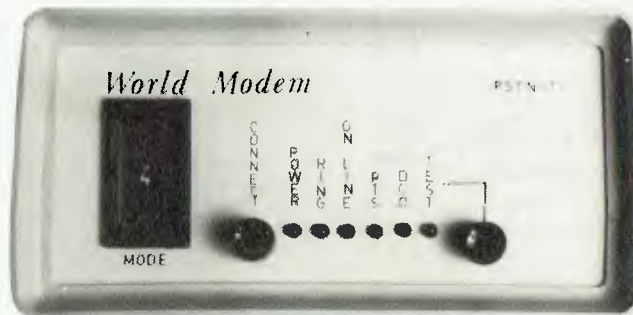
The new front inserter enables either single-sheet or forms (including cheques, pass books and tickets) to be entered and ejected automatically.

For further information, contact Rob Stirling at Datascape, phone (02) 909-1233 Sydney. ☐

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Dataview's Down Under Distributor

PITWATER COMPUTERS, of Sydney, has been appointed the Australian and New Zealand distributor for Dataview, the British-based software house.

Dataview is known to Commodore users as the distributor of the Wordcraft 80 word-processing package, together with such programs as The Executive, Datalex, The Financial Director and DTL BASIC Compiler.

Over the next few weeks, Pittwater Computers will be releasing Wordcraft for the IBM, Sirius, Digital and Commodore 64 personal computers.

Pittwater Computers will also be distributing Stack Computers' add-ons for the BBC Micro and Atari personal computers.

For further information, phone Pittwater Computers on (02) 939-6760 Sydney. ☐

Teach Yourself dBase II

A NEW BOOK explaining dBase II is now available in Australia, from Seahorse Computers, 10 Mitchell Street, Camden, 2570.

dBase II is a powerful database run on CP/M-based systems, but it is not easily understood by the novice who wants to create useful databases.

Adam B.Green's book, *dBase II User's Guide*, is aimed at overcoming this problem. Priced at \$32.95, plus \$1 postage and packaging, the book contains information to supplement the program documentation. It also has some useful examples.

Osborne-1 microcomputer users can also obtain a special six-disk tutorial on dBase II and a utility called Fix. This set of seven disks is also available from Seahorse Computers, at \$80, including postage and packaging. ☐

Organising The Organisers

TO AID THE efficiency of conference organisers, Wang Computer has developed a program called Ideas, in conjunction with Apex. The program is in two main files, called Registration and Tours.

The Registration file contains a number of interactive sub-files to record information relating to each registrant's requirements for accommodation and the like.

The Tours file was designed as a separate file, rather than a sub-file, as details of tours are usually unavailable until well after the start of registration.

For further information, contact Wang Computer, phone (02) 436-3477 Sydney. ☐

Computers In Education

THE MICROCOMPUTER Club of Sydney's Macquarie University is on May 23 presenting a lecture by Professor David Moursund, entitled "Computers in Education".

From the Department of Computer Science at Oregon University, Professor Moursund is a founder and president of the International Council for Computer Education. He is also the editor of the magazine *Computing Teacher*.

The lecture will start at 1.05pm, in the PG Price Theatre, Building W5C, at Macquarie University.

For further details, phone Dr John Barrett at (02) 88-9579, or Julian Hyde at (02) 88-9597. ☐

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Guess Who's Mum Got A PC?

THE FAMILY that earns at least \$25,000 a year and owns a colour television, automatic dishwasher, AM/FM car radio, component stereo, central air-conditioning, microwave oven and side-by-side refrigerator/freezer is most likely to buy a personal computer.

This was revealed in a recent United States survey of personal-computer owners, conducted by *Time* magazine. A total of 8000 magazine subscribers participated in the survey, and 7.5 per cent of them owned a personal computer.

The survey showed personal-computer owners were likely to be professional workers at either middle or top management level in the fields of trade, commerce, education or the services.

Almost half the personal-computer owners stated games and hobbies to be the main use for their computer, with 30.8 per cent nominating personal finance and taxes as a major use.

Apple computers were the most popular system, with a total of 17 per cent ownership. ☐

How To Be Type-Cast

IF YOU'RE fed up trying to type quickly with just two fingers and want to learn how to use your other eight pinkies, the Typequick computer course could be your salvation.

The Typequick course comprises 10 structured lessons, each of which has a specific objective and concludes with a report on the student's progress. Users progress at their own rate, but are guided by the computer.

The first eight lessons teach "touch-typing" of the 40 main keys, while the last two are intended to increase your speed and accuracy. Refresher lessons may be called up after completion of the course.

The Typequick course will initially retail at \$60 plus tax, increasing to \$70 by mid-year. For further information, contact Noel McIntosh at (02) 498-7428 Sydney. ☐

The All-Australian Video Board

THE GEMINI VIDEO board, just released by Bisshop Systems, combines all the functions of a text terminal and a colour graphics display. This is a completely Australian-grown product, from design through to personal-computer boards.

By adding a monochrome video display and a parallel keyboard, a complete 80 by 25 text terminal can be made. A colour video monitor makes an eight-colour, 640 by 200 graphics display. Connecting a small speaker enables the board to generate three octaves of tones under program control. A lightpen interface is included.

The Gemini - it generates two displays in one board - has an onboard Z80A microprocessor to relieve the host processor of all the hard graphics work. Commands are sent by a two-port interface which emulates a graphics terminal.

The timing is generated mostly by a 6545 CRT controller, so most video parameters are completely programmable. The board has four banks of 16 kilobytes of video memory - one each for red, green, blue and alphanumerics.

The price of the unit is \$680, plus tax. For further information, contact Bisshop Systems, phone (02) 569-3389 Sydney. ☐

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The Winner, By A NEC!!!



**PERSONAL COMPUTER
OF THE YEAR!**

Personal Computer Of The Year!

For the first time, a panel of experts has convened in Australia to select the Personal Computer of the Year, and at the centre of the activity was editor Les Bell. Here's his report:

THE ANNUAL Personal Computer of the Year Award from *Your Computer* magazine is a new award designed to stimulate public recognition of advances in the personal-computer industry.

This is the first year that the award has been made. We believe it will stimulate public interest in personal computers. It certainly has stimulated interest within the industry.

At an early meeting, the panel of judges drew up a shortlist of contenders for the title. Twelve machines were originally listed, but three of these had not yet appeared on the Australian market, and so they were excluded from further consideration. They will, however, be eligible for next year's award.

The shortlisted machines were:

Commodore 64
BBC Microcomputer
Otrona Attache
Toshiba T100
IBM-PC
Columbia MPC

NEC Advanced Personal Computer **Sirius** **DEC Rainbow 100**

We should first note that making it to the shortlist is, in itself, a considerable achievement. Of the machines released in the past year, this list represents the cream of the crop. Each machine has at least one feature which represents an advance in the "state of the art".

This does not mean, however, that we feel that these are necessarily the best personal computers on the market. Many good machines have been available for more than a year, and were thus excluded from our list. In addition, specialised software support and other features may make other machines the best choice for specific applications.

Nonetheless, regardless of your application, it's worth checking these machines out.

For purposes of evaluation, the machines conveniently fall into four groups. The first is the home and educational computer, typified by the BBC Microcomputer and the Commodore 64.

BBC Microcomputer

Both the BBC Microcomputer and the Commodore 64 are typical of the new breed of personal home/educational computer. The BBC machine is a descendant of the Acorn Proton, but it has been extensively re-designed to meet the requirements of the British Broadcasting Corporation for its computer-literacy project.

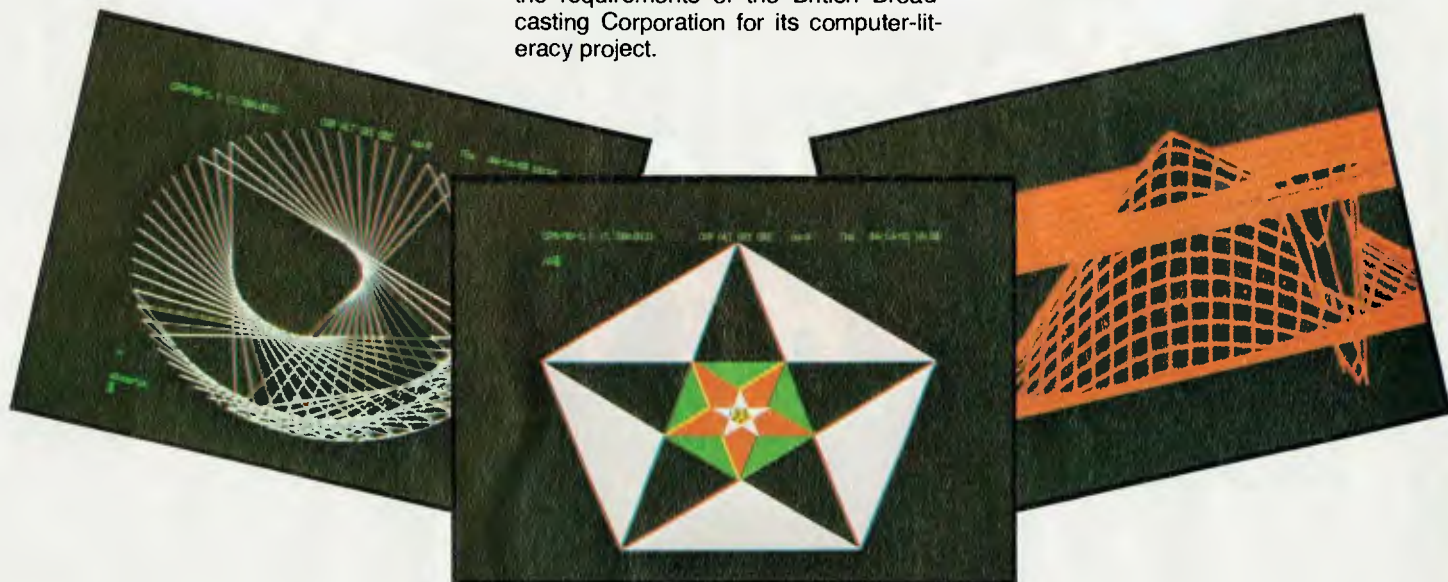
Several key features stand out about the Beeb, as it is known. First, there is its almost unique position in having the backing of a British Government corporation in the generation of educational materials. Already, there is a vast amount of educational software, games and applications, generally oriented towards the first-time user. In other words, a first-time user can take the machine home and put it to work immediately.

Secondly, the machine is highly expandable. Interfaces are provided for almost every conceivable peripheral, including a Teletext/Prestel converter, bit pad and even a robot arm. Internal expansion can include additional ROMs to provide extra languages, word-processing or other applications. Built-in interfaces include serial, parallel and four 12-bit analogue inputs.

The BBC Microcomputer incorporates an unusual expansion interface in the form of "the tube", a specialised high-speed serial interface to a second processor. Presently, a Z-80 processor is available, but the BBC's designers are working on a board featuring the 16032, National Semiconductor's "VAX on a chip".

The BBC also operates on the Acorn Econet, which can support up to 255 computers. Though originally designed for educational applications, the Econet is quite useable in an office environment.

BBC BASIC is a structured "superset"



(with some differences) of Microsoft BASIC. It has some very interesting features, such as in-line assembly language, multi-line functions, local variables, full recursion and, of course, support for the Beeb's high-resolution colour graphics and sound generation.

The BBC Microcomputer is a rather different design concept to the more conventional machines currently available. It offers very high performance in a general-purpose package and, because of its affiliation with the British Broadcasting Corporation, a level of software support which could exceed virtually all other machines.

Commodore 64

Perhaps the price/performance bargain of the year, the Commodore 64 packs an amazing amount of performance into a tiny, low-cost package. Despite the superficial resemblance, this is more than a Commodore VIC-20 with more memory.

Based on Commodore's 6510 micro-processor, the 64 has a full keyboard and a colour display with 320 by 200 pixel, 16-colour graphics. The 64 kilobytes of memory are not all accessible at once: under BASIC, 39 kilobytes are available to the user, while machine-code programs can get at 52 kilobytes.

The graphics chip in the machine allows the user to create up to eight independently controllable sprites. Each sprite is a shape, up to 21 by 24 pixels and in up to three colours, which the user can direct to move. The machine will automatically ensure that foreground objects pass in front of background ones, and will take appropriate action when objects collide.

Another impressive feature of the Commodore 64 is the speed with which Commodore has provided support for software developers – already, technical manuals and software development packages are available. A number of developers, including Commodore itself, have been putting these materials to use, and there is a vast area of software already on the market for the 64, ranging from games to word-processing and business packages.

The support extends to peripherals, too: there is a wide range of devices, including disk drives, cassette units, a printer and a four-colour printer/plotter – plus, of course, the expected joysticks, games paddles and a light pen.

The Commodore 64 has the much-vaunted ability to run CP/M – yes, well, it does run CP/M, but, owing to the slowness of the IEEE-488 bus to the disk drives, it takes 20 seconds to load PIP (versus half a second on any S-100 machine). And after a program has run, CP/M warm-boots – a process that



BBC

takes about 30 seconds. Once a CP/M program is loaded, it runs just fine; but can you imagine WordStar, which relies heavily on disk overlays for its menus, running on the Commodore 64?

Nevertheless, a special version of WordStar is said to be on the way. But the judging panel couldn't really take the 64's CP/M capabilities seriously and, in any case, the 64 can easily stand on its own merits regardless of CP/M.

From the point of view of ergonomics, the 64 is not too hot, with a rather cluttered keyboard and a maze of wiring between its peripherals (plus their power cords), but we can forgive this, bearing in mind its low cost and high expandability.

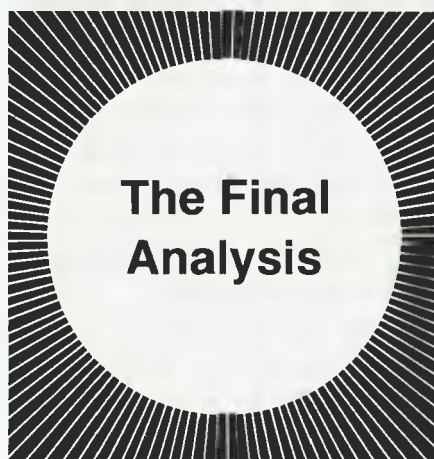
Toshiba T100

A very interesting little package, indeed. The Toshiba T-100 is a small unit, not much bigger than the Commodore VIC-20 and still small enough to fit in a briefcase, but which really does run CP/M and has one other feature which especially lends itself to portability: a liquid crystal display.

The T-100 has a full-size keyboard and, above that, a pair of cartridge slots which will accept ROM or RAM cartridges. At the back are connectors for disk drives and other peripherals, as well as video out sockets. There's also a couple of slots which are used to support a hinged liquid crystal display.

This display, which simply plugs in

PERSONAL COMPUTER



OF THE YEAR

The Award Criteria

THE WINNING machine must have been released on to the Australian market during the year immediately prior to the award. We distinguish between announcement of a new product and its first sales: the machine must actually have been sold to end-users during the period of time under consideration.

The major criteria which the panel use in judging the machines are (not necessarily in order):

1. Ergonomic design, in terms of both hardware and software.
2. Technical excellence in design, engineering and provision of advanced or new features.
3. User support, documentation and training.
4. Value for money.
5. Performance.

In addition, the panel may evaluate additional features as necessary. ☐



Columbia MPC

using a subminiature DIN connector, has eight lines of 40 characters, both upper and lower case, together with punctuation symbols. Using this display, the machine is completely independent of a video monitor, and can be used virtually anywhere.

BASIC is provided in ROM inside the machine, and additional 32- and 64-kilo-byte RAM cartridges can be inserted. When removed from the machine, the RAM contents are maintained by a battery. An inverter attachment is available for portable operation in a car.

The other DIN connector provides RGB colour video (640 by 200 resolution, eight colours), and Toshiba has a matching monitor which provides a high-quality display. Two operating systems are provided: TBASIC, which is Toshiba's version of stand-alone Microsoft BASIC, and CP/M, which provides MBASIC and other languages.

A wide range of CP/M 2.2 software is available. The demonstration packages included Software Solutions' Office Costing system and Sapphire MARS (reviewed last issue). This means the T-100 can be put to work immediately for serious business tasks.

The T-100 highlights one of the most important features of the next generation of personal computers – portability. An executive can use it in the office during the day, and then take it home at night and continue to use it without disturbing the family's television-viewing. It can even be operated in a car.

The major drawback with this kind of machine is that it is a black box. Japanese manufacturers, for some reason, seem to think that people will only write their own programs in BASIC, and only supply CP/M as an afterthought – even then, there is a lack of information about screen-control codes, serial port addresses and other vital statistics.

However, for its high-resolution colour graphics in such a small package, its portability and its innovations, such as



Toshiba T100

battery-backed RAM cartridges and LCD display, the T-100 deserves serious attention.

Otrona Attache 512

The Otrona Attache 512, reviewed in the November 1982 issue of *Your Computer*, is a small, portable machine which you can easily carry around – you could probably fit two of them under an airline seat!

The most obvious point of the Otrona is its attractive styling and neat packaging. Taking the covers off reveals the engineering quality continues inside. This is a quality machine. The keyboard, which unfolds *a la* Osborne, is small but has good spacing and feel, while the tiny screen is quite readable and produces high-quality video for external monitors.

The two disk drives have a total capacity of around 800 kilobytes, which is quite adequate for most applications. The operating system is CP/M 2.2, based on a Z-80A 4 MHz processor with 64 kilobytes of RAM. On power-up, the Otrona goes into terminal mode if no disk is inserted, and can be used as a terminal on a remote system.

A unique feature of the Otrona which impressed the judging panel was its Valet software package, which is partly ROM-based and partly resides on disk. By pressing the control and escape keys together, the user can obtain a small menu at the bottom of the screen. This labels the top row of keys to perform such functions as adjusting the screen brightness, controlling the tone and volume of the key-click and bell, and adjusting the baud rates on the serial ports.



Otrona Attache 512

In addition, a real-time clock and calendar is displayed. By now pressing the tab key, the user obtains a menu of additional functions. The most familiar of these is a screen-dump utility, which can be installed for the Epson MX-80 and other popular printers. Rather more unique are the other two functions – an alarm system and calculator.

Up to nine alarms can be set for any time and date in the future, and stored in memory. Associated with each can be a message line. Alternatively, the machine can be instructed to run a program, interrupting the current task if need be.

The calculator facility is similar to Hewlett-Packard's pocket calculators, with nine memories and an eight-level stack. Three of the memories are pre-initialised to common constants such as pi. Use of these Valet functions doesn't abort a running program – the operator can be in the middle of editing, using WordStar, and can then use the Valet calculator, returning to WordStar immediately.

Standard software supplied with the Otrona includes WordStar, Microsoft BASIC and a neat little graphics package called Charton. The Otrona screen boasts a 320 by 240 graphics resolution, which is assisted by plotting functions built into MBASIC, but Charton (which is written in MBASIC with source code supplied) extends its capabilities to provide simple business graphics such as line, bar and pie charts.

These software packages combine to provide a tremendous amount of functionality in a small package. This, along with the quality of design and construction of the machine, brought it to the shortlist.

IBM-PC

The IBM-PC personal computer is a comparatively recent entrant on the Australian market. However, it has enjoyed meteoric success in the United States, where it has spawned an entire industry and sub-culture of its own in a way that few computers ever have.

It is, in many ways, a standard against which the others are judged. The engineering design of the machine is first-class, with high-quality construction and a pleasing design. The low-profile keyboard, sitting in front of the system unit, which supports the display, results in an ergonomic design which is aging well and has been copied by countless others.

The IBM-PC already has a vast array of software from third-party vendors, plus a growing range of hardware add-ons. However, the judging panel was less concerned with the quantity of software available than with its quality, and the ways in which the machine supported recent software techniques, such as the use of user-definable keys and graphics.

From the point of view of the award

criteria, the IBM-PC is really a fairly conservative machine. The hardware used in it could have been designed in 1978-79, and there are some things that the designers would undoubtedly do differently today.

What is outstanding about the IBM-PC is that it does a lot of things right. It was designed around disks, and is really the first popular computer that doesn't assume the user will start with a cassette system (although that's possible). It has a real disk operating system that is not an afterthought. It uses a 16-bit processor and can support memory-intensive programs such as spreadsheet calculators.

Its graphics are nice, particularly when viewed on a colour monitor, though many purchasers are confused or bemused by the variations of colour graphics and monochrome printer adapters. In particular, it can sometimes be difficult for an owner to decide whether his machine is adequately "optioned up" to run a particular software package.

Its real plusses are less technical, less to do with the machine of itself and more to do with marketing and the snowball effect of gathering support for what is already a successful machine. In the eyes of its intended market, its major, dominating, feature is the IBM name tag on the front.

Next is the realisation that by buying an IBM, the user is joining a large, well-supported and mutually helpful group with no shortage of information, software and hardware options. The IBM support and dealer selection is also important.

The IBM-PC is almost completely devoid of failings. I could live with the keyboard, I could get by with 320 kilobytes/disk, and it shares with other 16-bit machines the surprising, and unnecessary, sloth of Microsoft's BASIC

interpreter.

The IBM-PC seems destined to take over the position now filled by the Apple II — a good all-rounder which can play games, be used to write simple BASIC programs, and which can also be introduced into the corporate environment as a personal workstation running such applications as VisiCalc or Multiplan.

In the eyes of the judges, then, this machine can be summed up as a conservative hardware design, not spectacular in itself, but with one major and significant contribution — the IBM-PC makes it safe to buy a personal computer.

Columbia MPC

The Columbia MPC is the most successful of the IBM-PC "clones" — machines which feature at least software, and often hardware, compatibility with the IBM-PC in order to capitalise on the huge snowballing aftermarket of add-ons.

Certainly, one of the major questions in the judges' minds was that of compatibility, and so part of the time was spent swapping software between the two machines. As far as can be told, the user can buy the Columbia secure in the knowledge that it behaves just like an IBM-PC.

Even programs which rely heavily on hardware features like graphics, such as Microsoft's Flight Simulator, run perfectly on the Columbia MPC. We tried booting up Context MBA, which is a UCSD p-system program, and only failed because we hadn't enough memory on the test machine (128 kilobytes is a small machine already?).

Our test machine had an integrated 10-megabyte hard disk, which significantly improved the utility of the machine — no more changing disks.

The major feature of the MPC, in the

PERSONAL COMPUTER OF THE YEAR COMPARISON CHART

Attribute/Computer	Weight	NEC	DEC	Otrona	Sirius 1	Columbia	IBM PC	Toshiba	Commodore	BBC Micro
Memory Capacity	.8	7 5.6	6 4.8	4 3.2	8 6.4	6 4.8	6 4.8	4 3.2	6 4.8	5 4
Disk Capacity	.8	8 6.4	6 4.8	6 4.8	7 5.6	5 4	5 4	4 3.2	4 3.2	4 3.2
Disk Compatibility	.5	7 3.5	4 2	3 1.5	3 1.5	7 3.5	7 3.5	3 1.5	4 2	3 1.5
Processor Speed	.8	9 7.2	6 4.8	6 4.8	6 4.8	6 4.8	6 4.8	4 3.2	6 4.8	6 4.8
Graphics	.8	9 7.2	7 5.6	6 4.8	8 6.4	7 5.6	7 5.6	5 4	6 4.8	5 4
Graphics s/w support	.8	8 6.4	5 4	6 4.8	7 5.6	7 5.6	7 5.6	5 4	7 5.6	5 4
Mechanical Design	.6	7 4.2	8 4.8	8 4.8	7 4.2	7 4.2	7 4.2	7 4.2	5 3	5 3
Electronic Design	.8	7 5.6	8 6.4	9 7.2	7 5.6	7 5.6	7 5.6	6 4.8	6 4.8	7 5.6
Construction Quality	.7	8 5.6	8 5.6	7 4.9	7 4.9	7 4.9	7 4.9	6 4.2	5 3.5	5 3.5
Software Innovation	.8	6 4.8	6 4.8	8 6.4	5 4	4 3.2	4 3.2	3 2.4	5 4	7 5.6
Software Ergonomics	.7	5 3.5	8 5.6	5 3.5	6 4.2	5 3.5	5 3.5	5 3.5	4 2.8	5 3.5
Keyboard Ergonomics	.7	6 4.2	9 6.3	6 4.2	7 4.9	6 4.2	6 4.2	4 2.8	4 2.8	5 3.5
Portability/utility	.8	4 3.2	5 4	9 7.2	5 4	5 4	5 4	7 5.6	6 4.8	4 4
Value for Money	.8	7 5.6	7 5.6	5 4	6 4.8	6 4.8	5 4	5 4	8 6.4	6 4.8
Total Weighted Score	.8	73	69.1	66.1	66.9	62.7	61.9	50.6	57.3	55

judges' view, is that Columbia is treading a fine line between providing IBM-PC compatibility and providing additional facilities or performance. For example, the MPC provides two serial ports and a parallel port as part of the main board; on the IBM-PC, these are optional boards.

The MPC has more slots available for expansion than the IBM-PC, has more memory as standard, and is supplied with a colour graphics adapter and RGB direct-drive monitor as standard. In addition, it comes with a bundle of software covering word-processing, spreadsheet, games, macro assembler, graphics, diagnostics and a tutorial on the operation of the machine.

Both MS-DOS and CP/M-86 operating systems are provided, giving the user access to a wide range of software. In addition, the Columbia supports MP/M-86, permitting multi-user operation of CP/M-86 software.

In summary, then, the Columbia MPC has many of the features of the IBM-PC. Its designers cannot provide the IBM logo on the front, but in many other respects the MPC out-IBM's the IBM-PC. It certainly provides equivalent performance at a price advantage, and offers very good value-for-money.

The machine's designers have done an excellent job, and the thought uppermost in the judges' minds was: what could Columbia have produced had it not felt constrained to provide IBM compatibility?

In the Seventies, IBM set a standard for its own computer architecture as well as that of many "plug-compatible" manufacturers with the System/360. Even its most recent machines are still based on the old 360 architecture, and the new XA (Extended Architecture) is really only a set of patches to bring it up to date (rather like the 24-bit addressing on the S-100 bus). The IBM-PC has had the same effect: it is now decreeing the personal-computer architecture of the Eighties.

Which led to a "moral dilemma" for the judges: can an award for advancement be made to a machine which deliberately avoids certain advances in order to maintain compatibility with an older design?

NEC Advanced Personal Computer

The Advanced Personal Computer, or APC, from NEC Information Systems Australia, was reviewed in the October 1982 issue of *Your Computer*. It is another 16-bit machine, but, unlike the Columbia, eschews compatibility and aims for performance.

It is a large machine, with an integrated colour display and two vertically

mounted 20 cm disk drives. The processor, unlike the other 16-bit machines on the shortlist, is an 8086 with a full 16-bit external bus. And from these hardware features follow the three major advantages of this machine.

First, it is fast. It completed our BASIC prime-number benchmark in just over nine and a half minutes, as opposed to 14 or 15 minutes for the other 16-bit machines. This raw speed is not significant in many applications (who cares if it runs WordStar faster?), but it's put to good use in graphics applications, as the judges later found.

Next, due to the use of 20 cm floppy disks, the APC has much greater disk capacity than the other machines — 1 megabyte per disk. Though a 10-megabyte Winchester disk is available, many users will be able to get along without it, whereas the other machines would require a \$2000 or \$4000 investment for a Winchester.

The most noticeable feature about the APC, however, is its colour graphics — they are nothing short of superb. The graphics resolution on screen is 640 by 475 in colour, and this is only a scrollable window into a bit plane of 1024 by 1024. Colour saturation is superb, and the integrated display is obviously of very high bandwidth.

The display is managed by a pair of 7220 graphics-controller chips — runner-up in last year's *Infoworld* Hardware Product of the Year contest (the IBM-PC won). The graphics is, therefore, very fast in operation, since a lot of work which is done in software on other machines is done by this chip.

The graphics demonstrations supplied to us were outstanding. The APC presently supports CP/M-86, and one set of demos was written to run under Digital Research's GSX-86 graphics kernel. These ranged from standard business bar and line plots to an office floorplan and scientific three-dimensional planar plots. All executed very quickly, indeed, with appropriate labelling, sideways printing and changes of typefaces and colour.

NEC Information Systems will release MS-DOS for the APC later this month, and this will be followed by a full graphics-extended BASIC, *a la* BASICA. In the meantime, NEC Information Systems has, since the release of the machine, put a lot of work into locating and supplying CP/M-86 software, either under the NEC label or from other vendors.

Already available are a number of word-processors such as Benchmark (which has integrated communications facilities) and WordStar, languages such as CBASIC-86, CB-86, Janus/Ada, CIS/COBOL-86, RM-COBOL, Supersoft

FORTRAN and Pascal/MT+86, and a wide selection of database, accounting, communications and other applications programs. Coming up in the next few months are Digital Research's PL/I-86 and C-86, the DRI Graphics Support System packages, and of course, a wide range of MS-DOS programs such as Multiplan.

The indications are, then, that the APC is not the software orphan that the panel feared it might be. The biggest drawback the judges saw for the APC was the lack of provision for a Z-80 processor to give access to the range of CP/M 2.2 software — the 16-bit bus design of the machine may make this difficult or impossible and, of course, with the passage of time, this will be less important.

The APC scored highly in several areas: speed, capacity, graphics (especially), local support and excellence of design.

Sirius

Marketed in Australia through Barson Computers, the Sirius is a very neat and compact 16-bit machine. It has been on the local market longer than the other 16-biters and has established itself strongly in that time.

The outstanding feature of the Sirius is the snowball effect, combined with an aggressive marketing plan both in Australia and overseas. The local agents were well aware of (and encouraged) all the third-party market activity around their machine, and produced an enormous software catalogue — really two catalogues for local and overseas software.

The Sirius has a tremendous range of software to support it, both in the general commercial area and in scientific and technical fields, where its high-resolution graphics have strong appeal. The graphics resolution is 800 by 400 — sufficient to provide virtually a grey scale or shading just by spacing out dots.

This high-resolution graphics capability has been one of the most attractive features of the Sirius. The demonstration programs supplied threw up some amazing graphics images, moving them about rapidly. Among enhancements to take advantage of these graphics capabilities is a video digitiser, or framegrabber.

Several software packages are available to enable the user to take advantage of the graphics capability. Utilities allow the user to create special character sets, control graphics through escape sequences or create business graphics presentations — including organisation charts, a unique feature.

An interesting word-processing package called Vuwriter takes "what-you-

see-is-what-you-get" screen formatting to its logical conclusion by allowing on-screen super- and sub-scripting, special characters, underlining and bold face and even mathematical equations (volume integrals yet!).

Like the Otrona, the Sirius has software-controlled brightness and also contrast control. The hardware design is neat, well-engineered and features considerable attention to ergonomics. There were a few small things that were "different" about the keyboard, such as a missing "control" key which turned out to be the ALT key, but overall it was quite convenient and easy to use.

The Sirius is also available with an integrated 10-megabyte hard disk which is broken up into volumes, allowing a mixture of CP/M and MS-DOS volumes on the disk. The hard disk is quite quick in operation, particularly under MS-DOS.

The software people at Sirius have been quick to take advantage of new techniques – for example, their latest version of MS-DOS includes a CP/M-86 emulator which allows CP/M-86 software to be run. The particularly neat feature of this implementation is that the emulator automatically loads and runs when required, transparently to the user.

Sirius Technologies has lined up a wide range of software for communications with mainframes (3270, RJE, asynchronous), micros (IBM-PC, Sirius) and networks (Omninet). There is a vast array of other CP/M-86 and MS-DOS applications programs.

The Sirius has a couple of unique features. Perhaps the best-known of these is its disk drives which vary their rotational speed in order to allow constant density recording. Using this technique, the Sirius designers have managed to

cram 640 kilobytes capacity on to each disk, a more than respectable figure. The only major drawback of this technique is the complete impossibility of providing IBM-PC compatibility.

Another innovative feature is an on-board CODEC (coder-decoder) chip which allows speech input-output. This is not the same as speech synthesis – it's more like low-quality digital recording – but it can be very useful. When the Sirius network is introduced later this year, it will provide the ability to send voice-grams between work-stations.

All of this adds up to a technically very sophisticated machine. It's easy to see why it's so well received – its advanced graphics features and the wide range of applications packages make it a very versatile computer.



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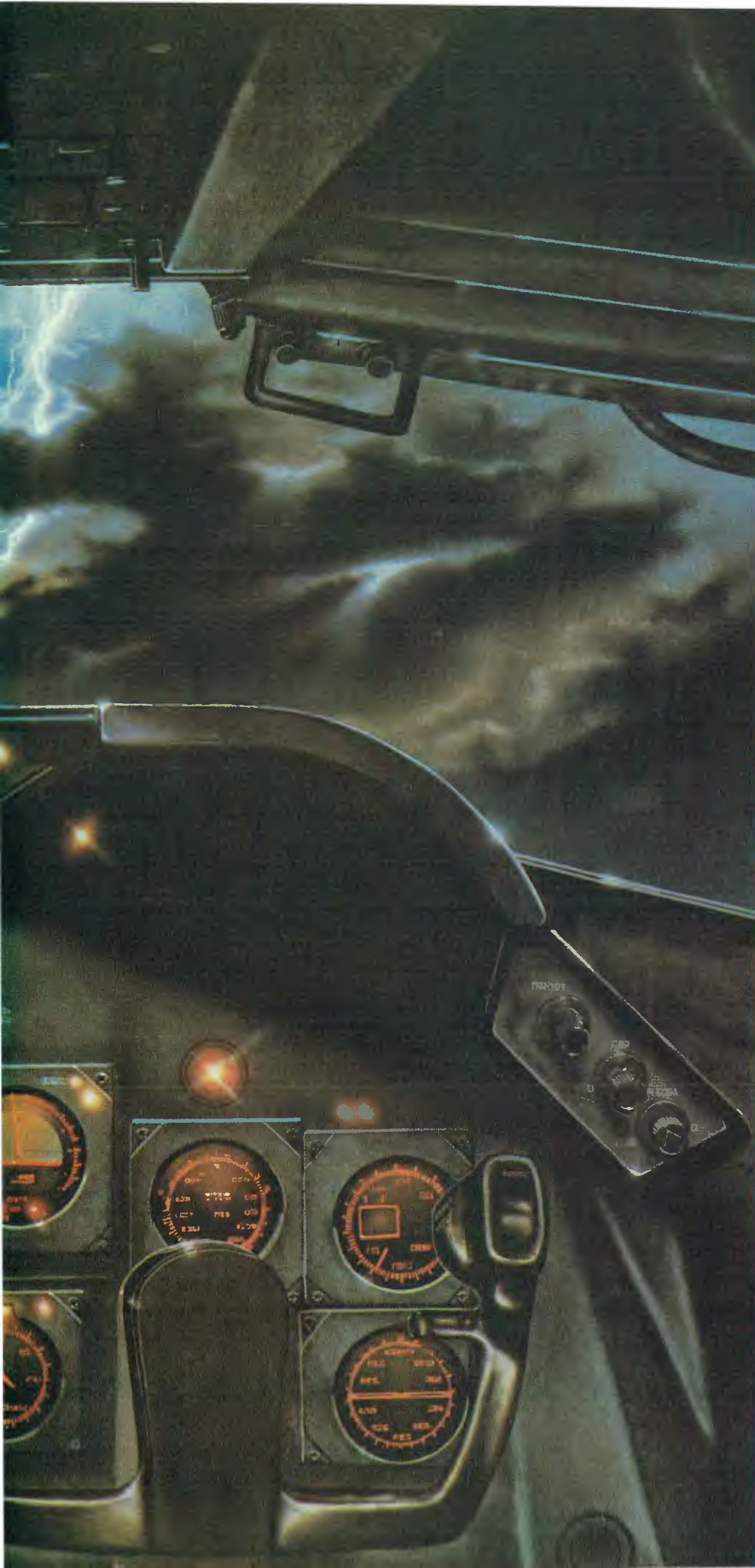
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DEC Rainbow 100

The DEC Rainbow 100, first discussed in *Your Computer* in June 1982, is a striking piece of equipment. From the point of view of ergonomics and styling, it's a very well-designed machine, indeed.

The main system unit is about the same size as the IBM-PC and is made of Lexan, an extremely tough and resilient plastic. It incorporates the main processor board, together with a dual disk-drive unit and power supply, with room for a second disk unit.

The system unit can be placed on top of the desk with the display on top, but a more stylish (and practical) solution is to slide the unit into a vertical floor-stand which hides all the cables at the back and sits on the floor beside the user's desk. The front name badge even rotates through 90 degrees!

The display is very neat, with a non-glare shield and, at the back, a small carrying handle. The keyboard plugs into the back of the screen, and the screen-computer cable carries the video signal, power for the screen and the keyboard data.

The keyboard is a joy – it easily the best of those on the shortlisted computers. It has a full QWERTY pad, then cursor and special functions and, at the extreme right a numeric pad. Across the top of the keyboard is a set of program-definable keys – some are dedicated to special codes like DO and HELP.

Even as just a terminal, the DEC Rainbow is superb; it fully emulates the DEC VT-102 terminal. Pressing the SET-UP key displays the first set of user-alterable tab stops. Pressing NEXT PAGE reveals a set of miscellaneous

parameters, such as hard/smooth scrolling, screen width (80 or 132 characters), enable/disable auto-wrapping, change baud rates and so on.

On power-up, the Rainbow performs a diagnostic test which is quite comprehensive and supplies the user with comprehensible error messages – the judges know because they got one. Their machine refused to boot, and the error message referred them to the user manual, which informed them that the heads on drive A were not stepping correctly. Possible cures: check the drive cables, replace the disk-drive unit or contact DEC for a service call.

The beauty of the Rainbow is that the user can check the cables himself – in fact, the entire machine can be taken apart, down to its functional modules, with no tools at all. A couple of spring clips remove the cover, some thumb-screws release the main board, and a clip releases the disk drives. After checking the cables, the test machine still wouldn't respond, so we phoned DEC's Hotline number and described the problem.

Two hours and 20 minutes later, a technician had arrived. Within 10 minutes, the disk drive was removed, heads slid into their proper position and replaced, and the system booted. However, a full diagnostic test revealed a further problem and so the drives were replaced.

The basic problem was that the transport card which protects the heads was pushing them too far out. When they stepped out to the home position, they were already past it and moving away. Result: a step error.

Full marks to DEC's service organisation; as far as we can tell, we were

treated as an ordinary user. Later the same day, the Hotline phoned back to check that the problem had been rectified to our satisfaction.

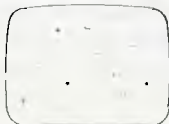
The Rainbow is a dual-processor machine (Z-80 and 8088) which has the ability to run both CP/M-86 and CP/M 2.2 software. It does this through a special version of CP/M called CP/M-86/80, which detects what kind of processor will be required for the program being loaded and automatically switches processors. This is a particularly elegant way of providing users with a bridge between the eight- and 16-bit worlds.

DEC itself takes advantage of this. While some of its software – for example, RED, the Rainbow screen editor – is written in 8086 code, other programs, like the DUMP utility, are written in Z-80 code. Assemblers, loaders and debuggers for both processors are provided, and when we ran DDT (the Z-80 debugger), a quick scan of memory revealed nothing that didn't look like a conventional eight-bit CP/M system.

