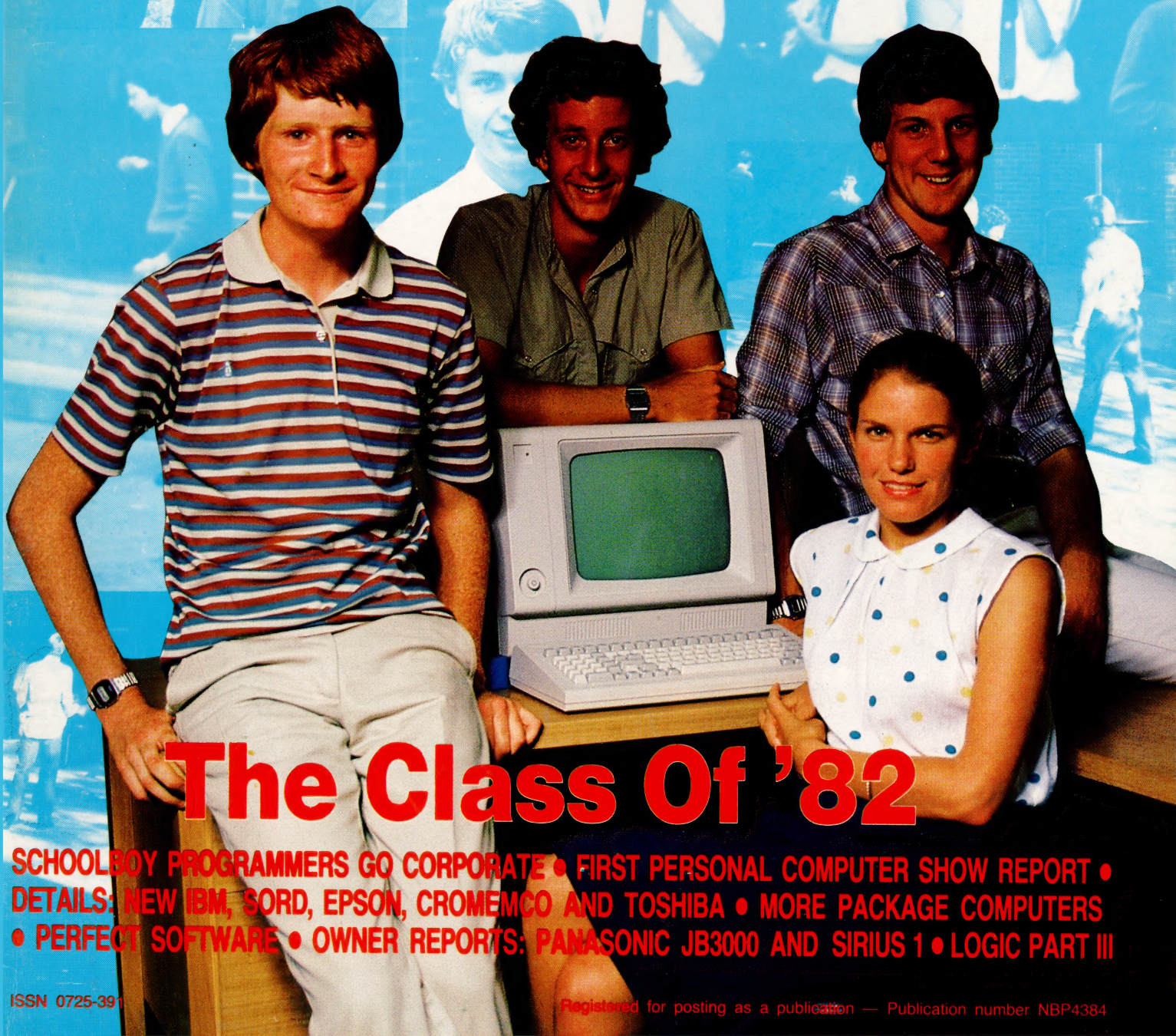


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April, 1983 \$2.00* NZ\$3

FOR BUSINESS AND PLEASURE



The Class Of '82

SCHOOLBOY PROGRAMMERS GO CORPORATE • FIRST PERSONAL COMPUTER SHOW REPORT •
DETAILS: NEW IBM, SORD, EPSON, CROMEMCO AND TOSHIBA • MORE PACKAGE COMPUTERS
• PERFECT SOFTWARE • OWNER REPORTS: PANASONIC JB3000 AND SIRIUS 1 • LOGIC PART III

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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.

The Spinwriter 3550 lets the IBM PC get down to business. It comes complete with documentation and training materials to fit your PC user's handbook. Just plug the Spinwriter in and your PC instantly becomes more versatile and flexible. **More than 70 print thimbles and 8 forms handling options to boost PC versatility.** NEC designed the Spinwriter's 8 modular forms handlers to accommodate a wide range of paper and document sizes and types. The easily mounted handlers let your computer print out forms you need for data processing, word processing, graphics, accounting or other business applications.

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made for each other



inside your computer

Vol 2, No 9. April, 1983.

special

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The Class of '82

The time of the electronics whizz kids is nigh. Out of school and eager for work, these youngsters have wasted no time in plumping for a career in computers. Two software companies have already been set up by school leavers. We also have a profile on a trainee female programmer, plus our youngest member of staff.

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Your Computer News

Our roundup of the latest software and hardware, plus all that's happening in the computer world.

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SuperShow And Congress

A detailed report of the Australian Computer Society's Personal Computer Congress, and the hugely successful First Australian Personal Computer Show.

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Any Colour, So Long As It's Grey

Finally, it's on sale – and an update has been released! Les Bell takes a look at the long-awaited IBM PC.

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The pitfalls of setting up a computer shop on your own, and having to deal with Joe Public and Joe Corporation.

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A Star of the First Magnitude

Two journalists describe how

they became hooked on technology, via the Sirius 1.

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Moose and his Mailing Lists

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Resisting the use of a word processor has almost become a full-time occupation for Eric Lindsay.

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And so we bid farewell – to Les Bell's mammoth series on BASIC.

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Logic for Literati

This month NAND, OR AND NOR functions are covered as we start to build test circuits.

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The Dis-Integrated Computer

An owner report on the Panasonic JB3000, the first of the many IBM clones to reach Australia.

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Sharp Thinking

We said last month we had this review...now, red-faced, we prove it. The Sharp MZ-80B had just been released here when this piece was done, only a little while ago...

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Here we strive to answer all your questions and problems.

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Readers' Services

Want to contribute a story, write a program, ask a question, subscribe, sue us or...? Read this first.



The First Australian Personal Computer Show (and Congress) was a spectacular success, with more than double the expected attendance. One of the reasons was its large complement of new machines – and they're in our report, starting on Page 36.



The phrase "I can't understand today's kids" may take on a new meaning as more of them start to speak 'strange' languages such as BASIC. Page 26.

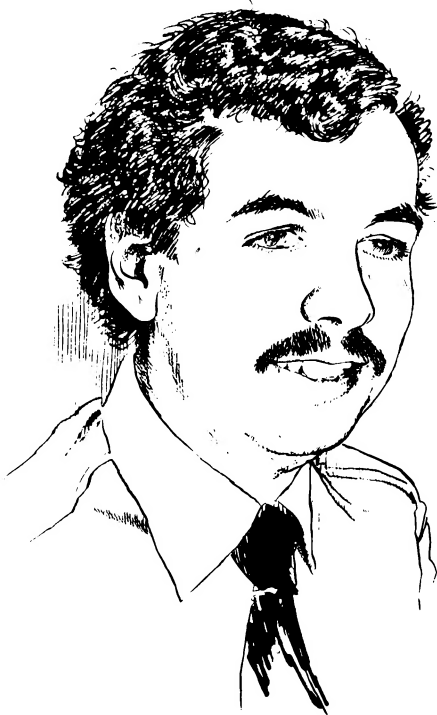
next month

Well, it certainly proved popular YC's bonus liftout section of pocket programs should be back next month (as long as the gremlins don't get to us and chew up the material you have been sending in or some such disaster).

This special feature, 16 pages worth on top of the usual size of the magazine, will be a semi-regular extra-value section for *Your Computer* readers during 1983.

And stay tuned for our special feature on future developments in microcomputing in the May issue that should be one you can't miss!

editorial



AT LAST, the microcomputer industry has come of age – or has it?

The entry of IBM into the marketplace has certainly lent an atmosphere of respectability to the industry, but we still are nowhere near the level of sophistication that one sees in the United States.

There, personal computers are being regarded as professional tools for tasks such as project management, maintaining personal records, indexing professional journals and the like.

The accent at the IBM-PC's Australian release, and at IBM's dealer training, was still very much on what have historically been the mainstay applications of the microcomputer market: word-processing, general accounting and spreadsheet calculating.

That's a big market, but one would expect that IBM, the company that made the 16-bit processor a success, to be rather more forward-thinking.

If anything, some of the dealers are positively retrograde. Let me give you an example:

One of IBM's new dealers organised for one of its staff to demonstrate the machine on a national breakfast television show. "Very impressive," said the hostess, "but what can you do with it?" "Well," says our erstwhile representative of the personal-computer industry, "the lady of the house can store all her recipes on it..." Store recipes on it? I thought that one went out with the Ark! I've been writing about personal computers for eight years now, and in all that time I have never met or heard about a single person who stores recipes on a computer. I believe Honeywell tried to sell a kitchen computer many years back, with disastrous results.

Can you imagine anybody sitting down to type up all her (or his) recipes on to disk? It would take hours (maybe there's a market for recipes on disks) and could never compare for cheapness, ease of access or interest with a beautifully illustrated cookbook.

Maybe it's time some of the newcomers to the industry got dragged into the Eighties and found out what it's all about. I'm concerned about the level of knowledge and support available from a dealer who thinks like that. □

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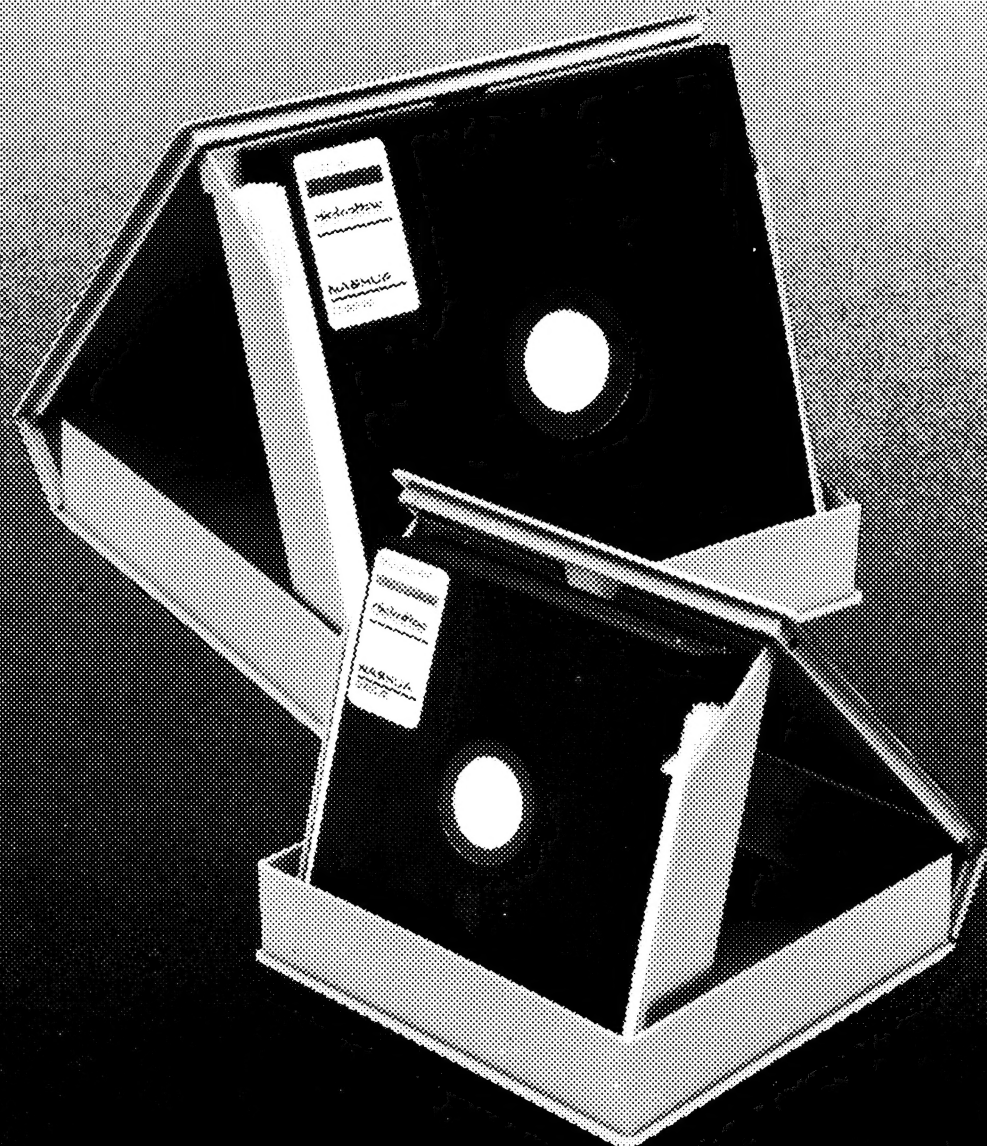
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"Quality Circle" Diskettes

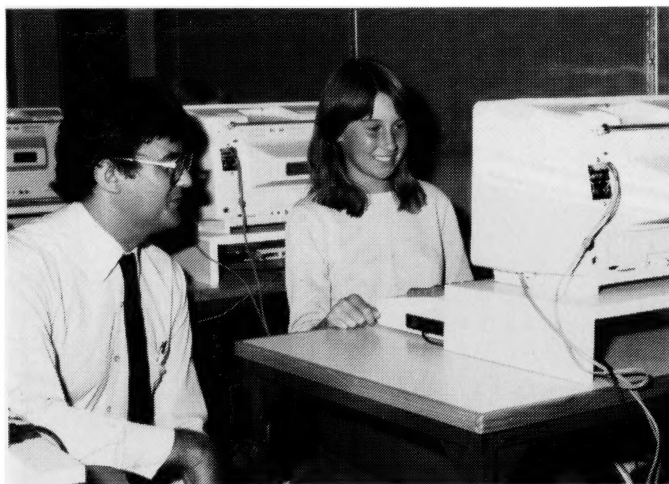


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your computer news



Computerised School

COMMODORE Australia has donated 13 VIC-20 microcomputers to the South Australian Education Department, the cost totalling \$13,000. The computers will be used by students in Years 5 to 8 at The Heights School at Modbury, Adelaide.

The VIC-20s will be used for learning keyboard skills, simple word-processing, basic programming skills, recreational computer programming and elementary computer-assisted instruction.

Twelve computers will be located at the school, and

the remaining one will be used to support the schools' activities.

The computers are all fitted with 16K memory expanders. A classroom set will also have two disk drives, a printer, cassette recorder, joystick and a variety of cartridge software. A simple networking system will allow up to eight microcomputers to be plugged into each disk unit and the printer. The network approach to school computers is in line with the recently announced South Australian Education Department policy for school computers. □

Computer Literacy Project

THE BBC, Barson Computers and Pitman Publishing have jointly announced the coming to Australia of the BBC Computer Literacy Project, a major project intended to provide the public with a better understanding of computers and how they are used.

The BBC has provided the impetus and overall control of the project, liaising with the other companies. The result is a number of books, ranging from an introductory text which barely gets into BASIC programming to more detailed reference works, together with two series of television programs and a specially-designed computer which meets the BBC's requirements.

BBC Enterprises is selling videotapes (Beta and VHS) of "The Computer Programme", a ten-part series of half-hour programmes suitable for use in schools or for adult education. The tapes are priced at \$290 per set from BBC Enterprises, Westfield Towers, 100 William Street, East Sydney, 2011. Phone (02) 358-6411.

The ABC will be broad-

casting the series, starting in June, during schools broadcasts. It is not yet known when it will be shown during adult viewing time.

To complement the television show, Pitman Publishing has a range of books and software for the Acorn-developed BBC computer, including *The Computer Book*, *30-Hour BASIC* and *The Book of Listings*. Software from both the BBC and Cambridge Educational is also available through Pitman, including a *Doctor Who* adventure.

Barson Computers is the agent for Acorn Computers, which manufactures the BBC computer. This machine incorporates a number of extremely advanced features, such as the EcoNet interface, which allows the computers to be networked. Already, two Australian schools have large networks of BBC computers – or Beebs, as they have become known in Britain – and an Acorn Education User Group is under way, producing an excellent newsletter.

The Beeb has PAL colour graphics with 640 by 256 resolution in two colours (doubling the colours prog-

Instant Program Switch

AED MICROCOMPUTERS, of Guildford (NSW), has announced a new enhancement to its range of computers which will allow the user to instantly switch between programs with just a few keystrokes.

The MPS (Multiple Program Select) system uses a specially formatted diskette to save the complete system status, including all-system RAM, contents of the video screen and the processor registers, so that a program can be temporarily suspended while another program is run.

Up to six programs can be saved on

the disk, together with a menu which allows the user to select which application he wants to resume next.

The system alleviates the problem of dealing with queries while using the computer for some other job – for example, a user may have to close a word-processing file, exit the word processor, load the accounting package, and then, through a series of menus, get to the stock enquiry section. All of this can take up to several minutes.

The MPS system takes only about six seconds to instantly swap programs – a feature that has never before been

available on small business computers.

AED has also announced its latest computer, the Universe Supercomputer II. Built into a roller cabinet and based on the S-100 bus, the Universe can be configured for single- or multi-user operation with up to 1 Mbyte of memory. A floppy disk-based system would typically have three 1.2 Mbyte floppy disks – two for conventional use and the third for MPS – while a hard-disk system would have one floppy and a 16 Mbyte hard disk. Operating systems supported are CP/M, CP/M-86, MS-DOS and MULTI/OS.

MPS costs \$300, while the Universe price depends upon the exact configuration required. For further details, contact AED Microcomputers, 130 Military Road, Guildford, 2161. Phone (02) 681-4966. □

ressively halves the horizontal resolution) as well as Teletext compatible display mode. A Teletext adapter will shortly be available. The processor is a 6502, but users who want CP/M can plug in a Z-80 board; the BBC was designed with multiple processors in mind.

Also planned is a 16-bit processor card, based on the National Semiconductor 16032. This has been described as a bit like fitting an ex-Spitfire Merlin engine into a Mini, and should produce a very interesting computer.

BASIC is provided in ROM, and has been designed to be a superset of Microsoft BASIC for maximum standardisation. There are 32 Kbytes of user memory provided as standard, with 32 Kbytes of ROM containing the operating system and BASIC. Multiple

banks of 32K can be added, and the ROMs are paged in the same way, allowing multiple languages and applications to be resident.

Other features include user-programmable function keys, a polyphonic music synthesizer, cassette and disk interfaces, optional speech synthesizer, four analogue inputs, light-pen input, serial and parallel ports and a range of software.

The BBC unit is a very advanced personal computer, with a lot to offer users in general and educators in particular. Two models are available: the A is a "stripped-down" version suited to network operation (price: \$1265 plus tax), while the B is better for stand-alone operation with more peripherals (price: \$1550 plus tax).

Further details from Barson Computers, 86 Nicholson Street, Abbotsford, 3067. Phone (03) 419-3033.

Vector Forecaster

DICKER DATA Projects, of Caringbah, Sydney, has introduced the first in a series of software application packages that automatically create ExecuPlan II financial forecasting models.

Called Forecasting ExecuModeler, the new package with menu-prompted commands enables the ExecuPlan user to easily create marketing oriented spread sheets matching specific financial forecasting requirements.

In a typical marketing application, the Forecasting ExecuModeler can create a series of models to forecast sales of specific products,

product lines, or services.

The user inputs the company name, fiscal year, regions, departments, products, and expense items such as 'Salaries', 'Commissions', and 'Advertising'. The Forecasting ExecuModeler software automatically builds a series of precise, fully-developed models containing the specified company information.

Forecasting ExecuModeler operates on all Vector microcomputer systems including the new Vector 4 8/16-bit dual processor business computer. The retail cost of Forecasting ExecuModeler, available through Vector dealers, is \$395.

For further information, contact Dicker Data Projects, 78 Cook Drive, Caringbah, 2229, or phone (02) 525 2122. ☐

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G-Pascal is probably the most useful program you will buy for your Apple! Its user friendliness and extremely fast compile speed (between 4,000 and 6,000 lines per minute) make it a joy to use for professionals and beginners alike. Its simplicity in fact makes it ideal for schools. The built-in text editor is very easy to use — you can actually use the Editor on its own for simple word processing applications. Operation of the compiler is very straightforward — error messages are in plain English, not numeric codes. Also available is a runtime system which will run programs independently of the compiler.

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Japanese Portability

EPSON'S portable computer, the HX-20, is about the size of an A4 notebook, yet it offers power and capabilities comparable to many desk-top computers.

Until now, the Japanese manufacturer has been better known for its dot-matrix printers, with which the firm enjoys a 40 per cent share of the world market. However, while the HX-20 represents the company's first export in the computer field, Epson is no stranger to computers — the company successfully launched desk-top computers in Japan in 1978.

The HX-20 computes numbers, writes programs to user's needs, and analyses data for action. It comes with a standard 16K RAM, of which the free area available for use is about 12,600 characters. This



memory is expandable up to 28.6K or 28,600 characters. The 32K ROM can be increased to 72K.

The operating language is an extended version of Microsoft BASIC, and the CMOS circuitry provides time and date functions. The model's full-size keyboard has 10 special functions which are automatic once programmed.

The LCD on the HX-20 instantly shows segments 20 columns by four lines. Maximum screen area, however, is 255 columns or characters (per line) wide by 255 lines long. This means computer-programming, word-processing and data entry are all possible.

The Epson HX-20 processes information and prints hard copy, too. The built-in

24-column printer outputs 42 lines per minute. This portable computer comes complete with cartridge ribbon, full ASCII character set and the international symbols needed to print most Western languages.

Nickel-cadmium batteries supply power for up to 40 hours of typical operation. Custom-made CMOS circuitry assures low power consumption, and batteries are rechargeable on regular household current.

The Epson HX-20's system is expandable. Several options include a display controller that allows use of a CRT as a monitor, floppy-disk drives for maximum memory capacity, and an acoustic coupler for transmitting data by telephone. □

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1 Kent St., Bicton 6157. Western Australia. Tel: (09) 330 7336

DEALER ENQUIRIES INVITED

Computer Store has developed a computer program aimed at owners of video rental establishments. Called the Video Rental Program, it is designed to operate on the Osborne-1 computer system.

The program enables the video rental manager to better control the loan and return of video cassettes – reports are generated quickly, giving details of customers and earnings of particular movies.

For further information, contact the New Generation Computer Store at 93 Longueville Road, Lane Cove, 2066, or phone (02) 427 4780. □

DEC Name Change

DIGITAL Equipment Australia Pty Limited has changed its name to Digital Equipment Corporation (Australia) Pty Limited. This is because the name Digital Equipment Corporation (Australia) Pty Limited will give closer identification in the public eye to American parent company, Digital Equipment Corporation (DEC), now No 2 in the computer industry, based on worldwide revenues.

It will also give closer identification with the corporation's trademark, DEC, which is frequently incorporated in product names like the DECmate personal computer, the DECsystem large-scale computer, and DECservice. □

Tongan Deal

AED MICROCOMPUTER Products has been awarded a contract to supply a number of multi-user Universe Supercomputer II systems to Tongan government departments.

The Treasury, Telephone and Telegraphy and Lands Departments are to have systems installed.

The Lands Department

will be using its system predominantly as a database to record land allocation and ownership details, and the Telephone and Telegraphy Department will use its system for a variety of applications, including engineering calculations, database information storage, and inventory control. □

Wang Lessons

WANG COMPUTERS has launched a program to train many of Australia's jobless for work in high-technology industries.

Wang is providing classroom facilities, word-processing systems, instructors and learning materials at its Berry Street, North Sydney, Educational Centre to train the jobless to be professional word processing operators.

Wang's National Education Manager, John Baker, said that while it was established practice for Wang to provide specialised training for its customers, this is the first time the company has opened its facilities to the public.

The emerging significance of word processors in both commercial and public sectors has created jobs, according to Baker. "Industry and government now need trained word processing equipment operators, and the demand exceeds the supply." The Wang courses are also aimed at typists seeking promotion but lacking word-processing skills and married women wishing to rejoin the workforce, but who are unfamiliar with recent advances in office automation systems.

"We can only accept school leavers who are fluent in keyboard usage, as we have neither the training personnel nor equipment to teach basic typing skills," Mr Baker said.

For further information, contact Ted Porter on (02) 436 3477. □

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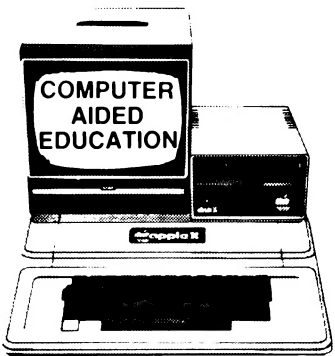
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Microbee Mine Drop

MB SOFTWARE, a new software house specialising in programs for the Microbee, has released Mine Drop, a chase game for the standard 16K Microbee. The program is written in machine code and is fully interactive.

The operator controls the movement of Supertank as it moves around the screen, picking up urgently needed supplies. Supertank is pursued by a homing rocket, Bingle. However, Supertank has a defence – Mine Drop, a mine can be placed to explode on command. Bingle is destroyed if it is passing over the mine at the time of detonation.

Mine Drop is available on cassette from MB Software, 248 Brunswick Road, Brunswick, 3056. Phone (03) 380-9805. The cost is \$12.95, from Microbee outlets.

Six computer stations will be available to students for individual practice and instruction. These facilities will be supplemented by films, lectures and demonstrations.

Weekday courses for school groups or weekend courses for individuals, commencing in the first week of May, can be booked by telephone or letter to: John Molloy, Morton Park Farm, Foxgrove Road, Canyonlight, 2577. Phone (048) 78-9132.

Significant assistance is being provided, both in the installation of hardware and training, by the Sigma Data Corporation, of Sydney. The microcomputers being used are from the OKI range and are fully supported with an OKI/Microsoft enhanced BASIC, and the CP/M operating system. Disk and cassette storage media will be operated.

Compucamps

A CAMPING adventure into the world of microcomputers has been introduced in New South Wales for boys and girls of high-school age.

Using the latest in advanced technology, student campers can learn about microcomputers, from basics to advanced applications, and at the same time enjoy the traditional fun of a camping holiday on a farm.

DEC Starts Promotion

THE AMERICAN-based Digital Equipment Corporation has appointed Computerland as its major dealer in Australia for its personal computers. The agreement between DEC and Computerland follows a similar agreement between the companies in the United States.

Though the DEC personal computers have been avail-

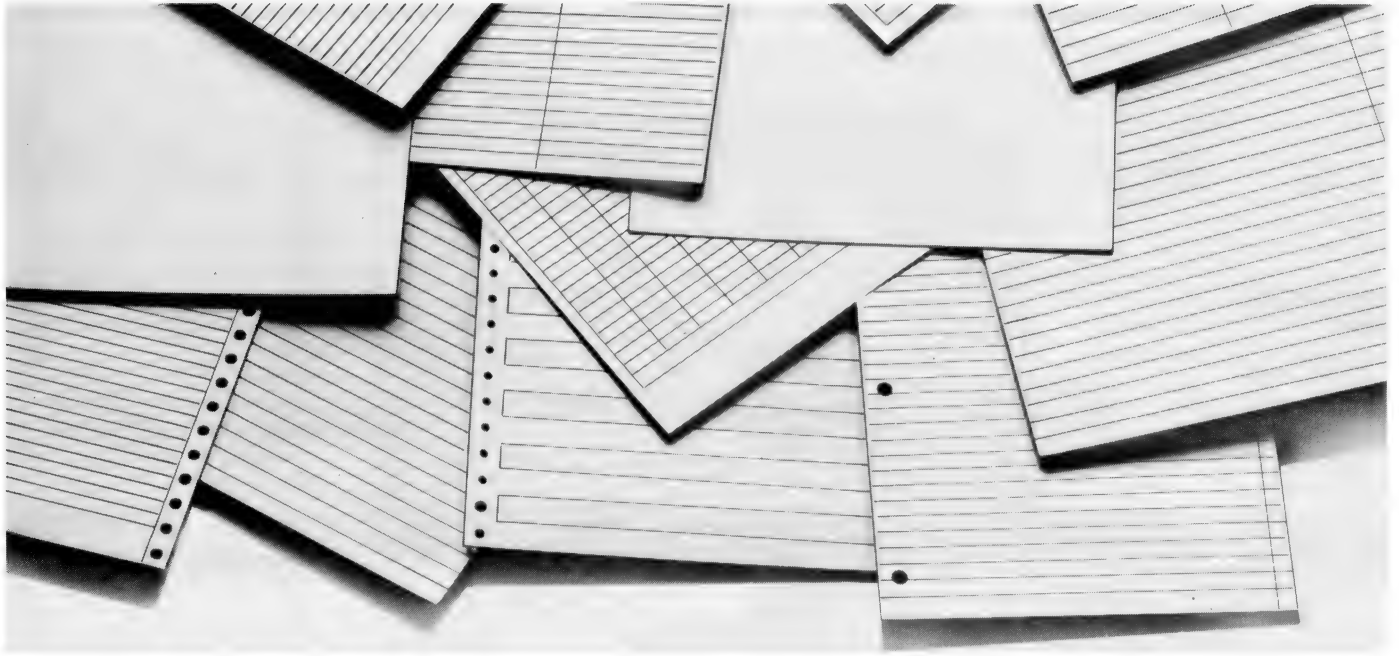
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Digital's portable terminal. The only thing plain about it is the paper it prints on.

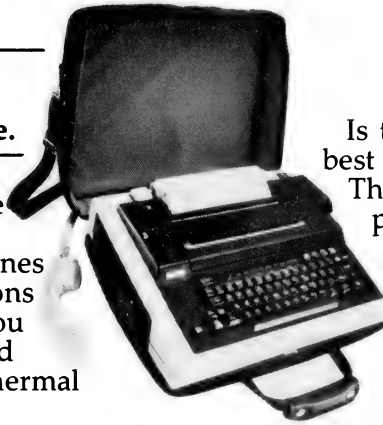
Introducing the Correspondent. The plain paper portable.

Now there is a portable DEC writer terminal from Digital that combines all of the communications power and reliability you expect in a terminal and it doesn't depend on thermal paper to do so.

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The correspondent is one of the fastest portables today. It can translate standard size computer text and graphics on to ordinary 8½" x 11" paper, all in clear crisp dot-matrix printing.

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Datatel Melbourne: Phone
(03) 690 4000, General Terminal Co.
Sydney: Phone (02) 439 8644.

Digital Equipment Corporation
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digital

able here since November, this marks the first step in DEC's bid for a slice of the Australian personal-computer market.

Announcing the agreement between the companies, Digital Equipment Australia's managing director, Frank Wroe, said Computerland was ideally suited to market the Digital range of professional personal computers.

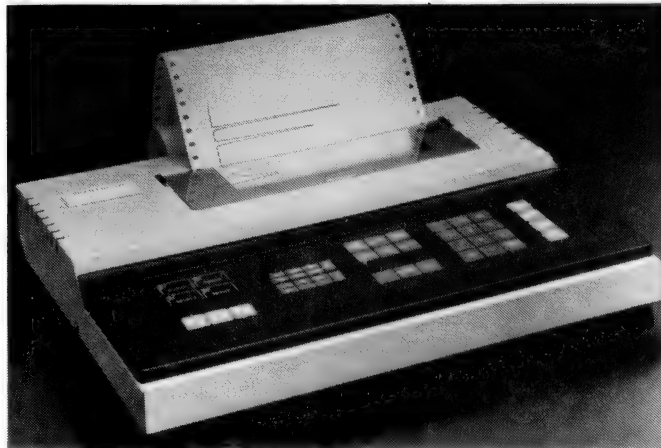
"Computerland's orientation toward the small business and professional areas suits our range of equipment perfectly," he said.

"We feel our marketing strategies can only be enhanced by Computerland's knowledge of the whole personal-computing marketplace." The DEC entry is further boosted by a joint marketing agreement with leading software house Integrity Management Systems. This covers the full range of IMS's Australian-developed general-accounting software which has been enhanced to allow word-processor access to many standard accounting files.

A similar agreement has already been signed between DEC and IMS's United States subsidiary, American Integrity Systems.

Improved Curves

COMPUTER USERS have for some time been asking



an instrument that will enable recordings of analogue inputs combined with graphics and dot matrix-printed data. When Hitachi's 661 graphic recorder was developed, stress was placed on the quality of the analogue curves which had to be comparable to conventional pen recorders.

In graphic mode, the recording area is 180 mm by 600 mm, with speeds up to 180 mm/sec. A powerful command set is included to facilitate the development of application software.

As a recorder, the 661 allows analogue input of 10 mV to 10 V in 10 ranges, with 70 chart speeds of 1 to 600 mm/min. The zero point is movable for -100 to 0 to +100 per cent. Arbitrary key-in specifications can be made for chart speed, zero shift, signal polarity, repetitive recording, scale gradua-

tions and recording line selection (solid, dot-dashed and so on). As a printer, the full ASCII character set is printable with either 40 or 80 characters per line at a speed of 40 cps. Printing is totally silent using standard thermal paper. All functions of the 661 can be placed under remote control from a microcomputer. □

Amicron's Joint Venture

AMICRON, the Sydney-based computer group, has linked itself with Systems Services International, a business computer-systems company, in a new joint venture to broaden its range of computer services.

Under the agreement, Amicron Business Systems will concentrate on marketing of computer hardware and software packages,

based on the successful operations of SSI.

Amicron Computer Services will specialise in development of software, provide on-going maintenance support services, computer installation services and training of computer operators.

Amicron Data International will also supply a complete low-cost data-entry service for all clients. □

Remington's 3270

THE REMINGTON NBI Office Automation System (Oasys) product family will now be able to communicate interactively with IBM main-frame computers by emulating IBM's 3270 product series. This follows the announcement of 3270 bisynchronous communications for Remington's Oasys 3000S standalone systems and 3270 (SNA/SDLC) for its Oasys 64 series of shared resource products.

With 3270 emulation (making an office workstation perform like the 372-series computer terminals), Remington users can now have a multi-functional workstation which can be used as a word processor, an asynchronous conversational/batch communications terminal, a bisynchronous remote job entry batch communications terminal, and a 3270 information display system. □

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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 Statham Pty. Ltd. has been a Morrow designs dealer since 1976.

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Efficiency Fair

THE THEME of the Business Efficiency Fair '83, to be held at Melbourne's World Trade Centre in August, will be survival in the Eighties.

The exhibition will be staged from Tuesday, August 9, to Friday, August 12, and will feature specialised business equipment and techniques designed to combat today's uncertain economic climate.

For further information, contact Bryan Humphis, Exhibition and Trade Fairs, 49 Cardigan Place, Albert Park, 3206. □

Anadex's New Printers

AIMED at small business and industrial systems, Anadex's newest dot-matrix impact printers, the WP6000 and DP9625A, are compatible with micro and minicomputer systems, employing serial or parallel interfaces.

The new WP6000 incorporates an 18-wire head, enabling either letter-quality printing at 150 cps or draft/data-processing printing at 275 cps on one pass. Applications are in word processing, using single-sheet stationery. (A single-sheet feeder is available as an optional extra.)

The DP9265A features all

word-processing capabilities of the WP6000 but is designed for tractor-feed applications only. Speeds range from 200 cps in draft to 50 cps in near-letter quality (double pass). □

Telecommunications Link

AMICRON, the Sydney-based computer group, has begun testing a new direct telecommunications link with its data entry resource, based in Singapore. The link should provide a vital back-up service for data-entry customers, as well as giving direct access to the Singapore resource for urgent work.

Initial tests have only recently been undertaken and it will take some weeks before the viability of the operation is known. However, it is the latest in a series of support services introduced by Amicon as part of its expanded range of services.

The company has also increased its software security service, to include its microcomputer clients as well as its main-frame customers. Microcomputer clients who have had software, whether standard or specially developed for them, can now have a copy of their software package stored in a special security vault. □



Westward Ho

A NEW high-powered range of graphics terminals, designed specifically for CAD/CAM systems, has been released in Australia by Insystems, of South Melbourne. The terminals are manufactured in Britain by Westward Micro Systems, and are suitable for use with micro, mini and some mainframe CAD/CAM systems.

The Westward range has full ergonomic features, screen tilt and rotation, colour-coded detachable keyboard, joysticks and interactive terminal configuration. Options include Digitiser pads and graphics printers for screen I/O, and all units have high-scan rates, using raster-scan technology.

The 2019W workstation is the most sophisticated of the Westward range. It provides 1024 by 1024 resolution on a 19in screen, with the screen and electronics built into an attractive desk. □

Oh, Brother

J. H. TESTER and company has released a typewriter interface to convert Brother EM-1 and EM-2 typewriters

into professional printers.

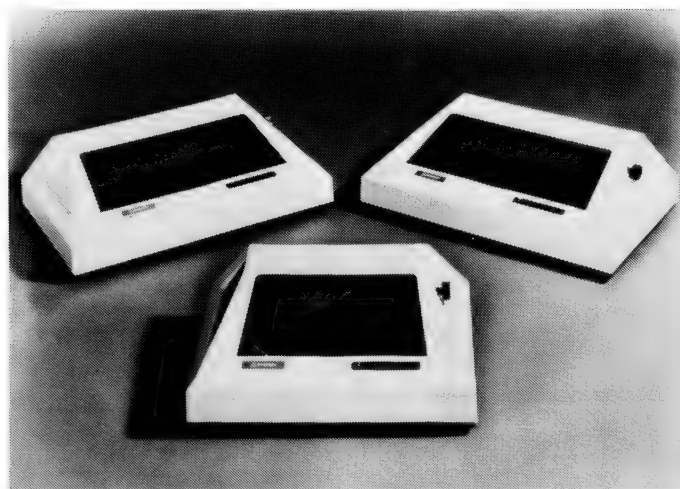
The interface differs from other units in that it has its own CPU which controls printing rather than feeding data into the typewriter keyboard circuitry. This approach means the printer is not limited to typewriter functions, and accepts software commands such as horizontal and vertical tabs, margins, bell, and forward and reverse feed.

Other features include automatic bi-directional printing, a 4K buffer which accepts around 3700 characters (the remainder being taken up with tabs, self test and baud rates up to 9600).

Standard printer controls such as Select/Deselect, Line Feed, Top of Form/Form Feed, Page Length, and Pitch are provided on a small console on the right of the typewriter.

Currently priced at \$733 (for Centronics) and \$789 (for RS 232), it provides a professional printer and a typewriter in the same unit.

For further information, contact J H Tester and Company, 13 Garden Street, Mount Pritchard, NSW 2170. □



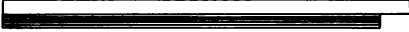
Computer-speed printing without the computer-print look.



Toshiba's new P.1350 Letter Perfect Printer is no ordinary dot matrix printer.

A remarkable 24 wire head enables it to print with the clarity and quality of a daisy wheel typewriter, while the speed at which it prints is enough to make any daisy wheel wilt — around twice as fast, or 1900 words per minute, give or take a comma. The P.1350 has an electronic brain that ensures it won't make mistakes either.

Connect it up to your existing electronic office equipment and it will print lengthy reports, concise business letters and even complicated graphics in the twinkling of an eye. And you have a choice of four fonts.

ABCDEFGHIJKLMNOPQRSTUVWXYZ	DRAFT
ABCDEFGHIJKLMNOPQRSTUVWXYZ	PRESTIGE ELITE
ABCDEFGHIJKLMNOPQRSTUVWXYZ	COURIER
	GRAPHICS

It also has three different methods of paper feeding, including a unique sheet feeder.

This allows you to print directly onto your company's letterhead, thereby eliminating the wasteful task of manually re-typing computer print-out.

See the new high-quality Toshiba P.1350 Letter Perfect Printer in action. Simply ask for a no-obligation demonstration in your office by calling Toshiba (Aust.) Pty. Limited (02) 887 3322, or ATAC Dataprocessing Pty. Ltd. (02) 436 2477.





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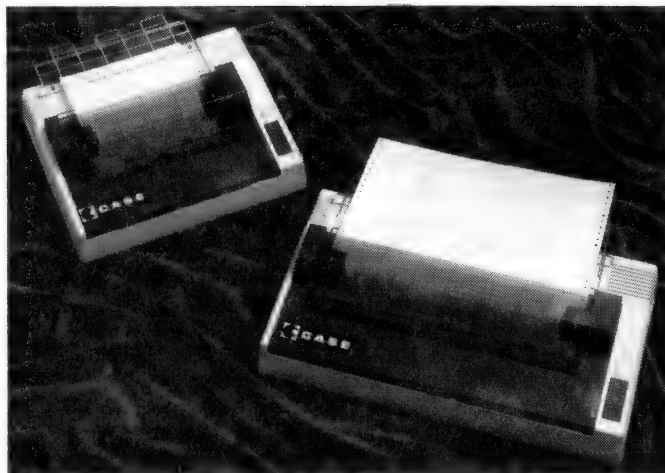
PROGRAMME NAME

Case's Matrix Printers

TWO NEW MODELS, the 510 and 515, have been added to Case Communication Systems' DP 500 series of matrix printers.

The DP 500 series enables a variety of applications requiring alphanumeric or graphic printing with single, roll or tractor-feed paper. The range of character sets and print modes enables a host of print combinations to be selected. The series can also produce proportionally spaced, correspondence quality print.

Using a bi-directional logic seeking mechanism, the printers operate at 100 cps. Model 510 prints 80 characters/line at 10 characters/inch on paper widths up to 10 inches. The wide carriage model 5155 prints 136 characters/line on paper widths up to 15 inches. Both double-width and compressed-print mode are provided, enabling line lengths of between 40 and 233 characters.



The DP 500 series uses a 9 by 9 matrix and prints the full 96 ASCII character set, with descenders. In addition, proportional spacing and italic character sets are provided as standard, together with a 64 special-character set. High-resolution bit image graphics are provided as well as 32-character block graphics set.

