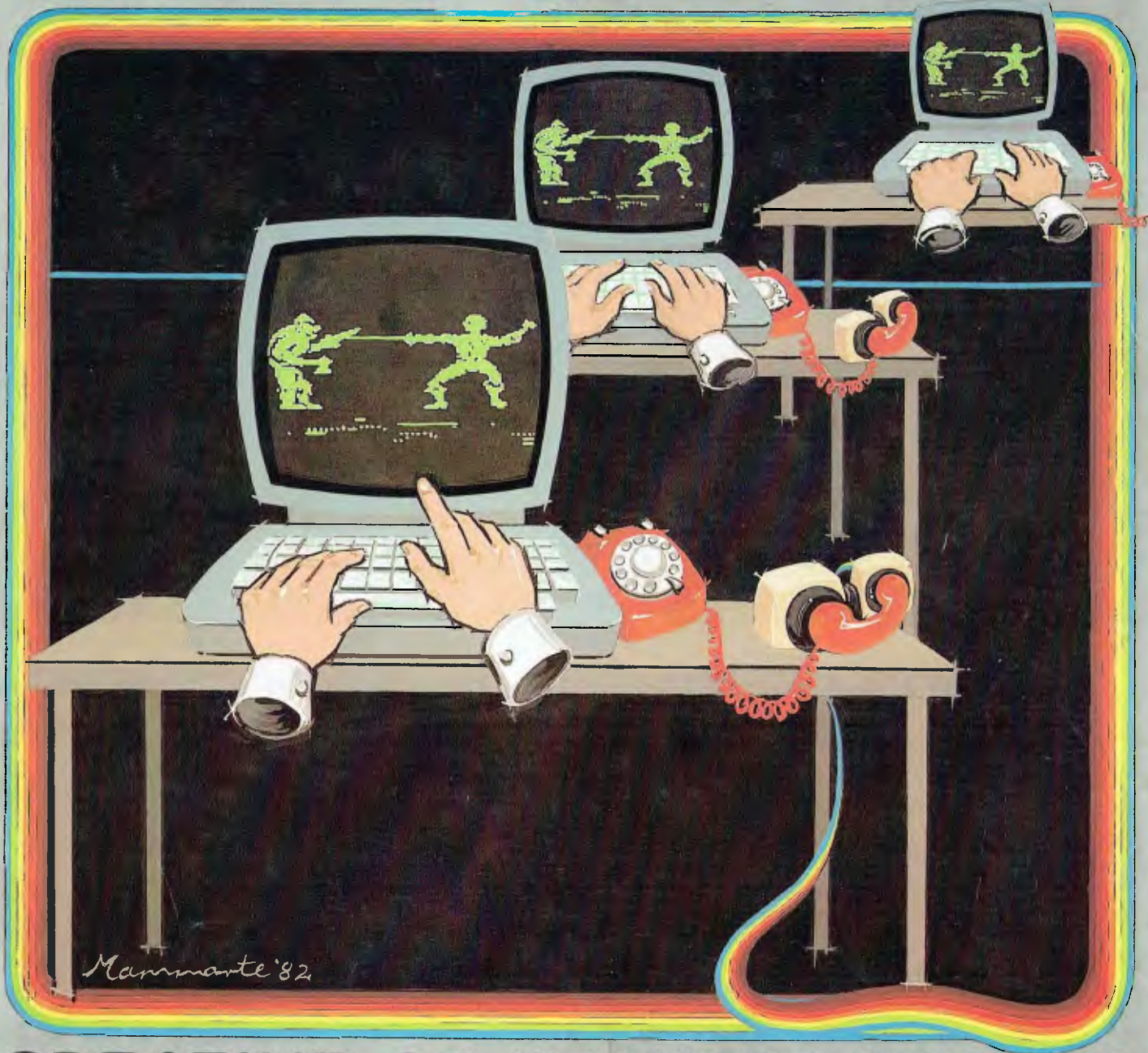


# your computer

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# inside your computer

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September 1982.

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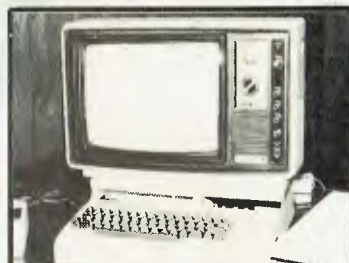
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### Readers' Services

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



The portables take off! Osborne started it, but it's not finished yet...two more under-the-airline-seat micros are about to be released, and they advance the state of the art yet again. See page 21.



VIC fans won't want to miss the Arfon expander gear on page 24 — or the chance to win it, in a new competition which gets underway this month. There'll be coupons in the next two issues, too.

## next month

We've been more than pushed for space this issue, and have had to hold over some planned and/or regular features and columns.

Mostly they'll be back next month; certainly Basic For Bird-watchers will be (won't it, Les!)

We'll have more on communications, some interesting reviews (including Microsoft's Multiplan), and another good selection of programs.

And if you're out to win the Arfon VIC expansion gear in our competition (page 24), you'll need next month's issue for another coupon!

# editorial



WHILE checking out Supervyz this month, I was struck by the opposing views which are currently espoused about personal computer operating systems. DEC, for example, has opted for a menu-driven operating system for its new Professional 300 micros, and other manufacturers seem to be going the same way.

I was prompted to consider how a program like CP/M's PIP could be converted to be menu driven. Using PIP, for example, I can type `PIP B:testfile.txt=ur1:[BND80EP60T-8LSFRED(Ctrl)-Z]` which will copy a file from the cassette tape reader to disk B in block mode using block mode transfer (X-ON/X-OFF protocol), numbering the lines as it goes, truncating text that extends beyond 80 columns wide, echoing the text to the console, inserting page breaks every 60 lines, expanding tabs every 8 columns, converting upper case to lower, and only starting this copying when it finds the string 'FRED'.

I ask you, how could you convert a program that has so many options to be menu-driven without involving the poor user in about 20 minutes of questions every time he wants to use it? Admittedly, the example above is somewhat contrived, and one would not usually use so many options at once. However, that represents only half of the options available on PIP.

Against this it must be said that very few people remember all of these optional parameters, and most users forget about them completely, even to the extent of writing programs to duplicate them.

The interesting point is that operating system designers will have to be careful to strike a balance between mollycoddling the user so that the system appears to be excessively simple, and making it so complex that he only uses a part of it. As the old saying says, 'If you can design a fool-proof system, then only a fool will want to use it!'

Options like the PIP parameters make some awkward tasks very easy; it would be a pity if such versatility were to disappear from our operating systems in the name of the much-vaunted 'user-friendliness'. The reduction of a powerful and versatile machine to a kind of cybernetic yes-man (that can always copy files, but never the way you want) is a bleak prospect indeed. □

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One last point: Computer Galerie didn't get to be one of Sydney's longest surviving small computer dealers by pricing themselves out of the market.

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# your computer news

## ComputerLand's Fifteenth

COMPUTERLAND, the worldwide chain of franchised microcomputer retail stores has opened its fifteenth store in Australia.

The latest franchised outlet is located in Maroochydore on Queensland's Sunshine Coast. The opening was celebrated on July 1 with the Minister of Primary Industry, Mike Ahern, initiating the opening by pushing a key on the Apple II keyboard, instructing it to print welcoming letters to the attending special guests.

Computerland has 300 stores worldwide to date. This latest store in Australia is the first to implement the new Computerland store design, created by Landor and Associates in the United States for worldwide use by Computerland stores.

The new store design uses wall graphics, modular display flexibility and controlled in-store lighting to create a professional and attractive image. The design includes the latest innovations in computer furniture and the 'saw-toothed' software display.

The Computerland network in Australia will expand to twenty stores by December 1982. Each store is individually owned and operated.

For further information contact Computerland at Second Floor, 65 Kent Street, Sydney 2000. Phone (02) 27 8959. □

## New IBM Clone

COLUMBIA Data Products of Maryland in the US has produced a new 16-Bit IBM-PC hardware and software compatible system, labeled the Multi-Personal computer.

The MPC product family supports single and multi-user configurations for personal and professional business, industrial and scientific applications.

Several hardware config-



urations are available including MPC Model 1600-1, which lists for \$US2995 and features as standard equipment a 16-Bit 8088 processor, 128K RAM, two RS-232 serial ports, Centronics parallel port, interrupt and DMA controller, counter/timer, dual floppy disks with 640K byte storage, Winchester disk and keyboard interfaces, and eight IBM-PC compatible expansion ports.

Two Winchester hard disk configurations, Models 1600-2 and 1600-3, are also available, with a 320K byte floppy disk and 5 or 10 megabyte hard disk storage.

The Winchester-based units feature a cache buffer hard disk controller, with an independent 64K processor system, which provides enhanced disk access performance in both single and multi-user applications. Models 1600-2 and 1600-3 list for \$US4995 and \$US5495 respectively.

The Multi-Personal Computer can support universally available RS-232 video pack-

display terminals for single and multi-user applications or black and white or colour CRT monitors, and IBM-PC compatible keyboard in single user applications.

Optional hardware expansion capabilities include RS-232 serial communications boards, expansion memory boards, black and white and colour display controller, Z80 CP/M 80 board, time/calendar board, 8087 mathematical processor, IEEE bus controller, 20cm floppy and hard disk systems, tape cartridge system, CRT monitors, and keyboard.

Available operating system software includes single user MS-DOS or CP/M 86 or multi-user, multi-tasking MP/M 86 or OASIS 16, with XENIX available soon, providing users with a host of compatible software packages for personal, professional business, industrial and scientific applications. CP/M 80 is also supported with an optionally available Z80 CP/M 80 board.

A large selection of high

level languages is also available, including BASIC, FORTRAN, Pascal, COBOL and Macro Assembler.

Columbia Data markets the MPC, together with other single and multi-user processor systems, through an international network of sales representatives, OEM's, systems houses, dealers and direct sales. Typical deliveries range from immediate to 30 days, depending on product configurations.

For more information, contact Jack Horner, Advertising Manager, Columbia Data Products, 8990 Route 108, Columbia, Maryland 21045, USA. □

## Computer Controlled Pubs

A PORTABLE "computer in a briefcase" is helping the management of Europe's biggest drinks organisation to take stock more efficiently in northern England public houses and also to tell immediately how profitable they are.

Known as a portable stock-taking device (PSD), the microprocessor-based computer has been developed by Systeme, a Leeds-based computer systems group, for stocktaking in the 320 'pubs' of a subsidiary brewery, also in Leeds, of Allied Breweries.

It weighs only 9 kg and comes in a lightweight case measuring only 380 by 325 by 155 mm. It contains a processor, a 76mm video display unit, keyboard, floppy disk, printer and a communications interface.

Used in a 'pub' stocktaking, the device needs only a 240 volt power supply. At the touch of a button the stock-taker is able to see on the PSD screen the essential details of the previous stock check, the amount of stock ordered since then and, after keying in the current stock-take details, the length of time the manager's stock is likely

to last and a figure of the pub's gross profitability.

There are likely to be many other application for this portable microcomputer, such as controls on aircraft duty-free stocks of drinks and cigarettes, stock controls in managed retail shop chains and any other where geographically remote points of sale require a portable computer with a printer, a communications interface and floppy disk storage.

The PSD has undergone successful trials in Tetley's Breweries houses in the Leeds area. It is now being tried in Allied Breweries managed houses in Scotland.

For further information: Quote G.439 to The British Consulate-General, Gold Fields House, Sydney Cove, Sydney, 2000. □

### Sirius For Computerland

COMPUTERLAND Australia has agreed with Barson Computers to promote the Sirius 1 Computer and peripheral equipment through its sixteen franchise outlets.

The Sirius 1 machine, according to Computerland, offers the user the first of its kind in 16-bit technology to be made available in Australia.

Says Justin C Beck, marketing-development manager of Computerland Australia, "We are very pleased to be handling the Sirius I Computer throughout our franchised network. This computer was created on the leading edge of microcomputer technology with the end user in mind. The Sirius 1 has the power to perform and the ability and the ability to satisfy the needs of a wide variety of business demands."

The Sirius 1 computer has been received with great success in the UK and Europe.

For further information contact Computerland At Seventh Floor, 364 Sussex Street, Sydney, NSW 2000. Phone: (02) 264 8200. □



### BBC Launched

A QUEENSLAND firm known as Sunstate Software has released the BBC-Micro (formerly referred to as the Acorn Proton) which, with its Econet interface, is believed to provide educational institutions with the lowest cost networking system in the world.

The first Brisbane secondary school to take advantage of the educational potential of the BBC-Micro network has been All Hallows Convent. It has recently installed nine terminals and there are plans to double the size of the Econet network in the near future. Several other large private schools have already expressed interest in the BBC.

The basic BBC-Micro features 16K of main memory, a 32K ROM and a keyboard all packaged in an integrated unit selling for under \$2000. Floppy disk storage (dual or single) and visual display unit are additional.

The BBC-Micro can also support an audio cassette recorder, printer and light pen. On board sound is a standard feature. Apart from a professional video monitor interface, the BBC-Micro has an interface for a domestic black and white television receiver, an RS-232 interface, Teletext adaptor, analogue interface and Econet interface.

Both Pascal and BASIC languages are offered with system. The BASIC offered is close to the standard Micro-

soft but with several important extensions.

Pitman Publishing has published a comprehensive text aptly entitled "The Computer Book" to accompany the BBC-Micro and later in the year the ABC will be screening the BBC Computer Literacy Programs with which the BBC-Micro is intended to be used.

Sunshine Software, a Queensland firm specialising in the development and marketing of educational software, is in the process of converting its most popular Apple II programs to run on the BBC-Micro.

For further information phone Sunshine Software on (07) 393 0000. □

### Video Store Software

VIDEO movies stores need no longer struggle to keep track of stock and customers, thanks to a new computer-

ised system developed by Computerland Eastern suburbs in conjunction with Charles Richter of the consultancy firm Heyile.

The system, which is written in Pascal, runs on the Apple II computer and completely replaces the manual card systems which are in use in most stores.

Key features of the system are:

- Four different system configurations to cater for small, medium, large and very large businesses.
- Instant access to customer and stock information.
- Up to eight member types catered for.
- Rapid transaction entry — typically five to ten key strokes.
- Optional receipt printing for cash transactions.
- Full audit trail and recovery system.
- Facilities to transfer stock to and from other branches.
- Cash sales.
- Comprehensive reporting — For example, overdue movie lists, expiring deposits, expiring memberships, top 30 chart, stock analysis, including number of times rented and mean shelf life and daily transaction summary.

For further information, contact David Saul at Computerland Eastern suburbs, 119 Oxford Street, Bondi Junction, 2022. Phone (02) 389 4466. □



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### Sinclair Arcade

VICTORIA'S Axiom Software has released a range of arcade-style games and hardware add-ons for the Sinclair ZX81.

The games are the QS range and are very similar to the popular arcade games Defender, Space Invaders, Scramble and Asteroids. All of the games require at least 4K of memory and are written in machine code for fast response. They are believed to be the fastest games available for the ZX81 at present.

QS-Defender is unique in that it uses a specially written display routine to display more on the screen than is possible using ordinary PRINT statements. The display of the ZX81 is expanded to 32 lines by 31 characters to contain the extra action on the screen. QS-Defender is suitable for the ZX80 with 8K ROM as well as the ZX81.

The QS range of hardware expands the horizons of the ZX81 and complements the QS range of games. There are three plug-in boards, a mother-board and a special connector in the system. The plug-in boards are a high-resolution graphics board, a sound-generating board and a programmable character generator.

The high-res board features 256 by 192 individually addressable points on the screen. The board also has software in a 2K ROM to simplify graphics applications. This software adds statements to the standard ZX81 BASIC.

The sound board has three independent channels for generating tones, a noise generator and two eight bit input-output ports. All of the sound channels have volume control under program control.

The programmable character generator allows the definition of up to 128 different characters at a time. Each character is built up in an eight by eight square us-

ing the program 'CHRS' included on the free operation cassette. The characters produced by this board can be printed using the ZX81 printer.

The QS games take advantage of the sound board and PCG if they are present to give detailed displays and sound effects. If the extra hardware is not connected standard characters are used to give a display that is still exciting and complex.

For further information contact Axiom Software, PO Box 168, Carlton, Victoria 3053. □

### Oops, We Slipped...

IF YOU rushed out to buy one of the cheap new Itoh 1550 printers we reviewed last issue, we apologise.

We listed the price incorrectly at \$1199. It should have been \$1500 for the parallel version, and \$1550 for the serial model.

We try to keep it accurate, but sometimes the gremlins defy our every effort...

### Buy An IBM

HERE'S your big chance...to own both a rare machine, and to have a media star in the family.

Customized Technology's Don Weir, who imported the IBM Personal Computer tested in our June issue, is selling his current IBM and Sorcerer equipment.

The IBM, which is only a few months old, was brought in to assist local software testing and is in excellent condition. It has two 160K disk drives, a monochrome monitor, 64K RAM, an expansion card with a further 64K (expandable) plus serial and parallel ports, a colour graphics interface, and \$700 worth of software. It carries a guarantee, and is available for \$4500.

Don's Sorcerer is also fairly complete, with 56K (switchable to 47), Revision B Monitor and BASIC Pac,



S100 expansion, two Micropolis drives, a monitor and \$1200 worth of software. He's selling it for \$3400.

Don also has two C Itoh printers available, for \$500 and \$910. He can be contacted on (02) 799-6373. □

### Win by A NEC

NADOW Australia has announced the commencement of a campaign to raise over \$40,000 to assist training schemes for the disabled.

The campaign takes the form of an Art Union called the NADOW NEC Computer Art Union which will be drawn on December 13. The prize, donated by NEC Information Systems Australia is a fully configured Colour PC8000 Personal Computer valued at over \$7000.

Available software for the PC8000 covers a wide range of business and home applications. The PC8000 was the largest selling personal computer in Japan last year, and is sold throughout the United States and Europe. Hanimex distributes the PC8000 in Australia.

Roger Dadd, Chief Executive Officer of NADOW said "NEC's generous gift has caused us to raise our expectations even higher for the success of this campaign".

"We will sell tickets to computer training college students, via the NADOW Computer Training Scheme committee members and through professional organisations (such as the Australian Computer Society), as well as directly to the public.

NADOW Australia, formerly the National Association for training the Disabled in Office Work, was formed in 1965 to provide practical, on-the-job training facilities in office procedures for disabled people.

The training programmes are available to the blind and partially sighted, deaf, spastics, polio victims, epileptics, arthritic sufferers, diabetics, cardiac patients and people suffering congenital deformities, as well as victims of road accidents, and so on. In fact, any disabled person who can benefit from NADOW's training course may apply.

Indications point to an increasing demand for computer personnel over the next five years. NADOW Australia's objective is to train as many disabled persons as possible to meet this demand.

Books of Art Union tickets (20) can be obtained by contacting NADOW AUSTRALIA directly on (02) 43 0333. □



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• Library Catalogue .....	\$150
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### Case Blue Boxes

CASE Communication Systems has announced the availability of a comprehensive range of data communication adapters designed to solve a wide range of terminal, computer and peripheral interfacing problems.

Comprising some 30 different devices the Blue box range enables computer users to configure large or small terminal systems in the most efficient manner and implement them at a minimum cost.

The product range includes limited distance modems, modem eliminators, asynchronous to synchronous converters, IBM loop adapters, modem sharing devices, code converters, interface adapters and fallback switching equipment.

Case Managing Director Mr Barry Foster said the new product range will extend Case's ability to provide mainframe, mini and micro-computer users with cost saving solutions to their data communication needs.

"Now, not only can we supply the terminals, multiplexers and modems but also special interfacing adapters that may be necessary to complete a user's network," he said.

"The need for these type of products is ever increasing as the range of computer, terminal and peripheral equipment widens and the need to interconnect the various equipment grows."

For further information contact Case on (02) 438 2400.

### Computing Wizzard

DICK SMITH has launched a video game which includes an in-built personal computer facility.

Dick Smith says his Wizzard is unique: "One moment it's the most advanced video game you've ever seen, with unbelievable graphics, control, sound effects and excite-

ment. Then, simply by plugging in a 'computer' cartridge, you've turned the Wizzard into a powerful personal computer".

Instead of simple 'stick' controls as found on many video games, the Wizzard has controllers capable of working in 16 directions. And the controllers have 48 push buttons with slide-in game overlays to tell you what to do.

Dick Smith says the Wizzard will very quickly become Australia's most popular video game.

"Even in a straight comparison between the Wizzard and other games on the market, I believe the Wizzard wins by miles. But when you consider the fact that the Wizzard is the only one with a computer facility built in, there's no contest at all!"

The Wizzard is available at all Dick Smith Electrics stores for \$295, together with a selection of games cartridges, at \$39.95 each.

"And we're working like mad to produce an even bigger range", says Dick.

"The plug-in computer cartridge is in the final development stages, and we hope to have this available by October".

"Further along the line, we'll also have a matching cassette unit and interface, so you'll be able to save your programs and load them from tape." □

### NEC's APC

NEC Information Systems Australia has announced the Advanced Personal Computer (APC), a new machine which is based on the 16-bit 8086 microprocessor.

In a fairly large, but neat, desktop package, the machine packs a 16-bit CPU, 128K or 256K of RAM, one or two 1.2 Mbyte 20 cm floppy disk drives, serial and parallel interfaces, screen and separate keyboard.

The screen can be eith-

er colour or monochrome (green), and a prototype colour machine we saw displayed very high resolution colour graphics indeed — 640 by 475 in eight colours. In fact, the total virtual graphics screen in 1024 by 1024 pixels in size, and the screen is a 'window' into this area.

The graphics are also particularly fast, in part due to the use of a 16-bit processor, and also a new CRT controller chip which has sufficient intelligence to draw line segments, arcs, circles and rectangles without any processor assistance.

The software side of this machine is quite interesting, too: operating systems are CP/M-86 and soon MS-DOS. Most popular software

packages will be available for the machine, such as dBase II, MicroPlan, the Benchmark word processor, Pascal MT+/\_ and Ryan-McFarland COBOL.

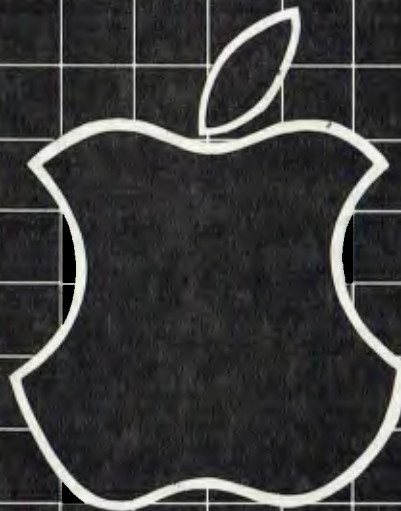
Also available for the machine are communications packages covering asynchronous, IBM 3270, 2780, and 3780 protocols.

The basic configuration machine with mono screen and one disk drive will retail for around \$4000, while a colour model with two drives is expected to cost around \$6000.

Shipments are expected later this year; further details are available from NEC Information Systems Australia, 99 Nicholson Street, Crows Nest 2065.



80 COLUMN CARD



## THAT'S WHO

The **Vision 80** video card is an easy yet sophisticated way to enhance the performance of your **Apple II** Computer. Just plug it in and immediately your **Apple II** will display a full 80 column, x 24 line screen.

The **Vision 80** is compatible with existing **Apple II** BASIC software and provides enhanced screen performance with programs written in BASIC, PASCAL, FORTRAN, CP/M (MICROSOFT) and ASSEMBLER.

And the **Vision 80** enables your **Apple II** to be used as a true intelligent terminal to mainframes and communication facilities.

Compatible with most good word processors, including Zardax and Wordstar.

A superb set of 128 upper and lower case characters in a 9x11 dot matrix, including 3 dot descenders. Shift and shift lock for upper and lower case. Source switches both hardware and software between 40x24 and 80x24 screen.

Plus: Now includes — Utilities Disk, BASICS, DIAGNOSTICS, CHARACTER SET EDITOR AND DEMO PROGRAM. Supports PASCAL key press & type ahead buffer, graphics character set & underline set.

Plus: Now supports — VISICALC in 80 column with full upper and lower case with 24 column on screen display.

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### Health Commission Contract

THE Health Commission of NSW has awarded Informative Systems a contract for the supply of microcomputers to hospitals and other health care institutions throughout the state.

Informative Systems, of South Melbourne, supplies Cromemco microcomputer systems.

The two-year contract covers various configurations, from single-user to multi-user hard disk systems, to be used in a wide variety of word processing, accounting, database, and biomedical applications.

The Managing Director of Informative Systems, Dr Simon Rosenbaum, places the credit of the tender success firmly in Cromemco's court.

"Although a lot of factors are taken into consideration in competitive tender situations, I believe the Cromemco's proven reliability and its demonstrated upgrade path to 16/32 bit architecture and local area networks gave us the edge during the evaluation tests," says Dr Rosenbaum.

For further information contact Informative Systems on (03) 690-2284.

### Business School

THE University of Queensland Business School has introduced a series of Executive Development programs during 1982 in an attempt to improve managerial skills and knowledge in the workplace.

The first series of courses was well patronised and received by Australian business people, so a number of new programs are planned for the second half of the year.

Among this range of management development courses in the marketing, behavioural and general management fields it is planned to run at least one computer program for managers. Given the initial response, the proposed two-day experimental approach to mini computers for managers will probably become an inbuilt part of the university's educational work.

For further information contact the university's Department of Management on (02) 377-1111.

### IBM Automates Chip Design

IBM engineers speaking at the ACM/EEE Nineteenth Design Automation Conference in Las Vegas have described new automated system for the design of VLSI (Very Large Scale Integrated) circuits, based on the 'master image' approach to circuit selection, placement and wiring. The new system can reduce the cost of designing logic circuits by as much as 90 percent.

The older 'gate array'

approach to IC design works out the best way to interconnect pre-fabricated circuit elements which are organised in a rectangular grid on the surface of the chip. The master image approach allows faster and denser circuits to be made up by 'filling in' empty cells with the appropriate elements. Prototype chips designed and fabricated at IBM contain 2508 cells in the interior of the chip and 103 cells on the periphery for the placement of I/O circuitry.

The cells and the channels separating them are the basis of the new system's automatic placement and wiring programs.

Designers choose circuits from a 'library' stored in the system. This includes circuits ranging from simple NOR gates to more complex functions like decoders and latches.

A number of larger circuits, called macros, include 8 static RAMs ranging from 144 bits to 4608 bits, and a variety of programmable logic arrays. The availability of these macros in particular allows better design of control circuitry and the elimination of interconnections to external RAM chips.

After the macros are manually placed on the chip image, the rest of the circuits are placed automatically.

The placement program operates hierarchically. First entire blocks of circuits are placed in relatively large areas of the chip. The circuit blocks are then broken down into smaller groups which are distributed into smaller areas until, finally, each cell of the macro-image contains two to three circuits.

The wiring program, too, proceeds by stages. An approximate solution is found first, using a trial and error approach together with a scoring technique that seeks to minimise the number of wire crossings. Once the approximate solution is found, a detailed wiring program is used to arrive at the most efficient wiring layout possible.

Another feature of the system is a delay calculator/optimiser. This function provides a high degree of assurance that the specified performance of the chip can be achieved. If a circuit block does not meet its required performance level, the delay calculator/optimiser will automatically replace the circuit with a higher power one that does. □

### A Health Hazard

EXECUTIVES in the computer and advertising industries face a high risk of developing serious health problems caused by stress, according to findings now being tabulated by Corporate Health Evaluation Centres (CHEC) in Sydney and Melbourne.

Personnel from these industries have formed part of a sample of over 3000 executives who have been assessed at CHEC centres.

According to CHEC's medical director, Dr John Tickell, results are showing the typical syndrome of overweight, high blood cholesterol and tryglycride levels and "perhaps even more importantly poor efficiency of heart muscle due to lack of physical activity".