But there are some problems with this approach. There is no Z-80 BIOS, for example, so programs which do direct-disk I/O won't work, though the Z-80 actually does the disk I/O. And what happens when a CP/M-80 program uses BDOS function 31 (Get address of Disk Parameter Block)? Chances are the DPB isn't even within the 64 kilobytes which the Z-80 addresses – or is it? We weren't inclined to try to find out.

The documentation supplied with the Rainbow is excellent – far better for the novice user than the Digital Research manuals – but they do leave the Rainbow as something of a black box. That it works beautifully well is undeniable, but sometimes the user needs to make

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decisions based on a knowledge of how it works. And that information is not forthcoming from DEC.

A graphics upgrade is available which provides high-resolution mono or colour graphics. Digital Research has also demonstrated its GSX graphics kernel on the Rainbow, but that isn't yet available here. However, the potential is there for some superb colour graphics.

To date, DEC has been a bit slow in providing software to run on the Rainbow. The standard utilities are excellent; there's a nice disk-maintenance program which allows group deletion, re-naming and the like, and which is much nicer than any of the public-domain utilities such as SWEEP. The screen editor, RED, is really nice – it's reminiscent of the UCSD Pascal editor, good enough to use as a word-processor and certainly much better than ED (which is also supplied).

An introductory course supplied with the machine teaches the user about the keyboard – how to use the DO and HELP keys, for example – as well as about files, directories, how to run programs and the other skills needed to get to grips with the machine. However, the care that went into designing this program hasn't been carried over to such small tasks as augmenting the CP/M-86 HELP command to cover the RED, DUMP and MAINT utilities – an easy couple of hours work for the right person.

This is the major drawback of the Rainbow – the software potential of the machine is not being realised quickly enough. Perhaps it needs a key individual with a lot of drive to convert packages off other machines, or perhaps it's because many software vendors are scared of the "blackbox" mysterious inner workings of the machine.

However, it scores highly for its well-engineered construction and ergonomic design, the innovation of the dual-processor design, the fantastic screen, its user-friendliness and the DEC thoroughness that underlies all this.

Choosing A Winner

By now, it should be obvious that selecting a winner from these machines was not an easy job. The judges pored over the machines, lingering over one, going back to another to check and compare.

Gradually, we narrowed the field down. The eight-bit machines were just not competing with the 16s – they didn't represent enough of an advance. A points-scoring system served to confirm this, though the Otrona does have sufficient innovations and performance to make it into the new, shorter, shortlist.

PERSONAL COMPUTER



OF THE YEAR

How The Judges Chose The Personal Computer of the Year Award

IT STARTED as a simple enough idea – pick the outstanding new computer of the previous year and present the manufacturer or distributor with an appropriate award from the magazine. However, it developed into a gargantuan exercise more akin to a military operation, occupying virtually our full attention for a month.

In a rapidly evolving field such as personal computing, new products are appearing weekly. Some will become classics, some will fade away, and some will do all right, filling the needs of an adequate portion of the market to keep going.

Each machine embodies new ideas, often the brainchildren of a single individual. Some are tested concepts of proven value, others are just new ideas which may or may not have real worth to the user.

All of this adds up to a source of much confusion for the computer buyer.

With these thoughts in mind, *Your Computer* set out to create an award

which would be a touchstone for the industry – an award which would acknowledge the machine that represents the biggest step forward, in the previous year, in the provision of personal-computing facilities for the general user.

The first step in setting up the award was to convene a selection panel whose members had to be independent of any computer companies, yet intimately involved with the use of personal computers and keen observers of the personal-computer industry.

The panel consisted of five people:

Dr Robert Graham is head of the Department of Finance at the New South Wales Institute of Technology, and is a leading expert on the use of personal computers in a corporate environment. He has been involved with personal computers since the late Seventies, and lectures widely on personal-computer software.

Professor Phillip Grouse, of the University of New South Wales, has long experience with microcomputers, including the design of a multi-user Z-80 system in 1979. The author of a number of computer science texts, Professor Grouse maintains a keen interest in personal computing and often pops up on the Software Tools' bulletin-board system.

Dr John Barrett is a lecturer in the School of Education at Macquarie University and regularly writes on education for *Your Computer*. He first came in contact with computers at the University of Oregon in 1969, and has been working with micros for several years.

Len Rust is the managing director in Australia of the International Data Corporation, a major United States marketing-consultancy company specialising in the data-processing and communications industries. Part of the International Data Corporation's brief is to continuously monitor the microcomputer market in Australia, and for some years the



Professor Phillip Grouse



Dr Robert Graham

company has been releasing total industry sales figures and forecasts.

Les Bell has been writing about personal computers since 1975 and has been editor of *Your Computer* since its inception in 1981. He also lectures on programming and undertakes occasional consulting assignments.

Having selected a panel, the selection process could begin. The first task was to establish a set of criteria which would be used to pick a shortlist and, from that list, the winner.

Since this was the first time such an award would be made, it was not an easy task. We were trying to identify the machine released in the past year which represented the greatest contribution to the "state of the art". However, advances have been made in several different areas, such as graphics, ergonomic design and disk capacity, which cannot be directly compared.

The panel met at a Sydney restaurant to consider this problem and, in the end, an iterative technique was used. First, the judges considered a set of criteria in the abstract, and drew up a preliminary list. They then went on to discuss the machines which they felt were possible contenders for such an award, regardless of the previous criteria, and tried to isolate the criteria which made them contenders.

This was then compared against the first list and revisions made, and a shortlist of machines was drawn up for final evaluation.

The selection was not too difficult. Though almost 100 machines were released on to the Australian market during the past year, many simply weren't distinguished enough to stick in the minds of the judges. Nonetheless, the discussion ranged around a number of machines for some time.

(Gradually, the panel became aware of the sudden silences and lapses in the conversation at the table next to theirs, and it dawned on them that the people sitting there were in the computer indus-

try, and were more than usually interested in our conversation! If they had an interest in one of the competitors, they may have been disappointed to hear it eliminated; they were certainly startled at some of the panel's comments!)

The panel struck one tricky problem with some of the possible contenders: though they had been announced, none had actually been sold in Australia.

It was decided to restrict the award to machines that were actually available to end-user purchasers, a decision that immediately restricted the field. Among the machines to be excluded for this reason were Apple's Lisa, the Epson QX-10 and the Wang Professional Computer. However, they will be eligible for selection next year.

Having drawn up a shortlist, the various computer companies were notified and sample machines obtained. In the meanwhile, the panel considered the selection criteria and, indeed, the whole problem, in greater detail.

Finally, the panel met again to examine the shortlisted machines in detail and to discuss them. Each machine was carefully examined, to the extent of even taking some of them to pieces to examine the innards. After all the machines had been examined in depth, the panel concentrated its attention on the top runners.

And so the first Personal Computer of the Year was chosen... ☐



Dr John Barrett



Len Rust



Les Bell

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The IBM-PC was similarly excluded. Its major advantages, and the major innovations that it brought to the market, are not part of the product itself (unless you count the three initials on the label). They are the IBM name and reputation, and the support of IBM and its dealers. The newer 16-bit machines held all the aces in other areas.

That brought the shortened shortlist down to five: the Columbia, the Otrona, the Sirius, the DEC Rainbow and the NEC APC.

The points system was brought into play again, this time combined with a forced-ranking system for scoring. Each of our objective selection criteria was compared against each of the machines in turn, and a table was constructed. The results clarified the situation considerably.

The Columbia now dropped out – its major advantage is IBM-compatibility, and it did not represent a major advance in any other area when compared against the remaining contenders.

Next to go was the Sirius, which to some extent surprised us. Despite its marvellous high-resolution display and the tremendous degree of hardware and software support, the newer machines technically out-classed it in several key areas. The Sirius is presently near its peak; the Sirius team has assembled a vast array of software, but that same software can be converted to run on the other 16-bit machines and, in time, almost certainly will. As the machine with the longest history on the market, it gained an advantage, but the others will catch up.

The Otrona, still in the running up till this stage because of its innovative Valet software, coupled with a high-performance BASIC and graphics in such

a handsome and portable little package, was now being steadily outclassed by the opposition. It's a marvellous little machine, but the newer machines had some major advantages.

That left NEC and DEC, and again the selection panel ground to a halt as it bogged down in masses of incomparable detail. It was then decided to take the machines to bits, examine the innards, and then study them again.

The DEC machine represents a triumph of design. Ergonomically, it is superb. The keyboard and screen are stylish and a delight to use, and the documentation is superb. The mechanical design supports ease of maintenance, and the diagnostic software backs this up. The dual processor gives an enormous potential for running widely-available software. And DEC has an enviable reputation as a minicomputer manufacturer. Against this must be set the "blackbox" character of the machine, and the current software vacuum.

NEC's Advanced Personal Computer has three major plusses: its much greater disk capacity, its processor speed and its incomparable high-resolution graphics. The APC excels in each of these areas. NEC is working hard in both Australia and the United States to port software on to the machine, and the documentation for the packages so far released is superb – not at all Janglish. The existing software availability under CP/M-86 is excellent. When MS-DOS is released this month, we expect NEC to firmly grab that ball and run with it, too.

So, on balance, after considerable debate, the selection panel has decided to award the 1983 Personal Computer of the Year Award to NEC Information Systems Australia for its Advanced Per-

sonal Computer.

The APC clearly excels in three areas which are critical to the performance of any computer system. It may well succeed in the world market in a way that no Japanese computer has done before – because of co-operation between the Japanese hardware designers and the United States office, which worked on software.

We at *Your Computer* would like to thank the various computer companies involved for supplying machines for evaluation, as well as for their patience in waiting for the result to be announced.

Because of deadline dates and other constraints, this award has spanned the period May 1, 1982, to April 30, 1983. Starting from next year, we intend to work on calendar years. Therefore, the next Personal Computer of the Year Award, to be presented in February 1984, will cover the period from May 1, 1983, until December 31, 1983.

At the same time, we propose to make an award for the Software Product of the Year – software is just as important as hardware in getting a job done.

So until January 1984, the hardware and software companies can get prepared. In the meantime, congratulations to NEC Information Systems Australia, the winner of the 1983 Personal Computer of the Year Award from *Your Computer*. □

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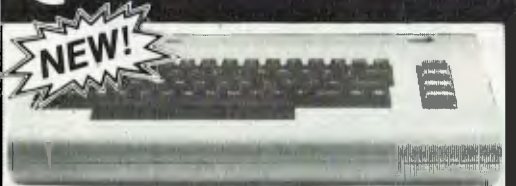
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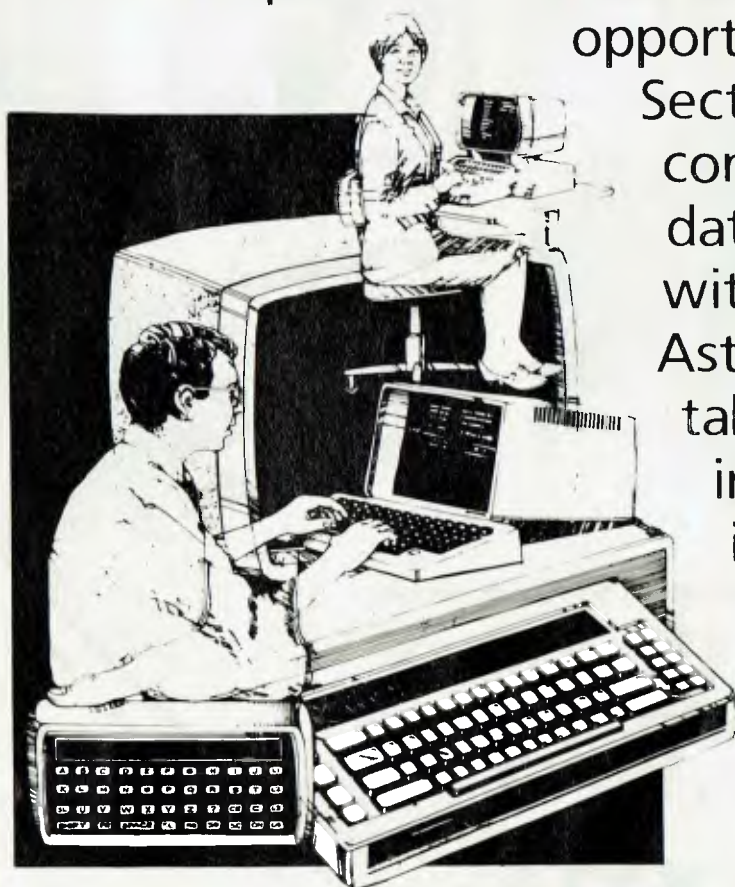
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THE NEXT GENERATION IN COMPUTER COMMUNICATIONS BEGINS MONDAY, MAY 2

***The Sydney Morning Herald* — The New Computer Section**

Every Monday from May 2 onwards, The Herald's new "Computer Section" will provide the computer community with all the information they need on industry personalities, industry briefs, seminars, product launches and employment

opportunities. "Computer Section" will keep the computer industry up-to-date with progress within its own industry. Astute advertisers should take advantage of the interest that the industry will direct towards this dynamic, new section by contacting Harry Roberts on (02) 2 0944, ext 2392.



Data 83 – Showcase Of The Stars

Compiled by Lindsay Shapero

THE WIDE VARIETY of computers now available will be fully represented at Data 83, Australia's largest annual computer exhibition and seminar series. Data 83 will be held at Sydney's Centrepont from May 17-19, and at the Victorian Expo Centre in Melbourne from November 8-10.

A three-day series of lectures has been organised to complement the exhibition. These seminars are aimed at assisting businessmen in selecting, installing and operating the right computer system for their individual requirements.

The themes that will be covered in Sydney are "Choosing the Right Computer System", "Computers in Manufacturing" and "The Automated Office". Registration brochures containing further details on the seminars can be obtained by contacting Graphic Directions, PO Box 781, Darlinghurst, 2010, or phoning (02) 212-4199.

Naturally, *Your Computer* will be at the show, so come and see us on Level Three, and talk (preferably in monosyllables) to members of our advertising and editorial staff.

Mitsui

Stands 134, 135, 136, 137

FIRST SEEN at the Australian Personal Computer Show, the Sord M5 weighs just under 800 grams and is less than half the size of a standard telephone directory.

It combines a video games unit with

an educational capacity and home accounting system. Retailing at \$350, the standard package consists of the M5 Creative Home Computer, an introductory BASIC cartridge, and a games cassette with two computer games.

PIPS III (personal information processing system) is a simple new computer language designed to allow people with no programming experience to operate a microcomputer. PIPS III is a suite of integrated software, incorporating a database management system, spreadsheet calculator and a data-entry system.

Mitsui Computer Systems' terminals division is the sole Australian distributor of the Diablo and Fujitsu range of printers, the Juki 6100 printer, matrix printers from Alps, the Esprit range of VDU screens, ITS-manufactured Telecomet 3100 communications terminal and the Totec TO5000 document reader.

Ibex

Stand 91

THE IBEX POS 2000 is a computer that incorporates a cash register function, yet it costs little more than a cash register.

The POS 2000 is software-driven from programs stored on dual floppy disks, written in BASIC and running under CP/M. The speed problem has been eliminated through the use of three Z80A microprocessors.

Ibex Computers also markets a range

of microcomputers imported from Logic Systems International, of Japan, plus complete accounting packages.

Also on show will be the Datasouth DS180 dot-matrix printer, which has no duty-cycle restrictions.

Australian Computer and Telecommunications (ACT)

Stand 153

ACT HAS a range of Winchester hard discs, together with a networking system for more flexibility of use.

The ACT Hard Disc is a locally supported system, ranging from 5-22 megabytes in formatted capacity. A removable five-megabyte cartridge-type hard disc and a 35-megabyte disc are expected shortly.

PC NET is a hard-disc sharing system. This allows a number of computers to access just one hard disc, which is divided into several logical drives. Operators can read all files, but limit writing to their allocated logical area.

Canon

Stand 85

CANON WILL be revealing its newest business computer, the AS 100, at Data 83.

The AS 100 is available in a monochrome version or with a colour display and a low-cost colour printer, both offering powerful graphics capabilities. The system uses either the CP/M or MS-DOS operating systems.

The 16-bit AS 100 is based on an

The software-driven POS2000 from Ibex.

Canon's AS100 and four-colour printer.



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Green Screen Monitor pictured is an optional extra.

16K PLUS

The 16K PLUS has built in features such as music generation, PCG high and low resolution graphics, with a screen display of 16 lines each containing 64 upper and lower case characters. When you also consider all of the standard extras like continuous memory, built in printer and input/output interfaces and parallel port, 4.5 volt battery back-up and self testing BASIC in ROM, the Microbee 16K PLUS is unbeatable in its class.

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32K PLUS

All of the standard features of the 16K Plus with twice as much usable RAM. When you add the new Wordbee ROM Pack, you have a powerful word processing capability which does a lot more than play the many games available for the Microbee. Add a printer and just see what you and your family can now do with your home computer.

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CEAT2933

DATA 83

8088 microprocessor and uses a standard 128 kilobytes of RAM, upgradable to 512 kilobytes. A software package, Canobrain, provides table-manipulation, graph-drawing and file-management applications.

Computer Reference Guide

Stand 106

ON SHOW will be a series of low-cost handbooks, giving detailed product and technical information.

These include the Australian Office Automation and Word Handbook, with detailed introductory, technical and buying information; the 1983 edition of the Australian Microcomputer Handbook; the Australian Terminals and Printers Handbook, carrying detailed technical summaries on a wide range of peripherals; and the Software Handbook, featuring listings of nearly 2000 software products.

ADAPS

Stands 10, 11

ONE OF Australia's largest and oldest service and software houses, ADAPS offers bureau services, small-business systems, software-package marketing, local government systems, motor vehicle registration systems and library systems.

Computer Resources Company

Stand 45

THIS COMPANY will be featuring two new products, both of which qualify for a 15 per cent discount, if orders are given at the show.

A new mini disk file is made of a virtually unbreakable plastic, holds 50 diskettes and is lockable and portable.

The company's second special is an ergonomic screen filter to fit almost all VDU screens. The filter is designed to reduce operator fatigue and eyestrain by eliminating glare, reflection and stray light. It also increases contrast and sharpens resolution.

Overseas Telecommunication Commission (OTC)

Stand 80

OTC PROVIDES a vast range of services, from the conventional telephone and Telex, to satellite television, high-speed data transmission and access to overseas computer resources.

Services featured at the Data 83 exhibition are Midas, a packet-switched, data acquisition service which links users to computer resources around the world, and OverseasFax, the transfer of exact document copies to worldwide destinations within minutes.

Wiser-Microsoft

Stand 108

MULTIPLAN, the award-winning software package, will be on display at the show, along with other products for the IBM-PC, Apple, DEC and other eight- and 16-bit machines.

Sanyo

Stands 72, 73

FIRST SHOWN at the Australian Computer Show in March, Sanyo's MBC 1000 microcomputer will be on view again at Data 83. The system costs \$2990, including tax, complete with CP/M and Sanyo BASIC.

With a single-disk drive (320 kilobytes capacity under CP/M) and a Z-80 with 64 kilobytes of RAM, the MBC 1000 can support the usual CP/M applications programs.

With the Sanyo Systems Solutions software running on the MBC 1000, a fully integrated set of accounting systems can be slotted on a single mini-floppy disk.

Sanyo will be demonstrating the system's ability to operate with up to three additional inquiry terminals, each able to perform any function with the addition of a hard disc system for around \$4560. The MBC 1000 is also multi-user and multi-tasking.



Telecomet 3100 multimedia terminal from Mitsui, has "unparalleled flexibility".



DATA 83

Wilbroprint and Computer Supplies

Stands 1, 2, 3

THE HIGHLIGHT of Wilbroprint's stand will be a clean-edge word-processing letterhead in both A4 and foolscap sizes.

There will also be a full range of computer forms produced by a subsidiary company, Swiftforms, which provide delivery of any computer form in five days, with a special-delivery "sprint" service of 24 hours.

A full range of Memorex magnetic media, computer ribbons, word-processing ribbons, floppy-disc storage devices, Megara computer binders and Hadak data safes will also be on display.

Kenelec

Stands 16, 17

KENELEC will be promoting a range of new equipment and established products, including VDUs, hard and flexible disc drives, printers and paper-tape peripherals.

Visual Technology will introduce the new Visual 330 terminal on the Kenelec stand. First released six months ago, this terminal emulates DEC VT52, ADM 34, HAZELTINE 1500 and D 200 terminals.

Also represented on the Kenelec stand will be the Decision Data Com-

puter Corporation, which manufactures a range of peripherals plug-compatible with IBM's systems 34 and 38.

Other companies to be represented on the Kenelec stand are the Data Royal Hi-G Company, Quantum, Teletype, Computer Devices and Burr Brown.

Moore Paragon

Stands 62, 63

A RANGE OF instant carbonless business forms, marketed under Moore Paragon's Rediform label, is available through Data Dealer. This range has a wide selection of machine house-approved computer form designs, with space for personalised details. The forms are also available in small carry-packs.

Also on display will be print-out and data files in a range of colours, and with a portable storage trolley, plus a tabletop mini-detacher and separate mini-decollator.

General Systems

Stand 131

A NUMBER of new products will be featured on General Systems' stand. LEX-11 is a database management and word-processing system for the office, and incorporates many new features. A new version for the M68000 central pro-

cessing unit (CPU) is also being released.

C-Calc is an electronic spreadsheet for budgeting, planning engineering and the like. Catch-23 allows the memory of RSX 11/23's to be expanded up to four megabytes. Quickstar allows RSX users to map discs in memory.

Other products will be Dache-11M, Multidisc-11M and a range of IBM OS/DS, ICL, DME/TME/VME software.

Nashua

Stand 7

NASHUA WILL be displaying its complete range of disc media for the computing and work-processing industry. The display will feature the two main categories - diskettes and hard-disc products.

Disc packs and cartridges for all systems will be featured, including the new 20 cm Lark cartridge. A greater emphasis will be given to diskettes - Nashua has a large range of 13 cm and 20 cm products in various formats. A simple guide to handling and care of diskettes will be available.

Transurety

Stand 132

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Some of Nashua's range of disc media.



Decision Data's 3751-11 workstation.

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Non-cartridge member \$30.00, both renewable annually. \$10.
- (2) Reduced membership rates are available with additional
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- (3) Exchange of Cartridges allowed at the rate of \$7.00 at time
of exchange. (+ \$1 certified postage if applicable).
- (4) The variety and number of cartridges available for exchange
will be controlled by The VIC Centre.
- (5) All Cartridges returned for exchange must be working and
undamaged.
- (5A) A service charge will be incurred on all repairable
cartridges.
- (6) Packaging and instructional material must be returned with
the cartridge and in good condition.
- (7) The cartridge returned must be the same cartridge borrowed.
- (8) MAXIMUM time exchange is 1 calendar month, after this
time the cartridge is unreturnable and deemed the property of the
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This does not apply to orders below \$50, Club Specials, items
purchased using Credit Certificates, or on trade-ins.

DATA 83

lems. Its computer media storage system ensures secure, disciplined removal of back-up media to an off-site security vault. Prompt retrieval is available 24 hours a day, seven days a week. Secure destruction of confidential material is also available.

Jenkin Security

Stand 142

JENKIN SECURITY produces a wide range of printed laminated cards for the banking and credit card industry, as well as promotional purposes. A high-speed bureau embossing and card-mailing service is also offered.

Jenkin Security is the Australian agent for the Farrington range; Farrington's cardwriter is the world's largest-selling embossing machine and has also proved popular in Australia.

Magnetics Laboratories

Stands 65, 66

THE LATEST Kybe tape-maintenance equipment (cleaners and testers) and Datsashield's disc-cleaning and inspecting service can be seen at this stand, with practical demonstrations.

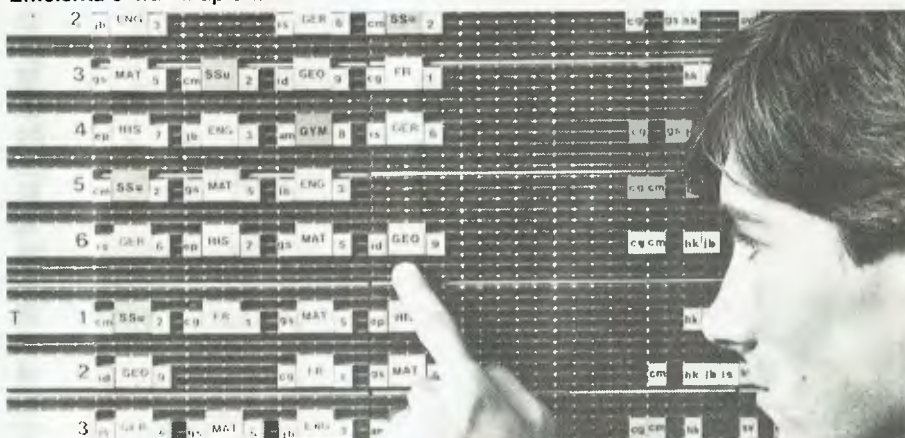
Magnetics Laboratories provides technical advice on the use of tape at a high-density, including the maintenance and management of a 6250-BPI library, archiving, cleaning routines, climactic variation effects, recovery methods and characteristics of various tape varieties.

J G Stephenson

Stand 110

COMPANY EXECUTIVES will be available at the stand to discuss the handling and quick-transit techniques which are increasingly necessary for importing and exporting computers and electronic equipment and spare parts.

Efficienta's wall-map chart.



They will also offer advice on international freight-forwarding, the international transport of computer and electronic equipment and tariffs. Special services include computerised inventory control, three- or four-day delivery from North America and Europe, and a facilitated air clearance service (FACS).

Datacraft

Stand 70

SEVERAL NEW products will be released at Data 83 by Datacraft, including digital matrix switching systems, packet switching systems, local area networking products and X.25 diagnostic test equipment.

Datacraft will also be demonstrating the new Concord Data System's V.22/bis data modem. This modem operates at 2400 bps full duplex over a two-wire telephone system.

The complete range of products from Datacraft will be on show, including the Codex 6000 series of intelligent network processors and the entire Micom range of statistical multiplexers for async and sync utilisation.

Computerworld

Stand 36

THIS PUBLISHING company will be selling the latest copies of its publications.

Peter Isaacson Publications

Stand 43, 44

BOTH *Pacific Computer Weekly* and the bi-annual Data-Processing Index will be on sale at the show.

Anchor Pad

Stand 115

ANCHOR PAD has been developed to

prevent the theft of office equipment. A variety of sizes and styles allow virtually any equipment, including desk-top computers, VDUs, typewriters and video equipment, to be protected.

The basis of Anchor Pad is a self-adhesive mat, providing a grip equivalent to more than 3000 kg of pulling power, with an aluminium casting over it, and secured to a machine by bolts at four points.

Anchor Pad's motto at the show is "How to Starve a Thief today."

Computer Resources

Stand 45

TWO SPECIAL new products will be unveiled by Computer Resources, the mini disk file which holds 50 floppy disks, and an ergonomic screen filter suitable for most VDU screens.

Toshiba

Stands 94, 96, 98

TOSHIBA'S T300 16-bit microcomputer, which will be released at Data 83, is at the top end of the range which starts with the CP/M-based T100.

The T300's control unit houses the Intel 8088 microprocessor chip, 128 or 256 kilobytes of RAM and two floppy-disk drives, one RS 232 communication port and seven expansion slots.

The detachable keyboard has a standard typewriter layout, with cursor-direction keys. Two types of VDUs can be used, a 30 cm high-resolution monochrome monitor and the 35 cm high-resolution colour monitor, offered with the T300.

The T300 runs a CP/M 86 operating system plus MS-DOS. There is a choice of printers, from the 25 or 38 cm wide printer to the P1350 24-wire head multi-mode letter-perfect printer, which will also be on display.

Toshiba's EW100 word-processing system can also be seen.

AED Microcomputer Products

Stand 161

ON DISPLAY will be the Universe Supercomputer II, a multi-user microcomputer running on CP/M, CP/M-86, MULTI/OS, UCSD PASCAL and, soon, MS-DOS and TURBO DOS. The central processing unit (CPU) is a software selectable eight- and 16-bit dual-processor, 6 MHz and 8 MHz 8088. Memory is 64 kilobytes, with expansion to one megabyte for CP/M-86 or MS-DOS.

A large range of software is available, to which AED will soon add a "slave

NEC gets personal with IBM

NEC designed the new Spinwriter™ 3550 especially for the IBM PC.

NEC's new Spinwriter letter-quality printer is the only one plug-compatible with the IBM Personal Computer. So you get the business applications you've been wishing for: letter-quality output for word and data processing, multi-language, scientific, and technical printing. Simple forms handling. Quiet operation. And the reliability of the industry's most popular printer range.

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The Spinwriter's 70+ print thimbles can more than triple your PC's usefulness. They come in both constant pitch and proportional-spaced fonts. Foreign language, technical and scientific versions. They snap in and out in seconds, and let you print up to 202 columns on 16-inch paper. They each last for more than 30 million impressions.

This printer's special features make everything look better on paper.

The Spinwriter's software-invoked features include automatic proportional spacing; bidirectional, bold and shadow printing; justification; centering; underscoring; and sub/super scripting, all at speeds up to 350 words per minute.

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DATA 83

card". The whole system has been almost completely designed and manufactured in Australia, and some of the more technically advanced software is being marketed in the United States.

Archives Computers

Stands 34, 35

THE DISCOVERY multiprocessor, launched last year at Data 82, is still the only CP/M distributed processing computer enabling simultaneous eight- and 16-bit processing, with multi-user database software support.

The new release for Data 83 will be the Morrow (reviewed in the November issue of *Your Computer*, the first computer/word-processor providing a business software/hardware package for less than \$25 a week.

Including the Archives III business computer, Archives has developed one library of software for all three systems.

Control Data

Stands 139, 140

BASED IN Victoria, Control Data's plant produces a broad range of peripherals, compatible with systems made by Control Data and its competitors.

More than 50 per cent of disk drives in the world today, from 13 cm floppy disks to 675-megabyte Winchester Drives, are manufactured in the United States by the Control Data Corporation.

As well as disk drives, Control Data also manufactures both 12 cm reel-to-reel and 6 mm cartridge streaming tape drives.

Dick Smith Electronics

Stand 48

DATA 83 will see the national launch of the Dick Smith VZ-200 personal colour

computer. Priced at less than \$200, the VZ-200 will be one of the cheapest systems around.

Also featured will be the Wizzard video entertainment computer and the latest version of the Blue Label System 80 — the Mk II, complete with an in-built numeric keypad.

Carmen Furniture

Stand 151

ERGONOMICALLY designed computer furniture will be highlighted on Carmen Furniture's stand.

Lengthy use of VDUs can cause serious operator fatigue, eye strain and back troubles. Data Decor's adjustable terminal stations enable separate video screens and keyboards to be varied in height and angled to give the most comfortable work and viewing positions.

A new single-action ergonomic desk, designed by Data Decor, is claimed to be a major breakthrough in this field. The desk mechanics centre around a unique remote-spiral action, which permits the desk height to be personally adjusted.

Magmedia

Stands 40, 41, 42

MAGMEDIA will be promoting the Datalife range of 13 and 20 cm disks, made by Verbatim covered by a five-year guarantee. Each Datalife disk features seven data-shielding advances, for greater disk durability and longer data life.

Other products on display will be Advance Ribbons' cartridge ribbons. New models for matrix printers include the RC150 and RC350 for Centronics, the RERCO3 for the Epsom ERC 03, the RTRS806 for the Tandy TRS80 and the RT3000 for Tally. The RH300 has been designed for Hermes and Burroughs

The Farrington III Automatic Card Embosser by Jenkin Security.



printers, the R15496 for IBM and the R18510 for Itoh and NEC. For daisywheel printers, there is the ROES 100F for Olympic and Whisperdisc, plus the RQMS 3 for Qume 111.

President Office Machines

Stands 99, 100

PRESIDENT is, of course, well known to *Your Computer* readers for the Kaypro II and Columbia MPC computers. However, at Data '83, President is hoping to steal the show with the prototype of a new Australian-designed and built portable computer.

The machine, which is of extremely advanced design, is called the Magnum, a name that was actually coined by *Your Computer* editor Les Bell over lunch with President's managing director, Tom Cooper.

The machine features 256 kilobytes of memory, a liquid crystal display and battery operation for up to 40 hours. Based on the Intel 80186 microprocessor, it should offer much higher performance than existing 16-bit machines and — with optional disk drives — will run MS-DOS and CP/M-86.

Plug-in ROMs will offer the user portable access to word-processing and spreadsheet calculations, and the machine also features a continuously running clock-calendar with special, very sophisticated, alarm functions.

The machine represents something of a flagship for high-technology in Australia, as not only does it incorporate the latest in American microprocessors, but it uses a special chip designed at the University of Sydney and also a locally manufactured liquid crystal display. Though the price has not been finally decided yet, it is extremely low.

Datatel

Stand 37

DATATEL, the local agent for Beehive terminals, will be featuring the Beehive Topper, a desk-top personal computer with the particular ability to emulate IBM terminals. The Topper, which has 64 kilobytes of memory, can run CP/M for local personal-computing, and can also go on-line to a remote IBM host.

Also available are protocol converters, in both four- and eight-port versions, which allow terminals to interface to a remote IBM system through IBM's Systems Network Architecture.

Computer Supplies

Stands 14, 19

COMPUTER Supplies, of Crow's Nest (Sydney), sells various supplies and consumables for office machines. From July 1, Computer Supplies will distribute for Verbatim Datalife disks; previously, it sold ODP floppy disks, which were, in fact, made by Verbatim.

As well as floppy disks, Computer Supplies has a full range of printer ribbons, daisywheels, print-out binders and all the other bits and pieces any computer or word-processor installation requires.

Computerwave

Stand 75

COMPUTERWAVE, which Sydneysiders normally find in the ground floor of Grace Brothers' Market Street (City) store, will be displaying its range of home computers from Atari, Apple and Texas Instruments. At the recent Australian Personal Computer Show, Computerwave's "singing face" attracted large crowds, and it expects that its display of home computers will have the same effect at this show.

Intelligence Australia

Stand 33

BEST KNOWN for its Micromodeller financial modelling software, Intelligence Australia will, of course, be displaying that package at the show. In addition, it is releasing three new packages of interest to professional and commercial users.

MicroGraph Power is a plotting package for the IBM, Sirius and other popular machines. It drives Watanabe and Hewlett-Packard plotters to produce a variety of line, bar and pie charts. Options allow scaling and labelling in a number of sizes and typestyles. The menu-driven system is very easy to use.

The Delta database package is an extension of the earlier DMS and is a general-purpose package for such applications as personnel records.

Micronet is a critical path network analysis program which should prove of particular interest to the construction industry and other managers of complex projects.

Intelligence Australia is also going into the hardware business with RAM memory cards for the IBM, Sirius and Apple,

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Because the basic cost of the 64 is so low, you can afford more peripherals for it. Like disk drives, printers or even printer-plotters.

This means you can own the 64, disk drive and printer for a little more than an Apple II+ computer alone.

HARD FACTS ABOUT SOFTWARE

The Commodore 64 will have a broad range of custom software packages including an electronic spreadsheet; business graphics (including printout); a user-definable diary/calendar; word processor; mailing lists, and more.

With BASIC as its primary language, it is also PET BASIC compatible.

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COMPUTER

DATA 83

as well as a combined 80 column video/64 kilobyte RAM card for the Apple.

Computerland

Stand 30

THE Computerland chain of stores will be showing its extensive range of personal and small business computers, including the IBM-PC, DEC Rainbow, Apples, Osborne I and others. However, the accent will not be on the machines, according to a spokesman, but on Computerland as the store you ought to buy your computer from.

Computerland will be stressing support, the ability to select from a range of machines, the strength of the organisation and the other factors which makes Computerland a leading retailer.

Commodore 64

Stands 21, 22, 23, 24

THOUGH released only a few weeks ago, the Commodore 64 microcomputer is already extremely popular, and a mass of software support has emerged from the United States, where it has been on a sale a little longer.

As well as the software, which includes word-processing, graphics support and a huge selection of games, Commodore is coming on strong with hardware add-ons such as a CP/M processor option and a low-cost four-colour printer/plotter.

Apple

Stand 5

THE STAR of the Apple stand will be Lisa, the "executive" personal computer which features stunning graphics and a new mode of user interaction based on a pointer device called a mouse.

Lisa has six integrated software packages which allow the user to transfer information between them by "cutting and pasting" the pages which appear on the screen. The screen, incidentally, behaves just like a desk-top, as folders are opened or filed, and those no longer required placed in the wastebasket.

Also on the display will be the Apple

IIe and III, as well as a range of new software for the machines.

Yellow Pages

Stand 102

THE PUBLISHER of the Yellow Pages telephone directory, Edward H. O'Brien Pty Limited, will have a special display promoting the use of its directory in finding suppliers of data-processing equipment and services.

Durango Systems

Stand 84

THE MODEL 900 series of desk-top computers will be on display. Incorporating a mini-Winchester fixed disk of seven or 14 megabytes, the Model 900's special feature is a multi-user function, for up to five work-stations, which can be upgraded to either eight or 12 users.

Pericomp

Stands 82, 83

FOR LESS than \$3000, Cromemco's C10 offers word-processing and spreadsheet capabilities, plus a range of applications software. The innards are based on the Z-80A processor, with a 4 MHz clock and 64 kilobytes of memory.

The Technical Bookshop

Stand 79

A RANGE of books covering a whole spectrum of computer-related subjects can be seen at this company's stand.

Caringbah Sheet Metal

Stands 20, 25

THIS SYDNEY company's speciality is filing cabinets, built to take floppy disks.

Telxon Australia

Stand 58IC

TELXON AUSTRALIA designs, man-

ufactures and markets portable data-entry terminals and supportive communication systems. Modules for simple interfacing include interchangeable keypads, receivers, optical light pens and printers.

Computer Supplies

Stands 14, 19

A RANGE of magnetic products, furniture, print-out binders, ribbons and general data-processing and word-processing supplies is distributed and, in some cases, manufactured by this company.

Hoods Galore

Stand 138IC

THE COMPUTER hoods being manufactured by Hoods Galore, a relatively young company, are claimed to reduce printer noise by almost 94 per cent.

AWA Micromax Computers

Stand 143IC

THE SAME Micromax computer installed as a twin floppy-disk system can be simply upgraded to the maximum configuration available, with no costly modification to software. An entry level system, including terminal and 120 characters per second printer, would cost about \$8500 (excluding tax).

Scomo

Stand 61

SCOMO is the Australian agent for the Eagle Computer range, and incorporates an array of eight- and 16-bit micros. The company is also involved in marketing single and multi-user accounting software.

Sola Basic

Stand 103

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Apple IIe — First Impressions

By Ken Ozzanne

THE APPLE IIe was released in Australia on January 20, at the same time as the surprise-packet LISA. While it didn't generate as much immediate interest — it doesn't break quite the new ground the revolutionary LISA does — it is far more significant for individual users at the moment.