The printer's mechanism supports as standard, sprocket, friction and single-sheet paper fed. Vertical-forms control is provided, plus horizontal and vertical tabulations. Designed to be used with all types of systems – mainframes, minis and micros – the DP 500

series is also suitable for use as a hard-copy device on VDUs.

series is also suitable for use as a hard-copy device on VDUs. □

Ink-Jet Printer

SIEMENS is about to release a new printer in Australia costing around \$900. It can be equipped either with a needle-head printer, or with a silent ink-jet printer – the first low-price model of this type. With a speed of 150 cps, the equipment has a particularly high performance, and can also print graphics.

The printer is designed for commercial and private use in conjunction with desk-top and home computers. When Interactive Videotex is introduced in West Germany later this year, it will also find wide applications to provide hard copy of the information displayed on the television screen. □

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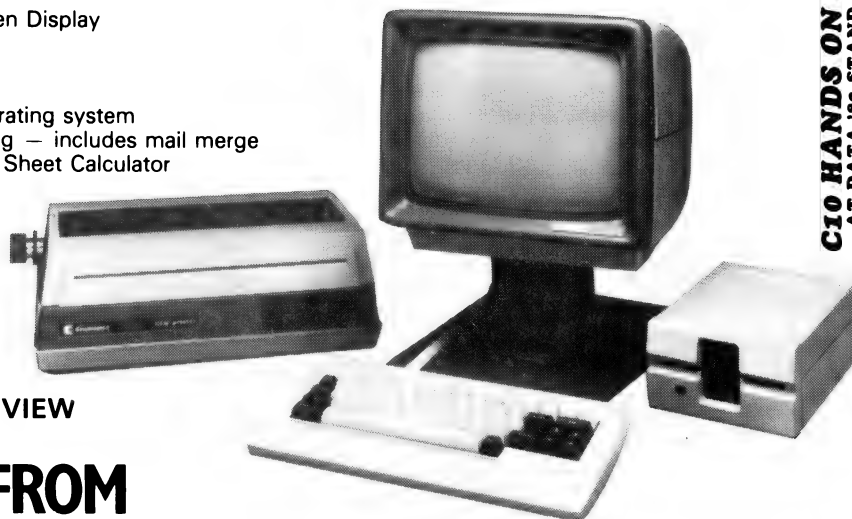
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NATION WIDE SERVICE AND MAINTENANCE

Time's Big Deal

TIME OFFICE Computers has released an enhanced local area network.

Called E-LAN, the network is designed for information management in medium-to-large offices. Up to 255 stations are linked together with a co-axial cable which transfers information at 10 million bits per second.

Advanced system software provides automatic network-wide access to files - this new operating system has been named EON. It supports up to 32 concurrent tasks, can run three CP/M applications at the same time and has UNIX-like system calls and file structure.

EON has a comprehensive electronic mail facility. Self-explanatory functions such as registered and urgent mail are designed for easy assimilation by new users. Mail waiting is indicated when a user logs on to the system. Telex is available at every E-LAN station.

The company says its experience with mainframe communications means it can connect E-LAN systems to any large existing computer network using bi-sync, SDLC and X.25 protocols.

E-LAN stations can be stretched out over a kilometre of cable: the single cable simplifies building wiring. Special T-junc-

tion hardware clamps onto the cable so that it need never be severed.

Software available with E-LAN includes the Australian-designed suite of accounting packages from IMS, WordStar word processing, project and financial planning and database management.

For more details, contact Michael Roberts or Wayne Wilson on (02) 437 4355. □

World News Monitor

WORLD NEWS Monitored in 50 languages from 120 countries will be available at the push of a button as a result of a new electronic publishing venture announced in London.

The World Reporter Service is the idea of the British Broadcasting Corporation (BBC) and Datasolve Ltd, a member of the giant Thorn-EMI group. These organisations have joined forces to offer a link-up between the offices of subscribers and a giant computer that stores the text of BBC overseas news broadcasts and information gathered worldwide by the BBC monitoring service.

Subscribers, who pay between \$48 and \$96 an hour for the service, simply use their office telephone to call up the Datasolve computer centre at Sunbury-on-Thames, London, where

some 120,000 'pages' of information containing more than 40 million words are stored.

With the aid of a simple keyboard and a television screen terminal, the subscriber can question the computer about literally any subject, and references to it in major world news bulletins can be displayed on the subscriber's television screen.

As well as drawing on the BBC's External Services news and the summary of world broadcasts, the World Reporter Service will also offer material published in *The Economist* magazine. □

IBM's Super-Transistor

A NEW super-conducting electronic device with operating characteristics similar to those of semi-conductor transistors, but based on entirely different physical principles, has been experimentally demonstrated at IBM's Thomas J Watson Research Centre in Yorktown Heights, New York.

The patented device is called the quiteron by its IBM inventor, Sadeq M Faris. Like the semiconductor transistor, the quiteron has been shown to amplify and invert incoming signals and to switch rapidly.

The quiteron can perform such switching at much lower levels of power dissipation, making it attractive for high-speed applications that require very high levels of circuit integration.

It is the first three-terminal super-conducting device that can both amplify and switch, and therefore shows potential for application in analog and digital circuits, although its design and operation have not yet been optimised. □

Talking Turkey

UNDERSTANDING the spoken alphabet and numbers from zero to nine - plus being able to respond to simple verbal commands - is no big deal. Nothing your

average, super-sophisticated computer can't handle.

By the same token, technicians at Lockheed Missiles think it's quite a feat, since tasks that formerly took months to accomplish are now performed in minutes by these 'educated' computers.

Before their computers were capable of taking spoken instructions, employees in Lockheed's microelectronics department recorded up to 110,000 hand-written entries each week. These entries were then transcribed to computer inputs for subsequent printouts. The entire procedure, from entry to printout, required up to three months.

Now, using a voice data-entry system that permits employees to speak into the computer-connected microphone, the information is recorded instantaneously, saving time and labour, cutting costs and virtually eliminating recording errors.

In an unrelated program at Lockheed Electronics Company, psychologists are developing a sub-system that will endow a host computer with the programmed intelligence needed to make the most efficient use of the machine.

Dr Rita Knox, who is directing the development, said the sub-system consists of two elements: a console of new integrated communication devices that provide alternate methods of exchanging information between computer and user, and the software needed to mimic some of the human thinking required for communications.

Among the devices are a voice recogniser and a voice synthesiser to provide two-way verbal communications, and two touch-sensitive video screens for presenting or receiving information displayed as pictures, diagrams or printed words. □

Continued on Page 96



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The VIC-20 is the friendliest way we know to learn computing. It has a full computer keyboard even a small child can operate. It plays music, has exciting graphics and lets you create pictures. It even tells you when you've made a mistake and how to correct it. The VIC-20 can take your children from pre-school through post-graduate studies.



The Commodore Information Centre, 3 Campbell St., Artarmon. NSW 2064. Phone: 437 6296

commodore
COMPUTER

Small Is Beautiful



One of the longest-established microcomputer companies is Cromemco. The United States company has survived by moving with the times, reports Les Bell, as he reviews its latest product, the C-10 desktop computer...

THINGS ARE really rocking at the bottom end of the personal computer market – the under-\$3000 machines with word-processing and spreadsheet capabilities. In the months AO (After Osborne), the market niche which that luminary found for himself has been invaded – in Australia, at least – by first Kaypro, then Morrow Designs, and now Cromemco, with the C-10.

The C-10 is a pretty little computer, designed to sit neatly on a corner of an executive's desk. The main electronics and the screen are in a small moulded plastic cabinet, which is designed to sit atop a tilt-and-swivel stand. Attached by

cables to the rear are a small keyboard and a single 13 cm disk-drive.

The machine is finished in two-tone brown and looks fairly friendly and neat, with a minimum of cables.

The display is 28 cm on the diagonal and is clear and easy to read. It features half-intensity, underlining and inverse

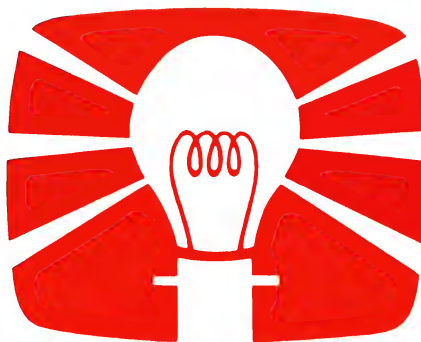
video, as well as special symbols and chunky and line graphics. The screen-driver software emulates a Cromemco (Beehive) terminal, providing 80 by 24 display with a 25th status line, though this is normally switched off.

Intended to take up as little space as possible, the keyboard is compact yet ergonomically designed. It features all the usual characters and control keys, with the exception of a numeric pad, though one section of the keyboard can be re-programmed to provide that function. The keys have a soft action, and feature moulded keytops.

At the back of the electronics enclosure is a panel with the connectors for various peripherals. The keyboard is attached by a curly cable and the ubiquitous Ma Bell telephone connector, while the disk drive attaches through a stacking connector. This allows additional disk drives to be attached with minimum fuss.

Two other ports are provided. One is for attachment to a modem or another computer – either using RS-232C or the

your computer



NEW MODEL

coming Cromemco C-Net local area network. The other connector is a DB-25 type which can be re-configured under software control to act as either a serial or parallel port for connection of a printer, plotter or other peripheral.

The C-10's matching disk drive is mounted in a moulded plastic case, and has a capacity of 390 Kbytes.

The innards are based on the Z-80A processor, with a 4 MHz clock and 64 Kbytes of memory. The basic design is not expandable – there is no bus structure – and is specifically designed to provide the functionality of an executive workstation.

The overall quality of construction is good; the box feels rugged and reliable. Because of its design, the machine can't be described as portable, but it is light enough to carry and move around from location to location.

The C-10 In Use

On power-up, the C-10 performs some diagnostics, and then boots off disk. The operating system is Cromemco's CDOS, which is a modified upgrade (and descendant) of CP/M version 1.4. However, the first-time user is not immediately exposed to the rigours of the operating system. Instead, the system brings up a menu program which allows the user to specify what he wants to do.

A range of applications software is supplied with the C-10, of which the WriteMaster word-processing package will be the most heavily used in many offices.

WriteMaster takes advantage of one of the nice features of the C-10 keyboard: in conjunction with the control and shift keys, the top (numeric) row of keys can be used as function keys. In fact, the secondary functions, which are dedicated to WriteMaster, are marked on the top of the keyboard. This certainly speeds the learning process, as fewer references to the instruction manual are required.

WriteMaster belongs to the "What You See Is What You Get" school of word-processing. Text entry is much like on a typewriter – automatic wrapping at line endings is an option – so most users will hear the bell sound as they near the end of a line, indicating that return must be entered soon.

Commands such as SAVE and QUIT are entered by hitting ESCape to put the machine into command mode and then typing the command. The program provides automatic command completion: type the first letter only, then return, and the program will either complete the word or display a list of possible commands starting with that letter.

The cursor-control keys are used to move about within the text, and the top

row of function keys cater for block moves, case toggling, bold face and underline, screen back and forward and deletion of lines, words or characters.

WriteMaster has some particularly powerful features, such as the creation of temporary files which are automatically deleted at the end of an editing session, and a particularly neat indexing scheme.

A feature I particularly liked is that parameters like varying margins and tabs are automatically saved with a file: that's something WordStar won't do for me.

PlanMaster, Cromemco's financial analysis program, is similar to VisiCalc in its fundamental concepts, but has some significant differences.

First, the spreadsheet is not as large, and is organised somewhat differently: there are 10 pages, each with 30 rows of 12 columns plus row and column totals. Rows and columns may be labelled, with labels appearing in formulae.

An unusual facility is the ability to display numbers in hexadecimal format – I'm not really sure why you might want

to do that, but then again it could be useful for working out memory maps or some such application.

Equations are not specified on the spreadsheet itself, but on its associated "define page". This allows a structure more like a programming language, including IF..ELSE..ENDIF statements. It also allows calculations to be performed in an arbitrary order.

The programming language supplied with the C-10 is Cromemco's Structured BASIC. This is a large language with many advanced features, such as matrix initialisation, degree mode for trig calculations, and advanced control structures such as WHILE/ENDWHILE and REPEAT/UNTIL.

Structured BASIC supports floating point in both single and double precision, as well as integers. Floating-point numbers are stored in BCD format, so that rounding errors are minimised on financial calculations. In my tests, Structured BASIC showed a disconcerting wish to use double-precision floating point unless specifically instructed not to – which made the prime-number ben-



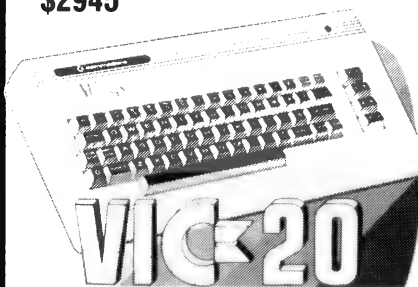
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chmark run surprisingly slowly.

The benchmark times obtained were: Prime number test, single precision, 26m 47.87s; Prime number test, double precision, 32m 10.67s; Sequential file write test, 46.30s.

File-handling in Structured BASIC is a bit different from Microsoft BASIC-80 and is, in many ways, more sophisticated. It is also possible for the user to patch in additional device drivers, making it easy to address non-standard devices such as plotters or modems.

A particularly useful feature is the ability to create files containing named procedures which can be loaded into memory with the user's program and called by name. Up to eight modules, each consisting of one or more procedures, can be loaded into memory partitions.

The ability to have labels in statements as the target of GOTO and GOSUB also make it much easier to follow structured programming techniques, and also help to make code that much more "self-documenting".

Other C-10 Software

Other software supplied with the C-10 as standard includes a chess game which plays to a high standard and puts the C-10's graphics to good use, and the usual selection of machine-specific utilities.

For programming in languages other than BASIC, a screen-oriented editor is supplied which is similar in operation to WriteMaster, but writes pure ASCII files, without any of the formatting information used by the word processor.

Other utilities are used for setting up the serial/parallel port, setting the screen intensity, and installing printer drivers. There's also a file-copy utility and a disk format and copy utility, as well as a program to display the

machine's full character set.

For those whose interests aren't met by the standard software, Cromemco has a wide range of other languages and applications software. These include a high-level COBOL compiler, FORTRAN IV, RATFOR, LISP and macro assembler. There's also a database management system and a spelling checker.

The documentation supplied with the system is excellent. The manuals are produced to a very professional level, and are intended for the first-time user. However, one area which I felt could have been more prominently covered was the initial copying of the system diskette, a task which most neophytes approach with considerable trepidation.

The only area not covered in depth is the CDOS operating system itself, though the CDOS manual is available as an extra.

Overall, the Cromemco C-10 scores well as a professional, personal workstation or small business computer. It has good software support from Cromemco, and can, of course, run a goodly percentage of CP/M 2.2 software. Though built to a price, the quality doesn't seem to have suffered.

The unit reviewed is the C-10SP, a package deal of hardware and software that is complete and ready to go at \$2299, plus tax. Also available at \$1295 (plus tax) is the C-10 without keyboard or software, for the user who wants it for a specific purpose.

Additional goodies and options include a full keyboard with numeric pad and separate function keys, and a low-cost 12.5 cps daisywheel printer.

In short, it's a good buy for companies wanting to move toward the "automated office" or for the professional wanting a personal computer. ☐



your computer book reviews

Beyond Games

KEN SKIER'S latest book, *Beyond Games: Systems Software for Your 6502 Personal Computer*, is well-suited to anyone wishing to learn assembly-language programming on a 6502-based microcomputer. Apart from being readable, explaining what the programs do and presenting programs that you can actually use, it is designed so that the programs can be used with the Apple II, the Atari 400 and 800, the OSI Challenger 1-P and the PET 2001.

This compatibility is obtained by writing a special control block for each machine, so that the programs presented will run without modification, except to the control block. Atari owners will be somewhat dismayed at the length of control block required for their rather unusual video format, but Apple, OSI and PET owners will have no problems.

The book includes a very short introduction to assemblers and a brief look at the 6502 instruction set, which is supplemented by an extensive set of appendices, and then dives into programming utilities.

The system utilities developed include screen utilities, a visible monitor, some print routines, a hex dump, a disassembler, a move utility and a simple text editor. These take you to page 170. The book extends to page 433...

What's contained in the appendices? Apart from details on the 6502 and the differences between the four microcomputers featured in the book, there are complete, fully commented listings of all the routines presented, plus a hex dump of them, and data statements for input from BASIC.

The system control blocks are also fully explained and listed.

This approach means that you can write totally portable code for 6502 machines, and transport from machine to machine by using the appropriate system control block. It is a fine approach for clubs and groups, or any individual who uses different machines from time to time.

Byte/McGraw-Hill has produced an excellent text, and I hardly begrudged the \$20.50 it cost. □

— Eric Lindsay

Apple Gaming

I'VE ALREADY gone on record as saying that I don't like computer games because a) I think programming is the ulti-

mate computer game anyway, and b) if I do start playing games I always get sucked in and don't do any work. However, even I found *Apple Pascal Games*, by Douglas Hergert and Joseph T Kalash (Sybex, Berkeley, 1981. \$19.95 rrp, review copy from the publishers), an interesting book.

The games in the book range from the old faithful number guessing game to a lengthy Cribbage-playing program. A couple of the games use the Apple's Turtle-graphics facilities, and all seem to be quite entertaining.

The major virtue of the book is its tutorial approach and explanations of how the programs work. In fact, coupled with a reference book on Pascal, such as Wirth's User Manual and Report, it makes quite a good introductory programming course in Pascal.

Each game is described, and a sample game shown where possible. Then comes a description of the program, with an explanation of how it works, and then the program itself. Although written for Apple Pascal, many of the programs will run under Pascal/M on CP/M (which is how I tried them).

Recommended for those seeking to master Apple Pascal and looking for examples to learn from – and for game players too, of course! □

— Les Bell

Awful BASIC...

WHEN I first looked at it, I wasn't too sure about *30 Computer Programs for the Homeowner, in BASIC* by David Chance (TAB Books, Pennsylvania, 1982. \$15.95 rrp, review copy from publisher).

Then I read it...Oh dear! This is the kind of book that gives computer book publishers a bad name – thank goodness TAB is big enough to survive this one.

The thirty programs are grouped according to the room they would be used in – living room, den, dinette and kitchen. Unfortunately there's nothing for the bedroom – it might have brightened the book up somewhat!

Bell's Law of Computing says 'Never use a computer when a 3 x 5 file card will do', and most of the applications in this book are those for which you wouldn't even bother reaching for the file cards.

For example, *Phone Directory*. We are told breathlessly that this will turn

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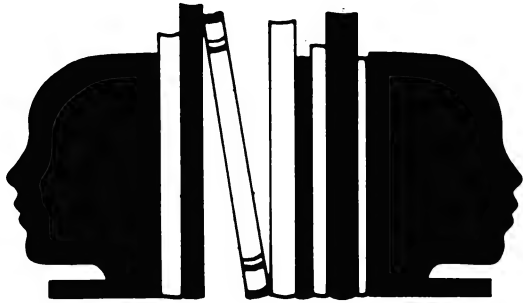
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your computer into a 'super-fast, super-intelligent phone book'. Later there's a small out: 'After loading the program and the cassette containing the phone number data, computer location of the number you need will take almost no time at all'.

All the programs are designed to run on a 16K TRS-80 Model I with cassette storage and suffer badly because of it. Almost all the programs simply store data in an array in the computer, with the option of writing to tape. The telephone directory doesn't even sort names into order!

Other gems: a recipe storage program (at last!) that will 'let you enter and store all the recipes you desire' - as long as each recipe is less than 240 characters; a 'household chore' lister, three TV and radio program listers, a message center (sic) that stores messages up to (gasp!) 7 - count them, seven - words. Throw away the pad on the kitchen wall...

If you own a TRS-80 with cassette and are desperate to find things to do with your computer, you could perhaps abstract some of the ideas from this book to suit your own purposes. But don't expect to get any serious usage from any of these programs - the effort involved in fiddling with tape means you'll still be using your Women's Weekly recipes and the Yellow Pages.

Perhaps it's just as well there aren't any bedroom programs; all that fiddling around is enough to slow anyone down.

Thumbs down! ☐

- Les Bell

Software Handbook

TONY WEBSTER has been publishing reference guides for the mainframe and office automation industries for some years now. A couple of years ago, he produced the first Australian Microcomputer Handbook, which summarised many of the computers available on the Australian market.

His new book - *Computer Reference Guide's Software Handbook* (by Tony Webster, Lindsay Costelloe and Elaine Ray, Computer Reference Guide, Sydney, 1982. Review copy from publisher) - does much the same job for software.

As we all know, it's the software that makes the machine go. Over 200 pages

are devoted to descriptions of hardware and software provided by mini and microcomputer distributors. Much of this information is devoted to operating systems and available languages, as well as broad applications categories like general accounting or word processing.

Chapter 5 covers 'industry standard' software such as CP/M and Micropro's various 'Stars', while chapter six (90 pages) goes on to provide details of independent vendor software by application area, as well as cross-referencing the hardware suppliers' wares.

The major drawback with all publications of this kind is that the compilers are totally dependent on descriptions provided by suppliers, many of whom are known for the optimism with which they describe their own products.

Nonetheless, this book is a good starting point for those in search of an applications program, and would be a good starting point for those seeking to purchase a small business system - remember, the software comes first... ☐

- Les Bell

More Software

MUCH MORE terse than CRG's *Software Handbook*, *Computerworld's Greenbook of Software and Related Services* (Computerworld editorial staff, Computerworld Pty Ltd, Sydney, 1982. Free with subscription to Computerworld, review copy supplied by publisher) also covers mainframe software, and thus is notable for the large numbers (to a micro user) in the 'Terms' fields. Boy, what those IBM sites will pay for a 4K program!

No hardware background is given in this work, which is very much organised for reference. Computerworld seems to have found many more of the small, specialised consultants who are now working in the micro area.

Application areas include CAD/CAM, systems software and compilers, financial planning/modelling, mailing, production/process control, text processing, word processing and hospital/health care, to name but a few. Brief details of each package are given - just enough to decide whether a follow-up is worthwhile.

The Greenbook suffers from the same

basic problem as the *Software Handbook* - in fact, one listing I saw claims features for a package that one user I know has been trying to get from the supplier for years, with success apparently no nearer. So you can't believe all you read...

Just the same, this is a very useful book to have on the shelf - I've been known to refer to it a few times myself - and at the price (free) it's a bargain. ☐

- Les Bell

...And More Software!

DATA INC's *Microprocessor Software DATA Book* (San Diego, 1982. \$133 a year; review copy supplied by the local distributor, J H Book Services of 75 Archer Street, Chatswood 2067. Tel: (02) 419 7779) is somewhat larger than the other software guides, containing 1281 packages from 89 vendors.

As the title suggests, the book contains information more oriented to microprocessor system development than to microcomputer applications. For example, IBM 2780 communications is listed as an applications program!

The categories covered include assemblers, emulators, simulators, compilers, interpreters, operating systems, monitors, editors, loaders, debuggers, subroutines, diagnostics, utilities and applications. The contents are indexed by application, by processor, by package name, and by vendor.

This book would be of most use to the system software developer, although the up-to-date applications programmer could benefit also. It's written in DATA's curious Polish/English, a language almost devoid of vowels: 'Oprts in 4 seqntl passes, prds three intermediate files. Incl's Pascal Translator & Support Library, C Native compiler w/preprocssr, parser and cde-gnrtr, and C Library which contains 3 libraries' - that's the description of Whitesmiths' Pascal.

It's quite up to date, with descriptions of recent software such as Computer Innovations 8086 C Compiler. A good book for dealers, software developers and large companies with lots of software development. ☐

- Les Bell

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The Class Of '82



By Natalie Filatoff

"EVERYTHING in this business has been done by somebody young." The words of *Your Computer's* (young) managing editor, Matt Whelan, fail to reconcile the approach of three gangling figures, all freckles, checked Western shirts, adolescent skin and regulation jeans, with the knowledge that they are starting their own computer software business.

But they are. Aged from 16 to 18, Michael Fackerell, Garry Epps and Martin Foord, all of Sydney's North Shore, form the nucleus of Dynamic Software.

The three registered their business in January, and have already begun producing multiple copies of their own microcomputer programs for retail through Electronic Agencies. With the aid of advertisements, they hope to attract other lone programmers to market under the Dynamic banner, the "inven-

tors" receiving royalties from the sale of their programs.

It's becoming a trend, this corporation cum co-operation of youth. Rumours of whizz kids being "ripped off" by adult conglomerates have accelerated the movement. While the possibility of being exploited incites no bitterness, it prompts a realisation that youth can help itself.

"What happened with me," says Michael Fackerell, the spokesman for the business, which is run from his St Ives home, "was that I'd been programming different machines for a while, like the Apple and the TRS 80 and System 80. I saw an ad for a new computer, called the Microbee, and it looked really interesting, but I was fairly sure they wouldn't have any software for it. So, when Dad said he was going to buy one, I went into Applied Technology (the

company that makes the Microbee) and started writing a game for them.

"Working there, I could see the opportunities. They had very few good programs early on. I got the idea of setting up this business, got hold of guys I knew were good programmers, and that's how it happened."

It's a maddeningly simple tale: An interest, which might just as well have been stamp-collecting, is fostered by parents; aptitude and enjoyment decode to "saleable expertise" in another language – and a businessman results.

"We've now got about eight programs for the Microbee," Fackerell continues. "We're working all the time. They're mostly games at the moment, and while we are dealing through Electronic Agencies, we're also selling programs ourselves."

The team aims to establish itself

quickly, before university and school workloads restrict its commercial activities, and before other software for the Microbee pours on to the market. "It happens quite often," says Fackerell, "that computers are released before they have software ready."

Stuart Chugg, a spokesman for Applied Technology, explained that, in his company's case, it was because of a contract with the New South Wales Education Department, for the supply of Microbees to schools, that initial emphasis was placed on the production of educational software rather than ordinary user programs. A large range of these, he says, will soon be released.

By then, Dynamic Software hopes to have moved on to other, unexplored pastures. Fackerell is "thinking about" buying a VIC machine and programming for that.

"We'd like to do the programming for the Spectrum – or whatever it will be called when it's released in Australia. And we also want to get into 16-bit computers with a lot more power and do business programming. But at the moment, we have to stick to a sure thing until we've got the capital to branch out."

Such logic, born of necessity, forms Dynamic Software's strategies. While all three staff members are now writing programs, other functions are to be specifically allocated as the business grows. Says Fackerell, "That's one thing I did learn in school: things work better if you divide tasks up between people."

"I'll be organising things – that sounds big-headed, but it's not meant to be. I think I'll probably get one person to do the copying and documentation, with some others to help when the workload gets heavy. I'll be making the contacts and handling the advertising."

A score of 485 out of 500 in last year's Higher School Certificate examinations indicates that Fackerell learned about more than the benefits of diversification and specialisation to the workforce. He brushes the 'brilliant' tally aside with a twang: "I'm not much for book-learning."

While the other two admit to a mathematical inclination (particularly Garry Epps, who took top-level mathematics, physics, chemistry, engineering science and "those other subjects you had to do"), Fackerell concedes, "I think English is important, too."

He describes himself as an all-rounder. "I always seemed to change as I went through school. I did languages up to Year 10, and found that interesting. I like different things, and I think computers is one area where you can put varied talents to use, because you can simulate so many things with them."

"You've got the opportunity to use your English expression, too. I think that will help me in advertising especially: to get people to buy things, you have to make the products sound attractive." None of the young programmers could be termed a total computer freak – they don't spend every spare moment at keyboard and screen. Their other interests range from cricket to "stereos, electric guitars and astrophysics" to music and a fascination with Dungeons and Dragons, the fantasy adventure game.

Music seems to hold an attraction for many young computer people. Martin Foord, the youngest and most easy-going of the group, believes a knowledge of mathematics, "which does help with computer programming", is also useful for an understanding of music.

He plays bass guitar ("I suppose I could play classical, lead and rhythm, too") and drums: "I did piano last year, and learned a lot about the theory of it. All the different rules you've got to know for harmonies and things like that coincide quite a lot with maths."

He laughs and describes the band in which he plays: "It's a joke band, really. We're called The Arabs, originally The Dense Arabs. We just jam around, play songs off the radio and write our own."

Now in Year 11 at the Sydney Church of England Grammar School, Foord's interest in computers was kindled two years ago.

"I used to play a lot of arcade games, and I always wanted to design my own," he explains.

"I suppose I learned just by curiosity and reading – I didn't take any courses. There were a lot of books in the library at school, and I asked around. Michael is my neighbour, and he's helped by letting me use his computers."

Foord has decided against buying his own computer, partly for financial reasons and partly because he believes it would take away time from his schoolwork.

"In the middle of term," he says, "I'm really more interested in schoolwork, but on Monday afternoons I'm writing a stocktake program for cadets at school. It files every cadet, how many berets, gaiters, pants, shirts he's got, whether he's lost or nicked anything; you know."

We decide it's a mug file and he giggles.

"But I'm much more into action games, where you're actually shooting things or something. I've written a couple for the Apple which I haven't marketed."

Garry Epps has been more aggressive in previous ventures. For him, Dynamic Software is a sideline: "I'm making a lot of money selling programs for the Compucolour. I've written heaps for it, including a whole word processor

which sells for \$50 a copy. I'm well into the four-figure net from that; it's sold all over Australia and overseas."

"But I'm much more interested in real-time games than anything else. I'm an addict."

Epps was introduced to computers about five years ago by an elder university-going brother. "He'd bring home these bits of paper with all this funny stuff on them and I'd go, 'Oh, what's this?' So he'd tell me what it meant, and I learned BASIC that way."

"With Dynamic Software, I'll be writing programs. At the moment, I'm working on a whole heap of card games, using high-resolution graphics to re-create the pictures on the cards. With high-resolution graphics, you can draw really intricate pictures."

While each of the boys has attended a school which has a computer, they often found they knew more than their teachers about the machines. Says Foord, "They don't mind at my school. Sometimes, they even come to us for help. There are a couple of masters who are into it with us."

The New South Wales Department of Education has committed itself to the furthering of computer studies in schools. Richard Wiktorowicz, the department's curriculum consultant in computer education, explains: "Schools have for some years been able to put up their own courses for approval. Computer courses come up all the time."

"The department conducts in-service courses for teachers to learn about computers, and the response has been excellent. We're looking now at establishing a computer centre, and there is generally a growing commitment to money and personnel for the furthering of computer studies in schools."

"There are two types of kids: Those who should know something about computers because they will affect everyone, and those who really want to learn how the machine goes."

The Dynamic Software team certainly falls into the latter category. All three will eventually study electrical engineering and computer science at university. As Foord puts it, "I want to be able to build my own computers, and also get qualified, just in case this venture doesn't get off the ground."

The group has little doubt that the business will be a success. How worried are they that new developments might make them obsolete? "I think we'll be able to move with any new technology,"

"People have funny misconceptions about computers – you just have to look at some of the movies they've got around at the moment. They seem to believe computers can think."

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The Class Of '82



John Nicholls Unlimited

YOU'D NEVER find John Nicholls in a fantasy cave. The 18-year-old Sydney programmer cum accountant cum company secretary of Digital Concepts Computer Enterprises is more attracted by the challenges of real life.

He and partner Dirk Williams registered their business after completing the 1982 Higher School Certificate examinations at Knox Grammar School. Both have been programming continuously ever since, and are looking for more young computer-wise people to help them with an ever-increasing workload.

"I can't believe how much work I've been doing lately," says Nicholls. "Every time I finish a project for someone, there are always five more to do."

"We work for ourselves and sell a lot of stuff through Applied Technology, because at the moment we aren't big enough to do it ourselves. Hopefully, in a couple of months we'll have the capital to take on more."

"Ultimately, we want to set up a full company and do the whole works ourselves — designing computer hardware and other things to do with electronics as well as computer software, and marketing it all ourselves."

"Applied Technology has been very fair about paying us. We get 20 per cent of the retail price of our programs, and

we've been given an account at Applied Technology's shop. The other day, we took a Microbee and a screen and put it on the account, and our royalties will pay for it. I prefer it this way. It means we've got something up front."

Their most successful program is Monkey Maths, an educational program for the Microbee. Nicholls describes it as "an excellent program for improving your maths."

He explains: "It's for kids, but when used at its highest level it's too hard for me. It's doing very well. I think we sold a couple of hundred copies over three days when it was first released on the market."

Nicholls, who says he has no great mathematical aptitude, believes logic is the key to good programming.

His natural qualifications for a profession in computers include a childhood fascination with pulling things apart "to find out how they worked." He was also intrigued by the elusive qualities of electricity: "Electricity was a challenge to me because you couldn't see it, you just had to assume it was there. And then the amount of things you could do with it..."

High-school physics classes included some study of electronics: "In Year 11, Dirk and I started to design a couple of things for our personal use. Once we'd

built them, they seemed to be up to marketable standard. We looked into it and nobody was designing anything like it, so we decided to give it a go. That was when we discovered you can't sell anything without a trade name."

Nicholls gives three reasons for starting up his and Williams' own company, rather than working for someone else: "Working for yourself, you need more initiative. You're not just sitting behind a desk where someone plops something in front of you and says, 'Process this.' You've got more chance of becoming bigger. If you work for someone else, you're stuck with them and they're always the boss."

"Another big point is that we both want to go to uni and if you do it full-time, you get your degree and nobody wants to employ you because you've had no practical experience. So we're doing our electrical engineering course on a part-time basis and getting some experience in the field."

"We had to form our own company because, at the moment, it's rather hard to get a full-time job doing what you want to do unless you employ yourself."

The boys are currently working from their respective homes, Nicholls in Chatswood and Williams half an hour's drive away in Avalon. Says Nicholls, "It's inconvenient for us to work at one house or the other because we live so far apart, but we're in constant contact and we're hoping to get modems to transfer information soon."

"I keep the accounts at Chatswood because our post office box is there and it's easier for me. Also, I'd rather do it myself, because I'm more methodical than Dirk. If anyone wants to check our records, they're all worked out down to the last cent."

Truly a business man, Nicholls relates how Williams' latest whim took him skydiving, which resulted in a broken pelvis.

"I told him there was no way, absolutely no way," he laughs, "that he'd get any workers' compensation from the company. We can't afford it, even if he is our best programmer." Nicholls' own interests include photography.

"I'm into landscapes, special-effects photography and macro photography, and I do all my own processing," he says. "I'm also into almost every sport there is — snow-skiing, water-skiing, rock-climbing, basketball, tennis, cricket..."

"The business," he says, "is really a challenge. That's the whole idea of it. I reckon life's a challenge and if you can't take the challenge, you'll never get anywhere."

If we fall flat on our faces, then we fall flat on our faces. That's experience."

The Class Of '82



The Schoolboy Columnist

WE FOUND Andrew Farrell in a dark and gloomy cave, where a subterranean river and a sword-brandishing dwarf were preventing him from appropriating a golden key which would let him into a goblin-infested castle, where he had to rescue a dragon in distress, who would ultimately lead him to a hidden treasure.

Most readers of Andrew Farrell's regular column, *Your VIC Computer*, would

be astonished to discover that the author is a 16-year-old Sydney high school student.

Farrell became involved in *Your Computer* as part of a work-experience programme run by New South Wales schools; we recognised his talents and asked him to contribute to the magazine on a regular basis.

He first became interested in computers about two years ago, when a friend who had built himself a computer showed him his manual.

"I saw the amazing things you could do with it and knew I'd have to buy one," remembers Farrell, who has a passion for Adventure-type computer games.

He saved diligently and eventually bought a VIC 20 microcomputer. "I'm writing software for it at the moment," he says. "I try to write stuff which is marketable and at the moment there aren't a lot of Adventure games for this particular computer. I add extra memory as I have the money, and soon I'll be able to start some simple business things.

"Smaller computers like mine don't have a lot of use in the business world because they're so limited. You put a few people's names in them and you start doing tricky things, like sorting them, and you soon run out of memory. But the good thing about the VIC 20 is that you can add on to it."

Farrell markets his software through another "young" company, Digital Concepts Computer Enterprises. "It's hard to tell who you should deal through," he says. "On the surface, anyone can look friendly and willing to help you out. But the blokes at Digital Concepts are

roughly my age – they're pretty reliable and they don't have a lot of other worries. And there's as much in it for them as there is for me."

Aside from programming and writing about computers, Farrell gives courses in basic programming to computer novices.

"It's a fairly easy arrangement," he explains. "I offer them courses on an hourly basis – I go around to their homes or they come around to mine. It just gives people a bit of an insight.

"Some clients," he says, "are a little shocked to see how young I am. But they don't really worry much. I think they kind of expect it.

"At school, I've got friends who really hate to talk about computers, so I don't bring the subject up in front of them. People often think you're a bit weird when you spend so much time behind a terminal. Some even hold it against you when you can do something they can't, especially older teachers who think it's wrong having kids telling them what to do."

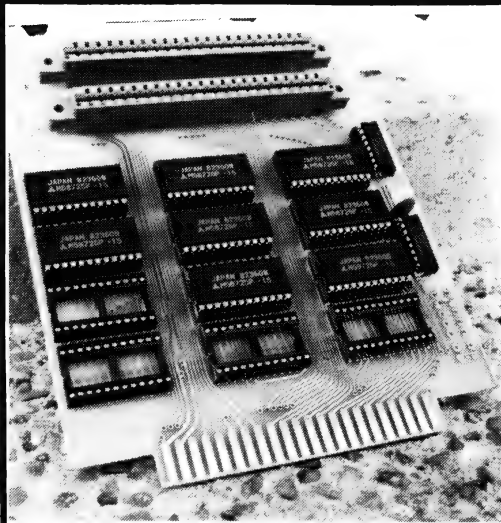
Farrell's aim is to go on to university and study computer science. "Then I might work for myself, just designing software and marketing it. If that doesn't go too well, I'll probably have to get a job with a larger company, which would probably be all right."

At present, it's computers, school, bike-riding, *Your Computer*, art and "a whole lot of other interests."

Farrell estimates he spends about two hours a day at his computer: "Some days it's a bit more, some a bit less. It depends on the weather or whatever I feel like doing."

One thing's for sure: when the surf's up, you won't find Andrew Farrell in a cave, searching for dragons in distress... □

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The Class Of '82



The Quest for Knowledge

WHILE YOUNG men seem to be launching themselves into the computer industry with a considerable amount of confidence, we had great difficulty con-

tacting young women in similar situations. Perhaps it's due to the disinclination of teenage girls to tinker with electronics, an avenue that leads many young men to computers.

Whatever the reason, girls tend to take computer courses before entering the industry, and generally work for companies rather than starting their own.

At 19, Debbie Edmunds has just begun a career in computer programming. One of the Control Data Institute's most promising students, she completed the institute's six-month training course late last year and is now employed by KSH Systems, at North Sydney, on a temporary basis.

"KSH is converting one language to another and there's a lot of tedious work to do," says Edmunds. "It's great for me because I'm learning to program and I'm doing some operating. I wish more companies would offer temporary work - there are so many people like me who need that experience to allow them to move into other jobs."

A former student of Pittwater House Girls' College in Collaroy, Sydney, Edmunds first became interested in com-

puters when, as part of a Year 10 work-experience posting, she spent some time seeing how News Limited's computer department functioned.

"I was 16," she recalls, "and the work fascinated me. I'd always done well at maths, so computers really appealed to me."

After completing the Higher School Certificate with mainly science and mathematical subjects, Edmunds was disappointed to find she hadn't scored the required aggregate to be admitted to a computer-science course at university.

"So I wrote to various companies, asking for a trainee position," she says. "I more or less said I'd do anything in their computer departments, but they weren't very impressed."

"Then I heard of the Control Data Institute's courses and thought it would be a good way to get my foot in the door."

In up to her ankles, she's still objective enough about her chosen profession to say, "A lot of people in the computer industry get really distant - they're always off in their own world. I hope I don't get like that..."

Her long-term aims, she says, are hard to describe: "I want to acquire a lot of knowledge. I want to be really clued up on everything to do with computers and eventually have a job where I'm dealing with people, probably in an advisory capacity." □

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HEARD ON THE BUS

By Leon Yendor

ON A RECENT trip to Asia, I accidentally stumbled into the R and D lab of Ling Foo Electronics whilst it was unoccupied and discovered the details of the revolutionary Advanced Programmable Register Integrated Logic chip, dash 1.

Notes made from the blackboard layout and the preliminary data sheet allow us to see some of the features of this device.

Shock Revelations

For a start, it is interesting to see that rather than the usual totem pole outputs, this one has bamboo pole devices which reduce the pull-down requirements and, being hollow, need only minor punch through to become open-drain conductors.

Another dazzling departure is the way that address calculation is reduced by avoiding fetches from memory and, instead, referring to what was described in the literature as the "Brack Book" - no doubt a set of registers used for storing useful look-up tables of the most interesting call routines.

Whilst this chip normally sits on a two-bit bus, it is capable of responding to DMA requests, whereupon it stands on the bus, thus handing over gracefully to the DMA (Dear Maiden Aunt) coming down the queue.

This nicety fits in well with the sophisticated architecture which also allows Virtuous Memory to function in parallel with an escape code linked to the previously mentioned Brack Book and the rather sketchily described Party Error Detector and Cheque Sum Generator.

These functions alone make for a wonderful level of support for high-handed languages, useful in programming requests on banked resources. At the same time, built-in masks make cycle-stealing more likely to be safely carried out, thereby avoiding the need for a bus at all.

Military Secrets

The desire of the designers for their product to find wide acceptance in satellite launch vehicles can be seen in the way that all counting is downwards, with optional and random holds being implemented as standard.

String-handling is enhanced over most chips by making sure that legs do not protrude from the case (see also Packaging).

Peripheral support is believed to be

strong, as would have to be the case when the major function block is a large barrel shifter with an adder on top.

This IC is packaged in a leadless inverted frame carrier and must be inserted manually (or, in other words, once a year). Occidentals please note that this should be done sideways to avoid interrupts.

Strong Language

As with most new processors, this one is fitted with an instruction set which has mnemonics apparently meaningless to anyone other than the legal office of the company which has chosen each one carefully to make copyright breaches obvious.

Some opcodes and their meanings:

BOO - jump one step forward.

UMM - insert wait states.

ALP - shift left.

LIB - shift right.

NCP - squat.