"It is becoming more ob-



vious the more evaluations undertaken, that the latter is becoming a very important risk factor," he said. Also apparent were high levels of tension, fatigue, dissatisfaction with personal relationships and an inability to cope with pressure. Dr Tickell said the research also showed coronary risks were increasing in younger age groups (as low as the 28- to 32-year-old age bracket).

### Scola School . . .

CHART a New Course is the invitation which greets anyone who happens to pick up the brochure for adult education classes being run by SCOLA, Sydney Centre of Learning for Adults.

SCOLA is a new adult education organisation which is shortly beginning its second program of day and evening classes in subjects such as philosophy, literature, botany, art, psychology, history, computers and many more.

SCOLA was founded because its directors felt that there was a greater need for such "liberal arts" or academic subjects in the community at large. There are no preliminary qualifications to join a class and there are no exams or certificates. The point is to learn purely for the sake of interest and enjoyment.

Classes which proved popular in the previous program were creative writing, psychology, computers and philosophy. These are being offered again together with a range of new subjects which include art appreciation, languages, poetry and botany.

Brochures may be obtained by calling 371-8197, by writing to SCOLA at PO Box K705, Haymarket 2000, or from your local library.

### NEC Mini

A NEW low end addition to the Astra series of business



computers has been announced by NEC Information Systems Australia.

Called the Astra 25, the minicomputer system is based on a 16-bit proprietary NEC microprocessor. The new system is upward compatible with the larger multi-terminal systems in the Astra family, and extends the line by offering a significantly lower priced system with substantial memory and disk capacities.

In making the announcement, marketing manager Jolyon Bone stated: "With the introduction of the Astra 25 we feel we are meeting the needs of the businessman who has limited funds available for the purchase of a computer system, yet anticipates rapid growth. We offer this businessman the high performance of a 16-bit minicomputer at a micro-computer price level."

As an entry level, hard disk based system, the Astra 25 is available for less than \$7500, which consists of processor, 256K of internal memory, a 2000 character 30cm monochrome display, and a storage subsystem containing a 20cm double sided, double density diskette drive with a megabyte of formatted capacity and a 13cm Winchester disk with four megabytes.

The Astra 25 will be available for customer shipment in late October.

For further information, contact NEC Information Systems on (02) 438-3544.

### Guadalcanal On Disk

SSI (Strategic Simulations) has announced the release of its first "monster" computer wargame called Guadalcanal Campaign.

Some playtesters have declared this 40- to 80-hour-long simulation of America's most devastating conflict with Japan the company's best game so far.

The game starts on August 7, 1942, and ends on December 31, 1942. Each day is divided into AM and PM turns — 294 turns in all. Every Japanese and American warship that historically participated in the campaign is included and rated for speed, cargo/plane carrying capacity, damage points, and number of main guns, secondary anti-aircraft guns and torpedo tubes.

The computer provides a colorful search map and allows for realistic battle conditions, such as hidden movement, limited intelligence, and inaccurate ship sightings. During tactical battle, it resolves every combat down to the last ship and plane.

When a long game is neither feasible or desirable, players may choose one of the shorter scenarios. There is a 184-turn game that lets

you bypass preparatory details and jump right into the heat of battle. There are also four mini-games that range from four to 12 turns, one of which is the Battle of Coral Sea. These games can be played in two to four hours.

Finally, there is a solitaire game in which the computer takes on the role of the Japanese. This game is designed for the 48K Apple II Plus or Apple III.

### Club Computing

LARGE licenced clubs use the services of bureaux with mainframe computers for their accounting, membership, poker machine analysis and so on — an expensive process often out of the reach of smaller clubs.

Yet with recent changes to the licencing laws, all clubs must keep a tighter reign on their finances and submit detailed reports on their takings.

Microcomputers to the rescue again . . . Seahorse Computers of Camden, near Sydney, has brought mainframe style reporting and accounting within their reach. Its programmers have combined elements of the proven 6S business software and adapted the General Ledger, Creditors and Payroll to suit club requirements.

These programs, together with a properly written club membership and poker machine analysis system have been merged to provide a suite of properly-written Pascal programs to run on the Apple III computer installed in Windsor RSL's office. The benefit of this system is that it gives the club instant and secure access to its affairs for less than \$15,000, complete with a 200 cps Anadex printer for fast printing of extended lists and accounts.

For further information contact Seahorse Computers, 10 Mitchell St, Camden 2570. Phone (046) 66-6406.

### Digital's Graphics

DIGITAL Research will extend its product line to include a full complement of graphics products to support the rapidly growing array of graphics hardware, announced Gary Kildall, president of Digital Research.

"Our goal is to develop microcomputer industry standards for graphics, just as CP/M is the standard for operating systems. To accomplish this, our products will incorporate the emerging graphics standards of the American National Standards Institute (ANSI) and the International Standards Organisation, as well as the North American Presentation Level Protocol, where appropriate," he said.

Digital Research will offer its first graphics software products through a joint development and marketing agreement with Graphic Software Systems, according to Fred Langhorst, Digital Research manager of graphics development.

Under the agreement, the two companies will cooperate to develop graphics products to provide application developers with a programming interface that is consistent with the emerging ANSI standards for computer graphics. The initial products will include a library of graphic primitives, necessary to graphically produce lines and text, and a library of higher level functions for plotting bar graphics and pie charts.

"Graphics software is one of the fastest growing segments of the microcomputer software market," said Langhorst. "With this agreement, Digital Research will become the first microcomputer systems software company to offer, in conjunction with its languages, graphics that are consistent with standards on mainframes and minicomputers."

The Digital Research/Graphic Software Systems agreement includes a significant amount of technology sharing over and above its marketing aspects, according to Langhorst. This includes the creation of graphic subroutine libraries for Digital Research compiler languages and the integration of graphic functions at the operating system level.

### More HP Hand-Power

HEWLETT-PACKARD has announced two new slim-line programmable calculators: the HP-15C, which includes an unprecedented number of math, science and engineering functions, and the HP-16C, believed to be the first programmable calculator designed for computer programmers and digital-design engineers.

In addition the price of the HP-11C scientific programmable calculator is being lowered from \$172.80 to \$133 (tax free).

Both new programmable calculators feature a compact design, liquid-crystal display, extended battery life, continuous memory, built-in keyboard, circuitry self-tests and dozens of advanced, built-in functions.

The new HP-15C has an unprecedented number of built-in functions for math, science and engineering.

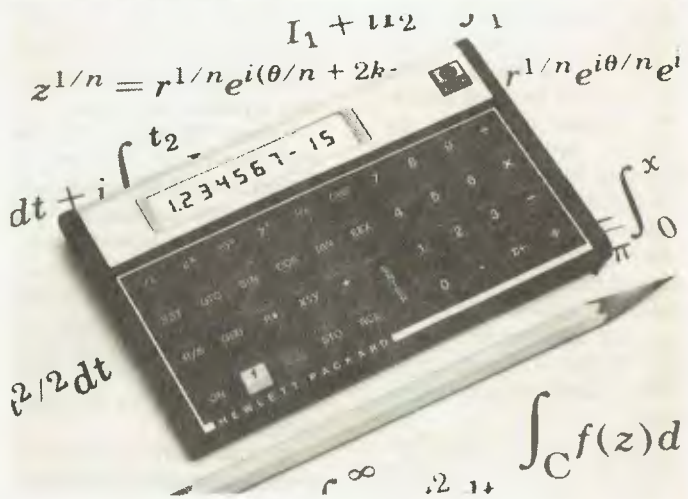
Two new sets of functions — never before built into an HP calculator — are standard on the HP-15C: matrix and complex-number operations.

Once matrix elements are defined, matrix arithmetic, inversions and transpositions are keystroke-easy.

UP to 64 matrix elements can be stored in the calculator's memory. These elements can be distributed among five different matrices.

The HP-15C will sell for a tax-free price of \$182.

The HP-16C represents a



new trend in calculator marketing for Hewlett-Packard: a special function set for a narrow but healthy market.

The calculator can retain up to 203 program lines or 101 16-bit data registers in memory. Reverse Polish Notation (RPN) logic and floating-point decimal arithmetic are HP-16C features common to other HP calculators.

But the calculator's specialised design becomes apparent when it is switched to "integer" mode for bit calculations. In integer mode, numbers can be entered in and converted to four different bases: hexadecimal, decimal, octal and binary. Hewlett-Packard believes binary mode has never been available in a handheld calculator before.

HP-16C owners can select

if numbers are to be interpreted as one's-complement, two's-complement or unsigned integers.

Also featured are 18 different bit-manipulation functions, four Boolean operators and a conventional floating-point calculator mode.

The HP-16C sells for a tax-free price of \$199.

### Superpilot

SUPERPILOT, a versatile extension of Apple's Pilot language, has been introduced by Apple Computer. It joins several new products in Apple's Pilot series that help educators and industrial trainers create lessons and illustrations for computer-aided instruction.

Superpilot offers all the capabilities of Apple Pilot plus added features for graphic enhancement, easy

debugging, and external video control. Designed for interactive video and graphics applications, Superpilot makes complex ideas and the hard to imagine more accessible to the student and trainee.

"Lessons or training sessions created on Superpilot will make difficult concepts and processes easier to understand and retain," states Debra Janssen, product marketing manager. "Powerful computer simulations for industrial or academic learning situations can now be designed without a mainframe computer or its complicated software."

Also announced are two support products in Apple's Pilot family, Co-Pilot and Superpilot Log. Co-Pilot is a completely self-contained, self-paced interactive tutorial on two diskettes which

teaches how to program in Apple Pilot.

Superpilot Log works with Superpilot as an administrative record keeping program that automatically tracks tests scores by item, student, or class and can also analyse non-computer test scores entered manually.

Superpilot will be available in mid-August from authorised Apple dealers. The program requires an Apple II or Apple II Plus personal computer with 64k of RAM.

#### TI In Focus

COMPUTER FOCUS of Liverpool, NSW, is supplying the new Texas Instruments colour personal computer, the TI99/4A.

Its 16K memory can be increased to 48K through a single expansion unit while

26K ROM is standard. External ROM in the form of command modules are available up to 30K each.

A large range (over 400) of educational, games, personal finance and other programs are available on command modules, disks and cassette (the cassette is built in as standard).

The disk drive takes a 90K diskette and up to 3 drives may be added. Colour and five octaves sound are also standard. An RS232 interface is available.

Computer Focus's assessment is that for a 16 bit (TI9900 chip) processor the 99/4A at the recommended retail price of \$499 will be a winner, especially with its potential as a really sophisticated system through the available upgrades and peripheral devices.

For further information

contact Computer Focus, 224 George Street, Liverpool, 2170; telephone (02) 600 8222. □

#### QT Showroom

QT COMPUTER Systems, a manufacturer of microcomputer systems and products, has moved to larger premises at 41 Sydney Street, Marrickville.

It now provides a ground floor showroom for the over-the-counter retail sales, and the factory area includes a service department for warranty and after sales service.

QT Computers offers a wide range of microcomputer systems suitable for general office work, word processing and industrial control.

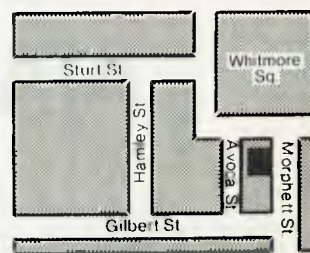
Special configurations are also available for education and research applications.

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It provides the true computer enthusiast with the things he needs most, expandability, flexibility multiple application capabilities and above all a computer that is designed to grow, so that as your needs change the Atari® 400 can change with you.

## Atari® 400 features

### Graphics

By simply plugging the Atari® into your home TV, you instantly have at your fingertips, a whole new world of graphic display, unparalleled colour and luminosity up to 128 colour luminance combinations.

### Sound

4 separate synthetic sound generators for a range of sound combinations you couldn't even begin to imagine. Who else has this at the price?

### Languages

Atari® Basic, Assembler Editor, Pilot, Macro Assembler-32K, Ext Fig Forth 16K Tape 24K Disk.

### Expandability

The Atari® 400 offers internal memory starting at 10K ROM 16K RAM expanding to 32K. Capacity to allow you the flexibility for multiple application. MORE graphics, word processing, storage for home and business records. This means more information at your fingertips.

The Atari® 400 is a truly upgradable system providing state of the art technology at the touch of a fingertip. Consult your dealer today for an Atari® that is a distinct cut above the current crop of personal computers both in quality and price.

# ATARI® HOME COMPUTERS

For your family's future.

For a no obligation demonstration of the Atari® Home Computers' amazing capabilities, see your nearest Atari® dealer: VIC: Computerland (Lonsdale St. City), Myer (City and Highpoint West), Calcutronic (Hawthorn), Logic Shop (Prahran and K-mart Burwood), Brashes (City, Blackburn and Geelong), Billy Guyatts (Carnegie, Ringwood and City), Computer Country (City), Gametronics (South Yarra), Dandy Sound (Dandenong), Bill Wonder (Greensborough), Computers 2000 (Frankston), Warehouse Sales (Frankston), Associated Micro Technology (Cranbourne, NSW: Grace Bros. (All stores), Computerwave-Myer (City), David Reid Electronics (City), Computer Connection (Miranda), The Logic Shop (Chippendale), Computermax (Brookvale), QLD: Myer (All stores), The Electronic Circuit (The Valley), Alliance Computers (Annerley), Exec-U-Games (Queens Arcade, Wynnum Plaza, Burleigh Heads and Maryborough), V.I.S. (Queen St. and Gold Coast), Galton (Valley), Datacom (Bondaberg), Gametronic (Rockhampton), Fields (Mackay), Games and Creative Toys (Townsville), Middle Earth Hobbies (Gladstone), Ipswich Hi Fi (Ipswich Centre Plaza), Music Maker (Brisbane and Mt. Isa), Computer Shop (Darwin), Ken Elbourne (Southtown Shopping Centre and Toowoomba), WA: Vision On, Parrys, Microbase, Computer Age, The Backgammon Shops, Nth West Audio (Karratha), Vision On (Port Hedland), Greyhound TV (Bunbury), Don Jones & Co. (Kalgoorlie), SA: John Martins (Rundle Mall), Magnetex, Video World, Sargent Electronics, Metropole Business Equipment, Key Computer, ACT: Computerland (Canberra) TRADE ENQUIRIES: Vic 555 9544, Qld 352 5645, WA 349 6111, NSW 693 1111, SA 291 6188



# LARGE EXPANDABLE MODEL.



If you're looking for a more sophisticated home computer than the Atari® 400 or those of its rivals the answer is the large expandable Atari® 800 a true state of the art computer that caters for the home enthusiast's every need.

It offers the same spectacular graphic display as the Atari® 400 as well as expandability, flexibility, multiple application capabilities equal to none. The Atari® 800, is a true, computer enthusiast's system, that is designed to grow, so that as your needs change the Atari® 800 can change with you.

## Atari® 800 Features

### Languages

For maximum control of the extraordinary capabilities every Atari® 800 is able to operate with a wide variety of operating languages. You have the choice of Atari® Basic, Microsoft Basic, Ext. Fig. Forth-16K Tape 24 Disk, Lisp-48K, Macro Assembler-32K, Atari® Pascal-48K and Assembler Editor for machine language programming.

### Expandability

The Atari® 800 has a modular operating system ranging from 10K ROM 16K RAM expandable for multiple application to 48K.

### Additional Features

Additional peripherals include, a state of the art 128K RAM DISK, full stroke typewriter keyboard, and facilities to use an extra 8K ROM cartridge. As well as a monitor Jack.

The Atari® 800 is a truly upgradable system providing state of the art technology at the touch of a fingertip. Consult your dealer today for an Atari® that is a distinct cut above the current crop of personal computers both in quality and price.

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### Osborne 100 Character Video

THE BANE of Osborne computer owners, the 52 character per line display has finally been overcome.

In a world first, Canberra designer Geoff Cohen has produced a 100 character per line display for the Osborne One computer. There are three modes available with the 100 character display board, easily selectable from any program:

- The original unmodified 52 character per line mode
- 100 characters per line display on either the internal or external display — great for Supercalc
- 80 characters per line, for the majority of CP/M software.

The display modification consists of a small (15 by 20 cm) plug-in printed circuit board, which can be installed in a few minutes. The 100 character display board is approved by Osborne Australia, and your Osborne warranty will be valid if the board is fitted by an approved Osborne Computer Corporation Australia dealer.

The price is expected to be roughly around the \$300 mark. For further details contact either Osborne Australia on (02) 438 1800, or Geoff Cohen at Boulevard Business Services on (062) 48 5411.

### Software Maintenance

THE lack of user-friendly documentation in most CP/M software may have made software purchase a frustrating experience to the average unskilled microcomputer owner.

Small businesses depend on the smooth operation of software, while an apparent lack of time prevents most software users from studying the often incomprehensible manuals and instructions provided with the software, resulting in needless and costly delays in data proces-

sing. But now there may be light at the end of the tunnel...

A new concept of customer service, just introduced on the Australian CP/M software market, might help. A software maintenance plan on CP/M software (purchased through Sydney's Software Source direct or through its retailers), entitles registered users to a wide range of fringe benefits.

End-users may take advantage of professional support on any aspect of the acquired software. A special hot-line provides instant phone advice to customers in difficulties.

The service covers all CP/M software supplied through Software Source, regardless of its origin. To join the Software Maintenance Plan, end-users complete the registration card, and mail it to Software Source, together with a reasonable registration fee.

For further information contact Software Source at 89 Oxford Street, Bondi Junction, 2022 or phone them on (02) 389 6388. □

### Micro Service

A COMPUTER maintenance service, specialising in microcomputers and with workshops throughout Australia, has announced a new support service aimed at commercial users.

It is offering by Kappalyn Computer Engineering, a

non-aligned organisation with well over ten years experience in all aspects of the computer industry, from mainframes downwards.

Service support has long been a problem in the microcomputer field, and one that has held back solid penetration of micros into the commercial area.

The home-hobbyist is happy to tinker, and looks upon a soldering iron as a normal piece of computer equipment. Obviously, the businessman is more interested in reliability, and with the new service offering a cost effective insurance against downtime, the micro becomes a far more attractive business tool.

Only a few different micro-processor chip sets are used on the 130 or so brands of microcomputers on the Australian market. This simple fact has allowed Kappalyn to set up a comprehensive spare parts inventory, with a resultant fast response to urgent service calls.

With its wide experience across the computer industry, in design, manufacture and maintenance, Kappalyn's service extends to peripherals as well as the microcomputers themselves.

Inherently flexible, the company will accept 'one-off' calls as well as term contracts from end-users, OEM's and dealers.

For further information contact Kappalyn Computer

Engineering at 2 Paton Place, Manly Vale, 2093, or phone them on (02) 949 3911. □

### Imagineering and MicroPro

MICROPRO International has appointed Sydney's Imagineering as primary distributor for MicroPro products in Australia.

As primary distributor, Imagineering will be producing product in Australia and maintaining a significant shelf inventory of product to support resellers of MicroPro products within Australia, and will provide training and technical support to these customers and will jointly participate with MicroPro at Australia's major industry trade shows.

MicroPro International Corporation, based in California, is the industry's largest supplier of micro-computer application software for business and is known for a family concept of business software featuring products such as WordStar, DataStar, CalcStar, SuperSort, Mailmerge, and SpellStar.

Imagineering is Australia's largest distributor of micro-computer software, currently selling to a national network of 120 dealers. An office in Melbourne is planned shortly.

It is expected that the role of a primary distributor will serve to increase the visibility of MicroPro in Australia, improve communications between MicroPro and its customers within Australia, provide an improved support level to that customer base, eliminate the hassle and expense of intercontinental shipment, and assist in identifying and prosecuting those guilty of software theft in the market.

For further information contact Imagineering at PO Box 4601, Sydney, 2001. Telephone: (02) 358 3011.



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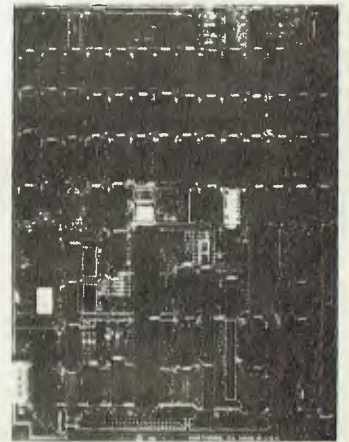
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- 4 mhz Z-80 A.
- 128k RAM configured as two 48k banks, a 16k block common to both banks, (perfect for MP/M) and the remaining 16k implemented as a transparent disk cache buffer.
- DMA disk controller supports up to four 8"; AND four 5" drives simultaneously in single and double density, single and double sided.
- Utilising DMA for sector deblocking (memory to memory moves) makes disk operations more than 10 times faster than conventional CP/M implementations.
- DMA channel available for use by all peripheral devices.
- Keyboard type ahead buffer functional even during disk transfers.
- Access to the internal buss for future expansion is via a 50 pin header.
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# Take Up Thy Computer And Walk



*Following Osborne's lead, a number of manufacturers are introducing personal computers in a portable format, and the market can be expected to hot up further. Here Les Bell reports on the action...*

THAT FELLOW OSBORNE is probably just beginning to realise what he's started. By introducing the Osborne One computer, a portable machine that can be picked up and carried around, he's opened up a whole new market for micro-machines.

When Osborne was in Australia a few months back for the launch of the machine, he insisted that the motivation for designing the machine the way it is was to produce an 'adequate' machine.

While other manufacturers are touting advanced features, Osborne felt that many of these features were not being used by purchasers, and that popular software packages like WordStar made no assumptions about the presence of these advanced features.

Therefore, what people would buy was a machine that would run those nice

packages, but would save money by omitting the frills. Thus was the Osborne conceived. It was intended to be a mass-produced 'Volkscoputer', built to a price that would catch on widely.

As part of that engineering to a price, the concept of the moulded plastic cabinet at some stage turned it into a portable machine, capable of fitting under an airline seat (which it does, on both Ansett and TAA, I am assured!).

As we all know by now, Osborne succeeded remarkably in his aims. And now that the world knows it, more than a few people are hoping to emulate his success, with the introduction of new portable computers.

## **Kaycomp**

First cab off the rank is the Kaycomp II, to be sold here as the Kaypro II.

The Kaycomp is built by Kay Computers, a division of Non-Linear Systems, a well-known manufacturer of miniaturised electronic test equipment such as digital voltmeters and oscilloscopes.

In fact, if my memory serves me correctly, Non-Linear Systems was the inventor of the dual-slope integration

method of analogue to digital conversion which is used in almost all digital voltmeters today.

What I'm getting at is that, although a newcomer to the computer business, it is certainly an experienced company when it comes to making rugged and reliable miniaturised electronic gear (of which portable computers are only one example).

The Kaycomp II is successor to the Kaycomp I, which never saw the light of day, as its gestation period coincided with the birth of the Osborne. The people at NLS reportedly waited to see what the reaction would be to the other machine, and then went back to the drawing board to design the first of the 'second generation' portables.

The Kaycomp is housed in a light blue metal case which is rather squarer and boxier than the Osborne. Instead of having all its controls and connectors at the front, the Kaycomp's connectors and reset switch are mounted at the back, out of the operator's way.

The screen, at the left of the front panel, is a full 9 inches diagonally, with a green phosphor CRT. The display is a full 80 by



24, removing the need for horizontal scrolling, and it is quite easily readable. The Osborne's small screen has been the major objection of most would-be purchasers, and for people who feel this is important to them, the Kaycomp would be an attractive alternative.

To the right of the display is a brace of vertical 13 cm disk drives, each double density, with a total capacity of 400 Kbytes. As users of small systems will know, disk capacity is not essential, but the more you've got, the better life is!

Above the disk drives is a brightness control for the display. The keyboard, which unclips and folds under the front edge of the unit, is a full QWERTY

typewriter type, with cursor keys and a numeric pad.

At the back is the power input and on/off switch, reset button, RS-232C mode port, Centronics printer port, and video output, for those who want a larger screen. Oh, and the carrying handle, of course.

Inside (you get three guesses...) there's 64K of RAM, a Z-80 CPU, and the usual kind of circuitry. No surprises, and no drawbacks either. There's an optional battery pack and charger, and a vinyl carrying case, for the dedicated traveller.

#### The Software

So much for what you can see — how

about the intangibles like software.

Standard software revolves around, naturally enough, the CP/M 2.2 operating system. The language of choice is SBASIC, a structured BASIC with some similarities to Pascal, which was widely advertised in the US a couple of years ago but never found very broad acceptance. It is an excellent BASIC, however, with features way beyond those found in most compilers.

For word processing, you can have the SELECT word processor; this is the one chosen by DEC for its new PC, and although I haven't really studied it in depth, it seems to be quite a nice package. For financial planning, there's ProfitPlan, which seems to be Chang Laboratories' MicroPlan in drag. Again, an excellent package, very powerful, if not quite as easy to use as the ubiquitous Visicalc.

Finally, in order to tame the raging CP/M and bend it to the user's will, the whole thing is tied together by a menu package called Utilyz.

All in all, a very neat package, nicely put together with good (if slightly obscure) software.

The Kaycomp II will be distributed in Australia by (surprise, surprise) President Office Machines, who did so well with the Osborne. Coming by year-end is the Kaycomp III, with 400 Kbytes per disk, and the Kaycomp V, with 5 Mbyte

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Winchester disk. The Kaycomp II will sell for \$2950 including tax.

### Otrona Attache

A new machine which is about to appeared in Australia (we only discovered who the agent was the day this issue went to press) is the Otrona Attache. Here's the same magic formula for success, in a slightly up-market form, and very nicely done indeed.

The Attache has a very much 'cleaner' appearance than either the Osborne (which looks like it was removed from a tank in the Sinai desert) and the Kaycomp (which looks like a piece of lab gear).

All the controls are at the back, leaving the front clear for a 12cm high-resolution green screen and two horizontally mounted floppy disks. The system is slightly smaller than the other two machines.

The keyboard is a QWERTY type, without a numeric pad; the machine is too small to fit more than a standard sized keyboard. Oh well, no big loss. The top row of keys can be user-defined for use with programs.

The CRT is quite readable indeed, providing a full 80 by 24 display and — wait for it — 240 by 320 high resolution graphics. Great for business graphs, pie charts and so on.

Both the screen and the disk drives are managed by a 9517A DMA (direct memory access) controller, leaving the processor free to get on with useful work. As a result, disk accesses are very fast, as is the screen update.

The Attache can perform three-dimensional transforms; that is, rotation and translation of two-dimensional representations of 3D objects, and can scroll characters up the page without disturbing a graphics display in the foreground. In addition, the system can swap pages of graphics in and out of the display very rapidly.

The disks are double-sided, double-density, with a capacity of 360 Kbytes each. The whole system is interrupt-driven, allowing some degree of keyboard type-ahead. Other features include internal RFI (radio frequency interference) shielding, an internal clock/calendar, and a power supply with brown-out protection and a two-second reserve for total power loss. Options include a battery pack, dc adapter and accessory pouch.

Software? How does CP/M 2.2, WordStar (version 3) and Microsoft BASIC-80 sound? There's also a communications package called Valet which runs in the background, giving the appearance of multitasking and allowing other work to continue while the machine is communicating. A graphics package called Charton generates business charts and graphs, and also allows screen dumps to

a printer such as the Epson MX-80.

Overall, the Attache is an extremely well designed unit. It is smaller than other portable machines, better finished, and comes with some very interesting software. Options coming for the machine include Winchester disk, A/D and D/A boards and possibly a 16-bit CPU. Local price hasn't been decided yet, but in the US it sells for \$3995.

It will be imported locally by Elmeasco Instruments of Mortlake in Sydney. This long-established scientific instrument company set itself up a year ago as an OEM distributor of systems for scientific use, and has decided to expand its computer involvement with the Otrona.

Sample models are already in the country. For further information contact Elmeasco on (02) 736-2888.

### So What?

The only remaining question one can ask about these machines is: do people really want portable computers?

I seriously doubt whether most of the Osbornes sold in Australia were bought for that reason; the big incentive is simply the low price for so much software and a box to run it on.