The IIe replaces the Apple II-Plus and continues the saga of the Apple II, the world's most popular computer. It is an upgrade of the II-Plus and will run virtually all software written for its predecessors.

The characteristics of software that will not run on the new version are detailed below, but it is fairly safe to assume that everything will run. Certainly all programs that do not use monitor routines will run as will most that do (stores should have a list of commercial programs that won't run — the list is fairly short. Also, IIe versions of most will be available soon).

The most welcome change is that the Apple now produces both upper and lower case on screen. Screen characters are well formed (as we expect on Apples) and the need for a lower case modification has gone for good. So ends a minor industry.

Also the computer now has 64K rather than 48K. We have the 16K on board that formerly had to be added via a RAM card. That means that the Pascal Language System, among other things, will now run on an unmodified Apple. This is a substantial improvement in itself.

A Real Keyboard

Next, the Apple now has an enhanced keyboard with eleven extra keys — finally, all ASCII characters can be produced directly from the keyboard. Some auxiliary keys have been moved, but the new keyboard is not hard to learn.

Unfortunately (or so it seems before I have used it), the American keyboard for the new version is a little better designed than the British one we are supplied with. On the positive side, the British keyboard does allow printing (to screen) of the pound sign by means of a little switch below the machine.

Two of the new keys, open and closed Apple, act as paddle buttons for arcade style games. The RESET key has been moved right of the main keyboard, recessed a little and now needs CONTROL to be pressed simultaneously. This seems to be in the nature of overkill to me, but I doubt that



anyone will accidentally RESET often in future. Pressing CONTROL, OPEN APPLE and RESET simultaneously now produces a REBOOT, which was formerly only available with certainty by powering down. Anyone who has ever broken the fragile Apple On/Off switch and been faced with a \$200 repair bill will be delighted with this move.

All appropriate keys now have automatic repeat. In consequence, the REPEAT key has disappeared from the keyboard (in its former place there are two keys, for left and right square and curly brackets).

Most of the new keyboard layout is easy to get used to — my biggest problem has been with the ESCAPE key being moved one place upwards.

In general, the new motherboard looks better than the old, with much more chip-level buffering than we are used to. Chip count is down to 35 (from more than 100) with many old un-specialised chips being replaced by a few specialised ones. In addition, memory is now provided by eight 64K by 1 dynamic RAMs instead of 24 16K by 1 chips and two 8K ROMs instead of six 2K ROMs. The layout is totally changed and amounts to a complete redesign.

80-Column Cards

Unfortunately, the screen display is still only 40 columns wide. The upgrade does make it easier to produce 80 columns, but you still need a card. Hopefully we should see 80-column cards a good deal cheaper than those we have been used to.

Incidentally, 80-column cards designed for earlier Apples should still

work, but I'd ask for a demonstration before buying one such for the IIe (some 80-column cards, such as the Vision 80 card, provide capabilities considerably beyond those available on the new Apple ones).

One of the new Apple 80-column cards has 64K of extra RAM aboard. I have not seen one in operation yet (only the simple one, which is a very small card). The upgrade generally makes it considerably easier to use extra RAM. We should see programs designed to use up to 128K of memory beginning to appear shortly (many American software houses were provided with advance machines to facilitate development).

A nice feature is that the eighty column card, once selected, can be deselected by ESCAPE 4 and reselected by ESCAPE 8.

Unlike previous Apple add-on memories which have worked by bank selecting on the uppermost 16K only, the IIe supports bank selecting of all four 16K banks. This is much more convenient of course, but it does create the possibility of writing a program that puts you completely out of touch with the motherboard routines that support it all! (This is not likely to become a practical problem.)

The 80-column card does present difficulties of its own if you carelessly reboot while in eighty column display mode. In that case the display goes out of control and it is necessary to change display mode back to forty columns to overcome the nuisance. No doubt we will all get used to swapping modes prior to rebooting, but until we do this is a distracting problem.

The slot that holds the eighty column card has been moved to a central position in the Apple (the other seven remain at the back). The new location, and the fact that sixty lines are brought to this card (fifty to the others as in previous Apples), combine to suggest that some rather fancy multifunction cards may soon appear for this slot.

Current production of the IIe is 37000 units per month, which suggests that the number of II-Plus machines in use will remain larger than that of IIe until sometime next year. But we must expect a gradual shift of the Apple support industry towards the IIe over the next year or so. However, the better part of a million machines will not disappear — and there are still firms making Apple II-compatible machines — so there is no chance that support for these machines will fade

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TEOE1613

away anytime soon.

The IIe has a built in self-test capability, like the IBM PC. This is triggered by holding down CONTROL, SOLID APPLE and RESET keys together. This facility removes some of the need for diagnostic programs like Brain Surgeon or Applecillin, but it tests only the basic system. There should still be room for diagnostic utilities that can test add on equipment.

The Documentation

In the past Apple has had a name for providing some of the best documentation in the industry, but the new owner's manual seems to owe more to Madison Avenue than to previous Apple documentation. While it does provide initial setup information, it will have little continuing use.

The serious manuals now apparently will be extra cost items. At present none seem to be available in Australia in any case. I hope this is a matter that will be speedily rectified — no first time user who wanted to write programs could possibly manage with only the owner's manual.

Keypads And Cursors...

Apple has not provided a numeric keypad on the keyboard of the IIe, but there is a male plug on the motherboard designed to allow a keypad to be plugged in directly. Apparently there is a design change and it will be necessary to get a keypad designed for the IIe, or find somebody with appropriate hardware knowledge to convert other keypads.

The Integer cursor is unaltered, but the Applesoft cursor appears as a little checkerboard instead of the inverse blank we are used to. There are other variations in 80-column inverse mode and in inverse monitor mode (CALL — 149). These changes are purely cosmetic and hardly noticeable within a day of use.

The Big IF

For the serious Apple user, none of the previous changes is likely to prove as significant as the changes in the Monitor.

There are now two 8K ROMs instead of the previous six 2K ROMs. As far as I have been able to work out, all but one page of the new space is taken up with additions to the system monitor. The monitor now uses two new page zero locations (\$08 and \$1F) previously used only by Sweet 16 routines. This is a potential source of conflict with programs written for the Apple II which make use of those locations as well as monitor routines.

The new ROM is cleverly bank selected with normal I/O locations from C100 to CFFF. It is possible that loca-

tions from C000 to C0FF are used twice over as well, but I have not found how if so. It is difficult to conceive how bank selection could take place actually on the page being selected, so I tentatively conclude that ROM locations on that page are not available.

The major named routines on the Autostart ROM that have moved are as follows:

FC42 — clear to end of page
FC58 — clear window to blanks and place cursor at top left
FC5A — set cursor vertical from accumulator and clear to end of window
FC70 — scroll up one line
FC95 — clear line
FC9C — clear to end of line
FD1B — keyin

This last is the most important by far and probably the source of almost all incompatibilities. Some copy protection schemes depend on using this area of the autostart ROM. Any program on a disk using such a scheme will fail to run as will any program simply using this routine. Alterations should be easy and all commercial software should be available in Apple IIe versions (where needed) shortly.

Software that is keyboard dependent may also need alteration regardless of copy protection. Sandy's word processor, for example, needs alteration to use the lower case and 80-column card of the IIe — an appropriate version is already available.

The keyboard version of the game "Falcons" uses semicolon and right facing arrow keys for movement. These are no longer together on the IIe and a change is needed to retain playability. Such a change would probably only be one byte — an argument for unlocked software for those who already own the game.

It won't matter for people who buy the IIe version, but the IIe is my second Apple and the fourth I have daily access to. It is a nuisance to have software that depends on being in a particular one. And that will simply get worse down the line when the IIe plus (whatever that may be) appears. The moral will be to test software before you buy — a thing everyone should do in any case.

A keyboard familiarisation program called "Apple Presents...Apple" is now included in the package. This is a real step forwards, but it would have been still better if the public domain "Applesoft Tutor" or equivalent had been provided as well (any reader without another source can obtain this from me).

A Considerable Improvement

The Apple IIe is the latest upgrade of

the basic Apple II design that has been with us since 1977. This is the thirteenth revision of hardware and the most significant since the appearance of Applesoft and the autostart ROM.

On the whole, the new version is a considerable improvement and a real effort has been made to keep problems of software compatibility to a minimum.

On the negative side is the absence of documentation with the IIe (which Apple should rectify, in my opinion) and the failure to move prices down. Apple is unlikely ever to produce the cheapest computers around, but it is time profit margins were trimmed a little. Sales of 37000 per month will not grow to 137000 if the Apple is priced too high. (Of course we, in Australia, account for only about 1000 per month at present, but that too could grow.)

There is life in the Apple II series yet, and Apple will doubtless make further upgrades. Probably the most wanted features are 80 columns built in and more memory space. The Apple could also do with an RS232C port and a parallel port as well. That would eliminate the need to use up slots to run printers and modems. □

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(nr David Jones)

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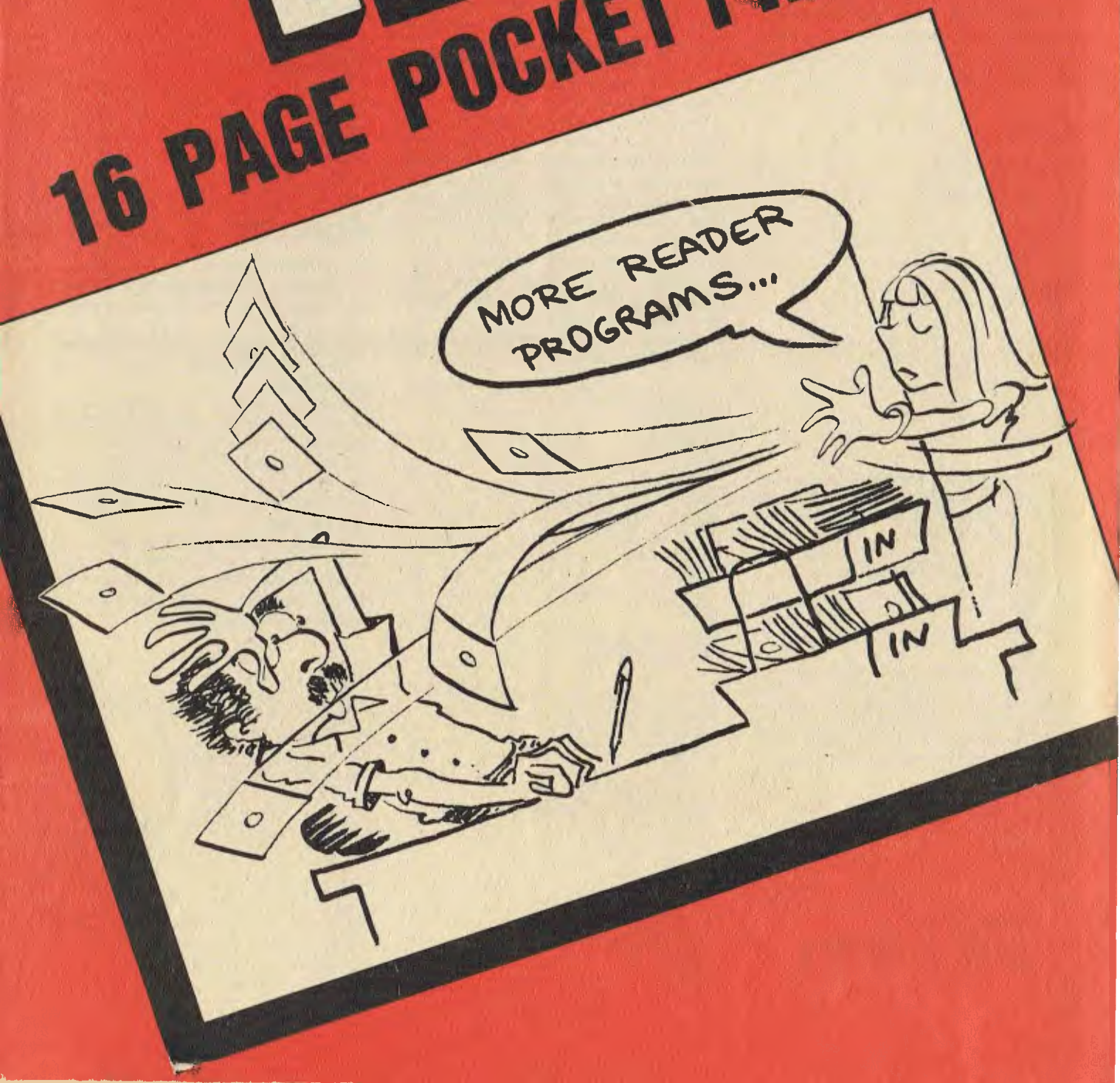
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BONUS

16 PAGE POCKET PROGRAMS




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```

Machine Code For BASIC

By Derek Au

THIS PROGRAM decompiles a machine-code file into an Applesoft program consisting of POKES and line numbers. This is useful for having machine-language sub-routines ready poked into memory from BASIC.

```

10 PRINT "NOMON C,I,O"
20 HOME
30 PRINT
40 INPUT "ENTER STARTING ADDRESS: ";AS:
A = VAL (AS)
50 PRINT : PRINT
60 INPUT "ENTER ENDING ADDRESS: ";XS
X = VAL (XS)
80 DIM LINE(2)
90 INPUT "YOUR DESIRED STARTING LINE: ";D
100 HOME
110 POKE 34,2: PRINT " SELECT MACHINE-CODE
FILE "
120 PRINT "CATALOG"
130 INPUT "FILENAME: ";FILES
140 PRINT "BLOAD";FILES
150 POKE 34,0
160 HOME
170 PRINT "OPEN CODE"
180 PRINT "DELETE CODE"
190 PRINT "OPEN CODE"
200 PRINT "WRITE CODE"
210 PRINT "DEL0,400": FOR PR = A TO VAL (XS)
220 CO = CO + 1
230 IF CO = 10 THEN CO = 1
240 IF CO < > 1 THEN 280
250 PRINT
260 PRINT D: " ";
270 D = D + 10
280 PRINT " POKE ";PR: " "; PEEK (PR): " ";
290 NEXT PR
300 PRINT : PRINT "CLOSE CODE"
310 PRINT "MON C,I,O"
320 PRINT "EXBC CODE"
330 END

```

Ullo Again...

By S. Zanker

WITH THIS program, you will know how much random-access memory (RAM) your computer contains, and which slots have disk cards, without having to open the cover.

You will also know how much memory is available to an Applesoft BASIC program, and where that program will be located, and the number of buffers available for disk files (current value of MAXFILES).

The program variables contain this information:

DAY\$ = Date of creation (you supply)
 TI\$ = Disk title (you supply)
 MEM = Highest RAM address + 1
 TY = Type of disk (SLAVE/MASTER)
 TYS = Type of disk ('SLAVE'/MASTER')
 HI = Current value of HIMEM
 PR = Pointer to start of basic program

FR = Free memory for basic program
 VOL = Volume number of disk
 MF = Current value of MAXFILES
 SP\$ = Five spaces for editing

Line 20 gives you the option of recording the date the disk was initialised. Line 30 enables you to give the disk a title. There is a 40-character limit.

Line 50 disables the INIT command, preventing loss of non-write-protected disks.

Line 60 displays the amount of RAM measured in 1024 bytes.

Lines 70 and 80 display the type of disk last booted (SLAVE/MASTER), and the creation date.

Line 90 prints an inverse bar on the screen.

Lines 110 to 130 give a formatted display of the variables concerning BASIC program memory.

Lines 140 and 150 poke and execute the machine-language routine which looks for disk cards.

Another inverse line is printed at line 160. The screen is now divided into three sections: the top section deals with system data, the middle section with free memory and the lower section with disk information, which is displayed by lines 170 and 180.

Line 190 asks if you want a CATALOG. Your response will default to yes.

Line 200 issues the command, if you want a second greeting program, replace the statement with PRINT CHR\$(4) RUN filename'.

Line 210 rings a bell and wipes the program from memory, ready for use.

The program can be run on any size system. You'll be surprised how much RAM you have remaining after zero page, the input buffer, screen memory and DOS have all had their share.

```

10 REM GREETING PROGRAM
20 DAYS = "01JUL82"
30 TITLES = "<> SUPPLY YOUR TITLE HERE <>"
40 MEM = ( PEEK (978) + 35 ) * 256:TY = ( PEEK (978) + 25 ) * 256 + 254:TT = ( 41 - LEN (TIS) ) / 2:TT = TT + ( TT < 1 )
50 POKE MEM - 6833,96
60 TEXT : HOME : PRINT TAB ( 14 );"APPLE
)+ "MEM / 1024;"K"
70 PRINT " DOS 3.3"; TAB ( 30 );TYS = "MASTER":
IF PEEK (TY) < > 54 THEN TYS = "SLAVE": FLASH
80 PRINT TYS;" DISK": NORMAL : PRINT TAB ( 13 );"CREATED ";DAYS
90 PRINT : INVERSE : PRINT TAB ( 40 );" : NORMAL
100 HI = PEEK ( 115 ) + PEEK ( 116 ) * 256:PR = PEEK ( 103 ) + PEEK ( 104 ) * 256:FR = HI - PR + 1:VOL = PEEK ( MEM - 2058 ):MF = PEEK ( MEM - 5545 ):SP$ = " "
110 PRINT " HIMEM = "; RIGHT$ ( SP$ + STR$ (HI),5 )
120 PRINT "PROGRAM = "; RIGHT$ ( SP$ + STR$ (PR),5 ); TAB ( 28 );"MAXFILES = ";MF: PRINT TAB ( 10 );"-----"
130 PRINT "FRE MEM = "; RIGHT$ ( SP$ + STR$ (FR),5 ); " ( "; INT ( FR / 1024 );"K": PRINT
140 FOR A = 768 TO 810: READ B: POKE A,B: NEXT :
DATA 162,0,169,200,134,6,133,7,160,7,198,7,165,7,201,192,240,24,177,6,217,1,251,208,239,136,136,16,245,165,7,233,192,32,227,253,32,72,249,76,8,3,96
150 PRINT "DISK CARDS ARE IN SLOT(S) "; CALL 768: PRINT : PRINT
160 INVERSE : PRINT TAB ( 40 );" : NORMAL
170 PRINT TAB ( 13 );"DISK VOLUME #";VOL: PRINT
180 PRINT TAB ( TT );TIS: PRINT : PRINT
190 PRINT "CATALOG [Y] [N] ?[Y]": HTAB PEEK (36) - 1: POKE 49168,0: GET ANS: PRINT ANS
200 IF ANS < > "N" THEN PRINT CHR$ (4)"CATALOG"
210 CALL = 198: NEW

```

Epson Connections

By John Marquet

I HAVE an Apple II fitted out as a Pascal program development tool. The system has 48 kilobytes of memory, two disks, a 20-line by 80-character monitor and an Epson MS80F/T printer. Using this system, I have developed a program for printing one or more copies of a UCSD Pascal text file on an Epson printer, with an optional character density or size.

The UCSD Pascal text editor can handle and format simple correspondence as well as sourcing programs. When the dense-print option is selected on the printer, a double-strike is given on each character, and the matrix print becomes clearer.

The program uses some of the features of the UCSD Pascal — for example, the file-naming conventions.

```

program typetext;
var hardcop,infiler,low: integer;
newk, innam: string;
chrt: char;

procedure initialnew;
begin
  writing;
  writeln('John's text output');
  writeln('Note that an input line with a leading "" will');
  writeln('result in a page throw in output. ');
  innam := " ";
  writeln('Type name of input text file: ');
  readln(innam);
  if pos(' ',innam) = 0 then innam := concat(' ',TEXT);
  (881-1)
  reset(infil,innam);
  if low = 0 then begin
    writeln('File not found: ');
    exit (program)
  end;
  (881-1)
  contr := " ";
  writeln('Enter < for small, > for large print');
  writeln('Enter 1 for high density normal size print. ');
  writeln('Any other character gives normal size and density. ');
  write('Type of print: ');
  readln(contr);
  if contr = '<' then begin
    writeln('Offset (no. of char spaces in left margin) ');
    readln(indent);
    and also indent := 20;
    write('No. of copies: ');
    readln(numbercopy);
    if numbercopy = 0 then exit (program);
    writeln('Set top of form on printer, then key "return"');
    readln(newk);
    reset(hardcop, printer);
  end;
  begin
    while true do begin
      initialnew;
      repeat begin
        reset(infil);
        while not eof(infil) do begin
          readln(infil,newk);
          write(newk);
          if pos(' ',newk) = 0 then
            begin
              write(hardcop,chr(12));
              newk := " ";
            end;
          begin
            case contr of
              '<' : begin
                  write(hardcop,chr(15));
                  for loop := 1 to indent do write(hardcop,' ');
                end;
              '>' : write(hardcop,chr(14));
              '1' : write(hardcop,chr(27),'E');
            end;
            write(hardcop,newk);
          end;
          case contr of
            '<' : write(hardcop,chr(10));
            '>' : write(hardcop,chr(27),'F');
          end;
        end;
        numbercopy := numbercopy - 1;
        if numbercopy = 0 then write(hardcop,chr(12));
      end;
      until numbercopy = 0;
      close(infil);
      close(hardcop);
    end;
  end;
end.

```

Hackatext

By Derek Au

HACKATEXT is a program which creates sequential files but allows you to input commas and colons which the MAKE TEXT program supplied on the System Master disk cannot — for example, BSAVE PROGRAM,AS4000,L8192,S6,V100,D2.

```

10 REM MAKE TEXT
20 HOME
30 HTAB 10: PRINT "TEXT-FILE CREATOR#1"
40 HTAB 5: VTAB 7
50 PRINT " (M)AKE TEXT
   PRINT " (C)ATALOG
   PRINT " (E)XIT "
60 PRINT " WHICH?: GET BS
70 IF BS = "M" THEN 110
80 IF BS = "C" THEN PRINT: INPUT "PRESS
   'RETURN' TO CATALOG";NS: PRINT CHR$ (4)"CATALOG":
   INPUT ";;";NS: GOTO 20
90 IF BS = "E" THEN HOME: PRINT "BYE!!": END
100 PRINT CHR$ (7): GOTO 20
110 PRINT: PRINT "MAKING TEXT: USE <CTRL>F TO
   ESCAPE....<CTRL>R>RETURN..."
120 A = 8192
130 GET WS: PRINT WS;
140 IF WS = CHR$ (6) THEN 160
150 IF WS = CHR$ (18) THEN A = 8192: GOTO 20
160 POKE A, ASC (WS):A = A + 1
170 GOTO 130
180 INPUT "FINISHED?->";NS
190 IF LEFT$ (NS,1) = "Y" THEN 210
200 GOTO 130
210 INPUT "FILENAME?->";FILES
220 INPUT "(T)EXT-FILE OR (B)INARY-FILE?->";MS:
   IF MS = "B" THEN 320
230 IF MS = "T" THEN 250
240 PRINT CHR$ (7): VTAB PEEK (37): GOTO 220
250 PRINT CHR$ (4)"OPEN";FILES
260 PRINT CHR$ (4)"WRITE";FILES
270 FOR WR = 8192 TO A
280 PRINT CHR$ ( PEEK (WR));
290 NEXT
300 PRINT: PRINT CHR$ (4)"CLOSE";FILES
310 GOTO 20
320 PRINT CHR$ (4)"BSAVE";FILES;"A8192,L";
   A = 8192
330 GOTO 20

```

Siren

By Robert Chalmers

HAVE YOU ever needed a short program that will sound an alarm for you at a pre-determined point in a main program?

Siren is a little machine-language program that will do just that. It is listed by code, hex and decimal, with a short demonstration program to show its use from within a larger framework. The starting address is 804 (dec), usually free for machine-code work.

```

10 FOR I = 804 TO 819
20 READ A
30 POKE I,A
40 NEXT I
50 DATA 160,0,169,105,153,200,7,32,50,255,200,192,40,200,241,96

```

To instigate this program from BASIC, use this method:

```

LDY 00      LOAD Y WITH 0
LDA 6A      LOAD ACCUMULATOR WITH FLASHING *
STAS70D,Y   STORE ACCUMULATOR AT 70D + CONTENTS OF Y.
              (BOTTOM LINE OF SCREEN.)
JSR 7F3A     JUMP TO SUBROUTINE IN MONITOR THAT RINGS OR
              BELL.
INY          INCREMENT Y REGISTER BY 1
CPY 52H     COMPARE VALUE IN Y TO 52H (40 DEC)
BNE V1      BRANCH BACK 11 STEPS IF Y IS NOT EQUAL TO
              52H (40)
RTS          RETURN TO MAIN PROGRAM

```

To demonstrate this in use, add the following:

```

60 PRINT "ENTER FIVE NUMBERS."
70 INPUT "1: ";N1: INPUT "2: ";N2: INPUT "3: ";N3: INPUT "4: ";N4: INPUT "5: ";N5
80 LET M=N1+N2+N3+N4+N5
90 PRINT "1:17 N=5 THEN CALL 804
100 GOTO 70

```

Merry Christmas

By Derek Au

THIS PROGRAM plays the traditional "We Wish You A Merry Christmas" tune. Just some short programming fun! The program POKES some sound routines which can be used in your own programs. Just: POKE 768,(pitch 1-255) : POKE 769,(duration 1-255) : CALL 770.

```

10 GOSUB 110
20 HOME
30 AS = "WE WISH YOU A MERRY CHRISTMAS", WE WISH
   YOU A MERRY CHRISTMAS', ... AND A 'HAPPY
   NEW YEAR!' "
40 DATA 133,110, 98,99, 98,99,88,80, 98,100,105,110,
   117,130, 117,150, 117,150, 88,110,
   88,110, 78,75, 88,99, 98,99, 105,150, 105,150,
   105,160, 78,100, 78,100, 67,110
50 DATA 73,100,88,100,98,100, 98,100, 133,130,
   133,130, 117,115, 88,120, 105,120, 98,200
60 FOR R = 1 TO 30
70 READ P,D
80 POKE 768,P: POKE 769,D: CALL 770
90 NEXT
100 END
110 POKE 768,0: POKE 769,173: POKE 770,173: POKE
   771,48: POKE 772,192: POKE 773,136: POKE 774,200:
   POKE 775,5: POKE 776,206:
120 POKE 777,1: POKE 778,3: POKE 779,240: POKE
   780,9: POKE 781,282: POKE 782,200: POKE 783,245:
   POKE 784,174: POKE 785,0:
130 POKE 786,3: POKE 787,76: POKE 788,2: POKE
   789,3: POKE 790,96: POKE 791,0:
140 RETURN

```

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1040
1050 ORG 7F0DH
1060 DEFB SPH ;CURSOR CHARACTER
1070 DEFB CHS ;LINE: NOT TO SCROLL
1080 DRIVE% 1B L,(1X+03) ;H:CURSOR POSITION
1090 1B H,(1X+06) ;A:COVERED CHARACTER
1100 1B JP A,(1X+05) ;IS CHANGED IS OFF
1110 LD A,(1X+05) ;VECTOR: 0=NO, 1=ON
1120 OR A ;ASCALL: 0=NO, 1=ON
1130 JR Z,OFF%
1140 C,HAL,A
1150 OFF% 1B A,C
1160 CP GH
1170 JC,C,SPD%
1180 R 0,0
1190 JR NC,ARMC%
1200 C,0H
1210 JR C,SPD%
1220 LD B,0
1230 LD C,HAL,A
1240 W,0
1250 ZP 0
1260 ZP 0
1270 ZP 0
1280 ZP 0
1290 ZP 0
1300 DTS L,ALL
1310 DTS L,ALL
1320 DTS L,ALL
1330 DTS L,ALL
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1870 DTS L,ALL
1880 DTS L,ALL
1890 DTS L,ALL
1900 DTS L,ALL
1910 DTS L,ALL
1920 DTS L,ALL
1930 DTS L,ALL
1940 DTS L,ALL
1950 DTS L,ALL
1960 DTS L,ALL
1970 DTS L,ALL
1980 DTS L,ALL
1990 DTS L,ALL

```


Modified CP/M

By Nigel Harwood

ON BOOT-UP of my Osborne 1 computer, it automatically executes a program called AUTOST.COM, which enables any program or function to be automatically started.

This is very useful, but not always desirable. However, when I decided that it wasn't wanted for a particular disk, I ran into some problems. You see, nowhere in the manual does it mention how to disengage the AUTOST facility.

I tried simply deleting the program AUTOST.COM, but then CP/M booted up with the message "AUTOST?" ... which, to me, looked very poor.

The answer I found was in slightly changing the CP/M itself. Execute SYSGEN, to the source-drive prompt, enter A. To the destination-drive prompt, enter RETURN. This will then have read in the CP/M system and left it in memory. Now, enter SAVE 35 CPM.COM, which will save the first 35 pages of memory; these contain the CP/M system.

Next, execute DDT CPM.COM, then in DDT enter D2008. You should now see:

```
2008 E5 01 07 41 55 54 4F 53...AUTOS
2010 54 20 30 31 32 33 34 35 T 012345
```

Now, enter S2008 and then the following: RETURN, RETURN, 00,20,20,20,20,20, ending by entering a fullstop and new line. Next, enter Control-C to get back to the CP/M operating system.

You have now modified the CP/M system - it was read into memory when you entered DDT, and it is still there now.

Execute SYSGEN again, answer RETURN to the source-drive prompt, because you wish to use the CP/M that you have modified in memory. To the destination-drive prompt, enter A.

When the disk light has gone out, press the reset button to reboot the system. After hitting RETURN to the boot-up prompt, the improved sign-on should greet you on a cleared screen.



"LOOKS LIKE SOMEBODY FORGOT TO TELL THE ENGINEER ABOUT OUR NEW ELECTRONIC SECURITY SYSTEM...."

Mastermind

By Tony Hinde

YOU USE the standard rules of the Mastermind board game for this program. No colours can be repeated, and the code at the end is set out at random, not in order.

```
10 CLS:CLEREAD
20 RANDOM
40 PRINT "THIS GAME IS THE COMPUTERISED VERSION OF MASTERMIND"
70 PRINT "I HOPE YOU ENJOY IT."
100 PRINT "PRINT HIT ANY KEY TO CONTINUE....."
130 IPEEK(15359)=HLEN30
160 CLS:PRINT "YOU HAVE A SELECTION OF EIGHT COLOURS."
190 PRINT "A FOR RED, Y FOR YELLOW, G FOR GREEN, B FOR BLUE"
220 PRINT "O FOR ORANGE, W FOR WHITE, P FOR PINK AND S FOR SILVER."
250 PRINT "YOU MUST GUESS THE COMBINATION OF FIVE COLOURS THAT"
280 PRINT "THE COMPUTER HAS SELECTED. YOU HAVE 10 ATTEMPTS."
310 PRINT "CHOK(143) MEANS RIGHT COLOUR RIGHT SQUARE."
320 V=0
340 PRINT "CHOK(134) MEANS RIGHT COLOUR WRONG SQUARE."
345 PRINT
350 PRINT "TO CORRECT THE COMBINATION YOUR WRITING PRESS THE"
360 PRINT "BACK ARROW KEY."
370 PRINT "PRINT HIT ANY KEY TO PLAY....."
400 IPEEK(15359)=HLEN30
430 K=0:"B" K=2:"Y" K=3:"G" K=4:"O" K=5:"W" K=6:"P" K=7:"S" K=8:""
440 FOR I=1 TO 5
450 FOR J=1 TO 5
460 IF I=J THEN K=K+1
470 IF I=J THEN K=K+1
480 IF I=J THEN K=K+1
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MICRO DECISION



The Micro Decision is a professional, CP/M® based computer system that comes with the hardware and software needed for the large or small business. This system is ideal for the professional or small business owner who wants to enter the computer age at an amazingly low price. It offers all the word processing, financial planning and programming tools needed to increase productivity.

The big office with a backlog of work on its minis and mainframes can use the Micro Decision to generate budget projections, sales reports, resource utilization studies, off-book receivables ... all those special projects that need to be done now, but don't justify tying up a big machine.

The Micro Decision is a single board, Z80®-based computer that comes with 64K of RAM, an on-board disk controller and one or two 5 1/4 inch floppy disk drives. An expansion port allows the Micro Decision to handle up to four 5 1/4 inch drives, while two RS-232 serial ports connect the Micro Decision to a terminal, and a printer or modem.

Standard software includes Wordstar®, the popular word processing program, and Correct-It®, a powerful spelling checker. Financial forecasting is easy with Logi-Calc®, the electronic "spreadsheet" that adds computer power to business projections. Programmers will appreciate the choice of three programming languages: Microsoft® Basic-80, BaZic®, and Morrow Designs' Pilot. The software package is completed by the CP/M 2.2 Operating System, the industry standard O/S that allows access to more than 2,000 business programs.

Morrow Designs' optional terminal offers a full 12 inch diagonal, high resolution screen with 80 characters by 24 lines. The detachable keyboard allows positioning for maximum user comfort. An extra RS-232 serial port provides opportunities for additional I/O communication. And the terminals' intelligent features significantly improve system performance.

Add a printer and you have all the tools necessary to produce and store letters, documents and financial reports.

The Micro Decision is more than just the sum total of its hardware and software specifications. Morrow Designs has added features to the Micro Decision that make it convenient for the beginner as well as the experienced CP/M user. These features include: multiple diskette formats, enhanced error handling, Virtual Drive, simple terminal configuration, extensive diagnostics, a menu-driven front end, and perhaps most important, a clearly written user manual.

The Micro Decision's straightforward component design insures continued reliability. Each system is given extensive quality control and testing before shipment.

Morrow Designs has been dedicated to high-performance, low-cost computing since 1976. First in solid state memory, then disk memory, today in both single and multi-user computer systems.

Automation Satham Pty. Ltd. has been a Morrow designs dealer since 1976.

*Plus Sales Tax if applicable

AUTOMATION STATHAM PTY. LTD.

47 Birch St, Bankstown, NSW 2200. Australia. Phone (02) 709-4144.

In Brisbane: The Softwarehouse (07) 221-9640

In Melbourne: Microtrix (03) 439-5257

Alarm Clock

By Philip Cookson

THE ALARM on this digital alarm clock can either be a "beep" alarm or a cassette on/off command, which can be programmed to record from radio or television.

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MBASIC Tokens

By Jeff Richards

THE TOKENS used in Microsoft BASIC have been published many times, but a program that actually finds all the BASIC reserved words, and prints them out with their tokens, may be of interest. The addresses of the routines that deal with each of the tokens are also listed.

This program was developed for Microsoft CP/M BASIC (BASIC-80) Version 5.2, but it should work for most Microsoft BASICs that use the same format.

Two variables may alter with different implementations. First, the value of BASE may change (though obviously for CP/M versions it will be 100h). For ROM Basics it will probably be the base of ROM.

Secondly, the value COUNT may have to be adjusted to get the addresses correct. This value is the token of the last keyword that could validly commence a program line. In the case of BASIC 80, this is RESET



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(CCh) with only such keywords as THEN, TO and STEP having higher-valued tokens.

If you want to use this information to do some poking around in the interpreter, have a look at the TRON and TROFF routines for a little bit of very sneaky code.

```

10 DEFINT A-Z
20 BASE=4H100+5
30 COUNT=4HCC
40 C=1
50 FOR I=1 TO 27
60   IF I=27 THEN J=J+1:GOTO 90
70   I1=BASE+256+(I*2)
80   J=PEEK(I1)+PEEK(I1+1)*256
90   IS="":IF I<27 THEN IS=CHR$(I+64)
100  IF PEEK(J)=0 GOTO 240
110  I9=IS+CHR$(PEEK(J)AND 4H7F)
120  IF (PEEK(J) AND 4H80) GOTO 140
130  J=J+1:GOTO 110
140  K=PEEK(J+1)
150  JS="":IF K<16 THEN JS=""
160  JS=JS+HEX$(K)
170  KS="":IF K>COUNT GOTO 210
180  IF K<64 THEN K=K+COUNT
190  K=(K-128)*2+BASE
200  KS=HEX$(PEEK(K)+(PEEK(K+1)*256))
210  PRINT JS;" ",IS,KS,""
220  IF INT(C/3)=C/3 THEN PRINT
230  C=C+1:J=J+2:GOTO 90
240 NEXT I

```

SAMPLE RUN - MICROSOFT BASIC-80 VERSION 5.2

TK	KEYWORD	ADDR	TK	KEYWORD	ADDR	TK	KEYWORD	ADDR
F7	AND		1A	HEXS	46B1	8E	RETURN	14FA
06	ABS	2866	05	INPUT	188D	8F	REM	1517
0E	ATN	394E	0B	IF	167A	A9	RESUME	15FC
15	ASC	4904	DA	INSTR		CA	RSET	547B
AB	AUTO	1644	05	INT	2A7F	02	RIGHT\$	499B
C3	CLOSE	53DA	10	IMP	200B	08	RND	380A
9A	CONT	4491	FB	IMP		AC	RESUM	22FC
92	CLEAR	4539	DD	INKEYS		CC	RESET	59BA
1C	CINT	2979	C8	KILL	59D3	BB	RANDOMIZE	248A
1D	CSNG	29F3	88	LET	1541	98	STDP	4435
1E	CDBL	2A1F	01	LINE	181F	A5	SWAP	44B4
2B	CVI	5180	C4	LOAD	52A1	CB	SAVE	539C
2C	CVS	5183	C9	LSET	547C	D4	SPC(	
2D	CVD	5186	9E	LPRINT	168D	D1	STEP	
0C	COB	38A6	9F	LLIST	209A	04	SGN	287B
16	CHRS	4914	1B	LPOS	1DE5	07	BQR	36FA
B6	CALL	4D11	93	LIST	209F	09	SIN	38AC
B8	COMMON	1515	0A	LOG	26C2	13	STR\$	46B7
89	CHAIN	4D94	30	LOC	5644	D8	STRINGS	
84	DATA	1515	12	LEN	48F8	18	SPACES	494D
86	DIM	39A3	01	LEFT\$	496A	BD	SYSTEM	59B3
AD	DEFSTR	13FB	31	LOF	565C	A3	TRON	44AE
AE	DEFINT	13FE	C5	MERGE	5362	A4	TROFF	44AF
AF	DEFSNG	1401	FC	MOD		D9	TAB(	
B0	DEFDBL	1404	32	MKIS	5167	C2	TO	
98	DEF	1E45	33	MKSS	516A	CF	THEN	
AA	DELETE	2287	34	MKDS	516D	0D	TAN	3939
01	END	443A	03	MID\$	49A5	D9	USING	
A2	ELSE	1517	03	NEXT	4508	D2	USR	
A6	ERASE	44F2	96	NULL	44A5	14	VAL	49C6
A7	EDIT	3D8E	C7	NAME	5864	DC	VARPTR	
AB	ERROR	1639	94	NEW	4354	A1	WIDTH	283C
D6	ERL		D5	NOT		97	WAIT	281C
D7	ERR		9D	OUT	2016	84	WHILE	4C79
0B	EXP	3757	95	ON	15AE	85	WEND	4C9C
2F	EOF	5592	BF	OPEN	58B9	87	WRITE	5881
FA	EQV		F8	OR		F9	XOR	
82	FDR	11EE	19	OCT\$	46A8	F2	+	
C0	FIELD	5418	BA	OPTION	2440	F3	-	
C6	FILES	59FD	C2	PUT	5AF6	F4	*	
D3	FN		99	POKE	22CB	F5	/	
0F	PRE	4B18	91	PRINT	16C5	F6	^	
1F	FIX	2A6C	11	POS	1DEB	FD	\	
89	GOTO	14C3	17	PEEK	22C1	DB	'	
89	GO TO	14C3	07	READ	1957	BF	>	
8D	GOSUB	14AB	8A	RUN	1495	F0	=	
C1	GET	5AF7	BC	RESTORE	441A	F1	<	

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Spaceship Lander

By C. Colle

WITH Spaceship Lander, you can simulate the landing of a spaceship on any planet in the solar system. The table gives you the surface gravity values for the planets and some of their satellites.