NEC - shift diagonally.

IBM - turn blue (privileged instruction).

HOW - for compatibility with Amerind language.

PAYE - incremental reduction of variable (wage).

UCV - return fictitious number.

MATT - executive call.

NCC - pack large number.

LES - write, write, write.

BILL - CP/M help function.

VCR - copy illegally (unless trapped).

STD - call expensively.

ISD - call more expensively.

Economic Disaster Pending

Deliveries of sample units are expected on the first day of the second quarter. However, the problems of OPEC in setting oil prices and quotas have led to rumours of the richer Middle East nations attempting to diversify their sales by buying up all of the world's beaches and deserts to add to their stockpiles of silicon, so please place your orders soon.

New Zealand buyers should be aware that their Government is negotiating directly with the factory on the basis of being able to pay in silicon when they have completed their take-over of Bondi Beach.

Order part number A.P.R.I.L.-1 directly from this magazine or from Foo Ling Yu Electronics and Nitware Company, 1983 Celestial Technology Drive, Ustax Haven, Third World. □

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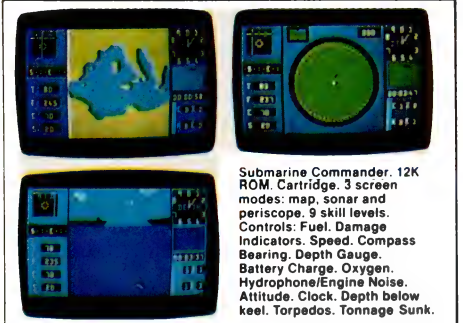
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And whilst budding Beethovens play the 'VIC Music Composer', would-be Chancellors can work on their budgets with 'Home Financial Management'. We also have educational puzzles for children that will puzzle adults at higher skill levels.

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will beat faster.
only sitting in an armchair.

A Surfeit Of Systems?

The second week of March proved to be a hectic one for the microcomputer industry, what with the show, the Congress and all. After vowing that he never wanted to see another computer again as long as he lived, Les Bell calmed down long enough to put finger to word-processor...

DURING THE second week of March, the streets of downtown Sydney seemed to be full of computer people commuting between the Australian Computer Society's Personal Computer Congress and the First Australian Personal Computer Show. The week really was a concentration of more personal-computer equipment and people in one area than has ever been seen before in Australia.

The result for me was total immersion - even I don't usually eat, sleep and breathe computers to that extent. However, the week provided a number of opportunities to meet and talk with interesting personalities, and to hear what some of the industry's gurus had to say.

It really started on the Tuesday with a good long chat with Micropro's Seymour Rubinstein, the man behind WordStar. Seymour started in the industry as marketing manager of the now-defunct IMSAI Corporation, the second personal-computer manufacturer. In this position, he was well able to see the scarcity of software, so, knowing what people wanted, he set out to provide it.

In May 1978, he formed Micropro as a one-man company, and hired a contract programmer to start software development. For five months, they burned the midnight oil to produce Supersort, which was followed shortly after by WordMaster, still rated by programmers as one of the most popular editors.

The company burst upon an unsuspecting world in September 1978, sharing a stand at a New York computer show. In the first month, sales were \$10,000, and Seymour felt confident enough to hire his first salesman - on a pure commission basis. The following month, sales were up to \$14,000, then \$20,000 - until the company learned the effect of Christmas on sales the hard way: takings were down to \$8000.

However, they quickly picked up again, and soon thereafter, the company moved to San Rafael, California, where the first salaried employee joined.

Meanwhile, Seymour and his prog-

rammer were working on WordStar. Development had started in October 1978, and in June 1979, Version 0.88 was released to the public. Since then, Micropro has never looked back. The company now has 246 employees (of whom 50 "cut code" and 20 write documentation) and in February alone shipped \$3.6 million worth of products.

From the beginning, Seymour Rubinstein has had a clear idea of the kinds of software tools he wanted to build and sell. His latest product, InfoStar, for example, has always been one of his plans from the earliest days, even though it has only just been released.

Seymour's ideas about personal computers are slightly different from many of the industry *cogniscenti*. He doesn't believe, for example, that there should be a terminal on every executive's desk: "If I came into work one morning and found everybody sitting at their desks playing with mice and pixel graphics, do you know what I'd do? I'd fire them all!"

"A manager's task is to delegate tasks," he said. "I don't even have a computer on my desk - I wouldn't know what to do with one!"

Perhaps Seymour's explanation of how he views InfoStar will demonstrate this. The concept behind InfoStar is that it allows the user to deal directly with the reports and data structures that he requires, rather than a programming language. He can draw the forms he will use on the screen, describe the report formats, and InfoStar will do the rest.

It sets up the data base and does all the work. The user can at any time request help from the system; it will respond with concise directions and a reference to a page in the manual - which, by the way, is among the best I have seen. The system is, in essence, designed for end-users, not programmers.

In practice, says Seymour, the boss will buy the package, learn about it and then set up the system to perform the tasks he needs. He will then turn it over to his secretary to manage the day-to-day data entry and production of reports, and so on.

InfoStar has met with incredible success: 11,000 copies were shipped in the first six weeks, and the package is destined to become one of the most important in the Micropro product line. But WordStar and related products will remain as a major part of the business. (It will probably come as no surprise that WordStar is already the top-selling word-processing package for the IBM-

PC.)

Incidentally, for WordStar freaks who think that the program does everything they could possibly want, Seymour indicated that Micropro will release, later this year, what he described as "profound enhancements", in the form of additional overlays. While he wouldn't elaborate further, he did later confirm that one of them will be a phototypesetter driver.

Another upcoming release is called Starburst. Now, I'm not sure that I followed his explanation, but from what Seymour described, it sounded like a super-sophisticated "shell" enhancement for personal-computer operating systems which will make them easier to use and will integrate applications software. It includes a menu compiler, an "action-list generator" and catalog functions, and will also manage file transfers between applications programs.

What all this means, I can barely begin to guess, but at least you read about it first. And it will obviously be easier to use than to describe!

Other new products under development at Micropro include further enhancements to CalcStar, together with a completely new and more sophisticated spreadsheet or financial analysis program. The company is also developing a new policy for "multiple-user licences" for multi-user and network installations of WordStar and similar products. This will involve a base charge plus a "per workstation" fee, and will include operator training - a major plus for institutional users.

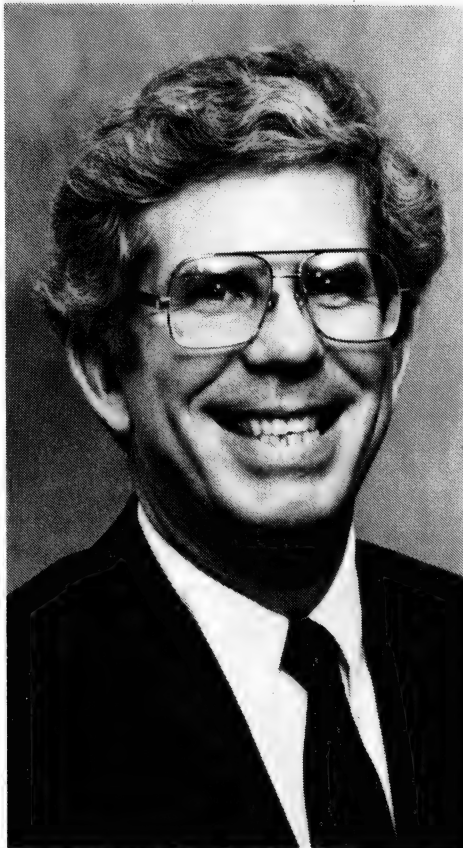
Seymour's paper at the Personal-Computer Congress was on the topic of "Common Misconceptions About Personal Computers". Though I missed the talk (can't be in two places...), he filled me in beforehand on some of his key points. One with which I particularly agree is that "the easiest software to use is not necessarily the best". In other words, extra effort spent in learning to master a more powerful software package will generally be repayed.

Private Mistakes...

Ed Faber, the president of the Computerland Corporation, spoke about the history of his company and the parallel changes in the marketplace. One of the key points he made was one which I had previously not thought of - that the personal computer allows the business user the privacy to make his own mistakes. On a mainframe computer, the whole department could well be watch-



Seymour Rubenstein, the man behind WordStar, and President of Micropro.



"The Father of the IBM", Don Estridge, announced a 12% price drop on the PC.



Ed Kramer, responsible for sales of DEC's products in the United States.

ing; on a personal computer, you can start again if you fluff your budgeting and no one's the wiser.

There was considerable discussion at the end of Ed's talk on the topic of user-training and the computer store's role in educating and supporting the user. One of the interesting phenomena of the market is that the customer is often more knowledgeable about a particular product than the poor old salesman, having read reviews, used similar products and generally built up a body of experience, while the salesperson has just had some "crammed" product-training.

This isn't yet a problem, but it will be interesting as people who have owned a computer for some time go back to buy another, and find the salespeople to be relatively computer illiterate.

Don Estridge, the "father of the IBM-PC", presented a very interesting overview of events surrounding the personal computer in the United States. He also caught many of the press off-guard by making the world-wide announcement of the IBM-PC XT, which could be described as a PC with mag wheels and a hatchback.

The XT looks almost identical to the IBM-PC, except for the label and the 10 Mbyte hard disk where the second floppy should be. Inside, the main circuit board has been redesigned to give 128

Kbytes of RAM as standard, and there are now eight peripheral slots instead of five. Also included as standard is an asynchronous interface card for communications.

Floppy-disk capacity is now up to 360 Kbytes per disk under the latest revision of PC-DOS. The XT will not be available until May, and so far Australian pricing has not been announced, partly due to recalculations because of devaluation (evidently, IBM doesn't use VisiCalc models to calculate prices!). In the United States, the XT base model will sell for \$4995, and a system with monochrome display adapter and monitor will sell for \$5675.

Also announced was an average price reduction of 12 per cent on the IBM-PC itself (with some components down as much as 30 per cent) and an expansion chassis which will allow users to plug in many more cards.

Mr Estridge also tackled the subject of user education and simplicity of man-machine interfaces.

"If you don't understand the concept of Nett Present Value or cash flow, it doesn't help if the machine is easy to use," he said. In other words, people need to learn ways of approaching their problems and putting them into a form suitable for computer solution.

The calculation of Nett Present Value

is extremely tedious, with a high chance of error, and most financial managers would use simpler but less accurate alternatives, such as payback. With the advent of the personal computer, more sophisticated techniques are available, if the user is aware of them.

As an illustration of the advances the computer industry has made, Mr Estridge recalled his days working on the United States space program computers at NASA. At the time that John Glenn was making his three orbits around the world, Mr Estridge was in charge of the NASA IBM-709 computer, which had 32K words of memory, and no disk drives, just tapes. "John Glenn probably didn't realise what a precarious position he was in," said Mr Estridge.

In June and December, IBM carried out two major surveys of IBM-PC owners, and discovered a number of very interesting things. First, of the IBM-PC owners surveyed, 60 per cent had their machines located in the home. Second, 11 per cent of machines sold to large-account customers were transported from work to home and back again at least once a week, and that percentage rises to 25 per cent of machines sold by IBM's direct sales force.

The patterns of home usage have shifted dramatically. In June, the fundamental application was gaming,

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with the second biggest application "literacy" and then education. Applications such as balancing the chequebook and home budgetting came way down at the bottom of the list.

In December, the most popular application was "financial planning" - note the change in description from "home budgetting". Very few people have such an orderly life that they can budget exactly by computer.

The patterns of home usage have shifted dramatically. In June, the fundamental application was gameplaying, with the second biggest application "literacy" and then education. Applications such as balancing the chequebook and home budgetting came way down at the bottom of the list.

In December, the most popular application was "financial planning" - note the change in description from "home budgetting". Very few people have such an orderly life that they can budget exactly by computer, but the computer can easily be used to produce forecasts and budgets for small business enterprises.

The second most popular application was child education - again, there was a change in wording from the terms "literacy" and education.

There was also a dramatic change in the usage patterns: in the first survey, respondents said that the original purchaser used the machine 98 percent of the time, but by December, children aged 5-19 years were using the machine 40 percent of the time, and spouses 30 percent of the time, indicating a spread in usage, according to Mr Estridge.

Interestingly, about 25 percent of respondents owned a second computer, and almost all the others were thinking of buying one.

Mr Estridge also did some crystal ball gazing. Though the prices of mechanical components such as the power supply and keyboard were dropping, manufacturers would prefer to build in more capability rather than cut prices, he said, and we could consequently expect to see more powerful and more functional computers.

The DEC View

Ed Kramer is Vice President of United States sales for Digital Equipment Corporation, the world's largest minicomputer manufacturer. Speaking on 'Personal Computer Strategies for Large Organisations', he described the new Third Generation personal computers.

These are characterised by multitasking operation, allowing the user to switch between applications in response to interruptions, and the use of comfortable and consistent program interfaces. They also have sophisticated file managers, the ability to handle multiple concurrent communications with powerful protocols, and high level development tools.

To date, the bulk of personal computers were not providing these facilities, which is one reason why only six percent of desks in the United States had terminals on them (a figure I thought quite successful!).

The successful office workstation or personal computer should be tailored to meet the needs of a working team of six to 10 people who will want to share data and integrate the pieces of a project or task. For this reason, teams will need a range of compatible workstations configured in a network or at least clustered around a central file-server.

Interestingly, DEC is its own biggest customer, with around eight to 10 percent of production going to internal use. Because of this heavy internal usage, DEC has a lot of experience in office automation.

DEC operates three internal networks. TSN is a private Tymnet service with 40 local nodes and three gateways to the national network operated by Tymnet. Perhaps the largest network is EMS, the DEC Electronic Mail Service, which handles 20,000 messages each day to 8000 users. The 13 American and two European nodes include links to the public Telex network. The system has shown a number of benefits to management, including fewer meetings, shorter meetings and faster decisions.

Almost as large is the E-NET (Engineering Net) which is used for soft-

ware development and engineering applications. This has 500 nodes worldwide and 8000 users.

Robert Fisher, of Peachtree Software (a division of Management Sciences of America), spoke of the industry as viewed by software houses. Gone are the days of the 'cottage industry' - today, to develop and launch a successful software product requires vast investment.

Bill Caelli, managing director of ERACOM Computers, on the Gold Coast, spoke about communications, networks and security of information workstations. According to the latest estimates, around 30 percent of the Australian workforce are information or 'knowledge' workers, and this has important ramifications, particularly when office productivity is considered.

Bill outlined two different views of professional workstations. The Japanese 'fifth-generation personal computer' will have a megabyte of memory, a 20 MHz CPU, high resolution graphics (up to 2048 by 2048) and 100 megabytes of mass storage.

The scientific personal computer, as seen by Carnegie-Mellon researchers, will have a capability of 1 MIPS (1 million instructions per second), 16 Kwords of writable control store (allowing emulation of various microprocessors), 1 Mbyte of RAM, high-resolution colour graphics and 100 Mbytes of mass storage. Both visions are remarkably similar, and very nearly realisable with current technology.

According to Bill, there are a number of problems with using workstations or personal computers to improve professional productivity. For example, 'haziness' of information and a lack of clarity of purpose are quite common in the way we approach problems, but the machine is not in the slightest bit hazy and demands specifics. Similarly, the information structures we work with are complex and dynamic, and personal computers aren't good at coping with them.

On the topic of security, Bill described the various kinds of vulnerability of most computer systems, ranging from casual browsing by unauthorised users to deliberate destruction of valuable data. For example, most microcomputer accounting systems provide very little, if any, guarantee of the validity and completeness of transactions, particularly in the form of audit trails.

Talking about the ease of theft of data, Bill startled the audience by ripping the mylar disk out of a floppy through the centre hole, folding it in four and putting it in his shirt pocket! Challenged as to how he would recover the data, he replied that with a cool iron and a sheet of brown paper, the disk could be flattened and placed inside another

disk-jacket to be read...

Elisabeth Reinhardt, Director for international marketing of office products for Apple, spoke on the topic of software ergonomics. At present only six percent of American senior and middle management use personal computers; the low priority of office productivity is highlighted by the fact that each factory worker is supported with around \$40,000 of equipment, while the office worker is backed up by only \$10,000 worth of equipment.

The thrust of her talk was the concern of users with finding time to learn about the new tools such as executive workstations. The more senior an executive, the more concerned he is about learning to use a computer, particularly typing. This is apparently a particular concern among women – can it be that female executives don't want to be seen as remotely connected with secretarial duties?

Apple's philosophy is to make the technology adapt to the users, not the reverse. The outcome of its work to date is the Lisa workstation, which works in a way much more like a desk-top than any other personal computer.

Scott Oki, from Microsoft, outlined some of the issues seen by Microsoft (the wonderful people who brought you MBASIC).

Networks are a major challenge for the software houses. There are plenty of wires (and fibres) available, but few companies have the required software to provide a 'total solution'. Similarly, there will be a strong demand for graphics software.

Perhaps the most intense issue at present is 'user-friendliness'. Software companies are addressing this problem with much more sophisticated help systems and menus in their products, together with better integration of software packages. Scott sees the operating systems providing a stronger foundation for applications software, even providing some of the intelligence of the user interface, and thus helping to ensure common user commands.

Another major area which is being worked on is tying personal computers to mainframes. Though almost all machines now have asynchronous communications and some have the IBM mainframe protocols, this is not enough. Further work must be done on protocols for database inquiry, abstracting sections of databases and turning them into a common format for downloading to a personal computer. Ironically, this has to be done at the mainframe end, and the innovative microcomputer houses working on the problem have little mainframe expertise and only weak ties with the manufacturers. ☐

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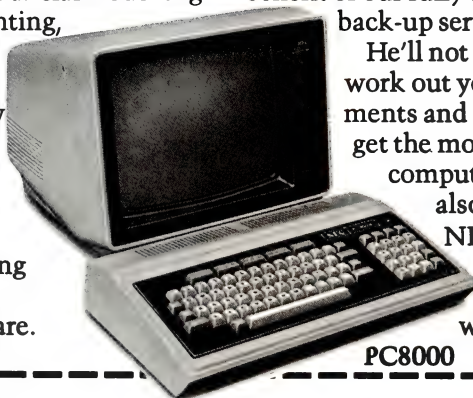
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I.E./Modem (Asynch) (A)

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Benchmark Mail List Manager (A)

Benchmark Telecommunicator (A)

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Mailmerge (C)

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Data Management

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SuperSort (C)

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Financial modelling

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Telecommunications

I.E. Asynch - 86 (A)

I.E. Bisync - 86/3780 (A)

I.E. Bisync - 86/3270 (A)

I.E. Bisync - 86/HASP (A)

Word Processing

Benchmark Word Processor (A)

Benchmark Telecommunicator (A)

Benchmark Mail List Manager (A)

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dBASEII (A)

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PC 8000

The First Personal

THE PERSONAL Computer Show itself was nothing short of hectic. By 3pm on the second day, almost 15,000 people had been admitted, confirming it as a huge success – the organisers expected 12,000 over the three days!

A number of new machines were on display. Perhaps the star of the show was Apple's display of Lisa, using a projection television. Lisa is one of those concepts that has to be seen to be believed and Apple was making sure that as many people as possible got to see it (her?).

The Apple IIe has been rather overshadowed by its big sister, but, now that it's here, it excited a lot of interest. The IIe has 64K of memory as standard as well as PAL colour, and Apple now has an 80 column card which plugs into a dedicated slot (right in front of slot three, which limits it to smaller cards). Due to the redesign of the machine and the inclusion of custom chips, the IIe is not completely compatible with the older models, but around 90 percent of software runs all right, according to talk round the trade.

Mitsui Computer Systems displayed the three new machines from Sord. The M5 home computer is really in the same league as the Sinclair Spectrum, offering colour graphics and cartridge games in a tiny \$350 format. The machine comes with an introductory BASIC cartridge and a games cartridge, and uses almost any standard cassette recorder for program storage. A spreadsheet calculator called FALC, which is a subset of Sord's PIPS program, allows the user to do simple home and business budgeting.

The M23P is the latest in the M23 line, and is designed for portable operation. With a liquid crystal display, battery pack and two 7.5cm (three-inch), 290 Kbyte microdiskette drives, it really is a portable package. In a fixed location, you can also take advantage of its colour graphics capabilities. The up-market machine is the M343, which is 8086 based, with arithmetic coprocessor and Z-80s for system control.

Epson's Surprise-Packages

Another system to use microdisks

was the Epson QX-10, displayed by Warburton Franki. Epson is making a strong entrance into the computer market with two new machines.

The HX-20 is about the size of an A4 sheet of paper, but incorporates a full keyboard, printer, liquid crystal display and optional micro-cassette for data storage. The QX-10 is a slim-line office machine with matching keyboard and monitor.

Hewlett-Packard demonstrated its new Series 200 Model 16 personal technical computer. Occupying about as much space as a three-ring notebook, the Model 16 is based on the Motorola 68000 microprocessor. 'Its 16/32-bit processor, 8 MHz system clock and software power provide the fast program execution speed required for scientific and engineering applications', said John Deftereos, Area Manager, Personal Computer Group.

The Model 16 consists of a 23cm CRT, a detached keyboard and a choice of one or two of the new microfloppy drives, each providing 270 Kbytes of storage, or a 4.6 Mbyte Winchester disk.

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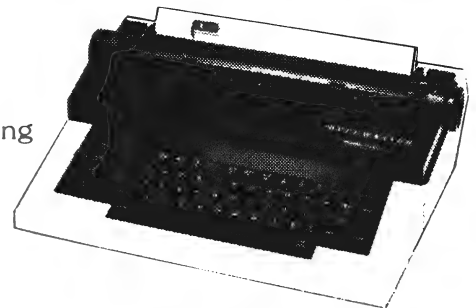
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Computer Supershow!

The standard 128 Kbytes of RAM can be increased to 768 Kbytes, or, with an optional expander, to as much as 4.6 Mbytes.

Also displayed at the show was the HP-100, a smaller version of the HP-125 which uses the CP/M operating system and is intended for use as an office workstation, and the 82967A plug-in speech synthesis module for Series 80 computers.

NEC showed the Advanced Personal Computer, running Digital Research's graphics software. The combination of the APC's high-resolution graphics and the DRI demos was absolutely stunning. The APC is now well established as one of the top-line 16-bit personal computers, with a wide range of software running under CP/M-86 and more to follow under MS-DOS.

Dicker Data showed the Vector 4 16- and 8-bit computer but, according to Fiona Dicker, a lot of interest was shown in the new Vector LINC local area network, due for release in the near future. This can link up to 16 Vector 4s into a network so that users can share databases and programs.

President Office Machines demonstrated the Columbia MPC running MP/M-86 with three users concurrently – a trick that the other IBM 'clones' can't emulate.

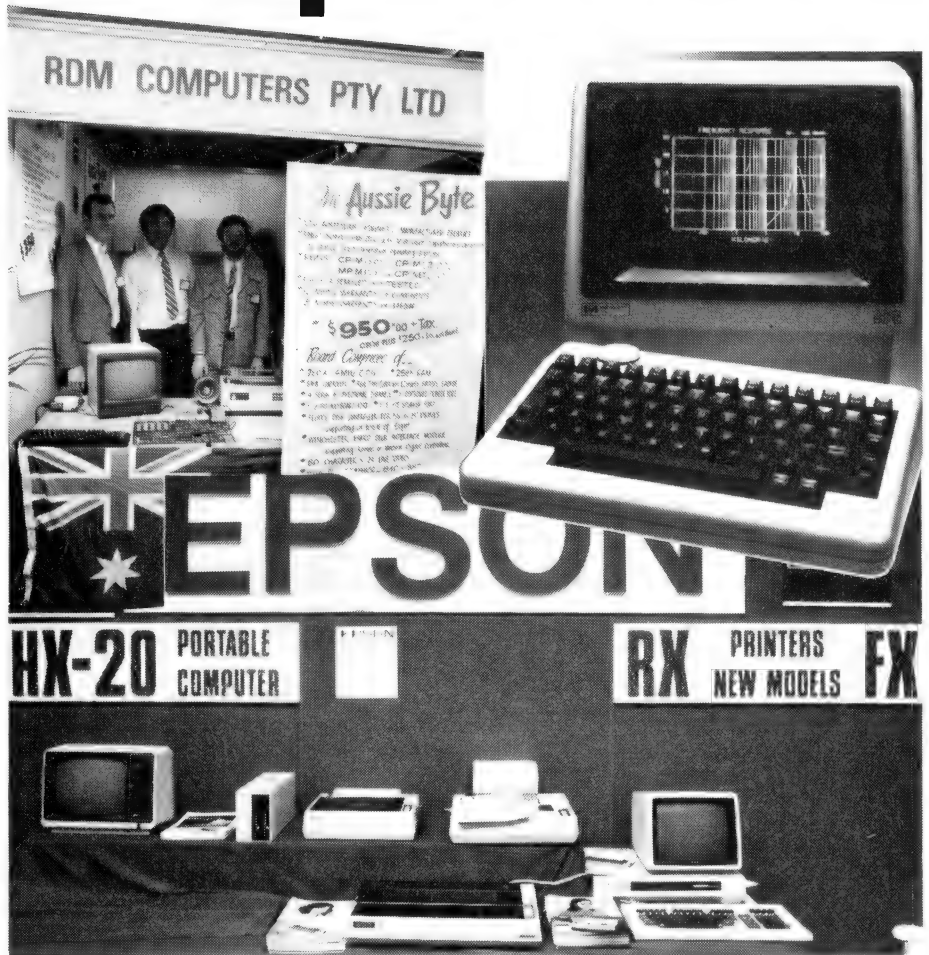
Inventive AussieByte

It is always encouraging to see Australian products at shows, so we were particularly pleased to see the AussieByte single board computer from RDM Computers. This board has a number of advanced features which show that Australian hardware and software design is still up with the world's best.

The board is not small, at 420 by 297 mm, but it has a lot on it. The processor is the ubiquitous 4 MHz Z-80A, and it is accompanied by 256 Kbytes of RAM – enough to support four users under MP/M II. For single-user applications, it would be ideal for large spreadsheets or for use as an M-drive.

There is also another 64 Kbytes of memory dedicated to graphics, allowing 640 horizontal by 382 vertical pixels of high-resolution graphics. Naturally, the display also permits 24 lines of 80 characters of text, with a range of visual attributes, such as reverse video and underlining. The board also has a parallel keyboard input as well as a light pen input.

At the rear of the board are four RS-232C connectors for the serial ports and



a Centronics compatible parallel port. Just in front of them are connectors for the disk drives – the board will support both 13 cm and 20 cm drives simultaneously, and uses a DMA disk-controller. A variety of disk formats is supported, including Osborne 1, ICL PC, Xerox 820 and Morrow.

Two other interface ports allow connection to either Konan or Western Digital hard-disk controller cards.

For high performance under MP/M II, all devices are supported by vectored interrupt circuitry. A real-time clock interrupt provides the time-slicing capability.

Other miscellaneous circuitry includes a battery-backed real-time clock, an optional speech synthesizer with unlimited vocabulary and a speaker-driver circuit for sound effects.

For those who find the board doesn't have enough, RDM has an STD bus expansion chassis, and other expansion units are planned for the S-100 bus and the Intel Multibus. RDM also has available a standard cabinet which will accept the board, matching switch-mode power supply, screen, keyboard and disk-drives.

In the software area, the board is well catered for. RDM has already implemented CP/M Plus, as well as MP/M II, CP/Net 1.1 and Turbodos. And, of course, that implies access to a wide range of applications software.

Best of all is the price: at only \$950 plus tax for the board, the AussieByte represents excellent value.

Also on display at the show was the new Commodore 64. Almost identical in external appearance to the VIC 20, beneath its innocuous exterior there lurks a heart of silicon with 64 Kbytes of RAM – enough for even the most dedicated home computerist. The ability of the machine to run CP/M with an adapter card also brings joy to my poor old prejudiced heart!

Toshiba showed its new T100 personal computer. Based on a Z-80 processor, this little box contains 64 Kbytes of RAM, 32 Kbytes of ROM and will sell complete with monitor screen, two disk drives and printer for under \$4500. The box also has slots for optional 32 Kbyte ROM and RAM packs – and the RAM pack has built-in battery back-up. □

Barson Breaks Out

By Lindsay Shapero

WE COULD ALL be forgiven for thinking Barson Computers was trying to keep its model range a secret both from this magazine, and the public, but it came out of hiding for long enough to give showgoers a glimpse of its 1983 activity.

Most obvious, of course, was the Sirius 1 (Barson has been admitting to that one publicly for a while now), but the real news-you've-all-been-waiting-for was the display of the BBC machine and Sinclair's Spectrum (you do remember Sinclair, don't you?).

The company's excuse for keeping all the good news from you is that it can't get enough of the machines...

However, it does seem Barson has really covered all aspects of the micro-computer market. For the low-end of the field, there's the ZX Spectrum; for education and hobbyists, the BBC (Acorn) range; and at the top-end, the business-like Sirius 1.

Barson is one of the few companies importing systems from Britain (apart from the Sirius), picking the cream of the English crop. The BBC, in particular, is the biggest seller in its field in Britain, with sales of 40,000, compared to sales of 35,000 for VICs, Pets and the like combined.

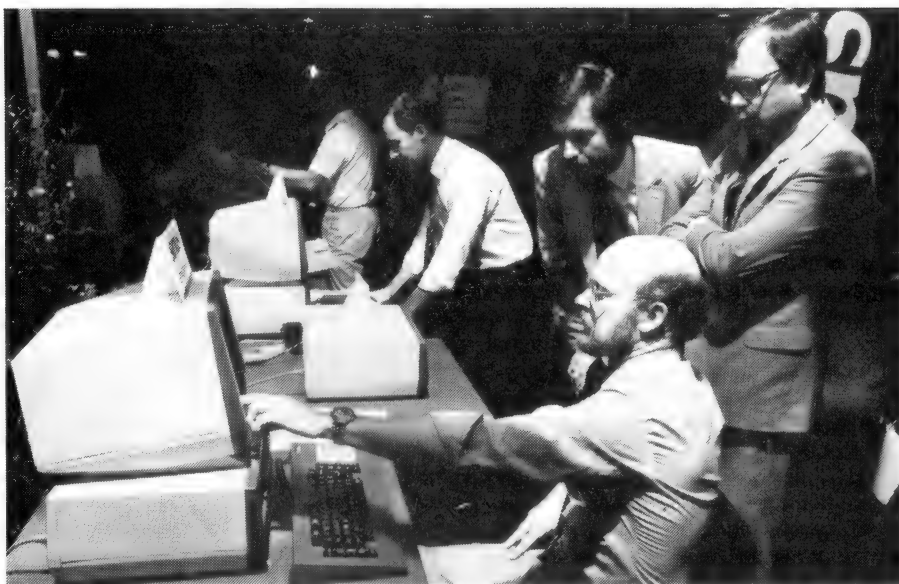
From Little Acorns...

The BBC microcomputer was first developed 14 months ago, and advancements and updates have been continual. Primarily for educational use, it will be used in schools throughout Western Australia (along with Applied Technology's MicroBee).

Colin Priestly, Barson Computers' production manager, explains the machine's conception: "To put together a BBC microcomputer range, the BBC first spoke to the education departments in Britain, and found out what they wanted. It then put up a tender for manufacturing and Acorn Computers came up with the best offer. It really was a combined effort between the BBC and the education authorities." The BBC Microcomputer has high-resolution colour graphics and can synthesize polyphonic music and speech. There are two versions: Model A, which offers 16K of RAM, and model B, with 32K of RAM plus a number of standard interfaces.

Model B has interface sockets for connection directly to a cassette recorder, television set or a number of other options.

The "Tube", which was designed by



A demonstration underway of Barson's Sirius 1 model. Their large stand also contained ready-to-use Sinclair Spectrum systems, and the BBC Acorn models.

Acorn Computers, allows addition of a second processor and leads the way to a fully CP/M compatible operating system. A 16-bit processor is being developed to yield a processing power similar to minicomputers.

A new machine, the Electron, is in the BBC pipeline from Acorn. This is another version of the current BBC model, but is for networking only, though it still fulfils all the necessary BBC specifications.

Sinclair Spectrum

Clive Sinclair submitted one of the original tenders for the BBC contract. Unfortunately for him, his ZX81 machine was turned down, as it was considered unsuitable. Undeterred, he decided to create a system which met the BBC specifications, albeit 18 months after Acorn's model - the Spectrum.

"The Spectrum is a complete re-think of the ZX81, ironing out some of its problems," says Priestley. "Really, the ZX81 is a computer toy, and the Spectrum is just a natural advancement." The ZX Spectrum has a new 16K BASIC ROM, giving eight full colours, a sound generator and high-resolution graphics (256 by 192 dots, each individually addressable). Storage is in either 16K or 48K of RAM.

A ZX printer has been released, with full ASCII character set. A COPY key prints what is on the screen without further instructions, at a speed of 50 cps. To be released later this year is an RS232 interface board, for connection of the Spectrum to a whole range of print-

ers, terminals, or other computers.

Sinclair will also be releasing a micro drive. This is a 7.5cm floppy disk drive, which should be very competitively priced. Each microdrive can hold up to 100K bytes on a single interchangeable microfloppy, with a transfer rate of 16K bytes per second.

Expanding...

Barson considers it has market leaders in three areas, and is moving into larger premises to help it keep up with what it calls great demand. And it has other plans on the drawing boards.

One point Colin Priestly was adamant about is the company's attitude to importing: "We're concerned about having to import, and are currently negotiating to attempt to manufacture the BBC locally. We're trying to get as much as possible of the computer made up here. It would be really wonderful to get most of the computer put together in Australia."

In an attempt to promote a greater understanding of computers, Barson Computers has joined with the BBC and Pitman Publishing, to bring to Australia the "BBC Computer Literacy Project". This course comprises a range of books from introductory to more detailed reference works, plus two series of television programmes.

Available in both Beta and VHS format, "The Computer Programme" video tapes are suitable for use in schools or adult education. The ABC will be broadcasting the series during school broadcasts in June.



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The Perfect Package

In previous articles, we have written about the Kaypro II personal computer, but covering primarily the hardware. This time Les Bell looks at some of the software, now available to run on other machines.

THE STANDARD SOFTWARE supplied with the Kaypro microcomputer includes the CP/M operating system, Topaz SBASIC and four applications packages under the collective title of "Perfect" software. Now, I'm sure everyone will understand when I say that I have still not seen literally *perfect* software – that day will probably never come – but the Perfect packages ain't bad.

And, as they're now being made available for a wide range of machines (written in C, they're nicely transportable!), we thought it was time for a closer look...

The major package in the group is Perfect Writer, a word-processing package with some interesting features, and this is accompanied by Perfect Speller, a spelling checker.

By typing "menu" at the CP/M command prompt, the user invokes a menu program which offers the choice of editing a file, formatting a file, printing it, checking the spelling or sending a command line to CP/M (or exiting, of course). Each of these options chains to the appropriate program of the Perfect Writer and Perfect Speller package.

Incidentally, because editing, print-formatting and printing are done by separate programs, Perfect Writer will not support concurrent printing and editing.

A user who wants to by-pass the menu step can simply type "pw" to enter Perfect Writer, "pp" to print, and so on.

Text entry is done by simply typing the text – there is no special insertion mode. Word-wrapping at line end is provided, so that the return key is only struck at the end of paragraphs. Errors made during text entry can be simply corrected by deleting and re-typing.

The subject of editing brings me to my main objection to Perfect software – the choice of the cursor movement and control keys. Most word-processor programs use either the cursor arrow keys or the control key in conjunction with a "diamond pattern" of keys: either E,S,D,X or I,J,K,M, although the latter is not often used because it clashes with the TAB and RETURN keys.

Perfect Writer, on the other hand, uses control keys that are based on a mnemonic relationship with the words forward, back, previous and next. Control F, B, P and N move the cursor right, left, up and down respectively. The ESCape key is also used to indicate "Meta" commands such as forward word and backward word (ESC F, ESC B). A couple of unique commands move the cursor to the beginning or end of the current sentence.

Writers and typists do work with words, but when they think about cursor movement, they do so by visualising the direction of movement, not by thinking of the word which represents that direction. For this reason, I found the Perfect Writer scheme slow and awkward to use, and liable to take my mind off what I was trying to write or lay out.

Really, for word processors, there is no substitute for a well laid-out diamond of cursor arrow keys and a word-processing program which uses them.

To the credit of the authors of Perfect Writer, they do provide a utility program which can be used to change the functions of the keys to whatever the user wants. The control and ESCape keys obviously cannot be changed, and the tutorial manual becomes useless, but if you really find you've got a mental block, you can do something about it.

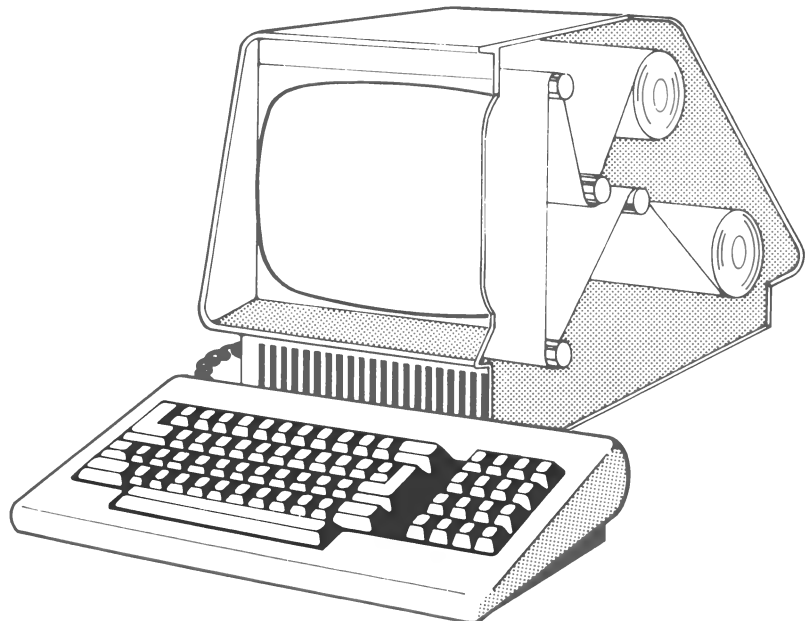
Part of the problem is the huge range of commands which Perfect Writer has. Written in C, Perfect Writer is reminis-

cent of many of the UNIX-influenced editors available on minis and mainframes. For example, moving of text is done by first deleting the block, which will automatically save it in a buffer, then moving the cursor and executing the "Yankback" command, which will retrieve the last deleted material. This command is also handy for undoing editing errors.

Another feature which appears in some UNIX-flavoured editors is the ability to work with a split screen, editing multiple files. Up to seven different files can be worked on in temporary editing buffers. This makes it particularly easy to move text segments between documents. Special commands allow the user to switch between buffers, delete buffers, display a buffer's directory and so on.

With the screen split in two, the top half can act as a window into one buffer while the lower half looks at another. An extensive set of commands allows the user to control each window independently; for example, scrolling through one while editing the other.

The usual search-and-replace facilities are provided, and there is also a huge set of commands which can be embedded in text for purposes of layout and design, as well as form letter printing. For example, the ENUMERATE command will number and indent paragraphs or items automatically, while the ITEMIZE command will offset items in a



An imaginative drawing to illustrate the scrolling process.

list from the margin and mark them with either a hyphen or an asterisk.

Special commands allow footnotes to be correctly placed at the foot of each page, and an indexing command will automatically produce an alphabetical index of all tagged words.

Print-formatting is well handled. Width and translation tables allow the printer section of Perfect Writer to handle proportional spacing on daisywheel printers, as well as unusual daisywheels with odd character sets. All the usual features, such as bold-face printing and super- and sub-scripts, are supported.

Perfect Writer can be installed on virtually any terminal which has cursor-addressing through escape sequences or the like. A menu of terminals is provided, or the user can alternatively supply values in hex, decimal or octal to define his own terminal. The program does not appear to work with memory-mapped video displays.

Perfect Speller

An option for the Perfect Writer package is Perfect Speller. With a 50,000-word dictionary, Perfect Speller should turn up a few number of correctly spelled words that it just doesn't recognise.

Perfect Speller can be entered from within Perfect Writer with just two key-strokes. After proofing the document, Perfect Speller can either mark each misspelled word in the document or can display a list of misspellings for appropriate action.

Spelling correction is done interactively, in context. Perfect Speller marks each word, and then asks the user whether he wants to add the word to the dictionary, change the spelling, return to edit mode, ignore the error, enter the word root into the dictionary or ask for help.

The Perfect Speller dictionary actually breaks words up into prefixes, roots and suffixes. For this reason, if words are added, it increases the chance that a misspelled word will slip through because it matches an impossible prefix-root-suffix combination. For example, Perfect Speller will accept *buyed* as the past tense of the verb *to buy*. Thus, words should be added to the dictionary with care.

An interesting feature is the ability of Perfect Speller to use UNIX-style re-directed I/O. Most users will never use that feature, but a little thought will reveal a few intriguing possibilities.

Perfect Calc

Spreadsheet calculators are the current "hot property" in the software market, and it is not surprising that the people at Perfect tried their hand at one.

My comments about the command structure of Perfect Writer also apply to

Perfect Calc. The cursor-movement commands of the two programs are the same, so that the user is spared having to learn two different command structures.

The Perfect Calc display looks rather like that of VisiCalc, with a few differences. Commands allow similar movement around the sheet with automatic scrolling at the edges and all the usual things one expects from a VisiClone. Again, control keys allow short movements, while the ESCape prefix moves larger distances.

The user can enter labels at the top and left of the sheet and can enter constants (numbers) or formulae all over the sheet. Formulae are entered very simply by moving the cursor to the required position and then entering an equals sign. Perfect Calc will respond with the left-hand side of the equation being built – for example, d5 equals – and the user can then enter the formula on the right-hand side; which consists, naturally enough, of an expression involving other cells.