One reason why a portable computer can be attractive is the trend for computers to enter the office via the home. Executives, buying a computer for the kids, realise that the machines aren't that complex and could be used in the office. A portable machine can be carried home from work, doing double duty and saving a bit of money.

For those whose requirement is a low-cost system, but who don't need portability, there is good news on the horizon, too. Two new systems are due to be released before the year-end, both priced at under \$2000, complete with software.

The Morrow Designs Micro-Decision is a small single-board box with either one or two 200K disk drives, which is designed to work with an external terminal. Priced at just under \$1200 for a single drive machine, or under \$1550 for a two-drive box, the Micro-Decision comes with CP/M 2.2, BASIC-80, baZic, WordStar, SpellStar and CalcStar as standard. Thus, for a total outlay of around \$2,400 the user gets a system with a full-sized screen and keyboard, 64K, two disk drives, and CP/M.

Cromemco will also release its C-10, a small desk-top system which will sell for under \$2000. Running CDOS (Cromemco's 'CP/M compatible' operating system, this little box of tricks offers Writemaster (word processing), Planmaster (financial modelling) and Cromemco structured BASIC, together with the ability to link into a local area network.

Those of us with big boxes are just going to have to grin and bear it! □

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## More Muscle For VIC

*Planning on adding some more oomph to your VIC? Although Commodore makes some quite natty bits for the VIC, you really ought to check out these goodies.*

ARFON Microelectronics is a small company in North Wales which specialises in microcomputer design and software writing. As part of the product line, it has produced a nice selection of add-ons for the Commodore VIC personal computer.

Central to the philosophy is its VIC-20 Expansion Unit. This is a metal box which is designed to accept the VIC 20 at the front and cradle it. Immediately behind the VIC is a box which contains, at the left, a power supply for both the VIC and its extras, and at the right, an expansion motherboard designed to accept a range of plug-in goodies. In the centre is an area where the video modulator can be inserted.

The VIC is pushed in from the front, and mates with connectors which supply power (so that the VIC's adapter is no longer needed) and also buffers the VIC's expansion bus and supplies it to the motherboard. The case is a squeeze, but it holds the VIC tightly in position.

Plug-ins for the motherboard include a 3K EPROM cartridge, and 8K and 16K RAM cartridges. There is also a range of serial, parallel and analogue I/O cards, which together turn the VIC into a formidable little computer.

The VIC has been quite cunningly designed to take advantage of additional memory. On power-up, it scans through



memory, checking each location, and if it detects more than 3K of memory, it moves the screen RAM out of the way of the BASIC so that larger programs can be loaded.

On the other hand, this has the disadvantage that programs, mostly games, which access the screen memory directly, will no longer work.

Arfon has, cleverly, developed a program which returns an expanded VIC into its original non-expanded state, to maintain compatibility with all other software.

Because all the slots in the motherboard are identical, each memory module will have to be set up, by moving wire links inside, to set them to the correct address. The Arfon documentation gives clear and complete instructions on how to do this, together with an interesting discussion of the VIC's memory map.

All the Arfon boards seem to be quite well made, and a lot of thought has obviously gone into them. Any VIC owner who wants to expand his system would do well to consider them.





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2. Does the Arfon include built in power supply .....
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Please fill in	Yes	No
I own a VIC	<input type="checkbox"/>	<input type="checkbox"/>
I am interested in expansion	<input type="checkbox"/>	<input type="checkbox"/>
I am interested in		
Software	<input type="checkbox"/>	<input type="checkbox"/>
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# Communication — The Next Big Breakthrough

*Computers are great at managing heaps of raw data; but where do you get your raw data from? Do you type it in the hard way, or are you able to access data stored on other computers? The secret is communications, writes Les Bell...*

TRADITIONALLY, computers have been used for such applications as number-crunching, where they have replaced expensive human labour cost-effectively. Now that microprocessors have brought the price of computing right down, computers are being used to do jobs that would have been unthinkable a few years ago.

For example, a word processor doesn't really do very much that a typewriter can't — in its simplest form, that is. Sure, it's very convenient, it's quick, and it produces perfect copy every time.

The advantages of word processors and computers are really in new areas. And communications is the at the heart of this. Having typed up a letter on a word processor it doesn't really make sense to then print it out and rely upon slow, old-fashioned mail to get it to its destination. It is much simpler to transmit it electronically.

What's more, the additional hardware required to do this is not very much at all. Your computer will require a spare serial port and a modem or acoustic coupler, and that's all.

On the software side, communications programs are available for most computers. Such programs as Telnet, MODEM7, YAM, ASCII Express, and Z-TERM are widely available at prices ranging from zero (free) to a hundred dollars or more.

Electronic communications between computers is the new growth area of the computer industry. Everybody's doing it — from IBM down to the microprocessor manufacturers.

In the professional area, the minicomputer manufacturers are regaling large companies with their distributed pro-

cessing systems. Briefly, these are networks of minicomputers linked together in such a way that a user on any system can communicate with any other computer, to send or receive files, access databases and so on.

In the mainframe area, the 'big boys' are already selling systems in which terminals do not link directly to the mainframe computer, but instead cluster in groups with local processors to perform such jobs as word processing, or to provide local intelligence for a department.

In the microcomputer world, such systems as the Nestar and the Corvus Concept can link together Apples, PETs or virtually any kind of computer.

## Networking Technology

While networking is available now, it is still comparatively expensive. Networks use the latest technology, and are based on one of three kinds of technology.

First is the standard bus topology, in which all stations in the network connect to a single cable, usually a co-axial cable. Typical of this type of system is Ethernet, a joint development of Xerox, Intel and DEC.

In this system, a station listens to make sure the cable is not in use before transmitting. Should two stations transmit at the same time, the message becomes garbled, and so the message is retransmitted. This technique is known as Carrier Sense Multiple Access/Collision Detection.

Adding an Ethernet interface to a computer or terminal is quite expensive — at the moment around \$2000. The major advantage of systems like Ethernet is the reduced cost of wiring a building; where

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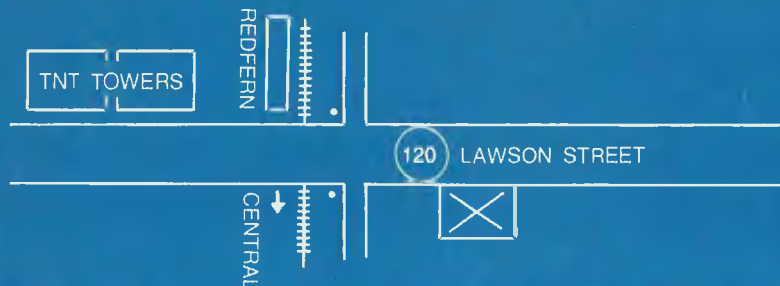
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previously a company would have a forest of cables emerging from the computer centre, now a single coax cable will do.

Similar to CSMA/CD is the broadband system, which basically transmits on the cable in rather the same way as radio and TV stations transmit. As long as two stations are on the same frequency, and nothing else is on that channel, there is no problem with collisions. Many more stations can use the cable simultaneously, but the system is correspondingly more expensive.

The third system is the ring network, in which each station is connected to the next to form a giant circle. Each station receives all messages on the network, and is responsible for passing on any messages that are not intended for it. The ring topology is fairly expensive, but offers several advantages.

All of these systems are suitable for use within a building, but not over large distances (more than a few hundred metres). They are what is called Local Area Networks. Most computer manufacturers are releasing such networks, and we can expect to see them installed in many large companies over the next few years.

However, while the major companies set out to design these systems, there's a small revolution taking place in the microcomputer world too.

### Editorial Bulletin Board

Our own offices would be a case in point. While the magazine's editorial offices are located in Waterloo, on the south side of Sydney, I write in an office in Artarmon, on the north shore. To make life even more interesting, our typesetter is in Cremorne, also on the north shore.

Under the old way of doing things, I would write an article on a typewriter, double-spaced, and then either take or send it to the magazine's offices. There it would be edited by hand, and then sent to the typesetter, who would re-type it, with the alterations, into the photo-typesetter. The galleys (typeset copy) would then be sent back to the offices.

It didn't take long before I was using WordStar to write articles, together with special programs to count the number of words and perform other tasks. The big breakthrough came with the addition of an acoustic coupler to the computers at both offices, and a special box of tricks and a coupler at the typesetter's office. Now, it works like this:

I write the article, like I'm doing now, on the computer using a word processing program, and then check the spelling using another program. Once I have a few stories stored away on disk, I ring the office, and then fire up YAM (Yet Another Modem), the program I use to send files by phone to the other end.

At the office, Matt Whelan starts up a

bulletin board program on the office system, and I establish communications with that computer. From there, it's a simple matter to send the stories up the line, as this example shows:

In this example, we're running YAM at both ends, except on the office bulletin board, it's actually XYAM, a special version which can be remotely controlled. The file transfer is handled completely automatically, with full error detection and sector retransmission if an error is found.

Once Matt has the article, he edits it (if he dares!) and then sends it — also by phone — to the typesetter. He just connects the modem to his phototypesetting

machine, takes the articles directly down to disk, and out comes the finished type.

As a result, stories get typeset faster, with fewer errors, and with less effort. We couldn't do without it!

Several of the magazine's columnists have been using this method to send us their articles for some months now. For example, Geoff Cohen, author of the OSI column, phones his copy through from Canberra, and Nick Gammon's story in this issue was sent the same way.

### Remote CP/M System

The bulletin board, mentioned above, is an adaptation of a remote CP/M system,

```
A>YAM B300<CR> (Start YAM at 300 baud)
Yet Another Modem by Chuck Forsberg
YAM for Godbout System Support Rev 3.09a 30-06-82

>>>a0:tf<CR> (Terminal mode, full duplex)
Term Function (Phone YC Office)
```

```
Welcome to the one-user RCPM system established for YOUR
COMPUTER magazine to allow MW to go to lunch while Les
Bell downloads his copy by himself.....
```

```
Goforit. . . . .
```

```
On system at 12:07:14 EST Thursday, September 2
```

```
Yet Another Modem -- by Chuck Forsberg
YAM for Godbout SS1 3.09c Rev 12-08-82
Type HELP for instructions
```

```
xYAM(A0)^E (Return to sender's command line)

>>>a0:b:
440 kb Free on B
>>>b0:dir
BEE .SEP COMMS .RAV CPU85/88.RVW DATA82 .DOC
DDT .BAS DEMO .DOC EDIT .SEP GLOSSARY.DOC
INV .LB LOGIC .DL NEC .L1 NEC .LAB
NEWS .SEP PORTABLE.DOC PROTOCOL.DOC SUPERVYZ.RVW
TICOL .SEP TRCOL .RVW YAM .LOG YAMDEMO .DOC
YAMLIST .DOC YCNCC+1 .SEP 440 kb Free on B

>>>b0:tf
Term Function
```

```
xYAM(A0)r ddt.bas
Receive: 'ddt.bas' FILE OPEN
^E
>>>b0:st ddt.bas 'ddt.bas' Open 2 Sectors 0.3 Minutes
Awaiting initial NAK
**
ddt.bas closed
^GFile transfer(s) successful^C
440 kb Free on B Term Function
344 kb Free on A
```

```
xYAM(A0)dir
ASM .COM BYE .ASM BYE .COM CHAT .COM
CPM61 .OBJ CPM61MOD.OBJ DD6 .COM DDT .BAS
DDT .COM ERAQ .COM HW .TBL LES .C
LES .COM LOAD .COM MAC .COM MBASIC .COM
```

```

PACMAN1 .COM   PAGE      .COM   PC          .COM   PIP        .COM
PRINT  .COM   PUT        .COM   SD          .COM   SDX        .COM
STARTUP .      STAT      .COM   SUBMIT     .COM   SWEEP     .COM
WC     .COM   XSUB     .COM   XYAM      .COM   XYAMHELP.T
YAM    .LOG   YAMHELP .T    344 kb Free on A

```

```

xYAM(A0)exit
Files closed, modem disconnected, exiting to DOS.

```

```
A>chat
```

```

CHAT ver 1.8 - Remote conversation utility.
Program returns to system in 30 seconds
if operator is unavailable.

```

```
Alerting operator . ^G.
```

```

Operator is available, enter CTL-C to exit CHAT
^GPlease go ahead:

```

```
Thanks Matt, there's that program you wanted.
```

```
gee, thanks boss...zatall you wanna do?
```

```
Yeah, I've got to finish this article. Will ring back with
more copy this afternoon.
```

```
ok, wannagofone or jes hang up?
```

```
Gofone..
```

```
^E
>>>b0:exit
```

```
Files closed, modem disconnected, exiting to DOS.
```

```
A>
```

an idea which has become hugely successful in the US and is starting to appear here.

Already YC's CP/M columnist Bill Bolton is running a RCP/M system which has logged over 1000 callers. The system carries copies of public domain software which can be downloaded using the same method as that described above, and can be used to leave messages, request help, and so on.

And, in a reversal of the procedure outlined above, Bill leaves his columns on the system for us to 'collect' at deadline time.

The popularity of the system is demonstrated by the fact that it is almost continually engaged!

All this serves to demonstrate that communications is not only possible on a microcomputer, it is actually quite easy and extremely useful. We confidently predict a huge growth in interest in the use of computer communications in both business and leisure — and we'll be there to help, with a comprehensive coverage of the communications scene.

**Footnote:** For the many people who are probably interested in our typesetting methods, the people to talk to are Hughes Phototype on (02) 90-4034. The system was developed by Melbourne engineer Colin Benyon, with a little help from Hughes and the YC staff. Colin can be contacted on (03) 876-3794. □

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# Dataphone — The Review

By Bill Bolton



SINCE OUR 'first look' review of the Dick Smith Dataphone direct connect modem last month quite a lot has happened.

As I mentioned then I'd only had a couple of days to use the Dataphone and certainly hadn't had a chance to do any technical performance measurements.

It wasn't too long before I did get into the technical evaluation and it soon became obvious that there was a problem with the unit. About this time I started to get reports from users of my RCPM system about problems with Dataphone units they had bought.

It turned out that the unit I had for review was one of the better performing ones, but that all the early production units had sensitivity problems.

I lost no time in reporting the problems to Dick Smith Distributors who were already well aware of them and working towards a solution. After a few days they came up with a satisfactory solution to the problem. They will adjust at no charge any of the early units that show the sensitivity problem. I took the review unit out to North Ryde and they had it adjusted by the next day.

The performance of the adjusted unit was not that much different when used with remote systems that delivered reasonable carrier levels (above -35dbm) to the Dataphone (see notes below).

The noticeable performance improve-

ment came when using the Dataphone with systems that were delivering carriers below -35dbm. Even the systems I had problems connecting to (as mentioned last month) now presented no problems.

The technical details behind the sensitivity problem were related to the XR2211 chip. The chips used in the prototype units turned out to be more sensitive than those used in the production run units.

The solution was to increase the drive level to the XR2211, to overcome parameter spread, by adjusting the gain of the input stages.

As I stated last month, this product is a very significant in terms of the development of micro-communications (the ultimate buzz word?) in Australia. Already the reports of the problems mentioned above have been widely circulated, there is nothing wrong with that.

However, I've detected an attitude of knocking (that great Australian past time) associate with the reports that have come back to me. While there might be plenty of things that the Dick Smith organisation deserves knocking about I don't believe the Dataphone is one of them.

It readily acknowledged the problem, fixed it quickly and at no charge. The generic nature of the problem (prototypes performing differently from production models) is one that haunts all man-

ufactures and I think Dick Smith Distributors has learned a few things about local manufacture as a result.

There are a few things about the Dataphone which I feel can still be improved as you will see later in this review, however these are minor and do not affect its ability to transfer data. To put it simply I am convinced that the major problem with the Dataphone is now *solved*.

## Technical Background

What follows is (I hope) a relatively simple technical discussion of some aspects of modem communications. If you want a detailed description of the circuit techniques used to modulate and demodulate a data signal you won't find that here; either look it up in a text book on data communications or just take it 'on faith'.

The technique used for data communications at 300 bps rate is called Frequency Shift Keying (FSK) and modulates a carrier frequency by a defined amount depending on whether a binary 1 (mark) or binary 0 (space) is being transmitted.

The frequencies used in Australia conform to International standards laid down by the CCITT. For 300 bps (in simple terms you can think of bps as the same as baud) modems such as the Dataphone, the relevant CCITT standard is V.21.

The 300 bps V.21 standard allows for full duplex operation.

This means that two data channels are available simultaneously, one is used for sending data from the originating modem to the answer modem while the other is used for sending data from the answering modem to the originating modem. Data can be transferred in both directions (by comparison a half duplex system is one in which data can only be transferred in one direction; the 600/1200 bps modem standard in most common use in Australia is a half duplex standard).

There must be agreement between the sending and receiving parties as to which frequencies they will each use for transmission and reception of data, obviously they can't both transmit on the same frequency.

There are two modes available in the V.21 standard, they are referred to as *originate* and *answer* modes. When a modem is in originate mode it can communicate with a modem set to the answer mode. If both modems were set to the same mode, either originate or answer, they would not be able to communicate with each other.

The modem standards use in North America (commonly called the Bell standards) are different from the CCITT standards and so modems made for the US market cannot be used here.

Of course Bell standard modems will work here if used with other Bell standard modems but they will not work with any of the locally available remote systems such as MIDAS, the Australian Beginning, my RCPM system or for that matter with anyone else who has a CCITT standard modem (99.9 percent of Australian modem users).

For comparative purposes the frequencies set down by the Bell 103 and CCITT v.21 are:

#### Transmit frequencies:

##### CCITT V.21

ORIGINATE	980 Hz (Mark)	1180 Hz (Space)
ANSWER	(Space)	1850 Hz (Mark)

##### BELL 103

ORIGINATE	1070 Hz (Space)	1270 Hz (Mark)
ANSWER	2025 Hz (Space)	2225 Hz (Mark)

#### Receive frequencies:

##### CCITT V.21

ORIGINATE	1650 Hz (Mark)	1850 Hz (Space)
ANSWER	980 Hz (Mark)	1180 Hz (Space)

##### BELL 103

ORIGINATE	2025 Hz (Space)	2225 Hz (Mark)
-----------	--------------------	-------------------

ANSWER	1070 Hz (Space)	1270 Hz (Mark)
--------	--------------------	-------------------

As you can see there is quite a difference in the frequencies. On top of that the polarity of the standards is different. The CCITT V.21 standard uses the lower FSK frequency as a mark (binary 1) while the Bell 103 standard uses it as a space (binary 0).

The frequencies used in both CCITT V21 and Bell 103 standards are close to that area of the voice grade transmission path (nominally 300 Hz to 3 KHz) which has the least transmission loss.

The carrier frequency is taken as the mid point between the two extremes generated by the FSK modulation technique. For CCITT V.21, the upper carrier frequency is at 1750 Hz while the lower carrier frequency is at 1080 Hz.

#### Carrier Detect

To achieve reliable transfer of data between two modems there must be sufficient signal level received at both ends.

The modem should give a carrier detect signal indication when sufficient carrier level is being received for reliable data transfer. The absolute minimum carrier level for reliable operation is generally taken to be -48 dbm. Both ends must be receiving sufficient carrier level for a data transmission path to be established.

There are many reasons why sufficient carrier level may not be detected from another modem. Typically the line losses in the total signal path are just too great.

Sometimes your local telephone exchange may be old and have big losses which makes it difficult to have data communications with anyone. Most 'out station' modems (those which typically are the originating point for most calls) will put a signal level of around -10 dbm into the telephone line so there typically is about -35 dbm leeway for accumulated losses in the total communications path.

'In station' modems (those which typically are the answering point for most calls, such as a timesharing system) will put a signal level of 0 dbm into the telephone line. If too many modems ran at the higher, 0 dbm, sending level there would be a number of potential problems in terms of overload and crosstalk on the telephone network.

Since there are relatively few in station modem sites compared to the number of out station modem sites Telecom allows the in station sites to put a higher level to line.

Because of this difference in send levels it is sometimes possible to successfully communicate with a big system such as MIDAS while not being able to establish communications with another microcomputer system.

Sometimes a communications path which will not work reliably with the user

originating the call in the originate mode and the user answering the call in the answer mode, will work fine if both users just swap their modes simultaneously. In theory this shouldn't make any difference but in practice it certainly does.

A number of other things can upset data communications. Crosstalk in the telephone system (crossed lines), echo and line noises are just a few of those things.

#### RS-232C Standard

This could easily take up a whole article on its own so let's just skim over the high points.

RS-232-C is computer interface standard for serial data communications over short distances (up to 15 metres). In microcomputer systems it is typically used for short distance circuits at up to 19200 baud. The voltage levels used are bipolar. This means that a binary 1 has a specified voltage level of one polarity while a binary 0 has a voltage level of the opposite polarity. A voltage level between +3 V and -3 V is not a defined level in the standard. This gives the standard good noise immunity.

The standard also defines a physical connector, typically known as a DB-25 type. It has 25 pins, not all of which are used, even in the most complete interface.

The standard recognises two types of data equipment and the connectors are wired differently for each type. One end is specified as Data Terminal Equipment (DTE) while the other is specified as Data Communications Equipment (DCE). DTEs are typically terminals, printers, plotters and so on while DCEs are generally modems and computers.

The two different schemes exist so the cables can be wired one-to-one; that is, pin 7 on one end goes to pin 7 on the other end. In this respect it is similar in concept to the familiar DIN plug used on Hi-Fi equipment.

Since most microcomputer RS-232C ports are designed for connecting directly to printers or terminals they are configured as DCEs. To connect a DCE configured port on a microcomputer to a modem (another DCE) a special cable with some of the wires crossed over will be needed. On the other hand a terminal (DTE) should plug straight into a modem on a standard one-to-one cable.

Some higher quality micro-systems will allow you to reconfigure the serial ports inside the computer (usually by replacing a DIP header plug) to look like DTE so that a one-to-one cable can be run from the computer to the modem.

The RS-232-C standard provides for some hand shaking signals to be passed between the the DTE and DCE as well as the data signals. These handshaking signals are typically used to inform either the

DTE or DCE about the status of the equipment on the other end of the line.

The only handshaking signal actively provided by the Dataphone is Carrier Detect. The Dataphone accepts no handshaking signals from the DTE.

### The Test Results

Generally the results are satisfactory. There are a few points that deserve further comment:

**Transmit Frequency Jitter:** Telecom normally expects its own modems to have no more than 4 percent of the transitions to be early or late. The Dataphone had a significantly higher number of early/late transitions, however in the five minutes

duration of this test there were no errors in the data received.

**Harmonic output in transmit frequency:** The measured figures are significantly worse than the specification.

Harmonics beyond the 2nd are of academic interest only as they are outside the bandpass of the telephone system. The originate mode transmit frequency harmonics will bring up carrier detect (with a 1:1 signal, line terminated in 600 ohms). This is a little disturbing but does not appear to affect the operation of the unit in on-line tests.

**Carrier Detect:** The carrier detect circuit is far too sensitive. Carrier levels below -48 dbm will not give reliable operation and giving a carrier detect signal on the

front panel LED and RS-232-C interface below this level will only frustrate users as they try to persist with communications paths which are plainly not satisfactory.

### Construction And Documentation

The filters in the Dataphone are set up with trimpots. These trimpots are sealed to prevent accidental movement, however in the long term they are a potential source of trouble.

If the unit is left in one place they will probably present no problems. I certainly wouldn't suggest that you seriously consider the Dataphone as a portable modem.

Overall the construction is satisfactory.

The unit is supplied with a five-page set

### Published Specifications

Maximum data rate	:	300 baud
Telephone line terminating impedance:		600 ohms +/- 15%
DC resistance	:	100 ohms approx
Modulator output to telephone line	:	-10 dbm maximum
Modulator tone frequency accuracy	:	+/- 6 Hz
Modulator tone frequency stability	:	within 0.2% (5 to 45 degrees C)
Modulator spurious output level	:	less than -38 dbm
Demodulator sensitivity	:	better than -40 dbm
Safety isolation to telephone line	:	greater than 3.5 kV RMS for 1 minute
Power consumption	:	less than 700 milliwatts

Figure 1 - Specifications

### RS-232C Interface

The interface is configured as Data Communications Equipment (DCE) and provides the following signals:

Pin 1	Protective Ground	
Pin 2	Transmitted data	To Modem
Pin 3	Received data	From modem
Pin 5	Clear to send (tied positive)	From modem
Pin 6	Data set ready (tied positive)	From modem
Pin 7	Signal Ground	
Pin 8	Carrier detect	From Modem

The Transmit, Receive and Carrier Detect lines are full bi-polar signals which meet the RS-232-C standard. The CTS and DSR signals are tied to a positive voltage in the modem and are provided because many types of DTE expect to see these signals present for communication to take place.





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of notes. These notes cover the operation of the Dataphone fairly well.

Also supplied is the relevant Telecom form that you will need to apply for the fitting of a 611 socket to your phone line.

### Our Findings

In use over the past couple of weeks the Dataphone has performed well.

The minor problems outline above have been reported to Dick Smith Distributors and are currently being investigated. They gave a clear commitment to solve them.

The only thing I can compare the Dataphone to is the Telecom supplied Di-

rect Connect modems. The Dataphone does not perform as well as a Telecom modem but costs considerably less and performs much better than any acoustic coupler.

I feel the Dataphone performs perfectly well for communicating with other direct connect modems or acoustic couplers.

The dataphone is good value for money and is now really the only valid choice for any microcomputer users wanting to buy a modem.

### Modifying It...

Legally you can't. The Permitted At-

tachment approval by Telecom applies only to the unit as manufactured, and DS Distributors won't want to know about your modifications.

Still, I expect that isn't going to stop many users from having a go at modifying it for auto answer operation or whatever. If you do, please don't do anything to compromise the electrical safety of the unit.

If you do come up with a modification of some sort, please let *Your Computer* know about it. We may not be able to publish it for legal reasons but we would certainly be interested in knowing about it. □

### Performance On Test

#### Transmit Frequency - ORIGINATE

		WAS	SHOULD BE	
Binary	1	981 Hz	980 Hz	OK
Binary	0	1181 Hz	1180 Hz	OK
- ANSWER				
		WAS	SHOULD BE	
Binary	1	1652 Hz	1650 Hz	OK
Binary	0	1855 Hz	1850 Hz	OK

#### Transmit level to line (Measured with 1:1 mark/space ratio signal)

	WAS	SHOULD BE	
ORIGINATE	-11.1 dbm	> -10 dbm	OK
ANSWER	-11.6 dbm	> -10 dbm	OK

#### Transmit Frequency Jitter (Measured using a 511 bit psuedo random pattern)

ORIGINATE	9% early	22% late	See Comments
ANSWER	12% early	27% late	See Comments

#### Harmonic Output in Transmit Frequency (Line terminated in 600 ohms)

ORIGINATE	981 Hz	Reference	0 dbr	
	1961 Hz	2nd harmonic	-24.1 dbr	See Comments
	2941 Hz	3rd harmonic	-32.9 dbr	
	3921 Hz	4th harmonic	-31.6 dbr	
		Noise	-68 dbr	
ANSWER	1650 Hz	Reference	0 dbr	
	3299 Hz	2nd harmonic	-26.3 dbr	See Comments
	4948 Hz	3rd harmonic	-43.5 dbr	
	6597 Hz	4th harmonic	-48.0 dbr	
		Noise	-69 dbr	

#### Bias (Receiving a 1:1 signal:)

approx 4% bias towards binary 1 OK

#### Carrier Detect

	DETECTED	LOST	
ORIGINATE	-67 dbm	-68 dbm	See Comments
ANSWER	-68 dbm	-69 dbm	See Comments

Figure 2 - Performance On Test

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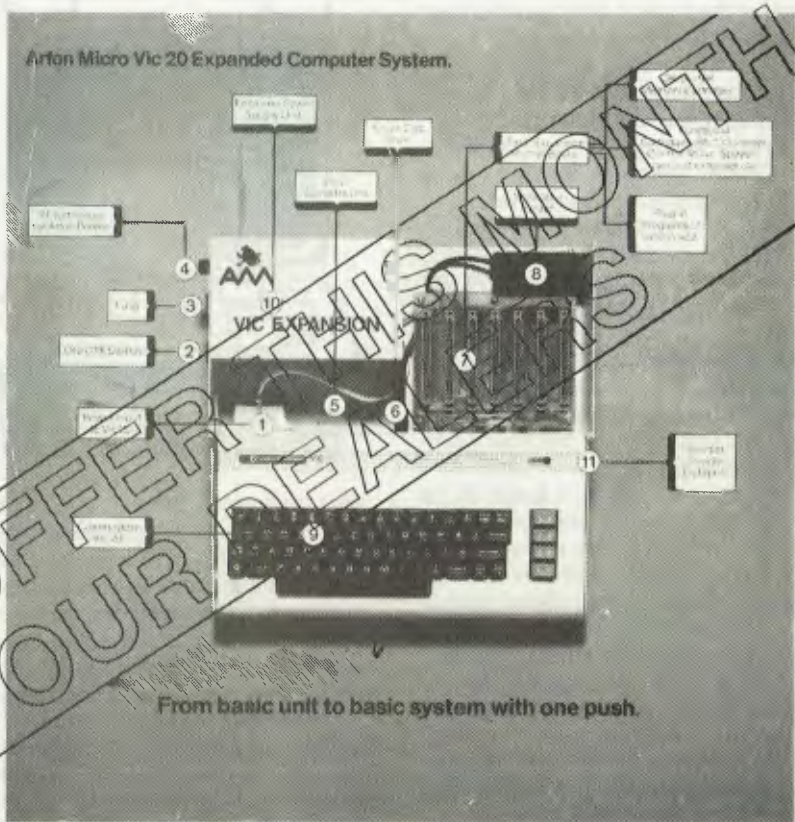
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# Play Games By Modem!