The gravity used in the sample run (1.62) is for Earth's moon, and is a good landing (soft landing and less than 200 metres from target). To have a successful landing, your speed must be less than or equal to eight metres per second when you're four metres or less above the ground.

To succeed, you have to input two accelerations, one to reduce the speed, the other to get nearer the target. If you slow down too much, the speed becomes negative, meaning that you're going up instead of down. The height, too, increases instead of decreasing. You can input an acceleration of zero, meaning free fall.

Surface Gravity Values (in m/s^2)

Mercury	3.95	Callisto	3.20
Venus	8.72	Saturn	8.77
Earth	9.81	Uranus	9.46
Moon	1.62	Neptune	13.66
Mars	3.84	Pluto	4.85
Jupiter	23.16	Ceres	0.85
Ganymede	3.43	Palas	0.54
Io	2.26	Juno	0.21
Europa	1.58	Vesta	0.43

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```

10:"L"PRINT "SP
   ACESHIP LAND
   ER"
15:S=1.3:D=5:M=
   2000:P=750
20:BEEP 1:INPUT
   "GRAVITY=" :
   G
30:F=4*G*M:A=((
   4*F)/(3*M))-
   G:V=64*(F/M)
   :U=0:Y=(V^2)
   /(2*A):X=V
40:J=((2*Y+V^2)/
   G)/(1+A/G):
   I=(J(J/A)*P)
   /(F*S)
50:Q=M-P
55:H=INT (Y):K=
   INT (V):L=
   INT (Q):N=
   INT (X)
60:PRINT "HEIGH
   T=";H;"SPEED
   =" ;K
70:PRINT "FUEL=
   ";L;"DISTANC
   E=";H
80:IF M=P THEN 1
   50
90:BEEP 1:INPUT
   "VERT.ACCELE
   RATION=" ;T;
   "HORIZ.ACCEL
   ERATION=" ;W
100:A=T*F/E2
110:B=W*F/E2
120:M=M-(((A+B)*
   I*D)/500)
130:IF M>P THEN 1
   50
140:A=0:B=0:M=P
150:Z=(D*(G-A/M)
   *6)
160:IF Z<0 LET Z=
   Z*-1
170:IF A<0 LET V=
   V+Z:GOTO 190
180:V=V-Z
190:U=U+D*B/M
200:Z=V*D*1.2
220:Y=Y-Z
230:Z=U*D
250:X=X-Z
260:IF Y<4 THEN
   280
270:GOTO 50
280:IF V<8 THEN
   310
285:GOSUB 500
290:PRINT "YOU C
   RASHED AT " ;
   K;"M/S"
300:PRINT N;" M.
   FROM TARGET"
   :GOTO 380
310:IF X>200 THEN
   350
320:GOSUB 500
330:PRINT "CONGR
   ATULATIONS.
   YOU"
340:PRINT "ARE "
   ;N;" M. FROM
   TARGET":
   GOTO 380
350:GOSUB 500
360:PRINT "GOOD
   LANDING BUT"
370:PRINT N;" M.
   FROM TARGET"
380:INPUT "ANOTH
   ER GAME ? " ;
   W
390:IF W="YES"
   THEN 15
400:END
500:N=ABS (INT (
   X))
510:RETURN
GRAVITY= 1.62
HEIGHT= 12250.
SPEED= 414.
FUEL= 1250.
DISTANCE= 414.
VERT. ACCEL.=5.
HORIZ. ACCEL.=5.
HEIGHT= 9994.
SPEED= 376.
FUEL= 1215.
DISTANCE= 406.
VERT. ACCEL.=5.
HORIZ. ACCEL.=5.

```

```

HEIGHT= 7969.
SPEED= 337.
FUEL= 1181.
DISTANCE= 389.
VERT. ACCEL.=0.
HORIZ. ACCEL.=5.
HEIGHT= 5652.
SPEED= 386.
FUEL= 1164.
DISTANCE= 364.
VERT. ACCEL.=0.
HORIZ. ACCEL.=5.
HEIGHT= 3044.
SPEED= 434.
FUEL= 1147.
DISTANCE= 331.
VERT. ACCEL.=100.
HORIZ. ACCEL.=5.
HEIGHT= 1660.
SPEED= 230.
FUEL= 789.
DISTANCE= 287.
VERT. ACCEL.=50.
HORIZ. ACCEL.=5.
HEIGHT= 846.
SPEED= 135.
FUEL= 602.
DISTANCE= 230.
VERT. ACCEL.=50.
HORIZ. ACCEL.=5.
HEIGHT= 742.
SPEED= 17.
FUEL= 414.
DISTANCE= 160.
VERT. ACCEL.=0.
HORIZ. ACCEL.=0.
HEIGHT= 346.
SPEED= 65.
FUEL= 414.
DISTANCE= 90.
VERT. ACCEL.=10.
HORIZ. ACCEL.=0.
HEIGHT= 35.
SPEED= 51.
FUEL= 380.
DISTANCE= 20.
VERT. ACCEL.=25.
HORIZ. ACCEL.=0.
CONGRATULATIONS.
YOU ARE 50. METRE
S. FROM TARGET

```

READ ABOUT

PRATTL

Mark Prediction

By C. Colle

THE MARK Prediction program will be particularly useful to students wanting to know, in advance, their average grade marks for the year.

Enter all the marks or ratings in any subject that you have received, and then those which you would like to get, and the program will tell you the percentage chance of this. However, you must assume that your work is constant. You can also find out the mean and standard deviation.

X is the mark to be entered, and Y is the frequency of this mark. When all marks have been entered, type O for the last X, then enter the mark you would like to get.

The program listing is for the printer. Press ENTER for your chances for a different mark. However, if this mark is for another subject, press SHFT M, as the memories must be cleared first.

```

10:"M"PRINT "MA
    RK PREDICTIO
N":CLEAR
13:INPUT "ENTER
    X ";X
15:PRINT "X = "
    ;X
20:IF X=0THEN 8
    0
27:INPUT "ENTER
    Y ";Y
30:PRINT "Y = "
    ;Y
40:A=YX:B=B+Y:C
    =C+A:D=XX:E=
    YD:F=F+E:G=C
    C
70:GOTO 13
80:M=C/B
90:PRINT "MEAN
    = ";USING "#
    ##.##"M
100:S=J((F-(G/B)
    )/B)
105:Z=S/J(1-1/B)
110:PRINT "STAND
    . DEVIATION=
    ";Z
120:V=ZZ
130:O=0:P=0:Q=0:
    R=0:T=0
137:INPUT "DESIR
    ED MARK ? ";
    N
140:PRINT " DESI
    RED MARK ? "
    ;N
150:O=N:GOSUB 20
    0
160:Q=4R:O=N-.5:
    GOSUB 200
170:Q=Q+R:O=N+.5
    :GOSUB 200
180:Q=Q+R:P=6.65
    Q/Z:BEEP 2
190:PRINT "YOU H
    AVE ";P;" %
    CHANCES":
    GOTO 130
200:T=(O-M)*(O-M
    )/V:R=J(EXP
    -T):RETURN

```

```

X = 7.
Y = 1.
X = 6.
Y = 3.
X = 5.
Y = 1.
X = 0.
MEAN = 6.0
STAND. DEVIATION
= 0.7
DESIRED MARK ?
6.0
YOU HAVE 52.2 %
CHANCES
DESIRED MARK ?
7.0
YOU HAVE 22.1 %
CHANCES
DESIRED MARK ?
5.0
YOU HAVE 22.1 %
CHANCES

```

MARK PREDICTION
** SAMPLE RUN **

Alien Attack

By Scott Story

ALIEN ATTACK starts with the Alien moving along the screen to base. The attack can be checked and stopped, after five hits, by pressing the 7 button (which stops the invader when it appears on the top of the screen), the 4 button (which stops the invader in the middle of the screen) or the 1 button (which stops the invader at the bottom of the screen).

The alien then begins another attack, each time moving faster and faster as it approaches the base. You score a point each time you hit the alien.

```

1:P=1:F=0:B=40
10:"A":CLEAR:
    WAIT 100:PRINT
    "ALIEN ATTACK
    START"
20:DIM T$(3)
30:T$(1)="0402030
    204"
40:T$(2)="10080C0
    810"
50:T$(3)="4020302
    040"
60:GOSUB 110
75:CLS:P=1:F=F+1
    :S=0:B=40
80:FOR I=1TO 11

```

```

90:GOSUB 5005
100:A$=INKEY$
110:IF A$="7"AND R
    =1GOTO 8000
120:IF A$="4"AND R
    =2GOTO 8000
130:IF A$="1"AND R
    =3GOTO 8000
140:P=P+10
150:NEXT I
155:L=F*5+S-5
165:GOTO 8300
200:FOR A=0TO 20
210:BEEP 1,A
220:NEXT A
225:GOSUB 1
230:PAUSE "ATTACK
    HALTED ":GOTO
    300
300:CLS:P=1:F=F+1
    :S=0:B=B-2
310:GOTO 80
5005:CLS
5007:WAIT 10:
    GOSUB 120:
    GPRINT "7F7F
    7F"
5010:R=RND(3)
5020:GOSUB P
5030:WAIT B:
    GPRINT T$(R)
    :BEEP 1,60
5050:RETURN

```

```

8485:WAIT 25:
    GPRINT "0800
    080808080808
8490:GOSUB 111
8495:WAIT 25:
    GPRINT "0800
    080808080808
    0808"
8500:GOSUB 125
8510:WAIT 55:
    GPRINT "2415
    1E3E7F"
8515:GOSUB 125
8520:WAIT 60:
    GPRINT "1449
    2C126C7F"
8525:GOSUB 125
8530:WAIT 60:
    GPRINT "0A20
    1C282A"
8600:PAUSE "YOUR
    SCORE-";L
9000:BEEP 1,90,50
    :BEEP 1,70,5
    0
9010:BEEP 1,150,9
    0:BEEP 1,150
    ,100
9020:BEEP 1,50,60
    :BEEP 1,250,
    150
9030:END

```

COMMODORE

Ship Maths

By Ric Kube

I DEvised the Space Maths program primarily for my son to learn his addition, but it can be changed to work any of the four functions + - * and / by changing line 30.

The program gives 10 problems (minimum) and keeps score. If you get five wrong, a red alert sounds and the ship travelling across the top sinks and a new game begins. The ships and waves are made using the programmable characters. This is found in lines 30-160.

Variables:

A\$-F\$ – different parts of the ships.

G\$ – waves on sea

H\$-R\$ – erases unwanted strings to produce movement

S and CT – top left corner of screen for poking and colour

H – loop for giving problems and moving ship
SC – score

W – sums wrong

A — loop for ocean.

Some of the lines are a little long and I needed to abbreviate as much as possible.

[illegible]

READ ABOUT
PRATT

G~PASCAL

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Symmetry

By Stewart Collins

SYMMETRY is a program that produces symmetrical patterns on a screen, and can only be stopped by pressing the space bar. It fits in one kilobyte of memory.

```

LET N=30,
LET M=21
LET U=0
LET D=-1
30 LET X=RND*M-M+RND
40 LET Y=D-RND*X+RND
50 FOR R=M TO N
60 PLOT N+X,M+Y
70 LET T=X
80 LET S=U
90 LET D=D-2*(D AND S)
100 LET U=S+D
110 LET X=X*U+Y*S
120 LET Y=T*S-Y*U
130 NEXT A
140 GOTO N

```

Execute by typing RAND and GOTO 0. ☐

Catcher

By N. Weaver

THE IDEA of Catcher is to catch as many Os as possible with the). The program uses the RND function to set the height of the "ball" and loops to move it across the screen. The INKEY\$ function controls the height. The main part of the program is in lines 17 to 27. Line 33 decides whether you have the top score.

```

1. LET Z = 0
3. LET A$ = ""
5. PAUSE 100
7. LET A = 0
9. LET C = 14
11. CLS
13. FOR J = 1 TO 10
15. LET B = INT (RND X 19)
17. FOR I = 0 TO 15
19. PRINT AT B,I;"O";AT C,15;"")
21. IF C = B AND I = 15 THEN LET A = A+1
23. LET C = C + (INKEY $ = "6") - (INKEY $ = "7")
25. CLS
27. NEXT I
29. NEXT J
31. PRINT AT 10, 0; "SCORE ";A
33. IF A > Z THEN GOTO 39

```

```

35. PRINT AT 14,0;" TOP SCORE= "; Z;" BY "; A$
37. GOTO 5
39. PRINT AT 11,0; "TOP SCORE. NAME ? ";
41. INPUT A$
43. PRINT A$; " "; A
45. LET Z = A DOWN-6
47. RAND Z UP-7
49. GOTO VAL "3"

```

Resistors

By Alan Hill

RESISTORS is a simple but useful program which runs on a Sinclair ZX80 with eight kilobytes of ROM and four kilobytes of RAM.

It should also run in one kilobyte, but not with the old ROM because of the arithmetic limitations.

```

10 PRINT "THIS PROGRAM CALCULATES
OVERALL RESISTANCE."
20 PRINT
30 PRINT "ARE RESISTORS IN SERIES ? (S)";
40 PRINT "OR IN PARALLEL ? (P)";
50 INPUT A$
60 IF A$="S" THEN GOTO 100
70 IF A$="P" THEN GOTO 400
80 GOTO 30
100 CLS
110 PRINT "HOW MANY RESISTORS ARE?"
120 PRINT "IN SERIES TOGETHER ? ";
130 INPUT N
140 PRINT
150 PRINT

```

Typing Tutor

By Peter McKay

THE AIM of Typing Tutor is to teach the user to type by being given lines five words long, to be typed as fast as possible. At the end of each line, the time is shown in seconds. Before the main program will run, program two must be run with data for the first sentences.

Sample data:

(R\$) - Jana, Rhys, Thom, Jane, Jack Scott.
(Z\$) - Threw, Found, Passed, Pushed, Helped, Sat on.
(S\$) - Fat, Big, Cold, Sick, Smug, Huge.
(O\$) - Hog, Pig, Cow, Cat, Rat, Dog.

Words of nearly the same length must be used so that spaces between the words are few. The program displays the sentence, and the last letter pushed appears in inverse. ☐

```

1000 DIM R$(6,4)
1100 DIM Z$(6,6)
1200 DIM S$(6,4)
1300 DIM O$(6,3)
1400 FOR I=1 TO 6
1500 INPUT R$(I)
1600 INPUT Z$(I)
1700 INPUT S$(I)
1800 INPUT O$(I)
1900 NEXT I

```

```

1 REM "TYPING TUTOR"
2 LET R=INT (RND*6)+1
3 LET Z=INT (RND*6)+1
4 LET S=INT (RND*6)+1
5 LET O=INT (RND*6)+1
10 LET M$=R$(R)+" "+Z$(Z)+" TH
E "+S$(S)+" "+O$(O)
15 PRINT AT 0,1;M$
20 FOR I=1 TO LEN M$
21 IF INKEY$="" THEN GOTO 21
22 LET A$=INKEY$
23 IF A$=CHR$ 116 THEN LET A$=
24 LET U=I
25 IF A$<>M$(I TO I) THEN GOTO
21
26 IF I=1 THEN GOTO 111
27 IF U=1 THEN LET U=2
28 PRINT AT 0,U-1;M$(U-1 TO U-
1)
30 PRINT AT 0,I;CHR$ (CODE M$(
I TO I)+128)
40 NEXT I
50 LET T=INT (65535-PEEK 16436
-256*PEEK 16437)/50
55 PRINT AT 1,0;"SCORE="
60 PRINT AT 1,0;"SCORE=";T
100 GOTO 1
111 POKE 16437,255
112 POKE 16436,255
113 GOTO 27
150 SAVE "TYPING TUTOR"
160 GOTO 1

```

```

170 PRINT "INPUT VALUES IN OHMS"
190 LET R=0
200 DIM V(1)
230 FOR J=1 TO N
240 F.I.T "R";J;" ? ";
250 INPUT V(J)
260 PRINT V(J)
270 LET R=R+V(J)
280 NEXT J
290 PRINT
300 PRINT "R = ";R;" OHMS"
310 PRINT AT 20,0;"HIT NEWLINE
FOR NEXT CALCULATION"
320 INPUT Z$
330 CLS
340 GOTO 10
400 CLS
410 PRINT "HOW MANY RESISTORS
ARE"
420 PRINT "IN PARALLEL
TOGETHER ? ";
430 INPUT I
440 PRINT N
450 PRINT
460 LET RR=0
470 DIM A(N)
480 PRINT "INPUT EACH RESIST
ANCE IN OHMS"
490 FOR K= 1 TO N
510 PRINT "R";K;" ? ";
520 INPUT A(K)
530 PRINT A(K)
540 LET RR=RR+(1/A(K))
550 NEXT K
560 PRINT
570 PRINT "R = ";1/RR;" ((1/Rr)
+.);" OHMS"
580 GOTO 310

```

Australia

By K.E. Johnstone

AS A TEACHER using a Sinclair ZX81 in primary grades, I've found that most programs seem to be aimed at mathematics or spelling. However, here's a truly Aussie program which has proved popular with children.

A map of Australia is printed and the user is asked to name each state. When all the states are named correctly, the name is done for the capital cities.

The program is entered in two parts — the first part sets up the map:

```

5 REM "AUSTRALIA"
10 DIM A$(132,2)
20 PRINT 1
30 FOR N=1 TO 132
40 INPUT A$(N)
50 CLS
60 PRINT N; AT 0,4;A$(N); AT 2,0;N+1
70 NEXT N
80 CLS

```

At this stage, the program should be RUN and the 132 pairs of co-ordinates entered as follows:

```

PV MU NT NS OR PR PQ PP QQ ON RM SL TK UJ VI VH WG XF XE XO
XC Y8 XA Y9 W8 V7 V6 U5 U4 U3 T2 S2 R2 Q1 P2 D1 N1 M2 L2 K3
K4 J5 J6 I7 H6 H5 G5 G6 F7 E7 D7 C8 B8 A7 96 B6 76 65 54 43
33 22 12 01 .1 .2 .3 .4 .5 .6 .7 .8 .9 -A *8 -C -D -E -F *G
/H .1 .1 .J .OJ .OK .1L .1M .1N .2M .3M .3O .3P .4Q .5R .6Q .7P .8Q .8R .9S
9T .AT .BU .ET .DT .CT .FU .GY .GT .FS .FR .GP .HP .10 .30 .K0 .LP .LQ .LR
LS .LT .R, R1 R/ 0* P* 0/ 0; 0, P; 0;

```

Lines 10 to 80 may now be deleted. Remember that the map co-ordinates are now stored as A\$ so don't use RUN.

```

160 LET Z=Z+100
165 PAUSE 300
170 CLS
175 IF Z=700 THEN GOTO 90
180 PRINT TAB 3;"NAME THE CAPITAL."
190 GOTO 105
200 FOR N=1 TO 132
210 PLOT CODE A$(N,1)-19, CODE A$(N,2)-19
220 NEXT N
250 FOR N=17 TO 39 STEP 2
260 PLOT 19,N
270 NEXT N
280 FOR N=19 TO 31 STEP 2
290 PLOT N,25
300 NEXT N
310 FOR N=25 TO 13 STEP -2
320 PLOT 31,N
330 NEXT N
340 FOR N=32 TO 40 STEP 2
350 PLOT N,22
360 NEXT N
370 PLOT 41,21
371 PLOT 42,22
380 PLOT 32,16
381 PLOT 34,15
383 PLOT 36,15
384 PLOT 38,14
390 FOR N=25 TO 33 STEP 2
400 PLOT 29,N
410 NEXT N
420 PRINT AT 13,18;" "
430 RETURN
440 REM 13, 18 = AUSTRALIAN CAPITAL TERRITORY BUT NAME TOO LONG
FOR SCREEN
510 LET D$="QUEENSLAND"
515 GOTO 1000
520 LET D$="NEW SOUTH WALES"
525 GOTO 1000
530 LET D$="VICTORIA"
535 GOTO 1000
540 LET D$="TASMANIA"
545 GOTO 1000
550 LET D$="NORTHERN TERRITORY"
555 GOTO 1000
560 LET D$="SOUTH AUSTRALIA"
565 GOTO 1000
570 LET D$="WESTERN AUSTRALIA"
575 GOTO 1000
610 LET D$="ALBANY"
615 GOTO 1000
620 LET D$="MURISCAINE"
625 GOTO 1000
630 LET D$="SYDNEY"
635 GOTO 1000
640 LET D$="MELBOURNE"
645 GOTO 1000
650 LET D$="HOBART"
655 GOTO 1000
660 LET D$="ADELAIDE"
665 GOTO 1000
670 LET D$="PERTH"
1000 FOR M=3 TO LEN D$
1010 IF D$(M)="" THEN PRINT AT CODE D$(1),CODE D$(2)+M-3;"?";
1020 IF D$(M)="" THEN PRINT " "
1030 NEXT M
1100 INPUT E$
1110 IF C$=D$(3 TO) THEN GOTO 1200
1120 PRINT AT CODE D$(1),CODE D$(2);E$
1130 LET Q(N)=1
1140 GOTO 150
1200 PRINT AT 21,0;"WRONG"
1205 REM. PAUSE MAY BE USED FOR SLOWER READERS
1210 FOR N=3 TO LEN D$
1220 PRINT AT CODE D$(1),CODE D$(2)+N-3;CHR$(CODE D$(N)+128)
1230 NEXT N
1240 PRINT AT 21,0;"

```

```

1250 LET F=1
2000 GOTO 150
9990 SAVE "AUSTRALIA"
9999 GOTO 90
Note line 620 - D$(1) is Graphics A.

```

Chaser

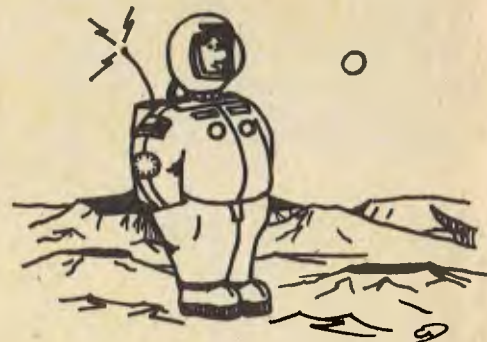
By N. Weaver

TRYING TO avoid being eaten by a monster is the aim of Chaser. When running the program, GET READY will appear, followed by a pause. Three dots will then appear on the screen, one with an H which is home, one on the left which is the monster, and the remaining dot on the right — you. The main part of the program is in lines 31 to 51.

```

1. PRINT "GET READY" (INVERSE)
3. LET Z = 1
5. LET A = INT (RND * 200)
7. LET C = INT (RND * 64)
9. PAUSE A
11. LET B = INT (RND * 44)
13. CLS
15. LET X = 63
17. LET Y = 30
19. LET L = 0
21. LET M = 30
23. PLOT X,Y
25. PLOT L,M
27. IF X = L AND Y = M THEN GOTO 57
29. PLOT C,B
30. PRINT "H"
31. IF INKEY$="H" THEN LET X = X + Z
33. IF INKEY$="C" THEN LET X = X - Z
35. IF INKEY$="Y" THEN LET Y = Y + Z
37. IF INKEY$="B" THEN LET Y = Y - Z
39. IF X = C AND Y = B THEN GOTO 65
41. IF INKEY$="S" THEN LET Z = 2
43. IF INKEY$="Q" THEN LET Z = 1
45. IF L < X THEN LET L = L + 1
47. IF L > X THEN LET L = L - 1
49. IF M < Y THEN LET M = M + 1
51. IF M > Y THEN LET M = M - 1
53. CLS
55. GOTO 15
57. CLS
59. PRINT "YOU'RE DEAD"
61. GOTO 69
63. STOP
65. CLS
67. PRINT "YOU WIN"
69. RUN

```



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Zuper BASIC!



In the search for ever-better versions of BASIC, Les Bell has discovered a new compiler that offers a number of interesting features. Here's his report...

AS MANY readers will know, BASIC is not by any means my favourite computer language. However, it has made a lot of things possible for a lot of people that could not otherwise have been done, and others have done a lot of things that would otherwise have been easier, despite the language.

Nonetheless, several versions of BASIC on personal computers are really quite powerful general-purpose languages, particularly such packages as Microsoft's disk-extended BASIC. The CP/M world has always missed out on such niceties as screen-addressing, however, largely because so-called CP/M compatibility says nothing about cursor control codes and partly because Microsoft has been busy selling versions of its language to OEMs.

But there's a new BASIC in town. It will never supplant MBASIC, because of that language's virtual monopoly, but it is well worth a look because of some of its advanced features. Despite its name, BASIC/Z is a BASIC compiler for 8080, 8085 and Z-80 microprocessors operating under the CP/M-2.2 operating system.

Unlike most compilers, however, BASIC/Z is a complete program development system, including a text editor which checks statement syntax at entry time, as well as performing tokenisation, thus making life easier for the compiler. Though BASIC/Z source code files (.BZS) contain tokens, the editor can read in ASCII files, performing a simultaneous syntax check and turning any lines with errors into remarks, which can then be located and fixed.

Once a program has been entered, it is saved on disk and then compiled. The result is a file of type .BZO (BASIC/Z Object) which contains object code for the 8080 microprocessor. However, rather than generating a .COM file, the system utilises a run-time module, RUN/Z.COM, which contains all the required functions, such as floating point, file I/O and so on, and which is loaded at the same time as the compiled program.

BASIC/Z is, to some extent, compatible with ANSI standard BASIC, but it diverges from other BASICs from that point on. Some functions are differently named; for example, what I expected to be CHR\$ was in fact CHAR\$.

The language is rather richer than other BASICs in variable types. As well as conventional floating-point variables which can vary in precision (up to 11 bytes each), the language supports BCD integers (three to 10 bytes). There are also control variables (one byte each) and controlled variables (two

bytes each). In addition, strings can be up to 250 bytes in length.

The control structures in BASIC/Z are also rich — there's FOR...NEXT, of course, but also WHILE...WEND and DO UNTIL. A very useful little trick is the ability to set an alphanumeric label to a line number, so that GOTOs, GOSUBs and IFs can be targeted to labels which mean something. Multi-line user-definable functions can give the illusion of ALGOL-style programming.

Like the C programming language, BASIC/Z recognises that when we frequently write $X = X + 1$ we are simply incrementing a loop control variable, and so it provides DECR and INCR statements, rather like C's $i++$ or $i--$. Like C, BASIC/Z can also be passed an argument from the command line which invokes the program.

Memory is dynamically allocated, and two-dimension statements are provided — one which is static, the other (DDIM) for dynamic allocation on the fly, and which generates code. Arrays that have been DDIMed can be reclaimed with the ERASE statement.

Console I/O is redirectable to the printer, to both console and printer, or can be spooled to a disk file. It is in the area of console I/O that BASIC/Z excels. The program is installed by a special .BZO program which patches in the values of several terminal escape sequences for cursor positioning, inverse video, flashing and so on. All these func-

tions are then accessible from within BASIC/Z programs.

For example, the statements:

```
340 RVIDEO
350 PRINT TAB(30,22);"Warning -
stock low"
360 NVIDEO
```

will print a warning near the bottom of the screen in reverse video. Note the form of the TAB function which accepts two parameters and acts like the UCSD Pascal function Gotoxy(x,y).

As well as the usual I/O facilities, the language also has facilities for reading a single character from the console (if one is available) or a sequence of characters, plus case conversion, which can be needlessly messy in other BASICs.

In addition, the BASIC/Z runtime package contains PL/I-like pseudo-variables which return the cursor and print-head positions. Also taken from PL/I is the VERIFY function which checks that all characters in one string are in another, and the FMT function, which uses format strings to perform the better-known PRINT USING.

A dBase-like feature is the EDIT\$ function. This allows the programmer to display a particular string value on the screen as part of a form which the user can edit. For example,