A good number of functions is provided, including mathematical and financial (for example, NPV) functions, although I did spot one howler in the manual – a statement that:

$$\tan(x) = 1/\text{atan}(x)$$

Note that a more perfect way of calculating it is:

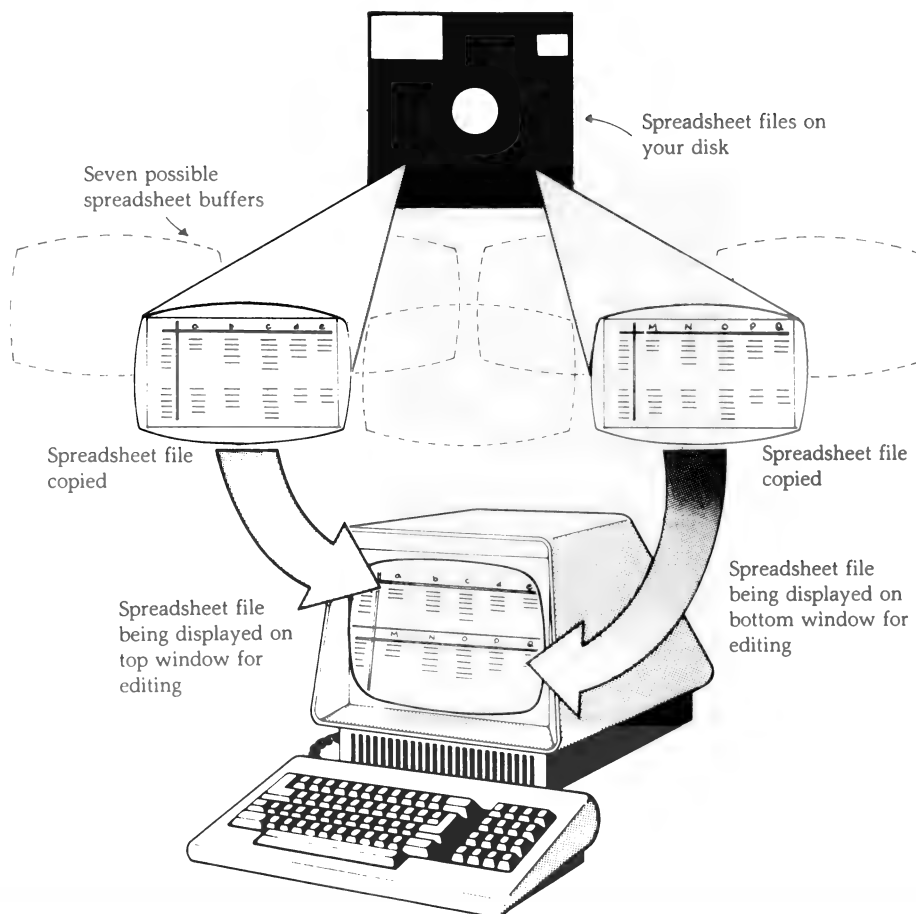
$$\tan(x) = \sin(x)/\cos(x)$$

Replication in Perfect Calc is rather more like block-moving on a word processor – and given that most Perfect Calc users will also have Perfect Writer, that's not a bad idea.

Also like Perfect Writer, Perfect Calc can work with multiple buffer areas – in effect, multiple spreadsheets – and can split the screen to show either two areas of the same spreadsheet or areas of two different spreadsheets at the same time.

With multiple buffers, spreadsheets can be overlaid on each other – a particularly useful facility for consolidation. Another neat trick is the ability to "associate" multiple spreadsheets; again, consolidation is one application that comes to mind, as well as providing commonly used tables or functions to another spreadsheet.

Perfect Calc comes with a number of pre-designed spreadsheet models – something that other software distributors could do well to copy. None of the supplied models is very complex, but they do provide a useful introduction to some of the techniques involved, as well as stimulating further thought about how spreadsheet calculations can be used.



Like Perfect Writer, Perfect Calc uses a "virtual memory" technique to make the most of the small memory space of the typical 64K microcomputer (Ye Gods — I used to think 16K was huge!). This is how it is able to manage multiple buffers each containing a spreadsheet. However, constant swapping between buffers will mean that the system will constantly be reading and writing the disk, with associated delays.

Perfect Filer

Perfect Filer is really a personal database system, rather like some of the small filing systems seen on the Apple and other home computers. Its most obvious application is for maintaining mailing lists or similar lists such as the membership of organisations. In fact, Perfect Filer comes set up with pre-defined file for just that application.

In Perfect Filer, records can be up to 1024 bytes in length, and there can be up to 70 fields in a record. That should be sufficient for most applications. Data fields can be alphabetic, alphanumeric, numeric or status types.

Each field can be associated with a template. The date template includes two slashes (/) and specifies the maximum values for each section of the field; for example, a maximum of 31 for the days. In addition, when a file is sorted on the date template field, the records will be sorted first on year, then on month, and lastly on day.

The most obvious shortcoming of Perfect Filer is that each database must occupy its own disk — that is, two databases cannot occupy the same disk. The reasons for this are not really obvious, and it would seem to restrict some of the potential applications or at least make the system difficult to use.

Commands allow the user to define his own record layouts and screen forms, so that the system has fairly gen-

eral applicability for tasks such as managing personnel records and so on. Other commands allow the user to sort the database, search for particular keys and produce reports.

The system has quite comprehensive formatting commands for report generation with all the usual pretty-printing of headings, sub-titles and so on. The system is particularly convenient to use for generating sticky labels for envelopes.

It is possible for the user to extract subsets from the database by using character- and string-matching in conjunction with relational operators, so that, for instance, all people living in a particular range of postcodes can be selected.

Perfect Filer is completely dumb as far as arithmetic is concerned, so it can't be used for accounting purposes; nor is it programmable, which makes its use by skilled operators rather unlikely.

Documentation

The documentation for all the programs is well produced. Each manual is typeset, with professional illustrations, and is organised as a tutorial. While this reduces the value of the manuals as a reference source, there are at least the indices and table of contents.

In summary, the Perfect software contains some interesting and powerful concepts. I personally had trouble with the cursor movement and related commands, and didn't see much pattern to the remaining commands which would help me to remember them. Continued and exclusive use of these packages would eventually solve those problems, although I do think that the packages could have been made easier to use.

If you've never used other packages before, then the Perfect packages will do all that you could imagine. They are, perhaps, an acquired taste, but they do work as advertised, and work well. □

SOFTWARE REPORT CARD

Program:	Perfect Writer/Speller/Calc/Filer			
Made by:	Perfect Software			
Useful for:	Word-processing, editing, spreadsheet calculations and financial analysis, personal databases			
Hardware Req'd:	Any CP/M or MS-DOS system			
Ratings:	excellent	very good	good	poor
Documentation:	✓			
Ease of use:	✓			
Speed:	✓			
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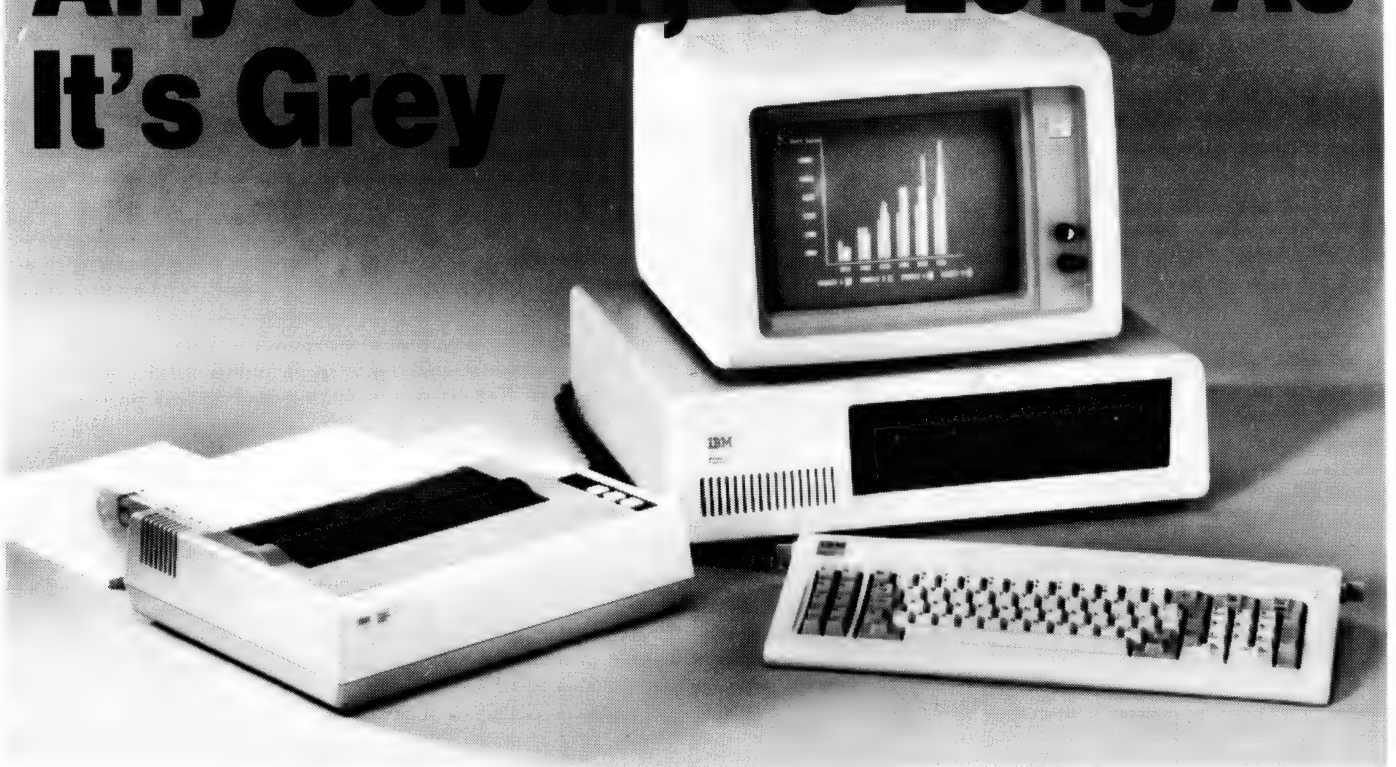
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PEN427

Any Colour, So Long As It's Grey



It really is here, at last! After months of unofficial previews in Your Computer, IBM has finally released its 16-bit personal computer in Australia. Les Bell takes a look at the 'new' model, and the newer version announced just a few weeks later...

THERE CAN BE no doubt that the official Australian release of the IBM-PC, in February, will prove to have been the most significant event in the personal-computer market in 1983. At long last, IBM had revealed the details everyone had been waiting for – how much and where you can get it...

But first, a little background information.

The IBM-PC being sold in Australia is virtually identical to the United States machine. It has a different power supply, because of the difference in the mains voltage, but otherwise seems identical. IBM expects the majority of systems to be sold with two disk drives, a lesser number with one disk drive and doesn't really expect to sell any with just the cassette BASIC.

The major target market for the IBM-PC is business – either accounting applications for small businesses or personal computers for managers or executives in large businesses. The dealer

training concentrated very strongly on the well-defined applications packages such as EasyWriter, Visicalc and the accounting package.

In addition, IBM will also pursue the education market, with a special educational discount scheme for schools and other institutions. The discount rate has not been revealed, but the standard educational discount on other IBM products is 15 percent.

However, IBM is alert to other possibilities. "This is the computer for just about everyone who has ever wanted a personal system at the office, on the university campus or at home," said Brian Finn, IBM Australia's managing director. "We believe its performance, reliability and ease of use make it the most advanced, affordable personal computer in the marketplace." The major software packages which will be bought by most users are DOS and EasyWriter. The DOS is well known and has become a de-facto standard, and is essential for any disk-based system.

The version of EasyWriter sold in Australia is version 1.1, which has had a lukewarm reception in the United States. Version 2 is already available there, and one wonders why it has not been released here.

EasyWriter is adequate, I guess, but it is slightly less than sparkling in its command structure. For example, to obtain emphasised printing, the user must

key in ESCape Control-O E, which is a longer control sequence than I have seen on any word-processor. Furthermore, the IBM's luxurious keyboard is not used to good effect, with no particular logic to the use of function keys.

I know you're all convinced by now that I'm some kind of prejudiced WordStar bigot. However, but after using WordStar on the IBM-PC, there is no doubt in my mind that WordStar leaves EasyWriter for dead, with such features as MailMerge, simultaneous printing and editing and much simpler commands, particularly for jobs such as text insertion (where there is no command needed).

The other major worry I have about EasyWriter is its copy-protection scheme. You're physically prevented from making more than one copy of EasyWriter (though how long that state of affairs will last is a question of the pirates' energy), and once you have accidentally damaged your disks – or they've just plain worn out – you have to buy the package again.

What's more, there is no exchange policy, not even on return of a genuine EasyWriter disk with serial number and statutory deposition – you still have to fork out the full price again, unless you can prove that the disk was destroyed by a hardware failure. I would be inclined to insure my copy of EasyWriter if I was daft enough to buy one...

It's a pity that EasyWriter mars an otherwise excellent selection of software.

Whered'yagetit?

The IBM-PC will be sold by a network of dealers throughout Australia. In Sydney, 17 dealers have been named — many will be familiar to *Your Computer* readers, including City Personal Computers' two stores, half a dozen Computerlands, The Computer Shop, Direct Computer Sales and Harry Harper's Zofarry Enterprises.

There are some new faces, though, that won't be so familiar. First, there's ACI Computer Services, a division of Australian Consolidated Industries. ACI Computer Services (alias ACICS) is Australia's largest IBM-based service bureau, and it seems logical that it should be appointed national dealer.

Next is New South Wales' largest department-store chain, Grace Brothers, which has established a business-equipment centre in Parramatta to sell the IBM-PC and other personal computers, as well as other office equipment. The Myer chain has also been appointed a dealer and, despite the confused situation due to Grace Brothers' takeover of Myer, has been doing brisk trading. Only a week after the launch, Myer's Sydney store was forced to employ additional staff to cope with the interest in the IBM-PC.

Parity Computer Services is best known, perhaps, for its contract-programming personnel arm, Parity People. As an IBM dealer, Parity will pursue sales to major companies, particularly those who are existing Parity clients.

The Independent Microcomputer Supply Company, just around the corner from the *Your Computer* offices in downtown Waterloo, is another new company that will be handling the IBM-PC.

The Melbourne Scene

In Melbourne Bill Saunders, at BS Microcomp, must feel like the cat who got the cream, having landed an IBM dealership. Melbourne's four Computerland stores, of course, are IBM dealers, too, as are Hisoft and Random Access.

New to the Melbourne personal-computer scene are ACICS, Myer and Tech-Rentals, a company which previously specialised in the rental of electronic test equipment.

In Adelaide, Brian Bennett and Associates, Computerland and ACICS will be selling the IBM, and in Perth ACICS, Computer Age and Merton Scott are the companies to see.

Boulevard Business Systems, a long-time Osborne dealer in Canberra, now has the IBM, along with Computerland Canberra and ACICS. In Brisbane, Computerland Brisbane and ACICS are

stockists, as are the Computerland stores at Gosford, Maroochydore and on the Sunshine Coast.

The PC will also be sold at the IBM Shop in Pitt Street, Sydney, as well as by IBM directly — in quantity to major customers.

Emma Chizzit?

The basic processor unit, complete with keyboard, 64 Kbytes of memory and a single 160 Kbyte disk drive, sells for \$3224 including all freight, duty and sales tax. A starter system would also include a monochrome display/prINTER adapter (\$461) and a monochrome display (\$588).

A graphics system would include the system unit (\$3224), printer adapter (\$207), colour graphics adapter (\$425), printer (\$906) and printer cable (\$81), totalling \$4843. Bear in mind that you will also need an RGB direct drive colour monitor, which will typically cost from \$600 to \$800.

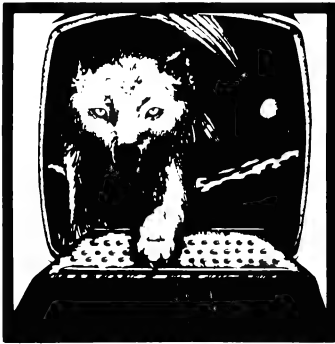
A business system would use a system unit with two 320 Kbyte drives (\$4407), monochrome display/prINTER adapter (\$461), display (\$588), printer (\$906) and printer cable (\$81), totalling \$6443.

The software for these systems is an additional cost. The DOS 1.1 (PC-DOS) will sell for \$71, with EasyWriter at \$294 and VisiCalc at \$294. A range of other software includes such gems as Adventure in Serenia and Microsoft's De-cathlon. For the serious-minded, there is a range of language compilers, UCSD p-system with its languages, CP/M-86 (though IBM doesn't seem to have any applications software to run under CP/M) and other applications such as the excellent Time Manager.

All in all, it's an impressive package. There is already a range of usable applications software, plenty of hardware options from IBM and others and, of course, the comforting knowledge that IBM is likely to be in business at least



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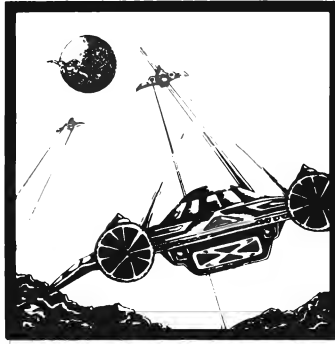
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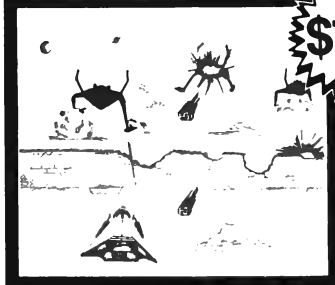


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PC II?

Rumours are abounding, from several reliable sources, about new personal-computer models from IBM. While no one at IBM's Australian headquarters is saying anything, it is interesting to note that IBM recently purchased 12.5 per cent of the Intel Corporation. Since Intel is the manufacturer of the 8088 micro-processor used in the IBM-PC, this acquisition is, presumably, of some significance to IBM's personal-computer division.

Intel has several new processors in the 8088-series family. The 80188 incorporates a number of the 8088's support chips into the one device, thus reducing the component count and making it possible to build a computer compatible with the IBM-PC, but at a lower cost. This is probably the device being used in the Peanut, IBM's projected low-cost (around \$700) computer which will be suitable for home and school use.

The 80286 is a high-performance version of the 8086 processor and is, to a considerable extent, software-compatible with the 8088 used in the IBM-PC. Programs which do not manipulate the segment registers (most programs less than 64K) will run directly, but with a great improvement in performance. The 80286 features virtual memory management, making it possible to write much larger programs and use disk storage as though it was main memory.

It seems likely that the 80286 would be the basis of a higher performance, possibly multi-user or multi-tasking version of the IBM-PC, designed to work in IBM's SNA (System Network Architecture) network around such machines as the 3800. Time will tell...

A PC With Mag Wheels And Hatchback...

SYDNEY, March 9, 1983: IBM today announced the IBM Personal Computer XT, significantly extending the performance range and storage capacities of the company's personal computer product line.

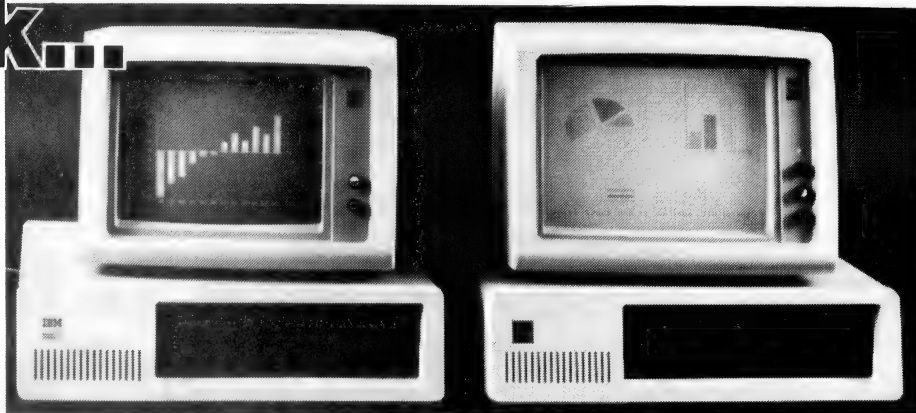
The base system, which is priced at \$7892 at The IBM Shop, features 128 Kbytes of user memory, a dual-sided diskette drive with 360 Kbytes capacity and an integral fixed disk drive with a capacity of 10.4 Mbytes. The IBM Personal Computer XT also includes eight expansion slots to permit convenient installation of additional memory or other features and options, as well as a built-in asynchronous communications adapter to enable the system to communicate with outside information sources, including other IBM PC's and larger IBM systems.

Also announced today were expansion units which dramatically increase the storage capacity of both the XT and the IBM Personal Computer, a new, more powerful DOS, and applications software.

"Building on the advanced features of the IBM PC, the XT is an easy-to-use, high performance personal computer for both first-time and experienced users who require a fast, convenient way to store and access substantial amounts of information", said Brian Finn, Managing Director of IBM Australia.

"The IBM Personal Computer XT's large, expandable storage capacity, its communications capability and its affordability make it outstanding value as a system for small- and medium-size businesses, as well as a productivity tool for professionals in organisations large and small", he added.

"With an additional, optional expansion unit installed, and maximum user memory, the XT has a total capacity of nearly 22 million characters of information, or the equivalent of 11,000 double-spaced, typewritten pages. This extensive storage capacity allows the XT to store and access customer lists, files,



Left: IBM Personal Computer; Right: IBM Personal Computer XT.

and records; cross reference and integrate accounting procedures and histories, and process an array of reports spread sheet analyses, forecast, graphic presentations and other functions.

"Additional hardware options for the XT include up to 640 Kbytes of RAM available on the unit's system board; the IBM Monochrome Display; single- and double-sided diskette drives; the IBM Graphics Printer, and other option attachment cards.

"In addition to the built-in adapter for asynchronous communications, an optional adapter is available for SDLC (Synchronous Data Link Control). With appropriate programming, these allow the XT to communicate with a variety of information services, host systems, and to emulate widely-used IBM information-handling terminals.

"Provisions for attaching video displays are built into the system unit. With the proper adapters, users can hook up with the IBM Monochrome Display, an RGB direct drive monitor or an NTSC video monitor (*a locally-produced PAL video card is rumoured to be available - Ed*). Up to 25 lines of upper and lower case text with either 40 or 80 characters per line may be displayed using either the IBM Monochrome Display or a non-IBM RGB monitor.

"The IBM Monochrome Display features green phosphor characters on a 29cm anti-glare screen. Text can be highlighted by underlining, blinking, re-

verse-image or high-intensity characters," he said.

IBM also announced a new version of its Disk Operating System, DOS 2.0, which supports expanded diskette and expansion unit storage capabilities for both the XT and the IBM PC, and includes an extended version of BASIC.

DOS 2.0 also permits selected IBM applications to operate on both IBM Personal Computers, as long as the necessary memory, diskette storage and other system resources are available. This compatibility means, for example, that programs and information may be exchanged between the two systems as required.

IBM also introduced PeachText, a word processing package by Peachtree Software. This "advanced, easy to use package" provides a series of 'Help' menus for quick problem solving. It can spread out existing text to make room for new copy, and simple commands from a single menu allow the user to write, correct, change, edit, store, display and print documents.

A variety of other business, professional and personal software is also offered by IBM for both the XT and the IBM Personal Computer. Among these are Multiplan from Microsoft, EasyWriter 1.1 by Information Unlimited Software, Visicalc 1.1 from VisiCorp, Software Publishing Corporation's pfs:FILE and pfs:REPORT, and Time Manager by The Image Producers. □

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The Byter Bit

Or, How To Hit A New Low With High Technology

By M U Grubb

"HOW DID I get into this," you asked yourself.

It seemed a good question – if only the answers were as good! Possibly it followed George Bernard Shaw's dictum, that the road to Hell is paved with good intentions.

The decision to open a computer shop followed close on the heels of your retrenchment from a major company, where you'd been a salesman. As you had a technical background, some of your work had involved microprocessor systems. You had been a computer hobbyist for several years, so you decided to put your knowledge to use.

In any case, being somewhat long in the tooth, finding another job seemed less and less likely. Sure it's a bad situation for the young unemployed – how much worse for a duffer over 40 with a mortgage, wife, two kids and a hire-purchase car to try and cope on the dole?

Taking your nest egg and electric typewriter in hand, you proceed to line up some suppliers. Having kept abreast of new products both in Australia and overseas, you have a fair idea of what you want. The initial contact with your first choice was by letter. Perhaps one should say initial approach, for it elicited no response.

Second, third and *n*th preferences fared no better. Perhaps there's a mail strike? From that moment, Telecom must have loved you. The usual game plan was to arise early, check the previous day's notes, have two cups of coffee, then start dialling. Typical conversation:

"I'd like to speak to Mr Fred Bloggs." "The Managing Direc-

tor?" "That's the one – or, at least, he was yesterday." "Just one moment, please, I'll see if he's in. Can I say who is calling?" Now Fred Bloggs is one of those chaps quoted in a published interview as saying, "my door is always open". The reason it's always open is that he is never in his office. Or, apparently, on the premises. You wonder if Bloggs is avoiding you and henceforth decline to give your name when calling.

When Bloggs *does* come to the blower, he points out that they already have a dealer in your area. But your country town is a big country town. You let him know that you know that that said dealer has only had the product for four months. In the past three years, Bloggs Bits has appointed five different dealers and two sub-agents in sequence.

"Why not try it two-by-two?" you suggest.

Bloggs decides it's not a bad idea.

"Where's your premises?" he asks.

Your reply is grudging. "I'm working from home at the moment." "That's no good to us. We must have a venue where the product can be seen." "I don't need premises if I don't have a product," you respond.

"Oh, yeah. That makes sense . . ." At least you've got him hooked, so you deliver a concise summary of your background and presumed ability to handle the goodies. And clinch it by advising him about an option on a prime shop in an excellent position.

"In that case, I see no reason why we can't do business. I'll send you the dealer information straight away." A week later, nothing has arrived and another

phone call informs you that Bloggs has gone interstate. You tell his receptionist the problem and she promises to chase up the requisite paperwork. It arrives the next day.

The dealer's application gets filled out and dispatched, along with a proposed initial order of stock. Another week passes. Another phone call. Lo and behold! Not only is Fred Bloggs back but he actually gets on the horn to say, "How's it goin', mate?" After a few pithy words, he claims in dismay that the paperwork has never been received. You dash to the post office and send your file copies, priority post.

Two days later, you call again: "Yes, we've got it and will call in your shop on Friday." So it looks like you're in business! You write a cheque to the agent for three months' rent on one newly renovated shop and begin ordering fittings, telephone and electric service, filing cabinets and so on.

"Not a bad location," says good old Fred when he calls on you. Fred glances down the street and continues, "Don't they have them business exhibitions in the next block?" "Yes," you reply, smugly. "That's why I chose this location." "What a pity. Afraid we can't give you a dealership after all, old chap. Don't want to upset the existing market structure." In other words, the current dealer has got stropky.

So there you are, with a shop and nothing to sell.

"Thanks a lot, Fred!" As Bloggs leaves, he delivers one parting shot: "Business is business, though. If those blokes don't pull their socks up by the end of the month, we'll get back to you

with a firm offer." By the end of the month, however, the manager at the existing dealers has argued with the owner and stomped off in high dudgeon to set up his own firm. As he has dealt with Fred for years and knows the skeletons in the closet, he pressures a dealership out of his cobbler. Now there are two Bloggs Bits dealers in town – only you aren't one of them.

Go to Plan B.

"What about the Volkskomputer?" you ask yourself.

It's down-market, but at least something to put in a shop you've rented. Actually, Volkskomp was one of the *n*th you wrote to initially. This time, you write a letter on genuine printed letterhead, black printing on buff stock. It's amazing what a \$30 investment will do; this time, you get a response.

"We'd be grateful to have another dealer in your area," writes Viktor Volks. "Our little bewdy sells well and we provide full support, including national advertising." You write a large cheque for the initial minimum order and place some local newspaper advertising. The customers arrive before the shipment does. When they see that you have nix, they go to the local stationer, the first Volks dealer in town.

You'd sneaked a look at his operation already, and reckon if he can sell them, anyone can. Typical scene: customer walks in, tries to find a clerk. Eventually, several are discovered in conversation about cricket, and are somewhat surly about being interrupted.

Prospective customer wants a demonstration. Clerk tries to get the Volks to go – without success. "Well, it ought to be this cable here," he grumbles as he battles a snarl that looks like a deranged octopus. "Or maybe that one. Oh, the power's not on..." After 15 minutes, he does succeed in getting a display. The customer asks him to "make it do something".

"I don't know about driving this stuff, cock. I just sell 'em." You note that the customer decides to take it. And you've learned a good lesson from a bad example: have a demo machine in proper operation at all times. Make sure all the program cassettes will load and that you can show a customer that the Volks indeed will do something.

Your shipment arrives. You unpack it lovingly, check each unit and find only one bad one. You had to pay freight on the initial order, or course. Now you pay a freight charge to send the bad one back for warranty repair (and they lost it) and then a third freight charge when at last it is found and returned. No profit on that one!

Two of the plug packs are the wrong voltage. Half a dozen items are back-ordered. Sixty percent of the program cas-

settes won't load even though you try three cassette machines and various playback levels.

You place more newspaper ads. A few more people trickle into the shop. Ninety percent want what you haven't got. More than a few desire the singing, dancing, colourful Bloggs. A few tell you, "I already have a Volks, but why don't you have Achtung Software? No one in town does." That's a good idea. You order from Achtung. Good Oz software. Unfortunately, the markup isn't all that good. But, if it gets customers, well, every little bit helps. The Achtung order arrives. It loads reliably and their approach is inventive.

"Too dear," say the next lookers. "Besides, we don't buy commercial software. We do our own." (They re-invent the wheel, frequently.) But they request blank cassettes. You have some verified data types at \$2 each. "Too dear! I can buy a C-90 at Q-Mart for 75 cents." Personally, you don't see the economy in spending four hours keying in a program and recording it on a junk tape that will never re-load, and you tell them so. A few learn the lesson and return to buy your proven cassettes.

At last you're starting to do business. You have a product and software. Then you discover a second computer not handled at all in your area. It seems to be a winner, even if not widely known.

A national Australian magazine gave it better marks than the...hell, never mind. Suffice to say that it's value for money. You get on to the importer with no trouble whatsoever and buy a demo system. Perhaps the ease with which you acquired it should have warned you, in light of previous efforts.

There's not a great deal of software available for this colour machine, but as most of your customers seem reluctant to buy commercial software, it may not matter. Then you find that, despite its assets, that the uni and matric types snigger at it. A prominent lecturer has claimed that it's "slow". Never mind it's good operating system, reliable disk drives, host of great features as standard, and really competitive cost – they know all the answers. Too bad they never were exposed to the questions...

One day, a bloke wanders in off the street and asks the price of the Volks. As you are selling at the best price in Australia, as far as you know, you are surprised when he sneers at your reply.

"I can get it cheaper somewhere else." As somewhere appears to be selling at cost, you say, "On your bike."

Somewhere else turns out to be the stationer. He hasn't been doing well in this area, and is dumping stock to get out.

Unfortunately for your firm, you cannot afford to sell at cost! Before too long,

people who bought at a cheap price come to you with their problems: it's got a bad modulator. A cable was missing. I don't understand how to drive it.

"They took my money, and now they don't want to know me," one fellow whines.

Another prospect comes in with the statement that they are cheaper up the road – but they're "out of stock" on the peripheral he wants. To get a sale, you knock 10 percent off the package price. Your profit margin is right down, but it's better to get some cash flow, for the rent never stops.

A bloke comes in and demands the printer from your expensive system. As far as you know, it is compatible with his system. Two days later, he calls you and complains that the printer you sold him is not the one he looked at. Now, he watched you unplug it and pack it up. And, as it is the only big printer you had in the shop, you know he has to be confused.

The following day, he calls to tell you the noise cover has a crack in it. Well, it wasn't there when you packed it up in front of him and you tell him so.

Another two days pass and he calls again.

"It doesn't work," the pest complains bitterly. "I went to the store where I bought the computer and they told me so. Said yours is no good." "Why didn't you buy a printer from them?" Well, they had no stock. But they didn't mind telling him that yours was crook. You learn he's written a letter to the consumer affairs people. Though you know your printer is not at fault, you offer him his money back.

A week later he comes back to the shop. Now he's been told he has a computer fault. Only they can't fix it at the local dealer's, so they send it to the head office repair centre. It gets lost. They send him a new unit (the new model, too) after he complains to all and sundry. Now that he's got a new machine, he comes back to you.

You are certain the printer will work in his system. He connects everything up, but you suspect that the printer interface cable is inverted.

You ask his permission to invert the edge connector and guarantee to cover any possible damage. He knows you are wrong – the other store told him so. When you invert the connector, however, and key in a simple For-Next printing loop, you prove that the printer does print from his machine. You list your little program. *Voilà!*

And now the bad news – his special program still will not function. It turns out the cassette was made for the American version of his look-alike machine. You make an educated guess that one system uses an Output instruction and the

other requires a memory addressed command to enable the printer. This explanation confuses him so he leaves, without the printer.

Ten days later, he comes to you with a letter received from the head office technical section. Surprise! Your explanation was spot on. However, the only reason he wanted a printer was for this one application. As the program is not compatible with his machine, he's not going to buy back the printer. Result: hours wasted, a bad report to the consumer people and though you've proved your point, you're not making any money.

When you point out to the pest that he ought, in all courtesy, to write a further letter to the consumer people, he can't be bothered.

Shortly thereafter, another person comes in wanting to buy that printer, for the same type system. He does so, even though you caution him about the sneaky problems that might happen. Sure enough, three days later he calls to complain that the printer categorically is incompatible.

You offer to go to his place and prove otherwise. As it happens, he's got everything in his van and brings it all in. No one would be amazed to learn that this bloke connects the printer cable to the interface the "wrong" way. You invert it and prove your point. He keeps the printer and at least a second person knows you're fair dinkum. He wonders why they lied to him up the road.

You ask yourself how many other lies have been told about your operation.

A university student comes in and expresses interest in the Volks. "I don't have much money," he begins, but adds that he is willing to spend up to \$50 for a monitor as he can't stand the moire from the Volksmodulator.

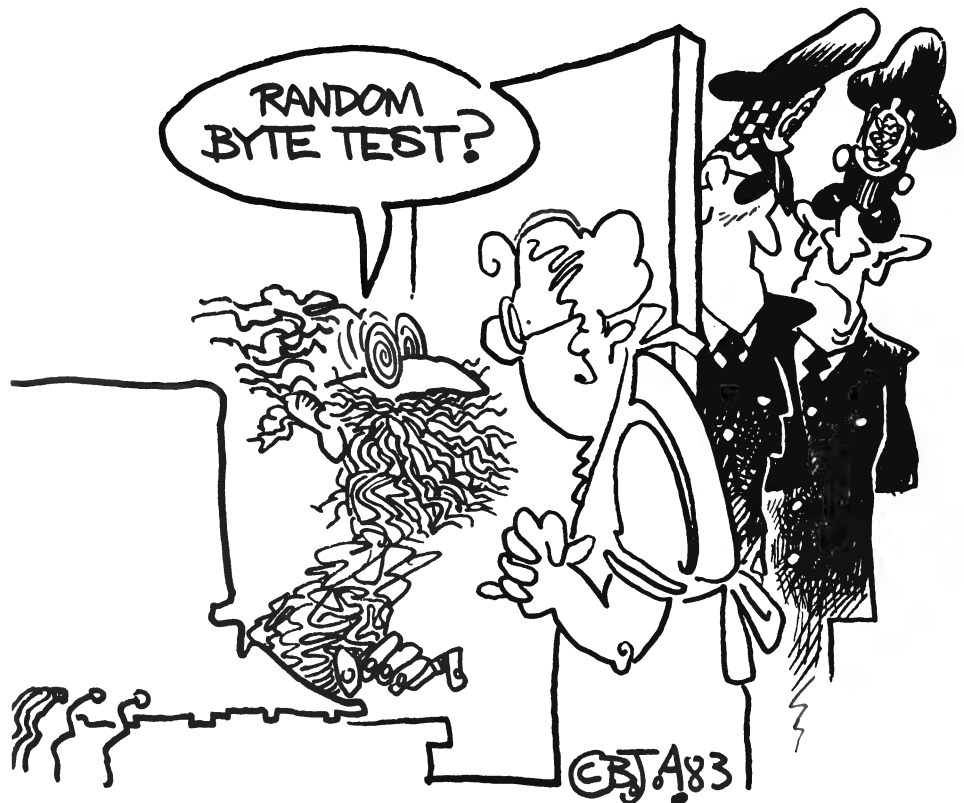
You remember your own lean days at uni. You have a second set at home you bought used for \$50 and figure you've gotten your money out of it. It's a straightforward video circuit, and easy enough to tap into the first video amplifier with a decoupling capacitor. You open up a Volks (thus voiding the warranty) and pluck the video out to a connector.

The uni student returns in a few days and now tells you he already has a Volks. He's still happy to buy the monitor, but can't see how it's possible to connect the two.

"Why can't you modify my Volks?" he asks.

Of course you can. Twenty dollars is not an unreasonable charge — but it's too expensive for him. If you won't throw in the mod to his machine for nix, he won't wear it.. You won't and he doesn't.

Then there's the bloke who's not certain what he wants, being "a total begin-



ner" in computers. You make a special concession and rent him one for a weekend at a modest price. It's amazing how quickly someone becomes an expert. He walks into the shop knowing nothing, by his own admission. When he returns the machine on Wednesday, he's read one computer magazine from the newsagent and knows it all.

"The modulator's real grim, ain't it? I don't like the power connection. They should have used thus-and-so-forth. Why didn't they put thing-o on it? Besides, they got a colour machine now and it's so much better; that's what I'll get." Only it's not been released in Australia and could be a year away...and will cost twice as much. And, still being a down-market machine, will have had to cut corners to be profitable. When the expert gets his hands on one, he'll surely find lots wrong with the thing.

Then you have an opportunity to pick up a major franchise. Potential customers (that 90 percent referred to earlier) are keen enough to give you a good possibility of more than \$20,000 of orders. You have a chat with your friendly bank manager. He wants 18 percent interest, a second mortgage on your house, and a surefire guarantee of "the availability to repay".

"Now, if you had a full-time job," he opines, "there wouldn't be any problem." "Just one," you respond.

He can't understand what that would

be.

"If I had a full-time job, how would I run the business?" As far as availability to repay, you show him the contingent orders. You point out the obvious: "If I don't get a loan, I don't get the franchise. If I don't have the franchise, I can't get the orders. If I don't get the orders, none of us make anything." You don't get the loan. But you do learn that said bank manager commits his bank to a \$3 million loan to a big company. They must have demonstrated the ability to repay — but they go bust anyway.

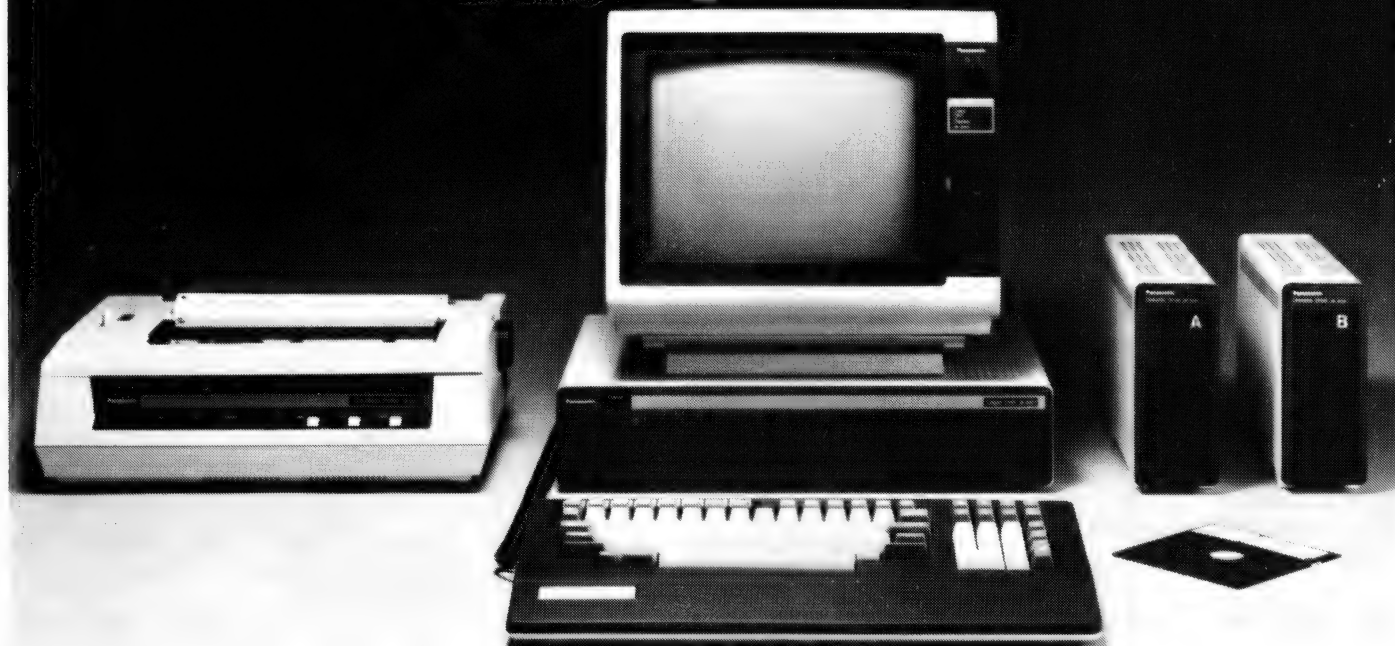
Presently, the stationer is out of the computer field. His name still appears in national adverts. Yours hasn't. Funny thing about Viktor Volks. When you initiated business, he was overjoyed. Then, when you wrote asking about technical manuals, software problems, and the non-appearance of your firm's name in national advertising, you got no response.

"It's darkest just before the dawn," your father once told you. And now perhaps there is a faint glimmer of sunrise at the horizon.

The manager of "the other shop" has been removed. At least he will tell no more lies about you. And the stationer will no longer undercut your prices.

Anyone out there want to buy an established microcomputer business at a bargain price? □

The Dis-Integrated Computer



An owner report on the first of the IBM clones to reach our market, Panasonic's JB3000...

PANASONIC'S JB-3000 personal computer is a system composed of discrete components – logic unit, display, keyboard, disk drive(s) and printer. Pin-outs for some peripherals are provided, but nothing about device drivers – or, indeed, any form of system modification – which makes it problematical to use Brand X peripherals. Perhaps a more appropriate word describing the system is “dis-integrated”.