By Nick Gammon

THE AVAILABILITY of low-cost modems (for example the Dick Smith modem, for \$169) will surely generate an increase in interest in data communications.

Transmitting messages via telephone is a fairly new idea for the home hobbyist. Previously the expense of hiring a Telecom modem — or purchasing an acoustic coupler — discouraged the amateur from experimenting with data transmission.

Some of the uses to which a computer with modem can be currently put are:

- Accessing data banks, such as the Australian Beginning, the Source, and various bulletin boards run by computer clubs. These primarily function as a source of programs, news and mail.
- Dialing into mainframe computers — for example accessing timesharing services, or the computer at work for those of us who also program professionally.
- Sending programs and data to friends or associates. For example, the words you are reading now were transmitted by phone from Melbourne to the *Your Computer* offices in Sydney.
- Multi-computer games. I know of no computer games which are designed to be run with two computers connected via a modem (there may be some, of course, I just haven't heard of any). Since games have a fascination for me (they're fun!) this article will describe some of the design concepts that will need to be incorporated into the multi-computer games of the future.

As an example, I present a two-computer noughts and crosses game (Tic Tac Toe) written in Applesoft Basic.

## Two-Computer Games

This article is primarily concerned with games involving two computers connected by phone, however the ideas would equally apply to two machines directly connected via cables (through their serial interface ports, for example).

What sort of games lend themselves to these concepts? Quite a few, really.

Obviously shoot-em-up arcade games are best played on the one machine. The types of games that are suitable are those where the computer is primarily acting as a 'mediator' rather than as a direct contestant. Games in this class include Star Trek and its variants, adventure games, word games and so on.



## GAME REVIEW

For example, imagine an adventure game played with two players in their own homes. The game would have the same basic scenario for both players, but they would not necessarily be in the same 'room' in the game at the same time. They might decide to cooperate to find the treasure (or whatever) or fight each other.

A particularly dastardly type might wait for his companion to find all the jewels and then stab him in the back (figuratively speaking) and take them from him! The game could inform each player what the other is doing by saying things like:

JOHN IS IN THE ROOM WITH YOU, or...

YOU SEE PETER IN THE DISTANCE - HE IS CARRYING A BIG SACK

Or imagine a Star Trek game with one player navigating and the other one controlling the weapons. Or maybe one player would fly the Enterprise and the other command the Klingons.

## Smart Or Dumb Opponents?

There are two ways a game involving two machines can be designed:

- One computer runs the game and the other end is only a 'slave' — it basically acts as a terminal to inform the player at

the other end what is happening but doesn't incorporate any game logic.

**Advantages:** 1, Easier to program; 2, Only one copy of the program needed — the person at the other end doesn't need a copy, just a 'terminal' program.

**Disadvantages:** 1, Poor response time — everything that happens has to sent up to the other end at 300 bits per second (slowly, in other words!) and then await a reply.

- Both computers run the game — they have to synchronise themselves by passing information to and fro about what each other is doing.

**Advantages:** 1, Much more sophisticated programs possible — for example an adventure game where each player acts independently and the only interaction is when they are in the same 'room' as each other; 2, Fast response to each player. Primary validation of player input is done at each end, not just at one end. By primary validation we mean checking that the player has entered a valid response, and so on.

**Disadvantages:** More complicated message-handling software needed at each end. The program has to know that a message that it sent was received correctly, and act appropriately if it wasn't.

## Two-Computer Tic-Tac-Toe

In order to keep the example simple, the game presented in this article is a simple noughts and crosses game. One player is the nought player and the other the cross player. They take it in turns to go first, and the game displays the state of the board after each move so that each can see what the other has just done.

The game assumes that a serial interface card is plugged into slot 1 of your Apple. If you do not have an Apple, or your serial interface is not in slot 1, then you will have to make minor modifications here and there. The serial interface card is, of course, plugged into the modem.

The game displays a sign-on message to both parties, then alternately accepts moves from the 'local' and 'remote' player. It checks the moves for validity and, if it accepts the move, updates its image of the playing board. It then checks to see if the latest move won the game, and if so displays an appropriate message.

The method of toggling between the local player and the remote player is by using the Apple's IN (Input) and PR

(Printer) commands. IN#1 means take your input from slot 1. IN#0 means take input from the keyboard. PR#1 means direct output to slot 1 (this is where the serial card is plugged). PR#0 means direct output to the screen.

The game assumes that the other end is 'dumb'. In other words, the other end can be any terminal or computer that operates in full-duplex terminal mode. Most Apple users with a modem will own a suitable terminal emulation program.

Lines 4700 and 4800 may not be needed by all users. In my system they 'condition' the serial card to output a linefeed when it receives a carriage return; and ignore the keyboard when obtaining input from the modem. My system has an Apple Super Serial Card (SSC) but the program should work with most other serial cards.

The program displays a board in the following fashion:

```

1 ! 2 ! 3
---+---+---
4 ! X ! 6
---+---+---
7 ! 8 ! 9

```

Where a number appears that move is available (for example: 6). Once a move has been made the appropriate number is replaced with O or X. In the above example square 5 has an X on it. □

```

10 REM
20 REM 2-COMPUTER TIC TAC TOE
30 REM AUTHOR: NICK GAMMON
40 REM
100 DIM B(9): REM BOARD
200 TEXT : HOME
300 T = 0
400 DS = CHRS (4)
500 GOSUB 5800: REM INSTRUCTIONS
600 REM
700 REM SET UP GAME
800 REM
900 FOR I = 1 TO 9
1000 B(I) = 0
1100 NEXT I
1200 W = 0: D = 0
1300 IF T = 0 THEN T = 1: GOTO 2100
1400 IF T = 1 THEN T = 0
1500 REM
1600 REM NEXT MOVE
1700 REM
1800 GOSUB 6700: REM DISPLAY BOARD
1900 N = 1: REM NOUGHT
2000 GOSUB 9600: REM GET MOVE
2100 GOSUB 6700: REM DISPLAY BOARD
2200 IF W = 1 OR D = 1 GOTO 2700
2300 N = 2: REM CROSS
2400 GOSUB 9600: REM GET MOVE
2500 GOSUB 6700: REM DISPLAY BOARD AGAIN
2600 IF W = 0 AND D = 0 GOTO 1900:
    REM AGAIN IF NOT FINISHED
2700 AS = "ANOTHER GAME ..."
2800 GOSUB 5200
2900 GOTO 600
3000 REM
3100 REM GET A CHARACTER FROM REMOTE END
3200 REM
3300 PRINT DS;"IN#1"
3400 GET CS
3500 PRINT
3600 PRINT DS;"IN#0"
3700 RETURN
3800 REM
3900 REM SEND AS TO LOCAL SCREEN
4000 REM
4100 PRINT AS
4200 RETURN
4300 REM
4400 REM SEND AS TO REMOTE TERMINAL
4500 REM
4600 PRINT DS;"PR#1"
4700 PRINT CHRS (9);"L E"
4800 PRINT CHRS (9);"F D"
4900 PRINT AS

```

```

5000 PRINT DS;"PR#0"
5100 RETURN
5200 REM
5300 REM SEND AS TO BOTH PLAYERS
5400 REM
5500 GOSUB 3800
5600 GOSUB 4600
5700 RETURN
5800 REM
5900 REM INSTRUCTIONS
6000 REM
6100 AS = "WELCOME TO 2-PLAYER TIC TAC TOE!"
6200 GOSUB 5200
6300 PRINT : PRINT "YOU WILL BE 'O'"
6400 AS = "YOU WILL BE 'X'"
6500 GOSUB 4600
6600 RETURN
6700 REM
6800 REM DISPLAY THE BOARD
6900 REM
7000 AS = ""
7100 GOSUB 5200
7200 AS = "CURRENT BOARD:"
7300 GOSUB 5200
7400 AS = ""
7500 GOSUB 5200
7600 I = 1
7700 FOR J = 1 TO 3
7800 AS = ""
7900 FOR K = 1 TO 3
8000 AS = AS + " "
8100 IF B(I) = 0 THEN AS = AS + CHRS(I + 48)
8200 IF B(I) = 1 THEN AS = AS + "O"
8300 IF B(I) = 2 THEN AS = AS + "X"
8400 AS = AS + " "
8500 IF K < 3 THEN AS = AS + "!"
8600 I = I + 1
8700 NEXT K
8800 GOSUB 5200
8900 IF J = 3 GOTO 9200
9000 AS = "-----"
9100 GOSUB 5200
9200 NEXT J
9300 AS = ""
9400 GOSUB 5200
9500 RETURN
9600 REM
9700 REM MAKE A MOVE
9800 REM
9900 IF N = 2 GOTO 10800
10000 PRINT "YOUR MOVE ..."
10100 AS = "WAIT ..."
10200 GOSUB 4600
10300 GET MS
10400 PRINT MS
10500 IF MS >= "1" AND MS <= "9" GOTO 11900
10600 PRINT "ENTER A NUMBER FROM 1 TO 9 ..."
10700 GOTO 10300
10800 PRINT "WAIT ..."
10900 AS = "YOUR MOVE ..."
11000 GOSUB 4600
11100 GOSUB 3300: REM GET REPLY
11200 AS = CS
11300 MS = CS
11400 GOSUB 4600: REM ECHO REPLY
11500 IF MS >= "1" AND MS <= "9" GOTO 11900
11600 AS = "ENTER A NUMBER FROM 1 TO 9 ..."
11700 GOSUB 4600
11800 GOTO 11100
11900 REM
12000 REM CHECK IF SQUARE VACANT
12100 REM
12200 M = ASC (MS) - 48
12300 IF B(M) = 0 GOTO 12800: REM EMPTY
12400 AS = "THAT SQUARE TAKEN - TRY AGAIN ..."
12500 IF N = 1 THEN PRINT AS: GOTO 10300
12600 IF N = 1 GOTO 10300
12700 IF N = 2 THEN GOSUB 4600: GOTO 11100
12800 REM
12900 REM SEE IF WINNER
13000 REM
13100 B(M) = N
13200 W = 0
13300 FOR I = 1 TO 7 STEP 3
13400 IF B(I) = N AND B(I + 1) = N
    AND B(I + 2) = N THEN W = 1
13500 NEXT I
13600 FOR I = 1 TO 3
13700 IF B(I) = N AND B(I + 3) = N
    AND B(I + 6) = N THEN W = 1
13800 NEXT I
13900 IF B(1) = N AND B(5) = N
    AND B(9) = N THEN W = 1
14000 IF B(3) = N AND B(5) = N
    AND B(7) = N THEN W = 1
14100 REM
14200 REM SEE IF DRAW
14300 REM
14400 D = 1
14500 FOR I = 1 TO 9
14600 IF B(I) = 0 THEN D = 0
14700 NEXT I
14800 REM
14900 REM ANNOUNCE WINNER
15000 REM OR DRAW IF ANY
15100 REM
15200 IF D = 0 AND W = 0 THEN RETURN
15300 IF W = 0 GOTO 15900: REM DRAW
15400 AS = "YOU WIN!!!"
15500 BS = "YOU LOSE - BAD LUCK!"
15600 IF N = 1 THEN PRINT AS: AS = BS:
    GOSUB 4600
15700 IF N = 2 THEN PRINT BS: GOSUB 4600
15800 RETURN
15900 AS = "THE GAME IS A DRAW!"
16000 GOSUB 5200
16100 RETURN

```



# Your Computer

MAGAZINE

## HAS MOVED

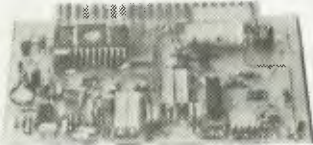
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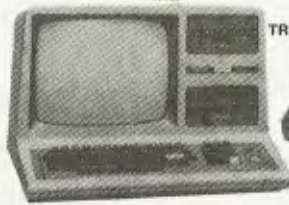


from

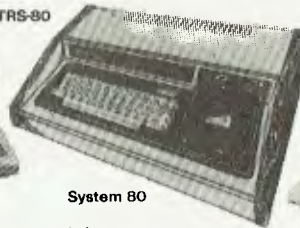
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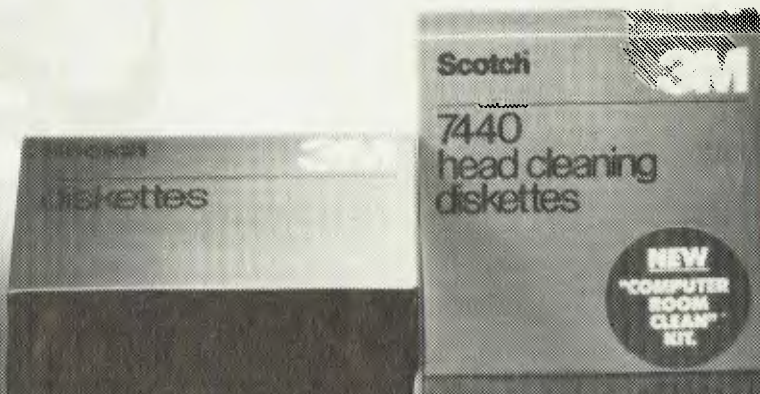
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# your computer

## text file

### Buying Help

I AM A beginner and I want to start buying some equipment. I might be able to start with an expenditure of around \$2000, and I might have to start at \$400.

What I want to know is what to buy and I know from your July issue that your magazine maintains that it cannot give that sort of advice.

Well then, how about I tell you the criteria that I want the computer, or computer systems to judge on? And your magazine, or you, then tell me which performs best.

Right then, I see it this way: The obvious place for me to end up is at a system that does everything you could ask a system to do. Printers, modems, hard disk drives, massive memory, all languages, and the greatest bulk of software programs can be used on it — all the BASIC programs, all the business applications programs, and it is compatible with mainframe computers and so on.

How about that? Does that sound reasonable? Because this is what I want. So I simply envisage a graph with columns for whatever you think is most important and the last column being a column showing the total cost of a typical system (what I mean by that is not a 'total' system as offered by the manufacturer necessarily, for that might include half a dozen hard disk drives giving hundreds of millions of bytes of on-line memory. It could go on forever. I mean what you might call a full size system, capable, say, of use by most small to medium businesses).

Now we all know which is the language — BASIC. Or that's my opinion anyway — but perhaps you know of more esoteric things that could turn out to be really important, things that will effect the 'potential for growth' of the system. If so, you could have a column to cover that.

Okay? I hope I made myself clear, I know I'm not very good at it (too much grog or something) but I reckon you'll figure it out.

I reckon such a listing could and should be a permanent feature of the magazine. It doesn't favour one manufacturer above others, it doesn't tell anyone what they should buy — it does show everyone what is available in the marketplace at the moment, (surely a good thing) and it does lay things out so that at a glance a person can tell what comprises what is seen as a 'complete' system nowadays, considering the state of the art and would imply what

we (or 'they') are, or should, be working towards (the 'complete' system in one package for \$100, payable in weekly instalments.)

And the last line (column) is the nitty-gritty, for the machine or system that gets there in an unbroken line (from col 0 to col end, for a 'break' in the line means one of the features is missing, cannot be supplied and this means that, barring a simple need for specific functions or abilities only, the system is useless to you because it can never be completed).

Okay? Get what I mean? To me it's nothing but a simple BASIC program — perhaps I should have tried to write it, but I'm a bit slack and I started this first anyway, that's the point, I don't know all the variables that add up to the system I need, that's what I'm asking you for in the first place.

And that gives me another thought, why not run a competition each month? 'Write a BASIC program to do ...' (Print out my 'graph').

You could give a little prize every month, even if only a couple of free copies of the magazine, I'd be satisfied with that. Wouldn't take much to run the entries through and judge them on running time, freedom from bugs, brevity or exceptional cleverness. I'll come in and do it for you for free if you like.

Anyway, that's not what I was talking about. Please give me a hand with this question. Where do I start, whether I start at \$2000 or at \$400. Apple? Commodore? Dick Smith? Microbee? Sorcerer? Where? and Why? Just where can I go from there?

I wish your magazine came out every week — how about a *Your Computer Output* — just a few pages, for fifty cents, say, in the middle of the month, with a little output from 'our computer'.

*D Hawcroft  
Mosman, NSW*

Ask us again next year...

### Not So Simple

I HAVE a little problem that the computer can solve and maybe your readers would like to have a go at it.

It looks very simple to people with a little trigonometry and mathematics, but it ain't. You try it.

I have a solution written in BASIC. Also

I'm collecting solutions from other programmers, in BASIC, so far I have none. Maybe the problem is too hard for normal people. I will send the solution to you or anyone who writes to me.



The length 'L' of the arc is known .... say 12

The length 'C' of the chord is known .. say 10

What is the height 'H' ?

It looks so simple. Most people will feel they have seen a formula for that problem, they will look up old text books and not find one. From then on it needs a bit of thinking.

PS: Is this worth a years free subscription?

*Alan Juggins  
Mordialloc, Vic*

No.

### We'll Prosper?

HAVING JUST read the self-accolade contained in the editorial may I add this comment...

Once I visited and saw how the editorial comment was produced by your editor on his own S-100 computer somewhere behind the Royal North Shore Hospital and visited the original company HQ in Military Road, Mosman. May I offer my laudation.

You have all done well, and provided the same state of arts keeps on, you will prosper.

May I suggest another section... 'Notes For Nongs'... Most get bitten ab initio. Further, in the oncoming period of 'squeeze' when more of the daily dollar will be required for bread, even a few K may not be so easy to beg, borrow or steal.

By offering more for the complete beginner, offering an insight into the usefulness of modern computing, what can be done with them, what problems can be solved and so on, can make interesting reading even to our new generation...schnooks or whiz kids.

*Keith Watson  
Mosman, NSW*

# your computer text file

## Game Plan

I AM considering submitting a program to your magazine. It is a real-time computer game, called Killer Robots, written for the OSI Superboard II.

The game involves dodging high-voltage robots in a minefield surrounded by an electronic fence.

Please inform me how I should undergo the submission. Would you send me details on:

- The necessary documentation of the program,
- The likelihood of publication,
- When the program would be published,
- Your payment for programs.

Bob Sainsbury  
Dalkeith, WA

**Send you details? We're not even sure ourselves...**

**Watch coming issues for an update to *Making Your Hobby Pay*, the February issue feature which dealt with this subject.**

**Meanwhile, here are some comprehensive micro-answers:**

- See Page 98
- Good
- Unpredictable
- \$10 if it's less than 10 lines. Maybe more if it's 20 lines.

## Better Than Good

WITH REFERENCE to the Graf Spee (page 32, August 1982): it received a 'very good' value for money tick at only \$69.95. I think it should have been given excellent value for money.

I was also wondering whether you would go to print on what you pay for a program (using examples if possible) and software reviews.

B J Thurkettle  
St Ives, NSW

**It is difficult for us to quote payment figures for the items you mention, as there are so many variables involved: the length and quality, how much extra work it involves for us, and small details like how much there is left in the editorial kitty that particular month.**

**Payments for 'normal' programs vary from \$25 or so to around \$100. Incidentally, for those who have asked,**

**the writer retains copyright, although we consider the program available for our re-use and, naturally, for readers' individual use.**

## Make It Simple

I HAVE read each of the issues of *Your Computer* with interest since purchasing my first copy in December 1981. This purchase was motivated by your article on that issue on kit computers, particularly the Super 80 which I was considering at that time as a low cost entry into personal computers.

With each new issue I have sought to add to my knowledge of microcomputers so that I can make a better informed decision with my initial purchase. Ideally, I wish to purchase a computer in the under \$1000 price range which has the ability for later expansion to printer and ultimately a disk based system.

However, at present I find I am floundering to understand the means of expanding beyond the basic computer and I must confess that I have failed to find this explanation from articles in *Your Computer*.

Whilst I do not naturally wish you to make my decision for me, I would like to see some articles on the following areas in *Your Computer* in the near future:

- the relevance of the size of ROM/RAM
- the advantages (both cost and ease) of expanding through serial, parallel or S100 buss
- comparisons between microprocessors — not which is the best, but the availability of materials, expansion facilities, and so on
- distinctions between the various types of disk systems e.g. hard disk, Winchester, double density, 13 cm and 20 cm.
- significance of Baud rates.

I am sure such information must be required by many newcomers to personal computers such as myself.

Michael Oborn  
Greenwood, WA

## Wrong Machine

I REFER to the Starfighter game report in the July 1982 issue. In the index it states that this game is an offering for the Sorcerer. It also states in the report that this game is available at Dick Smith.

I have made enquiries at Dick Smith stores but was told that Starfighter is only available in System 80 programs, and that

they know of no other available for the Sorcerer.

Could you please verify this as either an editorial mistake or perhaps Dick Smith has been misled.

George Muscat  
Wanneroo, WA

**We have to admit it — our mistake...it's a System 80 game.**

## At 9.6 KiloBard...

HAVING SPENT approximately six months watching my husband reading his 'bible' in the evening (*Your Computer*) I was moved to write this poem.

Perhaps I should say that since writing the said poem I have become somewhat interested in computers myself and am about to undertake a course in BASIC programming with my husband, whilst awaiting the arrival of our bayBEE (Microbee) from Sydney.

ALEXANDRA KELLY  
Belair, SA

## De Bugged

*He's sitting there on the lounge  
Your Computer in hand.  
His eyes they have that way off look  
— He's in 'Computerland'.*

*Which model will he choose?  
Apple, Atari or other?*

*It must have all its bits and pieces  
disk drive, printer and cover.  
I wonder which button he will press,  
when he wants a cuppa?*

*At times he's quizzed me,  
sneakily, expounding on their glories  
the 'talking board', 'Speech memory'  
and column thermal printers.*

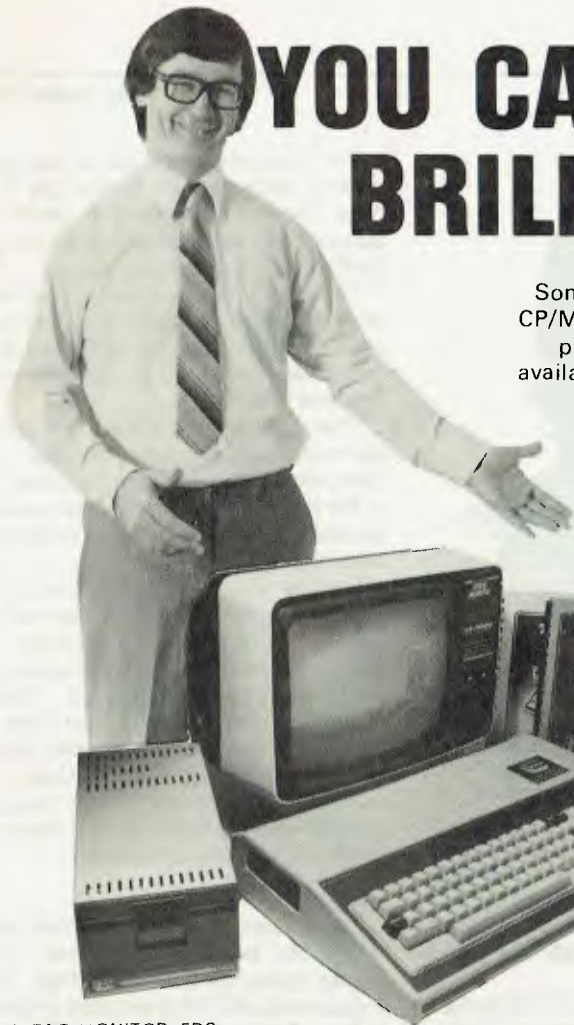
*He's almost got me hooked,  
Yes, I'm thinking now 'which colour?'  
the games look nice, the buttons flash  
I realise now — it's more than trash.*

*What disks are available dear  
I ask, for washing, cooking, cleaning?  
Can it be programmed specially  
for windows, walls, the ceilings?*

*He's looking at me strangely now  
that patient male look  
he doesn't realise I understand  
all about 'Computerland'.*

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When you purchase a Sorcerer Computer, VIC 20 or System 80 from Dick Smith Electronics you become eligible to win a **DATSUN STANZA GL four door sedan!**

**Don't delay, hurry in for your computer now! Contest must close soon!**

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THE APPLE II microcomputer has become the white hot centre of a bitter wrangle between state-funded computer interests and free enterprise.

At issue is the huge market for microcomputers in secondary schools. The stakes rose dramatically last month (June) when Polycorp Holdings Ltd filed an anti-dumping suit against Apple Computer and its New Zealand master agent CED Distributors of Auckland.

The charge, filed with the New Zealand Customs Department, was triggered by an extraordinary offer to educational establishments by Apple through CED Distributors. Apple dropped its tax exempt price to schools from \$4812 retail to \$1200. We must note here that Government departments and educational establishments are free from the notorious 40 percent sales tax on all computers — a tax which effectively increases the retail price by 32 percent.

The offer, in fact, is being sponsored by the Apple Education Foundation. The offer is limited to one system per school, university, or technical institute. The offer is for a complete system including disk drive.

According to the managing director of CED Distributors, Brian Eardley-Wilmot, the orders are being numbered so as to ensure that the educational establishments are not getting more than their fair share. CED Distributors expects that around 400 systems will be accepted under this offer.

Under New Zealand tax exemption conditions the schools must hold the systems for at least six months. Then they are free to dispose of them again. However, the result of the charge filed by Polycorp Holdings may be that a duty will be superimposed. There is no duty, or import licensing, on computers imported into New Zealand from the United States. But the Minister of Education can, if a dumping claim is proved, impose any duty he cares to on the products concerned.

Polycorp Holdings is 75 percent funded by the Development Finance Corporation which is New Zealand's publicly owned venture capital organisation. It is a rich, powerful, and successful organisation and exists to put money into just such projects as the locally designed and manufactured Poly computer aided instruction system. New Zealand's largest software house, PROGEMI Systems, wrote the software and also has a large interest in the project.



### Well Timed Sabotage

But Poly has run into one problem after another, and the Apple offer seemed to the Poly people to have been specially timed to sabotage the project once and for all.

In fact, the Ministry of Education has been in a tizzy about the secondary schools bulk computer contract for the past two years. Two years ago there was little doubt anywhere that Poly was going to get the nod.

The Poly was developed in 1979 by Neil Scott of the Wellington Polytechnic. It features a five screen overlay with remarkable colour and animation. It has fast response time.