```
670 NAME$ = EDIT$(NAME$,25)]
```

will display NAME\$ in a field 25 characters wide, right-padded with dots, and allow the user to edit this value. Similar editing functions on input are provided by the INPUT\$ function.

For those who agonise over the efficiency of their sort routines, the BASIC/Z SORT statement will be good news. This single statement will sort an array into either ascending or descending sequence, with optional forcing of lower to upper case.

For large systems, multiple programs can be chained, with an area for COMMON variables. In addition, BASIC/Z programs can chain to ordinary CP/M .COM files.

It is in the area of file I/O that the biggest differences emerge. Sequential I/O is similar to CBASIC's style, with the ability to switch from sequential reading to writing (though not back again). The PUTSEQ and GETSEQ statements act rather like MBASIC's PRINT and INPUT statements.

If a file is opened with the RECLN option specified, it is handled as a random access file, with a fixed record length. BASIC/Z random files are rather unusual, as the first 128 bytes of each file consists of a header containing system information used by the runtime module transparently to the programmer.

An entire array can be read or written in one statement, and the file can be logically shortened with the EOF function. However, this file type is not compatible with other languages. For this reason, BASIC/Z provides the UNFMT random file type. In this case, the first record of the file does not contain a header, and record length must be 128 bytes.

Extensive options are provided for error trapping and exception processing. The file create statement, for example, can specify target line numbers (or labels) for end-of-file and error handling.

In order to minimise the possibility of an operator messing up a file or program, BASIC/Z does not respond to the Control-C character. However, a debug mode is available which allows the programmer to single-step through a program or trace operation. DEBUG statements inserted in a program control the debug options, such as insertion of line numbers in the object code, or single-step operation with automatic display of variable values.

Other unique functions allow a BASIC/Z program to set files to SYS or R/O under CP/M, to convert variables to hex or octal, to input and output bytes through ports, peek and poke memory, set printer page size parameters and so on.

There seems to be very little that this language can't do!

BASIC/Z In Use

Benchmark tests seem to indicate that BASIC/Z is about comparable in performance to Microsoft BASIC. Though it could attain an improvement through being compiled, the slowness of its BCD floating point tends to slow it down

again, so the two come out roughly equal.

There's no doubt, however, that program development can be considerably quicker in the initial stages. The full editor in BASIC/Z is very convenient to use, particularly for global search and replaces, and the syntax check on input speeds things up considerably.

Once a program has been entered, though, things slow down a little, as repeated compilations are necessary to debug the logical errors in the program. But then again, the structured nature of the language should eliminate a lot of logical errors.

Without having seen any large example programs it's hard to be sure, but well-written BASIC/Z programs would probably be reminiscent of Pascal, and should exhibit the same maintainability and ease of debugging.

BASIC/Z has the definite style of one man who knows what he wants to put into this version of BASIC and who doesn't want to completely overload the language to get it. It has unity of design that makes it fairly easy to cope with its extended statement set.

BASIC/Z would be a good choice for general-purpose application programming in an organisation which has a range of CP/M-based systems, since it provides hardware-independent code which has full cursor addressing and other nice hardware features.

It also should produce good clean code, with reasonable performance and without any of the dirty tricks which are necessary to write high-performance code in lesser BASICs.

Our copy of BASIC/Z was supplied by Software Source, PO Box 364, Edgcliff, 2027. □



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Forget The Crosswords, Buy A Computer

By Cosmos Miro

I'VE KNOWN Mary for 10 years now. Fine woman, Mary. I married her daughter – a fine woman from a fine woman. Anyway, Mary is a compulsive crossword-puzzle solver. It's a case of up in the morning, "Where's my coffee? Let me at the crossword." Mary loves crosswords. She also loves mathematics. She coaches schoolchildren, she tutors university students and she recently completed her own MA (in mathematics, of course) just for fun.

Now, to get on with my discourse, the only other compulsive crossword-puzzle solver I know is Fred. Fred went to London some 20 years ago and took up computer programming. He then came back to Australia and set up a bureau.

I always thought that a bureau was a combination of a writing table and a chest of drawers and I thought Fred must have gone into the furniture business and, therefore, programming must be something like French polishing.

I carried around my delusion with me until I met Fred one day on the street. I asked, "How's the furniture business, Fred?" He looked a bit puzzled and during the subsequent talk it turned out that bureau can also be an office for collecting and supplying information, and that Fred had purchased a computer and was using it in his bureau.

This event took place about 15 years ago. In those days, a man with his own computer plus a bureau to keep it in was worth some respect – at least by the likes of me. I mean to say, no one laughed behind his hands when Fred was about. Well, not much, anyway.

The irony of it was that Fred subsequently sold the bureau and the computer and went into the scrubbed-furniture trade, and then to Canberra, to have a crack at ruling us. It's a case of out of the bureau and into the bureaucracy – actually, Fred hopes to be PM one day...

Be that as it may, the point of my plot is that if the computer programming was a good thing for Fred, it might be the very thing to keep Mary entertained. Fred seems to have done all right out of it, and if the test for success in computer programming is fanaticism for solving crossword puzzles, then Mary is

every bit as well-qualified as Fred. In short, her success is assured.

I admit this isn't the greatest line of argument in the world but, nevertheless, I thought I'd try out the idea on Mary – besides, I have a secret desire to have a go at the old computer myself.

So, as I said, I put the idea to Mary: "Mary," I said, "Mary, instead of wasting your time on those time-wasting crosswords, you could waste your time on one of those time-wasting personal computers." Before Mary could reply, I followed up with my best point: "Besides," I said, "you could have a crack at writing instructional mathematical software for those children you're constantly instructing." To give Mary credit, she didn't immediately run at the idea like the cat runs at the fridge's door each time we cross the room. No, she sort of paused before she ran at the idea like the cat runs at the fridge's door.

With Mary sold on the idea, we had to think about the captain. He was sort of forced out of his business. Let me explain it this way: first, they showed him the possibility of the golden handshake, then they pulled up one trouser leg and showed him a boot and asked him to choose...

The captain has just built himself an office at home and, now that the plug has been pulled on the typing pool, he could do with a little typing help. We put

it to him that a personal computer with a word-processor would do him some good.

We said we'd spring for the price of the computer and software but – ho-hum – would he spring for the price of a letter-quality printer instead of buying a new typewriter?

The captain pretends to mistrust these new things, especially if he can't think of how he can't put it on the boat. It's a ploy for time but when we finish our investigation as to the best personal computer for us, we'll take the captain into town and show him the thing typing – we expect his natural desire to have the best, together with his natural interest in machines, will prevail and he'll buy us a decent printer.

So you can see how things are shaping up. Mary and I are going to investigate the world of personal computers. We're going to pretend to be objective while we search for the best. I expect we'll constantly re-define that word "best" to suit our desires.

The possibilities for puns in this investigation are endless – will our search be fruitful? We will go forth into the future – only a clone would take an IBM. It's dreadful, isn't it?

However, you have to do your best at this kind of thing, so we'll do our best to describe our search and our little adventures at the computer shops.

I'll let you know how we go. ☐



*Mary, Mary, quite contrary, how does your garden grow?
With charging cats and hopeless Caps and Fred and Cosmos Miro...*

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Yesterday I Couldn't Spell Computer Operator — Now I Are One...

By Lindsay Shapero

COMPUTER courses, it seems, aren't restricted to classes in a college environment. In Sydney, where we based this survey of educational courses, the computer-hungry student can choose between "conventional" classroom lessons at such establishments as the Metropolitan Computer College, the Department of Technical and Further Education (TAFE) and the Sydney Centre of Learning for Adults (SCOLA), or he/she can learn about kilobytes and the like whilst on holiday, as an alternative to sunburn or rainy days.

And if those two options don't appeal, there's always the corporation-backed courses offered by the leading computer companies...

Wang, Bang, Thank You...

Wang Computer provides classroom facilities with word-processing systems, instructors and learning materials at its North Sydney Educational Centre in Berry Street, to train the eager public as professional word-processing operators.

The courses, held two nights a week over a four-week period, cost \$350. For further details, phone (02) 436-3477 Sydney.

An Apple For Teacher...

Electronic Concepts, sole Apple distributor before Apple Australia was formed, has full classroom facilities at 55 Wentworth Avenue, Surry Hills. The classroom contains 13 Apple IIs with disk drives, including one for the instructor. Some software is provided in classroom sets, while other software is available on request. Bookings may be made to attend the courses run in the classroom, or the classroom can be hired for all or part of a day or evening.

A range of day and night classes is offered throughout the year. For the first half of 1983, the courses have included an introduction to both the Apple II and III, covering a variety of applications, such as word-processing, BASIC programming, Logo, business software and educational uses.

Other courses include a 15-hour word-processing session, and two 12-hour courses in BASIC programming. For teachers, a course on the use of the computer in the school, including Logo,

the programming language that was developed to allow students to program graphically. Fees vary from \$15 to \$150.

The cost to rent the classroom is \$200 for a day or \$110 for a half-day or evening. An instructor can be supplied, to give advice or conduct the seminar. Class sizes are limited to 24.

The classroom is also available for rental by schools as an educational excursion, at \$50 for a half day. For any further details, phone (02) 212-2833 Sydney.

The One-Stop Computer Shop...

The Computer Shop offers a whole range of courses on the Apple II and the IBM-PC. All equipment such as printers, projectors, software and languages (including Logo and Pilot) are provided, as well as computer books and audio/visual training packages on computer literacy.

The courses available are: Introducing the Personal Computer, Introduction to the Personal Computer and its Applications, Word-Processing, Information Management System, Data-Base Management, VisiCalc and Multiplan, Instructional Software Development for Teachers and Trainers to Develop CAI, Introduction to Programming BASIC (1 and 2), Advanced BASIC Programming, Learning Logo on the Apple II, and An Introduction to Programming in Pascal.

The fee for a 10-hour course, held over four sessions lasting two and a half hours each, is either \$78 (using the Apple IIe) or \$98 (using the IBM-PC).

Room and equipment rental, including 12 IBM-PCs, is available at \$200 per day, or \$120 per half day. An instructor can be supplied on request. For further information, phone (02) 517-2999 Sydney.

Meanwhile, Down On The Farm...

Students of high-school age can go on a camping adventure in New South Wales and, at the same time, learn about microcomputers.

Using the latest in advanced technology, students who stay at the Canyonleigh farm gain hands-on experience in the use of microcomputers, from BASIC to advanced applications.

Six OKI computer stations are available for individual practice and instruc-

tion. The facilities are supplemented by film lectures and demonstrations.

Weekday courses for school groups or weekend courses for individuals can be booked by phoning the organiser, John Molloy, on (048) 78-9132 Goulburn.

Sun And Fun Computers...

Club Mediterranée, the world's largest resort organisation, now has the added facilities of Atari computer workshops at its New Caledonia and Malaysia resorts.

The object of the workshops is to introduce club members to the uses and enjoyment of personal computers, as an alternative to the greatly publicised outdoor activities. The workshops have been arranged into educational, entertainment and business sections, including family budgeting, and foreign and computer languages.

The systems used are the Atari 400s and 800s, with full peripherals. There is also a wide range of software. For further information, phone Kate Buckley on (03) 579-2011 Melbourne.

The Computerised College...

Sydney's Metropolitan Computer College, an offshoot of the Metropolitan Business College, is currently offering three courses.

The commercial data-processing diploma course costs \$4850 and is a full-time course lasting six months, with enrolment the last week in June.

The office technology diploma course is a nine-month course, also costing \$4850. However, enrolment closed in April.

The programming certificate course is an eight-week course, and can either include an introduction to data processing, or concentrate on a specific language. It begins on the first day of each month, and costs \$1320 with the introduction to processing, or \$1095 without.

A higher-school certificate (HSC) is required in order to qualify for the courses, as well as the passing of an aptitude test. For older students, only the aptitude test is necessary. Phone (02) 232-7666 Sydney for details.

An All-Round Sydney Education...

The Department of Technical and

Further Education (TAFE) offers a whole range of full-time and part-time courses in Sydney. These include data-processing certificate, data-processing concepts, computer programming in BASIC/Cobol/Fortran/RPG II, business computer systems, use and management of microcomputers, practical programming for beginners, and computing techniques.

The location of these courses is in colleges all over the Sydney metropolitan area. In many cases, some knowledge of computers is required beforehand, plus HSC passes in relevant subjects.

For further details, phone (02) 212-4400 Sydney.

For Adults Only...

The recently established Sydney Centre of Learning for Adults (SCOLA) is offering five of its own courses, plus one in conjunction with the University of New South Wales.

Courses run by SCOLA include an introduction to microcomputers (\$70), BASIC language for microcomputers (\$95), practical introduction to microcomputers (\$85), assembly language programming for the 6502 (\$70), and microcomputers in business (\$70). All courses run for 10 weeks; the next term starts in June.

The introduction to microcomputer hardware and operation is run at the University of New South Wales. This course lasts for nine weeks, with three hours of tuition per week, at a cost of \$350. An ability to write programs in

AppleSoft and some general technical knowledge is necessary; however, no prior knowledge of digital electronics is required.

Phone Bob Daglish on (02) 662-3371 Sydney for further information. ☐



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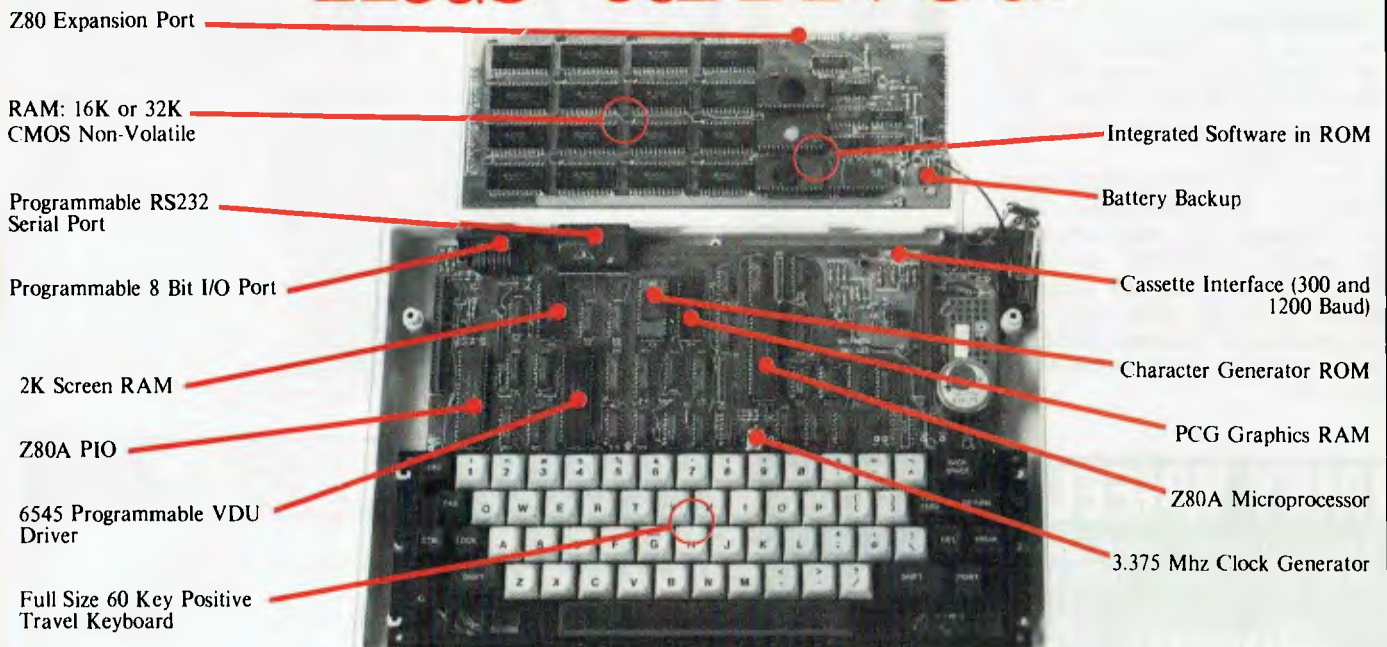
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Digitek's Apple Printmaster

By Jim Rennie

Digitek's peripheral cards for the Apple are really starting to make their presence felt. One of the more popular cards from this new range is the Printmaster, which provides a parallel interface, with graphics, for machines like the Epson MX-80/100.

WELL, WHAT can you say about a printer interface card? It works, it's easy to install, I like the colour...

I should have been flattered to be asked to review hardware for the Apple II, as I'm only a relative novice in the computer world. And I was flattered at the start... However, from the moment the package of two Digitek cards arrived at home, my feelings of inadequacy and ignorance grew.

Of the two cards, I already had the parallel card installed in my computer, driving a C.I.TOH 8510 dot-matrix printer, but the other card, an RS 232 high-speed serial interface card, was totally unknown. I'll deal with it at a later date, when I've worked it out.

The parallel card is the Centronics-type Digitek Printmaster parallel-printer interface, purchased in July last year along with the C.I.TOH printer. Since installation, the card has performed flawlessly. It sits there in slot one of my Apple, and waits until I type PR1, which links the printer into the input/output line of the computer.

From there on, a further series of commands is possible, controlling the margins, page length and other functions. If you don't want anything special - for example, simply a quick copy of a short program - then type LIST, and the default settings will cause the printer to operate.

An excellent feature of the Digitek Printmaster interface is the response when you forget to turn the printer on: it displays a flashing message on the Apple screen, reminding you to turn on the printer first, then press RETURN.

The interface accepts two sets of commands for the printer - text commands, controlling the printing of program listings and text files, and graphics commands, controlling which graphics page to print and the sizes and rotation of the image. All commands to the interface are preceded by CONTROL-I in BASIC, and CONTROL-Y in Pascal. This command code can be changed to suit your own requirements.

If you don't own a word-processor program, or you have one with primitive printer-control devices, then the text control codes for this interface give many of the commands you need for controlling the print-out of text. The ability to control line length of text means that printed listings of BASIC programs can use the full-page width, hence less paper used for a given print-out.

If you have a need to dump graphics pages to a printer, the commands avail-

able allow you to select page one or two, double the size of the print-out, invert the image, and to rotate the image 90 degrees. When developing a program using graphics, this set of commands provides full control of the print-out, giving a more permanent record of exactly what was on the screen when the program crashed.

So much for the glowing praise, what about the bad points? The only problem I have encountered in more than six month's use is that the printer card causes some noise, which appears on the HIRES screen whenever the system is awaiting some user input (from a GET or INPUT statement). It's not very bad, just mildly annoying. I have tried several cards, even disconnecting the printer, but the random pattern of dots keeps appearing.

I believe the Digitek Printmaster parallel-printer interface is a well-designed, functional and useful card. If you're about to buy a printer, or your present interface card can't do the things mentioned in this review, I strongly urge you to look at the Digitek card as an excellent investment to drive your printer. □

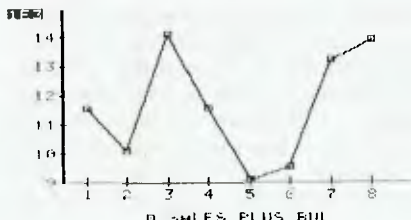
DIGITEK PARALLEL INTERFACE COMMANDS

Text Commands

PR#n	Enable the card in slot "n"
PR#0	Disable the printer card
CTRL I A	AUTO LINE FEED ON
CTRL I K	AUTO LINE FEED OFF
CTRL I H	Enable block graphics mode
CTRL I X	Return to standard text mode
CTRL I nN	Set line length to "n" characters
CTRL I I	Sends characters to screen and printer
CTRL I nL	Sets left margin to "n" column
CTRL I nR	Sets right margin
CTRL I nP	Sets page length to "n" lines
CTRL I B	Turns on the printer bell
CTRL I S	Prints 20 columns in from left edge
CTRL I CTRL Y	Changes control character to CTRL Y

Graphics Commands

CTRL I G	Used for all graphics commands
CTRL I G	Dump HIRES page 1 to printer
CTRL I G 2	Dump HIRES page 2 to printer
CTRL I G D	Print graphics double size
CTRL I G E	Print using denser image (EPSON only)
CTRL I G I	Invert the image before printing
CTRL I G L	Start printing at the left margin
CTRL I G R	Rotate the image 90 degrees



BASIC Statistical Analysis

Part 1: Variances On A Theme

By John L. Plummer

THE USE of computers has revolutionised statistical analysis of data. Even with a pocket calculator, analysis of a large amount of data (say, more than 100 items) often takes several hours. The work involved usually discourages a very thorough exploration of the data and, hence, conclusions reached may be inaccurate.

The programs to be given in this series of articles not only enable analysis of variance of a large quantity of data in a short time, but allow the investigator to check whether certain assumptions underlying the analysis are satisfied and, in some cases, to rectify departure from these assumptions.

The programs are written for the ZX81 with 16 kilobytes of RAM, but could be modified to suit other microcomputers.

One-Way Variance Analysis

This program determines whether a number of samples could reasonably have come from populations having the same mean. If sample sizes are unequal, the analysis may be carried out using the method of either unweighted or weighted means.

The method of unweighted means is appropriate where it is reasonable to assume that certain populations are of equal size, and unequal sample sizes have arisen by chance. This is usually the case if the data has come from a planned experiment – for example, in an experiment to determine the effect of four different diets on pigs. The method of weighted means is appropriate where

unequal sample sizes are due to unequal population sizes – for example, in groups of different ethnic origin in a random sample of the inhabitants of a large city.

The program asks for the number of groups (M, which is greater than or equal to 2), the number of items in the largest group (NMAX=N) and then the individual items, one group at a time. If a group has fewer than NMAX items, then enter PI after the last item. After all data is entered, the operator is asked whether unweighted means analysis is required. If 1 is entered, this method will be used; entry of any other number will lead to weighted means analysis. If all groups are of equal size, both methods give the same result.

The data is displayed on the screen and an F ratio, with its associated degrees of freedom, is given. The probability of obtaining a value of F equal to or greater than the calculated F, if all population means were equal, can be obtained from tables or from an appropriate program. A suitable program will be presented in a future article.

Example: A pig farmer wishes to determine whether any of three diets (A, B, and C) results in superior weight gain. If there are significant differences among the diets at the five percent probability level, he will in future feed the best diet to all his pigs.

Six animals were fed each diet for two weeks, and their weight gains measured. However, two animals receiving Diet C were run over by a truck and lost

from the experiment. (Because the analysis ignores missing items, it is essential that their loss is unrelated to the treatment being given; for example, if the two pigs had died as a result of nutritional deficiency, their loss should have influenced conclusions regarding the diets.)

Weight gains (kg) of the animals were:

Diet A	Diet B	Diet C
6.0	6.3	4.8
6.3	6.6	5.1
3.3	4.2	3.9
4.5	4.8	4.2
5.1	7.2	4.8
7.5		

The populations of interest are all of the farmer's pigs which might receive the diets. Because these populations are equal in size, the method of unweighted means may be used.

Result: $F = 2.8825$ (2, 13 DF)
 $p = 0.0896^*$

Conclusion: There is no evidence (at the five percent significance level) of any differences in weight gain among pigs fed the three diets.

Two-Way Analysis of Variance

The program carries out analysis of variance where two known factors affect the outcome of each observation. The F ratio calculations assume that both factors are fixed. If one or both factors are random, appropriate F ratios may be formed from the mean squares. If the numbers of items in each cell (a cell is where a row and a column intersect) are

not the same analysis of unweighted cell means is carried out.

Example: In the one-way analysis example, pigs of both sexes were included in the experiment. Wherever possible, factors which might influence the results of an experiment should be identified and considered in the analysis. The pig farmer feels that sex of the animals may influence weight gain, so a two-way analysis or variance is carried out to separate the effect of this factor.

Subdivision of the data according to diet and sex leads to a two-way table having three columns and two rows, with 2-4 items per cell.

	Diet A	Diet B	Diet C
Male	6.0	7.2	5.1
	6.3	7.5	4.8
	5.1	6.3	
Female		6.6	
	4.5	4.2	3.9
	3.3	4.8	4.2
	4.8		

If the populations which might receive the diets consist of equal numbers of male and female pigs, the method of unweighted cell means is appropriate.

Result: F columns (diets) = 5.620 (2, 10 df) $p=0.0222$. F rows (sexes) = 30.951 (1, 10 df) $p=0.0002$. F interaction = 2.179 (2, 10 df) $p=0.1604$

Conclusion: 1: Diet does have a significant effect on weight gain. Inspection of cell means suggests that Diet B is superior to the others. 2: Weight gains differ between the sexes. Inspection of the data reveals that males gain weight faster. 3: As the interaction is not significant, the optimal diet is probably the same for both sexes. □

One Way Analysis of Variance

```

5 REM "ONE WAY ANOVA"
10 PRINT "HOW MANY GROUPS?"
20 INPUT M
30 PRINT "MAX GROUP SIZE? (NMAX)"
40 INPUT N
50 DIM A (M,N)
60 PRINT "IF GROUP SIZE < NMAX THEN ENTER
   PI AFTER LAST ITEM"
70 FOR I = 1 TO M
80 PRINT "GROUP#"; I
90 FOR J = 1 TO N
100 PRINT "ITEM#"; J
110 INPUT A(I,J)
120 IF A(I,J) = PI THEN GOTO 140
130 NEXT J
140 NEXT I
150 LET Z = 0
160 LET GT = Z
170 LET UWT = Z
180 LET SQ = Z
190 LET MSQ = Z
200 LET RECIP = Z
210 LET GROUP = Z
220 PRINT "ENTER 1 IF UNWEIGHTED
   MEANS &&&&& ANALYSIS REQUIRED"
```

```

230 INPUT UW
240 CLS
250 FOR I = 1 TO M
260 PRINT "GROUP#"; I
270 LET Y = 0
280 LET T = 0
290 FOR J = 1 TO N
300 IF A(I,J) = PI THEN GOTO 380
310 PRINT A(I,J); " ";
320 LET Y = Y + 1
330 LET Z = Z + 1
340 LET GT = GT + A(I,J)
350 LET T = T + A(I,J)
360 LET SQ = SQ + A(I,J) * A(I,J)
370 NEXT J
380 PRINT
390 LET GROUP = GROUP + T * T/Y
400 LET RECIP = RECIP + 1/Y
410 LET UWT = UWT + T/Y
420 LET MSQ = MSQ + T/Y * T/Y
430 NEXT I
440 LET HARMEAN = M/RECIP
450 PRINT
460 LET CT = GT * GT/Z
470 LET SST = SQ - CT
480 LET SSG = GROUP - CT
490 LET UWSSG = HARMEAN * (MSQ - UWT * UWT/M)
500 LET SSE = SST - SSG
510 LET MSG = SSG/(M-1)
520 LET UWMSG = UWSSG/(M-1)
530 LET MSE = SSE/(Z-M)
540 IF UW = 1 THEN GOTO 580
550 LET F = MSG/MSE
560 PRINT "F ="; F; "Δ("; M-1; ", "; Z-M; "ΔDF)"
570 STOP
580 LET F = UWMSG/MSE
590 GOTO 560
```

Two Way Analysis of Variance

```

10 REM "TWO WAY ANOVA"
20 LET Z = 0
30 LET Y = 1
40 LET COLSQ = Z
50 LET ROWSQ = Z
60 LET AB = Z
70 LET CELLSQ = Z
80 LET ERRDF = Z
90 LET RECIP = Z
100 LET GT = Z
110 LET SQ = Z
120 PRINT "HOW MANY COLUMNS?"
130 INPUT C
140 PRINT "HOW MANY ROWS?"
150 INPUT R
160 DIM A(C,R)
170 FOR I = 1 TO C
180 LET COLSUM = Z
190 FOR J = 1 TO R
200 LET T = Z
210 PRINT "COLUMN#"; I; "ΔROW#"; J
220 PRINT "HOW MANY ITEMS?"
230 INPUT N
240 LET ERRDF = ERRDF + N - Y
250 LET RECIP = RECIP + Y/N
260 FOR K = 1 TO N
270 PRINT "ITEM#"; K
280 INPUT X
290 LET T = T + X
300 LET SQ = SQ + X * X
310 NEXT K
320 LET CELLSQ = CELLSQ + T * T/N
```

```

330 LET A(I,J) = T/N
340 LET GT = GT + A(I,J)
350 LET COLSUM = COLSUM + A(I,J)
360 NEXT J
370 LET COLSQ = COLSQ + COLSUM * COLSUM
380 NEXT I
390 CLS
400 LET AVCOL = COLSQ/R
410 LET CT = GT * GT/(R*C)
420 FOR J = 1 TO R
430 LET ROWSUM = Z
440 FOR I = 1 TO C
450 LET ROWSUM = ROWSUM + A(I,J)
460 LET AB = AB + A(I,J) * A(I,J)
470 NEXT I
480 LET ROWSQ = ROWSQ + ROWSUM * ROWSUM
490 NEXT J
500 LET AVROW = ROWSQ/C
510 LET HARMEAN = R * C/RECIP
520 LET SSCOL = HARMEAN * (AVCOL - CT)
530 LET SSROW = HARMEAN * (AVROW - CT)
540 LET SSAB = HARMEAN * (AB - AVCOL - AVROW + CT)
550 LET SSERR = SQ - CELLSQ
560 LET MSCOL = SSCOL/(C - Y)
570 LET MSROW = SSROW/(R - Y)
580 LET MSAB = SSAB/((C - Y) * (R - Y))
590 LET MSERR = SSERR/ERRDF
600 LET FCOL = MSCOL/MSERR
610 LET FROW = MSROW/MSERR
620 LET FAB = MSAB/MSERR
630 PRINT "COLUMN MS ="; MSCOL; ", F ="; FCOL;
   "Δ("; C-Y; ", "; ERRDF; "ΔDF)"
640 PRINT
650 PRINT "ROW MS ="; MSROW; ", F ="; FROW;
   "Δ("; R-Y; ", "; ERRDF; "ΔDF)"
660 PRINT
670 PRINT "INTERACTION MS ="; MSAB; ", F =";
   FAB; "Δ("; (R-Y) * (C-Y); ", "; ERRDF; "ΔDF)"
680 PRINT
690 PRINT "ERROR MS ="; MSERR; ", "; ERRDF; "ΔDF"
700 STOP
```

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Manual Labour

Eric Ulevik rips into the Going Ahead With Extended Colour BASIC manual, which he uses on his TRS80 Colour Computer. Fortunately, he not only shares his problems, but also gives instructions and explanations on how to rectify them.

ONE problem with Extended Colour BASIC (ECB) is that it won't let you do a PCLEAR 0, thereby reserving no pages for graphics. If you don't want to use graphics, you have to waste a whole page – 1536 bytes. Also, when you're typing in a long adventure program, it's extremely frustrating to be confronted by ?OM ERROR after you've worn your fingers to the bone.

So here is the code for a PCLEAR 0:

```
POKE 25,6 : POKE 26,1 : NEW
```

This works by setting a page zero pointer, which points to the start of your BASIC program; and then doing a NEW so as to make ECB recognise the new location. The start of the storage of your BASIC program in memory is given by

```
256*PEEK(25) + PEEK(26)
```

as this pointer is a two-digit hex number, stored with MSB (most significant byte) coming first.

If you do a POKE25,6:POKE26,1:NEW, the program you subsequently load must not contain any graphic commands. If it does, your program will end up looking like it's been through a mincer.

PUT-GET Arrays

The worst mistake in *Going Ahead With Colour BASIC* is in the section concerning PUT-GET arrays. This can lead to the dreaded ?OM ERROR, as well as leaving you unaware of all your options.

On page 69 of the manual, the section "Choosing the Right Array" is totally wrong. I discovered this when trying to write an animation program using PUT and GET.

After creating about half of the program, at RUN I was blankly confronted with ?OM ERROR. I then checked how much memory I had left for program and variables by

```
10 PCLEAR 4 'because using PMODE
4
```

80

```
20 DIM A(10,10,7) 'I needed 8 10 by 10
images
30 PRINT MEM
```

and ended up with

```
3605
OK
```

No wonder I got an ?OM ERROR!

In the manual, the PUT-GET array is stated to need one array value – one real – for each pixel (one bit in PMODE 4). A real is 5 bytes and, therefore, 40 bits ... so the storage of graphic images in arrays requires 40 times as much as it should! However, after I put a graphic image in an array, I soon discovered it consisted of mostly zeros! So, I tried a smaller array and, Tandy manual writer be reviled, it worked!

And Now, The Easy Way

When GETting an image, dimension your array as

```
(0,screen x.screen y.pages used)/160
```

The second value *must* be rounded up.

*Screen X = Width of the rectangle you wish to store (on a range from 0 to 255).

*Screen Y = Height of the image you wish to store (on 0 to 191).

*Pages used : See Table One.

The Not-So-Secret Formula

The requirements for array A(H,V) to GET(X,Y)-(X1,Y1),A, are

$$8*5*((H+1)*(V+1)) \geq (X1-X+1)*(Y1-Y+1)*\frac{\text{pages used}}{4}$$
$$((H+1)*(V+1)) \geq \frac{(X1-X+1)*(Y1-Y+1)*\text{pages used}}{160}$$

*H+1,V+1 are because of the zero dimensions, which we've got to worry about as we're concerned with memory usage. The right-side of the formula must be rounded up to the nearest whole number, as ECB will give an error message if the array is not big enough by even one bit.

How Big Can The Rectangle Be?

This section (on page 69 of the manual) is wrong because of the previous section ("Choosing The Right Array"). It states that a practical array limit is 7 kilobytes, which doesn't limit you to a 50 by 50 image, but allows you to cover all of any screen. Because of this, you needn't worry about this section of the manual.

PUTting Your Rectangles

The "Important Note" on page 68 doesn't tell the whole story. A graphics rectangle MAY be PUTted into another PMODE, but only if the correct height, width ratio and the exact same number of bits in the screen rectangle is maintained.

Thus, it's easy to GET in PMODE 3 and then PUT in PMODE 4 (or vice versa), and the same goes for PMODE 1 and 2. Array exchanging between other pairs of PMODEs can be impossible, and should really be left to masochists.

Racing Even Faster

The single most serious omission from the manual is how to almost double the speed of your BASIC (ECB and Colour) programs. This can be done by the command POKE65495,0, though this may not work on some older computers, and some not-so-old computers will not allow SOUND or PLAY to work. Please note this must not be used with cassette; normal speed must be restored by POKE65494,0.

For those of you who want to know the gory details, this works by writing to a port in high memory, which sets (\$FFD7 + 65495) and clears (\$FFD6 = 65494) a bit which defines the speed of the 6809 microprocessor. If the bit is set, the computer will run at 1.8 MHz when accessing memory from \$8000 to \$FEFF (that is, ROM), and at the normal speed of 895 kHz elsewhere. This must be done because RAM and peripherals may not work so fast. It is possible to make the 6809 microprocessor run at 1.8 MHz regardless by POKE 65497,0 (POKE 65496,0 to clear bit), but this is not much good to you as you lose your video sync, and your picture is messed up!

I hope I have provided some of you with some useful information. Don't worry if you didn't understand how some of these methods worked – you don't need to know this to use them. □

PMODE	pages used
Ø	1
1	2
2	2
3	4
4	4

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MLVL 173R

Make That Bee Buzz!

By Ash Nallawalla

IF YOU'RE thinking of buying a MicroBee for your own requirements, but need yet one more excuse to persuade your musically inclined spouse to loosen the purse strings, this article may do the trick. Or perhaps you own a MicroBee, but haven't progressed beyond the short examples listed in the manual. Although I can't hope to teach you how to program any tune in this article, I can certainly point you in the right direction.

The MicroBee is capable of producing 25 notes, starting at below middle C, and going up two octaves. Microworld BASIC uses numbers from 0 to 24 to represent these notes, with a rest denoted by 0 (see Figure 1). If you know nothing about music scores, you may have to seek help from someone who can read music.

Each note can be played for a duration between 1/8th of a second and 255/8 seconds (about 32 seconds). The BASIC command is `PLAY x,y`, where `x` is the note and `y` is the duration. For example, `100 PLAY 5,4` will produce a note of C// for 1/2 second. Using a number greater than 255 for the duration will still produce a duration of 255/8 seconds.

The MicroBee is monophonic: it can play only one note at a time — this is akin to playing an organ with one finger.

Guess This Tune

```
100 PLAY 11,2;11,2;11,2;11,2;9,4;9,4;7,2;9,2;11,2;7,2;
    4,2;6,2;7,4
200 PLAY 2,4;7,2;11,2;14,4;14,2;14,2;14,2;14,2;14,4;14,4
300 PLAY 7,2;9,2;11,4;11,2;11,2;9,4;9,4;7,2;9,2;11,2;
    7,2;4,2;6,2;7,4
400 PLAY 2,4;7,3;11,1;14,4;12,2;11,2;9,4;9,2;9,2;7,6
500 PLAY 14,4;14,3;14,1;14,4;11,4;19,4;19,3;19,1;18,4;
    16,4
600 PLAY 14,4;14,3;14,1;16,4;14,3;14,1;14,4;12,2;11,2;
    9,4
700 PLAY 7,2;9,2;11,4;11,2;11,2;9,4;9,4;7,2;9,2;11,2;
    7,2;4,2;6,2;7,4
800 PLAY 2,4;7,2;11,2;14,4;12,2;11,2;9,4;9,2;9,2;7,4
```

Okay, so now you have your first recognisable tune. Now, if you want to make a decent program out of this, you should `PRINT` the title and then the words per line before the corresponding `PLAY` line:

```
080 PRINT TAB(10)"*** S O N G   N A M E ***"
090 PRINT:PRINT:PRINT TAB(10)"Words for next line"
100 PLAY 11,2;11,2;etc
150 PRINT:PRINT TAB(10)"Words for next line"
160 PLAY 2,4;7,2;etc
```

You can program the rest of the song without much trouble, since the music is almost the same as the first verse, and you ought to know the words!

Other Uses of `PLAY` Command

You will find that a duration of 1/8th second need not be specified. For example, `PLAY 16;16;20;23;0;20;23,8` is the same as `PLAY 16,1,16,1;20,1;23,1;0,1;20,1;23,8`.

This example, by the way, is a little fanfare which would go well as a prompt.

You can introduce a delay in a program by the command: `PLAY 0,Y` where `Y` is a number between 1 and 255. The value 0 is equal to a rest (silence), and the duration will be a chosen value between 1/8th of a second and about 32 seconds.

Random Music

If you've never seen a program for playing notes at random, here's one guaranteed to very quickly drive you mad:

```
10 X=INT(RND*24+1)
20 Y=1
30 PLAY X,Y
40 GOTO 10
```

Line 20 can be deleted and line 30 changed to `PLAY X,1`. In fact, the program can be entered on one line, with a colon after each statement. For even quicker insanity, make line 20 read: `Y=INT(RND*255=1)`.

```
*** HAPPY BIRTHDAY ***
```

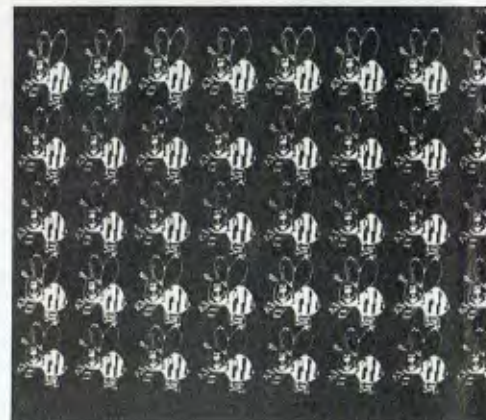
```
    Whose birthday is it ???
    (Enter name, and press the RETURN key.)
```

```
*** HAPPY BIRTHDAY ***
```

```
Happy Birthday to You
Happy Birthday to You
Happy Birthday dear
Happy Birthday to You
```

```
From Old Friends and New
From Good Friends and True
May Good Luck go with You
And Happiness Too
```