The logic unit is large and very flat, something like a coffee-table book on the history of art, and, somewhat reassuringly, has a two-part steel case with various vents (no fans are installed), and connector slots in the plastic end panels.

The top panel is fastened with six screws, which fit into threaded collets, and removal exposes the main circuit board and three-slot option board interface.

Under the cover is a power supply, various connectors and one very large board, measuring 360 by 300 mm. In contrast, the disk-controller board is also 300 mm long but 110 mm wide.

The most striking thing about the internals is the jewellery within – 16 64K RAM chips in two rows, seemingly gilded and glittering in any light. The physical appearance of these chips intimates the future of real personal computers, gigabytes on our wrists, brought to us by lasers, bubbles, or some technology yet a dream...

Along the back panel are connectors for the printer, power, keyboard, two displays, the speaker volume control and reset switch, and three plates covering access to the expansion boards. Circuitry

is present for connection of a light pen and cassette recorder, but the DIN plugs are blanked off by a rear panel.

I can't imagine anyone wanting to use cassettes (particularly since they are not supported in BASIC or the MS-DOS BIOS), so a disk controller is required in one slot. I expect the vast majority of systems would be expanded with an RS232 card and 128K more memory. However, it may confuse the issue that 13 and 20 cm drives need separate controllers. As far as I am aware, there is no other peripheral expansion in Australia at present.

The disk-controller board supplied was for 13 cm floppies and is quite large, but fortunately is mounted at both ends. It certainly looks as if the spacing between expansion boards barely allows one board to clear the next and I have a feeling that a fully-populated JB-3000 would run rather warm, 64K chips. Owners might consider fitting an interior or exterior fan.

It's interesting to see chips from Japan, the United States, Indonesia, Taiwan and Malaysia, and doubtless others from places like Hong Kong, Singapore and South Korea – perhaps the co-prosperity sphere is upon us, after all. It would be nice to think that this

your computer



OWNER REPORT

S-100 AND STD BUS CARDS - PARTS COMPUTERS

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spells a new international order of standardisation but, while this is true at the soldering-iron level, the JB-3000 is still a copy of a machine remarkable for being different rather than new.

The only chip sockets are eight for ROM, of which two are used for "BIOS, IPL, IOCS, character font". I suppose soldering chips is more reliable than socketing them, but this is one place where quality control is paramount. The Japanese certainly seem to agree — we had no operational problems in the weeks covered by this test, though we occasionally left the machine running over the weekend, without air-conditioning.

There is no empty socket next to the 8088 chip for an arithmetic processor. Performing floating-point calculations in software is always very weak, with drastic trade-offs of accuracy against speed, and makes a micro very small, indeed.

Also very weak is the 45 mm speaker. A musically practiced colleague was able to play recognisable tunes, but it must be regarded as an aberration in the light of very cheap machines capable of four voices. Programmable noise can be fun, but this one doesn't have much more appeal than the mechanical bell on my Teletype.

The display is a Matsushita RGB monitor connected to the case around its face but supported only by a plastic rim/baseplate, and rather bounces with the top case off. This monitor would not take much leaning on, and it's a pity the case is so flimsy, if only because all of the controls (except brightness and power) are inside.

For all that, it does the job of displaying dots and characters more than adequately, being sharp, steady and quiet (again, no fans are installed). However, a slight flicker was evident at close range in displays using the highest resolution. The 640 by 400 resolution (in monochrome only) is good for a machine in this price range, while the 320 by 200 resolution, using seven colours is fairly commonplace.

The keyboard is an Alps unit, a name I had not heard before, and is controlled by an 8048 chip. It's very flat and well-shaped for use by those with multiple thumbs. There is a teletype-like set of character/control keys, an editing keypad, a numeric keypad (with a duplicate return key), a row of program function keys and another row of special-function keys — in all, a total of 93 keys.

I found it a special nuisance that the cursor-movement keys are laid out three in one row and one in the next, rather than the conventional diamond or square pattern. I was surprised to find that some of the keys have no function at all, other than single-key generation of BASIC keywords. Can 93 keys be too

many even for the designers?

On the other hand, the decoding is done well, particularly in BASIC, and I found it possible to generate most of the ASCII character set.

The disk drives are made by Matsushita as well, and their major feature is compatibility with the IBM-PC drives. Just how advantageous this will prove to be remains to be seen, as so far there is little software in Australia for the PC; I don't think many people would consider a capacity of 106K per diskette an advantage! Fortunately, 20 cm drives are available (1.2Mb each diskette), and support for Winchester drives can't be far off.

The drives are, at least, quiet and reliable. They come in vented pressed-steel cases similar to that of the logic unit, and have an unusual pivoting "door" which impressed me as more sensible and stronger than the conventional pushbutton or spring catch.

Use of the printer was considerably delayed. However it runs from a Centronics-type parallel interface and provides all the facilities expected in a classy dot-matrix printer. It was supplied with a ribbon, but no interface cable, paper or demonstration program, despite the description program in the operations manual.

On removal of the cover, I discovered the inscription "TEC 1550P", which presumably makes it the bigger brother of the C Itoh 8510. The market for pen plotters must be substantially reduced with the ready availability of dot-matrix printers featuring bit-image graphics, reverse linefeeds, proportional spacing, programmable character sets, software selectable fonts and the rest!

Hung together, the hardware impresses with its strong styling, sharp display and "handy" keyboard. It has proved to be capable, quiet and reliable and, with the exception of the printer cable, travelled well and was easy to set up.

The supplier disappointed me when, after specifically requesting delivery by air express and waiting over two weeks, I discovered that the boxes had been forwarded by road! I was relieved to open the boxes and find no more pieces than the accompanying documentation described and, on assembly, pleased to find everything working as promised. However, I was less than pleased not to find the printer interface cable, several manuals, and two software packages.

Other buyers could well check the contents of their boxes before leaving the store to prevent embarrassment and the frustration of a return trip.

Two diskettes were supplied, one MS-DOS master and one blank. Macro assembler and Multiplan were ordered but not supplied (Multiplan arrived with the

printer cable). The software which was supplied consists of MS-DOS and associated utilities, BASIC-86 and BASICA, as well as a demonstration program written in BASICA. I am not a lover of BASIC interpreters in a production environment, and I was annoyed to find that an assembler is an optional package rather than a supplied system component.

All the regular utilities are present: the nitty-gritty editor and debugger, disk format and copy, handy disk and file compares, the sinister CHKDSK which "verifies the integrity of the directory structure", but no assembler or system source. It's hard to imagine what use DEBUG would be without an assembler, or anyone using EDLIN for more than a couple of days.

The minimum operating size for this OS is 32K, and even though 8086 machine instructions tend to be longer than 8080/Z80 ones, we could expect at least an improvement on facilities over CP/M-80 (which lives in 6-8K of RAM).

Indeed, the system features "compatibility" with CP/M-80, and it's interesting to see the manual touting Intel's conversion program for 8080 assembler source. I suppose Microsoft uses it - it might say "using the best available tools" - and I feel confident that the charming tools and applications you know and love, warmed over for the Z80, will now be reheated for the 8086/8. It's a small pity that we are replacing our FJs with Commodores and still feeding them low-octane fuel...

The vaunted command line editing proved to be a gross overkill; I didn't spend enough time entering MS-DOS commands to bother studying up the very confusing features in this area. It would be so much more effective to use a "full-screen" mode, as does BASICA, where a user simply moves the cursor to the appropriate line and overtypes as necessary, then hits RETURN.

It's strange how the addition of code to the I/O supervisor can often improve performance and, while I haven't any basis for comparison with CP/M-80 or 86, performance of disk-filing applications was adequate for a single-user system, as it is on most microcomputer operating systems, unless running compute-bound applications in interpreted BASIC.

Only one bug was noticed, if in fact it is a software problem: the keyboard driver would not recognise the underline, "", shift 0. This is not a real problem in BASIC, where it can be programmed around, but, embarrassingly, is required in some circumstances by Multiplan.

BASIC-86 is the regular Microsoft interpreter, which was abandoned after I

ran the benchmarks; it's slower and clumsier than BASICA, but is substantially smaller, leaving over 40K for user programs and variables.

Its purpose in life must be concerned with compatibility, to ease the upgrade from an 8-bit machine, though since it really has nothing on BASICA in terms of performances and ease of use, users may be facing a software as well as hardware upgrade.

Some samples of timing: to format an MS-DOS master diskette takes 45 seconds, to copy all files from one diskette to the other takes 80 seconds, and the DISKCOPY utility takes 45 seconds to achieve the same end. The benchmarks popularised by *Kilobaud* were typed in and run, with these results:

Benchmark	BASIC-86	BASICA
1	2.5	2.1
2	7.6	6.5
3	15.2	13.4
4	15.6	13.7
5	18.2	15.0
6	34.7	26.8
7	53.3	41.6
8	47.5	36.4

Multiplan was reviewed in the October 1982 issue of *Your Computer*, so I won't go into detail here. Suffice it to say that this is the sort of package which justifies the purchase of a microcomputer; it's flexible and powerful, and much attention has been paid to its ease of use and sensible, consistent operation. If you haven't used a planner-calc, rush down to your dealer today. This package has unqualified recommendation.

Incidentally, I have not yet attempted adaptation of IBM-PC software.

There is a manual for each device supplied, an introductory manual of operating instructions, and manuals for MS-DOS and one for both BASIC languages. In addition, we received a registration/warranty card, an invitation to various maintenance plans offered by STC for JB-3000s, and an accreditation for part of any course at the Metropolitan Computer College, out of more than 15 courses covering business operations, word processing, and BASIC programming, all based on the JB-3000.

It was a particular pleasure to see this more formalised education offered and, even though the courses are only run in Melbourne, Sydney, Adelaide, Canberra, Brisbane and Perth, the supplier gets full marks for organising such a wide range of courses.

The peripheral manuals are all a bit Janglish, but they contain much useful information, and are not really hard to follow. The printer manual is particularly good on technical information, as it needs be with all those options! The manuals generally cover setting up, op-

eration and troubleshooting; not a lot of detail, but enough to offer the user some feeling of security and relieve the customer-support staff of a few phone calls.

The operation instructions manual is just that, covering configuration, specifications, connecting, introduction to MS-DOS and its commands, and introduction to BASICA with many small demonstration programs. Finally, there are a series of appendices, stating rather than describing the memory map, character generator, CRT, printer, keyboard and expansion bus pinouts, and a handy summary of key definitions for the various packages, all in all a good introduction, summary, and reference.

As for the MS-DOS manual, well, what can I say? Here is a couple of hundred pages about how it all works. After the Janglish hardware manuals, we have the thrills of Yankblah such as "most all Microsoft languages are available ..." Do they mean "most" or "all"?

Otherwise, it's an excellent introduction, with a helpful amount of information about each command and option. I'm sure there's something missing (in addition to the assembler documentation). I'd take excessive over inadequate documentation any day, and so should you.

The manual for the BASICs is a work of the devil; if you must use BASIC, then you must use this manual. I find it very difficult to say anything further about the manual.

It's a little disappointing that the machine, so well designed and constructed, is let down by software and supplier support. It doesn't offer improved performance over well-established 8-bit machines, and the software support is negligible compared with the CP/M world. Possibly its only distinction is its release as the first machine available in Australia running MS-DOS, but unless users are prepared to exploit the alleged IBM-PC compatibility, this simply makes us guinea pigs and software producers by default.

My experience in this world is that the imitators of companies such as IBM tend to have more reliable hardware and software, and may be (very roughly) 15 per cent cheaper for comparable capabilities. However, they can't provide the service and support of IBM, the cooperation of third-party hardware and software suppliers, or the experience and assistance of a large and active user community.

Is all that worth 15 per cent? ☐

(Footnote: This is just the sort of reader's submission we like - a good story on an interesting machine, sent in without name and address details so we don't have to pay....)

A Star Of The First Magnitude

By Leigh and Barbara Hemmings



THE DICTIONARY defines "Sirius" as a star of the first magnitude, and that pretty well describes our new computer work-horse. As writers, we see using a "third generation" computer, compared to the latest electric self-correcting typewriter, as akin to those writers of long ago who put down quill and ink and took on the Mark 1 Remington.

However, prior to the purchase of Sirius, the whole exercise seemed like an endless struggle. We were searching for a word-processing set-up which would (hopefully) still be worth owning in another five years. Initially, this left us with a greatly diminished choice – down to tens instead of hundreds!

In the beginning, what handicapped us was that we knew not one machine from another. The solution was two-part: a subscription to *Your Computer* on the advice of a journalist friend and, secondly a trip to the library – read, read, read. As we became more and more engrossed in the subject, we started to talk about computers to anyone who even looked remotely like he knew a keyboard from a CPU.

We also subscribe to an American magazine, *Writer's Digest*, which has published articles on word-processing systems for writers. When we read the

first such article, more than two years ago, our understanding level was just above an amoeba. However, with agonising slowness, things began to fall into shape – parts of Les Bell's editorials almost made sense! So, armed with a little dangerous knowledge, we felt the time had come to take a gamble and buy ourselves a computer.

Living in the country (and in Joh's land) makes it damn near impossible to get hands-on demonstrations. Even in the cities, it was difficult to actually use machines whose glossy brochures we'd pored over. The salesperson's usual excuse was: "They're coming in the next container. If you can just wait a few more months, we're sure our machines will be here." And in the slow passing of those months, more brochures would arrive on our desk. The "very" latest computers would, it was claimed, be in plague proportions in (you guessed it) a few months time.

Aside from the total frustration of not being able to even touch a suitable machine, the months of waiting did allow us to save a few more dollars. But this, too, had its problems. Anyone who is shopping around for a system will discover that although computers are not yet unionised (give them time), there

seem to be distinct lines of demarcation. Those lines are carefully drawn in dollar notes, and usually multiples of fifties.

Naturally, the computer salesperson couldn't resist the temptation to tell us, in hushed conspiratorial tones: "Although we're sure Computer X is coming in the next shipment, Computer X+A is sensational. Yes, it's another thousand dollars, but it does everything but proposition editors." Can we see one?

"No, regrettably we think it's on the shipment, after the next shipment." Ahhhhhhhhhhhhh!!

Just when we felt sure the last container-load of the very latest computers had been sunk at sea, we tripped over Sirius. And choked at the price! For us, the terrific thing about Sirius 1, wasn't just its massive memory, ear-splitting "voice", soft-porn graphics, or even the exceptional disk-storage capacity. No, what brought Sirius 1 up front was that its ship had come in, literally. Here, at long last, was a real computer and word-processing system. One which we could sit down and, via WordStar, actually play with!

Initial impressions were that the keyboard felt easy to operate, the CPU had a built-in fan (important in our

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MORE INFORMATION PLEASE

Mr.

Queensland climate), and the green screen monitor was both flicker-free and very easy to read. As we would be sitting in front of it for about eight hours a day, a screen really needs to be gentle on the eyes.

Sirius 1 comes with CP/M-86, MSDOS and MBASIC. Not that those operating systems are of the slightest use to us as non-programmers at this stage, but we feel they will still be around in another five or ten years' time, with a corresponding massive array of software.

The fact that the Sirius was in good supply meant that not only could we sit down and "play" with the set-up, but we could engage in a little horse-trading. (And before all hell breaks loose, we do realise the basic price is tied up tighter than a fish's you know what, but many of the extras aren't.)

Sirius 1 comes with the Intel 8088 16-bit microprocessor, standard 128K bytes RAM (expandable to 896K), four expansion slots and digital voice coder/decoder. The mass storage is on two 13mm double-density floppies with 600K bytes single-sided or 1.2 megabytes on the optional double-sided version. Because we wanted a word-processing set-up, there were incidentals which could be bargained for: WordStar and SpellStar, training, diskettes, printer, printing elements, paper, and ribbons. It's surprising just how much those bottom-line dollars can vary if you're prepared to shop around.

We also chose to buy our machine from Quill Systems, a Brisbane firm which is just as much into writing software as it is into selling computers. When we required a special program to be written to cater for the photographic side of our business, Quill Systems proved to be both inexpensive and effective.

Thus far, we have needed only three lessons on WordStar/SpellStar due mainly to the good documentation provided by Sirius. However, this documentation has one strange omission which, unless learnt by the operator, can severely restrict the worth of the Sirius keyboard. Aside from the usual set of keys, there are seven programmable keys which can access WordStar menus at a single keystroke. There are also a further 10 keys that perform the functions of scrolling, move to top of screen, set insert mode, delete a character, delete a line, reform a paragraph, and move the cursor up, down and side to side, each with a single keystroke. Many of these functions are changed when the shift key is held down at the same instant; for example, scrolling up instead of down, or moving whole words across instead of characters.

The strange omission in the Sirius



Sirius 1 and the Brother HR1 18cps Daisywheel printer. Once SET WS.KEY has been entered, the Sirius 1 keyboard's programmable keys make word processing much faster. However, at no time do the fingers actually leave the hands.

manual for WordStar is that it has forgotten to tell you how to set these function keys! After the system prompt appears, following loading of the WordStar disk you need to type SET WS.KEY. Sirius responds by displaying Control U, K, O, P, Q, L, J, across the bottom of the screen. Then you can go into WordStar with the usual WS.

After four months with this magical machine, we have increased our work output by at least 50 percent and at the same time are producing a better product. How? Well, to produce an article like this in the Dark Ages (that is before Sirius), one of us would have roughed it out on hard copy. He or she would have sat down and edited, then retyped it. Together, we would have then edited the article and a final "perfect" copy would have been laboriously typed out. All on paper...and as anyone who types would know, each time you retype something, you add more mistakes.

With Sirius, the only time the article goes to paper is via a daisywheel printer, after it has been edited on screen. And as soon as more magazines get into the computer age this too, will change. The article is still edited in the same sequence but only the changed parts are rewritten, rather than the whole piece. This way, each time the article is edited it gets closer to that final "perfect" copy.

In writing that last sentence, I did something which also illustrates just how much faster it is to work on screen rather than on paper. In my sloppy fast-typing speed, I had originally written *closer to that final "perfect copy" rather than closer to that final "perfect" copy.*

To correct a hardcopy with a typewriter would have needed the words *"perfect copy"* to have been erased, then retyped with corrections. Working on screen to put in the space and the final inverted commas took two keystrokes. With INSERT on, WordStar simply pushes everything along to make room for the inserted characters. Multiply that ease of correction by a few hundred mistakes in a couple of thousand words and you begin to see why the 50 percent increase in speed.

Also take the case of my use of the word WordStar. I originally had it as WORDSTAR. Instead of taking ages to find the word, then make corrections to it, I just typed Control QA, which prompted WordStar to ask FIND? I typed in WORDSTAR, it replied with REPLACE WITH?. I typed in WordStar and for OPTIONS I typed G. This then instigated a global search of the whole document. Each time WORDSTAR was found, I was asked if I wanted it changed to WordStar; had I included N in the original instructions, it would have been replaced automatically.

Our attained 50 percent increase in speed has not been at the expense of quality since we're much more willing to do extensive editing. For example, to check whether an edited paragraph is better than the original, you only have to block the par by Control KB, then Control KK, move the cursor to a space below, and type Control KC. You then get a copy of the par to work on, whilst still retaining the original above it. The one you decide to be second rate is simply eliminated.

Once all the editing is completed, there are three main areas where writing with a good word-processing system makes for a better product. Before going to printer the work is checked for spelling mistakes, but prior to actually re-entering the copy and checking those errors SpellStar has counted each word in the document – a job that can be a pain for both editors and writers. After the work has been corrected for spelling mistakes, you then command the printer to do its stuff.

And while it is turning out a letter-perfect copy of the article, we can be doing something else a little more creative. As writers we are no longer tied to being a typist for this last time-consuming draft.

One final thought: although Sirius 1 has bought us into this century, the computer doesn't use common cents. It cannot eliminate mistakes like sense and cents – that's where the writer comes into it. However, it's only a matter of time before we can learn to write by computer via Sirius's capacity for speech.

Then, it will truly be a star of the first magnitude. □

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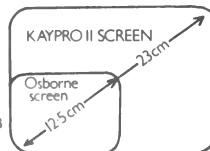
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Space Math - Spaced Out

This software review, by primary-school teacher Albin Wallace, of Commodore's educational game, "Space Math", is particularly damning. It also raises questions as to the suitability of many other educational games.

IT IS VITAL that educational computer games must not have a totally discouraging effect on those children who fail them, yet they must be suitably stimulating for the brighter youngsters. The most important point, however, is how well do these games replace conventional teaching aids?

This was the main question facing me when I set out to review Commodore's first educational game for the VIC-20 microcomputer, "Space Math". Written by Duane Later and Neil Harris, "Space Math" is described as a "maths improvement game for Grades 1-4" and runs from two to five minutes.

After the program is loaded, RUN typed in and RETURN pressed, the program introduces itself and queries INSTRUCTIONS? N bypasses the instructions and Y displays text stating that the operator is the captain of a starship who must destroy an attacking missile by solving the maths problem inside the missile and hitting RETURN.

Mistakes may be deleted with the DEL button. After HIT(ing) any key to continue, the operator chooses NORMAL or FAST; this varies the speed of the missile. Any or all of the four processes are then chosen (for example, ADDITION?Y). Correct answers result in sound effects and MISSILE DESTROYED, CAPTAIN! Incorrect answers are met with LASER CANNON MISSED, CAPTAIN and the missile continues. If the missile reaches the ship (either through non-response or incorrect answers), there is an explosion and text such as HIT! DAMAGE CONTROL: SHIELDS WEAKENED.

A game lasts for 10 rounds with five points added for a correct answer, five subtracted for each missile reaching the ship, and two subtracted for each wrong answer.

The program uses sounds effects, colour graphics (spaceship and missile)

and scoring, and is intended for individual use. As with all low-resolution VIC-20 programs, the line length is 22 characters.

The program and screen display work quickly if correct responses are keyed in. Incorrect responses during instructions do nothing. However, simultaneous pressing of RUNSTOP and RESTORE wipes the screen. RUNSTOP breaks the program with a BREAK IN line number statement. Both these circumstances require re-running of the



program. Continuous or indiscriminate pressing of RETURN produces bleeping but otherwise does not affect the running of the program.

The program involves interaction between one individual and the computer. When used by children in the 7-10 age group, the interest was initially high but rapidly faded to apathy after about 10 sessions.

The on-screen instructions are far too complex for a primary school-age child, as are the textual responses to incorrect answers. A child who cannot calculate five plus four is unlikely to understand HIT! DAMAGE CONTROL: LITHIUM CRYSTALS WEAK. The screen is too cluttered with flashing graphics, scores, previous and current responses and lengthy comments.

A primary-school child desperately trying to solve an arithmetic problem, type in the answer and hit RETURN be-

fore he is blown to bits, can only be distracted by such features, as the "motivational" devices are present even during presentation of the problem.

The program appears unsuitable for children with Maths problems as the pressures exerted by the program are as great if not greater than those in the classroom. A score of -50 (the worst possible) with the caption PRACTISE, CAPTAIN is not acceptable as "motivation" for the under-achiever, and could lower a child's self-esteem and confidence. High-achievers get bored easily as the program is static and repetitive.

The use of * for x and / for divide, though necessary in computer education, is unacceptable for use with primary-school children and could add to their confusion. The program also does not fulfil any educational need which could not be satisfied by the use of cheaper, more accessible aids such as paper and pen.

The intended purposes of the software is unclear. It teaches no concepts (except punishment for incorrect answers) and is ineffective for drill. Because of its negative, punitive approach, it is unsuitable as a remedial device and is not adequately stimulating for drill practice. It is an expensive teaching aid which can only be used by one person at a time, and contributes little to learning.

Student/teacher notes are sketchy and only duplicate what appears on the screen. As a home-entertainment "educational" toy, it needs several modifications to make it even barely acceptable:

1. Re-write instructions to be clear and appropriate for grades 1-4.
2. Change * to x and / to divide.
3. Simple means of returning to instructions at any stage.
4. Introduce a reward for correct responses, encouragement when incorrect response given.
5. Deletion of negative scores for incorrect or non-response.
6. Optional deletion of scores entirely.
7. Tidying up and simplification of graphics.

However, these points would only make the software less educationally harmful, and would still not make the program acceptable for use in primary schools. □

How can I write better software, faster?

Write it in BASIC/Z!

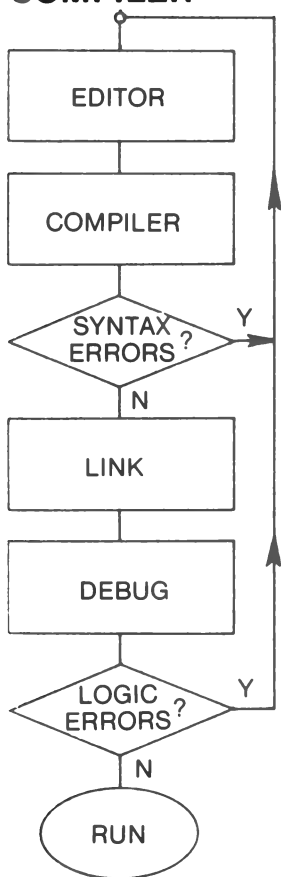
BASIC/Z. A new standard in compilers for the CP/M system.

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.

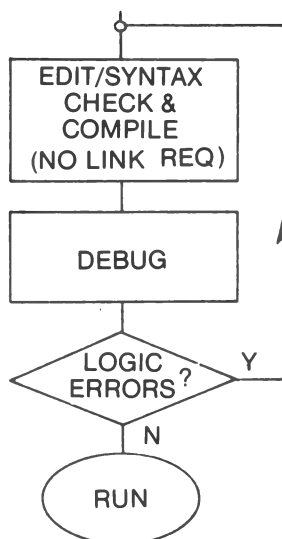
Syntax testing as you type. A BASIC/Z first!

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.

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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.

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Basic For Birdwatchers

Part XVI

This month, Les Bell wraps up his series on BASIC with a comparison between Microsoft BASIC and CBASIC . . .

UP TILL NOW, all the examples in this series have been written in Microsoft's MBASIC, probably the most common variant of BASIC on microcomputers. However, the reader should be aware that there are many other versions of BASIC available. In this article, I will look at one of them – CBASIC 2 – and briefly mention others.

CBASIC 2 is the latest in a line of programs which started when Gordon Eubanks wrote a BASIC compiler during his student days at the Naval Post-graduate School in Monterey, California. That compiler, BASIC-E, was written in PL/M, the Intel high-level language, and is now in the public domain. The complete source code for BASIC-E is in the CP/M User Group library, and anyone who has a PL/M compiler can customise it to his heart's content.

What makes BASIC-E and CBASIC fundamentally different from MBASIC is that the former are compiled languages. MBASIC is interpreted – in other words, you type your program into the interpreter, which stores it, and that is what actually runs (I know, I'm ignoring BAS-COM).

CBASIC programs, on the other hand, are entered into a file using a text editor such as ED or WordStar in non-document mode. The CBASIC compiler is then invoked by typing "CBAS2 progname", and it reads in the source code and produces an output file called progname.INT (for INTERmediate).

Then, by typing CRUN2 progname, the intermediate code file is loaded and executed. Note that the compiler produces pseudo-code (that is, machine code for an imaginary machine) which is then interpreted by the run-time package, CRUN2.COM.

Because only pseudo-code need be distributed, and not source code, CBASIC has long been popular with authors of commercial software. Compilation has another advantage for authors: the addition of comments makes no difference to the size of the resultant object code, so liberal use of REMs is quite justifiable!

CBASIC has another appealing feature for authors of business programs: all CBASIC arithmetic is done using 14-digit floating-point decimal numbers. This means that there are no rounding errors in conventional arithmetic, as happens in BASICs which use floating-point binary numbers. No fractions of cents can be siphoned off into the programmer's account, as has happened in some computer installations!

Looking at a CBASIC program, the

first thing the reader will notice is the comparative absence of line numbers. Because the user can insert lines at any point using a text editor, line numbers are not required for editing purposes. They are, however, still required as the targets of GOTO, GOSUB, and the like. However, they need not be in sequence, and they can consist of any decimal numbers – including fractional parts or even exponents! But be aware that 123 is a different line number from 1.23E2.

Apart from that obvious difference, simple MBASIC and CBASIC programs will look fairly similar. The remaining differences are primarily of detail, such as the RND function not taking an argument in CBASIC (see example). The INPUT statement does not automatically supply a "?" after a prompt, allowing the user to supply ":" or "-" if he wants to.

PRINT statements work slightly differently: comma separation of data items breaks the print line into fields 20 characters wide, while semi-colons work the same way as in MBASIC.

CBASIC is particularly good at supporting a structured programming style. For example, functions can be defined by the user in a similar way to that allowed by MBASIC, but multi-line functions are also allowed, giving the feature particular power.

In addition, CBASIC supports the WHILE/WEND construct (as do later versions of MBASIC). This is a kind of

...THE WRAP UP...

UP... UNTIL NOW,
DEAR FRIENDS, WE'VE
HAD THIS SERIES AS
OUR COMMON BOND...

...NOW, AT SWEET XVI
...THE END, FINAL...
...FINISHED...COMPLETE
...SAD...

1/1 ...ONE DAY, HOWEVER, WE EACH
MAY LOOK BACK & SAY,
E "BASIC HAS LIVED ON IN ME,
...I HAVE BORNE IT STILL..."
...STILL BORNE, SO TO SPEAK..."

...WE ARE HERE, DRAWN TOGETHER
(ARTIST'S LAST RUN) TO PAY OUR 'LAST
RESPECTS' TO OUR VALUED FRIEND...

ENDING A PROFITABLE RELATIONSHIP...

PLEASE, DON'T BE
AFRAID TO LET
YOUR FEELINGS SHOW...

VALUED..?

PROFITABLE?

PROFITABLE?

PROFITABLE?

**MIDCHROME
PANNER**

PROFITABLE?

PROFITABLE:

* GIRAFFES *
AREN'T GOOD
LISTENERS

AND SO,

THE LOOT'S
IN THE COFFIN

WHERE'S OUR SHARE
OF THE PROFITS?!

PIRATE!

CAD!

BOUNDER!

**BAD
FELLOW**

MY TURN
NEXT!

BLAGGARD!

SWOIN!

ॐ ब्रह्म



loop (similar to FOR/NEXT) but which relies upon repeated testing of a condition, rather than repeating a specified number of times.

The basic logic is this: WHILE a particular condition exists, every statement down to WEND will be done, and then control will pass back to the WHILE to test for the condition again. If the condition is not met, execution continues after the WEND.

Note that this means that it is quite possible for the condition to fail the first time the WHILE is encountered, so that the body of the WHILE is never executed. Thus, we will often have to ensure that variables being tested have sensible values before the WHILE.

Listing 1 shows an example of a simple CBASIC program. This is a version of the simple guessing game developed back at the beginning of this series. By dint of some rearrangement, I have managed to dispense with line numbers altogether, using two WHILE loops to control the program flow.

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

File Handling

The major difference between the two BASICs comes in the area of file-handling, where no standards exist. CBASIC deals with two types of data files: sequential and relative. Sequential files are not opened specifically for input or output; they are just opened. This means that a CBASIC sequential file can be appended to by reading up to the end and then writing to it, a trick which is not permitted by MBASIC (and there

are good and sufficient reasons for that).

The open statement can best be illustrated by a comprehensive example:

```
200 OPEN "B:SALES.DAT" AS 3,\
      "B:RCV.DAT" RECL 128 BUFF 4 AS 4
```

This will open file B:SALES.DAT for sequential input/output as file 3, and B:RCV.DAT for relative (random) I/O with a record length of 128 and buffer of four sectors (512 bytes) length, as file 4.

The FILE statement will open a file or automatically create one if it does not exist, and will assign the lowest available file number. The CREATE statement, of course, will create a file.

File I/O is performed using the PRINT #, PRINT USING # and READ # statements. The PRINT # and PRINT USING # statements write data to disk in exactly the same way as it would appear on paper, with the exception that commas do not cause tabbing - instead, they cause commas to be inserted in the data field as data separators. Each record is ended with the CR/LF pair, which must be figured into the record length.

CBASIC's random I/O stores numeric data in ASCII format, unlike MBASIC, which uses the internal form for data. This means that files are much easier to patch using a text editor, and are also easier to transfer to or from other programs.

A number of CBASIC features are particularly useful in creating larger applications programs, such as accounting packages. The COMMON statement specifies which variables are common to different programs and are, therefore, preserved when control is passed between programs using the CHAIN statement.

While MBASIC uses the LPRINT statement to print on the system printer, CBASIC switches all output to the printer using the LPRINTER statement. All subsequent output will go to the printer until a CONSOLE statement is executed. The LPRINTER WIDTH 80 statement will set the printer width to 80 characters, causing CBASIC to insert automatic CR/LF pairs when required. The console width can also be varied by POKING a memory location.

Machine-language sub-routines are particularly easy to use with CBASIC. The SAVEMEM statement will reserve a number of bytes at the top end of memory and will automatically load a binary file into the reserved area. The machine-code routines can subsequently be accessed by the CALL statement.

CBASIC also provides some interesting functions. Most of the functions are identical or very similar to those in MBASIC, but unique functions are provided for testing the console status, and

for returning the command line entered into CP/M when the program was invoked.

The overall flavour of CBASIC is very like other BASICs, with some differences in detail and particularly in areas like file-handling. It's not a very good BASIC for game-playing, or for learning to program, particularly because it has to be compiled, but it is very popular for business/commercial programming.

Incidentally, there is a fully compiled version of CBASIC, called CB-80, which is very much faster and has some very nice features, and there are also 16-bit versions of these programs for the IBM-PC and other 8086/88-based computers. I also understand that there is a version of CBASIC for the PDP-11 minicomputer.

Other BASICs

While Microsoft BASIC and CBASIC are the most popular microcomputer BASICs, there are a number of other versions. Perhaps the best known is North Star BASIC, which follows the style of Hewlett-Packard's minicomputer BASIC.

The major area of difference between North Star and the BASICs previously discussed is string-handling. There are no RIGHTS, LEFT\$ and MID\$ functions. Instead, a string is handled as though it is an array of characters. So, if we have:

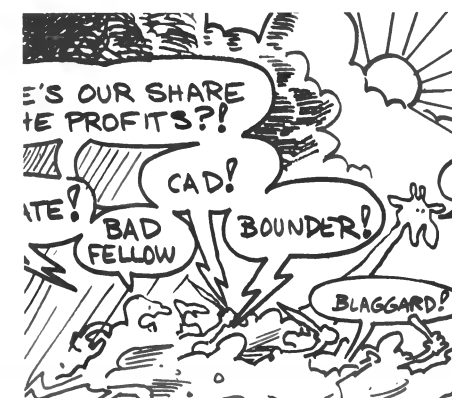
```
A$ = "ABCDEFGH"
```

then A\$(2,3) is "BCD" - that is, the three characters starting at the second character position.

File-handling is different again, but the fundamental concepts we have discussed still hold good.

Then there's BASIC/Z, a native-code compiler which is unique in having a range of data types, including 10-byte BCD integers! While this BASIC is even further away from the "standards" we have covered, most of its unique features are additions to a standard base, and simple programs should be easily convertible. But file I/O is different again!

Applesoft is a bit different from Microsoft BASIC, but simple programs should



be close enough for easy translation. It is in the file-handling area that the major differences arise. Applesoft writes command strings to the DOS as though they were console output; the only difference is that they are preceded by a Control-D. Because of this, programs which involve files (most really useful programs) will require extensive re-writing to run on the Apple.

SBASIC, from Topaz, is a compiled BASIC which is rather like CBASIC in many ways - no line numbers, for instance - but which takes the structured programming extensions to a further stage by borrowing a number of concepts from Pascal. For example, procedures are supported, and variables must be declared before use. The result is very powerful, but many programs will require extensive conversion work.



The fundamental (almost wrote basic there!) problem is that the ANSI standard for BASIC defines only a very simple language, and every manufacturer has gone its own way in defining the extensions required to support files, printing, and especially graphics.

However, a committee is now working on a new standard which is very much better, and I noted with interest that, though Hewlett-Packard nowhere mentioned the fact, the BASIC on its HP-75C portable computer corresponds closely to the currently proposed standard. Digital Research is rumoured to be working on a BASIC interpreter/compiler pair, and since this company tends to do things right, hopefully that will implement the ANSI standard.

Perhaps we can look forward to a new age of standardisation in BASIC! □

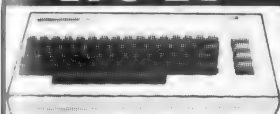
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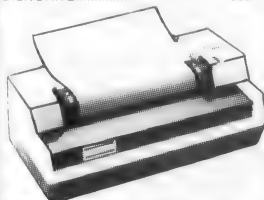


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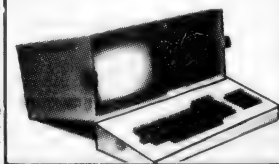
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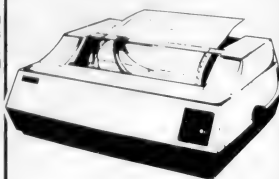
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Sharp Thinking

By Lachlan Wetherall and Andrew Baartz

THE SHARP MZ-80B has been available in Britain for more than a year now, but has only relatively recently been released on the Australian market. A small computer aimed at professional and engineering applications as well as small businesses, the MZ-80B is not cheap compared to many personal computers. However, it is quite impressive and ideally suited to many applications.

The MZ-80B is a fully integrated unit weighing about 14 kg. It is contained in a moulded plastic case, and is sturdy in construction. The standard unit contains a 23 cm green CRT, cassette drive, and a standard QWERTY keyboard with numeric keypad, user definable keys and cursor control keys.

The keyboard has a good feel to it and is very easy to use. The display is software selectable between 25 lines by 40 characters or 25 lines by 80 characters, making available word processing possibilities. The screen resolution is good and very readable, even in the 80 by 25 mode. The layout of the keyboard and the position of the screen is adequate, and the computer is comfortable to use.

The cassette mechanism, on the right of the screen above the numeric keypad, is solenoid-operated, allowing software control of the cassette drive. The data transfer rate is 1800 baud, which is faster than most other computers. Reading and writing to the cassette is a simple and reliable process and the absence of any controls, or fiddly leads, makes it easy to obtain error-free loading and saving.

In general, the hardware and ergonomic factors of the MZ-80B are excellent. Sharp has obviously put a lot of effort into preventing breakdowns – an important consideration in business applications, where computer down-time means lost profits.

However, breakdowns do sometimes occur, and to minimise the effects of these, Sharp has made available a service contract whereby the owner pays about two percent of the capital cost of the computer per annum, in return for a servicing charge rate of \$16 an hour in the event of a breakdown. This compares favourably with most other service agreements, which require a payment of around 12 percent a year.

The availability of this service contract, and the computer's ruggedness and reliability, make it ideal for business

applications or engineering use.

Internal Architecture

The MZ-80B is based on a Z-80A CPU running at 4MHz, making program speeds quite fast compared to most smaller computers. The computer has an unusual internal structure, which allows it optimum use of the available memory space.

In its standard state, the memory map consists of two 32K RAM blocks called RAM (I) and RAM (II). There is no ROM. The operating system resides in bottom memory and must be loaded in from cassette when booting the system up. This is annoying, in that it takes two or three minutes before the operating system is loaded and the computer can be used. The main advantage of this system, however, is that the language or the operating system can be changed by simply inserting a different cassette at boot-up time.

To accomplish the boot-up procedure,

the computer, when first switched on, connects a 2K ROM called the Initial Program Loader (IPL) into the bottom of memory while the RAM (I) block is switched in to occupy memory from 32K to 64K. The RAM (II) block is not connected at this time. The IPL ROM then loads the operating system (be it BASIC, PASCAL, Assembler and so on) from the cassette, into the RAM (I) block.

When program-loading is completed, the IPL ROM is switched out of the memory map and the RAM (I) block is moved down to occupy the bottom of memory and the RAM (II) block is switched in to the top of memory.

The video RAM is accessed in a similar manner, by switching out the RAM (II) block and switching in the video RAM when required. In this way, the entire 64K of memory range is made available to the user in the form of RAM.

The video display is memory-mapped, and it is theoretically possible to POKE

Specification and Report Card

Unit:	MZ-80B
Made by:	Sharp
Processor:	Z-80A
Clock Speed:	4MHz
RAM:	64K
ROM:	2K Boot ROM
I/O:	RS232C, IEEE 48 (optional)
Languages:	CP/M, BASIC, PASCAL, FORTRAN, COBOL, Assembler
Keyboard:	Full qwerty, numeric keypad, user definable keys
Display:	80 x 25 or 40 x 25 (software selectable)
Graphics:	320 x 200 (monochrome)
Peripherals:	Dot-matrix Printer, Disk Drives
Best Points:	Reliable, easy to use.
Worst Points:	Slow Boot-up time, no ELSE statement.

Ratings:	excellent	very good	good	poor
Documentation:	✓			
Ease of use:	✓			
Functionality:		✓		
Support:			✓	
Value-for-money:		✓		
Price:	\$1895 for basic unit.			
Review Unit from:	Servcorp Ltd, Level 59, MLC Building, Sydney, 2000			

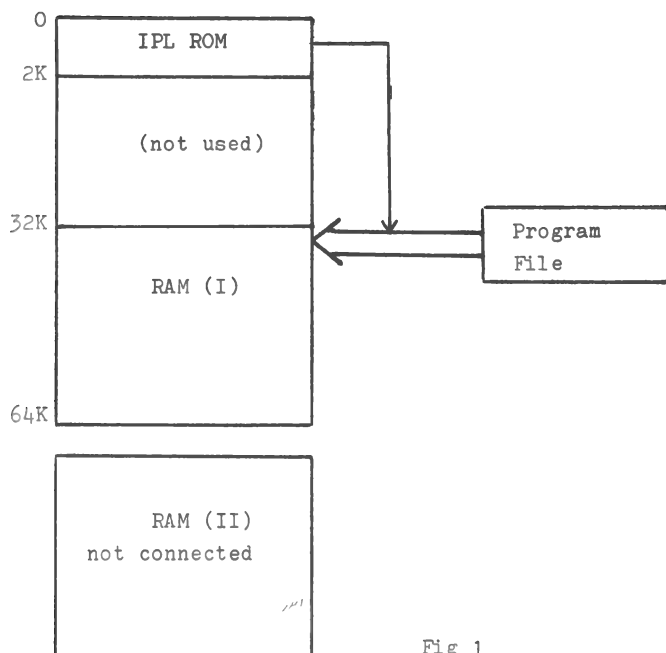


Fig 1

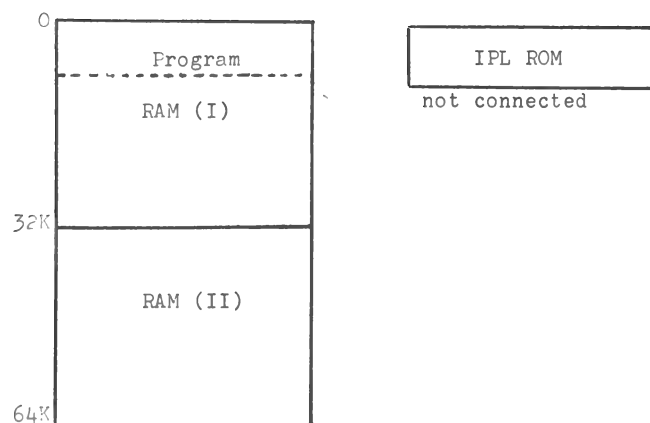


Fig 2

into the video RAM from a program after switching the video RAM into the memory map.