It also has the advantage of being the most completely New Zealand made product in the patchy history of New Zealand's ventures into high technology. Even the printed circuit boards are made in New Zealand, by Delphi Industries.

The product, however, is vulnerable politically. The release of Poly as a fully fledged educational computer coincided with the release in Auckland of the Microprocessor Developments Ltd MX Series of locally assembled, or 'integrated' microcomputers.

According to MDL these systems are as adequate for instruction work as the Polycorps. The MXs are multiprocessing and multiprogramming and are made up of seven individual computer boards. They have enjoyed considerable success with the local government market here.

At the same time, Auckland microcomputing interests as a whole banded together to form a lobby whose prime objective was to scotch the pending Government bulk procurement allocation to the Poly.

They succeeded, and were helped by a sudden political lurch to the right by the New Zealand Government which was supposed to have issued tenders anyway by the first working week in June.

The Apple offer seemed to spur everyone into action. A hastily convened panel of experts has been established to vet computers that could be suitable for New Zealand schools.

This committee, it seems, will draw up technical specifications for the 'ideal' computer for New Zealand schools. This is the technical equivalent of convening a committee to decide whether or not motherhood is a good thing.

For the last 18 months schools have been busy purchasing their own computers out of unallocated resources. Two busy bulk procurement cooperatives have been particularly successful. Birkdale College along with David Reid Data Products organised a bulk purchase discount scheme for Tandys. Selwyn College did the same thing for Apples. So almost all schools now have one or more computers generally an Apple or Tandy.

### Rubber-Stamp Body

The independent sector, meanwhile, views this 'technical committee' as the rubber stamp for an okay to Poly. There are currently 80 Polys installed in schools in New Zealand. But Polycorp Holdings requires hundreds more to make the local assembly operation economically feasible.

The machine was sponsored by the Development Finance Corporation under a broad assumption that it would be on the receiving end of the Ministry of Education's bulk procurement contract for all secondary schools.

Time is against the Polycorp, meanwhile. The imported versions can benefit from advancing technology, while the Poly must necessarily remain frozen in time. And this means, of course, that the price must also remain frozen.

The Development Finance Corporation has gone so far out on a limb for the home-grown system that it has even devoted the best part of a floor in its downtown tower building for the sales management of Poly. The free enterprise sector charges that Poly is not subjected to the same laws of market reality that they are.

Ian Coombe, the DFC man in charge of Polycorp told me that he saw the Apple cut price deal as a deliberate attack on his company which was given no option other than to respond with a 'defensive action' — the anti-dumping allegation.

Brian Eardley-Wilmot of CED, meanwhile, fears that Apple may simply withdraw the offer if it is the subject of an international trade wrangle. The point is that Apple might not want to be involved in a legal dispute over an offer it claims to have made charitably.

So, win or lose, the Poly may once again be a loser. Win the argument, and Poly earns a spoil-sport tag from the educational establishment. Coombe is at pains to point out that the charge was levied to protect Polycorp Holdings. "We do not want to prejudice the opportunity of schools", he emphasised.

Presumably, the Customs Department will have to weigh up if the offer was made in a genuine spirit of charity or profit.

However Steven Jobs, 27-year-old founder of Apple, has a consistent policy toward educational donations. For example, the Wall Street Journal recently reported that his "The Kids Can't Wait" scheme involved the donation of \$200 million worth of Apples to schools around the United States.

Those of a more cynical turn of mind, meanwhile, claim Jobs is merely clearing stocks for the arrival of the Apple IV. They also claim the strategy of the company is simply to seed as many Apples as possible throughout education everywhere to ensure a long-term buying pattern.

### Giant Order

Process control microcomputer specialist, Production Engineering, has won perhaps the largest single order for a manufactured export in New Zealand history.

It is for the company's full integrated micro-controlled petrol station systems. It does everything automatically. Chiefly, it takes into consideration the extraordinary shift in filling station marketing patterns in New Zealand.

Nowadays, they are as busy selling snacks, moccasins, coal, and clothes as they are petrol. The secret of the Production Engineering PRISM systems is to link events on the petrol forecourt with what is going on in the retail side.

The company takes its microprocessor work far upstream, designing its own circuit boards which are powered by Intel microprocessors which the company programs itself.

Now, Production Engineering has won an order for at least \$8 million of PRISMs from Australia, presumably one of the Seven Sister oil companies.



Production Engineering managing director John Williams (right) with New Zealand Prime Minister Robert Muldoon at the opening recently of factory extensions.

### Software Trailblazing

Pioneer microcomputing retailer, Frank Goldingham of Viscount Electronics, Palmerston North, has blazed a new trail. He has sold a farm management package to Australia's Dick Smith.

The farm management package was written by Wairarapa dairy farmer Jim Bicknell and it includes optimum feed patterns and pasture usage. The software went through almost a dozen revisions before Goldingham decided it was suitable to release on the export market.

"This is a real user package", enthuses Goldingham. "Jim uses it all the time himself. He has tried it from every angle. He's confident that it now covers everything a dairy farmer really wants to know about his business."

Those New Zealand farmers are more conservative than anyone thought. Government figures have just revealed that no more than 75 microcomputers are being used on farms. And farmers claim even this is optimistic. The true figure may be as low as 50.

Commodore just managed to bring the VIC 20 into the consumer market for under \$1000. Retailers are just whiskering the magic four figures — which is not a bad achievement bearing in mind that the New Zealand dollar is only worth 75 cents in the US, plus the 40 percent purchase tax.

Commodore meanwhile has joint ventured with Auckland's Interactive Applications, New Zealand's biggest software house, in a systems approval scheme. The scheme allows users to have an entire system plus software on approval before making a decision.

Disappointment all around when IBM

drew back the curtains on its new street-side Product Centre only to reveal that the Personal Computer was not among the goodies.

Indications are that the personal computer will not arrive in New Zealand for another year at least. This has been particularly disappointing to IBMers who wanted the system to be the centre-piece of the new Product Centre which handled everything between a Selectric and a System 34.

Technology Marketing, the New Zealand 'cartel' with outlets in Auckland, Christchurch, Hamilton, and Wellington, has been chosen to run International Computers Ltd's first Trader Point scheme.

This is ICL's strategy to delegate its small systems to dealers. At first the Trader Point will operate out of Technology Marketing's Wellington operation, Compusales. The Compusales Trader Point will initially handle four of the smaller range of ICL models. They are the models 31, 32, 30, and 10 personal computers.

The first Trader Point will operate out of Compusales new premises in the former Wang offices in downtown Wellington. The model 10 will retail for around \$11,000. It features 64K bytes of RAM memory, integral dual mini floppy disk drives. The model 30 will sell for \$15,000 and models 31 and 32 for \$19,000. The 30 and 31 feature multi-user and multi-programming operating systems.

The Trader Point deal confirms Technology Marketing's position as far the biggest microcomputing retail organisation in New Zealand. The group recently landed the Microcomation agency. □



# DATA 82

*While Australia has never managed to rival the tinselly extravaganzas of the US such as NCC, it does have its own computer shows. Last month, Data 82 hit Sydney, and YC was there to have a look round.*

THE TROUBLE with computer shows is that after walking around for a day or so, you become punch drunk — it would take something revolutionary to make any impression on you at all.

Regrettably, there was nothing really revolutionary at Data 82, but there were plenty of new machines to see. Here's a run down on some of the things that caught our eye at the show:

Dicker Data Projects displayed the Vector 4, a new machine which combines a Z-80B processor with a 16-bit 8088, both running at 5.1 MHz. Memory starts at 128 Kbytes and can be expanded to 256 K. Graphics: 640 by 312 black and white, 320 by 312 with 4 levels of grey and external video in up to 8 colours.

Also built in is a series of interfaces (including parallel Qume/NEC), speaker with tone generator, and S-100 expansion. Floppy disk drives and Winchester are available already. Operating system is a modified version of CP/M-80, though I dare say we can expect CP/M-86 and MS-DOS soon. Pricing sounds good, too.

General Electronic Developments displayed its new networking computer system. Based on an integrated screen and two double-sided double density 20cm disks with detachable keyboard, the system uses a twisted 3-wire cable to link over 10 workstations. Each 'terminal' has 64K of RAM, and can be used as a standalone system if required.

Also on display was GED's neat little 'dumb' terminal which has cursor control keys with two modes — one the conventional set of control codes, the other set up for WordStar!



Rank Xerox actually had, working on its stand, a real live Ethernet system; now I believe! Perhaps the star of its display, however, was the 8010 executive workstation which combines a graphics system, word processor, network terminal and computer into one box.

Based on bit-slice hardware, it incorporates all the years of research that Xerox's Palo Alto Research Centre has put into designing sophisticated systems with an intuitively 'correct' user interface.

I want one, I want one! But like the man said, 'If you have to ask the price, Mr Rockefeller, you can't afford it!'

The Computer Company, of Milsons Point, had a huge space devoted to the Panasonic JB3000 personal computer. This machine, which is to a considerable degree software compatible with the IBM PC, attracted a lot of interest, and at the time of writing, TCC claimed to have orders for over 1000 machines.

The Panasonic wasn't the only PCM (plug-compatible micro) on display, however. Delta showed the new Hitachi machine which is designed to capitalise on the IBM PC marketplace. Claimed to be smaller, but with more features, than any other IBM look-alike, the new machine will run both CP/M-86 and MS-DOS.

Delta also had the new Peach II plug-in 8088 processor card for the Peach, as well as the new Hitachi 8cm (3-inch) 'pocket floppies'. Reminds me of the 'Metacard' (8088 plus 128 Kbytes plus CP/M-86) being sold in the US for the Apple.

While we're thinking randomly, the addressing range of the 8088 processor is 1 megabyte. Why are all the PCM-builders following IBM's lead and stopping at 256 Kbytes? That's like someone selling Z-80 machines with a maximum of 16 Kbytes. Surely the smart thing we be to go to a full 1 Mbyte if the user wants it — CP/M-86 supports it...

NEC Information Systems Australia had its new Advanced Personal Computer on display. Based on a 5 MHz 8086 with a true 16-bit bus and 2 by 1.2 Mbyte 20cm floppies, the APC will be available in both monochrome (green screen) and colour versions.

Operating systems are CP/M-86 and MS-DOS, and languages available include Ryan-McFarland COBOL, Pascal, C and others. Packages available include the 'Benchmark' word processor, dBase II, IBM 2780/3780 and 3270 communications, and others.

Mitsui was displaying the Sord M23, which has previously been reviewed in these pages. Most interesting was the new liquid crystal display which was stuck on top of the machine — unfortunately, when I looked at it, the heat was obviously getting to it (as it was to me!), and it wasn't working too well. Crowded shows are not good conditions for computers anyway. □

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OPEN FILE	GET RECORD BY KEY
CLOSE FILE	GET NEXT RECORD
ADD RECORD	GET PREVIOUS RECORD
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SORT FILE BY KEY	SHOW FILE STATISTICS

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Printed reports can be sent to the screen, the IBM parallel printer, or to a serial printer. \$99.95

### CROSS REFERENCE

Will list your basic program and print all of the variables used in the program. The line numbers following each variable are the lines on which the variable is used. The program also cross references all line referencing statements such as GOTO, GOSUB, ON-GOTO, ON-GOSUB, IF-THEN-ELSE, and RESTORE. You can easily determine if a line number is referenced by another part of the program.

The listing can be sent to the screen, the IBM parallel printer, or to a serial printer.

#### EXAMPLE: PROGRAM LISTING

```
820 Q$ = N$; J = 1; QL = 157
830 IF J > QL THEN Q = 0; RETURN
840 QM = (J + QL)/2
850 IF Q$ < Q$ (QM) THEN QL = QM + 1; GOTO 830
860 IF Q$ < Q$ (QM) THEN QL = QM - 1; GOTO 830
870 Q = 1; RETURN
```

#### CROSS REFERENCE LISTING

2	830 FROM	850	860		
4	J .....	820	830	840	850
1	N\$ .....	820			
2	Q .....	830	870		
3	Q\$ .....	820	850	860	
2	Q\$( ) .....	850	860		
4	QL .....	820	830	840	860
5	QM .....	840	850	850	860

END OF LISTING \$29.95

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Frog	Lawyer Billing.

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 \* IBM and Panasonic are authorised names.



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64K of RAM socketed for 512K. Includes serial and parallel ports. \$6.99

### STRINGSORT

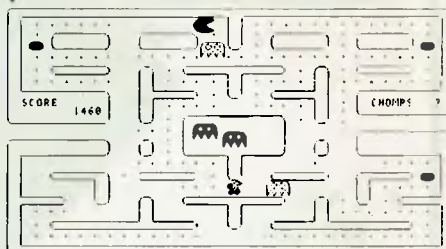
Will sort any string array into ascending alphabetical order. 11,000 variable length strings, sort in under 4 seconds. 5,000 3-character long strings, sort in 14 seconds. \$29.95

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# HEARD ON THE BUS

By LEON YENDOR



LAST ISSUE I wrote about the National Computer Conference and as I then promised I'll deal this month with another aspect of the show; but first let me tell you how the left hand picture of the three on the bottom of that page should have been cut.

The artist laying out the page cropped the picture to show only the part which would normally have set the scene, the crowds entering the main door to registration. Unfortunately the point of the picture as it was taken was that above the heads of the people was the plaque announcing that this was the Houston Cattle Exposition Building!

How appropriate, and I'm sorry you missed the fun. Never mind, it looks as though we will be back there in 1984 if the preface to the conference proceedings is accurate.

## Swapping Heads

What I really wanted to deal with this month was the way in which these shows in USA are used to introduce products which are not really ready for the market but unless you can see them in person

and have the time to press for a demonstration you'd never know it.

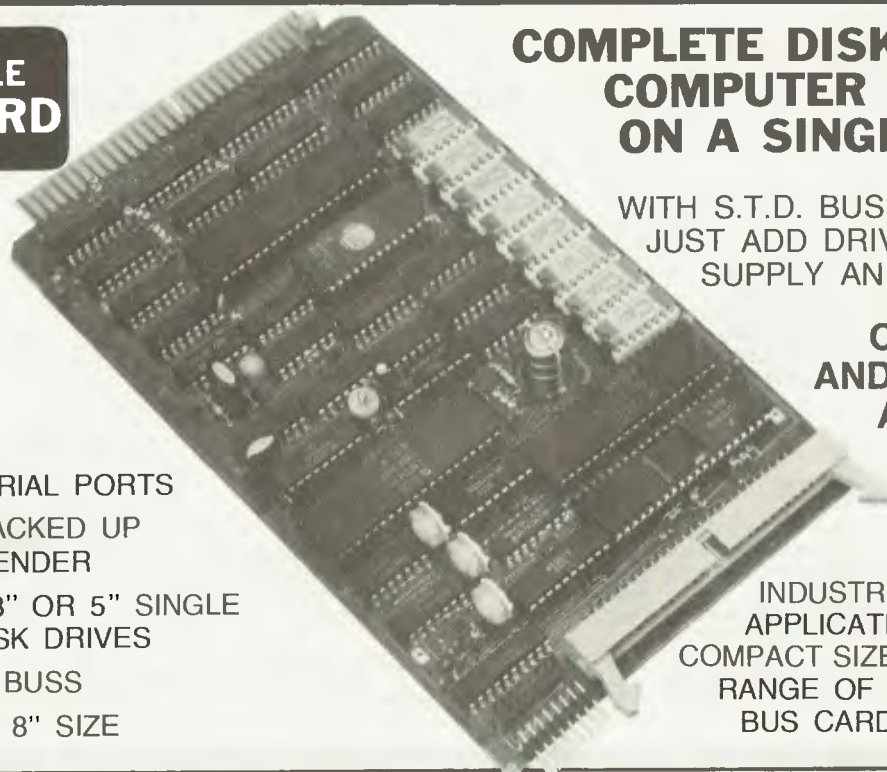
I will use only one example and this one is really a borderline case because it may well be very close to being a finished product and so make it into the market place in the near future. It is just that it is so hard to pretend that a printer is a working production model if you don't have it running in the show. I mean, if someone shows a three inch winchester drive with a claimed capacity of twenty megs you'd never know just by looking at it as long as the disk spins and the heads move.

Anyway this printer is sufficiently novel in concept that its inventors deserve just a little publicity to maybe spur them along and really be ready to take orders next May.

It is called the Dotsy and has claimed speeds of 150 cps in dot matrix mode and 20 cps in letter mode. Yes, we've all seen the dual mode dot matrix machines before but this one swaps from dot to daisy wheel (see, DOT-SY) and uses wheels from Diablo and Qume to really achieve letter quality albeit at a very low speed in the daisy mode.

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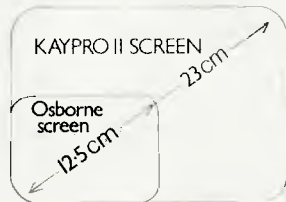
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# Almost A Word Processor

By D Mason

I GUESS there must be a boundary between a text manipulator and a word processor and, to keep the purist happy, I'll only claim this program to be a manipulator.

With it, lines of text can be added, deleted, inserted, and moved. It allows the text to be altered, or characters inserted and deleted, and cleared of text. Lines may be output — with or without line numbers — to either the screen or the printer (with selectable line spacing).

The purist may also complain that it is written in BASIC, which is obviously so much slower than machine language. This does not recognise the vast majority who do not or cannot use M/L, and hence would be unable to relate the program to their needs on their machines.

In any case, readers often peruse programs only to find routines and techniques, and the function of the overall program is quite secondary.

To allow the program to be adapted to other machines, I have used many explanatory REMarks. Removal of these allows the manipulator to run on a 16K system.

## Text Disk

At creation of the Text Disk, the user is given the option of storing from one to five texts (with corresponding variation in text

length). Each text has two random files; one is designated RND and the other INX. A random file INDEX stores the title of each text.

Initially, each RND file has '99' inserted; this is used later to indicate a free record. The INX files have a 0 inserted, and each INDEX record has VACANT inserted.

The INX file acts as the text line number; the record number is the text line number and the data in the INX record is the RND record number that contains the text of the line. For example, INX record number 13 may contain the number 20; this would indicate that line 13 of the text is held in RND record 20.

This system permits lines to be inserted, moved, added, and deleted by manipulating the numbers stored in the INX file only. For example, to insert a line, the data stored in the succeeding INX records is moved along, until the end of text is reached (indicated by a 0 in the INX record); the number of the first free RND record is then inserted at the selected INX record.

## Limitations And Development

The basis of the system is that a fixed length (64 byte) random file record contains a line of text. As such, it does not

accommodate for overflow of content from one line to the next.

Of course the line length may be altered, or made variable, but I set it at 64 bytes as this is a power of 2, giving storage economy on the disk, and is viable for most applications.

The number of lines per printed page is set at 55, but this too can be altered, or even be made selectable.

Another development could be to allow lines to be edited at insertion or adding. I did not include this facility as the line length is the same as the screen display, and any excess becomes obvious when typing.

Provided the line of text has not been entered, it is a matter of simply bringing the cursor back to an appropriate point, and hyphenating the last word, if necessary. Otherwise, the offered facility of truncation may be employed.

## Compucolour Features

One feature of programs written for Compucolour/Intecolour computers (as this was) is their use of Plot Numbers. To help clarify their meaning, I have explained them with remarks at their first usage.

The extensive use of remarks should make it relatively easy to convert the program for other machines. □

```
100 REM *****
110 REM **
120 REM ** TEXT MANIPULATOR WRITTEN FOR COMP.11 **
130 REM ** ADD, INSERT, DELETED, EDITS, MOVES **
140 REM ** TEXT ON A SEPARATE DATA FILE. **
150 REM ** D. MASON 1982 **
160 REM **
170 REM *****
180 REM
190 CLEAR 1024 : DIM A(736)
200 PLOT 12 : REM * CLEAR SCREEN
210 PLOT 3:15:2:6:28:14 : REM * SET CURSOR, COLOURS, LGE CHAR.
220 PRINT " T E X T M A N I P U L A T O R " : PLOT 15:6:3 : RE
M *
230 PRINT " I N T E R C O U R S E M O V E " : PRINT
240 PRINT " P L O T 12 : R E M * C L E A R S C R E E N " : PRINT
250 PRINT " P L O T 3 : 1 5 : 2 : 6 : 2 8 : 1 4 : R E M * S E T C U R S O R , C O L O U R S , L G E C H A R . " : PRINT
260 PRINT " P L O T 1 5 : 6 : 3 : R E M * I N T E R C O U R S E M O V E " : PRINT
270 PRINT " P L O T 1 2 : R E M * C L E A R S C R E E N " : PRINT
280 PRINT " P L O T 3 : 1 5 : 2 : 6 : 2 8 : 1 4 : R E M * S E T C U R S O R , C O L O U R S , L G E C H A R . " : PRINT
290 PRINT " P L O T 1 5 : 6 : 3 : R E M * I N T E R C O U R S E M O V E " : PRINT
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410 PRINT " P L O T 1 5 : 6 : 3 : R E M * I N T E R C O U R S E M O V E " : PRINT
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430 PRINT " P L O T 3 : 1 5 : 2 : 6 : 2 8 : 1 4 : R E M * S E T C U R S O R , C O L O U R S , L G E C H A R . " : PRINT
440 PRINT " P L O T 1 5 : 6 : 3 : R E M * I N T E R C O U R S E M O V E " : PRINT
450 PRINT " P L O T 1 2 : R E M * C L E A R S C R E E N " : PRINT
460 PRINT " P L O T 3 : 1 5 : 2 : 6 : 2 8 : 1 4 : R E M * S E T C U R S O R , C O L O U R S , L G E C H A R . " : PRINT
470 PRINT " P L O T 1 5 : 6 : 3 : R E M * I N T E R C O U R S E M O V E " : PRINT
480 PRINT " P L O T 1 2 : R E M * C L E A R S C R E E N " : PRINT
490 PRINT " P L O T 3 : 1 5 : 2 : 6 : 2 8 : 1 4 : R E M * S E T C U R S O R , C O L O U R S , L G E C H A R . " : PRINT
500 PRINT " P L O T 1 5 : 6 : 3 : R E M * I N T E R C O U R S E M O V E " : PRINT
```

```
500 PRINT " P L O T 1 2 : R E M * C L E A R S C R E E N " : PRINT
510 PRINT " P L O T 3 : 1 5 : 2 : 6 : 2 8 : 1 4 : R E M * S E T C U R S O R , C O L O U R S , L G E C H A R . " : PRINT
520 IF SE=1 OR SE=12 THEN PLOT 28:11 : GOTO 310 : REM * UP A LI
NE, DELETE IT
530 INPUT "ENTER TEXT NUMBER : " : REM * KEYBOARD STATUS
540 IF SE=1 GOTO 510
550 PLOT 12:3:0:14
560 PRINT " P L O T 1 2 : 3 : 0 : 1 4 " : PRINT
570 IF SE=1 GOTO 510
580 INPUT "INSERT TEXT DISC - HIT RETURN : " : REM * FILE TRAP TO LINE 620
590 FILE "D:\INDEX" : FILE "A":1:A1:A2:A3:A4
600 IF SE=1 GOTO 510
610 PLOT 12:3:0:14 : PRINT " * TEXTS ON THIS DISC * "
620 FOR G=1 TO 99 : SET 1:54:1:1:TL$(25)
630 PRINT " P L O T 1 2 : 3 : 0 : 1 4 " : NEXT
640 PRINT " : PRINT " P L O T 1 0 : 1 : INPUT "DO YOU WANT TO TITLE A TEXT
? " : REM *
650 IF SE=1 AND SE=12 THEN PLOT 28:11 : GOTO 430
660 IF SE=12 GOTO 570
670 PRINT
680 INPUT "ENTER TEXT NUMBER : " : REM *
690 IF SE=1 OR SE=12 THEN PLOT 28:11 : GOTO 470
700 PRINT " P L O T 1 0 : 1 : INPUT "ENTER TITLE : " : TL$
710 PUT 1:TL:1:TL$(25) : PRINT
```

```

510 PRINT SPC(10); : INPUT "NAME ANOTHER TEXT ? "I2Z$
520 IF Z$<>"Y" AND Z$<>"N" THEN PLOT 28.11 : GOTO 510
530 IF Z$="Y" GOTO 460
540 PLOT 12.3,10.5 : PRINT " * THEN ON THIS DISC * "
550 FOR GH=1 TO A2 : GET 1.6H,1:TL$(25)
560 PRINT SPC(5)GH, "TL$ : NEXT
570 FILE "D"+1
580 PRINT : PRINT SPC(10); : INPUT "ENTER THE NUMBER OF THE SEL
ECTED TEXT : "I1$
590 IF ST<1 OR ST>5 THEN PLOT 28.11 : GOTO 580
600 FILE "R"+1,STR$(ST)+1 : FILE "R"+2,STR$(ST)+".INX"+1
610 FILE "H"+1,R1+R2+B3+B4 : GOTO 640 : REM * B2 GIVES RECORD C
APACITY OF FILE
620 IF SE=1 GOTO 650
630 PRINT : PRINT SPC(14)"FILE NOT ON DISC" : PRINT : GOTO 360
640 IF SE=1 THEN PRINT : PRINT SPC(14)"FILE ALREADY ON DISC" :
PRINT : GOTO 1320
650 PLOT 12
660 PLOT 3.15,2.6,28.14
670 PRINT " T E X T M A N I P U L A T O R " : PLOT 15.6,3
680 PRINT : PRINT
690 ON SE GOTO 730,1070,1370,1570,1780,2160,2330,2460,2540,2650,
2870,3190
700 REM *****
710 REM ** CREATE NEW FILES **
720 REM
730 PRINT SPC(20)"CREATING NEW FILES" : PRINT : PRINT : PRINT
740 PRINT SPC(20)"SELECTION PARAMETERS" : PRINT
750 PRINT SPC(5)"TEXTS : "I : FOR BJ=1 TO 5 : PRINT SPC(5)BJ :
NEXT
760 PRINT : PRINT
770 PRINT SPC(5)"LINES-TEXT : 736 352 224 160 128"
780 PRINT : PRINT
790 PRINT SPC(5); : INPUT "ENTER NUMBER OF TEXTS REQUIRED ON THI
S DISC (1-5) : "I1$
800 IF TT<1 OR TT>5 THEN PLOT 28.11 : GOTO 790
810 ON TT GOTO 820,830,840,850,860
820 RR=736 : GOTO 870
830 RR=352 : GOTO 870
840 RR=224 : GOTO 870
850 RR=160 : GOTO 870
860 RR=128
870 PRINT : PRINT SPC(20)"SIT BACK AND RELAX" : PRINT : PRINT
SPC(20)"THIS TAKES A WHILE..."
880 FOR AB=1 TO TT
890 FILE "N",STR$(AB)+RR,64,16
900 FILE "N",STR$(AB)+".INX",RR,4,32
910 NEXT
920 FILE "N","INDEX",TT,25,TT
930 FOR BA=1 TO TT
940 FILE "R"+1,STR$(BA)+1
950 FOR BC=1 TO RR : PUT 1.6C,1: "99"[64] : NEXT : FILE "D"+1
960 FILE "R"+1,STR$(BA)+".INX"+1
970 FOR CD=1 TO RR : PUT 1.6C,1:0 : NEXT : FILE "D"+1
980 NEXT BA
990 FILE "R"+1,"INDEX"+1
1000 FOR EF=1 TO TT : PUT 1.6E,1:"VACANT"[25] : NEXT : FILE "D"
+1
1010 PRINT : PRINT SPC(12)"THE FILES REQUIRED BY THE TEXT MANIP
ULATOR
1020 PRINT : PRINT SPC(12)"HAVE BEEN CREATED ON THIS DISC
1030 PRINT : PRINT SPC(20); : INPUT "HIT RETURN TO CONTINUE "I2
$ : GOTO 190
1040 REM *****
1050 REM ** ADD NEW MATERIAL **
1060 REM
1070 PRINT SPC(20)"ADD NEW MATERIAL"
1080 FOR FH=1 TO B2 : GET 2.4,1:LN$ : IF LN=0 GOTO 1110
1090 NEXT
1100 PRINT : PRINT SPC(14)"TEXT DISC IS FULL" : GOTO 1320
1110 PRINT : PRINT SPC(5)" * NOTES * " : PRINT SPC(5)"1. PUT A
 * AT START OF LINE TO FINISH ADDING"
1120 PRINT SPC(5)"2. PUT TAB TO TAB A LINE" : PRINT SPC(5)"3. DO
NOT USE DOUBLE QUOTES (") AT THE START OF A LINE
1130 PRINT SPC(5)"4. USE # AT THE START TO GIVE LINE NUMBER"
1140 PRINT SPC(5)"5. THERE IS A CAPACITY OF "B2" LINES FOR THIS T
EXT
1150 PRINT : PRINT SPC(10)"PLEASE WAIT ..."
1160 FOR I=1 TO B2 : GET 1.6,1:FR$(3)
1170 IF VAL(FR$)<>"99" GOTO 1310
1180 IF G=0 THEN PLOT 28.11 : PRINT SPC(10)"COMMENCING AT LINE"J
1190 G=G+1
1200 INPUT "I$NM$
1210 IF LEFT$(NM$,1)="#" THEN PRINT SPC(10)"LINE : "I : GOTO 1200
1220 IF LEFT$(NM$,1)="#" GOTO 1320
1230 IF LEFT$(NM$,1)<>"?" GOTO 1260
1240 H=VAL(MID$(NM$,2,2))
1250 IF H+LEN(NM$)>B2 THEN BC=MID$(NM$,68-H2,1) : GOSUB 3250
1260 IF LEN(NM$)>64 THEN BC=MID$(NM$,64,1) : GOSUB 3250
1270 PUT 1.6,1:LN$(64) : PUT 2.4,1:K
1280 I=I+1
1290 IF I=B2 THEN PRINT : PRINT SPC(10)"THIS WILL BE THE LAST L
INE OF THE TEXT"
1300 IF I=B2 THEN PRINT : PRINT SPC(20)"FILE FULL" : GOTO 1320
1310 NEXT I
1320 PRINT : PRINT SPC(14); : INPUT "HIT ENTER TO CONTINUE : "I
$
1330 G=0 : "99" : FILE "D"+1,2 : GOTO 200
1340 REM *****
1350 REM ** DELETE A LINE **
1360 REM
1370 PRINT SPC(20)"DELETE A LINE"
1380 PRINT : PRINT : PRINT SPC(20); : INPUT "ENTER LINE NUMBER
TO BE DELETED : "I1$ : IN=0
1390 FOR I=(DN-1) TO (DN+1) : GET 2.4,1:LRN(IN)