```
00100 REM Microworld Basic v5.01 program for the MicroBee
00110 REM by Lesley and Ash Nallawalla
00120 CLS:PRINT TAB(13)"*** HAPPY BIRTHDAY ***"
00130 PRINT TAB(20):PRINT TAB(20):PRINT TAB(20)"Whose birthday is it ????"
00140 PRINT TAB(13)"(Enter name, and press the RETURN key.)"
00150 INPUT N1$
00160 CLS:PRINT TAB(13)"*** HAPPY BIRTHDAY ***"
00170 PRINT:PRINT TAB(20)"Happy Birthday to You"
00180 PLAY 4,2;4,2;0,4;4,4;9,4;8,0
00190 PRINT TAB(20)"Happy Birthday to You"
00200 PLAY 4,2;4,2;0,4;4,4;11,4;9,6
00210 PRINT TAB(20)"Happy Birthday dear",N1$
00220 PLAY 4,2;4,2;16,4;13,4;9,4;8,4;6,4
00230 PRINT TAB(20)"Happy Birthday to You"
00240 PLAY 14,2;14,2;13,4;9,4;11,4;9,12
00250 PRINT:PRINT TAB(20)"From Old Friends and New"
00260 PLAY 4,4;6,5;4,5;9,5;8,6;0,1
00270 PRINT TAB(20)"From Good Friends and True"
00280 PLAY 4,4;6,5;4,5;11,5;9,6;4,1
00290 PRINT TAB(20)"May Good Luck go with You"
00300 PLAY 4,5;16,6;13,6;9,6;8,6;0,1
00310 PRINT TAB(20)"And Happiness Too"
00320 PLAY 14,6;13,6;9,6;11,6;0,1;9,12
00330 END
```



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- ☐ Programmable tone generator & speaker
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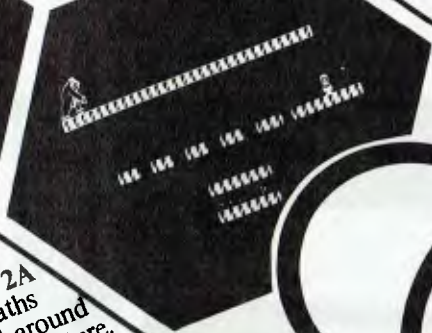
ROBOT MAN —
You must move about the maze eating up the power food. Watch out for the Robot Men as they are programmed to destroy you before you complete your mission!
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A menu driven collection of 6 BASIC programs featuring excellent use of PCG graphics.
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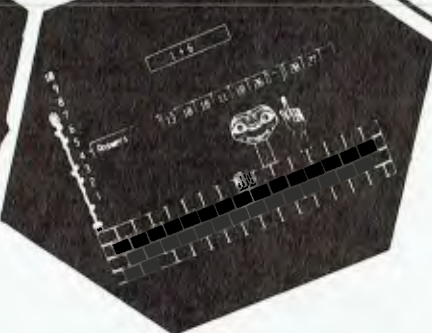


Love my
Microbee
Don't you



CHESS —
Match your skills against the MicroBee chess master. You can select from 1 to 6 ply and also analyse any position. A built-in 'Help' feature enables the computer to play your current move for you.
\$9.95

LEARNING CAN BE FUN — Volume 2A
A — C This is a maths revision program, based around a well known little Alien Creature. All questions, including the opening selection, are answered by moving the hand of the alien to point to the required answer. Correct answers score points and also cause a plant to grow on the screen.



Incredible software support.

The MicroBee is supported by a wide range of software running in colour and black and white. High resolution, low resolution graphics and text freely mixed.

MICROSPACE INVADERS — Yes the arcade favourite! This fast moving version was written especially for MicroBee by Tim Morris-Yates and has become one of the most popular programs yet released. **\$14.95**

MATHS ADVENTURE — Wander into the fascinating world of the Wizard of Aus. Test your mathematic skills and have fun at the same time. A highly recommended graphics adventure game. Fun for high school maths students and teachers. **\$14.95**

TURTLE GRAPHICS — A very clever program allows the student to use the MicroBee to draw using high resolution turtle graphics. A booklet of procedures is available from the N.S.W. Department of Education. This is a very powerful graphics program which uses the PCG facility of the Microbee to its full extent. **\$14.95**

WORK-A-BEE — A new release. Work-A-Bee is a program which can actually write educational programs almost automatically! Any teacher with little or almost no knowledge of BASIC can insert details as to question and answer, number of tries, marks per question and other controls. Any CAI program can be saved and reused and subroutines have been included to enable the student to go back over his work, printing answers, avoid error traps etc. **\$14.95**

CONCENTRATION — A real family favourite for 1 to 4 players to test your memory skills. If you call one player Merlin, the computer will play that turn so watch out! **\$9.95**

BUSY-CALC — Yes, an electronic spread sheet running under microworld BASIC. Accepts text and numbers with easy cursor

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PRINTER PACK — Biorhythm Calendar Maker, Banner Print Maze Maker. Ideal for parties or carnivals. Requires a serial printer. You can print biorhythms for anyone. Also prints calendars for any year A.D. and B.C. **\$9.95**

Z TREK — Captain! The warp drives are disabled, the Klingons are closing in on us, what will we do? In Z Trek you are the captain of the starship Enterprise, your five year mission to search out the Klingons and destroy them. There are ten levels of difficulty (0 - 9). Beware of this game — it is strangely addictive. **\$9.95**

SEARCH AND DESTROY WUMPUS — Have you ever played the game Wumpus? If you liked it then you'll like this! The object is the same as the earlier version except that it's a lot harder. To say any more would spoil the fun. Good Hunting! **\$14.95**

ESC KEY — This is a program for all of the two fingered typists in the world. The program allows you to enter BASIC key words in an abbreviated form. For instance, instead of typing 'list' the user would press the "ESC" key and then "l". The computer then types out the rest of the word for you. Suitable for 16K and 32K machines. Only. **\$14.95**

GRAPHIC GAMES PACK — This cassette contains five programs, 'Poker', 'Slots', 'Dodgem', 'Picture', 'Richochet'. 'Poker' is the main program on the cassette. In this game the computer is the bank and you have to beat it at Draw Poker. Warning — the computer plays a cunning game and is quite prepared to bluff! 'Slots' is a one armed bandit and for 20c a go you can try your luck. In 'Dodgem' the player must guide his car through a forest to the bottom of the screen — this game allows you to drive a car without the random breath tester getting you!! 'Picture' is an excellent game for the children. The final program on the cassette is 'Richochet', where the player has to decide where to fire a bullet through a hole in the wall. If you hit the wall you're dead. **\$14.95**

PCG TUTORIAL — The PCG Sampler cassette has eight programs on it. These programs show you how the graphics work and demonstrates their capabilities by way of games etc. The cassette is excellent for both beginners and experts. It allows you to design your characters on the screen, so you can see exactly what you are creating. Suitable for all MicroBees. **\$9.95**

STARSHOOT/HANGMAN — Starshoot is perhaps one of the most deceptive games available on computer. It appears to be very easy: it isn't. Hangman is based on the popular school game that everybody knows. **\$9.95**

ELIZA — Want someone to talk to? Eliza is possibly the person for you. (If you can get her to shut-up). Eliza is a program that demonstrates artificial intelligence. Eliza is prepared to talk about life, the universe and everything. **\$9.95**

BUSY BEE CAI SYSTEM — Easy to use computer aided instructions similar to the very popular Work-A-Bee, a two sided program with students and teachers versions. **\$14.95**

TYPING DRILL/SOLITAIRE — Want to become a touch typist? Typing Drill enables you to learn touch typing without paying an exorbitant fee to learn. Solitaire is a game in which the object is to remove all of the "pegs" from the board, leaving one peg in the centre of the board. Sounds simple, but, it requires skill to master it. **\$9.95**

TARGET — Target is a game of hit and miss. Your task is to aim the cannon at the bottom of the screen and shoot down the U.F.O.'s (ET watch out). There are nine levels of play to this entertaining game thus making it suitable for any player. Suitable for all Microbees. **\$9.95**

LEARNING CAN BE FUN — This set of 3 cassettes combines graphics with text to produce highly motivated teaching games. Uses variations of well known arcade games to enhance the learning process.

Volume 1A: GRILLA — Answer questions to avoid the barrels Kong is rolling.

FRACE — A game to teach fractions.

Volume 1B: MUNCH — Tests your knowledge by eating the right answer.

TNT — Answer before the dynamite fuse burns down.

Volume 1C: ADSTAR — Avoid the invaders. Shoot the space ship with the right answer. **SQUARE** — The Enterprise can save the Galaxy. You arm the laser cannons. **\$9.95 each or \$24.95 for the set of three.**

PILOT — Pilot is a very easy programming language to learn, and ideal for preparing CAI (computer-aided-instruction). Microbee Pilot supports several enhancements including full integer arithmetic. **\$14.95**

BOGGLER — The popular family word game. **\$14.95**

ESCAPE FROM COLDITZ — An exciting adventure game. Beat the Hun and escape to freedom. **\$14.95**

SEADOG GRAPHICS GAME — A Swashbuckling adventure at sea in days of old. Engage the enemy, fire cannons and launch boarding parties. Call in at port for supplies — but watch out for the natives! **\$9.95**

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MICROBEE BASIC TUTORIAL — Teaches familiarity with Keyboard Self Pace Learning of Microworld Basic. Ideal for real beginners. **\$9.95**

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NEW LEARNING CAN BE FUN — Volume 2A: A - C — This is a maths revision program, based around a well known little Alien Creature. All questions, including the opening selection, are answered by moving the hand of the alien to point to the required answer. Correct answers score points and also cause a plant to grow on the screen. **M-RACER** — Similar to A - C but without the graphics. The main variation is that a pre set time limit is placed on answering each question. **\$9.95**

NEW MICROBEE CHASE PLUS — CHPLUS — A menu driven collection of 6 BASIC programs featuring excellent use of PCG graphics. The first 3 items on the menu are pattern drawing programs. The **TIMEHOLES** program can produce a superb display. **BANNER** allows large character displays on the screen. **KNOCKOUT** is a variation of single player Ping Pong. **CHASED** is a game where you attempt to avoid robots which are chasing you around an enclosure with electrified fence. **\$14.95**

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The Modem Is The Message

By Peter Jetson

I HEAR THE same things almost every time I talk to computer hobbyists about modems: "Why do I need a modem?" or "What can I do with a modem?"

Let's assume I've written a new program and I'd like to give a copy to you. The problem is that your computer has 13 cm disks, and mine has 20 cm disks. If we both had modems, I could simply phone you and tell you what I wanted to do, and then we could connect our modems to our phones and transfer the program, without having to worry about incompatible disk formats.

But what if you're not home when I've got time to call you? There are two ways around this: an auto-answer modem to allow access to your computer system when you're not there, or a store-and-forward system.

An auto-answer modem allows your computer to connect itself to the telephone lines and, with a proper program, the data transfer can take place untouched by human hands.

The store-and-forward systems, which are computerised versions of telephone-answering services, are just starting to appear in Australia. Generally known by the generic name of computer bulletin board services (CBBS), I could dial into one of these systems and leave a copy of my new program for later retrieval by

you, or anyone else on the system.

CBBS systems usually have an electronic equivalent of a cork-and-drawing-pin noticeboard, and this is a good place to buy or sell used computer equipment, or to gain or give information on computer-related subjects.

Because of Telecom regulations, most Australian CBBS systems require access passwords, and you will have to contact the person or club operating the system to obtain the password.

Modems operate by converting a digital signal from your terminal or computer into tones so the data can be sent over the telephone lines. To allow communications in both directions at the same time, modems use two different sets of tones — one modem sends on one set, the other modem sends on the other set. In this way, their tones do not interfere.

The terms "originate" and "answer" are a way of designating which set of tones the modem is using. Typically, the modem that initiates the call is set to the originate mode, and the remote modem is set to the answer mode. Most modern modems are switch-selectable between answer and originate modes.

Most modems that are used on normal telephone lines operate at 300 baud, which is approximately 30 charac-

ters per second — about as fast as most people can read. If the characters were sent any faster, transmission would have to be stopped at regular intervals to allow the data to be read. Besides, due to technical limitations, it is not usually possible to use a modem at greater than 300 baud over normal telephone lines.

Acoustic modems have rubber cups which are designed to accept a standard telephone handset. The modem has a small speaker and microphone which transfer the tones to and from the telephone handset, and the rubber cups seal out any external noise. Direct-connect modems are electrically connected to the telephone system with a special plug and socket, and this connection must be made by Telecom. A small connection fee and annual rental apply.

With modems, the terms "half duplex" and "full duplex" refer to the way characters are sent between the modem and your terminal or computer. With a full-duplex modem, the characters that you type are sent to the remote computer, which echoes them back to you again, so you know that the line is good and that your data has been received. With a half-duplex modem, the characters you type are echoed back by the modem. Being able to operate in a half-duplex mode is not a vital capability in a modem; the most common mode of connection is full duplex.

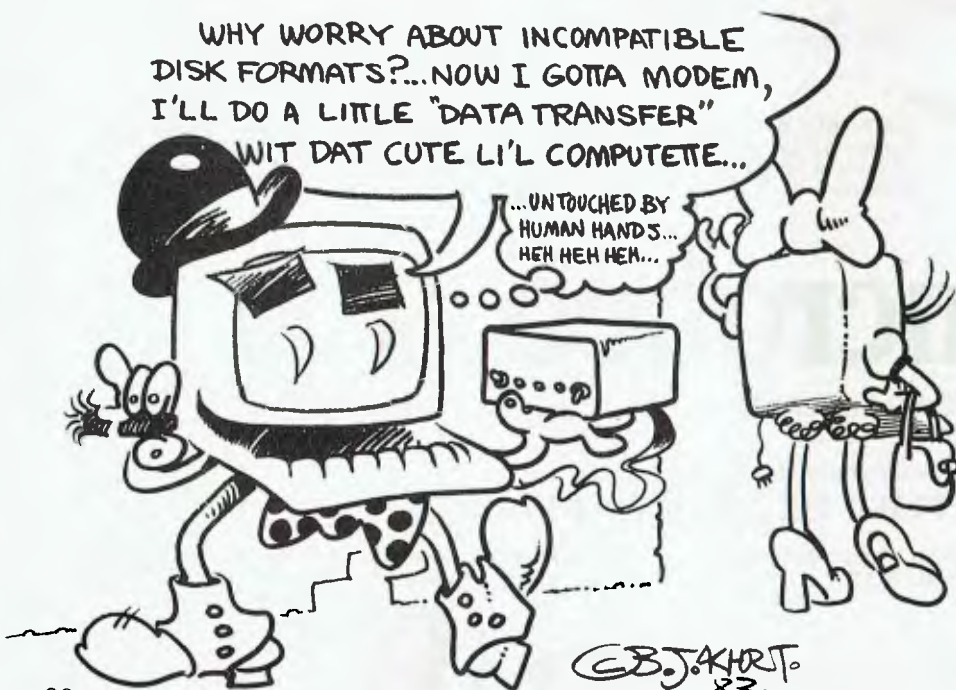
A good choice for a first modem would be one that operates at 300 baud, full duplex, with both answer and originate modes available.

If you will use the modem only to communicate with CBBS-type systems, the ability to operate in answer mode isn't strictly necessary, as the remote computer would be operating in the answer mode, requiring you to use originate mode. An originate-only modem would severely limit your communications with other computer hobbyists, unless they had a modem which could operate in answer mode.

The choice between a direct-connect modem and an acoustically connected unit is up to you. If you need to use the modem in several different locations, an acoustic modem would be a good choice, because it offers portability. However, if your computer system is in a fixed location, and you have no need

WHY WORRY ABOUT INCOMPATIBLE
DISK FORMATS?...NOW I GOTTA MODEM,
I'LL DO A LITTLE "DATA TRANSFER"
WIT DAT CUTE LI'L COMPUTETTE...

...UNTOUCHED BY
HUMAN HANDS...
HEH HEH HEH...



to use the modem in any other location, a direct-connect modem might be a better choice. Technically, a direct-connect modem provides slightly better operation than an acoustically connected one.

To connect your new modem to your computer, you will need an RS-232 serial port capable of operating at 300 baud, and a computer program to allow your keyboard data to be routed to the RS-232 port and modem, and data from the modem to be routed to your video display.

Unfortunately, some personal computers don't have an RS-232 serial port fitted as standard, and will require a plug-in unit to allow them to be used with a modem. The Exidy Sorcerer, the TRS-80 Models 2, 16 and Colour Computer, and the MicroBee are examples of personal computers that have built-in RS-232 serial ports that are suitable for operation with a modem. Other personal computers, such as the TRS-80 Models 1 and 3, the System 80, and the Commodore VIC-20 need plug-in boards or expansion interfaces to allow them to operate with a modem.

Most personal computers will also need a program to allow them to be con-

nected to a modem and to operate as a terminal. The simplest program would be one that sends keyboard characters to the modem, and displays characters from the modem on the screen.

This type of program, called a "Dumb Terminal Program", would usually allow the serial port to be set up with various configurations of data bits, parity bits and stop bits. The most common configuration used for communications between microcomputers is 300 baud, with eight data bits, no parity bit and one stop bit.

A more complex program would allow the user to prepare text and messages for transmission at a later time, and save a session to disk or tape, or echo the session to a printer as well as the screen. These type of programs, called "Smart Terminal Programs", generally have many different options and commands to allow them to be used in many different ways.

The ability to save a session to tape, disk or printer means you don't have to be connected to the remote computer to read messages and text. With some remote computer systems, the user is charged for the time spent actually con-



nected to the system; a smart terminal program would allow the user to connect to such a system, retrieve the text and messages desired, disconnect from the system, then read the data transferred, without being charged for the extra reading time.

The ability to compose a reply or message without being connected to the remote system is also an advantage, for similar reasons.

Interested in a modem yet, or have one and want to get more out of it? Then read on, for Bill Bolton's description of the "protocols" used for file transfers by many of the Smart Terminal programs, particularly on the CBBS-type systems. □

The Christensen Revolution

Bill Bolton, "Sysop" of the Software Tools Remote CP/M system (RCPM, an electronic bulletin-board/software exchange service), describes one of the surest methods of downloading free public-domain software from such a service. He details the transfer protocols used on his system — the same ones being made available for downloading Your Computer programs from the Mi-Computer Club Bulletin Board...

FOR ME, ONE of the most frustrating computing tasks is to have to key in a program from a magazine. I'll go to almost any lengths to avoid doing it.

As I'm sure it's a common situation, *Your Computer* and the Mi-Computer Club (MiCC) are going to try to relieve some of the pain by making the various "pocket programs" published in *Your Computer* available on the MiCC computer bulletin board service (CBBS).

This means MiCC members can

download the programs by using a modem, instead of having to retype them.

The simplest way of downloading the programs is to get the MiCC computer to send them to you as ASCII text. As the MiCC BBS is a CP/M system, you would, for instance, say "TYPE ZOT.BAS" to get the computer to send the BASIC file ZOT.BAS to you. On the computer at your end, you would simply need a program that would save the text coming in from your modem on disk or cassette.

While this works fine most of the time, it can be difficult to detect random errors caused by line noise. Some will be obvious mistakes, such as "FOR" getting changed to "FUR", but others may not be so easily detected, such as "3" getting changed to "7".

To overcome this potential corruption, it's possible to use a communications "protocol", which is simply a way that both the sending and receiving computers agree to transfer data. Typical protocol systems will send data in blocks and look for errors. Corrupted blocks will be re-transmitted until they are correctly received.

There are many commercial programs that successfully use protocols for trans-

ferring data between computers. Unfortunately, most of them use a unique proprietary protocol which the authors won't reveal to the users. This means you must have the same program at both ends of the communications link. For instance, in the CP/M world, BSTAM won't transfer files to LYNC.

Christensen Arrives

To overcome this problem, Ward Christensen — one of the founders of the CP/M User Group and the operator of the very first microcomputer bulletin board service — developed a simple but very useful communications protocol and placed it in the public domain. This protocol is now commonly called the "Christensen protocol".

To date, Christensen protocol communications programs have had the greatest popularity in the CP/M community. Public-domain programs utilising Christensen protocol, such as MODEM7 and YAM, have hundreds of thousands of users around the world. Some low-cost commercial programs using Christensen protocol, such as RCPMLINK (for the Osborne 1), PC-MODEM (for the IBM-PC) and MODEM86 (for CP/M-86 and MSDOS computers), have also appeared for those without the desire or



time to adapt the public-domain programs.

Spreading The Word...

CP/M users should have little trouble getting access to good public-domain programs which will enable them to use Christensen protocol for data transfer. What we really need now is to spread the protocol more widely amongst the microcomputer community. To encourage this, there is a description of how the protocol works later in this article. I hope that users of non-CP/M computers will have an attempt at implementing Christensen protocol on their Apples, MicroBees, Tandys, HX20s, ZX81s or whatever. I already know of someone who is working on an implementation for the Commodore VIC-20.

As affordable modem communications is, for most of us, still limited to 300 baud, it should be possible to write a simple Christensen protocol handler in interpretive BASIC that will run fast enough. For instance, I know the PC-MODEM program is written entirely in Microsoft BASIC. If you get something running on your system, send it in (by phone, if you like!) so we can print it – and put it up on the Bulletin Board – to save others from having to re-invent that particular wheel.

It will be worth the trouble – after all, the more a common protocol is used, the more hardware (read disk) format incompatibilities fade to insignificance.

Christensen Protocol Explained

This discussion of the Christensen protocol, by Kelly Smith, is extracted from the now-defunct "CP/M-NET Newsletter". I have modified it somewhat, mostly by deleting references to material not relevant to Australian conditions and correcting a few errors. This protocol is used by XYAM on the Software Tools RCPM system and will be used on the Mi-Computer Club BBS:

I thought it may be of some interest to those of you who use the MODEM/XMODEM file transfer capability of Remote CP/M Systems, to get a little insight as to the communications protocol – that is, "handshaking method" – used by these systems. Herein lies the details

of a very good (but not perfect) data communications protocol that has become the *de facto* standard for various remote CP/M systems (RCPMs) that are accessible across the United States (and now Australia).

Data is sent in 128-byte sequentially numbered blocks, and appended by a single checksum at the end of each block. As the receiving computer acquires the incoming data, it performs its own checksum. Upon each completion of a block, it compares its checksum result with that of the sending computer's – if the receiving computer matches the checksum of the sending computer, it transmits an ACK (ASCII character for ACKNOWLEDGE – 04 Hex, Control-F) back to the sending computer. The ACK, therefore, means "all is well on



this end, send some more..." In the following example, the sending computer will transmit an "initial NAK" (ASCII character for NEGATIVE ACKNOWLEDGE – 15 Hex, Control-U); or, "that wasn't quite right, please send again".

Due to the asynchronous nature of the initial "hook-up" between the two computers, the receiving computer will "time-out" looking for data, and send the NAK as the "cue" for the sending computer to begin transmission.

The sending computer knows that the receiving computer will "time-out", and it uses this fact to "get in sync". The sending computer responds to the "initial NAK" with a SOH (ASCII character for START OF HEADER – 01 Hex, Control-A), sends the first block number, sends the two's complement of the block number (which is very important – I will discuss this later), sends 128 bytes of 8-bit data (that's why we can transfer ".COM" files) and, finally, a checksum. The checksum is calculated by summing the SOH, the block number, the block number's two's complement, and the 128 bytes of data.

Receiving Computer:
 /NAK/
 06H
 Sending Computer:
 /SOH/BLK#/BLK#/DATA/CSUM/---/SOH/BLK#/BLK#/DATA/etc.
 01H 001H 001H 8bit 8bit 01H 002H 002H 8bit ...

This process continues with the next 128 bytes (if the block was received all right and an ACK sent back by the receiving computer), and then the next sequential block number and its two's complement, and so on.

But what happens if the block wasn't received all right and a NAK has been sent back? Easy – the sending computer simply re-sends the previous block.

Now, the hard part: what if the sending computer transmits a block, the receiving computer gets it and sends an ACK, but the sender doesn't see the ACK? The sending computer will then think it has failed and, after 10 seconds, will re-transmit the block...ARGH! The receiving computer has "stashed" the data in memory or on disk (the data is written to disk after receiving 16 blocks), and is now one block *ahead* of the transmitting computer!

Here comes the point in having block numbers: the receiver detects this is the last block (all over again) and transmits back an ACK, throws away the block and effectively "catches up"! What's more, the integrity of the block number is verified by the receiving computer, because it "sums" the SOH (01 Hex) with the block number plus the two's complement of the block number, and the result *must* be zero for a proper transfer (for example, 01 + 01 + FE hex = 00, on the first block). The sequence of events then looks like this:

Receiving Computer:
 /NAK/
 15H
 Sending Computer:
 CSUM/---/SOH/BLK#/BLK#/DATA/CSUM/---/SOH/BLK#/BLK#/DATA/etc.
 8bit 01H 001H 001H 8bit 8bit 01H 001H 001H 8bit ...

Normal completion of data transfers will then conclude with an EOT (ASCII character for END OF TRANSMISSION – 04 Hex, Control-D) from the sending computer, and a final ACK from the receiving computer.

Unfortunately, if the receiving computer misses the EOT, it will continue to wait for the next block (sending NAK's every 10 seconds, up to 10 times) and, eventually, "time-out". However, this is rarely the case and, though not 100 per



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cent "bulletproof", it's a very workable protocol.

Receiving Computer:

```
---/NCK/---/NCK/"Transfere Complete"/a>(or B>)
06H 06H .....
```

Sending Computer:

```
CSUM/---/BOT/---/A>(or B>)
8bit 04H .....
```

In some cases where the telephone transmission is repeatedly "trashed" (weak signals, multiple noise "hits" and so on), the receiving computer – and operator – will be provided the option to quit. Here, the operator enters "R" or "Q" in response to "Retry or Quit?" (after 10 retries); if quit is invoked by the operator, a CAN (ASCII character for CANCEL – 18 Hex, Control-X) is sent by the receiving computer to cancel the entire transfer session (Note: It is possible to "garble" an ACK to a CAN, and abort prematurely):

Receiving Computer:

```
---/NAK/...NAK's ten times.../"Retry or Quit?"(Q)/CAN/A>...
15H 18H .....
```

Sending Computer:

```
CSUM/---/...Garbled Data...../-----/A>...
8bit .....
```

A final consideration when using the MODEM program is timing-related problems when transfer-status messages and/or textual data is directed to the screen of a slow (4800 baud or less) terminal or to a hard-copy printer.

This problem is readily apparent (multiple NAKs) when using MODEM for the first time, and can usually be "cured" by not specifying the "V" (video) sub-option when sending or receiving files. Users of Lifeboat Associates' BSTAM encounter the same problem.

More Advanced Versions

What Kelly Smith described is the



basic protocol. It has since been extended to optionally cope with a full CRC16 (cyclic redundancy check), instead of a simple checksum, and to accommodate a "batch" mode for transferring multiple files.

However, those sort of embellishments are beyond the scope of this attempt to encourage the spread of Christensen protocol – if you're really interested in these extensions, then hunt up the source code for any version of MODEM7 later than version 7.4 (for examples in 8080 assembler source code) or any version of YAM later than 3.09 (for example in C source code).

In all the CP/M programs that use

Christensen protocol, and no matter how many new features that have been added, the basic protocol – as described here – is still supported and used for most file transfers.

Table 1 is a list of all the Christensen protocol programs that I could readily find in the various user group collections that exist for CP/M users. (The list isn't complete, as it doesn't take into account the very latest volumes.)

Well, go to it! I'm sure that if you have to transfer data between microcomputers, you'll find it worth your while to have a good look at Christensen protocol.

And don't forget to phone your program through for listing in *Your Computer* when you get it up and running...□

BDS C User Group

Prog No.	Size	File Name	Description
3.14	31K	UMODEM27.C	Fancy modem program from Unix system
3.15	2K	UMODEM27.DOC	See UMODEM27.C
3.19	9K	YAM1.C	Yet Another Modem program version 2

CP/M User Group

Prog No.	Size	File Name	Description
6.8	13K	MODEM.ASM	SEND/RECEIVE FILES, CONTROL REMOTE COMPUTERS
25.11	13K	MODEM.ASM	INTELLIGENT TERMINAL PROGRAM
25.12	3K	MODEM.DOC	DOCUMENTATION FOR 25.11
40.28	40K	MODEM4.ASM	Checksummed blocked file transfer program
40.29	7K	MODEM4.DOC	DOC on above. PMMI/Hayes/serial
47.10	14K	MODEM.LIB	MacLib library for MODEM7.
47.11	43K	MODEM7.ASM	Latest revision of Ward's "universal" MODEM.ASM
47.12	8K	MODEM7.COM	See MODEM7.ASM
47.13	16K	MODEM7.DOC	See MODEM7.ASM
47.14	3K	MODEM7.SET	How to patch MODEM7.COM if you don't have MAC
61.5	45K	MODEM926.ASM	UPDATE OF CP/M USER GROUP 40.28
61.8	20K	XMODEM32.ASM	DC HAYES SUPPORT
62.16	46K	MODEM5A.ASM	Auto-dial on DC Hayes and PMMI modem boards
62.22	8K	MB00P3.ASM	Compacted version of MODEM for RECV only usage
62.23	24K	XMODEM38.ASM	Update of SIG/M 7.8 – CP/M to CP/M transfer
68.8	36K	APLMODEM.ASM	CP/M file transfer for Apple 2/DC Hayes
69.13	29K	XMODEM41.ASM	Remote CP/M to CP/M file transfer
79.1	16K	MODEM7.DOC	Documentation for MODEM 7 and higher
79.2	14K	MODEM7.LIB	MACLIB file for use with MODEM741.ASM.
79.3	66K	MODEM741.ASM	Assembler source for MODEM version 7.41.
79.4	10K	MODEM741.COM	See MODEM741.ASM
79.5	4K	MODEM741.SET	Patching instructions for MODEM741.COM.
79.6	1K	MODEM7X.BUG	Bug report on MODEM7.
79.7	85K	SMODEM37.ASM	Assembler source for SMODEM version 3.7
79.8	26K	SMODEM37.DOC	Documentation for the SMODEM37.ASM

SIG/M User Group

Prog No.	Size	File Name	Description
48.02	16K	MODEM7.DOC	Update of Modem7 program
48.03	14K	MODEM7.LIB	Update of Modem7 program
48.04	3K	MODEM7.SET	Update of Modem7 program
48.05	63K	MODEM73.ASM	Update of Modem7 program
48.06	10K	MODEM73.OBJ	Update of Modem7 program
48.12	39K	XMODEM46.ASM	Remote CP/M file transfer program
49.51	12K	MODEM.ASM	Modem cons under PLI
65.06	69K	MODEM76.ASM	Updated MODEM
65.07	10K	MODEM76.COM	Updated MODEM
65.08	6K	MODEM76.SET	Updated MODEM
66.02	8K	APMBOOT.ASM	Apple modem support
66.03	5K	APMODEM.DOC	Apple modem support
66.04	40K	APMODEM22.ASM	Apple modem support
66.05	34K	MODEM3.ASM	Modem support for PMM 103
67.08	83K	SMODEM36.MAC	Updated MODEM 7 for Smart Modem
72.03	6K	ACOUSTIC.PAS	acoustic version-DCMODEM
72.11	6K	DCMODEM.PAS	modem program for DC Hayes

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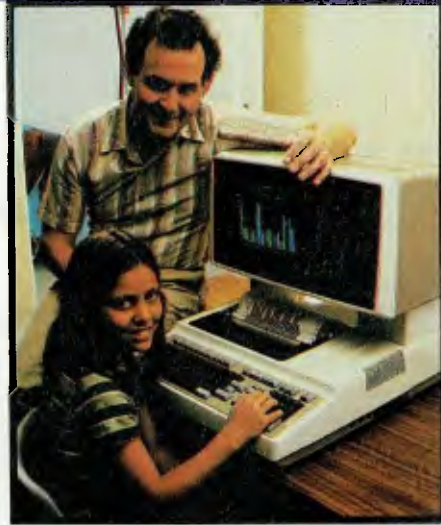
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Making MicroBee Text

By Eric Lindsay

WORDBEE is an exclusive word-processing package for Applied Technology's MicroBee. However, the draft copy of the WordBee manual quite freely admits that many ideas originated in well-known word-processors: screen-formatting from Electric Pencil, the on-line help menu from Word Master and the control key and dot command from WordStar. Naturally, the code is very different.

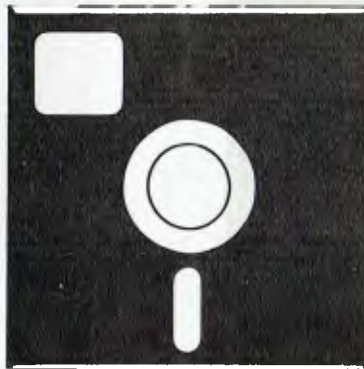
To save reading a long, cassette-based program, WordBee is sold as a pair of 4-kilobyte EPROM chips fitted into the MicroBee memory board. If you already have the editor/assembler option, you simply remove those two chips and replace them with the WordBee chips. If you don't have the appropriate sockets for these chips, Applied Technology can arrange to modify your MicroBee. (You could fit the sockets yourself, although your Basic will not allow access to them without other changes.)

WordBee runs in 16- or 32-kilobyte MicroBees and requires no additional equipment, apart from a cassette recorder for your files and a 1200-baud serial printer. Almost the entire memory - 30,462 characters in a 32-kilobyte MicroBee - is available for your text.

Upon entering WordBee, by typing EDASM and pressing RETURN, you are presented with the main interface menu. This offers a choice of file-handling and printer menus, or a file-status report which details character usage.

From this Interface menu, you can also load or verify cassette tapes, save your text to cassette at 300- or 1200-baud, count the number of words you have typed, print your text on a 1200-baud serial printer, or enter the machine-language monitor. The commands that will destroy your text are KIL, which requires three keystrokes, and E (for Exit to BASIC). If you do press E, you will be asked to verify the command by pressing Y.

your computer



SOFTWARE REVIEW

The file-control menu lists the many cursor-control keys, accessed by pressing CONTROL and the required key. The control keys for other commands are also listed here. This menu is always easily accessed from your text by pressing LINE FEED and then, when you are back at the main menu, pressing the question-mark key.

The printer help menu uses dot commands similar to WordStar, and is available from the main menu by pressing the fullstop key. These embedded dot commands allow justified printing, setting margins, line-spacing, gaps between pages, page numbering, headers and sequences of control characters for special printer functions. However, though you can print parts of the file, there is no easy way to make use of a 300-baud printer or a parallel printer. (The machine language monitor is provided to allow for these changes, but this is of little use to the many beginners who have bought MicroBees.)

The screen display wraps round at the end of each line, and moves any

truncated words to the next. I wasn't able to type fast enough to prevent WordBee from keeping up, unlike the case of some well-known word-processing packages.

Print-formatting is an area in which most word-processors manage well, and WordBee is no exception. You can justify the text and print it in almost any format, except double or multiple columns. It provides page-headers and page-numbering, and will send control-character sequences to printers. Nevertheless, I'm disappointed that printers other than 1200-baud serial aren't more explicitly supported, particularly as the MicroBee has sold heavily to newcomers in computing.

Editing is relatively easy, since you can use the control keys to move the cursor anywhere within the text, and then insert, delete or replace. You can also mark your position in the text with a "ringer" marker and return there simply. Blocks of text can be marked and then copied to another location, deleted or moved. A global search-and-replace function is provided and this includes a "find only" function which enables you to locate any word or set of words, or to replace any specified set of words with different ones.

As with any new word-processor, I found it somewhat confusing to remember which command did what, especially as the commands often differ from similar commands in the MicroWorld BASIC or the monitor. However, the help menus are easily viewed, and without losing your place in the text.

The WordBee controls are position-based - that is, the movements provided by various keys are related to the positioning of the key. For example, the top line of keys moves you toward the top of your text, the bottom line to the bottom of the text, and so on.

The manual, which consists of about 50 printed pages, is well written and

easy to understand, though newcomers to word-processing may wish to consult the glossary provided before they read beyond the introduction. Likewise, the tutorial should perhaps appear much earlier in the text. However, newcomers will probably not get much help from the instructions for the machine-language monitor.

The price of WordBee, at about \$90, might be said to be high for a cassette-based word-processor, but it is one of the only two cassette-based word-processors I would consider using.

And Now, The Bad News

Now that I've given my praise, I must add a few minor criticisms. These relate to the difference between good programming and good human/machine interaction. I believe the WordBee program is well done – I've not discovered any bugs in either the preliminary version or the version as released for sale – but the ability and knowledge of the programmer also tends to produce possible blindspots. In essence, my complaints are about philosophical differences!

In an attempt to make WordBee compatible with other word-processors, it has been made less effective as a creative writing tool. (It may, however, be advantageous for business use, due to its

high compatibility.) Take the main Interface menu, which is reached from the other two menus by pressing the RETURN key. Is this reached from the text mode by pressing RETURN? Well, no – such an action produces a blank line ... you need to press LINE FEED to reach the Interface menu.

In the insert mode, you get an asterisk as a cursor, which is great, as it distinguishes it from the block cursor of the replace mode. However, the asterisk cursor reverts to a block cursor on the following lines, which is very confusing when you lose track of which line you're on and decide you might be overwriting text accidentally.

I found the global search-and-replace very annoying, since it doesn't show you what is going on. This means that if you make corrections, you have to include sufficient characters to preclude any chance of changing the wrong word. Basically, I object to working blind when making corrections. I also object to having to move the cursor to the top of the file to ensure the file is searched, since I invariably forget to do so.

My main objection to the working philosophy of WordBee is that it is line-oriented – that is, the text file is considered to be a collection of characters organised into lines which can be deleted, or new lines added, and these lines are

then formatted for printing. This is mostly transparent to the user, since there are no line-numbers involved, and the text file is continuous, without line-indicators.

The impression given is that of a mainframe terminal, and that the unit of input is partly line-based, but English language just doesn't work that way. The unit after the character is the word, which is organised into sentences and paragraphs. In my opinion, a word-processor should be organised the same way, with deletions working on a word or sentence basis, and insertions the same.

Despite these complaints, I was very impressed with the overall quality of WordBee, particularly considering the limited space available for the code. My overall impression is that if you have a MicroBee, and intend to write with it, this is the program to get.

The MicroBee would also be worth considering if you have a need for a word-processor for personal or small-business use and don't already have a microcomputer. The combination comes at a very attractive price, and the constant-memory feature of the MicroBee, which ensures you don't lose your text when you switch off the power, make it far more useful than any other non-disk-based systems. □

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Original development took place in England, with Barry Meredith and John Perry of Padmede in Australia making extensive changes to suit local requirements. This included use of the advanced Sigma/OKI facilities such as high resolution colour display and inbuilt 80 cps printer.

Sigma/OKI Personal Computers also have a large library of software from other suppliers. These include Digital Research, Micropro, Sorcim, and Australian applications from Cyres, Boulevard, IMS, John F. Rose and others.



Kathy McLean and Barrie Meredith from Padmede

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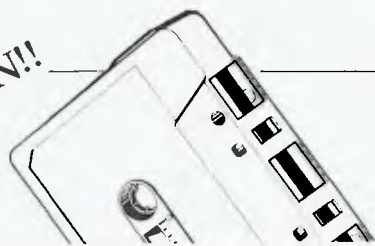
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SHARK ATTACK - You are in shark infested waters - your only protection an atomic net which you trail behind you - protecting yourself and ensnaring sharks - careful of the octupi! **\$ 19.00**



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PIXEL (UK)

HARVESTER - unexpanded VIC - A cut throat strategy game to reap valuable Boosterspice around the planet Delta. HiRes graphics and lots of fun for two to four players. **\$ 18.00**

BRAINSTORM - A battle of wits as you try to get three human explorers across a river of goo with three alien lifeforms that can literally blow your mind! **\$ 18.00**

PIXEL POWER - To create user definable characters and save them with your own programmes. 8k expansion **\$ 18.00**

ENCOUNTER - Would you know what to do if you encountered extra-terrestrial beings? In this exciting adventure, you are abducted by aliens and the space invaders play YOU! 16K expansion. **\$ 18.00**

STARQUEST - A voyage of discovery and adventure in the cosmos. With the help of your onboard computer, you seek a habitable planet amidst the perils of deep space. 16K expansion. **\$ 18.00**



ZOR - Two mighty robots are designed for one purpose - to fight to the death. In the style of a mediaeval duel, you must do battle with the 'Champion of Zor' to save the planet Earth. 16K expansion. **\$ 18.00**



SUBSPACE STRIKER - It comes from out of nowhere and then vanishes back into the ether. With your deadly antimat torpedos, you unleash havoc in the Federation's spacelanes! 16K expansion. **\$ 18.00**



TRADER - Actual 3 x 16K parts to this program. It is hard enough to look at an amorphous hydrosilicon blob from PSI, never mind swing a deal with one, but when they ask to pick your brains. 16K expansion. **\$ 18.00**

MR MICRO LTD. (UK)

GREAT BALLOON RACE
Graphics Game for keyboard or joystick **\$ 19.00**

MYSTERIOUS ISLAND
Recommended multi-tape adventure game for keyboard or joystick - needs 16K **\$ 19.00**

VIC VALUE NO 1
Keyboard or joystick - four games - Helicopter Lander, Dragon, Hunter, Alien Pilot **\$ 19.00**

RAYFLECTION & MICROMIND
One game involves firing out rays to find the atoms, other is a variant of 'Mastermind'. **\$ 19.00**

RABBIT SOFTWARE (UK)



RAID ON ISRAM (SCRAMBLE)
Raid on Isram is possibly the most challenging game ever introduced for the VIC-20. You must guide your craft through many perils to eventually get to your home base! **\$ 17.00**

ORBIS
Defend your Uranium Fuel Dump from the invading "Zylons" by laying "space mines" in their path as they slip through the "energy field" but be careful as you only have a limited number of mines. **\$ 17.00**

KRELL
Your mission is to defend the poor "Zymwatts" from the evil "Tharg" which sends "energy bolts" against their brick defences. You must destroy the "Tharg" before he kills all the "Zymwatts" which is not so easy as to get at the dreaded "Tharg" you must fend off his guardians. **\$ 17.00**

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Conquer planet Aldebaran, fight the aliens on the way and negotiate the deadly meteor fields. **\$ 54.95 cart**

AMOK
You are trapped in Amok, a deserted space station, try to find your way out but look out for the deadly robots. **\$ 39.95 cart \$ 16.00 cass**

CREATIVE SOFTWARE (USA)

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Astroblitz **\$ 55.00 cart**
Trashman **\$ 55.00 cart**
Terraguard **\$ 55.00 cart**
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Choplifter **\$ 55.00 cart**
Apple Panic **\$ 55.00 cart**

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Datestones of Ryn **\$ 30.00 cass**
Invasion Orion **\$ 36.00 cass**
Sword at Fargoal **\$ 42.00 cass**
Rescue at Ryel **\$ 42.00 cass**
Crush, Crumble, Chomp **\$ 42.00 cass**
Monster Maze **\$ 55.00 cart**
Plattermania **\$ 55.00 cart**

HES SOFTWARE (USA)

Vicrek **\$ 24.00**
Lazer Blitz **\$ 24.00**
Tank Wars **\$ 24.00**
Concentration **\$ 24.00**
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LLAMASOFT (UK)



ABDUCTOR
A classic new space game! ZAP the swirling alien hordes before they ram you and abduct your humanoids. IN MACHINE LANGUAGE REQ. JOYSTICK **\$ 17.00**

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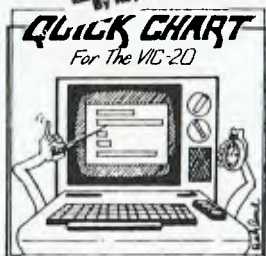
ABACUS SOFTWARE (USA)

ALL ABACUS software is available on DISK or CASSETTE and most also include demonstration programmes.

SCREEN-GRAPHICS-64 – Super graphics for the COMMODORE-64. Here's the finest graphics software for your COMMODORE-64. SCREEN-GRAPHICS-64 gives you High Resolution, Multicolour and Sprite graphics all in one package! You get 320 x 200 points in High Resolution mode, 160 x 200 in Multicolour and Sprite Graphics in either HiRes or Multicolour modes. This is the most powerful package for the COMMODORE-64 yet developed. SCREEN-GRAPHICS-64 gives you two screens – one for normal text and the other for graphics displays. You can switch back and forth between the two screens in either command mode or from another program control mode. And you can mix both HiRes and Multicolour and Sprites on the same screen.

\$28 cass

\$31 disk



QUICK-CHART for the VIC-20 and Commodore-64

QUICK-CHART is a tool for creating bar charts on either your VIC-20 or COMMODORE-64 (VIC-20 requires 8K expansion). It is designed to give you presentation quality charts from the data that you enter at the keyboard. QUICK-CHART is menu-driven which makes it very easy to use. QUICK-CHART prompts you for data and then edits the data you enter against your minimum and maximum values. It does automatic scaling and if you wish to create monthly bar charts it does automatic prompting. What's more is that you can save up to 10 charts onto either cassette or disk (3 charts with the VIC-20) so that you can later recall them for redisplay.

\$ 24.00 cass

\$ 27.00 disk

PIPER – The Music Machine for your VIC-20 or PET/CBM micro. PIPER is an exciting way to turn your VIC or PET/CBM micro into a music machine. PIPER lets you compose, conduct and play your own musical scores with ease. And you'll be amazed at the speed with which you can enter your music using PIPER. PIPER works on the VIC-20 and PET/CBM micros, including the 8032.

\$ 24.00 cass

\$ 27.00 disk



HIRES/MULTICOLOUR GRAPHICS for the VIC-20

The VIC has two additional graphic display modes available for anyone to use. Here's a package that gives you immediate access to these impressive VIC features. The HIRES/MULTICOLOUR GRAPHICS utilities make it simple and inexpensive to add these graphic display capabilities to your VIC. And best of all they require no additional memory. Without any additional hardware the high resolution utility provides a display area of 104 x 152 plot positions. You can draw and or erase points, lines, rectangles or write text onto the HiRes screen. The multicolour utility offers 52 x 76 plot positions in multiple colours.

\$ 24.00 cass

\$ 27.00 disk

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SOFTWARE OR HARDWARE

ALL ITEMS ARE SUBJECT TO WITHDRAWAL OR PRICE AND SPECIFICATION CHANGES WITHOUT NOTICE

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HiRes or Multicolour graphic were never this easy!
\$ 24.00 cass
\$ 27.00 disk

SYNTHY-64

Music and Sound Synthesizer for COMMODORE-64.
\$ 33.00 cass
\$ 36.00 disk

SKIER-64 for the Commodore 64

Test your skill on the slopes with SKIER-64, a fast moving game for your CBM-64. This arcade-quality game requires good hand-eye coordination for you to score high. And you can play without even getting cold in the snow.
\$ 24.00 cass
\$ 27.00 disk

BUDGETEER for the VIC-20, COMMODORE-64 or PET/CBM

Now you can use your VIC-20, CBM-64 or PET/CBM to plan and track your personal budget for the year with our visual planner BUDGETEER. Its features are surprisingly wide including bar chart and printout options. BUDGETEER requires a VIC with a 3K, 8K or 16K memory expander, a PET/CBM with at least 8K of memory or a COMMODORE-64.
\$ 24.00 cass
\$ 27.00 disk

CRIBBAGE for the VIC-20 or COMMODORE-64

Another fine game to run on your VIC-20 or CBM-64. This is the same classic card game that has been played for many years. Your computer does the dealing and scoring – quickly and accurately.
\$ 24.00 cass
\$ 27.00 disk

TINY BASIC COMPILER for the VIC-20, CBM-64 or PET/CBM

Here's a useful and educational tool for users. The TINY BASIC COMPILER brings you the high-speed advantages of a compiled language at a very modest cost. If you want to gain the advantages of a compiled language, learn more about the workings of compilers or delve into the VIC-20, CBM-64 or PET/CBM's firmware, then try our TINY BASIC COMPILER. For the VIC-20 with a 3K, 8K or 16K memory expander; for PET/CBM with OLD, NEW or 4.0 ROMS or 8032; for the COMMODORE-64.
\$ 24.00 cass
\$ 27.00 disk

GRAPHVICS super graphics for the VIC-20

You must have heard about the High Resolution and Multicolour graphics that are built into each and every VIC. HiRes gives you 152 x 160 points and Multicolour 76 x 80 right on your VIC's screen. Now you can utilise both with the most versatile graphics package yet available for the VIC. GRAPHVICS gives you 2 screens, one for normal text and one for graphic displays. The function keys allow you to switch back and forth between the two screens. On the GRAPHVICS screen you have control over 24,000 individual points! And you can mix both HiRes and Multicolour modes on the same screen to create spectacular graphic pictures on a \$299 computer.
\$ 28.50 cass
\$ 31.50 disk

VIGIL for the VIC-20 or PET/CBM

Includes nine games. VIGIL stands for Video Interactive Game Interpretive Language. Vigil is a simple, new language for writing game and graphics programmes for your VIC or PET micro. Vigil brings you more than 60 powerful commands for manipulating graphics figures in double density on your VIC or PET screen. Complete with manual. It requires a 3K, 8K or 16K memory expander on the VIC 20.
\$ 33.00 cass
\$ 36.00 disk

JOYSTICK PAINTER for the VIC-20

Here's one of the easiest ways yet to become an artist. VIC JOYSTICK PAINTER places a paintbrush in your hand. Use your joystick to draw pictures, graphs, figures.
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\$ 27.00 disk

I-CHING the Fortune Teller for the VIC-20

I-CHING is one of the oldest and most revered of fortune tellers. Now you can delve into your future with this colourful version of I-CHING based on ancient Oriental philosophy. The beauty of I-CHING is that you can go as far into it as feels comfortable. I-CHING comes as a complete package: the cassette program (or disk) with living colour and sound; the users introductory manual to get you started; and a 275+ page book to guide you through the hexagrams and Yin and Yang lines.
\$ 28.50 cass
\$ 31.50 disk

TINY PILOT

PILOT stands for Programmed Inquiry Learning or Teaching. PILOT is an easy to learn language in which to program computer aided instruction lessons. Our version of TINY PILOT is so simple to use that you'll be writing your first program in minutes.
\$ 24.00 cass
\$ 27.00 disk

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- ★ Club member specials

AARDVARK (USA)

Adventure games for the VIC-20—16K expansion required Available soon for the Commodore-64

ADVENTURES are interactive fantasies. It's like reading an exciting book, except that you're one of the characters. You explore a new world as you try to think or fight your way out of a jam. You give the computer plain English commands such as "look in coffin" and "light the torch" and it carries out your bidding. Each ADVENTURE normally takes from 15 to 30 hours to play, spread out over several days. If the FDA ever catches us, we are going to have to add a warning label. Those are definitely addictive!! These ADVENTURES are in BASIC—but they are full featured, full plotted, fast action adventures. They come with listings and, as they are in BASIC, you can modify them yourself.

ADVENTURES ARE \$20.00

EARTHQUAKE BY ANDERSON & RODGER OLSEN – A second kids adventure.

You are trapped in a shopping centre during an earthquake. There is a way out, but you need help. To save yourself, you have to be a hero and save others first. Authors note to players— This one feels good. Not only is it designed for the younger set (see



note in Haunted House), but it also plays nicely. Instead of killing, you have to save lives to win this one. The player must help others first if he/she is to survive. **\$ 20.00**

QUEST BY BOB RETELLE & RODGER OLSEN – This

is different from all the other games of ADVENTURE!!! It is played on a computer generated map of Alesia. You lead a small band of adventurers on mission to conquer the Citadel of Moorlock. You have to build an army and then arm and feed them by combat, bargaining, exploration of ruins and temples, and outright banditry. The game takes 2 to 5 hours to play and is different each time. This is the most popular game we have ever published. **\$ 20.00**

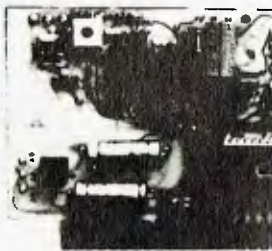
androgenic (UK)

WORDCRAFT 20 – Wordprocessing cartridge—includes 16K ROM and 8K RAM, supports any parallel printer off user port or RS232, fully compatible with big Wordcraft. (Also includes 8K memory expansion for use with other programmes etc.)

\$239.95

WORCRAFT-64 available soon

computer world" (HOLLAND)



TDK-20 RTTY/MORSE Interface for VIC-20 – Send and receive RTTY/MORSE code, listen to Radio Amateurs and International News Radio Teletype (RTTY) with your VIC, TDK-20 and receiver. **\$229.00**

Requires 1/12 volt centre taped transformer **\$6.50**

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EPROM PROGRAMMER FOR VIC-20 – complete with software and manual. **\$203.00**

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MORE ADVENTURES!

PYRAMID BY RODGER OLSEN

This is one of our toughest Adventures. Average time through the Pyramid is 50 to 70 hours. The old boys who built this Pyramid did not mean for it to be ransacked by people like you.

Authors note to players – This is a very entertaining and very tough Adventure. I left clues everywhere but came up with some ingenious problems. This one has captivated people so much that I get calls daily from as far as New Zealand and France from bleary eyed people who are stuck in the Pyramid and desperate for more clues **\$ 20.00**

MARS BY RODGER OLSEN

Your ship crashed on the Red planet and you have to get home. You will have to explore a Martain City, repair your ship, and deal with possibly hostile aliens to get home again. Authors note to players – This is highly recommended as a first adventure. It is in no way simple playing time normally runs from 30 to 50 hours – but it is constructed in a more "open" manner to let you try out adventuring and get used to the game before you hit the really tough problems. **\$ 20.00**

CIRCLE WORLD BY BOB ANDERSON

The alien culture has built a huge world in the shape of a ring circling their sun. They left behind some strange creatures and a lot of advanced technology. Unfortunately, the world is headed for destruction and it is your job to save it before it plunges into the sun! Editors note to players – In keeping with the large scale of Circle world, the author wrote a very large adventure. It has a lot of rooms and a lot of objects in them. It is a very convoluted, very complex adventure. One of our largest. **\$ 20.00**

DERELICT BY R. OLSEN & B. ANDERSON

For Wealth and Glory you have to ransack a thousand year old space ship. You'll have to learn to speak their language and operate the machinery they left behind. The hardest problem of all is to live through it. Authors note to players – This adventure is the new winner in the "toughest Adventure at Aardvark Sweepstakes". Our most difficult problem in writing this adventure was to keep it logical and realistic. There are no irrational traps and sudden senseless deaths in Derelict. This ship was designed to be perfectly safe for it's builders. It just happens to be deadly to alien invaders like you. **\$ 20.00**

VAMPIRE CASTLE BY MIKE BASSMAN

This is a contest between you and OLD DRAC – and it's getting a little dark outside!! **\$ 20.00**

HAUNTED HOUSE BY BOB ANDERSON

This one is for the kids. The house has ghosts, goblins, vampires and treasures – and problems designed for the 8 to 13 years old. This is a real adventure and does require some thinking and problem solving – but only for kids. Authors note to players – This one was fun to write. The vocabulary and characters were designed for younger players and lots of things happen when they give the computer commands. This one teaches logical thought, mapping skills, and creativity while keeping their interest. **\$ 20.00**

INTERCEPTOR MICRO'S (UK)

FROG

An amazing version of Frogger in the unexpanded VIC-20. With driving turtles and plenty of vehicles to run you down. Fast action and high resolution graphics. **\$ 18.00**

PUCKMAN – MACHINE CODE

The old favourite back again. Joystick or keyboard control. Fast action. High resolution colour graphics on the unexpanded VIC 20 **\$ 18.00**

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WORDHANGER

A highly educational hangman game with vocabulary and 2 player or play against the computer option **\$ 18.00**

VIC BOMBER

An extremely fast action Bomber game for the VIC-20. With high resolution colour graphics. Flatten the enemy city before it's too late. **\$ 18.00**

STACK (UK)

LIGHT PEN

plus 1 game additional games available **\$ 70.00**

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The Magician Draws The Line

By Glen Thornley

A THREE-PART graphics utilities package written by Chris Jochumson, David Lubar and Mark Pelczarski, Penguin Software's The Graphics Magician is designed to enable the "average" computer user to put high-resolution graphics into his or her own programs.

This aim has been achieved admirably in two of the three separate editors.

The three editors, in order of appearance, are the animation system, the picture/object editor and the super shapes editor.

First, the animation system. Unlike the other two systems, this is divided into three separate editors: the shape editor, the path editor and the animation editor.

As its name implies, the shape editor is used to create the shape of your space invader or rocket, or whatever. Seven "shifts" are provided so that internal animation of your character can easily be incorporated into the design.

The I J K M key-pad is used to move a cursor which simultaneously plots in all activated shifts. The editor is menu-driven, but the menu, like most of the editors in the package, is rather cryptic. Until you are familiar with a particular editor, it is necessary to be continually referring to the manual to find exactly which single-letter command corresponds to what you want to do.

For example, the menu in the shape editor is printed:

I J K M Z X Q W H E O A 1-7 D

The path editor is used to define the path that will be followed by a shape. It uses a more complex system of cursor movement — that is, the U O N and comma keys are used to provide diagonal movement as well as the I J K M keys. Once again, a cryptic menu is shown.

The animation editor is where all the real animation takes place. You are given the opportunity to load pre-defined shapes, paths, animation tables or high-resolution screens which are combined in very nearly any way imaginable to create a vast range of effects.

Up to 32 independent shapes may be animated at one time, in an area much larger than that shown on the Apple's screen. (The valid range is X:0 to 1791, and Y:0 to 255.) This allows an object

— that is, a shape and path combined — to continue animation off the screen.

Six memory-mapped tables are provided during animation so that the controlling program can read various data which is pertinent to the objects being animated. The animation routine also reads its data from these tables and, consequently, required changes in the animation can be made with a poke to the appropriate table.

In a program, all that is required to use the system is to set high-resolution graphics and BLOAD the animation table. After this, each time the statement "CALL 36928" is encountered, the animation is progressed by one move for each object.

The picture/object editor is, in my opinion, the best editor in this package. It enables the user to create high-resolution colour pictures in almost any combination of its 107-colour "palette" (the slight limitation is due to the way the Apple displays colour graphics) and store them, on disk, in only two or three sectors, rather than the familiar 34-sector high-resolution dump.

This is possible because it stores the moves taken to create the picture, rather than the picture itself. When called, a binary sub-routine redraws the picture as originally created.

The "object" part of this editor's name comes from the fact that an object can be added to a picture on the screen. This can be used in adventure games, when a box may or may not appear in a certain room at a certain time.

The super shapes editor is an enhancement of Applesoft's shape tables. Its only distinctive feature, when compared to many of the other shape table enhancements available, is that it does not limit the size of a shape to a box of pre-defined dimensions. For example, I have successfully created a shape which, when drawn, displays my signature across the screen.

The manual that comes with the Graphics Magician is, on the whole, very good. As with most manuals, it is at times necessary to read between the lines, but detail is one thing that has not been neglected, down to the point of "technical details" on how the various editors work. (This is *not* recommended reading, unless you're really into that sort of thing.)

The Graphics Magician is a combination of two other packages from Penguin Software, The Complete Graphics System and Special Effects, but with some of its own features. It is available from Imagineering outlets and, at \$69, represents very good value for money. □

SOFTWARE REPORT CARD

Program:	The Graphics Magician			
Made by:	Penguin Software			
Useful for:	Games, graphs demos			
Hardware Req'd:	Apple II, disk			
Ratings:	excellent	very good	good	poor
Documentation:		✓		
Ease of use:	✓			
Speed:	✓			
Functionality:		✓		
Support:			✓	
Value-for-money:			✓	
Extras include:	Animated alphabet, binary transfer utility			
Price:	\$69			
Review Copy from	Random Access, Adelaide			



LINTON-SIMPKINS

AS EVERYONE knows, Pandora's Box has been replaced by the media as the source of all the world's miseries. We who practice our trade with the pen, or the terminal, have been blamed for everything from the drought to herpes type II.

One must admit, however, that in recent times we have been let off the hook a mite, as both the drought and herpes have been listed as another case of the Almighty's wrath being visited on a nation which has refused to re-elect His chosen party.

Weaving along from the train through the blazing heat of that Sydney desert known as Circular Quay, I was musing on how misunderstood we of the "Fourth Estate" (the press) were by the general public and the aristocracy of the landed Gentiles. Then, after dodging a taxi that was being driven by an ex-Panzer commander, I entered the mirage that is called the Regent of Sydney Hotel.

At the door, a mini (actually, almost micro...and an eight-bit one at that) Asian opened the door for me. Then, as I looked rather more bewildered than usual, two other uniformed staff rushed up to offer assistance. It must be the beard, I thought, while desperately trying to re-establish contact with reality. They think I'm an Arab with oil wells and a harem...

It was great. It reminded me of my stay in Singapore, and for a moment it seemed as if the media had at last been recognised as truly important.

What it was all about, was that I was arriving 30 minutes late for a press conference put on by Sigma Data. The company was launching a new family of computers with its normal manic energy. What, another new maker here, you might ask with feigned horror. What with some 170 makes of personal computer, 14 mainframes, and God knows how many minis and single-board computers, what do we need another one for? The answer is, Why not?

The computer industry is just about the only one in Australia with free and open competition. That, however, is just another name for the bloody war that is

being fought across the boardroom tables of the nation. Olivetti is selling Dr Edward de Bono's lateral thinking, and Digital seems to be telling us that little girls are soon to abandon dolls, knucklebones, mud pies and the ancient game of "You show me yours and I'll show you mine", in favour of using a DEC machine for advanced accounting procedures.

But back at the Regent, things were happening with a certain stately grace. My late arrival wasn't as successful as I had hoped. I hadn't missed Mike Faktor's sermon on Sigma and its new machine, made by Convergent Technology (of guess where).

I normally try to miss Mike's speech because I always find myself reaching for an order form and a pen whenever I hear him for longer than two or three minutes. Convergent Technology seems to have either imbued itself with Burroughs philosophy, or the other way about, and its growth has been exponential. I love that phrase, mainly because not one person in 10 actually knows what it means, and so it makes me seem more profound. But back to the Regent, and an attempt to revert to convergent rather than divergent thought patterns.

Convergent/Sigma, for they both share in the local operation, are marketing two sets of work stations that make up into coherent networks of multi-purpose units. These can swap purposes with the facility of a Liberal politician moving between leaders. The Sigma-sold units, either IWS (integrated work station) or AWS (application work station), are meant to be arranged in clusters. The AWS family seems to be better suited to fairly simple applications as part of a network, but not its head.

The AWS units can have from 256 to 512 kilobytes of RAM, a 28 by 80 screen, one or two 13 cm floppies at 630 kilobytes each, and a 13 cm Winchester drive with 5, 10 or 16 megabytes. It really isn't your personal computer, but it's very businesslike.

Convergent/Sigma see a group of IWS units connected through a cluster controller, to be part of a network shar-

ing mass storage. Each IWS unit is dedicated to a particular task – for example, Cobol – at a particular time.

Moving right along to the AWS unit, we see that its units are intended to be either the masters of clusters or merely spear carriers in the chorus of the clusters. IWS units can have from 256 kilobytes to one glorious megabyte of RAM (I can recall how I suffered from programmer's agoraphobia when I swapped from an 8-kilobyte mainframe to a 64-kilobyte one), a 24 by 32 screen, one or two 20 cm floppies with 500 kilobytes each, a 20 cm Winchester with 10, 20 or 40 megabytes, and an SMD storage module of up to 1.2 gigabytes. What exactly a gigabyte is I am not absolutely sure, but it's one hell of a lot of bytes.

Naturally, the system has all sorts of software and handles more networking protocols than the butler at the Lodge. But *Your Computer* readers are of the program-your-own persuasion, and I won't go into the software maze, even for you lot.

The Sigma people were astonishingly hospitable, and the lunch afterwards would seem to imply that the firm of Faktor, Cohen and Nathanson expects to do its usual business...

A Nice Contrast

The friendliness with which Sigma greeted the Fourth Estate was a nice contrast with the events of the next few days, like trying to get into the First Australian Personal Computer Show, and not being one of the chosen few to make it to the Australian Computer Society breakfast.

After the elation of the press spirits caused by the Sigma/Convergent release, it was with some shock, almost requiring the administration of plasma and saline, that I returned to Earth by attempting to visit the exhibition of personal computers, located in Centrepont, Central Sydney's teenage heaven.

I was calling by on my way to see a Data General release across town, and I had some hopes of killing two birds with one stone. Passing through the lower reaches of Centrepont, I foreswore breathing, as many citizens around

me were smoking a certain illegal substance in the corridors...and if I had breathed in, I'd have had no need of escalators or lifts to get to the start point of the "Data-Processing Comes to the Suburbs" show.

I never managed to get in, but other noble writers in this magazine have written detailed reports. Finally, abandoning my fruitless efforts to make an entry, I headed off by way of a medieval-style coffee shop to the Sheraton Wentworth Hotel to view the latest Data General offering in the mini-computer race.

Shares In Printer's Ink

In the days when I had up to 11 pages of a major newspaper to fill with more-or-less computer-oriented copy, I was forever grateful to Data General. The company released a new hardware product each week and, since hardware is far easier to write about than software, I found Data General to be an ever-present aid.

What Data General was on about was its new Eclipse M/V 10,000 computer system. I must say it seems like a rather nice machine that might just get lost in the gigantic rush that is the Australian computer industry. (You should by now be aware that the Americans have decided to hold a limited computer war with the Japanese in Australia, just like they are planning to hold a limited nuclear war with the Soviet Union in Europe, rather than on home ground.)

At the Sheraton Wentworth release, we heard all — I stress the *all* part — about the Eclipse M/V 10,000 and a new and rather striking graphics terminal.

Despite the narcotic nature of the data flow, the message that got through was that Data General had a very good graphics terminal on paper, and I look forward with great interest to trying it out in practice. The Eclipse M/V 10,000 is just another very good super mini at the top-end of the Eclipse range which, with its new graphics terminal, can now be thought of as a top-end business machine, and good for technical applications, too. In fact, the Eclipse M/V 10,000 looks like a mainframe machine, but with many of the advantages of single-board computers to boot. Not the least of these advantages is that the machine fits into the general furniture of the office. At around \$100,000, it isn't really a personal computer, but it remains interesting to computer freaks like us.

For the technically minded, the Eclipse M/V 10,000 operates through a range of 2500 kilobytes single-point and 1900 kilobytes double-precision Whetstone ratings. According to Data General, it has this stupendous performance because it uses advanced Schottky and gate-array logic and a two-

board hardware floating-point processor. To go with all this, Data General has made the machine able to operate on several commands in parallel.

In hard speed figures, the Eclipse M/V 10,000 has a cycle time of 140 nanoseconds, a 32-bit processor (ah, the nostalgia of it all — fixed words and 32 bits, I regain my youth) which employs microprogramming, hardware floating-point, advanced circuitry and a 57.2 megabytes per second memory system bandwidth.

Many of the features urged by Data General as selling points for the Eclipse M/V 10,000 leave one a mite perplexed as to their precise meanings. There is a mild whiff of the advertising copywriter's art about them...

Under the heading "Highly Parallel System Architecture", Data General lists things like pipelined instruction processor and cache, hardware address-translation accelerator and cache, dedicated address-generation processor and, finally, multiple dedicated bus structure.

Other items offered include a 104-bit micro-instruction word and a control store that is expandable to 8192 words. It gets to be rather more exciting than the pictures of tattooed Maoris on the wall and the mineral water in one's glass, doesn't it? Actually, the Eclipse M/V 10,000 is likely to sell well to mixed commercial and technical users, particularly with the graphics unit.

So then it was over. The Data General users said how they loved Data General, and Data General said how they loved them, and one man told us how he was going to use the new terminal and, shortly, a new Eclipse M/V 10,000. And we all went home tired but happy after a rather good lunch and with a bottle of sparkling wine with Data General's label on it.

I'm saving mine to celebrate the establishment of a truly local chip-manufacturing plant that builds 32-bit micros. I suspect that Data General's sparkling wine may not last that long. I'll tell you around 2001.

Frank Feels Neglected...

As probably the only computer writer in the Southern Hemisphere who hasn't received an IBM-PC to play with, I feel neglected.

Still, I haven't missed out on playing with the wretched thing, as many of my colleagues have them on loan (and an academic I know has one that was actually paid for). At least one of these machines was made in a mushroom-packing country which lies to the west of the Middle Kingdom, and used to have a Portuguese name.

International Business Machines has done its usual superb marketing job on the IBM-PC, and one can expect that

the boys from the Kent Street pagoda will sell thousands of them to members of the normally-born-to-rule-but-now-temporarily-in-opposition Liberal/National party coalition.

In fact, after looking over the IBM-PC and re-reading the *Byte* magazine feature on it, I am more and more convinced that the machine was designed for use by Harvard graduates, and will shortly be available with a nine-carat gold-trimmed keyboard, and offered for sale in *Playboy's* Christmas issue.

To a non-Harvard graduate like myself, who can't afford to even buy a Christmas issue of *Playboy* (curse you, Bob Hawke, and your 10 per cent devaluation), the IBM-PC seems rather over-priced and, dare I say it, a mite down on power.

Make no mistake, IBM will sell shiploads of the things — IBM sells better than anyone. In the meantime, many competitors are around and some of them offer vast amounts of power and fun for rather a lot less than the IBM-PC sells for. But this situation is nothing new to IBM and even if the company relies on dealers, those dealers will be selling IBM's way and with IBM's crusading faith.

Greater Access

Access, one of IBM's competitors, does offer rather a lot, and even IBM's legendary marketing may not be able to bridge the gap. For about the minimum usable IBM system cost, Access offers an integral printer, 64 kilobytes, two 13 cm double-density floppies with 386 kilobytes and a small screen.

To go with all the other stuff, the Access people say that they are offering some fairly exciting software. Again, this software has a markedly business look about it, but it doesn't detract from the personal-computing aspect of its capabilities.

Offered are an integrated word-processor, some accounting programs, spelling corrections and a data-base facility. Communications haven't been neglected, with internal modems allowing acoustic coupling or by a direct-contact telephone jack.

If anything goes wrong with the mud removal system at some powerhouse or other, the Access system operates for an hour on internal batteries. Oh, one more thing, it uses a stylus print, so type styles can be altered by software.

It's all rather confusing, isn't it? Which one of the available 176 models of personal computer will you buy?

Perhaps if you wait, you might be able to find someone who has found out that he/she or it really hates computers, and now wants to sell up his personal and use the money to invest in a bottle of straight malt whiskey.

your CP/M computer

By Bill Bolton

AFTER THE CP/M '83 conference, our Australian tour group went on a study tour of several significant manufacturers on the West Coast of the United States.

The first manufacturer we called on was Victor, alias Sirius. However, as there is a clear conflict of interest for me to make any comment about that visit, I've asked one of the other tour-group members to write about it. His story hasn't arrived yet, so I'll have to leave his comments till next month. Suffice it to say, Sirius gave us a tour of its assembly facility and a chance to talk to Dan Seales, one of the company's vice-presidents, about where Sirius/Victor is going.

The next day, we visited Intel. However, as most of its manufacturing is now done outside California, we could only be shown a small, old wafer production facility but that was fascinating enough.

Technical presentations on the Intel 80286 and 80386 processors were given. The 80386 is a frighteningly powerful processor — in fact, each time Intel gives me a glimpse into its view of the future, it scares the pants off me. I have great trouble conceiving how one can effectively harness the power of a 32-bit processor such as the 80386 in what we presently call a microcomputer.

After visiting Intel, we made the long trek down the Californian coast to Monterey and Digital Research. This was both an exciting and disappointing day.

It was disappointing in that Digital Research had only prepared a couple of hours of presentations for us — after having committed ourselves to more than five hours of travelling just to get there and back, I had hoped that we would get a full day's worth of activities.

Nonetheless, what Digital Research had to tell us was exciting. A clear presentation of Digital Research's view of the micro software world was given, with some excellent conceptual stuff about where the company saw its products fitting in.

Osborne was the target for the next day. Osborne is being very aggressive in the international market, and is now producing Osborne 1 microcomputers with special keyboards and translated software for several non-English markets. While we were at the factory, Osborne had a large run of German-language machines going down the production line — a very smart move which will further cement Osborne's position in the market place, especially as it is the only American microcomputer manufacturer

taking the non-English market seriously.

Osborne is also aggressively moving into the software publishing field and has an excellent author's guide available (in the United States) for software authors who want to bring their programs up on the Osborne.

From the way the Osborne executives avoided directly answering questions on 16-bit software/machines, it seems clear that they will shortly release a 16-bit-based computer, probably IBM compatible (but presumably in a quite different sort of configuration). They were also aware of the real limitations of the Osborne 1 and I expect that many of these will be attended to in the eight-bit Osborne 2, due for release soon.

Microsoft was our last stop and this involved a flight up to Seattle and into the cold parts of the United States. Microsoft had prepared a variety of presentations which kept us busy for all the time we had there — definitely a big plus over Digital Research on the public relations side.

What is most impressive about Microsoft is its commitment to using small computers. They're everywhere. Most offices have a micro in them, and in every wing of the building there are at least two "machine rooms" full of a wide variety of micros which are used for software testing and development.

An excellent technical presentation was given on MS-DOS. However, while the possibilities for MS-DOS are exciting, the marketing aspect of the presentation was disappointing and left me feeling very uneasy about MS-DOS as a product. Microsoft has only now released the general MS-DOS versions of its languages and Multiplan, and I can only wonder why it has taken the company such a long time to support its own operating system with its own software products.

I also got the feeling that Microsoft is much more committed to XENIX than to MS-DOS as its operating system of the future. For some time, I've been concerned that MS-DOS development is being controlled largely by what IBM wants and can support on the IBM-PC — it is the major user of MS-DOS in its PC-DOS form.

However, this was vigorously denied by Microsoft, both at the factory and later in Sydney by Scott Oki, who was here for the Australian Personal Computer Show in March.

I managed to get some time to talk with Scott about where Microsoft is

going. After our chat, I felt more confident about his company's commitment to MS-DOS. However, Microsoft still needs to back up its talk with better performance.

However, one statement that is often made by Microsoft is that the battle between MS-DOS and CP/M-86 was won by MS-DOS a long time ago. I regard this claim as rubbish — if it seriously was Microsoft's corporate attitude, the company would be in big trouble. As I have said before, it will be some time before we see a winner.

At the moment, Digital Research is ahead in my estimation but not so far ahead that Microsoft can't catch up. Microsoft has tremendous resources; it only needs to make up its mind how it wants to apply them to the MS-DOS task.

Some counter to Digital Research's moves toward device-independent graphics is crucial if Microsoft expects to remain competitive in the operating system area. However, when I pressed Scott about what Microsoft had planned in the graphics area, I was unable to get any sort of satisfactory reply...

Digital Research Extracts Finger

Since joining NEC Information Systems, I have had a chance to experience the frustrations of a supplier in getting hold of software to support a product. Though the Digital Research 16-bit language products and productivity tools have been readily available in the United States, it has been very difficult to get them in Australia.

In an effort to improve Digital Research's 16-bit software supply situation, NEC approached Archive Computer Services in Brisbane about ensuring local supplies of 16-bit software; Archive Computer Services already had some marketing agreements with Digital Research on its eight-bit products.

With a firm order from NEC in hand, Archive Computer Services' Peter Illiffe went across to California to talk to Digital Research and found that the manufacturer now has someone on board who is familiar with the Australian market. Peter negotiated an agreement for Archive Computer Services Brisbane (not to be confused with Archives Computers in Sydney and Melbourne) to represent Digital Research in Australia on an interim basis.

At long last, Digital Research seems committed to strengthening its support for its Australian customers, and the company will probably move to open an

office here in the future.

What this effectively means is that we now have a place in Australia on which to focus Digital Research inquiries and complaints. Archive Computer Services probably won't be able to answer your queries immediately – there's no way it can provide the kind of support that Digital Research offers its American customers.

So don't expect an immediate and dramatic improvement in Digital Research's local support. However, what the new deal does mean is that rather than all the feedback from Australia going into Digital Research on a piecemeal basis from individual users and being easily overlooked, it will now be channelled through one point. As a result, the nature and scope of Digital Research's support situation in Australia may become obvious to the folks back at Pacific Grove.

Archive Computer Services should soon be able to supply the full range of Digital Research's products to end-users and dealers. In fact, it already has most of the range available – I was in Brisbane recently and saw large stocks of software freshly arrived from Digital Research.

User Group Programs On Disk

While I in Brisbane, I took the opportunity to update Archive Computer Services' public-domain collection. It now has CP/M User Group up to volume 90, SIG/M User Group up to volume 93 and BDS-C User Group up to volume 29 available for distribution on disk.

The charge is about \$15 a volume on a 20 cm disk and slightly more for 13 cm formats, which seems a fair price to me. Archive Computer Services should also be able to supply printed catalogues. I can't supply any user-group material on disk; the only way you can get programs from me is on the RCPM system. Incidentally, I have no particular connection with Archive Computer Services, except that it has always given me excellent service and has always endeavoured to make the software it sells available on the widest possible range of disk formats. This, I believe, deserves commendation.

The Dead-Easy Disk Editor

Software Solutions, of Melbourne, has an interesting disk editor available for CP/M-80 called DEAD (it's an acronym for "disk editor and diagnostics"). Whilst admittedly clever, the name is rather unfortunate as far as I'm concerned, for

the first version I got did die when I tried to fire it up on my 8085 CP/M system, despite the fact it was supposed to be written in Digital Research's PL/I-80, which should run fine on 8080/8085/Z80 processors.

I reported it to Software Solutions, which quickly found the problem (there was some Z80 code in an assembly language part of the program) and had a working version for me. Software Solutions certainly gets full marks for excellent support of its product.

DEAD is a general-purpose disk editor with some useful extra diagnostic features. The latest version has run first time without problems on several quite different CP/M-80 systems. DEAD reads the current disk parameters from the CP/M disk parameter blocks and displays the disk configuration each time a disk is logged in.

At the moment, it can't handle the system tracks on the double-density CP/M disks that use IBM System 34 physical format, as these disks have track 0 in single density. However, the rest of tracks on these disks can be handled successfully.

The documentation currently supplied with DEAD is just adequate, but Software Solutions tells me that new documentation is being prepared. A short tutorial on how to use a disk editor should be included, as it's possible to create absolute havoc with one if the user doesn't understand what it's for.

While disk editor programs are useful for changing the contents of sectors on a disk and for learning how the CP/M file system works, I most often use a disk editor for patching up a damaged CP/M disk directory. Unfortunately, DEAD has some shortcomings in this role.

Most disk editors allow you to easily dump out the directory section of a disk so that you can see the complete contents of the directory entries. The directory space on a CP/M disk is actually part of the file space which is partitioned off. However, the directory space is still regarded as part of the file allocation block scheme; its just that the blocks which the directory occupies are permanently reserved for the directory and are not accessible for file space allocation. On a single-density 20 cm CP/M disk, allocation blocks (or groups) 0 and 1 contain the directory.

DEAD allows you to dump out allocation blocks to the screen but will not dump the directory blocks. A directory display command is provided but it will only display the file names from the di-

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rectory in a conventional CP/M format. The only way I could look at the whole directory space was to set the track and sector numbers and dump out each sector, which is very messy. Once I had determined which sector of the directory I needed to edit, the rest of the DEAD facilities enabled me to do it easily.

It should be easy to add a whole directory dump command to DEAD, as Software Solutions has written it in a structured language, PL/I, to be easily maintainable.

Apart from the directory dump, DEAD worked well and should be a useful program; Software Solutions will doubtless soon have the shortcoming fixed. Incidentally, a CP/M-86 version is also in the works (now that the PL/I-86 compiler is available) and should be available soon.

I'm sure that some of you are wondering why I'm writing about a commercial disk editor when good disk editors, such as Ward Christensen's DU or my own DD6, are available from the user group collections. Frankly, the public-domain editors might be excellent hackers' tools

but they aren't well documented and have command structures which only hackers would put up with. DEAD already has adequate documentation plus a sensible command structure with good on-line help facilities that should be understandable by most users. Plus it doesn't need to be modified to run on your system.

DEAD is a very good Australian product and only needs attention to some details to gain a first-class rating.

And Now, PAMS News

The Sorcerer Users' Group in Sydney is preparing to put an RCMP system on line for Sorcerer users. I'll let you have more details when the group is nearer to going on line.

The Mi Computer Club's bulletin-board system, phone (02) 662-1686 Sydney, is well and truly back in business and is already clocking up a respectable number of callers each day.

The initial bulletin-board software problems are now largely under control and new features should be added soon

— check out the article on page 86 of this issue about Christensen protocols for some idea of the planned software download facilities.

Gary Stern put a lot of work into developing the bulletin-board software part of the system (now you can stop leaving messages on the system telling everyone you wrote it, Gary) and Matt Whelan has massaged it a bit further and tied the whole thing into a working system. For the moment the system is only available to MiCC members, although visitor access is being considered for non-members.

Another Sydney RCMP system is making rapid progress toward on-line status. The SYSOP is currently getting a line installed for the RCMP and plans to eventually have a whole stack of programs on a magnetic-tape storage which will be accessible on-line from the RCMP.

The MICOM bulletin-board system in Melbourne, phone (03) 762-5088, is doing well and serving an important function as an information interchange. □



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Futuretronics is the agent in Australia for ATARI[®] microcomputer systems and will be sponsoring one of the international keynote speakers to this year's A.C.E.C. He is Mr. Don Rawitsch, Director of User Services of the world famous Minnesota Educational Computer Consortium. The company is also providing an ATARI[®] equipped computer laboratory for the conference and is mounting a major display at the exhibition.

If you are at all interested in the field of computers in education we hope to see you at this year's A.C.E.C.

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your MICROBEE computer

By Richard Pakalnis

HELLO and welcome back. The absence of my column last month was due to space considerations and no further communication will be entered into. (Thanks for those calls, mum and dad - you disguised your voices very well).

I didn't thank those who came to visit me on the *Your Computer* stand at the Australian Personal Computer Show - you know, the one sponsored by that other magazine. It was a pleasure to meet you. I was surprised by the number of people who recognised me by the cartoon. I think I'll have a facelift - not too many women enthusiasts out there.

Well, back to work. Those who were at the Sydney show will have seen the Colour Bee in action: 64 characters by 16 lines, with 512 by 256 PCG graphics. And let's not forget the new 64-kilobyte Bee - read the ads in March and April...

Again, letters, letters and more letters. Some nice, some not so nice. Complaints have been handed to the Complaints Department; I deal with the nice ones. Just one word, though: Don't write Dear Dick!

Problems Solved

My mail starts with a short letter from John Bornsek, of Clifton Hill (Victoria). John bought a Bee for two reasons - first, because it was Australian, second, because it can retain programs in memory. Well, imagine John's surprise when he turned it off and then on again later. ***!!!!XX!!**

You guessed it: Applied Technology to the rescue. John will be receiving a spare battery and instructions on how to fit it to his Bee. It must be understood that the battery pack was an option on the Bees sold before December 1982 when the Plus model was released.

Hot Spot

Randell Edwards, of Bendigo, tells me he has a 16-kilobyte model and a Haga monitor. He writes, "I have a problem with the Bee performing resets by itself and a black line appears and scrolls up the screen and can't be corrected using the vertical control on the monitor. I believe it has something to do with the Arlec-type power pack, which gets pretty hot when being used. Also, most of the chips on the main board get hot when being used, especially the CPU and PIO. Is this normal?"

"Another problem is with the speaker. When using a 100 uF capacitor, I found the sound faded out after operating the

bell key. I now have a 1000 uF capacitor for C31, but the volume is still not constant. What value should I use?"

Well, Randell, it appears you have a faulty plug pack. Applied Technology has sent one directly to you to save having to send yours back for service. The CPU and PIO do get a little hot but this is normal. The plug pack also gets a little hot but you shouldn't be able to cook an egg on it. The Bee has been tested and runs comfortably with a 55-degree Celsius internal case temperature!

To eliminate the problem with the speaker, eliminate the 100 uF capacitor and connect the speaker directly.

Say Again Sam...

J.F. Aalbers, of Glengarry (Victoria), asked for a little help on pricing: "You stated in a past issue that you visited the Applied Technology showroom and got hold of prices for upgrading the Bee. I have probably Bee No 50 or thereabouts, which is a 16-kilobyte version. What I want to know is, what is the cost if I want to convert from 16-kilobyte to CP/M disc drive."

"I also would have expected to see a price on printers available for the Bee - would it be possible to have a section on printers in your next issue?"

To convert to a 64-kilobyte Bee, you would have to return it to Applied Technology for a full modification. Your old-style Bee will need to be mounted in a new case and then upgraded to 64 kilobytes. The cost would be \$300 to convert everything to operate with disk drives. The disk drive with CP/M will cost \$799 which includes associated software, such as BASIC, Edasm, WordBee and several useful utilities.

The S100 interface is no longer required so this is the total outlay needed to add a disk to the MicroBee. Please note this figure includes the 380-kilobyte double-sided, double-density slimline 13 cm drive. Additional drives can be mounted in the same case and these will cost \$399 (all prices include sales tax).

Printers are another matter. I take your point about a section on printers for the Bee and will look into it for a future issue. For the moment, however, look in the advertisements and see what's happening. I personally believe you should pay the most you can possibly afford. Don't forget, you have to read the results - and if you upgrade, at least you still have a fine printer. But I'm biased: I use my printer, an Epson MX80, for

printing the listings for pocket programs and suchlike, and obviously print quality is very important.

Click Go The Bees

Here's another musical (?) quickie, this time from Alister Ferrier, of Coleraine (Victoria). He says this program involves sound-effects using the "OUT 2,59:OUT 2,65" command to make the internal speaker "click". In turn, you can place this command in a loop with graphics and get some very nice effects.

He went on to say other "OUT" commands may do the same as this but has found this one to be the most effective.

```
00100 REM *****
00110 REM      SOUND EFFECT *****
00120 REM *****
00130 REM      BY *****
00140 REM      A.FERRIER *****
00150 REM *****
00160 CLS
00170 LORES
00180 FOR A=1 TO 127 STEP 2
00190 GOSUB 380
00200 SET A,0
00210 NEXT A
00220 FOR A=1 TO 47 STEP 2
00230 GOSUB 380
00240 SET 127,A
00250 NEXT A
00260 FOR A=127 TO 1 STEP-2
00270 GOSUB 380
00280 SET A,47
00290 NEXT A
00300 FOR A=47 TO 1 STEP-2
00310 GOSUB 380
00320 SET 0,A
00330 NEXT A
00340 END
00350 REM
00360 REM SOUND ROUTINE
00370 REM
00380 OUT 2,59:OUT 2,65
00390 FOR T=1 TO 10:NEXT T
00400 RETURN
```

The Beilharz Line

Hans Beilharz, of Kareela (New South Wales), sent in quite a useful bag of tricks. His letter will explain that heading - be patient.

1: Memory location 257 (dec) stores the status of the LOCK (capital lock) key, 1=UPPER CASE and 0=lower case. The keyboard can, therefore, be set during the running of a program just before an input or KEY\$ statement to avoid having to test for both upper and lower case.

2: A trap to watch when converting Tandy TRS-80 programs is the DIMension statement. This works best when put right at the beginning of the program. One TRS-80 program used the DIM statement in a sub-routine, but will

not work on the Bee. It doesn't cause an error, it simply doesn't dimension an array. There seems to be some conflict between the dimensioned array and the sub-routine stack in memory.

3: Another useful idea is to change the VDU display to get a seventeenth line on the screen. This seems to fit all right on most screens I have seen. The line is very handy for displaying messages or status information, as it is not affected by scrolling or clear screen.

You need the poke statement to print anything on the seventeenth line – the program listed clears the seventeenth line and you input the message.