However, we were unable to do this without causing the system to re-boot, although there must be some way around this problem. The graphics RAM consists of an 8K block separate from the character RAM, allowing mixed graphics and characters without limitation.

Software

With this method of IPL, it is theoretically possible to boot the system up in any language. At present BASIC, PASCAL and Assembler languages are available. The machine comes supplied with BASIC SB-5510 on cassette, which takes a couple of minutes to load when booting the computer up.

Perhaps the most useful feature of the machine is the 10 software definable keys situated above the keyboard. These keys can be defined to represent any keyword or command, or even just a string of frequently used characters. Unfortunately, it does not seem possible to define the keys to represent a sequence of commands – a facility which would be useful.

The BASIC also includes user-definable functions, something which is usually absent from most BASIC interpreters. There are also included a number of system constants such as Pi (to make the engineers happy), and T1\$ which returns a time variable derived from an 8253 programmable timer. This constant can be used for determining elapsed times in games or for timing program loops.

Another interesting feature that will please computer buffs is the ability to specify arguments for functions such as

PEEK and POKE directly in hexadecimal form – no more messy conversions!

Also included is a monitor, which enables machine code programs to be entered and run. The LIMIT function limits the size of the BASIC program area, allowing the reservation of memory space for machine code programs to be called through the USR function.

The standard line-printer functions are provided, as well as a COPY/P command which copies the screen graphics, characters or both to the printer. IMAGE/P allows individual dots in the dot-matrix printer to be accessed, enabling complicated graphics display to be output to the printer.

The graphics capabilities of the machine are quite good with a resolution of 320 by 200 pixels. The graphics functions allow for the setting of points, drawing of lines and elementary shape tables. These functions are adequate for most purposes, but are by no means extensive.

The MZ-80B has the unusual capability of having two separate graphics areas (8K each), allowing two screen displays to be stored at the one time. Either or both screens can be displayed at any time. This facility can be used to display one graphics screen while loading in another from disk, allowing quite dynamic graphics displays.

Another useful feature of the video display is the ability to define a scrolling window, via the CONSOLE command. The scrolling window causes only certain lines to scroll up, leaving the others unchanged.

Cassette file manipulation is well catered for in this version of BASIC, with commands for opening and closing files, and reading and writing to files. There is also a simple sound generator and

corresponding MUSIC function. Most of the other standard BASIC functions and commands are provided.

On the negative side, there are a number of limitations and omissions apparent in the BASIC. Arrays are limited to two dimensions only, which can be restrictive in many program applications. As in the Apple, there is no ELSE statement for the IF statement – a very annoying point for graduates from other computer BASICs having this statement. There are also no logical operators (AND, OR, NOT) available on the MZ-80B.

Another minor grievance is the error reporting, which just returns as an error number. Until the user becomes accustomed to the various error codes, the occurrence of an error sends the user diving back into the manuals to decode the cryptic error messages.

Editing on the MZ-80B is via four cursor control keys which allow the manipulation of the cursor around the screen. There is also an insert key and a delete key. The editing is similar to that on the Apple; no problem was found in using it.

Documentation

The documentation supplied with the machine is excellent.

The BASIC language manual accurately and concisely describes all the available statements and commands, while the Owner's Manual contains much information on the internal structure of the machine as well as a store of information on the Z-80 CPU and its peripherals.

The manuals, however, are aimed at an experienced user and would probably not be adequate for a newcomer to computing.

BASIC Reserved Words

ABS	FAST	MON	RND
ASC	FOR	MUSIC	ROPEN/T
ATN	GET	NEW	RUN
AUTO	GOSUB	NEXT	SAVE
BLINE	GOTO	ON	SET
BOOT	GRAPH	OUT	SGN
CHANGE	IF	PAGE/P	SIN
CHARACTER\$	IMAGE/P	PATTERN	SIZE
CHR\$	INP	PEEK	SPACE\$
CLOSE/T	INPUT	POINT	SQR
CLR	INPUT/T	POKE	STEP
CONSOLE	INT	POSH	STOP
CONT	KLIST	POSITION	STR\$
COPY/P	LEFT\$	POSV	STRING\$
COS	LEN	PRINT	TAB
CSRH	LET	PRINT/P	TAN
CSRV	LIMIT	PRINT/T	TEMPO
CURSOR	LINE	READ	THEN
DATA	LIST	REM	TI\$
DEF FN	LIST/P	RESET	TO
DEF KEY	LN	RESTORE	USR
DIM	LOAD	RETURN	VAL
END	LOG	REW	VERIFY
EXP	MID\$	RIGHT\$	WOPEN/T

Expansion

The Basic unit comes with 64K RAM, one 8K graphics block, manuals and a cassette BASIC and costs \$1895. A 13 cm dual floppy disk drive, double-sided, double-density, will give 280K per disk storage.

These drives are available for \$1900. CP/M is available on disk, opening up the full software library of CP/M. Languages available on disk include BASIC, FORTRAN, COBOL and PASCAL.

Sharp also plans to release a single disk drive unit for those who do not need to go to the dual unit. Also available is a dot-matrix printer for \$910, IEEE 48 interface for \$360 and an RS232C interface for \$445.

Conclusion

Overall, the MZ-80B is a very reliable and functional computer. With its great expansion capability, it seems ideally suited for small business or scientific application.

The high-resolution graphics enable very useful dynamic graphical displays to be implemented. The computer was very easy to use and get accustomed to/and, apart from a few minor deficiencies in the BASIC interpreter, the MZ-80B is an excellent choice for a small computer to be used in serious applications. □

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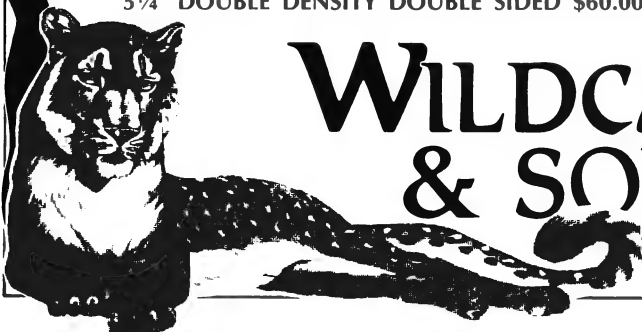
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Itinerary:

Friday May 13th: Qantas flight QF11, Sydney – Honolulu for a 2 day 'get acquainted' stopover on the island of Hawaii. The tour cost includes a rental car for each minimum of two people, so you can explore the islands and enjoy a couple of days away from technology!

Sunday May 15th: Hawaii – Honolulu – San Francisco – Los Angeles and we're ready to face the biggest computer show in the world!

Monday 16th – Thursday 19th: NCC. This year's conference, on the theme of 'The Emerging Information Age: Computers, Communications and People' features the most extensive exhibition of computer hardware and software in the world. The Conference has 80 sessions in 11 tracks ranging from mainframe management to office automation and microcomputers.

Friday 20th: We fly United to Newark, New Jersey, our base on the East Coast. Saturday and Sunday are free of work, and we will arrange local tours of interest, a Broadway show, etc.

Monday 23rd: A visit to the SIG/M User Library, one of the biggest libraries of CP/M software: stock up on utilities, find out what's happening in the CP/M world. In the evening, a social get-together with the Amateur Computer Group of New Jersey.

Tuesday 24th: Atlantic City is the base of Plum Hall, the internationally-acclaimed UNIX and C consulting group. Here, we'll hear about the latest trends in operating systems and system programming languages.

Wednesday 25th: We return to San Francisco.

Thursday 26th: A visit to the factory of Morrow Designs, where top hardware and software designers will discuss the latest techniques in multi-user and low-cost single-user personal computer systems.

Friday 27th: A half-day each at Apple Computer and Intel Corporation. Hear about the latest in personal computers like Lisa and see Apple computers being built. At Intel, we'll hear what's new in silicon, 16- and 32-bit processors, memories, bubble memories and more.

Saturday 28th and Sunday 29th: Free for you to explore San Francisco or nearby areas such as Yosemite National Park. We leave on Qantas QF4 at 9 p.m. Sunday, arriving back in Sydney at 8.40 a.m. Tuesday – just in time for you to get back to work!

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Modellers From MARS

Now that financial modelling on microcomputers is an accepted fact of management life, new modelling packages are appearing almost daily. Les Bell reports on the latest, Sapphire MARS.

THERE CAN'T BE many microcomputer users who haven't played around with VisiCalc or one of the VisiClones by now. Many companies bought their first microcomputer, generally an Apple, just to run VisiCalc, and many managers are now quite *au fait* with the concepts of financial modelling on computers.

There are new packages appearing on the market faster than almost any other category of software – some estimates put the figure at around 50 modelling packages on the Australian market. Can yet another modeller survive?

There are some good reasons why Sapphire MARS (Management Accounting and Reporting System) will be around for a while. Produced by a British company founded specifically to develop a financial modelling package, Sapphire MARS is a comprehensive package with some unique and interesting features.

Written in CBASIC to run under the CP/M and CP/M-86 operating systems, Sapphire MARS combines some of the features of the spreadsheet calculators with a command language and a menu-driven supervisor. This makes it easy for the neophyte to create models without the details of the package distracting him from the design of his model.

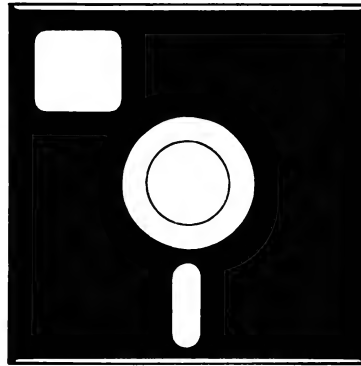
On start-up, Sapphire MARS displays an entry menu allowing the user to create a new model or work with an existing one, or perform various maintenance functions. Creating a new model leads the user naturally into a secondary menu, and the user then works down the various selections, supplying the necessary data.

When a new model is created, the system actually copies files from an existing default model, or from another model that is closer to what the user wants to do. This set of files is then modified, using a special-purpose editor, until the model is finally run.

The job editor allows the user to enter the model name, description and specifications of the matrix in which the actual calculations will be done. It is also used to set up the format for the final printed report, and to enter the calculations which are to be performed.

Data to be input to the matrix is al-

your computer



SOFTWARE REVIEW

ways taken from files on the diskette. There are three main ways that they get there: they can either be output from another Sapphire MARS model, they can be data files from another package – say, an accounting module – or finally, and most commonly, they can be input by the package's own data entry module.

This is one of Sapphire MARS' greatest strengths. The data entry module can read the row and column headings from the job data file, and creates a simple form on the screen, prompting for the data. Consequently, data can be input quickly by untrained users, without any need to move the cursor around to the appropriate cells.

The program is also particularly strong in the consolidation area. Individual rows and columns can be read from other matrix files to any position in the current job matrix, avoiding the need for re-keying or remembering row and column coordinates. Consolidation can also be done for entire blocks.

Once the actual matrix has been specified, the next job is entering the rules for calculation. These are placed in a separate file, and are read back in at run time. Because the instructions are executed from top to bottom down the list, there is no need to stick to row-before-column (or *vice-versa*) order, and the calculations can be as arbitrary as desired.

Once the calculations have been entered, the remaining option is the format of the final printed report. Sapphire MARS offers a wide range of options, much more like a database report generator than a spreadsheet.

Finally, the data is placed in the data input file, and the model can be run. As the model runs, the results will appear on the spreadsheet. One of the

strengths of Sapphire MARS is that at this stage, the user can use it in a VisiClone mode to make immediate changes – the usual "what-if?" analysis.

In fact, it can be used in three modes: either by following the menu prompts, or by typing in direct commands, or by direct entry into the spreadsheet *a la VisiCalc*. This makes it suitable for a wide range of users, from professional management accountants, who will use it heavily, to secretaries or office juniors, who will only enter data and run the model.

The spreadsheet can have up to 6000 cells, with a maximum of 99 columns and 999 rows. Column widths are variable, like SuperCalc's, and a range of functions like Net Present Value, Internal Rate of Return and Payback are provided.

For those who find that the functions they need are not supplied, it is possible for the user to create his own by writing them in CBASIC and linking them in. The procedure is not complex – it really just involves copying a COMMON statement into the program and knowing which variables represent what.

This extensibility makes it possible for the user to perform functions like rounding all results in a particular way, or souping up the admittedly weak conditional function provided as standard.

The package is not blindingly fast; however, compiled versions in both CB-80 and CB-86 are now in the beta test phase and will be released later this year. That should produce a significant improvement. A number of other enhancements are planned for the product, and in 1984 we can expect to see an integrated software package from Sapphire which combines financial modelling, database management and word-processing.

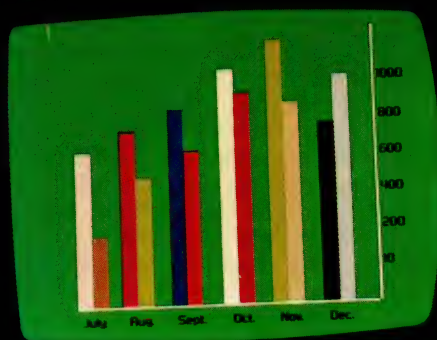
Sapphire, by the way, is a British company which has a number of other activities, including a comprehensive accounting package and a management game. MARS is its biggest success, and is now in use with several of Britain's largest companies.

Sapphire MARS will run on the vast majority of CP/M micros plus the Sirius 1, IBM-PC and other 16-biters. The product is represented in Australia by Bisplan Consulting Services, 2nd floor, 10 Help Street, Chatswood, 2067, which is experienced with financial analysis programs, having run a number of seminars on the subject.

The cost? \$650, plus tax, which will bring it to around \$730.



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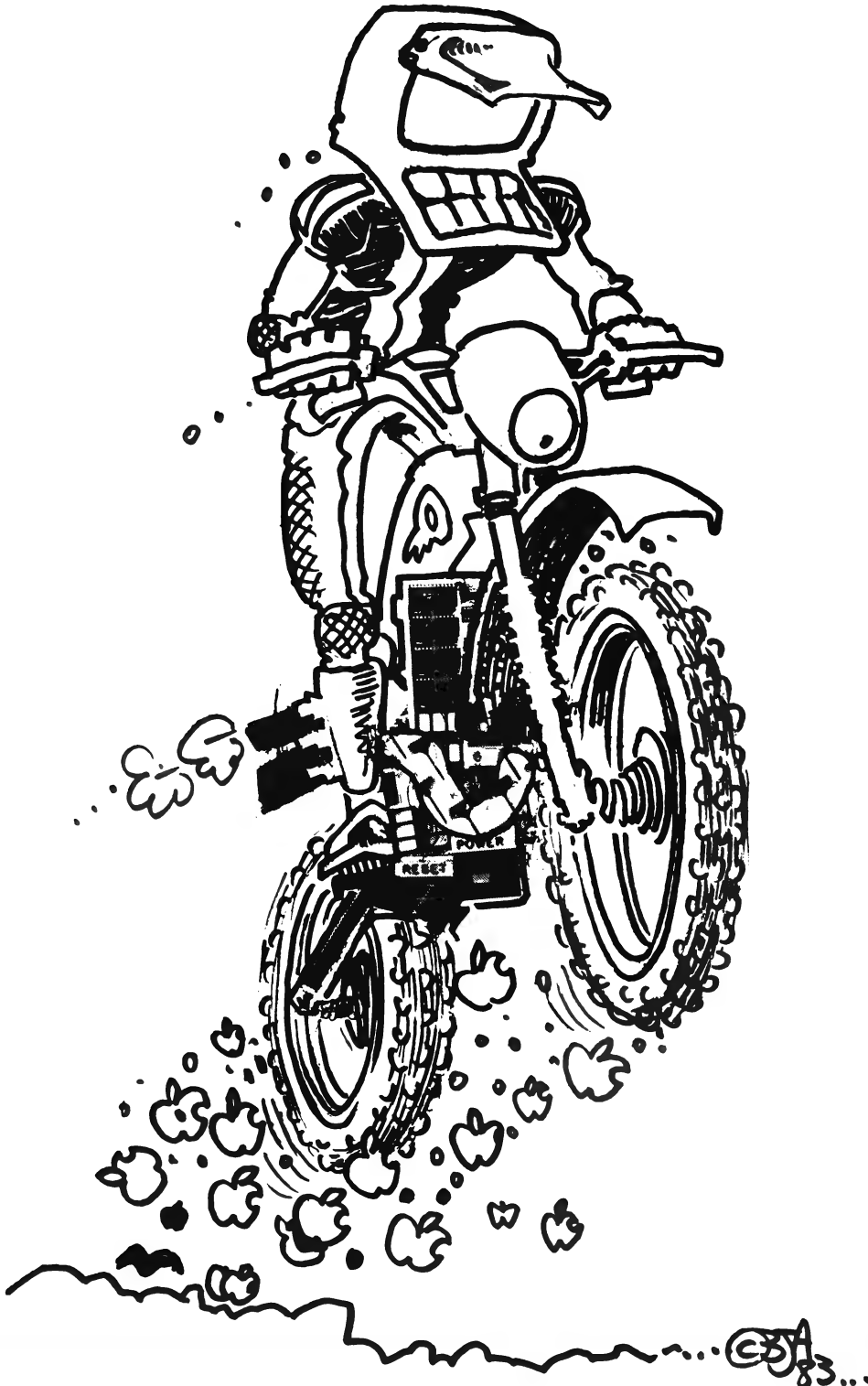
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COMPUTER

Moose And His



TWO YEARS AGO, I had greatness thrust upon me when the members of the Nowra and District Motorcycle Club decided I should be their club secretary. When I took over the job, I was handed two cartons of seemingly useless junk and told to work it out from there.

I did just that, with the aid of a portable typewriter, and two fingers. This worked fine until March 1981, when I had to run a national motocross meeting. I won't bore you with the details, but suffice it to say that I had to send out something like 200 sets of entry forms. That's a lot of envelopes to address.

Next came the entries – 112 in all – which I had to sort into four grades and five engine capacities, and put then into their various races. All this had to be done overnight, in order to be with the programme printer by midday the next day. I started the task at 6.30pm and finished at 9am the next day, kept awake by consuming numerous cups of coffee.

After this experience came the obvious question – There's gotta be an easier way? – and I decided to look around for the solution. I ended up at South Coast Computing Services, where I showed my complete ignorance of computers. However, we talked of Apples and disk drives and printers and whatever else came to mind, and I left with a bundle of papers you couldn't jump a motorcycle over.

Now, I knew there was no way the club could afford to buy the necessary equipment, so if it was going to happen, it had to come out of my own pocket.

That evening, I went over all the pamphlets, and my finances. Next morning, the phone conversation went something like:

"South Coast Computing Services. Can we help you?" "Yes, I was in there yesterday afternoon. Have you got an Apple II, two disk drives and a 132-column printer in stock?" "Yes, sir." "Good, I'll be there in about an hour to pick them up." About two hours later, I was on my way home with all the above, plus a Sandy's word processor.

Before leaving the shop, however, I was introduced to Andy 'Moose' McVeigh, their then-resident programmer. Moose had just finished writing a program for the local BMX club, and pointed out that some of it could be used by me, with the necessary alterations.

With Moose's help, the first half of my motorcycle program – that which sorted all the entries into their various grades

Motorcycle Mailing Lists

By A C Skarratt

and races – was ready by about the end of July 1981.

Now I had to start setting everything up, which wasn't that hard, as everything is menu-driven and, with Moose's help, it all fell into place very easily.

The first job was to set up the various categories. a category consists of grade and engine capacity – for example, A-Grade, 126 cc to 250 cc. There are 15 categories in our set-up. Next, I had to tell the Apple the maximum number of competitors in each race, and then tell it what categories went into each race and, finally, set up the race program itself.

All this took some time, as I was forever discovering things I had forgotten to tell Moose to put into the program. As a result, I would cop a blast from him, and have to wait for him to re-write sections of the race program.

Eventually, after testing, the program was ready for my next national meeting, in September 1981, and it worked perfectly – not one bug. It took me only two

hours from the time I started putting in the entry details, to the time the printer finished its work, just over an hour being taken up with entering the data.

Since then, the second half of the program has been completed; this allows me to enter results from each individual race and from this information the computer works out the point scores, then prints out the final results for the day.

Because the system has to go mobile about three times a year to dusty racetracks, floppies were considered completely unsuitable, even in an enclosed space. As a result, in March 1982, the system was expanded to contain a 10 Mbyte Corvus disk drive. The Corvus has cut down the time from two hours for 112 entries to an hour and 40 minutes for 130 entries.

The system is still far from complete, as the next step is to include all club motocross meetings for the year, a running point-score system, and whatever else I can think up that will be useful. Needless

to say, the manual cannot be written until everything is finished; at present, I work with a set of notes from Moose, plus the occasional phone call if something goes haywire.

So far, it has cost me about \$1200 for the program, which may seem excessive, but it must be realised that it is a one-off job until it is completed, and has to be paid for as such.

DB MASTER has since been added and is used for the club membership list – about 100 entries – and motocross and reliability trial mailing lists, each with about 200 entries.

These are not strictly mailing lists as they also contain personal details of the club members and competitors, and are used for printing the necessary lists which have to be sent to the Auto-Cycle Union of New South Wales for insurance purposes. The lists are also used for checking competitors at race meetings, and by the treasurer to check that the club fees have been paid. ☐

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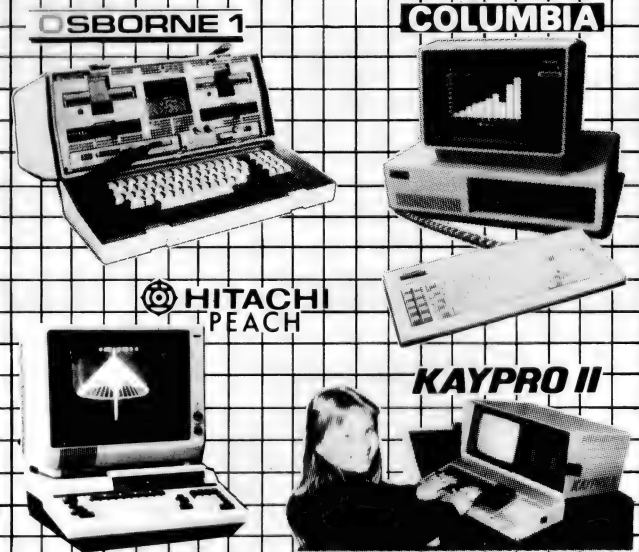


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SinclairCalc!

By John Crabb

A BRITISH software house has come up with an electronic worksheet for the Sinclair ZX-81 that earns a rave review from me.

Called Vu-Calc, the software was written by Psion and it seems this software house has entered into an agreement with Sinclair, as the cassette is now marketed by Sinclair ZX-81 Software of Stanhope Road, Camberley, Surrey.

For the price (7.95 pounds, including postage), it is almost unbelievable; okay, it may not be as big as VisiCalc (you only get 36 by 26 boxes), it may not have all VisiCalc's facilities (although you can label, apply formulas or insert data into each of the 936 boxes as well as using some other neat tricks) but it is user-friendly.

I must confess I was a little disappointed when I opened the package and found just a boxed cassette. Perhaps I have been spoiled by the American packs, with their manuals, operating and reference cards, keyboard overlays and so on.

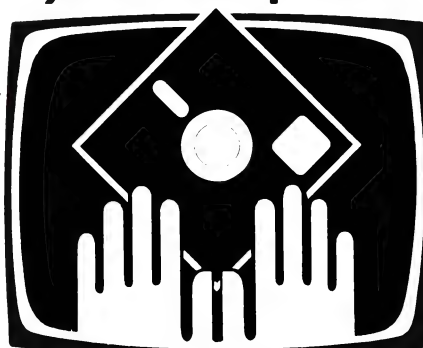
Anyway, on opening the cassette box, I found a small leaflet wrapped around the actual cassette. It was as small as 29 by 10 cm (printed both sides), and of this, 15 by 10 cm is devoted to the maker's name and logo and advertising other goodies. However, once the leaflet is read (which doesn't take long, as you may imagine) and the cassette is loaded, all is forgiven...and nearly everything (including mealtimes) is forgotten.

You have the fascination of constructing, generating and calculating, doing 'what if' projections all on your very own electronic worksheet.

I'm a business student, so perhaps you'll have to reduce my enthusiasm by

applying a formula of 0.5 by E10 (as the worksheet might express it). On the other hand, a friend whose business uses a 'big' micro with lots of software, including VisiCalc, was also very impressed by my 'toy' ZX-81 and its new worksheet. After all, how often would most users need more than 36 by 26 boxes? Even with headings, monthly figures, quarterly sub-totals, annual grand

your computer



OWNER REPORT

total, for example, you need less than 20 boxes. Even if each item was shown as 'Actual' and 'Budget' it still would squeeze into the 36 columns.

Loading Vu-Calc takes a long time, so don't get impatient and press 'BREAK'. When you see the size of the program printout (13 hefty REM machine-code statements, plus BASIC lines 110 to 9995 even with some big gaps in the sequence of line numbering), you understand the length of the loading time. The Main Menu appears: E for Enter, C for

Continue, S for Save With Data, W for Save Without Data. Press E and you're away.

Having entered your headings in the appropriate boxes and loaded in some data, you probably want to use some formulas and make some calculations. Nothing easier. Enter F and then at the bottom left hand corner of your screen a new cursor appears. Enter your formula (up to 32 characters long), press newline and then you get a prompt asking Absolute or Relative? (Incidentally, this was the only error I found in the instruction leaflet – it tells you A or R are the last items in the instruction sequence rather than the first. It doesn't make any difference, but it may shake your confidence the first time it happens.)

Next, you have a prompt asking you whether you wish to move by Row, Column, or to Exit? By using R or C you can apply a formula to a selected portion of a column or row. Exit means you are only applying the formula to your current box.

You may then key in C for calculate and, after a brief blanking of the screen, your results appear in their appropriate box(es). In the event you made an error there is a neat error identification (and recovery) routine. In fact, there are some 15 commands, including the useful Get a formula and Set a formula. It would take longer to describe them all than to run them on your electronic worksheet!

To test its capabilities, I tried to copy a worksheet shown in an advertisement in a well-known American computer magazine. In a very short time, I had reproduced the display shown in the advertisement, except that I hadn't got my amounts rounded off (that would be possible, I expect) and there is no correct 'justification' of numbers – they all start on the left side of their boxes. That might be a disadvantage if you were adding them up, but since the worksheet does this for you, it's not a real problem.

Value for money? Very definitely. In my view, it's the best piece of software I've used in 'serious' applications. ☐



In business



It's not
who you know...
It's what you know.

What you should know about the Vector 4:

- ☐ Dual processors — 16-Bit 8088 and 8-Bit Z80B
- ☐ 128K RAM
- ☐ 12-inch green phosphor screen, 24 x 80
- ☐ High resolution graphics, 640h x 312v
- ☐ 2 x RS232C serial ports
- ☐ 2 x parallel ports
- ☐ 15 programmable function keys
- ☐ Programmable tone generator & speaker
- ☐ 2 S100 expansion slots
- ☐ 5 or 10 megabyte hard disk
- ☐ 1 x 630k floppy disk
- ☐ CP/M, BASIC, SCOPE full screen editor RAID full screen debugger & ZSM assembler

Get to know the
Company Computer,
personally.

I'd like to know more about the Vector 4.

Name

Company

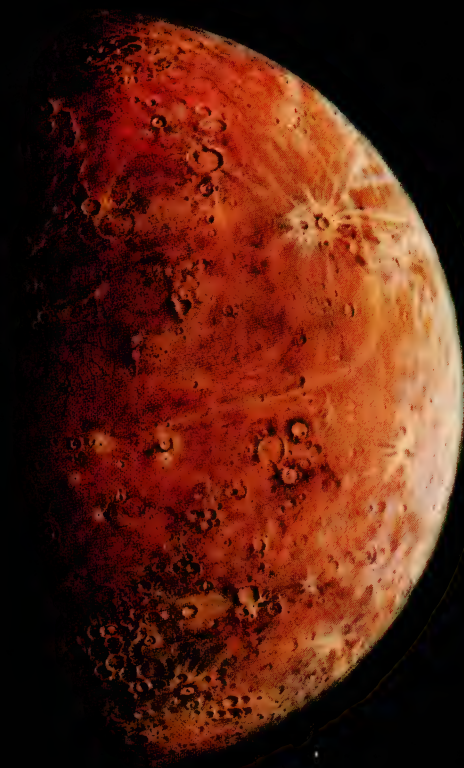
Address

..... Phone

To: Dicker Data Pty. Ltd., 78 Captain Cook Drive,
Caringbah, N.S.W. 2229, Tel. (02) 525 2122

VECTOR

THE COMPANY COMPUTER.



The Mercury Printers

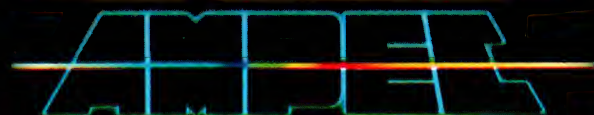
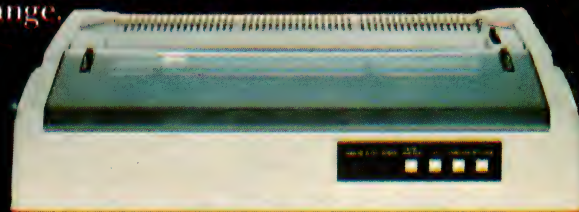
Ampec have the printers for you... The Mercury F10 gives you high quality printing at 40 cps. It gives you easier adaptability and simplifies your software requirements, through its built-in word processing functions. All this is a unit only 6" high, which will fit easily into your current system or onto any office desk.

If you want excellence in printing, but a higher print speed, your answer is the Ampec Mercury SP830. Rated at a maximum speed of 80 cps, this printer features fine line spacing which offers excellence in graphics, including superscripts, subscripts and curves.

These daisy wheel printers are built for maximum quality and long life. Both use

industry-standard cartridge ribbons and type wheels, giving you a wide range of type faces which are interchangeable in seconds.

Printers for tomorrow – ready for your needs today – from the Ampec Mercury range.



The absolute in peripheral thinking.

Some Of My Best Friends Use Word Processors

By Eric B Lindsay

SOME OF my friends are writers, and this is a very fine thing, for they are mostly witty, erudite, and fine drinking companions. However, they do tend to display one very undesirable trait: they keep asking me when I am going to write something.

I tried the traditional excuses: "Someone else is using the pencil." They persisted, I resisted. For example, I resisted the electric typewriter, the noise of the motor was distracting. Unfortunately, my friends mostly write science fiction, or advertising copy for computer companies, and thus are progressive. So I am now resisting word processors.

A word processor is a computer program designed to assist in the preparation of written material.

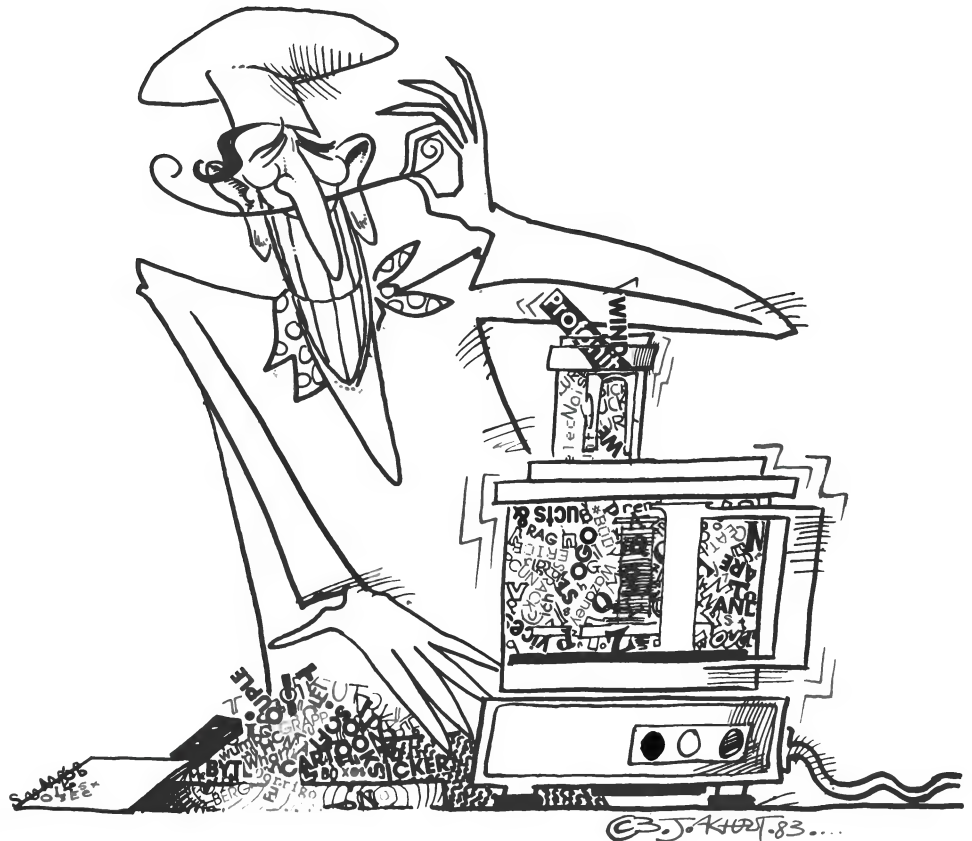
Some word processor salesmen will tell you that the only effective word processors are 'dedicated' machines that are designed exclusively for word processing. These are usually easier to use, and often have much better display facilities.

However, a general purpose business or hobby microcomputer can usually produce equivalent results. For example, the Apple computer is almost impossibly bad for word processing. It has no lower case, no true shift or shift lock keys, no cursor-control keys, displays only 40 characters across the screen, and cannot drive a printer. Despite this, there are at least 30 word processing programs for the Apple, many of them needing only minimal investment in changing the hardware of the Apple.

In short, most microcomputers can run a word processor, whatever the apparent disadvantages in their design.

Contrary to the belief of certain salesmen, word processing is not suited to all writing situations. In some circumstances, word processing may take longer than using a typewriter. For example, if you are a skilled typist and have a single letter to type, and it is unlikely to require a second draft, then a typewriter will be quicker than a word processor.

Word processing can be of use if your material is subject to multiple review and correction before the final draft (for ex-



ample, writing articles); if you send much the same letter to many people (mailing lists, business letters using blocks of pre-written text); and minor changes each time they are used (price lists, legal documents).

A lot of professional writers frequently change their word-processing programs. They recognise that word processing assists, but they have problems adapting to its use, or simply cannot see why they should adapt. This leads to a constant search for the perfect word processor – or at least, one that is easier to use.

In many ways, the traditional methods work well. Consider the humble pencil as a word processor. Good points include easy writing of the text, you can rub out anything you don't like, you can insert additional material anywhere, and you can move text by cutting out sections and pasting them elsewhere. Bad points include the untidy results, problems in locating errors, and the slow-

ness of hand-writing compared with typing.

The best thing going for writing is that we've done it for so long, and in such a consistent manner, that it tends not to distract us from the subject matter. In short, it seems natural.

Compare this with word processing. Many people learn to use a typewriter early in life, and typing therefore seems fairly natural. A typewriter also follows mechanical principles that many find intuitively obvious. Not so most word processors. These often contain an extensive range of instructions (or 'commands') that must be committed to memory, as they are constantly used when typing your original material.

The functions a word processor should include easy typing of the original material, without any special control codes; the easy removal of errors, via a back space or deletion key; the ability to automatically change or replace sequences of letters or words throughout

the text, the ability to move and duplicate blocks of text; the ability to stop printing for the addition of material from the keyboard (a feature ideal for handling small amounts of semi-repetitive correspondence); the ability to save and reload the text at a reasonable speed; and the ability to allow you to deal with more text than will fit into the memory of the microcomputer.

After the operating system and the word processor are included, many microcomputers have only between 10,000 and 30,000 characters of space for text, or about the equivalent of 1700 to 5000 words. This is not much, especially if you happen to be writing a 200-page report. Working with a long text is easier if you can treat all the text as being in one piece, and not have to worry about which parts are in memory and which are stored outside the microcomputer. Unfortunately, rather few word processors let you do this.

One fairly natural way to enter text is to leave the entry point fixed on the video display, and move the rest of the text accordingly, rather like a piece of paper in a standard typewriter. While I can appreciate the ingenuity of the programmers who do this, I tend to look at text, even in a typewriter, when it is fixed in place, and not when it is moving. I prefer to enter text along a line near the bottom of the video display, just as it appears using a golfball typewriter.

The entry point for text is usually indicated by a cursor, and moving the cursor is a problem. If you use a combination of keys, they are hard to remember. Most word processors use something vaguely mnemonic, such as the arrow

keys or else something that fits a diamond pattern.

The best method is probably a joystick, followed closely by a special set of word processing keys as part of the keyboard. Controls to move in each direction should take you steadily along the line of text, and move to the next line when they reach the end of a line. Controls that take you up and down through the text should also repeat automatically. The rate of repeat should increase the longer you push the control.

When you reach the end of the text in the microcomputer, the word processing program should check the disk and locate any other text that continues from the place you have reached without you having to type special commands (very few do this).

You should be able to type in, or insert, any amount of text at any place the cursor might be. You should also be able to delete text from any place the cursor is, and this should repeat until you release the control. Any deletion should easily expand so that you can remove unwanted words, sentences or paragraphs with ease.

Controls that work by the line are written for the programmer, not for the writer, and should be avoided by anyone not using the word processor for writing programs.

Indicating blocks of text to move would be more natural if you could point to them. A lightpen, with a menu so you could change the sequence, would be easier here. Most word processors use a series of keys to mark blocks of text. Using one marker for start, one for end, and one for where the block is to go is

harder to memorise, and it is silly for you to be expected to remove the markers after the move, although many programs expect this.

The vast majority of word processors are much better at formatting text than they are at aiding the writing and editing of it. Programmers, especially those trained in business programming on large computers, tend to have considerable experience producing reports with complex formats. This may have influenced current word processors to make format handling much superior to ease-of-use.

Many typographical tricks require specific printers, and the more complex the printer, the more detailed the code required to take advantage of it. Some printers will not even underline, yet others will overprint, do sub and superscript, bold print, various pitches, and different character sizes and styles. However, you can never be sure that a specific word processor can handle a specific printer, so if advanced printing features are important to you, make sure you try your microcomputer linked to the printer you want, using the word processing program, before you buy.

You will almost certainly want to be able to change the margins of your text, change the line spacing, and the number of lines on the page. Reject anything that does not give you at least this amount of control. After all, a typewriter would.

Justified text is a feature of most word processors. This means the right margins are flush, as they are in this magazine. This is achieved by two methods. Spaces are added between

COMMANDS	SANDYS	ELEC PENCIL	WORDBEE	WP6502	WORDSTAR
Cursor Up	CTRL N	CTRL W or Up Arrow	CTRL E	LineFeed	CTRL E
Cursor Down	CTRL V	CTRL Z or Down Arrow	CTRL X	CTRL LineFeed	CTRL X
Cursor Right	Right Arrow	Right Arrow or CTRL S	CTRL D	Space Bar	CTRL D
Cursor Left	Left Arrow	Left Arrow or CTRL A	Backspace or CTRL S	Rubout	CTRL S
Delete	CTRL K	CTRL D or ShftLftArrw	CTRL G or Delete	Rubout or D	CTRL G or Delete
Search For String	CTRL S	CTRL V	CTRL F	G	CTRL QA
Notes: The word processors listed are Sandys, for the Apple II, Electric Pencil for the TRS80 Model 1, Wordbee for the Microbee, WP6502 for Ohio Scientific, and Wordstar for all CP/M equipped micros.					
TABLE 1. A SAMPLE OF WORD PROCESSOR COMMANDS					

your computer

clinic

Info On CP/M

I WAS wondering if you can enlighten me on CP/M. I am considering upgrading my present 2650 system and am considering going to CP/M on a Ferguson board as one alternative.

I have read in various columns of the vast area of programs available for CP/M but never see anyone advertising these programs for sale. How can I actually find out about these programs. I am interested in purely hobby programs (games, education, personal, financial management).

I have also read of the hundreds of programs in the "public domain". How are these accessible?

STUART MCLAUGHLIN
Tannum Sands, QLD

Funny thing, the vast range of CP/M software generally isn't widely advertised because, well, CP/M users generally know where to get it.

Contact Archive Computer Services, PO Box 13, Clayfield, 4100, who have a whole selection of CP/M software. Be aware, though, that CP/M doesn't have a whole lot of games available for it, or indeed education, personal, financial management or other programs, certainly at low prices.

It seems to be that software to run under CP/M is generally not cheap, but it is considerably more sophisticated than comparable programs for other operating systems.

Buzzing Bee

I HAVE recently read an article about adding speech to your computer (not the magazine). The article says that to make this kit work on a computer the computer needs a Centronics-compatible parallel output port.

The magazine claims that the voice synthesiser has an almost unlimited vocabulary and the kit costs \$100-\$150, depending on what sort of case and loudspeaker you buy. I was wondering if this could work on a MicroBee?