```

```

2810 FOR MD=(FR+1) TO TP : GET 2,MD,1:RN : PUT 2,(MD-1),1:RN : N
NEXT : GOTO 2830
2820 FOR MD=(FR-1) TO TP STEP -1 : GET 2,MD,1:RN : PUT 2,(MD+1),
1:RN : NEXT
2830 PUT 2,TP,1:RE
2840 FOR PT=(FR-1) TO (FR+1) : GET 2,PT,1:RN : GET 1,RN,1:DE$(64
) : PRINT "LINE#PT : PRINT DE$ : NEXT : PRINT : PRINT
2850 PRINT SPC(20) : INPUT "DO YOU WANT TO MOVE ANOTHER LINE ?
" : NY$
2860 IF NY$(<"Y" AND NY$(>"N") THEN PLOT 28,11 : GOTO 2860
2870 IF NY$(<"Y" AND NY$(>"N") THEN PLOT 28,11 : GOTO 2860
2880 GOTO 1320
2890 REM *****
2910 REM ** DELETE A RANGE OF LINES **
2920 REM
2930 PRINT : PRINT SPC(20)"DELETE A RANGE OF LINES
2940 PRINT : PRINT SPC(14) : INPUT "ENTER FIRST LINE OF RANGE
" : FL
2950 PRINT : PRINT SPC(20) : INPUT "ENTER LAST LINE OF RANGE
" : LL
2960 FOR NL=LL TO B2 : GET 2,NG,1:RN : IF RN=0 GOTO 2980
2970 NEXT : REM * NO MARKS FIRST FOUR LINE NO *
2980 DE=LL-FL+1 : REM * DE MARKS NO OF LINES REMOVED
2990 FOR TL=(LL+1) TO (NG+DF) : REM * GO FROM LINE AFTER END OF
RANGE
3000 GET 2,DL,1:RR : PUT 2,(DL-DF),1:RR : REM * MOVE RN BACK BY
DF LINES *
3010 NEXT
3020 PRINT : GOTO 1320
3030 REM *****
3040 REM ** DELETE ALL LINES **
3050 REM
3060 PRINT SPC(20)"DELETE ALL LINES" : PRINT : PRINT SPC(20)"DE
LETINES . . ."
3070 FOR DL=1 TO B2 : GET 2,DL,1:RN : IF RN=0 GOTO 2490
3080 NEXT : REM
3090 FOR ET=1 TO (DL-1) : PUT 1,(ET),1:"-99"[64]
3100 PUT 2,ET,1:0 : NEXT
3110 GOTO 1330
3120 REM *****
3130 REM * CLEAR LINES *
3140 PRINT SPC(20)"CLEAR LINES"
3150 PRINT : PRINT
3160 PRINT SPC(14) : INPUT "ENTER LINE NUMBER : " : LL
3170 GET 2,LL,1:RN : PUT 1,LL,1:""[64] : PRINT
3180 PRINT SPC(14) : INPUT "DO YOU WANT TO CLEAR ANY MORE ? " :
Y$
3190 IF Y$(<"Y" AND Y$(>"N") THEN PLOT 28,11 : GOTO 2580
3200 IF Y$(<"Y" AND Y$(>"N") THEN PLOT 28,11 : GOTO 2540
3210 GOTO 1330
3220 REM *****
3230 REM ** JUSTIFY **
3240 REM
3250 PRINT SPC(20)"JUSTIFY ALL LINES" : PRINT : PRINT SPC(20)"J
USTIFY ALL LINES" : PRINT
3260 PRINT SPC(14)"CHARACTER #64 : " : BC$ : PRINT
3270 PRINT SPC(20) : INPUT "SELECT NEW LENGTH : " : NL
3280 IF NL=1 OR NL=64 THEN PLOT 28,11 : GOTO 3270
3290 NL=LEFT$(NM$,NL)
3300 PRINT : PRINT "NEW LINE READS : " : PRINT NT$ : PRINT
3310 PRINT SPC(10) : INPUT "IS THIS O.K. ? " : YN$ : IF YN$(<"Y" A
ND YN$(>"N") THEN PLOT 28,11 : GOTO 2810
3320 IF YN$(>"N") GOTO 3270
3330 NM$=NT$ : IF SE=2 THEN PRINT : PRINT SPC(14)"CONTINUE ADDI
NG : "
3340 RETURN
3350 REM *****
3360 REM ** LIMIT PRINTING TO 55 LINES PER PAGE **
3370 REM
3380 PG=PG+1 : IF PG=55 GOTO 2430
3390 RT=RT+1
3400 PG=0 : POKE 33265,TMP : PRINT SPC(20) : INPUT "CHANGE THE
PAPER AND HIT RETURN"[28]
3410 PLOT 27,18,3,27,13 : REM * SEND TO PRINTER
3420 PRINT TAB(25)"PAGE#1:TAB(46)"D. MASON" : PRINT : PRINT :
PG=0
3430 RETURN
3440 REM ** PRINT 0 TO 64 IN 7 COLOURS **
3450 M=17 : PLOT X
3460 FOR A=1 TO 10 : IF A=10 THEN M=M+1 : PLOT Y : A=0
3470 A=RIGHT$(STR$(A),1) : PRINT A$ : G=5+1 : IF G=64 THEN G=0
: GOTO 3460
3480 NEXT
3490 RETURN
3500 REM *****
3510 REM **

```

```

2830 GOTO 1320
2840 REM *****
2850 REM ** OUTPUT THE TEXT **
2860 REM
2870 PRINT SPC(20)"OUTPUT THE TEXT" : PRINT
2880 PRINT SPC(14) : INPUT "DO YOU WANT TO PRINT LINE NUMBERS ?
" : LY$
2890 IF LY$(<"Y" AND LY$(>"N") THEN PLOT 28,11 : GOTO 2880
2900 PRINT
2910 PRINT SPC(20) : INPUT "OUTPUT TO PRINTER OR SCREEN : " : PS$
2920 IF PS$(<"P" AND PS$(>"S") THEN PLOT 28,11 : GOTO 2910
2930 IF PS$(>"S") GOTO 3000
2940 PRINT
2950 PRINT SPC(20) : INPUT "INTERLINE SPACING : 1, 2 OR 3 : " :
I$
2960 RI=1
2970 IF I$(1 OR I$(2) THEN PLOT 28,11 : GOTO 2950
2980 POKE 33284,80 : REM * NO OF CHARACTERS PRINTED PER LINE
2990 PLOT 27,18,3,27,13 : REM * SEND TO PRINTER
3000 PRINT : FOR IJ=1 TO B2
3010 GET 2,IJ,1:RN : IF RN=0 GOTO 3120
3020 GET 1,RN,1:DE$(64)
3030 IF LY$(<"Y" THEN PRINT "LINE#IJ" : "
3040 IF LEFT$(DE$,1)="" GOTO 3030
3050 IF LEFT$(DE$,1)="" GOTO 3030
3060 I=VAL(MID$(DE$,2,2))-1
3070 PRINT TAB(I,MID$(DE$,4,64-J)) : GOTO 3090
3080 PRINT DE$
3090 IF PS$(>"S") THEN PRINT : GOTO 3110
3100 FOR IJ=1 TO IS : PRINT : GOTO 3390 : NEXT
3110 NEXT
3120 POKE 33265,TMP : REM * BACK TO SCREEN
3130 POKE 33284,64 : REM * NO OF CHARACTERS PRINTED PER LINE
3140 PG=0
3150 GOTO 1320
3160 REM *****
3170 REM ** STORE DATA **
3180 REM
3190 PRINT SPC(20)"CLOSING FILES"
3200 FILE "1:1,2
3210 GOTO 1030
3220 REM *****
3230 REM ** SUBROUTINE WHEN LEN(NM$)>64 **
3240 REM
3250 PRINT : PRINT SPC(14)"LINE IS TOO LONG" : PRINT SPC(14)"LE
NGTH : " : LEN(NM$)
3260 PRINT SPC(14)"CHARACTER #64 : " : BC$ : PRINT
3270 PRINT SPC(20) : INPUT "SELECT NEW LENGTH : " : NL
3280 IF NL=1 OR NL=64 THEN PLOT 28,11 : GOTO 3270
3290 NL=LEFT$(NM$,NL)
3300 PRINT : PRINT "NEW LINE READS : " : PRINT NT$ : PRINT
3310 PRINT SPC(10) : INPUT "IS THIS O.K. ? " : YN$ : IF YN$(<"Y" A
ND YN$(>"N") THEN PLOT 28,11 : GOTO 2810
3320 IF YN$(>"N") GOTO 3270
3330 NM$=NT$ : IF SE=2 THEN PRINT : PRINT SPC(14)"CONTINUE ADDI
NG : "
3340 RETURN
3350 REM *****
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3370 REM
3380 PG=PG+1 : IF PG=55 GOTO 2430
3390 RT=RT+1
3400 PG=0 : POKE 33265,TMP : PRINT SPC(20) : INPUT "CHANGE THE
PAPER AND HIT RETURN"[28]
3410 PLOT 27,18,3,27,13 : REM * SEND TO PRINTER
3420 PRINT TAB(25)"PAGE#1:TAB(46)"D. MASON" : PRINT : PRINT :
PG=0
3430 RETURN
3440 REM ** PRINT 0 TO 64 IN 7 COLOURS **
3450 M=17 : PLOT X
3460 FOR A=1 TO 10 : IF A=10 THEN M=M+1 : PLOT Y : A=0
3470 A=RIGHT$(STR$(A),1) : PRINT A$ : G=5+1 : IF G=64 THEN G=0
: GOTO 3460
3480 NEXT
3490 RETURN
3500 REM *****
3510 REM **

```

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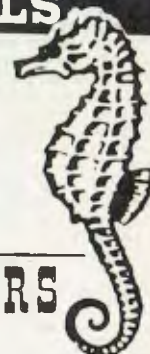
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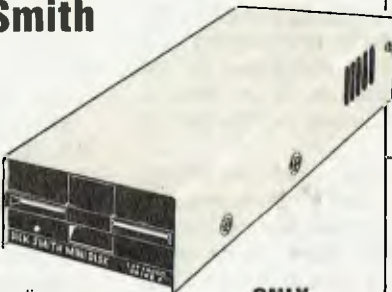
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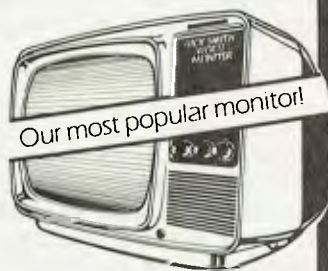
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# More ZX Mods...

By Robert Chalmers

THESE HINTS on modifying your ZX80 may well prove to give your little mighty mite a new lease of life, even extend its stay on your desk! They're simple tasks that to date I have not seen mentioned, and that improve the quality of the display greatly.

The first concerns the TV lead that is supplied with the ZX80.

It helps if you found, as I did, that each time you connected the unit to the family TV it was necessary to detune the set, with resulting panic from the better half when the set was next used, and you had forgotten to re-tune it. Random interference is also a major problem.

Someone seems to have forgotten that the ZX80 is in one sense a transmitter, and works far better if working into a balanced load.

All this means is that if you take a suitable length of 75 ohm co-axial TV antenna lead and attach the correct fittings to either end, you need never have to tune the set again, the picture will lock on channel 0 rock steady, as well as reducing outside interference. If your set has only the 300 ohm input (ribbon cable), then place an antenna balun, 300 to 75 ohm, in the line.

The second hint is somewhat more complex, but should not present a problem if you're handy with a soldering iron. If not, your local TV fixit man could do the job in half an hour.

The characters of the ZX display are very close, and you may find, as I did, that it is sometimes very hard to tell which number is which. The answer of course is to use a monitor. The difference is startling, to say the least. As monitors cost as much as, if not more than, the ZX80, they are not really on, but you can convert your black and white portable with a minimum of fuss, and cost.

A word of caution here though, if you are at all unsure of how to read a circuit diagram, then get someone else to do it. Mistakes on TV circuits can be disastrous.

Most popular TV's are suitable, the video input from the detector stage to the base of the first video amplifier stage should be about 1 volt peak to peak, negative going, and you can usually get this information from the circuit diagram.

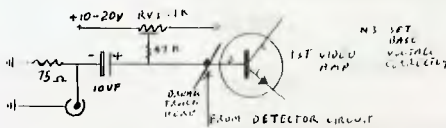
Using the diagram, locate the base of the first video amp stage transistor and isolate it. Or just cut the copper track. The following circuit should then be constructed and fed into the base of the first video amp transistor.

## your computer



## OWNER REPORT

RV 1 allows you to set the dc level to that specified for the base circuit, and should be set before the circuit is connected. Mount the antenna socket in a suitable location, keeping the leads as short as possible. If a two way switch is incorporated in the base/monitor/detector circuit, and TV can still be used as a normal receiver.



When you are satisfied that all is correct, it is time to modify the ZX80!

Don't panic, simply disconnect the RCA plug on the end of the coax and connect the lead to the circuit board side of the RF modulator, that little tin box, making sure that the braiding is connected to the ground side of the circuit. A suitable socket could even be built into the back of the case.

The results are well worth the efforts; you will think you own a new computer, the resolution is improved that much. The added bonus is that when you do move up, you will already have a monitor! The savings will buy that first software package.

Just to keep this article on a practical level, try owning the most complex clock in town. Thanks to Mr Duggins of Birmingham, the following program will set one up, along with a modification or two of mine.

### ZX80 Real Time Clock

This program will give a continuously updated display of the time, accurate to a

few minutes a day. The updating routine could be used in a variety of other ways.

```
5 REM,type 53 characters in
   here to save machine code
10 LET K = UST(16427)
20 CLS
30 LET S = S+5
40 OF S = 60 THEN GO TO 100
50 FOR U = 1 TO 2
60 NEXT U
70 IF M<10 THEN PRINT
  "TIME",H;":O";M;":":S
75 IF M>9 THEN PRINT
  "TIME",H;":":M;":":S
80 LET K = USR(16468)
90 GO TO 20
100 LET S = 0
110 LET M = M+1
120 IF M = 60 THEN GO TO 100
130 GO TO 70
200 LET M = 0
210 LET H = H+1
220 IF NOT H>12 THEN FO TO 70
230 LET H = 0
235 LET H = H+1
240 GO TO 70
250 FOR A = 16427 TO 16479
260 INPUT I
270 POKE A,I
280 PRINT I;":":;
290 NEXT A
```

### Machine Code, In Decimal

237	91	12	64	6	50	205	200	5	46	250
229	62	237	1	56	25	42	12	64	203	252
205	176	1	43	62	232	14	55	4	205	176
219	254	225	45	32	5	201	211	255	24	
220	6	90	16	254	211	255	24	214		

Enter the machine code by typing GOTO 250. Then, when code is entered, you may delete from 250 on, using /n NEWLINE.

Using direct commands, for example LET S = 0, LET M = 15, and so on, set the correct time.

Remember, after each command and N/L, the program will re-display. To start the clock type GO TO 10, and when the preset time is reached, press N/L. If more than 20 characters are to be displayed, the byte at address 16432 should be increased by 1 for each character.

**Editor's Note:** Projects like this can be dangerous if you do not understand the subject completely. Any hardware, software or modification project contributed is published for your information on the basis that it has not been tested by us, and is not warranted by us. We take every care with material prepared for this magazine, but can take no responsibility for it. See our regular warnings on this subject on page 98. □



your computer



tutorial

# Understanding Assembler Part VII

*As a long-time member of the Society for Putting Things On Top of Other Things, Les Bell has long known about stacks. However, as he explains below, microprocessor stacks are not a quick way to lose things...*

IN THE last episode, we developed linear search techniques and a technique for string comparison, and the reader's exercise was to find some way of bringing the two together in a workable way. There are several ways of doing this, but the most useful is a key concept in assembly language programming.

This is to treat program segments as subroutines which can be called from elsewhere within programs, in a manner analogous to the GOSUB in BASIC. A CALL instruction is like a JMP instruction with one important difference; before it jumps, it leaves the address of the next instruction to be executed in a special data area known as the stack.

Stacks are an interesting way of organising data storage areas which offer several advantages over more straightforward techniques such as tables. To understand a stack, it is necessary to review briefly the hardware architecture of the 8080/8085/Z-80 family of microprocessors.

The 8080 has several pairs of registers: accumulator and flags, BC, DE and HL. In addition, there is a program counter, which steps through the program being executed, and the stack pointer.

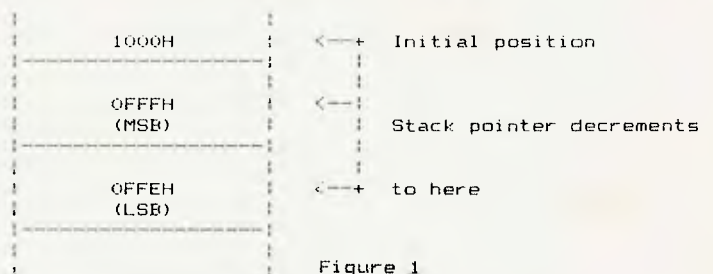
The stack pointer is a 16-bit register which points to the bottom end of an area in memory called the stack. In general, the stack is situated at the top end of the available RAM mem-

ory, and grows downwards as it is filled. The way this works is as follows:

Suppose I have a microcomputer system with 4 Kbytes of memory, and I want to run a program which will use the stack pointer. How is this done?

The stack pointer is first initialised to 1000H, that is, the first byte after the end of memory. To store the contents of a register pair on the stack, I use the PUSH rp (register pair) instruction.

When the processor executes the PUSH instruction, the first thing it does is to decrement the stack pointer, so that now it points to 0FFFH, the last byte of memory. Then it writes the most significant byte of the register pair into this location and decrements the stack pointer again (to 0FFE H). The least significant byte of the pair is then written into this location.



Following this, if we want to save another register pair, the stack pointer will be decremented twice more, and the next value will be inserted into the stack under the first. Notice that the stack 'grows' downwards.

The reverse of the PUSH instruction is POP rp. When this is

executed, the processor first fetches the least significant byte of the word, then increments the stack pointer and fetches the most significant byte. Finally, it increments the stack pointer again, to point to the next element on the stack.

Notice that the number of PUSHes and POPs in a program should match up, in much the same way as the brackets in a mathematical equation should match up (in fact, brackets are analogous to stack operation, as users of Hewlett-Packard pocket calculators will realise).

In fact, in some circumstances, the PUSHes and POPs may deliberately not balance, but in general, and especially for beginners, this is a dangerous practice.

The next thing to notice is that the PUSH instruction does not specify a destination, only a source. Thus, the instruction PUSH D will push the contents of the DE register pair onto the stack, but exactly where is determined only by the contents of the stack pointer, which is itself dependent on the number of previous PUSHes and POPs.

Likewise, the POP instruction has no source; the location on the stack which is read depends purely upon previous activity. A corollary of this is that values must be POPped off the stack in the reverse order from that in which they were PUSHed.

This is not a problem: indeed, it is a considerable advantage of the stack. Incidentally, for this reason you will often see reference to stacks as 'first-in, last-out'.

### Suspending Operations

The stack is not only a useful place to store data while it is not needed; it is also a useful place to store the status of a program while the processor temporarily does something else. Take, for example, the execution of a subroutine.

Let's briefly recap on what a subroutine is. Some useful pieces of code occur frequently in a program; for example, a routine to output a character to a terminal might occur fairly frequently. Rather than repeat the code throughout the program, the programmer will write it once, in a general purpose form, in such a way that it can be jumped to from anywhere in a program.

Now the problem with jumping to a routine from a number of different places in a program is that the processor must have some way of finding its way back to where it was before it jumped, so that it can carry on with its job. This is done (you guessed it) by leaving a return address on the stack. It works like this. Consider the following segment of code:

```

START:  LXI    SP,STKTOP
        *
        *           ; figure something out
        *
        CALL  CHAROUT ; output result
        MVI  A,B
        *
        *           ; figure something else
        *
        CALL  CHAROUT ; output that too
        *
        *           ; do something else
        *
        JMP  BOOT   ; go back to operating system

CHAROUT:
        IN   STATUS ; check port status
        *
        *           ; perform character output
        OUT  DATA
        RET
        END

```

How does this work? The secret is in the CALL and RET (return) instructions, which work in a manner similar to PUSH

and POP. When a CALL is encountered, the processor's instruction counter is incremented to fetch the two halves of the 16-bit address which it will jump to. As the final part of this fetch sequence, the PC will be incremented again to point to the next instruction.

At this stage, the most significant half of the program counter is placed on the stack, followed by the least significant half. In other words, rather than PUSHing the contents of a register pair, the processor PUSHes the contents of the program counter.

Finally, the address fetched from the CALL instruction is placed into the program counter, so that the processor continues executing the program there. That completes the operation of the CALL instruction.

The processor will now continue on its merry way, with the address that it should return to safely stored on the stack. Once the subroutine has been concluded, the final instruction in it should be a RET (return). This performs the reverse of the CALL instruction.

Now the processor 'POPs' the return address off the stack and places it in the program counter. Execution will therefore resume with the instruction following the CALL.

Notice that it doesn't matter where in the program the CALL instruction is located; the processor will always leave the correct return address and later return to it properly. Furthermore, subroutine calls can be nested; that is, a subroutine can itself call another subroutine, which in turn can call another subroutine, and so on. Because the return addresses are placed on the stack in order and taken off in the reverse order, everything matches up.

Readers who are familiar with BASIC might like to reflect on the similarities between the CALL instruction and BASIC's GOSUB statement. In fact, the GOSUB and RETURN statements are executed in exactly the same way as the CALL and RET statements, only the user doesn't have to bother about setting up the stack.

Furthermore, BASIC has some nice safeguards built in to protect the user from his own folly if he should, for example, try to RETURN before he's GOSUBbed. What would happen if a machine code program tried to RET without a corresponding CALL.

The answer is that the program would probably go galloping off into the wide blue yonder. In fact, this is one of the most common causes of crashing machine language programs for the novice, and fortunately is one of the easiest to guard against.

Suppose our hypothetical 4K computer has its stack pointer sitting at its initial value, when a RET instruction is encountered.

The processor, not knowing any better, will load the program counter with the contents of non-existent memory; probably FFFFH, or possibly 0000H. As we've agreed there's no memory at FFFFH, the instruction it finds there will be opcode FFH, alias RST 7; this is a call to address 038H, and goodness knows what's located there!

Location 0, on the other hand, will probably be the start of the program, the equivalent of a reset, which, although not exactly desirable, is probably a bit safer than the first case (note to hardware designers: this is a good case for having inverting bus drivers so that any systems which gallop off will fail-safe by resetting. Alternatively, put a jump to an error trapping routine at location 038H).

So, bad stack discipline can be harmful. Let's examine an actual program to show how subroutine calls can be used.

### Searching For A Substring

Last month I set readers an exercise of combining substring comparison with a character search routine, to produce a substring search program/routine. I also promised to show one possible solution, so here it is.

In this case, the substring comparison is treated as a subroutine to replace the single-byte comparison in the original character search routine.

; text search test

```
bdos equ 0005h
spfnc equ 9 ; bdos string print function
wboot equ 0
org 0100h
```

```
test: lxi h,text ; set up pointers
lxid,ndtext
```

; search text for substring. Enter with hl set to beginning of  
; text and de to end of text

```
srch: call compar ; compare text with word
inx h ; point to next char
jz found ; if zero, then found
mov a,e ; check for end of text
sub l
mov a,d ; reached end?
sbb h ; if so, print not found message
jne srch ; otherwise keep trying
jmp srch

found: lxi d,fndmsg
jmp print
nfound: lxi d,nfndmsg
print: movi c,spfnc
call bdos
jmp wboot
```

; compar - compare string pointed to by hl with word pointed to by de.  
; Return with zero flag set if found.

```
compar: push h ; save text pointers
push d
lxid,word ; point to word

compar1:
ldax d ; get next char of word
ora a ; is it zero?
jz goback ; yes, end of word, found match
cmp a ; compare it with text
inx d ; move to next letter
inx h ; of text and word
jz compar1 ; ok so far?
goback: pop d ; retrieve original pointers
pop h
ret ; and return to caller
```

; variable areas

```
text db 'Now is the time for all good men'
ndtext equ $-1
word db 'tome',0
```

```
fndmsg db 'Word found$'
nfndmsg db 'Word not found$'
end
```

It's not terribly mysterious. The original string comparison has been written so that instead of printing a found/not found message it sets or resets the zero flag before returning to the calling program.

In almost every respect, the modified search is exactly like the original, and the comparison has not been changed very much either.

Notice that the hl and de register pairs are saved on the stack when the subroutine is entered, as it will use them for its own purposes. Similarly, they must be popped off the stack (in reverse order, of course) before the subroutine is exited.

A little experimenting with DDT will show how the stack pointer goes up and down as registers are PUSHed and POPped.

That's it for this month — next time we'll start looking at the overall design of a monitor program. □

# STOP

(Read this now!)

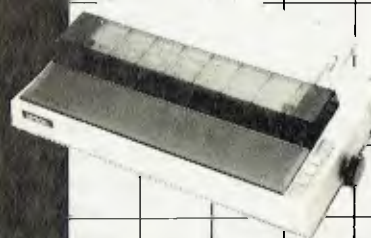
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## CITY PERSONAL COMPUTERS



# Tape Archiving For Apple Disks

By Steven Zanker

SO YOU'VE had your Apple II disk-based system for quite some time now and, depending on your application, you've written many programs, accumulated a lot of data, or both.