```
100 FOR A = 0 TO 63
110 POKE 62464 + A, 32
120 NEXT A
130 INPUT A1$
140 FOR A = 1 TO LEN(A1$)
150 POKE 62463 + A, CHR(A1$(A))
160 NEXT A
```

Learning A, Bee, C

Starting about now, two young fellows are running computer courses in Syd-

ney's Hornsby district. The courses, which will be held on weeknights between 6.30pm and 9.30pm, are to be run in a set of four courses, each costing \$25 per three-hour lesson. There are family and group discounts.

The course will be oriented around the MicroBee and will cover BASIC programming and a simple overview of hardware. If you want more information, write to Digital Concepts Computer Enterprises, 75 Patrick Street, Avalon, 2107, or phone John Nicholls on (02) 419-5905 and Dirk Williams on (02) 918-9712.

Merlin's Adventure

Lindsay Ford, alias Dreamcards, has written another fabulous piece of software for the Bee. Called Merlin, it's a 32-kilobyte adventure set in England during the Dark Ages.

Your task is to search through a dark forest inhabited by robbers, outlaws and creatures with awesome magic powers

to find a legendary sword that will unite the kingdom. As you travel about, you'll find many strange things and see many strange places.

With the program comes a 54-page booklet which includes the program listing. Who else gives you that? Lindsay's fully commented listing makes it easy to make alterations to the game or conversion to another BASIC. It is available from Dreamcards, 8 Highland Court, Eltham North, 3095.

I look forward to seeing a lot of you at the Data 83 show in Sydney's Centrepoint from May 17-19.

Next month, more contributors' letters and hints, a look at some excellent software from Mytek, a closer look at Dreamcards' Merlin and Psychotec games and a few surprises.

Incidentally, a big thank you to Tom Cooper and his staff at President Office Machines for allowing *Your Computer* space on his stand at the Australian Personal Computer Show in March.

Bye for now.



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Apple II: Educational programs, addition, subtraction, multiplication — for kids of all ages. Vincamp, Box 112, Mount Beauty, 3699. Phone 057 572046 (Evenings).

Club: The newest club for the Ohio super-board has begun! For free introductory newsletter, write to 27 McGown Rd, Mt Eliza, 3930.

ZX81 1K: For sale, plus manual, leads, tapes, transformer. \$150.00, price negotiable. Rhiannon Software, 72 May Street, Preston, Vic 3072.

Hitachi Peach: 6 months old, 48K RAM, dual 320K, 13cm drives, colour monitor, Hi-writer, Procalc, Assembler, games, complete documentation, a dozen blank discs. Worth over \$5600. Sell \$5000 o.n.o. Phone Winston, (02) 638-4504 (after 3.30pm).

VIC20: Datasette, 20K, 16 colour high-resolution graphics, \$300 worth of software. Joystick, 2 manuals. Super value! Urgent Sale! New — over \$1000, pay only \$790 (o.n.o.). Phone (049) 487024.

MicroBee 16K: Editor/Assembler, manuals, 10 cassette programs including Chess, Target, Utilities. \$390 o.n.o. — Bob Milne, 10 Brennan St, Yagoona. Tel 644-8046.

TRS80: System 80 owners. See the Richcraft Handbooks. A wealth of information on programming and interfacing. Analogue conversions, Morse, ASCII and RTTY programs. SASE to Northern Digital, PO Box 333, Charlestown, 2290.

Superboard II: With Cegmon monitor, Tasker expansion system with an 8K Eprom board (extended monitor), and 8K RAM board, 12" black and white monitor. \$400 o.n.o. Ring Mark (07) 398-3983, between 5 and 9pm.

S100 Boards: TCT RAM card with 64K fitted, \$295. TCT PROM card takes 2708 through to 2532/2732 up to 64K, \$80. Phone (02) 888-7624.

TRS80: Model 1 (48K), DSE drive, RS232, B+W monitor, cassette. \$1700 o.n.o. Phone (056) 551239 (a.h.).

TRS80: System 80 Software. Eliminator, Star Fighter, Star Flite, Penetrator, only used once. \$80.00 thef lot. (02) 819-7821 Mark Gosbee.

ZX81: Includes 16K RAM, one tape recorder + tape, leads, manuals and two games books. \$350. Tel (02) 367143.

System 80: Blue label, 16K, Manuals. 8 months old, excellent condition, Basic book, \$280 game software. \$550 o.n.o. (02) 588 3720 (any time).

Monitor: 12" B+W monitor. Modified TV, as used for MicroBee. \$100 o.n.o. Ph (02) 875-1758 (a.h.).

Clare C70 Users: Upgrade to locking alpha key, TAB key, cursor keys with Wordstar codes, up to 75 user defined functions. \$25 plus chip. Enquiries (02) 729 6301.

VIC20: 12K, 4 cartridges, 4 cassettes, 4 books. Excellent condition. Value \$575, only \$450. (02) 546-6513, John Loh.

Wanted: A program to send MicroBee Lores/Hires graphics to an ITOH 8510 Printer. S. Frawley, 30 Donaldson Drive, Paradise, S.A. 5705. Phone (08) 336-4569.

TRS80: Model 1, 16K, for sale, plus some games, manual and assembly language programming book. \$500. Phone Bruce (063) 722286.

MPI 51: (2) used disk drives in very good condition. \$450 o.n.o. Also for sale, TI PC-100C print cradle, plus a TI59 programmable calculator. All manuals inc, plus magnetic cards, power supplies, printer paper (thermal), lots of software on magnetic cards, and plug packs. Both sell for \$450 o.n.o. Tel Nick, (03) 481-2768 (a.h.).

Atari: With 4 cassettes and 3 hand controllers for sale, as new \$275. With 18" B+W TV \$310. (A.h.) 661-7480.

TRS80: 48k, Double density board, disk drive, DMP 100 Printer, Level 4, Fortran, VDU, Clock, \$500 of software, cassettes. \$1600. Tel Cartwright 607-6228.

IBM PC: RS232 adaptor, \$150. ABM Omniboard with game and clock \$225. Printer adaptor, \$150. Amdek colour 1 monitor, needs 240/115v trans, \$250. Enquire B. Lee, 44 Queen St, Berry, 2535 NSW.

WORPRO: Wordprocessor for System 80 and TRS80. Do you write letters, student reports etc., but can't justify the expense of a sophisticated wordprocessor? WORPRO3 will probably be just what you require, and at a price you can afford. One disc, 48K, ready to mount on your DOS. \$55 postage paid. Country Software, Baradine Road, Bugaldie, 2357.

Hitachi Peach: 64K, disk drives, high resolution colour monitor, word processor, manuals \$2850. ASR35 printer \$160. Phone (062) 58173.

Ageing Managing Editor: Well-worn brain cells, basically over the hill. Would rather sell than shoot. All enquiries to Home for Retired Computer Journalists, Hades.

Fair: Are you interested in selling an educational program you have developed? Sell it at the Woden Valley Computer Fair on April 29th, 30th. Contact Sue Burn, Woden Valley High School, Ainsworth Street, Phillip, A.C.T., 2606 for details.

TRS80: Computer Admirals. Computerised version of board game. Tape etc \$7. E. Hughes, 52 Lowry St, Cardiff NSW 2285.

Apple PAL Colour Encoder Card: Never used. Brand new \$95. Phone (057) 57 2046.

Swap: TRS80 programs Penetrator, Scarfman, Galaxian, Armoured Patrol and more. Write to Flat 10/160 Kangaroo Road, Oakleigh, Vic 3166.

ZX81 1K: 6K programs, Basic and machine code. Send SSAE to D. Noble, 34 Murri St, Blackheath, NSW 2785.

For Sale: Softcard (Microsoft) plus original documentation for Apple II, as new \$370. Bob Fell, 8 Robinson St, Carnarvon. Tel (09) 941-1122.

MicroBee Software: File Index system — for name and address oriented records. Features 20 user definable record categories. Ideal for debtor/creditor records, club/organization lists complete with individuals details, sales records etc. Tape with instructions and listing \$13. Card Index System — for all classes of date oriented records. Can search forwards and backwards on exact or approximate dates, etc. Tape \$8. Financial manager — now features 24 expense analysis categories, each expressed in money and percentages. Ideal for home or small business. Tape with instructions and listing \$13.

Text Editor — also recently upgraded with improved displays and enhanced edit facility. Tape with instructions and listing \$15. All above programs offer tape save/load of keyboard entered text and optional printer routines inbuilt. Mail orders to B. Procter, 27 Roberts Av, Mortdale 2233. Prompt return guaranteed.

VIC20 Program: 3.5K, Hangman with sound, defined graphics and timer. Instructions and program on tape. Send \$10 to 'Maksoft', 50 Dixon St, Stereet, Malvern, Vic 3144.

Hitachi Peach: PAL card, SS/SD Drive, plus \$300 worth programs. \$2000. Also Tandy CTR-80A cassette \$50. Tel Allan (086) 862210 10-5.

MicroBee Educational Software: Suitable primary and secondary schools. For complete list, write R Goddison, 14 Mollison St, Vic. Tel (057) 841926.

Wanted: ZX81 Cheap. Tel (057) 261207.

TAB EDP Terminal: Very powerful, top condition. \$1500. Handbook included. Tel (062) 315886 after 4pm.

Apple Tetwriter: Lowercase output to your printer. No keypad modifications required. Functions include, add to file, update file, recall, save, tabs, delete, write. A versatile, useful utility when the cost of a full wordprocessor is unjustified. Just right for essays, letters, reports or club news. Requires Apple 48K, 1 disk drive, printer. Unprotected so you can change printer codes to suit your printer. (Epson is default). Complete instructions. \$25.50 to R.A. Chalmers, 26 Bittern St, Inala, 4077, Qld.

TI 99/4A Wanted: Will pay \$350 negotiable. Ring Michael Anderson (046) 258828.

ZX Spectrum: 16K RAM, colour, hires graphics, power pack & \$60 worth of software, hardly used, \$300. Tel John, Wk (03) 874-2233, Hm (03) 729-9531.

Apple II Games: All types, new catalogue. Ban-Pit, 79 Lakeside Av, Mt Beauty, 3699. Tel (057) 572097.

For Sale: Disk drive and controller card, and 10 mags. Also numeric keypad. All for \$1150. Tel P. Allen (07) 358-4050 or (07) 521830.

For Sale: TRS80 Model 1, level 2 16K with monitor, lots of software. \$700. Phone Richard (02) 869 8149.

TRS80: 16K extended basic colour computer. Comprises computer, manuals, joysticks, two games, cassette cable. Worth \$815 for just \$699. Phone (059) 567233 a/h.

ZX80: Basic Programming Course. Menu Driven, cassette loading. Send \$25 to V. Winterbine, 6/10 Hoddle St, Elsternwick, 3185, Vic.

Printer: C-ITOH 8300 (serial) 160CPS. Four different fonts. Urgent Sale. \$300. Interface for Apple \$100. Will separate. Tel George 43-4091 (a/h).

MicroBee: User group. Frenchs Forest area, Sydney. Anyone interested in forming a group, please contact David on 452-3156.

MicroBee Users: Swap your homebrew software or hints, with a member of Melbourne MBUG. Tel (03) 741-5534 7-9pm.

For Sale: VIC20, datasette, joystick, 5 manuals, superexpander, 2 cartridges, and many programs. New \$700 — sell \$550. Tel D. Stone (02) 525-2996.

Pet/CBM/VIC Assorted Programs: Send for catalogue \$10. All programs supplied on tape with full instructions — all one price \$10. G. Pearson, 7 Braeside Place, Engadine, NSW 2233. Tel: 520-4628 (a/h).

THOUGH originally designed for the MicroBee, the ETI 688 EPROM Programmer (developed by our sister publication, *Electronics Today International*) is well suited to the Kaypro.

The design features simple circuitry (only four integrated circuits), simple interfacing and reasonably simple software. Its only drawback is that programming is not as fast as it could be, but in some respects this is an advantage, as both software and hardware timing become very non-critical.

Interfacing the ETI 688 involves two steps. First, a plug for the Centronics parallel port must be wired up, then one chip on the Kaypro must be replaced by jumpers.

Table One lists the connections for the parallel port, in terms of both the original ETI schematic and pin function.

Table Two shows the interconnections needed for the jumper plug that will replace U52 in the Kaypro. This integrated circuit is a 74LS241 and it functions as an output buffer — it's not bi-directional and, as the ETI 688 requires that the parallel port be both input and output, we have to replace it. The only effect of replacing it with a jumper is that the PIO chip is now directly connected to the port, so any careless handling of connectors could destroy the PIO rather than the 74LS241. It is recommended that U52 be re-inserted when not using the ETI 688.

The software to drive the ETI 688 has been written in SBASIC, and functions differ slightly to the original MicroBee software — the major difference is that it obtains its data for programming from a disk file. The program also contains no provision for programming part of an EPROM. This feature is of limited importance in this application, since the source data is a disk file.

The recommended procedure to program part of an EPROM is to copy its contents into a disk file, patch the file with the required additions and then re-program the EPROM with the entire set of data. If the changes made were only to unprogrammed parts of the EPROM, then it doesn't have to be erased.

Finally, a few tips on constructing the ETI 688: The program/read switch must be checked manually for the correct orientation, as the diagram cannot be trusted. To do this, check that pins seven and eight on the personality socket are shorted in the "read" position and are open circuit in the "program" position. If you use metal stand-offs,

make sure that the one adjacent to IC2 is insulated from the PCB track. The variable resistor may have tabs that are too large for the PCB holes. If this is the case, it can be mounted on short legs and then bent over IC4. This has the advantage of making it very accessible for adjustments.

Incidentally, the write-protect tabs supplied with every box of disks make excellent covers for protecting the EPROMs from erasure by stray ultra-violet light. □

Table 1 — Connections.

Name	Microbee Parallel	Kaypro Parallel
	Port Pin Number	Port Pin Number
Gnd	8	19
Strobe	7,15	1
D0	13	2
D1	5	3
D2	12	4
D3	4	5
D4	11	6
D5	3	7
D6	10	8
D7	2	9

Table 2 — Jumper for U-52.

Connect the following pairs of pins together (1 pair for each of the 8 data lines)

2-18
3-17
4-16
5-15
6-14
7-13
8-12
9-11

Listing 1 — ETI 688 EPROM PROGRAMMER

```
FILES R(2048)
DIM BASE BYTE ARRAY(2047)
VAR BUFFER=INTEGER
LOCATION FILE BUFFER=0
LOCATE ARRAY AT BUFFER
VAR I,J,M1=INTEGER
M1=0FFH

PROCEDURE DISPL(ROW,COL=INTEGER;DS=STRING)
PRINT CHR$(27);";";CHR$(31+ROW);CHR$(31+COL);DS;
END

PROCEDURE DELAY(D=INTEGER)
FOR J=1 TO D
NEXT D
END

FUNCTION GETBYTE=INTEGER
VAR B,C,D=INTEGER
B=INP(8)
C=INP(1CH)
D=C AND M1
OUT 1CH,D
D=D * 2
OUT 1CH,C
DISPL 15,30,HEX$(I)
END=8
```

```
PROCEDURE TEST
PRINT "TESTING";
OUT 9,4FH
FOR I=0 TO 2047
IF GETBYTE<>0FFH THEN DISPL 18,30,"ERROR!"
DELAY 150
NEXT I
END

PROCEDURE PROGRAM
PRINT "PROGRAMMING"
OUT 9,0FH
READ #0,0
FOR I=0 TO 2047
OUT 8,ARRAY(I)
J=GETBYTE
DELAY 100
NEXT I
END

PROCEDURE VERIFY
PRINT "VERIFYING"
OUT 9,4FH
READ #0,0
FOR I=0 TO 2047
J=GETBYTE
IF J<>ASC(ARRAY(I)) THEN DISPL 18,30,"ERROR!"
DELAY 100
NEXT I
END

PROCEDURE GETFILE
VAR FILE.NAME=STRING
DISPL 10,10,"EPROM DATA FILE NAME ="
DISPL 10,33,CHR$(23)
INPUT2 FILE.NAME
CLOSE #0
OPEN #0, FILE.NAME
END

PROCEDURE ASK
VAR COMMAND=BYTE
DISPL 12,10,"COMMAND ="
DISPL 12,20,CHR$(23)
INPUT3 COMMAND
DISPL 12,20,""
CASE ASC(COMMAND) OF
10:PROGRAM
20:TEST
22:VERIFY
24:STOP
27:GETFILE
END CASE
DISPL 12,20,STRINGS(32,32)
END

REM MAIN PROGRAM
PRINT CHR$(26)
TEXT 0,\
ETI-688 EPROM PROGRAMMER
COMMANDS ARE -
" T - TEST THAT THE EPROM IS FULLY ERASED.
" P - PROGRAM THE EPROM.
" V - VERIFY THAT THE EPROM IS CORRECTLY PROGRAMMED.
ESC - RETURN TO "FILENAME" QUESTION.
" X - EXIT TO CP/M.\
I=10H
J=INP(1CH)
J=J OR I
OUT 1CH,J
GETFILE
REPEAT ASK UNTIL 0
```

your TRS80 computer

By Rod Stevenson

SINCE I AIM my articles at beginners, it seems appropriate here to repeat my answer to criticism that a lot of material written about Our Hobby is of too high a technical level. While this is undeniably so in some cases, I believe the absolute newcomer is being unrealistic if he expects to pick up an article concerned with a technical subject such as computing, and understand every word at first glance.

Certainly, I had the same lack of understanding some years ago, but in time all became clear and I was then able to re-read those articles as though they were newly written. There is, in fact, a disadvantage at the opposite end of the scale: those people who have located easily understood material, which in turn has given them quick advancement, have missed out on the real "feel" of appreciative understanding that comes with slow learning.

In the Adelaide TRS80 Users' Group, we have a policy of aiming our newsletters and monthly meeting topics at the member who has been with us for six months or more. This means it's not a big step up or down.

So, if you find it's all a mystery, stick with it. You'll be glad you did!

Printer Control

Because of the way our version of Microsoft BASIC organises its LPRINT routine, a little deviousness is required to be able to send control codes to the printer. Various codes that you LPRINTed are often changed by the LPRINT logic, which thinks you've made a mistake.

The answer is not to LPRINT them at all - POKE them, which is the equivalent of a machine-code routine. On a Model 1, it's a simple matter of using memory-address 37E8H to check if the printer is busy before POKEing the desired value to the same address. On a Model 3, it's a little more complicated: still use 37E8H to check if the printer is busy, but then send the values OUT port 248.

This is my method of initialising my Olivetti Praxis typewriter which at switch-on already has margins and tabs set. There have been articles in various magazines on programs which do this, but to me this is the simplest way, and the most readily understandable.

Don't Just Sit, Think

Because of the readily interactive nature of BASIC, it's all too easy just to sit

at the keyboard and type in a program as it comes. And this is why the detractors of BASIC rubbish it as being unstructured, because you can get away with such a lot.

To me, this is a decided advantage - I do like Assembly, but I use BASIC if I want to get a job done quickly.

However, this very "friendliness" does lead you into traps, such as not having data in the form required when it's to be printed, either on the screen or on paper. As well as such obvious techniques as PRINT A\$ + B\$, there is the use of a dummy variable which is assigned to arrange things for the print-out without changing the variable for later use in the rest of the program.

For example, so that a numeric variable can easily be "modified" to have leading zero rounded to five cents, or otherwise worked on,

```
DU$ = STR$(A):  DU$ = RIGHT$(DU$,  
LEN(DU$)-1)
```

will change a numeric variable to an alphabetic one and remove the leading blank position provided for a plus or minus sign. However, the actual variable A will not have been altered when needed again by the program.

Note my use of DU for dummy variable; I use T1 as a temporary variable. Regular readers of this column will remember my pleading for the use of meaningful variable names, rather than X,Y,Z,Q. When you have to decode someone else's coding, you'll really appreciate this.

It's also of value when you come back to your own masterpiece next year (month?) and are able to instantly recognise variables because you always use N\$ for name, N for number, C for country, and so on.

As I Was Saying...

Because I'm aware of just how valuable magazines are as a learning tool, and because I meet many newcomers whose total learning so far is from the printed word, I'm moved to lament the impracticality of including pronunciation guides with the various glossaries.

While it's entirely an emotional matter, I can't help feeling there's some knowledge missing in the person who says "A dollar" instead of "A string," or who mispronounces the A in BASIC, as in plastic rather than as in taste.

Yet another reason for joining your local user group.

Push The Button

The reset button is put there for a purpose, but while disk operators make good use of it, I wonder if the rest do? The reset button will often get you out of a program that doesn't recognise BREAK (though reset can be disabled, too), and it's better than switching off to get rid of a program.

A great advantage of the reset button is that it will often save losing a BASIC program when you see MEM SIZE - it depends on the reason why you see it, but it's certainly worth trying rather than resigning yourself to pressing ENTER, and thereby certainly losing all.

Another time to use the reset button is when you get a syntax error and, therefore, are put into the edit mode, a normal exit from which will zero all variables. If you press the reset button instead, you'll be back to BASIC READY, with variables intact (though of course the SN ERROR will still need to be fixed later).

From there, you can GOTO a line after CLEAR and DIM statements to save inputting the variables again. This points out that RUN will zero all variables (not all operating systems do), but GOTO will not.

It's worth keeping in mind.

Opposite Concatenation

At times, there is a need for the facility to remove a character from a string, just as there is a facility to add a character by using the plus key. Though it's not possible to subtract from a string with a minus key, the same result can certainly be achieved.

If the character has to come off the beginning or the end of the string, it is fairly obvious that RIGHT\$ or LEFT\$ will do the job. However, if it has to come out of the middle, the answer isn't so easy. The technique is to use the MID\$ function in conjunction with the LEFT\$ and RIGHT\$.

If the character to be removed is at 1 (found by a FOR-NEXT loop of LEN iterations), LEFT\$(A\$,1-1) will give the part of the string before 1, and RIGHT\$(A\$,LEN(A\$)-1) will give the part of the string after 1. There does need to be a test to check that 1 is not 1, nor equal to LEN.

Yes, I know all this seems somewhat confusing and too complicated to use, but it does show that most things are possible, even if not as direct statements. □

...And Something For CoCo lovers

By Richard Newcombe

SINCE CHRISTMAS, a growing number of new users of the TRS80 Colour Computer have been looking for advice and help. If you're one of these, I strongly suggest you attempt to contact a local user group. The Australian TRS80 Colour Computer "network" is unique and also closely knit – all users are welcome, but don't expect to find a ready source of free or pirated software.

Tandy has not been lagging in its recent sales push, and I gather from local agents that there was a dramatic run on their Colour Computer specials before Christmas. In all, this means there's a multitude of relative beginners out there, struggling through the manuals and preparing to bloom into another generation of computer fanatics ... with the inevitable back-lash from computer widows and widowers.

As there are differences between American television standards and our own, the Colour Computer was a little slower in being introduced and taking off here, by comparison with the United States. This has provided one key advantage: the essential documentation and incidental information, so useful to the average user, has already appeared.

However, the majority of recent purchasers of the TRS80 won't be aware of the Australian network of user groups – I would sincerely recommend they contact:

Adelaide: Richard Newcombe, phone (08) 272-3081. Brisbane: Brian Dougan, phone (07) 30-2072. Hobart: Dave McKeand, phone (002) 25-2985. Melbourne: Debbie Hercules, phone (059) 86-4386. Perth: John Richardson, phone (09) 293-3648. Sydney: Greg Wilson, phone (02) 358-6491.

On the subject of new computers, I'd like to mention a particular point: the various Tandy work-a-likes that may soon appear on the market will *not* be as compatible with Tandy software as they may appear (for example, the British-made Dragon-32 has different entry points into the BASIC ROM routines). This type of problem is well known to Model I/III users and System-80 owners; in this latter instance, a number of seemingly minor differences in printer ports, cassette I/O and RS232

vectors produced a nightmare of software compatibilities.

The Dragon-32 is one such beast and some incompatibilities are known but to what extent these are problems is presently undetermined. Obviously, competing manufacturers have to offer frills and lower prices to be successful, but at the same time they have to be careful not to transgress design and copyright boundaries, for fear of ending up in court. It is the old adage: let the buyer beware.

There is a mountain of reasonably good independent software (and some not so good) for the TRS80, developed by mainly-American companies, but presently there aren't many outlets in Australia. A fair proportion of this software is available (at American prices) through "non-commercial" suppliers that can be contacted through the various TRS80 user groups.

As Tandy's *Colour BASIC* and *Extended Colour BASIC* manuals are the obvious starting place for beginners, I don't intend to duplicate them at all. It's more useful to focus on the functioning of various areas, such as the BASIC interpreter, operational aspects of the TRS80 and any other miscellaneous curiosities and programming tips.

As everybody likes the dramatic, I suspect that most will appreciate a re-hash of the much-quoted high-speed mode. The high-memory addresses FFD6-FFD9 (65494-65497) are four addresses that control the SAM chip. A POKE of any value to FFD? (for example, poke &HFFD7,1) puts the central processing unit (CPU) in high-speed (double-speed) mode for memory accesses from 8000 to FFEF.

This is mainly applicable to BASIC programs, as the BASIC ROMs are located in this area of memory. Hence, most machine-language programs are unlikely to be speeded up, as most do not significantly use routines in ROM. However, BASIC programs can be quite dramatically increased in their effectiveness by using this mode.

The CPU is reset to its original rate by doing a POKE of any value to FFD6.

The "fast-fast" mode, which is high-speed for all memory locations, is achieved by a POKE to FFD9 and is reset to the original value by a POKE to

FFD6. This mode is really only useful for brief periods, such as when it is necessary to do a lot of number-crunching. The most obvious disadvantage of the mode is that the screen display is wrecked by the SAM chip, which cannot maintain transparent screen refresh. Also, ordinary RAM may deteriorate in this mode to the point of becoming increasingly unreliable after some seconds.

In this extra-fast mode, the keyboard may also be locked out and it may be up to the program to re-establish the slower speed mode (by POKEing to FFD8). This is obviously a little too complicated to be indulged in at any great length here. In essence, the ROM speed-up mode is probably the more useful for the average BASIC programmer.

The speed-up for the processor rate should not be used during any printer, cassette or RS232 functions. This is because any timing loops used in data transmission, or other functions, would be adversely affected by any change in the CPU speed. Using the speed-up for the BASIC interpreter functions – that is, those addresses above 8000H – can be of particular use in reaction-dependent games. They can also be inserted in the program in a fashion that will allow the player to select the level of hardness.

Though many of the colour graphics functions are extremely fast, as they are in machine-language sub-routines, BASIC is still somewhat slow in comparison with pure machine-language games. One example of this is the rather patchy response you can find in the BASIC interpreter's attempt to read the input from the joysticks. Some users may have noticed that if the stick is moved quickly, the points plotted on the screen can jump erratically.

Cassette Files

The TRS80 is a fairly reliable computer for storage on tape, and most difficulties arise from either the tape recorder or, in particular, from the tape. It's not worth using cheap tapes – for the average compact cassette, it's far better to use tapes that suit the inherent biasing, and not one of those better suited to stereo cassette decks.

Much frustration is avoided if files on tape are always recorded twice. Most people only need to be bitten once, but if your only copy of a particular file is lost, there can at times be ways of resurrecting the lost program.

THE VIC-20 brigade was out in force at the Australian Personal Computer Show, with 36 people working full-time on the Commodore stand, displaying the vast new range of cartridge software.

Many other exhibitors were also busy promoting VIC-20 products from American and British companies, including some high-quality software packages.

Business Software

For the serious user, Commodore has a whole range of new business/utility software, attractively housed in book-shelf-style boxes.

VicFile is a set of menu-driven disk-based programs that allow you to design a filing system and then enter, edit, sort or print information.

The create option enables the user to design a layout by inserting labels and headings on the screen and defining the type of input required for each field.

VicFile can also be used to produce reports, and simple mathematics may be carried between various fields. The user guide included in the package is of a very high quality and explains in detail the operation of each program through various examples and a helpful "training section".

VicFile should be available from most dealers now and requires a 16-kilobyte expansion cartridge and disk drive. A printer may also be used but it is not necessary.

SimpliCalc, the Commodore version of VisiCalc on the VIC-20, is very similar. It also requires a 16-kilobyte expansion cartridge and comes on cassette or disk.

The worksheet may be up to 60 columns by 100 rows in size, and the manual includes various examples of applications as well as a "training section" similar to VicFile.

Kongo Kong

There are now so many games around that it's hard to choose the best. However, for the standard unexpanded VIC-20, Kongo Kong has to be one of the better cassette games around.

In case you're not familiar with the name, Kongo Kong is based on the popular Donkey Kong arcade game. The object is to rescue the maiden who is stranded at the top of a building. As you try to climb the various ladders and levels, a multitude of barrels come tumbling towards you.

The game increases in speed and dif-

ficulty as Kong doubles and triples the number of barrels he throws down. The coloured maiden is worth an extra 500 points per frame, and the barrels increase 100 points per frame.

After playing the game a few hours, I managed an all-time high score of 18,700 from a total of seven maidens. At that stage, the speed was so fast that the barrels appeared to be a constant stream down the building.

Overall, it's an excellent game, definitely worth buying. Our preview copy came from the Computer Spot and normally retails around \$9.95. Use either the keyboard or a joystick, and keep me up to date with your top scores!

Choplifter

First available on the Apple, the Choplifter game is continuing to sell well and is now available on cartridge for the VIC-20.

Your mission is to rescue groups of 16 men at a time from enemy territory and land them safely at your base, using a helicopter. One point is gained per man, and at each game a new foe is waiting to hamper your progress.

Choplifter features good graphics and is highly entertaining. It requires a joystick and retails around \$49.95.

User Groups

With more than a million VIC-20s now in existence, it would make sense that more user groups would be slowly starting to form across Australia. Undoubtedly, there's probably a couple hidden away somewhere, so if you have one – or are even thinking of forming a club of some sort – please let me know. I'm sure there are many others who would also be interested to hear from you.

A Sydney VIC-20 user group has been started by Mike La Robina, of Micro Visions. The group meets at Micro Visions on the third Saturday of each month at 2pm. If you're interested, phone (02) 662-4063.

A newsletter for VIC-20 users called *VicLine* will shortly be available through mail order and from most computer stores for around \$1 an issue.

Vic Tips

POKE 802,1; POKE 805,0; POKE 818,105

This stops a program from being saved, once it has been run.

POKE 785,194; POKE 37150,3

This disables the restore key.

POKE 788,194:

This disables the runstop key.

POKE 788,191:

This enables the runstop key.

SYS 8192

This is the same as restore.

PRINT CHR\$(8)

This disables the shift key, stopping the switch to upper/lower case.

POKE 36879,8

This is about the best background colour for the VIC-20. However, not only does it look best, it also minimises eye strain and headaches.

Graphics

Most users have seen the graphics that are obtainable on the VIC-20, using the character generator to define new characters. However, few people are aware that high-resolution bit-mapped graphics can be accessed on a standard, unexpanded VIC-20.

The easiest way to use this feature is to obtain the super expander cartridge which adds all the necessary commands to BASIC, plus a few extras for music and so on, and an extra three kilobytes of high-resolution memory area.

If you'd rather not lay out money for a cartridge, there are also cassette versions, such as GraphVics, which do similar things. However, if you really want to use this feature, you'll have to know exactly how bit-mapped graphics work, and what they are.

Essentially, the process is fairly simple, but using BASIC is going to make any animation rather slow. Bit-mapped graphics is very useful for games and other applications where the VIC-20 character set is not enough.

Normally, the VIC-20 allows us to use a selection of characters from the two character sets that are stored in ROM, starting at location 32768. Each dot within a character is stored in memory as part of an eight-bit binary number; each bit represents one dot on the screen.

Light Pen

A light pen is on the way for those of you who have been asking. It should retail around \$50. A cheap colour plotter will also be here soon from England. Watch this space for more information soon.

More on graphics next month. Don't forget, I'm waiting for your programs, ideas and problems. For those who have already written, your replies should be on the way now. ☐

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INTERFACE

Newsletter of the Mi Computer Club



May, 1983

The Bulletin Board dominates again...mainly because there's been so much interest from members (and also because we want to explain the logon process again - it had changed even before the last issue of Interface reached some members with the details!).

The board has already logged more than 420 successful calls - and there have been quite a few failures as well! Of the successful ones, around 15 percent have been from visitors; club members who are not board members.

Most of the unsuccessful ones have been people who have failed to read the instructions - both here, and in the 'newcomers' message on the board - on how to enter their "ID-CODE".

Board Membership

One thing that has puzzled many newer members (those who weren't in the club when the previous board was on-line) is the difference between club membership and board membership.

To become a fully-fledged bulletin board member, you have to pay a joining fee which is completely separate to your normal club membership. This fee is a once-only charge, to cover administration costs and documentation (when we finally get it out!); once this is paid, there are no further connect-time or annual charges. Your board membership remains valid for as long as you maintain your paid-up club-member status. The fee is \$20 at the moment, although you can expect that to rise in July.

Non-board-members are allowed visitor access to the board: this allows them to log on up to 10 times for a look around. They can look at everything (except the private mail section - because mail can't be sent to non-board-members anyway), but they cannot place notices, advertisements or meeting notices.

The Advantages

The obvious advantages of bulletin board membership are that you can send and receive private mail, place public notices, advertise club meetings or items and services you wish to sell. You can also seek help from other members in solving your problems, which should provide a much more immediate solution than writing off to the club to have your plea for help included in Interface...

Other benefits to come in the near future include instant product-ordering - we're currently working on an ordering system which will have your request printed out ready for action the next working day - plus the ability to download many of the "Pocket Programs" from **Your Computer** magazine. That should save a lot of typing!

ENQUIRIES:

Phone: (02) 662-8888, ask for
Mi Computer Club

Bulletin Board: (02) 662-1686
(24 Hours)

Mail: P.O. Box 21, Waterloo
N.S.W. 2017

Norma Jackson: Club correspondence
Order and subscription queries.

Contributors can also use the board to download stories, ensuring safe and speedy delivery of their epics. And if we have your copy on disk, it has a much better chance of appearing, quickly, because there's less work for us to do to get it to print...

Long-Distance Callers

Don't think you have to live in Sydney to use the Board - we've had regular logons from Perth, Adelaide and Darwin, and one caller, according to his sign-on, rang in from New Guinea!

While you mightn't want to spend all night reading public notices at STD rates, a quick logon could be quite useful when you need help, or want to order some products.

The Current Log-On Procedure

The phone number for the Bulletin Board should appear in the box on the cover of Interface each month from now on. It's (02) 662-1686.

The first thing you'll see when you ring in is the question "HOW MANY NULLS (0-9) DO YOU NEED?". This is to set the number of null characters output by the Board after every carriage return. For normal terminals you would answer 0, but if you find your screen is a little slow and you are losing characters at the start of each line, experiment with the number of nulls until it is working correctly. (As an example, an Apple needs no nulls using its standard 40-column screen, but if you are using an 80-column card you will often need 3 nulls).

The next question is "CAN YOUR TERMINAL DISPLAY LOWER CASE?". If you answer 'N' to this one, the board's communications supervisor will fold all lower-case output (in messages etc.) to upper case before sending it to you.

The third question asks "DO YOU WANT TO FLIP THE MODEM MODE?" - if you are having reliability problems with your modem or the phone line, this gives you the chance to switch from Originate to Answer mode, which sometimes helps.

After these three questions, you are asked your first and last names for our user logs. This is then checked against the USERS' file and, if your name isn't already there you are put through the first-time login process which includes a special bulletin for newcomers and a system-user survey. You will only ever see this the first time you call, unless you forget how to spell your name...the moral is, if you want to avoid this time-consuming process, don't start signing in as FREDERICK when you used FRED last time, and so on.

Once you have been logged to disk (and put through the newcomer process if it's your first logon) you are passed to the Bulletin Board. If you get dumped to CP/M command level - which seems to be happening a lot these days (we'll fix that bug soon! In fact, as soon as we start putting the pocket programs up you'll go direct to CP/M before the Board anyway) - you simply type BOARD to get to the message system. In the meantime, you're welcome to look around by typing DIR or HELP; it's just that there's not much to see at the CP/M level at the moment.

Then comes the ID-CODE, which seems to be causing some people problems. We repeat: it is your member number, followed by a dash, followed by your password. The default password is the first six characters of your surname as it appears on your mailing label.

Therefore, for club member Paul Johnson, member number 1234, the ID-CODE would be: 1234-JOHNJO

No spaces, capital letters, and the dash is a must! If you change your password (which we highly recommend; just type PASSWORD at the Bulletin Board command level) the member number and the dash remain - only the six-letter password can be altered, to any alphanumeric string up to six characters.

Once you have changed to the new password, you must match it exactly, including upper and/or lower case. It's surprising how many members have complained to us they can't log on because the computer won't accept a valid ID-CODE - when we check our printer log, we invariably find they have ignored all the warnings and used lower case...

More Product Super-Specials

Watch out for price rises! Yes, that's what's happening all over the place at the moment - our suppliers have, in most cases, raised their price to us two or three times since we released our last catalogue. We're hoping to produce a new catalogue for next month, and until then we'll hold current prices wherever possible. However, we may have to up the prices on some orders - if that's the case, you'll be advised.

Just to soften the blow a little, here are some discounts on our general product lines - towels, T-shirts and diskettes. Firstly, seeing as how it's no longer summer, you can have a beautiful, big, blue MiCC beach towel (complete with computer logo) for a discount of around 30 percent - \$9.90 instead of \$14!

Same goes for the T-Shirts: you can have the standard shirt (white, with blue MiCC logo) for a mere \$4.50, or the Adventurer shirt (with Brendan Akhurst Adventure cartoon) for just \$4.90. Stock up for summer - you'll be hard-pressed to find T-Shirts of this quality at such giveaway prices. Don't forget to quote your size.

And now, for the one you've all been waiting for - a sell-out on **Nashua Diskettes**. We're offering a 10 percent discount on the old catalogue price on our current stock (several hundred diskettes). And, if you buy three or more boxes at a time, you can make that 15 percent!

Giant Saving For Apple Owners!

We've made a super-scoop purchase of two excellent locally produced software packages for the Apple, and we're passing the saving - up to 60 percent! - on to you.

The first is **Grafpak 1.0**, a superb tool which provides several extensions to Applesoft BASIC. It retails for just under \$100; we're offering it for a staggering \$39!

The second is **Phil's Cheap Editor**, a text processor that's perfect for people who don't need a full-scale word-processor. It retails for around \$50 - we're selling it for \$29...

Now, if that's not special enough for you, wait for this: If you buy both, you can have them for \$55 all-up - just over half the price of Grafpak alone. It's a giveaway - so get your order in now!

Computer Dust Covers Offer

COVERCARE of Chatswood has offered club members custom made computer dust covers at a discount price.

The covers are made to measure from anti-static cotton-backed vinyl, which is hard wearing and affords total protection. The discount represents a 25% saving.

The discounted price including postage is \$15.00. Covers are available for the Apple II, Atari 400 and 800, Commodore VIC-20 and the TI-99/4.

Covers are available through your dealer, Computerwave or direct from Cover Care. All orders to include Cheque or Money Order.

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