STEPHEN DONALDSON
Willetton, WA

Yup, sure can. Port A of the Microbee's PIO chip is not used by the machine and can be set up as a Centronics port. To help get the system running, get hold of the data sheet for the Zilog Z-80 PIO and become familiar with programming it. From there it's probably fairly easy - a few PEEKS and POKES will get it going.

Osborne Answers

I WORK in a small Consulting Engineering practice and my boss has recently purchased an Osborne I computer to help out with engineering calculations, accounting, payroll, invoicing and other office duties.

We have been buying your magazine for the last nine months or so to check out what sort of computer might suit our purposes. Now that we actually have a computer I'm afraid I'm getting the bug, as so many other people are.

What I would like to know is if you could possibly help me with some of the following questions- 1) I would like to purchase Basic For Birdwatchers, and also find out if you could recommend any other worthwhile publications for programming MBASIC, so that I can start compiling my own engineering programs.

2) Can I program our Osborne I in MBASIC for arcade type games or does it have to go in some type of assembly language? (Novice question.)

3) Can I purchase arcade type games on disks to suit our Osborne I, and if so what do I look for or ask for to purchase such games?

4) Is there a worthwhile publication which has programs and games that a novice like myself could purchase and play around with to gain experience in and get the fundamentals of programming from?

I think your magazine is excellent in the way it covers topics for novices, enthusiasts, and freaks.

R B JACKSON
Forrester's Beach, NSW

1) Back copies of the magazine are available from the publishers - details on the Services page. 2) and 3) There are some games available for the Osborne - contact your dealer for details. Most arcade-style games have to be programmed in assembly language or a compiled high level language for speed. However, MBASIC is okay where not too much speed is required.

4) Sybex (available through the ANZ Book Company in Sydney) has published a book of BASIC games with explanatory notes. Also check out 101 Basic Computer Games, published by Creative Computing.

Cramp Pains

I WOULD like to compliment you on your magazine. It is a change to read a computer magazine which is not written for experts and I have been able to learn a lot from it.

However, I have run into a problem which I cannot solve and wondered if you could help me. In the May issue on page 75 there was a program called 'Cramp'. I have tried running this in the BASIC version on a System

80 Business Computer and all I get is the message "Bad Memory at -32767". This I assume is because I have not reserved the 104 bytes specified as I don't know how to.

As I have run into this problem before, could you please explain how to go about reserving bytes at the top of memory and then how you load the program into this area. Would you also explain what a system tape is.

G PARRANT
Tascott, NSW

For a detailed answer please look at the TRS columns of various past issues, where this question of protecting memory has been covered in general. However, to this specific program: by looking at the listing you'll see that the program determines where you've protected memory and then assumes space above to POKE its machine-code into. Thus, if you've not protected any, it will try to POKE into non-existent memory, which is why you got the 'bad memory' message.

The obvious answer is to protect memory, either at switch-on by answering Mem Size (first Ready on the System 80) with the required number (in this case 32663), or by a program line to accomplish the same protection on RUN. This latter method is far superior, and I don't know why everyone doesn't do it! Again for this specific program, with your 16K of memory:

105 POKE 16561,151 :
POKE 16562,127 : CLEAR
50.

For more general information about this method see the TRS column where it will become all clear!



your computer clinic

Bee Programs

IN THE February 1982 edition of Your Computer, the article on the MicroBee computer stated "Another important factor ... is the existence of hundreds of programs already written in Microworld BASIC." Are the programs you refer to suitable for direct and immediate loading into the MicroBee 'dialect' of BASIC and entered via the keyboard?

Could you advise me where I might obtain programs on cassette or in publications that would work on the MicroBee without modification, other than those available from Applied Technology.

IAN J LYALL
Nth Fitzroy VIC

Applied Technology, manufacturer of the MicroBee, previously supplied systems based on the S-100 bus, using MicroWorld BASIC. This means it has have built up a considerable number of programs in that version of BASIC.

Generally, you will not be able to load programs off cassette tapes from other systems into your MicroBee. Therefore we suggest that you stick to programs specifically written or modified for the Bee.

Applied Technology is the major source of programs for the MicroBee. Contact it for information on programs available. In addition, many other MicroBee software suppliers have sprung up, many of whom advertise in Your Computer, either in display advertising or in the Market Directory or readers' classifieds.

Integer Conversions

I WOULD like to know if there is any way that an Integer BASIC program on the

Apple can be changed to an AppleSoft program, as I do not have the language card and I would like to use some of the integer BASIC programs.

D R MOORE
Warrane, Tas

Sorry, we don't know of a way to do it – the biggest problem being you can't even get the Apple to load the program so you can modify it.

VIC Software

I AM AN owner of a VIC 20. I would like to know of some places (in SA) where I could purchase VIC 20 software.

I would be very grateful if you could supply me with an answer. Thank you for your help.

SAMUEL SANGSTER
Toorak Gardens, SA

Try your local Dick Smith store...

Osborne Communications

CAN THE Osborne I computer communicate with other users on the Telecom telephone typewriter network, or specifically, to the Porta Printa Plus?

I know the Porta Printa can be modified to ASCII code format, but can the Osborne be converted to communicate using the original Porta Printer format?

In short, is there an interface or any software available to enable me to modify my Osborne I?

BRIAN STEVENSON
Kingsgrove, NSW

This is one of those questions that can only be answered 'Yes – if you have the time and the talent'. A computer is a completely general purpose machine and can be programmed

to do almost anything – a fact which does not escape most computer salesmen as they assure you that their model can do exactly what you want!

Several communications programs are available for the Osborne – check with your dealer or on The Source; ah but of course, you can't do that without a communications program. Assuming that the Porta Printer can be modified to standard 300 Baud CCITT ASCII communications, then you shouldn't have any difficulty.

System 80 Fuzz

I OWN a Dick Smith System 80, and whenever it's on, the TV set acts up. Channel 2 is the worst affected. An article in Electronics Australia discussed this problem, but I don't wish to go roaming around inside my computer, for fear I would probably damage some vital part. Is there any way to stop this without taking the computer apart?

I tried wrapping aluminium foil round it, (metal shielding) but this had no effect.

JASON RUBENS
Sth Coogee, NSW

There isn't really any easy way of stopping RF interference without getting into the computer's circuitry. It shouldn't do it in the first place, though, so I suggest you check with Dick Smith Electronics for a cure.

Super CPU

I AM sure many people were very interested in the 'State Of Art' Godbout Electronics CPU 8085/88, S-100 board, reviewed in the October issue.

Equally, I am certain the

majority of readers are not extremely familiar with S-100 systems, but a few would be most eager to build a personal home computer system with this CPU board at its heart – as every personal computer on the marketplace either lacks all the features offered by this CPU S-100 system or is horrendously expensive. The cheapest personal 16-bit machine I can think of being the very expensive Apple III.

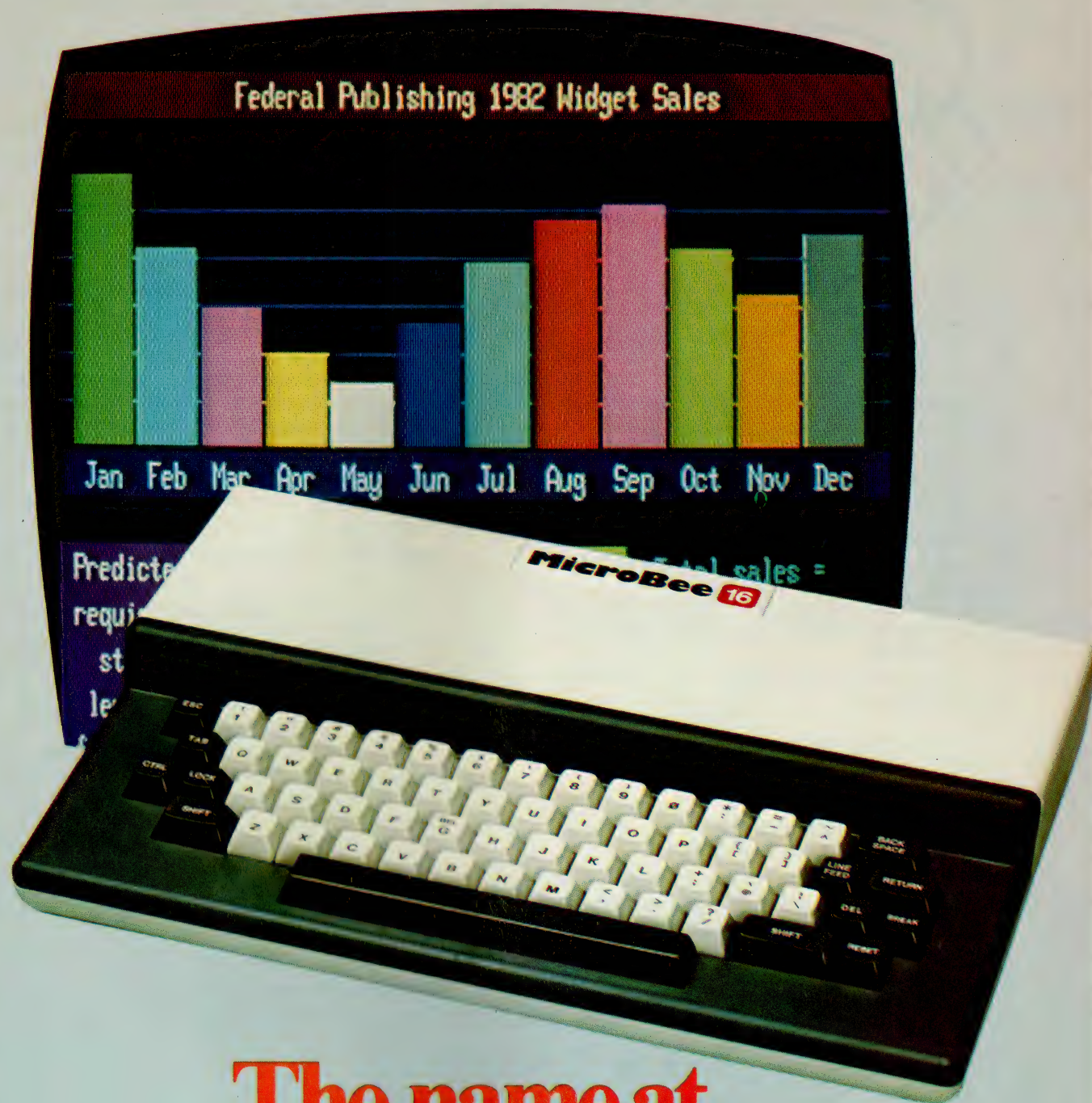
Please could you advise on how an S-100 system (using the CPU 8085/88) could be put together into a general purpose personal home computer configuration and how languages like BASIC, Pascal, Forth, and so on could be added to it - to make it a Super home computer at a reasonable price compared to other popular machines currently on the market?

K FONG
St Lucia, Qld

Oh boy, I hate to tell you this, but a complete system based around the CPU 8085/88, designed to take maximum advantage of its capabilities, will cost around \$7000 plus terminal and printer.

You could get away for quite a bit less by building parts of it yourself and skipping some of the more advanced bits, but that would be wasting the CPU 8085/88. It will certainly be a lot more powerful than most personal computers, but who needs all that power? I have a Godbout system myself in the office, but I'm writing this on a Kaypro which does almost as much as the Godbout at less than half the price. There are a lot of things it won't do that the Godbout will, but they won't matter to the average user. □

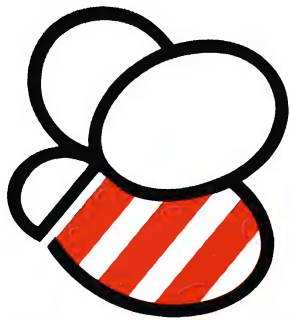
Continued on Page 93



**The name at
everyone's fingertips**



microbee®



microbee®

Microbee 16K PLUS

The Cost Effective Australian Personal Computer with more performance for the price. Includes all these features;

Microworld BASIC in ROM with room for additional firmware such as WORDBEE or EDASM. User area is 16K of battery backed CMOS RAM — Retains program after switching off. I/O is an 8 bit parallel port, RS232 serial port 300 and 1200 baud. Direct video output, cassette interface 300 and 1200 baud. Optional Z80 bus for future expansion. Screen is 16 lines of 64 characters upper and lower case with low resolution 128 x 48 and PCG high resolution 512 x 256 graphics. Built-in loud speaker plus music over 3 octaves.

Fully expandable to colour, 32K and 64K as your needs grow.

All for only **\$449**

The complete microbee 16K PLUS "Learner Bee" PAK

A complete personal computer system ready to plug in and start helping with school work and home work. Comprises; microbee 16K PLUS, microbee 'crisp green screen' monitor, Data cassette recorder, easy connecting leads, complete instruction manual, plus a big range of useful software including BASIC demonstration tape, Robot Man arcade games and a set of three education games tapes "Learning can be fun".

All this for only **\$699**

Applied Technology have a range of printers available as an optional extra, to easily expand your microbee to a word processor.

Microbee 32K PLUS

All the standard features of the microbee 16K PLUS with twice as much usable RAM. Has BASIC in ROM with room for additional ROM based software such as WORDBEE and EDASM. Has full 32K of CMOS battery supported user RAM as well as 4K screen and graphics RAM. Operates in 64 character x 16 lines format as well as high resolution 512 x 256 PCG graphics. A powerful machine equally useful in the classroom, home, or small office. Easily expandable to colour and 64K.

All for only **\$549**

Buy a complete microbee 32K PLUS Home Bee PAK

This complete personal computer PAK comes complete, ready to plug in and start anywhere in your home. Comprises microbee 32K PLUS, a microbee 'crisp green screen' monitor, data cassette recorder, easy connecting leads, complete instruction manual and a whole host of useful software including BASIC demonstration tape, Microspace Invaders, Maths Adventure, BUSY CALC and Data base.

*All this for a big saving
on separate prices* **\$799**



You won't find a better performance for the price.

Microbee 64K PLUS

The top of the microbee range with 56K user RAM, 4K screen/PCG RAM and 4K system ROM.

A freestanding, powerful personal computer or can be coupled with disk drives to give a top performance system capable of running any world class software under CP/M.

Built-in monitor program simplifies disk booting, memory examination and alteration, loading and saving to cassette tape and even emulates the popular ADM 3A terminal for remote communication through modems.

Has programmable 80 x 24 and 64 x 16 screen format and can be fitted with optional colour to probably produce the lowest cost CP/M colour computer on the Australian market.

*The mighty microbee
64K PLUS*

\$699

The mighty microbee 64K complete Personal Computer

Microbee's top of the range complete personal home computer PAK ready to plug in and go to work immediately. Just check the quality and performance of these components; microbee 64K PLUS, Twin half height microbee disk drives which operate under CP/M world standard system for 8 bit microprocessors, 390K formatted storage on each double-density double-sided drive, high resolution microbee 'crisp green screen' monitor to produce crisp graphics and text, a whole host of most useful software programmes including CP/M, BASIC, EDASM, WORDBEE, MICROSOFT BASIC and Microworld disk BASIC, plastic moulded connecting leads, easy-to-follow instruction manual all set to plug in and use your microbee PC at home.

*Microbee PC
DISK PAK*

\$1999





BUSY-CALC—Yes, an electronic spreadsheet running under microworld BASIC. Accepts text and numbers with easy cursor control. Commands include: Average; Sum; Compute Format; Recalculate; Load and Save. Ideal for cash flow projections, bill of materials and even classroom data. **\$14.95**

CEAT0331

your computer clinic

Continued from Page 88

On DEC

I WRITE on behalf of a friend who has recently acquired a DEC VT 103 to assist him in his work as a language translator.

As I understand it, he came by this machine at a bargain price, however the blood just drained out of his face when he priced a new floppy to suit so what we would like to know is whether or not it would be possible to use a second hand drive from another manufacturer.

ROD MCGREGOR
Eastwood, NSW

Wow - God only knows - I thought a VT-103 was a terminal, not a computer, in which case the DEC VT-180 is a matching single-board computer and disks

which mounts inside the VT-100 cabinet. That's the simplest option, although a Morrow Micro Decision (see last issue) might make a nice low-cost alternative.

Apple Source

I WONDER if you can help me with a question to which the answer I found hard to find being out in the sticks. It is in regard to communication with the Source.

I have an Apple II and a Vision 80 communication card. The Source manual says that for that machine (but not the card (unknown there?)) the 'BREAK' function is Control-P but that sure does not work for me nor anything else I tried except Reset which gets

you back even out of OTC.

Without this function it gets to be a bit expensive to sit through all the verbose repetition. Another more minor matter is that I also cannot use Control-Q and Control-S for stop and start scrolling as the latter demands a file name. I would be most grateful if you can help with this problem.

PETER STOUTJESDIJK
Hopetoun, VIC

Oh dear, we sold our Apples and no longer have this kind of problem. Control-P is indeed a DATA LINK ESCAPE (DLE) and the Source will respond to it, if you can send it.

The problem lies in the way the Vision-80 card arbitrarily uses control codes for its own com-

mands - you can perhaps solve the problem by having the card updated to the current set of ROMS, which have improved the control code situation. Otherwise, you might prefer to use a purpose-designed communications program such as Bill Blue's ASCII Express.

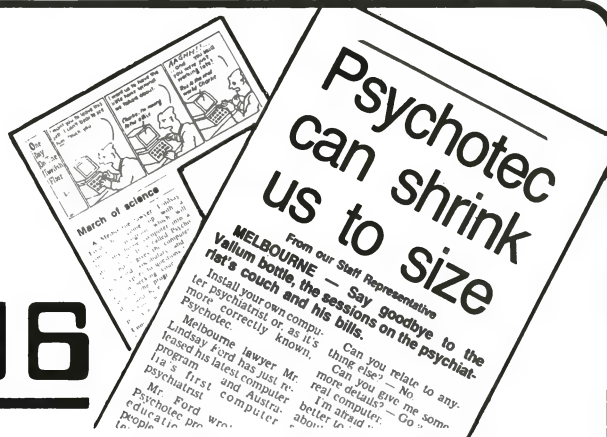
Kaypro Kwestions

As a recent purchaser of the Kaypro II computer, and with the understanding that *Your Computer* is currently evaluating it, I would appreciate consideration being given to the answering of the following queries either in the test review or separately:

A) Why does the screen fail to respond to the 'POKE' command?

**YOU READ ABOUT ME IN
THE PAPERS NOW
MEET ME IN PERSON (?!!!)**

PSYCHOTEC 16



I am the most amazing display of artificial intelligence available for the home computer! They call me 'the silicon psychiatrist' - just sit down at the keyboard and tell me your troubles. We can talk them out together (and nothing to claim from Medibank at the end!)

This 16K Basic programme is written specifically for the MicroBee computer, but comes as a detailed booklet with instructions for conversion for other machines. All routines are user-accessible and fully listed and explained, so you can modify to your heart's content!

Booklet \$20.00 : Cassette (Microbee Only) \$5.00 **extra**

Return to: DREAMCARDS
8 HIGHLAND CRT.,
ELTHAM NORTH 3095 VIC.

Please send me copies of
PSYCHOTEC and tapes. I enclose
my cheque/postal order for \$

NAME

ADDRESS

..... POSTCODE

Please charge Bankcard number:

Expiry Date / / 198..

Signed

your computer clinic

B) Is there a 'clear screen' and 'home cursor' command that I have been unable to find?

C) How does one best overcome the lack of graphics capability?

D) Ditto for the screen interference occurring on disk access.

E) Why does a 'COM' file take up to twice as much and more disk storage than the equivalent 'BAS' file?

F) Why has screen memory 4K address space for stated 2K memory and can the unused 10K or so on Bank 1 be made useful?

M G LYONS
Newcastle West, NSW

To answer your questions point by point:

A) The screen memory

is in a separate bank of memory, and must be switched into position before it can be poked. Furthermore, the code that does the poking must not overlap the screen, otherwise it will cause a crash.

B) The screen emulates a Lear-Siegler ADM-3a terminal, so to clear it and home the cursor, you should send a control-Z character (1AH, or CHR\$(26)). For further details, see BASIC for Birdwatchers, in the April 82 issue of Your Computer, and Jeff Richards' Kaypro column.

C) One doesn't write graphics software. The question most people are asking about their gee-whiz computers is 'How does one write programs to take advantage of the

graphics facilities?'. If you want graphics, use a plotter, which will give you high resolution, colour and hard copy.

D) This is simply a design flaw. It could be fixed with some hardware mods, but this is not recommended.

E) This is a hoary old chestnut! The source code for a BASIC program cannot be run directly on a computer; it needs either to be placed in memory along with an interpreter program, or to be compiled, to form a .COM file. The combination of BASIC interpreter plus source code generally occupies more space than a compiled program, and runs more slowly.

The compiled program has to include library

routines to perform such tasks as floating point arithmetic; some compilers/linkers are not very smart, and include these even when they are not being used. However a good compiler can produce very small .COM files indeed.

F) Probably the 4K memory allocated to the screen is shared with the CP/M BIOS code, which also lives in the same bank of memory (this is why the screen flashes during disk accesses). The BIOS will use it for its own purposes such as disk buffering, and you should meddle at your peril!

The remaining memory is not there: it's only room for future expansion or some such trick. ☐

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Continued from Page 18

```
10 FOR J=1 TO 10
20 PRINT J
30 NEXT J
40 END
100 '.....File Name : "MEMREAD"
110 '.....A program to read a BASIC program in memory by Dom Swinkels
120 '.....Change lines less than 100 to program to be examined
130 '.....then "RUN 100"
140 INPUT "ENTER FIRST MEMORY LOCATION TO BE READ";S
150 PRINT : INPUT "ENTER NUMBER OF LOCATIONS TO BE READ";N:PRINT
160 PRINT"LOCATION  CONTENTS"
170 PRINT"-----"
180 FOR L=S TO S+N
190 AS=HEX$(PEEK(L))
200 IF LEN(AS)<2 THEN AS="0"+AS
210 PRINT HEX$(L),AS
220 NEXT L
230 END
```

Table 4

IBM Prices Up

IBM Australia has revised prices on a number of imported products and some products and services with an imported content, following the devaluation of the Australian dollar. Among the prices changed are those of the Personal Computer products, some of which are increased and some decreased, following the introduction of the PC XT.

The basic 64 Kbyte system unit with a 160 Kbyte drive has come down to \$3066, while a 320 Kbyte drive system box is \$3429. The XT system unit will sell for \$7892. The XT Expansion Unit 1 sells at \$5325, while the Expansion Unit 2 is \$4261. A 10 Mbyte fixed disk will retail at \$2622, while the fixed disk adapter card sells at \$1066.

Although most other prices have gone up, we noted that the price of memory has dropped, as has the price of the disk drives. □

We Goof Again...

YOU PROBABLY spotted our deliberate mistakes in the October issue of Your Computer, in Dom Swinkels' article on Basic Tokens in *Your Peach Computer*.

Hopefully these corrections will sort everything out:

Microsoft Basic

Thus the word RANDOMIZE is replaced by the hexadecimal number BD (decimal number 189). This takes up only one byte of memory; while the word RANDOMIZE would take up 9 bytes.

DIV/MOD

The ASCII code for the

Yen symbol on the Peach is 92 but my printer (EPSON MX-80) prints a backslash for this code.

Basic in Memory

Table 4 gives the program, which will list the contents of memory in the form given in Table 3 (without the explanation of course). □

DMS Data Base

THE DMS - Data Management System - from Compsort in England has been released in Australia.

With more than 4000 installations in Britain, DMS has received wide acclaim. DMS is, according to its distributor, a program that can be used by the computer novice as well as the professional as it works entirely in everyday English. Documentation comes complete with a tutorial section.

Local distributor Australian Integrated Business Services (AIBS), provides application guides which show how to set up installations such as property management, student records, library records, customer mailing lists, hospital records, job costing and stock control.

Other features available are: a built-in letter writer; label option; advanced calculation processing within records; comprehensive reporting options; links to other files or to WordStar, and user-defined screen formats for ease of input.

DMS is available on most CP/M based machines and the latest 16-bit machines such as the Sirius operating under MS DOS.

For further information,

contact AIBS at PO Box 473, Springwood, Qld 4127 or phone (07) 208 1925. □

VIC-20 Special Offers

IMAGINEERING has launched a new range of entertainment and educational VIC-20 software programs, from Creative Software and UMI Industries.

The Creative range consists of five cartridges: Apple Panic, Choplifter, Serpentine, Astroblitz, and Trashman. The UMI product range consists of eight cartridges and 16 cassettes, retailing from \$15.95.

Also available for the VIC-20 is an inexpensive expansion chassis. A four-slot expansion unit with fuse is retailing for \$59.95 (plus tax), it allows additional cartridges to be run alongside the 16K RAM carriage.

In addition, Imagineering is carrying a comprehensive range of application software and add-on peripherals for the IBM-PC. Consumers can now obtain free IBM-PC VisiCalc, providing they purchase any two other lines from the IBM-PC VisiCorp family. □

Accounting Package

INTELLIGENT Terminals, of Melbourne, has released Davidson Business Software, a suite of book-keeping/accounting packages.

Designed around an advanced file management technique that is said to give increased data storage and faster response times, Davidson Business Software packages give up-to-the-minute cash-flow details, prompt billing, audit standard accounting and the capability for meaningful management reporting.

For further information, contact Intelligent Terminals Pty Ltd at 6/83 Glen Eira Road, Ripponlea, 3183, or phone (03) 523 6311. □

Austpac Link-Up

BURROUGHS has launched several X.25 prod-

ucts to allow its equipment users to communicate with other systems through the Austpac public data network.

The X.25 software is now available for the B20 micro-computer, B900 small business computer, the CP9500 communications processor and the B5900, B6900 and B7900 large systems computers.

The company's X.25 hardware interface for the Burroughs terminal range is in the final stages of development and will be available shortly for testing on Austpac.

Austpac can carry up to 48,000 bit per second, compared with up to 4800 by a dial-up line, and allows the user to hold more than one 'phone conversation' at the same time.

For further information, contact Barry McCrea on (02) 922 6466. □

Small-Business System

DATAPoint Corporation Australia has introduced the 1560 Small Business computer System, aimed at bringing local computer networking to the small businessman.

The 1560 is an entry-level system, built to expand from a stand-alone system to multiple, inter-connected processors on a local network. The 1560 supports Datapoint's ARCNET local networking system, a token-passing network introduced by Datapoint in 1977, in which up to 225 processors or processor-based peripherals can share the same disk files, printers and other resources. The 1560 will also offer CP/M within an ARCNET networking environment.

Other software packages and options offered with the 1560 provide word processing, electronic mail and mainframe communications interfacing capabilities beyond the range of most small business systems. □

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MicroBee 16K: Plus B/W monitor plus cassette recorder. All brand new. \$400. Phone (052) 31 1150.

MicroBee 32K: New ease, factory assembles model, 4 months old. With green monitor and tape. Approved by NSW Education Dept. \$640 or will separate. Phone 827 2327.

Apple II: + RAMcard - 64K, two disk drives, PAL Colour, 80 column card, serial interface, monitor and lots of software (VisiCalc, Zardax, Games, Pascal, etc.). \$2950. Phone Graham (03) 697 5027 (b/h), (03) 419 1630 (a/h).

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ZX81: My exchange system means quality software for a few dollars. SSAE to Peter McKay, R.S.D. Swan Hill, Vic 3585.

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Secretary For Sale: Offers welcome. 10 cents on Answers to the name of Dummy. Write to Office Services, YC.

Exidy Sorcerer: 32K, c/w B4W monitor and cassette recorder, EC. \$1060 o.n.o. Phone Paul Nichols (03) 88 5034.

Commodore 8000 Series: MINIWORD; Basic Word Processor program. 22 text line are displayed with reference numbers. MOVE, COPY, INSERT and DELETE line/s. F/R paging, F/R single line or scroll. Full cursor controls for line editing, no need to retype the entire line. Quotes may be used freely. Versatile disk file handling including the ability to create disk files which are larger than main memory. files may be printed from disk without disturbing the file in memory. All commands are single key including comprehensive printer formatting such as Font selection, Margin, Page numbering, Density, Line pitch etc. Printer may be formatted for direct disk print. Printer commands may be imbedded in the text. MINIWORD was written for ASCII printers, (ITOH 8510/1550) but a commodore Printer version will soon be available. A version for use with tape drive in lieu of disk is also available. MINIWORD is supplied on disk \$49.95 or tape \$44.95 with complete operating instructions, Orders to R Walsh, 7 St Georges Crescent, Drummoyne, 2047 or SAE for more details. Nominate Computer/Disk models, version and media required.

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MicroBee: "Logic Dice" program. A game of strategy played against the computer. Listing \$5. With tape \$8. W J Bock, 14 Tudor St, Belmore, 2192.

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Sorcerer Users Group: Meets on the third Friday of each month at the Greenwich Community Hall, Greenwich Road, Greenwich, Sydney at 8.00 pm. For other inquiries write to - SUG, Box E162, St James, NSW 2000.

Adventures: Numbers 2, 3 & 4 for Sorcerer. Original tapes, all 3 for \$15, call Steve Pullan (02) 922 8480 (b/h), or (02) 449 9778.

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MicroBee Software: Send a 27c stamp for free catalogue to Tim Buchalka, 1 Arbor St, Mt Gambier, SA 5290.

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For Sale: TRS80 cabinet model complete with video display, disk drive and Anadex 80 column bi-directional printer (dot matrix). Price complete and in good order. \$2200. Phone Bruce Wall (058) 216902.

OSWEST: The Osborne Users Group of Western Australia has elected Mr Ron Nainby as Hon President at their inaugural meeting which was held on Wednesday February 16th. Further details can be obtained by phoning OSWEST on (09) 330 3439.

TRS80: Model 1 program exchange. Send four on cassette with \$2.00 p&p and receive four new. G Egel, 18 Sturt St, Loxton, 5333.

The Colour Computer Club: meets every Friday fortnight in Geelong. Any further inquiries needed can be obtained by phoning Andrew Gay on (052) 78 3424 (a/h).

For Sale: Software "Microfiles" and "Profile" in original condition for TRS80 Model 1/111. \$60 each or \$100 for the two. Phone (02) 981 4762. □

Logic For Literati, Part III

Having NOT yet covered NAND, OR AND NOR, Les Bell continues his series on logic with those functions...

LAST INSTALMENT, we covered the NOT, or negation, function. NOT occurs a lot in circuitry, for a number of reasons which will be revealed as we proceed. One thing I didn't mention is the way the NOT function is represented when it is written.

If we have a signal called A, the negation of A is written as A with a bar over it. From experience, I can tell you that since most typesetters don't have an over-bar symbol and it therefore usually has to be drawn in by hand, a lot of mistakes occur in printed descriptions of logic circuits. For this reason, a new convention has recently been adopted, that of indicating the inverse of a signal by an asterisk (*) after the name, so that NOT A (as it is said) would be written A*, and may be pronounced "A star".

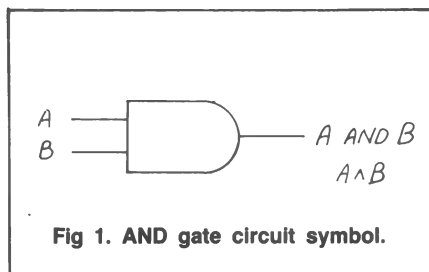
Actually, in much the same way as we strive to give program variables sensible names, so a signal line would (hopefully) never be called A. Instead, a look at a logic circuit will reveal such names as MEMREAD, CYCLE1*, or OUT-PORT*.

The next thing we shall look at is the AND function. We use the word 'and' a lot in ordinary speech, to tie related ideas together. The logical use of 'and' occurs when we say 'If such-and-such happens **and** so-and-so happens, **then** I'll do this-or-that.' For example, "If my house catches fire and is flooded the following day, then I'll give up." What the speaker is saying is that if his houses catches fire, he can cope with that; if his house is flooded, he can cope with that; but if they both happen together, he's had it.

In formal logic, AND works the same way. It's related to what philosophers call a syllogism. Take these statements: "Paris is in France." "I am in Paris." The logical deduction is "I am in France." Another way of saying this is "If Paris is in France and I am in Paris, then I am in France." (*And today must be*

Tuesday? – Ed).

The electronic AND gate is a circuit with two inputs and one output – plus the power supply pins on the chip, of course. Its circuit symbol is this:



Imagine that we have an electronic circuit that mysteriously provides two signals: one goes high when we are in Paris, and the other one goes high whenever Paris is in France – which it has been for as long as I can remember. How can we tell when we are in France?

The answer is to feed the two signals into an AND gate and look at the output - it should go high whenever both of its inputs are high.

The usual way of representing the operation of a circuit such as this is with a truth table. The truth table for the AND gate looks like this:

A	B	A ^ B
0	0	0
0	1	0
1	0	0
1	1	1

truth table 1

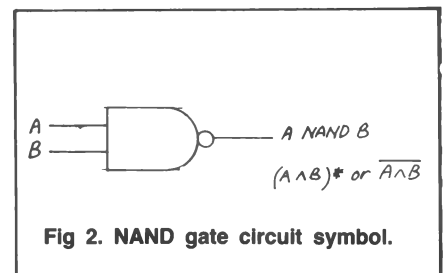
The output of the AND gate only goes high when both its inputs (both A and B) are high.

The AND gate has a close relative, the NAND gate. It works much the same way as the AND gate, except there is a NOR gate attached to its output so that its output is the opposite of the AND gate if both are fed the same signals.

For reasons that are related to the internal circuitry of logic gates, it is simpler

to make a NAND gate than an AND gate, and consequently a bit cheaper. It also happens that any logic circuit can be made out of just NAND and NOR (which we'll come to) gates, and that the AND and OR gates aren't really needed at all.

Here's the circuit symbol of the NAND gate. Notice the blob on the output, which is the representation of an inverter or NOT function:



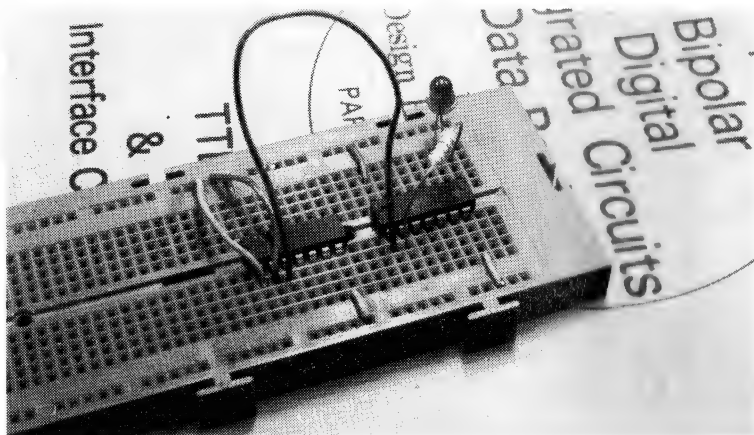
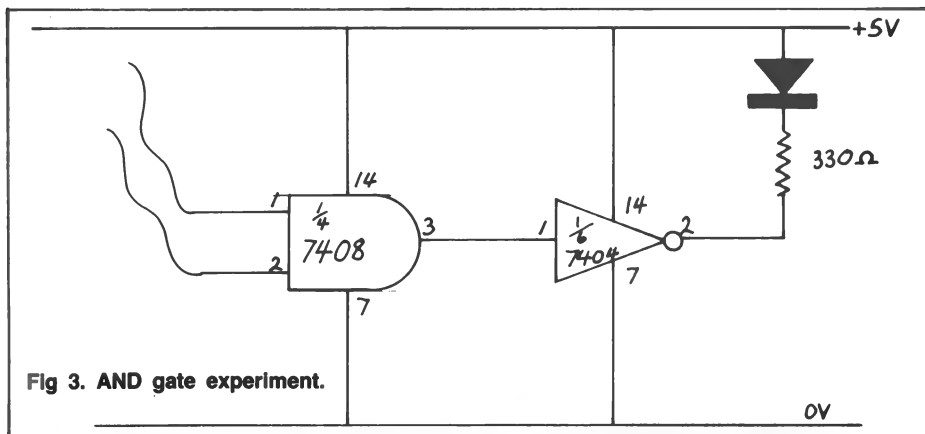
We can easily work out its truth table, as it will be the same as the AND gate, only negated. Notice that we write NOT (A AND B) as (A ^ B)*, and not as A ^ B*, which would be A ANDed with NOT B. The parentheses work the same way as they do in arithmetic.

A	B	A ^ B	(A ^ B) *
0	0	0	1
0	1	0	1
1	0	0	1
1	1	1	0

truth table 2

At this stage, you might like to wire up a couple of these circuits, using the breadboard. The 7408 integrated circuit contains four AND gates – you'll only need one for this experiment. Incidentally, since AND gates aren't really necessary in circuit design, you might find it hard to get hold of a 7408 – in which case don't worry, it isn't really necessary to do this experiment.

Wire up the circuit shown in Figure 3 (the photograph might be a help). The two inputs to the AND gate (pins 1 and 2) should have free-floating wires attached.



When the circuit is switched on with those inputs not connected to anything, the LED will light up. The reason for this is that open-circuit (disconnected) inputs to a TTL gate will pull themselves high. Therefore, both inputs are a 1, the output goes high, and the inverter makes the LED turn on as described last month.

Now, use flying leads to connect the inputs to the 0 V and 5 V supply lines, which are logic signals of 0 and 1 respectively. What happens to the LED? Make up a chart of your results – how does it compare with the AND truth table?

The 7400 NAND gate has exactly the same pinout as the 7408 and, to repeat the experiment with that chip, you'll use the same circuit. So switch off the power, then pry the 7408 out of the prototype board and replace it with a 7400 in exactly the same position. You should have the same circuit, but with a NAND gate in place of the AND gate – check the connections to make sure.

Now, repeat the experiment. This time, on power up, the LED will be off. Connect the NAND gate inputs to the supply lines various ways. What happens? Make a table of results and compare it to the AND gate results. How is it different?

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DEALER ENQUIRIES WELCOME

OR and NOR

By this time, you should have a good idea how the OR and NOR gates will function. So, since the 7432 OR gate and 7402 NOR gate have the same pinout as the chips we've been using, you can replace the 7400 with those chips and repeat the experiment again.

This time, chart your results and work out the truth table for the OR and NOR functions, then compare them with those that follow.

As you might expect, the output of the OR gate is high if one or other of the inputs (or both) is high. The NOR gate is, of course, an OR gate with the output inverted, so its output will do the opposite. That is, the NOR gate output is low if one or other input (or both) is high, and only goes high when they are both low.

Here is the truth table for the OR function:

A	B	A v B
0	0	0
0	1	1
1	0	1
1	1	1

truth table 3

And here is the truth table of the NOR function:

A	B	A v B	(A v B) *
0	0	0	1
0	1	1	0
1	0	1	0
1	1	1	0

truth table 4

The symbol for the OR function is v; contrast this with the symbol used for AND. You will sometimes – often, in fact – see AND represented by a dot (.) or implied, like implied multiplication (AB instead of A.B), while OR is represented as +.

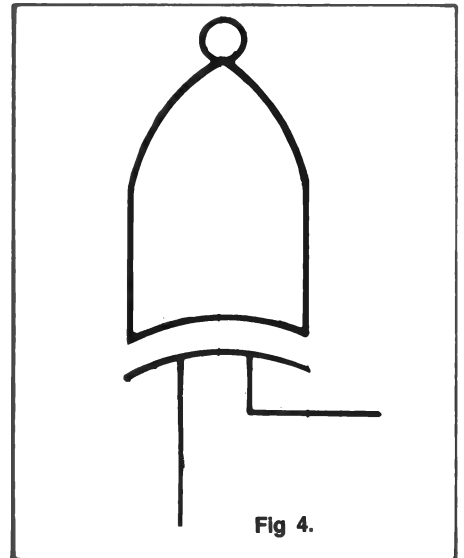
The final basic logic function is called Exclusive-OR (XOR), and works rather like the OR function, except that it goes low when both inputs are high. In other words, its rule is: the output goes high when either A or B is high, but not both. Another way of looking at it is as a comparator: the output goes high when the inputs are different, and low when they are the same. Here's the truth table:

A	B	A + B
0	0	0
0	1	1
1	0	1
1	1	0

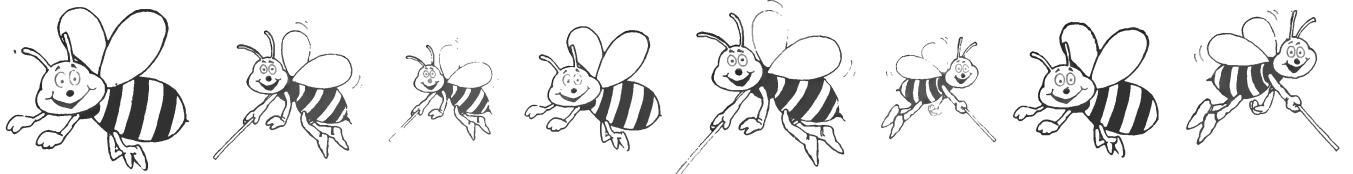
truth table 5

The symbol for the Exclusive-OR gate is shown in Figure 4. The 7486 contains four XOR circuits, and its pinout is shown here also (it's the same as the other basic logic chips). If you've got one, you may like to repeat the experiments done above on that chip, compiling a table of results and comparing it to the truth table.

Next month, we'll start combining the various gates to form logic elements such as flip-flops. ☐



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your CP/M computer

- **By Bill Bolton**

I TOLD Matt Whelan he could have my CP/M column *or* have the Mi Computer Club bulletin board running by April, but not both. Being a typical managing editor he said he wanted both...argh!

Well, there is no way I can give you a full, wordy column this month so I thought that, as I've had a lot of queries about 8086 assembler lately, I would show you one of the utility programs I knocked out recently for CP/M-86.

Most of the recent CP/M-86 implementations have a "self-sizing" feature which sizes the CP/M-86 to the amount of contiguous memory available in the system at cold boot time. This means that you can easily just add more memory and have CP/M-86 start to use it without any software modifications.

There remains just one problem — how do you make sure the memory actually got there (that is, there isn't a hardware problem). Also, if running in an MP/M-86 or MP/M 8-16 system, how much memory will the MP/M kernel allocate to a user?