When you first bought the system, you realized the need to increase the insurance cover to protect your purchase. But now stop and think; while insurance will pay for replacement of the hardware, have you given any thought to the question of software?

I doubt even Tony Greig could find an insurance policy for software. So while you cannot insure, you can assure against loss of software, by having a backup of programs and data. But three questions arise: On what do I store the backup? How can I copy? What do I do when I need the backup?

These questions should be answered for you in this article.

There are three types of storage available to the personal user:

- Disks — buy another set of disks and copy disk to disk. However this method is very expensive, and care is needed when storing disks.
- Paper — have a hardcopy of program listings, and data, using a printer. Firstly you need a printer, and secondly you must have the time to re-key the programs and the data if the worst happens.
- Cassette tape — dump disks byte for byte onto tape. This is the best solution as tapes can be very cheap, and will store easily. This is the method we will be looking at.

## How To Copy?

Listing 1 is a program that will dump the contents of a disk onto tape, and when required, will fully restore that disk!

The program is based on the RWTS (Read or Write a Track Sector) subroutine. Each disk has 35 concentric grooves or tracks (numbered 0 to 34). Each track contains 16 segments or sectors (0 to 15), and each sector holds 256 bytes or characters.

When using the disk, the Disk Operating System (DOS) normally handles all data flow to and from the disk. When accessing any sector, 256 bytes of internal memory must be set aside for the data

flow. This piece of memory is called a 'buffer'. Additional information can be found in the RWTS chapter in the DOS manual, and my previous article *Single Drive Disk Copy* in the May 1982 issue.

The overall object of the program is to transfer from disk to tape, or vice versa, its entire contents. While there is not enough memory in a 48K Apple to store an entire disk, there is room to store one-fifth, or 112 sectors. Here is a description of the program:

Line 100 sets HIMEM to protect those 112 buffers.

Lines 500 — 999 show the variable names used.

Lines 2000 — 2120 show the memory locations of the Controlling Subroutine, the Input/Output Block, the Device Characteristics Table, and the Tape-Input subroutine. The portions of these tables that are changed during program execution are shown in lines 2160 — 2520. The RWTS data is read and poked into memory in lines 2540 — 2560. Lines 2580 — 2720 show the addresses in which the range to be written to/read from tape.

The program is memory based, that is, you select which function is to be performed. Selection is made by a single key stroke. The menu is found in lines 4000 — 4440. The explanation will now be diverted into the available selections.

## Disk To Tape

The overall procedure of this selection is to read one-fifth of a disk at a time and dump it onto tape.

A user interrogation section begins at line 10020, requiring slot, drive and volume numbers, but also provides instructions. The current track and sector numbers are calculated and poked into the Input/Output Block in lines 10420 — 10480. The buffer starting address is then changed in preparation for the contents of the next sector, by adding 1 to the high byte (which is always calculated by 256). The controlling subroutine is called and the next sector read at line 10520, with an error check made in the following statement.

After reading of the seven tracks for that pass, an inverse message is displayed for the benefit of any humans watching.

Statement 10600 causes a delay between reading the disk and writing the tape. When writing a tape, the Operating System (OS) records a ten second header to be used for synchronization when reading. Now if a read of the tape is called and the header has already commenced playing, the OS cannot synchronize with the tape, and a successful read cannot be achieved, hence the delay.

## Save The Program

Included is a selection allowing easy saving of this program on tape.

You may have already guessed that when the backup is needed, this program is also required.

## Tape To Disk

This selection will restore a disk from the data recorded on tape.

Any data already on the object disk, will, of course, be destroyed. Therefore first up is a warning message/question. Once the go-ahead is given, the usual slot and drive questions appear, together with the required volume number for the new disk.

Note that there is only the range restriction; you may have a different volume number to the original. When the volume number has been entered, the disk is formatted, using the RWTS command code 4.

After the disk has been formatted, an error check is made, and if no error, a CATALOG is then run for display purposes. A pause instruction follows, allowing the user time to prepare for the copy.

The copy section is similar to that of the Disk To Tape selection, except that the tape is the source on input, and the disk is output. Lines 30580 — 30600 poke the range to be read into memory, then the tape-input subroutine is called.

Now a tape-read subroutine resides in ROM, however if an error occurs, only a message is displayed. To overcome this simply, I have copied the ROM sub into RAM, and have changed the last few instructions, so the program will halt if an error occurs.

Note that each read will dump into memory 28,672 bytes (7 tracks worth), and if one byte is wrongly read, it may

affect the whole disk. When the range of memory has been read, the 7 tracks of the disk are written from that range, and a disk error check is made (lines 30660 — 30840). The program loops back for the next 7 tracks. Once all 5 passes have been completed, the disk will be in a ready-to-use state, and execution will return to the menu.

## Getting It Running

If you've done little or no work with tapes: read the Applesoft and Tutorial manuals regarding the use of tapes, key in a short program, SAVE and LOAD to and from tape until you know the best record and playback volume levels.

Do not proceed to the next step until you have mastered this. You must have a 100 percent success rate.

Key in the program and check for errors. Pay particular attention to the DATA statements. Perform trial runs to see if everything is in order. Use the FID program on the system master to VERIFY the restored disk. Run a few programs off the new disk. If anything is amiss go back to step 1.

Buy the cassette tapes, the length de-

pends on which one of four methods you wish to use. All disks are assumed to be single sided: a) The utility programs saved three times (two backups) on one side of a cassette, and disks dumped one per cassette side. Needs C60 tapes. b) On one side of any cassette appears the utility program and one disk. Uses C60. c) Same as a) except the disk is dumped twice (a secondary backup). Needs C90 tapes. d) The utility program then the disk dumped twice. Needs C90 tapes.

I recommend method d). Being a long time user of tapes in audio work, I can assure you, tapes are not indestructible. Using this method you will have a second chance.

Clean the record/playback heads according to the unit's manual. Dirty heads give dirty tapes give dirty disks.

Dump the disk using whichever method you chose. Label each tape after the dump. Transport and keep the tapes in a suitable place away from magnetic fields, heat, animals (includes humans), and humidity (low or high). I suggest your locker or desk at work, a friends home, or the bank. A copy of this article should accompany the tapes.

When you've added a few more files to a disk, dump it on another tape, and swap tapes. Do not dump on the same tape, as you will have no backup, while the tape is at home.

## Footnotes

Due to the run-time of this program (14 minutes each way), I have designed it so the user can start, then walk away. Upon return, if the menu is displayed, then the copy has been executed successfully. A fatal error will stop execution and display a flashing message without clearing the screen.

There are two characters used in this program that are not available from the keyboard: CHR\$(91), a left square bracket, and CHR\$(92), the backslash. For the latter use control-x (cancel) and re-copy the entire line. For the former use an immediate mode print statement (?CHR\$(91)) and use the edit keys to move up and copy from the screen when needed. Lines 4040 to 4120 contain 40 characters in each print string.

Finally, always store tapes vertically, and fully wound on one hub. □

```

10  REM TAPE BACKUP
100 HIMEM: 9720
200  REM /-----\
220  REM !                                     !
240  REM !           APPLE ][             !
260  REM !           DOS 3.3 48K         !
280  REM ! TAPE BACKUP UTILITY !
300  REM !                                     !
320  REM ! AUTHOR: S.ZANKER !
340  REM ! WRITTEN: 31MAR82 !
360  REM !                                     !
380  REM \-----/
500  REM

```

<-> VARIABLES <->

```

520 A = 0
540 ANSWERS = ""
560 B = 0
580 D$ = CHR$(4)
600 DRIVE = 0
620 G$ = CHR$(7)
640 OVOBJECTVOL = 0
660 PASS = 0
680 SECTOR = 0
700 SLOT = 0
720 SVSOURCEVOL = 0
740 TRACK = 0
2000 REM

```

<-> MEMORY MAPS <->

```

2020 REM
      ++ RWTS MAP ++
2040 REM 768-84=CONTROL SUB
2060 REM 800-16=IOB
2080 REM 817-20=DCI
2100 REM 832-37=ERROR TABLE
2120 REM 848-02=T-READ SUB
2140 REM
      + LOCATIONS ACCESSED +
2160 REM -----IOB-----
2180 REM 801 =SLOT NUMBER * 16
2200 REM 802 =DRIVE NUMBER
2220 REM 803 =VOLUME NUMBER
2240 REM 804 =TRACK NUMBER
2260 REM 805 =SECTOR NUMBER
2280 REM 808&9=BUFFER ADDRESS
2300 REM 812 =COMMAND CODE
2320 REM 813 =ERROR CODE

```

```

2340 REM 814 =ACTUAL VOLUME
2360 REM 815 =PREVIOUS SLOT
2380 REM 816 =PREVIOUS DRIVE
2400 REM -----ERROR TABLE-----
2420 REM 832 =ERROR FLAG(=128)
2440 REM 833 =ERROR COUNT
20180 HTAB 1: INVERSE : CALL - 868
20200 PRINT "SAVING PROGRAM";
20220 NORMAL
20240 SAVE
20260 HTAB 1: CALL - 868
20280 INPUT "ANOTHER COPY ?";ANS
20300 ON LEFT$(ANS,1) = "Y" GOTO 20120: RETURN
30000 REM

```

<-> TAPE TO DISK <->

```

30020 HOME : PRINT : PRINT
30040 PRINT "INSERT BLANK DISK."
30060 VTAB 15: FLASH
30080 PRINT "WARNING THIS PROGRAM DESTROYS THE"
30100 PRINT "CONTENTS OF THE DISK."
30120 PRINT "DO YOU WANT THIS";: NORMAL : INPUT AN$:
      IF AN$ < > "YES" THEN RETURN
30140 HOME : PRINT "INSERT TAPE AND REWIND"
30160 PRINT " DO NOT CHANGE DISK!"
30180 VTAB 10: INVERSE : PRINT "SLOT NUMBER (1-6) ";:
      NORMAL : INPUT AN$: IF AN$ = "" THEN RETURN
30200 SLOT = INT ( VAL (AN$)): IF ABS (SL - 3.5)
      > 3 THEN PRINT G$: GOTO 30180
30220 POKE 801,SLOT * 16
30240 VTAB 14: INVERSE : PRINT "DRIVE NUMBER (1/2) ";:
      NORMAL : INPUT AN$: IF AN$ = "" THEN 30180
30260 DRIVE = INT ( VAL (AN$)): IF ABS (DR - 1.5)
      > 1 THEN PRINT G$: GOTO 30240
30280 POKE 802,DRIVE
30300 VTAB 18: INVERSE : PRINT "WANTED VOLUME
      NUMBER (1-254) ";: NORMAL : INPUT AN$:
      IF AN$ = "" THEN 30240
30320 OV = INT ( VAL (AN$)): IF ABS (OV - 127.5)
      > 127 THEN PRINT G$: GOTO 30300
30340 POKE 832,0
30360 REM

```

<> FORMAT THE DISK <>

```

30380 POKE 803,OV
30400 POKE 812,4
30420 CALL 768
30440 IF PEEK (832) > 127 THEN 40000
30460 PRINT D$"CATALOG"
30480 PRINT : PRINT : INPUT "SET THE TAPE IN PLAY

```

```

MODE AND PRESS RETURN";ANS:
IF AN$ < > "" THEN RETURN
30500 POKE 812,2
30520 REM

<> COPY SECTION <>

30540 FOR PASS = 0 TO 4
30560 PRINT : PRINT : INVERSE : PRINT
"READING TAPE";: NORMAL
30580 POKE 60,0: POKE 61,38
30600 POKE 62,255: POKE 63,149
30620 CALL 848
30640 IF PEEK (832) > 127 THEN FLASH : PRINT
10080 SLOT = INT ( VAL (AN$)): IF ABS (SL - 3.5)
> 3 THEN PRINT G$: GOTO 10060
10100 POKE 801,SLOT * 16
10120 VTAB 14: INVERSE : PRINT "DRIVE NUMBER (1/2) ";:
NORMAL : INPUT AN$: IF AN$ = "" THEN PRINT G$:
GOTO 10060
10140 DRIVE = INT ( VAL (AN$)): IF ABS (DR - 1.5)
> 1 THEN PRINT G$: GOTO 10120
10160 POKE 802,DRIVE
10180 VTAB 18: INVERSE : PRINT "SOURCE DISK VOLUME
(0-254) ";: NORMAL : INPUT AN$: IF AN$ = ""
THEN PRINT G$: GOTO 10120
10200 SV = INT ( VAL (AN$)): IF ABS (SV - 127)
> 127 THEN PRINT G$: GOTO 10180
10220 HOME : VTAB 20: INPUT "INSERT SOURCE DISK AND
PRESS RETURN";ANS: IF AN$ < > "" THEN RETURN
10240 VTAB 24: PRINT "PRESS RECORD NOW"
10260 POKE 803,SV
10280 POKE 812,1
10300 POKE 815,SL * 16
10320 POKE 832,0
10340 REM

<> COPY SECTION <>

10360 FOR PASS = 0 TO 4
10380 PRINT : PRINT : INVERSE : PRINT
"READING DISK";: NORMAL
10400 POKE 809,37: POKE 808,0
10420 FOR TRACK = PASS * 7 TO PASS * 7 + 6
10440 POKE 804,TRACK
10460 FOR SECTOR = 0 TO 15
10480 POKE 805,SEC
10500 POKE 809, PEEK (809) + 1
10520 CALL 768
10540 IF PEEK (832) > 127 THEN 40000
10560 NEXT SEC,TRACK
10580 HTAB 1: CALL - 868: PRINT
"READ #";PA;" DONE,"
10600 FOR A = 1 TO 6250: NEXT A: REM DELAY - DONT CHANGE
10620 INVERSE : PRINT "WRITING TAPE";: NORMAL
10640 POKE 60,0: POKE 61,38
10660 POKE 62,255: POKE 63,149
10680 CALL 65229
10700 HTAB 1: CALL - 868: PRINT "PASS #";PA;" COMPLETED."
10720 IF PASS = 3 THEN INVERSE : PRINT "LAST PASS
COMING UP!": NORMAL
10740 NEXT PASS: RETURN
20000 REM

<-> SAVE <->

20020 HOME : PRINT : PRINT
20040 PRINT "INSERT TAPE"
20060 PRINT " SET IN RECORD MODE"
20080 INPUT " THEN PRESS RETURN";ANS
20100 IF AN$ < > "" THEN RETURN
20120 HOME : VTAB 20
20140 PRINT "THERE WILL BE A 10 SECOND DELAY";
20160 FOR A = 1 TO 8500: NEXT A
2460 REM 834 =WRITE-PROTECT
2480 REM 835 =VOLUME MISMATCH
2500 REM 836 =DRIVE
2520 REM 837 =READ
2540 FOR SV = 768 TO 820: READ OV:
POKE SV,OV: NEXT SV
2560 DATA 169,3,160,32,32,217,3,176,1,96,
169,128,141,64,3,24,96,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,1,96,1,0,18,6,49,
3,34,34,0,0,1,0,0,96,1,0,1,239,216
2580 REM

<> TAPE MAP <>
2600 REM 60&61 =START ADDRESS
2620 REM 62&63 =FINISH ADDRESS
2640 REM 65229 =WRITE SUB (ROM)
2660 REM 848 =READ SUB (RAM)
2680 FOR SV = 848 TO 902: READ OV: POKE SV,OV: NEXT
2700 DATA 32,250,252,169,22,32,201,252,133,46,32,
250,252,160,36,32,253,252,176,249,32,253,252,160
2720 DATA 59,32,236,252,129,60,69,46,133,46,32,186,252,
160,53,144,240,32,236,252,197,46,208,1,96,169,128,

```

```

141,64,3,96
4000 REM

<-> MENU <->

4020 TEXT : HOME : INVERSE
4040 PRINT "/-----\";
4060 PRINT "I DOS 3.3, 48K TAPE BACKUP UTILITY !";
4080 PRINT "!";
4100 PRINT "I AUTHOR: S.ZANKER WRITTEN: 31MAR82 !";
4120 PRINT "\-----/"
4140 NORMAL : POKE 34, PEEK (37) - 1
4160 POKE 33,30: POKE 32,10: PRINT : PRINT
4180 PRINT "CHOOSE ONE:"
4200 PRINT " [C] CATALOG"
4220 PRINT " [D] DISK TO TAPE DUMP"
4240 PRINT " [S] SAVE PROGRAM ON TAPE"
4260 PRINT " [T] TAPE TO DISK DUMP"
4280 PRINT " [ESC] END PROGRAM"
4300 POKE 49168,0: WAIT 49152,128: POKE 49168,0:
ANS = CHR$ ( PEEK (49152))
4320 POKE 32,0: POKE 33,40
4340 IF AN$ = "C" THEN TEXT : PRINT D$"CATALOG": INVERSE:
INPUT "PRESS RETURN";ANS: NORMAL : GOTO 4000
4360 IF AN$ = "D" THEN GOSUB 10000: GOTO 4000
4380 IF AN$ = "S" THEN GOSUB 20000: GOTO 4000
4400 IF AN$ = "T" THEN GOSUB 30000: GOTO 4000
4420 IF AN$ = CHR$ (27) THEN 50000
4440 PRINT G$: GOTO 4000
10000 REM

<-> DISK TO TAPE <->

10020 HOME
10040 PRINT "INSERT TAPE AND REWIND"
10060 VTAB 10: INVERSE : PRINT "SLOT NUMBER (1-6) ";:
NORMAL : INPUT AN$: IF AN$ = "" THEN RETURN
"TAPE READ ERROR";G$: NORMAL : POP : GOTO 50000
30660 HTAB 1: CALL - 868: PRINT "READ #";PA;" DONE,"
30680 INVERSE : PRINT "WRITING DISK";: NORMAL
30700 POKE 809,37: POKE 808,0
30720 FOR TRACK = PASS * 7 TO PASS * 7 + 6
30740 POKE 804,TRACK
30760 FOR SECTOR = 0 TO 15
30780 POKE 805,SEC
30800 POKE 809, PEEK (809) + 1
30820 CALL 768
30840 IF PEEK (832) > 127 THEN 40000
30860 NEXT SEC,TRACK
30880 HTAB 1: CALL - 868: PRINT "PASS #";PA;" COMPLETED."
30900 IF PASS = 3 THEN INVERSE : PRINT "LAST PASS
COMING UP!": NORMAL
30920 NEXT PASS: RETURN
40000 REM

<> DISK ERRORS <>

40020 POKE 832,0: FLASH
40040 IF PEEK (813) = 16 THEN PRINT "WRITE PROTECTED";G$:
NORMAL : POP : GOTO 50000
40060 IF PEEK (813) = 32 THEN PRINT "VOLUME MISMATCH";G$:
NORMAL : POP : GOTO 50000
40080 IF PEEK (813) = 64 THEN PRINT "DRIVE ERROR";G$:
NORMAL : POP : GOTO 50000
40100 IF PEEK (813) = 128 THEN 40140
40120 PRINT "DISK-ERROR ERROR": NORMAL : POP : GOTO 50000
40140 PRINT "READ ERROR";G$: NORMAL
40160 POKE 833, PEEK (833) + 1: POKE 837, PEEK (837) + 1
40180 ON PEEK (837) GOTO 40220,40260
40200 STOP
40220 A = PEEK (808) + PEEK (809) * 256: FOR
B = A TO A + 255: POKE B,0: NEXT B
40240 GOTO 10520
40260 PRINT "TRACK #";TR;" , SECTOR #";
SEC;" CONTAINS A READ"
40280 PRINT " ERROR: LOOK P97 DOS MANUAL ('IBSTAT')"
40300 PRINT " THE UNWRITTEN AREA"
40320 PRINT " WILL BE FILLED WITH ZEROS. RUN CONT."
40340 POKE 837,0: GOTO 10560
50000 REM

<-> END OF RUN <->

50020 OV = PEEK (37): TEXT
50040 VTAB OV
50060 HIMEM: 38400
50080 END

```

# CASE HISTORY

AN AUSTRALIAN life insurance company has achieved a world first with the sophisticated use of programmable calculators to replace the complexities of rate books.

Mercantile Mutual Life found a few years ago that its agents were experiencing problems in manipulating the many variables involved in designing customised life insurance packages for their clients. The wide range of variations required a comparatively complex rate book.

"Many insurance companies have only simple rate structures, because the range of possibilities is limited", explained Graham Nicholson, the Marketing Manager.

"We were already very flexible, and wanted to increase the range of options available to our clients, but this created problems for the agents and brokers in learning our new systems."

A small portable computer seemed to be the answer, and after a careful search of the market the decision was made to standardise on the Hewlett-Packard HP-41CV programmable calculator.

Paul Scully, Supervisor of Actuarial Services was in charge of the project which delivered the first calculators into the hands of agents in June, 1981. The development of the system was tackled in two stages.

"We needed the trial stage to show what progress was being made and familiarise agents with the basic approach of the programs", explained Scully. "The lead time in developing plug-in ROM modules was quite a few months, and so we chose to introduce the system using programs stored in the Random Access Memory of the calculators, while we were developing the plug-in ROM modules."

The stage one trials were a resounding success and laid a solid foundation for the introduction of the ROM modules. Most of the agents took to the system like ducks to

water. MML formed a User's Club and started a regular monthly publication called 'Computer Plus' to keep the agents up to date with the development of new programs and to help them become familiar with the computerised approach.

Paul Scully explained that a primary consideration in selecting the Hewlett-Packard hardware was to ensure the company had a system with the capacity for future expansion, in particular by interfacing the calculators via telephone modems to the MML central HP3000 mainframe computer.

In the trial stage the agent still had to carry a rate book and feed relevant factors into the calculator on each occasion. These problems were overcome with the introduction of read-only memory modules in March 1982. These modules plug into the back of the calculator and carry the programs, together with all the rate factors required.

This has freed the RAM for a wide range of individual applications. Under the new system only two small linkage programs are held in RAM, and these can be upgraded at branch offices whenever conditions change significantly.

The use of RAM to store the linkage programs was an obvious solution to the potential problem of having to replace modules when the economic situation altered. The HP-41CV has continuous memory, which retains the information stored in RAM even when the calculator is switched off.

Graham Nicholson is enthusiastic about the success of the new modules.

"Without a rate book an agent can give information on sums insured, maturity values and premiums all tailor-made for the client and available within seconds", he said. "He can manipulate variations of these elements at will, while he is with the client."

"If the agent wishes to expand his

system, he can have a completely portable office system containing all the files and basic information he needs".

The four plug-ports in the back of the calculator allow the agent to extend the memory, and also to interface the calculator with a miniature HP Digital Cassette Drive and thermal printer. With these two units an agent in the field can carry his complete records of client files, stored in a few small dictaphone-type cassettes.

It takes less than thirty seconds to access any record on the cassette, and each cassette holds about 180 complete client files. Information can be printed out or updated immediately, almost eliminating the time previously spent on paper-work back at the office.

At present Mercantile Mutual Life has about 140 units out in the field and another 30 are being used internally. One-day training courses are sufficient to familiarise agents with the system, and special seminars are now being organised to acquaint them with some of the new programs being developed.

These seminars also give the agents a better understanding of the way in which the system is developing, and teach them how to program their own material.

Agents are sharing their own programs through the User's Club and the monthly newsletters.

Graham Nicholson believes a secondary — but most important — benefit to the company is that its agents have now become familiar with computing in an increasingly technological society.

"They can now see how automation frees them from the time spent in office paper-work and filing, and allows them to spend more time selling insurance," he said.

"From the agent's point of view this is one of the most significant changes that has taken place in the insurance industry in the last fifty years." □

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# A Beginner's Guide To Tandy Games

*Edward McArdle didn't buy his computer to play games, but play them he has — so for the new owner of a Tandy or Dick Smith machine, he presents this guide to the vast range in his library...*

LIKE MANY others I bought my microcomputer, a TRS-80 Model 1, for mathematical reasons, not intending to spend much on games, and now have a stack of them. Unlike a lot of others, from what I read, I don't spend long hours at a time in front of the keyboard. I don't have enough long hours.

This article is intended for those who have not yet begun to explore computer games, but are interested.

As with software generally, you can buy games on cassette or disk, or you can buy books with listings of games and type them out yourself. Some magazines, like 80 Microcomputing and Creative Computing publish a good number of do-it-yourself programs.

In commercial games, a basic classification is into those that can be solved, and those that cannot.

In the latter category are the 'arcade' games. The first of these I bought was Tandy's Invaders, and I still think it is one of the best. I had never tried this in an arcade, but am a devotee of pinball when I have a bit of spare time, and I had the idea that mine was inferior to the arcade version. When I eventually tried one, I changed my mind. Apart from the colour graphics I prefer my own.

A basic problem with these games is that keys must be used as controls, instead of buttons and joysticks (if you are really keen, you can get joysticks for your computer.) On Invaders Tandy has at least used buttons which are convenient to operate.

Another game which is not bad is Big Five's Super Nova, but in this case it is not as good as the arcade version, Asteroids. You are in a ship in an asteroid field. You must blow up asteroids, especially if they are about to run through you, and enemy ships which pass occasionally. There is one type of ship which shoots back.

The graphics are very good, except for your own ship, which is a simple T shape. It can only turn on angles of 45 degrees (and often insists on turning 90 degrees), where as the one in the arcade turns continuously. Worse, it is difficult to tell which way you are facing when you are tipped at



## GAME REVIEW

45 degrees.

One option when you are in trouble is to press the SPACEBAR and go into hyperspace. This re-materialises you in a random spot. Unfortunately, apart from the intended hazard that you may materialise in front of an asteroid, it is often difficult to find your ship.

The screen works as a scroll, so that as you disappear off one edge you appear on the opposite side. One of the problems with hyperspace is that you may appear half off the screen, and the only quick way to locate yourself is to fire.

One I found not very interesting is Tandy's Paddle Pinball. It simulates a pinball game, but you have to slide the paddle along the bottom for the ball to bounce from, and it is a bit slow and hard to handle. The paddle is moved with the horizontal arrow keys, and the ball will bounce to a stop 'under gravity' unless you boost it by pressing the space bar at the same time.

This is a bit of a nuisance, and somewhat awkward. To fire the ball you press RETURN, which is awkward again, as it is under the fingers on the arrow buttons. The game can also be used with an amplifier if you have one.

Tandy's Flying Saucers is good fun, and not very difficult. You have a gun wh-

ose angle can be altered, and a variety of space-ship types flying past to be shot at. The gun can be fired continuously, but you are mildly penalised for shots which miss. The graphics are very good, especially the exploding ships. The pilots are obviously not licensed, as they keep running into each other (but you get no points for that).

In this game you have a set time to score as much as possible. It may be possible to become skilled enough to get a perfect score, but it would require some practice.

There is a level-of-difficulty setting, but it simply speeds up everything. At the lowest level everything travels slowly, but that includes your bullets, and it seems a little harder to judge them so that they arrive at the same place as their targets.

Also in the category of infinitely usable games would be those like Backgammon and Blackjack, where the computer uses its random number capability to simulate dice or cards results. I was given a cassette with these two on it when I bought my TRS-80, but have not used them much. It is more fun to use real cards and dice (and real opponents).

A group of distinctive games make up the Star Trek category. In these you are a commander of a starship, and have to make decisions, move to another quadrant, fire phasers and photon torpedos, and so on until the universe is safe for Our Side.

There seem to be versions of this game everywhere, and magazines often have varieties for you to type up for you own machine. I have two of the commercial variety.

One is Tandy's Invasion Force. It came with a sixteen-page instruction booklet, which should have warned me. It seems like a good game when one has memorised all the commands, but I am nowhere near that. I have tried to play it a few times, but get lost trying to look up all the commands.

Like all the other games I have mentioned, it is in assembly language and runs very fast, but if you accidentally type in an incorrect command you are likely to find a READY appearing on the screen, and the game is gone! I feel that it might be a good game if I learn it.

The other, which I like, is Trek '78, which I bought at Dick Smith's. Unlike most of the other games I have, it is written in BASIC. One side of the tape has the instructions, and the other the game. I



found this game pleasantly easy, and I win unless I do something silly. The only criticism is that it would have been much more convenient to have the instructions on a sheet of paper.