The answer is this MEMSIZ program, which interrogates the BDOS using function call 53 – GET MAX MEMORY - and reports the result in the form of a base address and length of available memory. The program requests the physical maximum available memory that an 8086 can address so that whatever is returned will be the maximum

that the BDOS is prepared to say is available.

The results are reported in “paragraphs”. A paragraph is 100H bytes long so that 0FFFFH paragraphs is equal to 0FFFFFFH bytes (1 Megabyte). The program has only modest stack requirements so the 96 byte stack available in the CCP is used rather than going to the overhead of setting up an

internal stack.

The program is constructed using the Intel "small" memory model.

PAMS News

The software Tools RCPM is now running on a new hardware configuration thanks to Automation Statham, G.E.D. and *Your Computer*.

```

;*****
;*
;*      Memory Sizing Program for CP/M-86
;*
;*
;*****
;
;
;      By      Bill Bolton
;
;      NEC Information Systems Australia
;      99 Nicholson St.,
;      St Leonards,
;      NSW, 2065
;      Australia
;
;      VERSION LIST, most recent version first
;
;      01/Mar/83 Refined Hex display code, added version number equate,
;      added code to subtract length of this program. Version
;      1.1 [BB]
;
;      28/Feb/83 Initial version 1.0 created [BB]
;
LF      EQU      0AH                      ;ASCII line feed
CR      EQU      0DH                      ;ASCII carriage return
VER      EQU      11                      ;Current version number
;
CONOUT   EQU      2H                      ;BDOS display character function
STRING   EQU      9H                      ;BDOS display string function
MAXMEM    EQU      35H                    ;BDOS get maximum memory function
;
CSEG                                ;Small memory model
;
START:                                ;Use CCP stack as program is small
      MOV     DX,Offset SIGNON           ;Tell them who we are
      CALL    PRINT
      MOV     CL,MAXMEM                  ;Query BDOS for available memory
      MOV     DX,Offset MCB              ;Memory Control Block to hold result
      INT     22A
      MOV     DX,Offset BASEMSG          ;Display the base address message
      CALL    PRINT
      MOV     DX,MCB                    ;Display base address
      CALL    DHEXOUT
      CALL    CRLF                       ;New line for next message
      MOV     DX,Offset PARAMSG         ;Display the paragraph length message
      CALL    PRINT
      MOV     DX,MCB+2                  ;Get paragraph length
                                      ;The next line gets the assembler to work
                                      ;out how long this program is at assemble
                                      ;time. The instruction then subtracts
                                      ;that length from the BDOS return value.
      SUB     DX,(((Offset CEND - Offset START)+(Offset DEND - Offset DSTART))/100H)+1
                                      ;↑ Subtract the length of this program
      CALL    DHEXOUT                   ;Display paragraph length
      CALL    CRLF                     ;Another new line for formatting
      MOV     CX,0                     ;Return to CP/M-86
      MOV     DX,0
      INT     22A
;
;      SYSTEM SUBROUTINES

```

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```

;
; PRINT STRING FROM DX REG
PRINT: MOV     CL,STRING
      INT     224
      RET

;
; CONVERT A BINARY VALUE IN DX TO FOUR DISPLAYED ASCII CHARACTERS
; Destroys contents of DX
;
DHEXOUT:
      PUSH    AX                ;Save
      PUSH    BX                ; the
      PUSH    CX                ; environment
      MOV     BX,4              ;Number of hex digits

HLOOP: MOV     CL,4              ;A count of 4 for each
      ROL     DX,CL              ; to shift left
      MOV     AX,DX
      CALL    HEXASC             ;Display as ASCII character
      DEC     BX                ;Adjust loop counter for next digit
      JNZ     HLOOP             ;Done?
      POP     CX                ;Yes, Restore
      POP     BX                ; the
      POP     AX                ; environment
      RET

HEXASC: AND     AL,0FH           ;Mask off high nibble
      DAA                     ;Add 6 if 'A' to 'F'
      ADD     AL,0F0H           ;Bump out a carry if 'A' to 'F'
      ADC     AL,040H           ;Now its ASCII
      CALL    DISPLAY           ;Show it!
      RET

;
; DISPLAY A CHAR FROM AL
;
DISPLAY:
      PUSH    CX
      PUSH    DX
      PUSH    BX
      MOV     CL,CONOUT
      MOV     DL,AL
      INT     224
      POP     BX
      POP     DX
      POP     CX
      RET

;
; Display a newline
;
CRLF: MOV     AL,CR
      CALL    DISPLAY
      MOV     AL,LF
      CALL    DISPLAY
      RET

;
; CFEND EQU $ ;End of code segment marker
;
; DSEG EQU $ ;Start of data segment marker
;
; ORG 100H
;
MCB DW 0
DW 0FFFFH ;Request maximum size block of memory
DW 0

;
SIGNON DB 'CP/M-86 Remaining available memory sizing utility.',CR,LF
DB 'Version ',VER/10 + '0','.',VER MOD 10 + '0',' ',By Bill Bolton'
DB ', NECIS Australia.',CR,LF,LF,'$'

;
BASEMSG DB 'Base paragraph address = $'
;
PARAMSG DB 'Memory length from base, in paragraphs = $'
;
DEND EQU $ ;End of data segment marker
;
END

```

The IMSAI has gone into graceful retirement and been replaced by a North Star card cage (handed down from my main system) stuffed with Godbout/Compupro cards and a separate terminal. The drives are now all boxed up together and the long awaited D: drive is now on-line. For those who were having problems with the FLIP function that has been fixed too!

By the time you see this the MiCC bulletin board should be running again on a new computer and number. Existing users will need to get a new ID to access the system, those who use the Software Tools RCPM system can read the message in MINIRBBS and get issued with their new ID through the RCPM system. "Interface" should contain details of obtaining a new ID for those who don't use the RCPM system.

Paris Radio Electronics has a system on-line with details of 6809 hardware and software available from them. The service is only available after hours (1830 to 0900 hours I think, plus weekends) and uses the same data format as the existing services (8 data, 1 stop, no parity, 300 bps, originate). The login is "INFOCENTRE".

The Gippsland RCPM is having auto answer modem problems and is not yet on-line. The SYSOP, Bob Sherlock, is working on sorting out those problems and hopes to have the system running soon. Bob also supplied the CP/MUG volumes I mentioned last month, thanks!

A Melbourne RCPM is also being put together, the hardware is being collected and the software adapted to it. The timetable for it coming on-line is not certain yet but the SYSOP tells me that it should be going within the next few months.

Many users of the Software Tools RCPM and the MICOM CBBS have commented that the free services are much more useful to them than the commercial timeshare services. The operators of some of the commercial timeshare services don't like to see free services running as they see them as unfair competition - how ridiculous! A commercial service should be able to provide a much higher standard of service simply because it has an income to finance its operations.

If the timeshare operators are seeing the free services as real competition then it can only reflect on the level of service being offered...

Next month I'll return to the news from the CP/M '83 trip. ☐

your TRS80 computer

By Rod Stevenson

SINCE my appeal to be told of any Amateur Radio skeds set up on a permanent basis, I'm pleased to advise that there is one currently in action between the members of the Adelaide Users Group and their most distant member, Graham 5W1DQ in Western Samoa, at 0030UTC on 28.490 Sundays.

While this particular frequency may not be a good choice for a general computing net, it is a regular contact that has been going on for some months. And I'm sure any other interested participants will be welcomed.

So, with the lead of the Adelaide Group, are there any more to follow?

Sunday Mornings

No, this heading is not about what you thought!

I've found to my dismay that Sunday mornings seem a good time for one of my neighbours to do his welding, with the expected result to me (despite my power-filter block) — I lose things!

Since I do customarily follow my own advice (in this matter at least) and keep making regular backups while "creating", or even while writing this, I tend not to suffer the disaster that I might. But, particularly when I'm processing words, I tend to feel that those words I've just lost have been the best ever written; thus I tend to have uncharitable thoughts toward such events.

So I therefore pass on a hint that may save you some hair-tearing and breast-beating. That is, immediately you notice something astray, save what you have. It may be that you have garbage; but it may be that you have something worth saving! At least it's worth a try. For when the moment of stress passes you will be able to re-claim it from tape or disk: perhaps not as a normally read file, but in some form is better than nothing. And that goes all the more if you've not been in the habit of making regular backups!

As to how to re-load what you've saved? I won't go in to the procedures with disk, since the likelihood of having something at all is rather more remote since whatever upset things will probably have re-booted your disk. But with tape there is a good chance (depending on what happened of course) that you'll have a data file on tape even if without some of its normal formatting. So all that's necessary is to load it into memory with a monitor or TRCOPY and print it out on paper, or at the worst read it from the screen to refresh the memory and perhaps make notes.

Beginners

Really I aim this column at the above level. And this is the reason why I repeat things in different ways from time to time, for I believe that finding the same thing said differently may let it through. And there is also the chance that there may be a reader who has not read all I've written in back issues! So, having qualified myself...

With the departure from the new market of the Model 1, I'm distressed to find potential recruits to our Hobby are now in a dither as to which micro to buy: I seem to get more than my fair share of requests for help in their decision-making process. And just look at the letters pages of this magazine to see what I mean.

In the idea that my readership may encompass some of this category, I offer here the same advice I've offered to those who ask me face-to-face (or ear-to-ear by phone). The major point is to decide what you want to do with it. Yes I know you want it for a hobby (as we all do), but there needs to be a more detailed analysis of the situation than this.

To pose just a few: Do you want it as a sophisticated game? Colour Computer... Do you want it to modify in hardware? System 80... Do you want it as a word processor? Model 3... Can the family really do without their television while you use it as a monitor? This sort of analysis will avoid some of what seems to be a large number of cases of disappointment to which I've been privy lately.

Or are you in the group that believes that the best way is to buy cheaply at first to get a feel for what's available, then with a real knowledge to splash out? I do accept that there's something to be said for this way of thinking.

Not to be overlooked is the "pre-loved" market. I've witnessed some positively remarkable and fortunate buys here. The medium is the morning paper, to be read first thing because the bargains are so great they're gone by 8am!

The same thinking applies to printers too. Please don't just buy the cheapest available. Assess whether it will do the job you want a printer to do. The cheap price is of momentary advantage, but is really an extravagance if the printer can't be used for what you bought it to do. A \$50 Teletype from Telecom may not be a good buy if, after you've got the interface to make it work and the soft-

ware to drive it, you find it hasn't the characters you need.

Tandy CP/M

Yes, I know Bill has his own column, and not being a CP/Mer I'm certainly not wishing to intrude. I merely want to pass on the point that seems too often bandied about among us TRS aficionados: that our own specific and dedicated DOS systems are always and necessarily better than CP/M.

Not so. What is so is that it seems, when one is used to one of our DOS systems, one needs to spend an amount of time honestly assessing before throwing out the window.

Just a simple point, but one I've picked up from a number of what I'd consider to be learned sources. And it matters not whether it's the high ORG version or with a hardware mod.

Utilities

This is such a fruitful area for investigation that I'd advocate purchasing *80-Micro* just to look at the adverts to see what's available in America to do the job you were dreading. And if there is such advertised, simply write direct. It's not as hard as you think!

Your local bank will provide a Bank Cheque in American dollars to put in a letter just as you would a local mail-order. Merely being at our distance makes no difference I can assure you. It may be necessary to pay a few dollars extra for airmail.

I've yet to find anyone who has had unsatisfactory dealings with any of the "normal" companies advertising from the US; it may be different from the classified ads. It's a sad point that I cannot report the same feeling of goodwill about Australian suppliers in our field.

Another source of information as to whether there is a utility already available to do the job you want is your own local Users Group. So yet again I point out the value of belonging to such organisations...

Word Processing

Having mentioned in passing such things, I feel I must pass on that I use "Scripsit". I find it to be entirely adequate on my tape system and have absolutely no hesitation in recommending it to all comers.

Like most software it does have shortcomings: in the local (Adelaide) Users Group we have our own "home-grown

expert" to modify it all we want.

If you've not used a word processor than I strongly suggest you get hold of one, even if only for the fun of it. And, of course, to know what we're all taking about!

Since what I like about computing is the logic of programming, I'm in my element with the somewhat inadequate instruction manual provided with Scripsit.

The program will do all sorts of things, it's just that the manual doesn't tell you that it will, let alone how to! For example, try putting a page number in the page header right justified with no extra feeds...

Disable Break-Key

As well as the "playful" reasons for wanting to do so, there are "genuine" reasons. Such as simply protecting against accidental presses by making it into a shifted break-key. And if you are writing for a non-computerist's use there should be no reason why the break-key will be needed.

Of course there are the routines aimed at protecting against all manner of things as well as the break-key (they prevent things like listing, saving, and so on), but I refer here specifically to guarding against accidental touch.

All these are for Level 2: the various DOS systems often have their own (probably superior) ways.

POKE 16396,23 will disable, POKE 16396,201 will re-enable.

POKE 16396,241 will return the value of 4 if break is pressed while executing an INKEY loop.

POKE 16396,195 will perform the reset function when break is pressed.

POKE 16396,165 will disable break, but not shift break.

POKE 16396,195 followed by LSB/MSB will make break key initiate a jump to the address specified in the LSB/MSB.

The above is not intended to be a complete tutorial for beginners. What should be apparent is that the address of the break key is 16396. Having found such address the possibilities are innumerable; but the above I consider to be of real practical value.

And talking of having found addresses... the same thinking applies to other interesting areas. For example, knowing that the address of the screen driver is 16413 allows such things as disabling the screen by POKE 16413,0. Or, if we have the keyboard driver address we can disable it by POKE 16405,0, or in-

tercept the normal keyboard scan to make it do our bidding by putting a new scan routine LSB/MSB at 16406-7.

Since I've doubtless whet your appetite, why not follow my recommendation in my column in the September issue where I reviewed the "Assembly Language Toolkit"?

Disk To Tape

This seems a major point of difficulty for most newcomers: to convert a machine language program that has been running on disk to their tape system's requirements. A brief word as to why it seems needlessly difficult.

Many programs start off their life as Level 2 programs, and as such, start from the bottom of Level 2 memory (in fact 4300H, which is not quite bottom). But Disk Operating Systems use this area for their own ends, so it's clear that they both can't share space and both operate satisfactorily. Therefore what is necessary is to move the machine code into a suitable place higher in memory, merely as a temporary storage area.

When this program is to be run of course it will have to go back down to the memory area it was intended to run from, and was possibly written so it will run from nowhere else. This is where the Block Move capability of the Z80 is used, for it will do just that, simply and with no confusion. True, it may be done by any number of utilities (such as LMOFFSET in NEWDOS), but it is still doing exactly the same as if done by hand.

The actual mechanics are to put into register pair HL the address of the start of the memory block to be transferred, into BC is put the number of bytes to be moved, into DE is put the address to where the block is to be moved. Having done this the Block Move function is invoked by LDIR and all is done, ready to jump into the new entry address of the freshly moved program.

The reason for doing anything at all with the program once having got it from disk to tape is that usually a tape system is 16K (although this is now not as usual with the many in-keyboard memory units abounding) and a program that has been moved for disk will certainly not fit into 16K! So the obvious thing is to use a machine with the necessary memory so that you can run it on yours. And don't make the assumption that a "diskie" will know what to do! For I've found to my surprise that most are not any more knowledgeable than us "non-diskies".

Continued from Page 86

the words in each to stretch the line so that it matches the others; or spaces are added between the letters to give the same result.

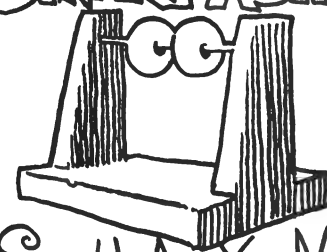
If you are buying a word processor, you should try out as many as you can and for as long as you can. Computer clubs and user groups can help here, as can the dealer at your local computer shop. I would be very suspicious of any word processor I couldn't try, even though several excellent models seem to be obtainable only by mail.

The user's manual for any software will often give an indication of the quality of the product. One fairly reasonable guide to what the authors of a word processor think of their produce is to see if they printed their manual using it.

A good user's manual will introduce the product and give an overview of the purpose of it. It will describe, in detail, the working and use of each command. It should include a tutorial if the product is complex (I believe the best word processors for writers, as distinct from business users, are those that are exceedingly simple to use). There should be a quick reference table for an experienced user to change the software to suit their system.

It is preferable if the package contains software to assist with this. It would also be very nice if it included an annotated source listing, though it seems rare, and I would decline to buy any package that did not allow easy backup of the original — tapes and disks do get destroyed by accident; if the maker is 15,000 km away, it can take a long time to get a replacement.

Finally, any manual should contain a decent index, or at least a contents page that is sufficiently detailed to let you find whichever selection you need. □

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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.

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your KAYPRO computer

By Jeff Richards

PERFECT WRITER is a powerful and comprehensive word processor, and ideally complements the facilities of the Kaypro. However, although the operation on Perfect Writer is well set-out in the manual, the procedure involved in creating a set of working disks is not so clearly explained.

The most obvious feature of Perfect Writer is the number of program files it uses. There are six – a data file, a help file, a dictionary file, a suffix and prefix file and a swap file – and in order to manage them, Perfect Writer has a pre-determined method of searching. First, it looks on the “default” disk and then, if the file is not found there, it looks at the disk in drive A. The apparent impact of this search technique is that most files should be on drive B, with only the overflow on drive A, and this is what the manual implies. In fact, it is not the simplest solution.

The best solution is to put as many files as will fit on drive A, but to invoke Perfect Writer from drive B. Thus, drive B is the “default” drive, but any required system files not found there will be searched for, and found, on drive A. It is possible to fit all of Perfect Writer's files, except the swap file, on drive A, together with the necessary CP/M utilities. Drive B will, therefore, consist of the swap file and all the text files. A major bonus from this arrangement is that you never have to type the drive prefix for a data file name – all data files live on drive B.

The list of files that should be on drive A is given in Table 1. With this arrangement, the only file needed on drive B is PW.SWP. Although the manual implies this is simply a section of the disk on which Perfect Writer will dump certain portions of memory, it must in fact be correctly set-up or the system will error at start-up.

The easier way to set it up is to copy it from an existing PW.SWP file. It may be worthwhile to keep a special disk that has only PIP.COM and PW.SWP on it, in order to create new data disks. alternatively, you could create a new data disk by copying an existing one and deleting all the data files.

Once you have set up drive A according to Table 1 and drive B with PW.SWP, the commands to invoke Perfect Writer are simple. Just type B: to make drive B the “default” drive, then A:MENU to invoke Perfect Writer. But there is an even simpler way. Make the

first file you create with Perfect Writer a file called MENU.SUB with just two lines in it:

```
B:
A:MENU
```

Don't forget the Return after the second line. Move this file to drive A (there is just room for it). Now, to start Perfect Writer all you need type is SUBMIT MENU at the prompt.

With one extra step, we can make life easier still. Do a rename of SUBMIT.COM to, say, RUN.COM. The command to do this is: REN RUN.COM=SUBMIT.COM.

Then, to start Perfect Writer, you will simply type RUN MENU at the prompt.

There is no need to use the PWCONFIG program to get started with Perfect Writer, as all this work has already been done. The only need for PWCONFIG will be if you want to advise Perfect Writer of some extra features that are available on the particular printer you have attached to the Kaypro – features such as underlining, backspacing, boldface and so on. But even if your printer has these features, it will still work perfectly well if it is treated as a “plain vanilla” style printer.

The reason that Perfect Writer does not need to be specifically informed about your printer is simply that it makes one heroic assumption: that your printer is the CP/M LST device. So although you don't have to tell Perfect Writer about your printer, you may have to tell CP/M something about it. That is, although Perfect Writer assumes it will use a very simple printer attached as the CP/M LST device, you will still have to tell CP/M to which output port your printer is attached.

Software for the Kaypro comes set up for a printer attached to the parallel (Centronics) port. This is the port that CP/M refers to as the LPT device, and you have no worries if your printer is attached to this port. However, if your printer is attached to the serial port – which CP/M refers to as TTY – then you have one or possibly two steps to carry out.

First, it will be necessary to alter the operating system to permanently attach the CP/M logical device LST (the device to which Perfect Writer will send its data) to the physical device TTY (which is the term that CP/M uses for the serial port). This procedure is done through the CONFIG program, option 1 – I/O Byte cold boot defaults.

Using CONFIG will force the operating system to send printed output to the serial port whenever it has been started from the disk set up by CONFIG. Also, any disk that is SYSGENed from a disk that has been altered by CONFIG will have the printer as the serial port.

Secondly, you may have to set the baud rate. If you are running your serial printer at a rate other than 300 baud, you will have to set the serial port baud rate each time the computer is reset. CONFIG provides an option that will do this for you.

The baud rate selected is not written into the operating system, so it will only apply until the operating system is reloaded, which happens when the machine is reset or turned off and on again. Of course, if you set your serial printer to operate at 300 baud, you will never have to worry about setting the baud rate, although your printing may be slower than it is capable of managing.

If you're using a commercial serial cable, it may appear to work just fine but there may be problems if you use it at a high baud rate. This is because the handshaking signal from the printer to say when it is busy is not being routed to the correct pin of the Kaypro serial port. This is not anybody's fault: it's just that there is very little agreement on which signal line from the printer should be used to signal ready/not ready. So if you occasionally lose chunks of printout, try slowing down the baud rate.

A final warning: the Perfect Writer manual suggests that you remove the ‘write enable’ tabs from the master disks to ensure they can never be accidentally written over. This, of course, applies to 20cm disks. For the Kaypro's 13cm disks, it is important to attach the “write protect” tabs to achieve the desired protection. The inversion of the function of identical features is one of the more subtle insanities of the small computer world...

Table 1

Perfect Writer master disk contents:

```
AFFIXTAB.SPL
DICTIONARY.SPL
MENU.COM
PF.DAT
PIP.COM
PP.COM
PS.COM
PW.COM
PW.HLP
STAT.COM
SUBMIT.COM
```

your computer glossary

Absolute: Located at a fixed address in memory.

Access: To read or write from a location in memory, or a file, or disk.

Accumulator: The major register of a CPU, in which arithmetic and logical functions are performed. Some computers have several registers which can function as accumulators; in others some registers can perform a subset of the full set of operations.

Address: A memory location which can contain data or an instruction.

Algol: Algorithmic Language, an early computer programming language for mathematical applications. Widely used in Europe, embodied early structured programming concepts and was a precursor of Pascal.

Algorithm: A set of instructions which define a method of obtaining some result (usually mathematical). A cooking recipe is an algorithm, as is a knitting pattern.

Alphanumeric: Composed of either letters or numbers or both.

Analogue (Analog): Representation of a value by a voltage or some other measurable datum, rather than a binary or other representation based on counting.

Apple: The Apple 11 computer is a computer based on the 6502 microprocessor with an integrated keyboard. Noted for its colour graphics capabilities, which make it popular with schools.

Application: What you do with your computer.

Array: A set of values under a common variable name, which are accessed through a subscript. For example A[1] is the first item in array A, A[2] is the second, etc. A[N] is the Nth item.

ASM: Assembler, also a suffix added to assembly language file names to distinguish them from other files with the same name.

Assembler: A program which converts assembly language into its corresponding machine (or object) code, which can be executed by the computer.

Assembly Language: A language in which each machine code instruction is represented by a short mnemonic which is much more comprehensible to the programmer. For example, the 8080 machine code

[10010110]
in binary, is
[SUB L]

(subtract L from accumulator) in assembly language. Each line of assembly language becomes one machine instruction.

Assign: To make one thing equal to another, e.g. [A = B] assigns the value of B to A.

Atom: An indivisible component of a data structure.

Attribute: A property possessed by some object, such as a file. Often attributes take the form of restrictions, such as a file being read-only.

Backup: An extra copy of a disk, tape or file taken as a precaution against damage of the original.

Backus Normal form: A special language (a metalanguage) used to describe precisely the grammatical rules of another language.

Base: The lowest number inexpressible in a given number system.

BASIC: Beginners All-purpose Symbolic Instruction Code. Invented in 1970 at Dartmouth College by Kemeny and Kurtz as a teaching language, it has since been enhanced in its more exotic forms into one of the most sophisticated yet easy-to-use languages available on personal computers. Its major rival is Pascal, which has the added virtue of stressing structured program design.

BDOS: Basic Disk Operating System. The major functional component of the CP/M DOS.

Binary: The system of counting in 1s and 0s used by all digital computers.

Binary Search: A method of searching for an entry in a table by successively halving the table until all that's left is the desired entry.

Binary Tree: A form of data structure in which entries are tagged on at the end of the appropriate branches.

BIOS: Basic Input/Output System. The part of the CP/M operating system which is different for each machine and provides any special I/O routines for disks, terminal, printer, etc.

Bit: Binary Digit. Either 1 or 0.

Boot: To load the operating system into the computer from a disk or tape, either initially or subsequently after running a program.

Bootstrap: To use one short program to load a longer loader program which then loads the operating system.

Branch Instruction: A program instruction which causes the computer to jump to another instruction, usually fairly close by.

Buffer: An area of memory used for temporary storage while transferring data to or from a peripheral such as a printer or a disk drive.

Bug: an error in a program. Makes programmers itch.

Bus: A set of wires over which, data, addresses, or control signals are transferred between the central processor and memory or I/O devices.

Byte: A computer word eight bits wide. A byte in memory can hold a character or a binary number between zero and 255 (or — 128 and 127), or a computer instruction.

C: A programming language, developed at Bell Labs, which is particularly convenient for writing system utility programs.

Case Statement: An instruction found in some high level languages which allows control to pass to one of several subroutines depending on the value of a variable. For example, the BASIC statement

ON X GOSUB 100, 200, 300

will jump to line 100 if X = 1, 200 if X = 2, 300 if X = 3.

Call: A jump to a subroutine which leaves the return address on the microprocessor stack, so that when the subroutine is finished executing, control returns to where it left off.

CBASIC: A commercial version of the BASIC language, running under the CP/M operating system. Doesn't use line numbers on every line, and is compiled, rather than interpreted like Microsoft BASIC.

CCP: Console Command Processor. The part of the CP/M operating system that reads a command line and sorts out what it means.

Chain: To automatically run one program after another.

Character: A letter or number, or in some circumstances, a control code such as "carriage return".

Checksum: A running total of the characters in a file, recorded or transmitted with the file so that errors can be detected.

Code:

Absolute: Machine instructions which are intended to be loaded and executed in a particular area of memory.

Object: Machine instructions, as distinct from the source code from which it was generated.

Reentrant: Code which can be used by several users at once, keeping separate variables for each.

Relocatable: Code which can be loaded and run anywhere in the computer's memory.

Source code: A program written in assembler, or a high level language such as BASIC, which must then be assembled or compiled to produce the object code which can actually be executed.

Cold Boot: To start up a system from scratch, loading the operating system from disk or tape.

Cold Start: See Cold Boot.

COM file: In CP/M parlance a command file, that is, a machine code program that can actually be run.

Command: An instruction from the console for the system to do something.

Comment: A note added into a program to help the reader (or programmer) to understand its operation. Does not affect the program's execution in any way.

Compiler: A program which accepts as input a source file written in a high level language, and produces as output an object file containing the machine instructions which are actually executed.

Computer: Are you serious?

Concatenate: To join two strings together, one after the other.

Conditional: A test; for example, is X greater than Y: IF X is greater than Y
THEN GOSUB 500 (BASIC)

or, if the carry flag is set, jump to location NEXDIG:

JC NEXDIG (Assembler)

Conditionals are one of the most powerful features of any computer language.

Console: The keyboard and screen from which the operator controls the computer.

Control characters: Codes which perform functions like acknowledging correct receipt of a message or requesting retransmission of an erroneous message. Control characters are defined as part of the ASCII and similar codes.

Copy: To duplicate, usually for backup safety.

CP/M: A disk operating system for 8080 and Z80 based microcomputers. Allows the user to store information and programs in named files, as well as managing disk storage and input/output functions. Other disk operating systems include TRSDOS (on TRS-80) and DOS 3.3 (for Apple).

CRT: Cathode Ray Tube. Usually refers to the screen of a video terminal or the terminal itself.

Data: Information to be processed by, or output from, a program.

DDT: Dynamic Debug Tool. A program that assists the user to find errors in machine code programs.

Debug: To locate and fix errors.

Decimal: Based on ten.

Delete: To erase.

Device: A piece of equipment such as a printer or tape drive which the computer uses.

Directory: A list of the programs on a disk (or occasionally tape) together with necessary information, such as length and location.

Disc: A flat, circular magnetic surface on which the computer can store and retrieve data and programs. Is fast compared with tape, particularly when access is not one item after another.

Disk drive: The mechanical assembly which rotates the disk and positions the read/write head.

Disk Operating System: A program which operates one or more disk drives automatically and manages the system.

Display: The computer's output device at the console, usually a TV-like display of letters and numbers; sometimes the computer can draw on the display.

Double Density: A method of recording twice as much information on a floppy disk.

Dump: To list out the contents of memory or a disk.

Echo: When the computer inputs a character from the keyboard, it then sends it back to the display so that you can see it was received correctly.

ED: An editor program; part of CP/M.

Editor: A program which lets you alter and correct source files and other documents.

Erase: See delete.

Error Message: Tells you something went

wrong, and sometimes what.

Execute: To run a program; to follow its instructions.

FIFO: First in, first out.

File: A continuous collection of characters (or bytes) saved on a disk or tape for later reloading.

Fixed Point: Counting in integers only. Usually limited to small values, and restricted in accuracy, giving rise to ridiculous answers such as $9/5 = 1$.

Flag: A variable, sometimes a single bit, which can have only two values, used to indicate some condition.

Floating point: The kind of arithmetic used in scientific calculators.

Floppy disk: A disk, made of thin flexible mylar, and enclosed in a card jacket, which can be used for magnetic storage. There are two varieties; eight inch and 5 1/4 inch. These can typically store somewhere between 140,000 and 3 million bytes (characters).

Focal: Formula Calculator. A simple language, rather like a small BASIC, found on some mini and microcomputers.

FORTRAN: Formula Translation. One of the first computer languages, and beginning to show it.

Function: A sub-program that processes variables in some well-defined way.

Garbage Collection: The process of going through memory or disk space, reclaiming all the unused space.

Global: A variable which is known to all the parts of a program. See local.

Grammar: The formal rules of a language.

Hard Disk: A disk made of hard material, larger, faster and more fragile than a floppy disk, and capable of storing 70 million bytes or more.

Hard Copy: Printout.

Hardware: The bits of a computer you can kick, as opposed to the programs you can only swear at.

Hashing: A method of reducing the size of a table which otherwise would have mostly empty entries.

Hexadecimal: The method of counting to the base sixteen. Or the method of splitting binary digits into groups of four, which is the same thing. In hex, you count: 0 1 2 3 4 5 6 7 8 9 A B C D E F 10 11 12 13 14 15 16 17 18 19 1A 1B 1C 1D 1E 1F 20 21 22...

Identifier: A label, or the name of a variable.

Iff: If and only if.

Index: A variable which usually points to an entry in a table or list.

Index Register: A processor register which is used to access tables and lists in memory.

Indirect Addressing: Referring to a variable which actually contains the address of another variable.

Input: To get data into the computer.

Instruction: A step the computer can perform

Integer: A whole number.

Intermediate Code: A special kind of object code which cannot be run directly on the computer, but must be interpreted.

Interpreter: A program which examines source code a line at a time, decides what it means, and then does it. Compare with compiler.

Interrupt: To electronically drag the computer away from what it is doing in order to respond to some time-critical situation.

I/O: Input/Output.

Jump Instruction: Normally, control proceeds from one instruction to the next, one after the other. A jump instruction passes control, not to the following instruction, but to some other. Jumps can be conditional.

Kilo-: Prefix meaning one thousand.

Kilobyte: 1024 bytes (Kbyte).

Kilobaud: 1000 baud (kbaud).

Label: A word which identifies the destination of a call or jump instruction, or simply identifies some location in memory.

Language: The set of instructions, and rules for stringing them together, which you use to instruct the computer what to do.

Library: A set of programs, or sub-programs.

Line Number: A number at the beginning of a line, which identifies it in a similar way to a label.

Line Printer: A high-speed printer for computer output.

Link: Part of a data item in a list, which tells the computer the location of the next data item.

LISP: A list processing language, much favoured by the artificial intelligence community.

List: A sequence of consecutive data items.

Load: To transfer some data or program into the computer memory.

Locate: To "fix" a relocatable code so that it will only run if loaded in a particular location.

Logical Device: A device as the computer "sees" it; what the computer regards as the "list device" may be one of several "physical devices", such as a line printer or teletype.

Loop: To repeatedly execute a sequence of instructions; part of a computer program that is so executed.

Machine Language: The binary codes the machine actually executes.

Macro: A user-defined sequence of instructions which can be inserted anywhere in a program.

Macroassembler: An assembler which can utilise macros.

MBASIC: Microsoft BASIC: the BASIC used in the TRS-80, PET, Apple 11 and so on.

Memory: Where the computer stores data and programs internally for fast access.

Menu: A display which offers the operator a choice of several alternatives.

Microcomputer: A small computer based on a microprocessor.

glossary

- Microprocessor:** The central processing unit of a computer, built into a single silicon chip.
- Mini-diskette:** A 5 1/4 inch floppy disk.
- MP/M:** A multi-user version of CP/M.
- NAD:** A name and address file maintenance program.
- Numerical analysis:** The art and science of number crunching.
- Object Code:** Machine code.
- Object File:** A file containing object code.
- Object Module:** An object file containing part of a program, ready to be linked to others.
- Octal:** the system of counting to base eight, or grouping bits in threes.
- Offset:** To load an object file somewhere it will not run, in order to edit or modify it.
- Open:** To give the operating system the characteristics of a file so that it can subsequently read or write it.
- Operand:** The number an operator (+ , - , etc) operates on.
- all work. See Disk Operating System.
- Operator:** An arithmetic function or some other function which alters variables.
- Optimization:** Making a program work better (or faster, or using less memory).
- Output:** What the systems produces.
- Packed Data:** Data which shares the same address, and has to be unpacked before use.
- Page:** A length of memory, typically 256 bytes.
- Parameter:** A constant which sometimes has to be varied
- Parity:** An extra bit on the end of a character or byte for error detection.
- Pascal:** A modern structured language which may eventually rival BASIC in popularity.
- Password:** A secret word the system may demand of you before allowing you access to certain (or all) programs or data.
- Patch:** A temporary (ha,ha) fix on a bug.
- Peripheral:** A piece of equipment the computer uses, like a printer, disk drive, or modem.
- Peripheral Driver:** A program which outputs data to a peripheral and controls it.
- Physical Device:** See Logical Device.
- PIP:** Peripheral Interchange Program. A CP/M utility for copying files between devices.
- PL1:** Programming Language /1. A good general purpose commercial language.
- Pointer:** A variable used for indirect addressing
- Polish Notation:** A method of separating operators and operands: e.g. $4 + 5$ is Polish Notation for $4 + 5$
- Poll:** To ask a peripheral if it requires service.
- Postfix Notation:** Also known as Reverse Polish Notation, this is similar to Polish: $4 + 5$ means $4 + 5$
- Preprocessor:** A program which does part of a job to make life easier for the program which follows: e.g. a macro processor before an assembler.
- Printer:** Gets computer output down onto paper.
- Priority:** The resolution of which interrupt is serviced first if two should arrive at the same time.
- Process:** A program.
- Program:** A sequence of instructions which can be understood, and ultimately followed, by a computer.
- Prompt:** A message asking the operator to supply information.
- Queue:** A list in which entries are made at one end, and removed from the other.
- R/O:** Read Only: cannot be overwritten.
- RAM:** Random Access Memory.
- Random Access Memory:** The computer's internal memory which is used to hold running programs and data. The computer can both write and read RAM.
- Read Only Memory:** Memory used to store programs, which can not be erased or overwritten.
- Reader:** Paper tape input device.
- Read/Write Head:** The small coil which reads and writes on the surface of a disk.
- Reconfigure:** To reorganise the I/O or other aspects of a system.
- Record:** A set of related data items. For example, an employee's name, address, payroll number and pay rate would form a record.
- Recursion:** The ability of functions in some languages to call themselves.
- Redundant:** Not needed or taken for granted.
- Reentrant Code:** Code which can be used by several programs simultaneously, keeping separate data for each.
- Register:** A location in the processor capable of performing logical or arithmetic functions on the contents
- Relocatable:** Capable of being moved in memory
- Relocatable Object Module:** Part of a larger program consisting of many such modules, all linked together and located.
- Resident:** Permanently in the system.
- Reverse Polish Notation:** See Postfix.
- RPN:** See Reverse Polish Notation.
- Run:** To execute a program.
- Save:** To store a program on disk or cassette (particularly BASIC)
- Schedule:** To decide at what stage a process should run (of an operating system)
- Screen:** See CRT
- Sector:** A section of data on a disk
- Simulation:** Making one system behave like another.
- Software:** Programs
- Source Code:** The original text form of a program.
- Source File:** A file of source code
- Source Language:** The language the source code is written in, e.g. BASIC, Assembler, C.
- Sort:** To arrange items of data in order
- Spool:** To output a file to a peripheral, usually either a printer or tape
- Stack:** A list in which both entries and removals are made at the same end. A micro-processor usually has a hardware stack which is used to save subroutine return addresses, temporary storage of data, and to pass variables between subroutines.
- String:** A sequence of characters.
- Submit:** To put the system under control of a file of system commands.
- Subroutine:** Part of a program which can be accessed from several points within the program.
- Symbol:** The name of a variable or a location in memory.
- Symbol Table:** A table constructed by an assembler or compiler to give the addresses of all variables and labels in a program.
- Symbolic Name:** A label.
- System:** A collection of hardware and software, possessed of the property that the whole is greater than the sum of the parts.
- System disk:** A disk carrying the operating system.
- Teletype:** An electromechanical printer/-keyboard
- Timeshare:** Running several programs on a system simultaneously.
- Track:** The area under the read/write head during one rotation of a disk.
- Transfer:** To move data.
- Transient:** A program that is only in memory for a short time before being overwritten. Often, the only program that is not a transient is the operating system.
- Tree:** A list in which each data item may refer to several others.
- TTY:** See Teletype.
- Unix:** A multi-user, multi-tasking, multi-programming operating system, expected to appear on microcomputers before long.
- User:** One of the people connected to the computer.
- Utility:** A program of use to most users.
- Variable:** Named quantity that can take on different values.
- Verify:** To check that data written on a disk or tape can be read again correctly.
- Warm boot:** To reload the operating system a second or subsequent time.
- Word:** The amount of data fetched from one memory location. Typically one byte, but can be two on recent processors.
- Word Processor:** A system for manipulating, editing, printing and formatting texts files.
- WordStar:** A proprietary word processing program.
- Write Protect:** To remove the cover from the notch in a floppy disk so that it cannot be written on.
- Zilog:** Manufacturer of the Z-80 and Z8000 microprocessors.
- Z80:** A popular 8-bit microprocessor

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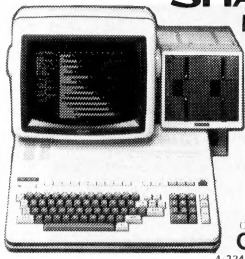
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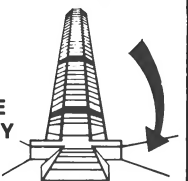
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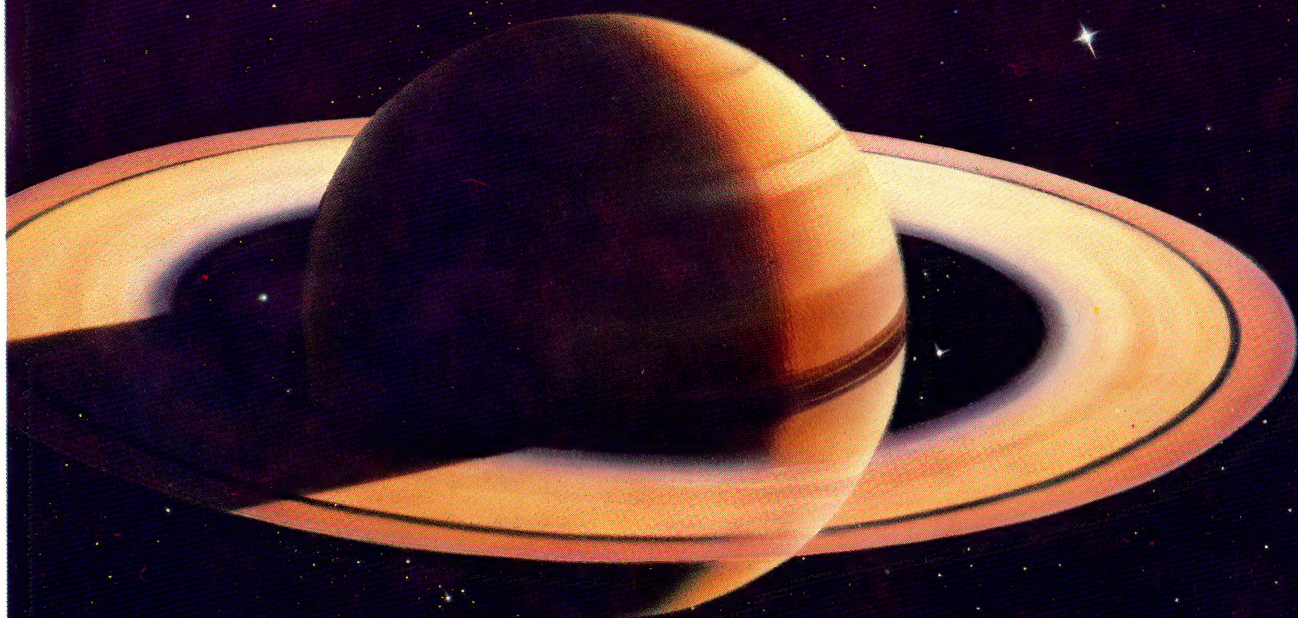
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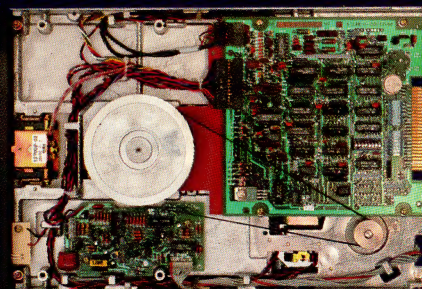
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