You appear in a random quadrant of the galaxy. (These games are set up randomly, so that each game is different.) There are a few Starbases, and lots of baddies (Klingons). You wander about and wipe them out. There are also Romulans who may be baddies or goodies as the whim takes them. If you run low on energy you have to get to a Starbase to refuel, which can be a problem if you can't find one.

At any time you can call up a map of the galaxy, but it only shows parts to which you have been already. The rest is uncharted.

Apart from the pleasure of the game, the fact that it is written in straightforward BASIC means that you can fiddle with it, for example adding to the impolite messages the Romulans occasionally send. It is also easy to make a backup copy.

Another game which must await a long spare time, but which seems interesting, is Broderbund's Galactic Revolution, Part 3 of The Galactic Sage. This one comes with a 32-page booklet, but seems to be within my level of comprehension. I can at least play it, even if I cannot win. It is written in BASIC, but is not easily comprehensible unless you are well into programming.

The game can take up to three players. Those roles not taken by humans are taken up by the computer. This is a game in which you amass armies, weapons and money, win and lose worlds, and try to become ruler of the galaxy by winning hearts and minds. It is a much more interesting game when played by two or three. The game is available at Dick Smith's.

The other main category is what is generally called the Adventure games. These involve solving problems, such as finding treasures, escaping from mazes, and so on. They have one big distinction from the first group, in my opinion. They are too hard for most people.

That may seem a sweeping statement, but they have to be hard. Once you have finished an Adventure game it is unlikely that it will hold any further interest for you. Since they may range in value from \$20 to \$40, they need to hold your interest for a good while. Ideally, they should begin fairly easily, and become progressively more difficult. Unfortunately, in being reasonably difficult for the most intelligent players they may be much too difficult for the average person.

A difficulty is that if you get to a stage where you cannot think of a new approach, there is nothing you can do. One solution is to find someone who has

gone further than you, and ask them. This brings up another difficulty. If you know someone who has solved the game, they will be dying to tell you how, whether you want to or not. If you ask for a little hint they will pour forth information.

These games typically involve some sort of travel, so draw a map. You probably won't get far if you don't.

Some of them have a GAME SAVE option, so that you can take a recording of the place you are up to, and continue from the same place again later. It is suggested that you do this when you think you are in imminent danger. After you have been killed, you start from the same spot again, differently. You think this makes them rather easy? You haven't tried them (how do you know you are in imminent danger, for a start!)

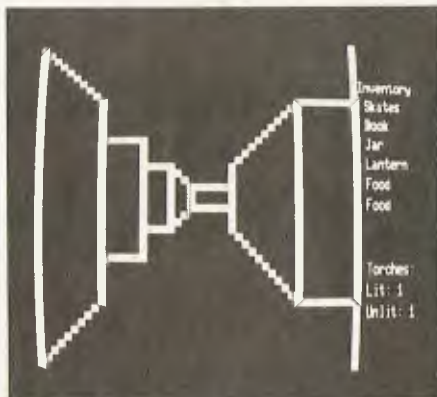
The first few games I bought were Tandy products (I didn't know others existed.) They were Haunted House, Raaka Tu and Pyramid 2000.

Haunted House is probably one of the easiest of these games. I read a review in 80-Microcomputing which criticised it for its extremely limited vocabulary, but I found it interesting and involving. It is reasonably easy to get upstairs. But all of a sudden you can get no further.

I was stuck there for weeks, and might never have got any further if I had not been given a clue in the article mentioned above. The author mentioned it because he thought it unfairly difficult for the game, which was otherwise good for beginners. The game proved interesting for my young relatives when they came visiting, and they got most of the way through it in a day with some help from me.

This game has no save game feature, and the rather poor requirement that if you are killed you not only have to start again, you have to completely reload it from tape! However the game is so short that, including loading, it only takes five or six minutes to run through the whole thing.

As I discovered by tinkering, there is a simpler method. If you press RESET, then system and /, you will be back at the start, but still carrying everything you had. You can do this in some other games, but sometimes it can have odd results, and



some games are protected; if you try it you just get a MEM SIZE? and an empty computer.

Haunted House and Raaka Tu are distinguished by the fact that they are the only games I have yet finished. In Raaka Tu you have to find your way into a temple, get some treasures, and get out again.

It has an interesting feature, in that some of the occurrences seem to be random. For example, hitting the serpent with your sword may kill it or not. This may have some relation to other things you are carrying, but it is not obvious to me if so.

This is one game I would be tempted to try again, for that reason (and because I missed a treasure — I have no idea what it is). You receive five points per treasure, and the result is doubled if you carry them outside and get on the correct square. This seems a good game, easy enough for the intelligent beginner.

Pyramid 2000 is a similar game, wherein you travel through a pyramid, accumulate treasures, and gain points by bringing them out again. I had been getting nowhere, but occasionally trying again, when a casual acquaintance in a shop insisted on giving me a few hints, so I don't know whether I would have gone any further by myself. Beware of strangers standing near the games shelf!

I eventually found myself in Compshop in South Melbourne where there is a good display of games. They had a \$3 sampler of a Scott Adams Adventure (actually the start of Adventure No 1), so I bought it, and one called Escape From Traam, by Jyym Pearson.

I took the sample home and finished it in half an hour. But it was interesting, so I went back and bought Adventure 7, The Mystery Fun House. I discovered this was considerably harder, and I am still plugging away, but getting no further in four different directions!

Still, I enjoyed it, so I splashed out \$160 for the Adventure Series Gold Album, with all twelve Adventures. I have only tried four as yet, so I should stretch that investment over a fair time.

The Adventures by Scott Adams are the best I have yet tried. They may eventually turn out too hard for me in some cases, but they have a lot of virtues. One is the sense of humour of the author(s). Another is that you can think your way about, because there is a logic to everything. Third, in most cases the author has anticipated most of the words you are likely to use, and you will get a sensible reply, of some sort. By analysing replies you can compile a list of words the program does or does not recognise.

The composition of these games is economical because in those I have tried it is necessary to be continually retracing your steps to get things, so that it takes a long time to get through a game even

when you know what you are doing.

Pirate Island is supposed to be an easy one for beginners, but I ran into a man who had never got out of the first two rooms (he had no objection to my telling him how.) In fact it is fairly difficult, except that if you ask for HELP it gives you clues.

If you want an easy one to start, I would recommend The Count. At least there are things to do that are fairly obvious.

I am disappointed in Escape From Traam. It is too hard for me. Also it has a very limited vocabulary, and gives vague replies. If you say 'spring up', in a Scott Adams Adventure the program will reply, "I do not know what SPRING means".

If it says something like, "I may be stupid, but I do not understand you", you can infer that the words you used are in its vocabulary, but cannot be used in that combination.

In Traam the message is WHAT? You do not know whether it recognised either word or neither. Traam can take more than two words, but I suspect it just looks for key words. If you type anything with the word underneath in it, the reply is "All right...urrgh", or something like that.

At the beginning of the program, whatever you do, your ship will crash. If you happen to say a particular phrase, you find (and of course GET) a hand laser. After that it never recognises that phrase again.

Moving in the only direction possible you will find yourself at the base of a cliff. After a number of tries I got nowhere, so I went back and bought a hint sheet. So I got up the cliff. There is a pattern of six squares I can cover, but I have run out of ideas to get any further, and the situation is not covered on my \$1 roneoed hint sheet.

I am fairly sure I know what to do. I have to sail my giant leaf on the stream, but I have not been able to guess the vocabulary required to allow me to do so. Maybe I'm wrong. Anyhow, I definitely don't recommend this for beginners.

Another one I don't recommend for beginners is Asylum. But it is involving, and worth seeing for the graphics. Its companion, by the same authors, is Deathmaze 5000, and I do recommend this. There is also Labyrinth, which I do have.

In Asylum you begin at a locked door, and fairly easily get through it. You venture along a corridor, and are captured by a guard.

I don't know if there is any way to avoid capture, but I suspect not. You are locked in a cell. I have escaped the cell, and wandered up and down the corridor outside, and into some nearby passages, but in over three months have never got further.

The game is supposed to be interesting

in that you meet interesting inmates, buy and sell objects, and eventually escape. I have never met anyone except guards who capture me and end the game. I have found no object that seems of use. It seems too hard.

On the other hand, the game has one great virtue. You can call up on the screen (and copy down) its entire vocabulary. So you will at least recognise a word.

Deathmaze 5000, on the other hand, is relatively easy (for a while). You materialise inside a maze. As in Asylum, you move forward by pressing the button with the up arrow, and turn using the other three arrows. You MUST draw a map as you move, or you will never get anywhere. You have torches to start, and must find more before they burn out, and food before you starve.

Asylum requires a fairly extensive vocabulary, while Deathmaze requires very little besides GET, DROP and OPEN. In the latter there are five levels, of which I have covered four, and don't have a clue how to get further (apart from preventing the monster from killing me). There is a calculator I have learnt to avoid on the top level, but maybe I need it for something?

I continue to be parted from my money fairly often, both for games and magazines, but so far remain solvent. Perhaps it is time to stop buying, and solve all the puzzles I now own. □

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# Come In, Spinwriter

*The Nippon Electric Company — otherwise known as NEC — is one of the giants of the Japanese communications and computer industries. It has an ever-stronger presence on the Australian market, thanks to the local offshoot NECISA (NEC Information Systems Australia). If the quality of the Spinwriter printer series is any indication, the company's future here is a bright one...*

SINCE DIABLO launched the daisywheel with its Hytype I in 1972 it has dominated the correspondence-quality printer market.

These days, however, it is finding it harder to fight off the challengers. Not only does Diablo have to worry about a rash of cheap newcomers and improving dot-matrix printers, but also it has an increasingly popular NEC to contend with.

NEC has been grabbing a growing share of the market with a reputation for quality, reliability and speed. We've just tried two of its latest offerings, and can well understand why.

We tested examples from the top-of-the-line 7700 series — an update of the successful 5500s — and from the 'baby brother' lineup, the 3500 series.

## **Rugged Speed**

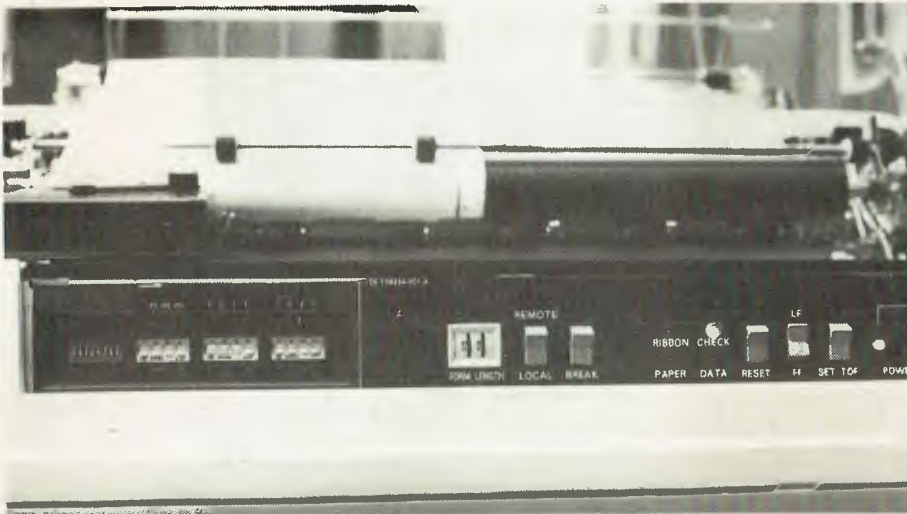
The first to go on trial was the 7710, a serial-interface (and thus slightly more expensive) version of the 7700.

It's a rugged, solid (21kg worth of die-cast aluminium) and obviously quality-made unit. It feels indestructible — it's the machine for those who need high-speed, heavy-duty printing.

And speedy it is, with a rating of 55 characters a second, almost 40 percent faster than Diablo's 630. While print-speed ratings often don't mean much, the Spinwriter *is* that much faster.

Its rating is clearly a genuine measurement for a block of text, rather than the 'burst-speed' rating popular among many dot-matrix printer manufacturers. In fact it's measurably faster than the '80 cps' Epson MX-100; We ran a test on several printers recently, timing them on a 9600-character document, and the Spinwriter came out well in front.

The document — a draft of a *Your Com-*



Machine	Rated	On Test
Spinwriter 7710	55cps	42cps
Epson MX-100	80cps	36cps
Diablo 630	40cps	32cps
Centronics 739	100cps	31cps
Spinwriter 3510	35cps	25cps

**Figure 1:** Actual speed performance printing a 9500-character *Your Computer story*. Solid text with little tabbing or other lengthy head movement.

*puter story* — was solid text, with very little extra tabbing or line-feeding. Given more white-space, with tables and such to test the printers' mechanical speed, we've no doubt the Spinwriter would have come out even further in front of the Epson in particular.

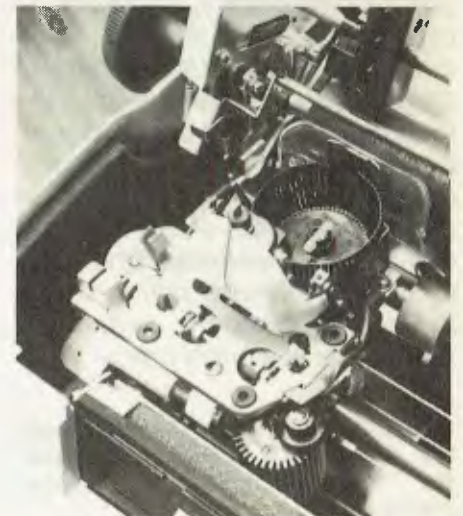
As you'll see from the table, it has a significant advantage over the Diablo (although the difference is less important if you are running them under a properly-installed WordStar, for example, where printing of one document can take place while you are editing/writing another).

**Daisy Petal Picking...** One reason for the extra speed is NEC's print 'thimble'. Most of the correspondence-quality printers use a daisywheel, a circular plastic (or metal) wheel with 96 'petals' each containing a character.

This wheel spins until the correct character is in place, when a metal hammer strikes it from behind, impacting the ribbon onto the paper.

NEC's thimble (like a daisywheel with its petals folded up at right-angles half way from the hub) cuts the 'spin-time' by carrying two characters on each petal; the whole mechanism moves up and down as well as spinning.

A side benefit of this method is that you can have a choice of 128 characters on a thimble, compared to a maximum of 96 on a daisywheel. Whether you need the characters — or even have software which can access them easily — may make this a rarely used feature, but at



### Specifications and Report Card

<b>Unit:</b>	NEC Spinwriter 7710			
<b>Made By:</b>	Nippon Electric Co			
<b>Processor:</b>	8085			
<b>Clock Speed:</b>	N/A			
<b>RAM:</b>	256 Kbytes			
<b>ROM:</b>	N/A			
<b>I/O:</b>	RS232-C serial			
<b>Languages:</b>	International character sets			
<b>Keyboard:</b>	Optional			
<b>Display:</b>	N/A			
<b>Graphics:</b>	5760 dots/square Inch			
<b>Peripherals:</b>	Multiple paper-handling options			
<b>Expansion:</b>	N/A			
<b>Best Points:</b>	Speed, quality			
<b>Worst Points:</b>	None			
<b>Ratings:</b>	excellent	very good	good	poor
<b>Documentation:</b>		✓		
<b>Ease of Use:</b>		✓		
<b>Functionality</b>	✓			
<b>Support:</b>	✓			
<b>Value-for-money:</b>		✓		
<b>Extras Included:</b>	N/A			
<b>Options:</b>	Bin feeders,tractors, typefaces etc of all types			
<b>Price:</b>	\$3476 plus tax			
<b>Review Unit from:</b>	NECISA, 99 Nicholson Street, St Leonards NSW.			

# VECTOR 4

## VECTOR 4 SPECIFICATIONS

### Central Processing Unit:

Processors: 8-bit Z-80B<sup>®</sup> and 16-bit 8088  
(single or multiprocessor operation)  
Clock Speed: 5.1 MHz  
Memory: 128K Dynamic RAM Standard  
Expandable to 256K

### Video Display:

Screen: 12 inch high contrast green phosphor  
20 KHz Horizontal, 60 Hz Vertical  
Alphanumeric: 24 Lines x 80 characters  
High resolution 16 x 13 dot matrix  
High Resolution  
Graphics: 640h x 312v pixels (B/W)  
Gray Scale  
Graphics: 160h x 312v pixels, 16 levels of gray  
320h x 312v pixels, 4 levels of gray  
Color Graphics: External RGB Monitor  
160h x 312v pixels, 8 colors  
320h x 312v pixels, 4 of 8 colors

### Keyboard:

Detached, with 8035 auxiliary processor. Capacitance keyswitch with 91 keys, including 15 programmable special function keys, cursor control keys, and 10-key numeric pad for rapid data entry.  
Coiled cable with Interface

### Input/Output:

Serial Keyboard  
Centronics Parallel Interface  
Qume/NEC Parallel Interface  
RS-232 Serial Printer Interface  
RS-232 Communications Interface  
RGB color signals  
Programmable Tone Generators and Speaker  
S-100 expansion slots

### Disk Drives:

Type of Disk:	5¼" Floppy	5¼" Winchester
Total Capacity:	630 Kilobytes	5 Megabytes
Transfer Rate:	250 Kilobytes/sec	5 Megabytes/sec
Rotation Speed:	300 RPM	3600 RPM

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Model 4/30 One floppy drive and one Winchester hard disk drive

-----

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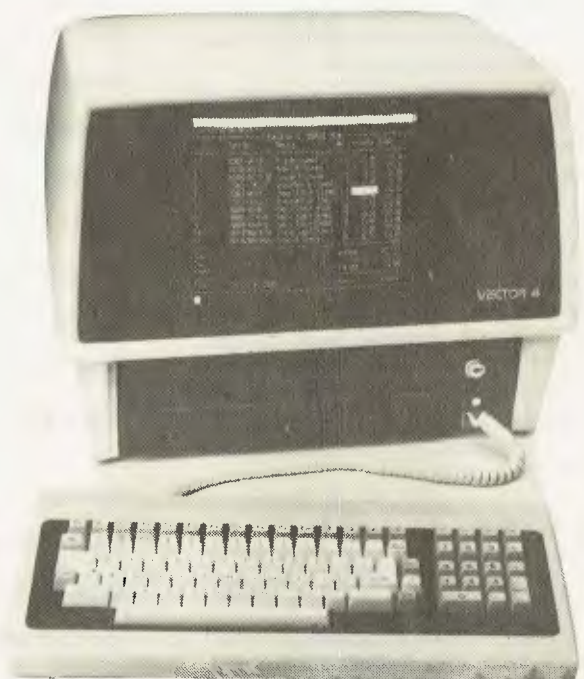
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# VECTOR

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least it's there.

There's no shortage of typefaces for the Spinwriter, despite its variance from the daisywheel 'standard': NEC has more than 70 different styles in its catalogue. Several take advantage of the extra character availability to provide mathematical symbols, foreign language characters, and so on.

A feature we didn't get to test is the graphics capability. It can be programmed to move in 1/120th of an inch increments horizontally and 1/48th of an inch vertically, which means quite high resolution graphs and so on are possible if you have (or write) the software to drive it.

The Spinwriter comes in a variety of models, starting at \$2880 plus sales tax, with several interfaces and read-only or keyboard versions. The RS232 unit supports ETX/ACK and XON/XOFF protocols and will run at speeds up to 1200 bits/second (or 9600 as an option).

A good range of paper-handling options is available. Friction feed (as in a typewriter) is standard. Options (with tax-free list price) include: vertical forms tractor, \$233; bidirectional forms tractor, \$405; cut sheet feeder, \$1349; dual bin feeder, \$1617; pin-feed platen, \$213; and bottom feed, \$106.

### Baby Brother

The newer addition to the Spinwriter range, the 3500 series, shows a real family resemblance.

It looks and feels a lot lighter (although at 17kg it is no featherweight) and, perhaps, less rugged but in all other respects it is a scaled down 7700. It uses the same thimbles and ribbons, and is functionally compatible with the bigger machine.

The speed rating is 35 characters a second, not a lot slower than a Diablo and surprisingly close to our '80cps' Epson. Again, the mechanical actions — tabbing, linefeeds, print-head movement and so

on — are fast, so it doesn't waste a lot of time getting to where it has to print.

Microprocessor control helps this

speed: it controls 'motion minimisation', which combines sequences of carriage movement commands into a single operation that moves the print thimble by the shortest path to the position that would result from performing each individual operation.

The microprocessor also controls eight different impact intensities of the print hammer, depending on the character struck, to give an even print result.

Graphics and plotting features are similar to the 7700 models. Automatic word processing aids available under operator control include justification, proportional spacing, centering, underscore, bold print and shadow print.

Paper handling options are similar to those for the 7700s, although they are cheaper and, in several cases such as the dual bin feeder, better (read more recent) designed. The 3500 prices start at \$2251 tax-free, the dual bin costs \$1385, and the bidirectional tractor costs \$264. □

### Specifications and Report Card

<b>Unit:</b>	NEC Spinwriter 3510			
<b>Made By:</b>	Nippon Electric Co			
<b>RAM:</b>	2 Kbytes			
<b>ROM:</b>	N/A			
<b>I/O:</b>	RS232-C serial			
<b>Languages:</b>	International character sets			
<b>Keyboard:</b>	Optional			
<b>Display:</b>	N/A			
<b>Graphics:</b>	5760 dots/square inch			
<b>Peripherals:</b>	Multiple paper-handling options			
<b>Expansion:</b>	N/A			
<b>Best Points:</b>	Price, quality			
<b>Worst Points:</b>	A little slow compared to 'big brother'			
<b>Ratings:</b>	<b>excellent</b>	<b>very good</b>	<b>good</b>	<b>poor</b>
<b>Documentation:</b>		✓		
<b>Ease of Use:</b>		✓		
<b>Functionality</b>		✓		
<b>Support:</b>	✓			
<b>Value-for-money:</b>	✓			
<b>Extras Included:</b>	N/A			
<b>Options:</b>	Bin feeders, tractors, typefaces etc of all types			
<b>Price:</b>	\$2546 plus tax			
<b>Review Unit from:</b>	NECISA, 99 Nicholson Street, St Leonards NSW.			



# MIDNIGHT

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CCS Centronics I/O	\$99
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## MISCELLANEOUS

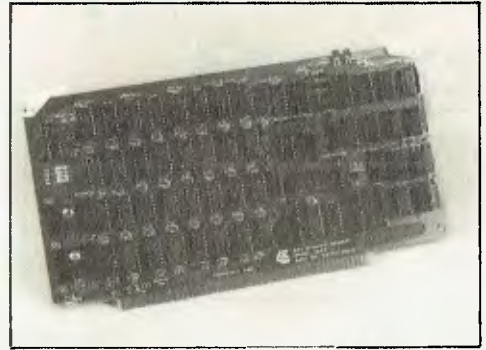
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Pearl 2	\$300
Pearl 3	\$500
Plan 80 financial mgmt	\$240
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Cbasic User's Guide	\$21
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Super Calc spreadsheet	\$250

## MICROPRO

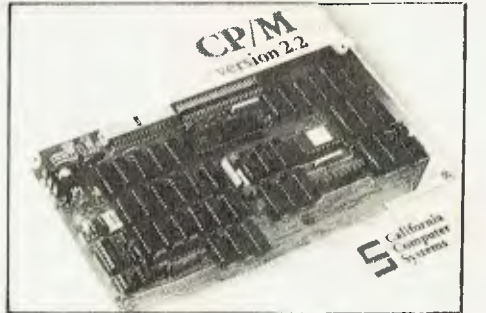
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## ZX80/81

X	Y	(X AND Y)	(X OR Y)	(X=Y)	(X Y)	(X Y)
0	0	0	0	-1	0	0
0	1	0	1	0	0	-1
1	0	0	1	0	-1	0
1	1	1	1	-1	0	0

### ZX80 Logic

By Jeffrey Chi Poon

IN ZX80 Logic the AND and OR statements function similarly to other popular micros.

That is, if you typed in PRINT (X AND Y) you would get '1' if both X and Y equals one, if not (that is, X or Y equals zero) you would get '0'.

The OR statement works similarly works, however the result works on the principle that if either value equals one then the bracketed values would give you one, hence OR.

The use of logic in programs, especially BASIC ones, is mysterious to many. Consider this: Let X= male and Y= female. The question is 'Who's in class?'

If the data reveals either X or Y is zero then we are able to say

that a sex is missing by using the 'AND' statement; that is, if (X AND Y)=0 then one or both sexes are missing. By using the OR statement we could find out if anyone is present at all. In this case we are able to obtain simple information in one line without analysing the exact figures.

The other three expressions on the chart represents true or false representations.

False information results in the output of zero. Affirmative gives you -1. In some other micros the -1 is replaced by +1. These logic forms are often found in quiz-type programs; an example on a different note is given in this program, TV Cricket.

To play just press Newline throughout the game and watch the limited overs match between you and the computer. You always bat first.

### Lunar Lander and Cannibals And Missionaries By Duncan Morrison

AS A ZX80 user, I find YC's column on the ZX80 most useful. After reading about peek and poke in the January issue I produced a twisted version of the well-known Lunar Lander game.

In this version your lander has 15 units of fuel (each time you enter a move one unit is used) and if you feel this is not enough then increase F in line 50 to a larger number. To move left press key 5 and to go right key 8, while key 7 will apply thrust down and move the lander up. Gravity is random and can pull up to 2 spaces down. If you run out of fuel or hit a star or even hit the lunar surface you crash.

To win you must land your ship on the randomly selected site the computer picks (represented by an inverse character).

The other program here is a version of the Cannibals and Missionaries puzzle.

The idea of this game is to move the three cannibals and missionaries across to the other side, with a boat which can only hold two people at any time.

To play this game just select whether you want cannibals in the boat or missionaries or both. The boat must travel back once it has been to one side with at least one person aboard.

To win just move all the cannibals and missionaries across to the other side but, if on the left or right side of the river the cannibals outnumber the missionaries they will eat them and you will have lost the game.

### Lunar Lander Variables

Y = initial location of your ship when game starts and as it is played.

D = randomly picked landing site.

F = amount of fuel available at the start of and during the game.

Q = selects a star or a blank space.

C = initial starting point for drawing the lunar landscape.

A = the height of each section.

T = the input for movement.

J = randomly selected gravity level.

```

10 LET Y=16995
20 LET D=RD(32)
50 LET F=15
80 FOR I=1 TO 352
90 LET Q=RD(10)
100 IF Q=1 THEN PRINT CHR(155);
110 IF Q=1 THEN PRINT CHR(128);
120 NEXT I
130 FOR L=1 TO 32
140 LET C=17250+L
150 LET A=RD(7)
160 FOR T=1 TO A
170 POKE C,9
175 IF D=L AND T=A THEN POKE C-33,180
180 LET C=C-33
190 NEXT T
200 NEXT L
240 POKE Y,166
250 INPUT T
255 LET F=F-1
260 POKE Y,T28
270 IF T=5 THEN LET Y=Y-RND(2)
280 IF T=8 THEN LET Y=Y+RND(2)
290 IF T=7 THEN LET Y=Y-66
300 LET J=RND(3)
310 IF J=1 THEN LET Y=Y+33
320 IF J=2 THEN LET Y=Y+66
330 IF PEEK (Y)+180 THEN GO TO 370
340 IF F=0 OR PEEK (Y)=9 OR PEEK (Y)+155 THEN PRINT
"CRASHED LUNAR LANDER"
350 IF F=0 OR PEEK (Y)+9 OR PEEK (Y)+55 THEN STOP
360 GO TO 240
370 PRINT "LANDER SAFELY AT BASE"

```

### Cannibals Variables

H&L = direction of river and travel.

M&N = missionaries on each side.

C&D = cannibals on each side.

X = input to make move.

K\$ = used to draw the river, it can contain a greater than or smaller than character.

```

100 LET H=1
110 LET L=1
120 LET M=5
130 LET C=3
140 LET M=0
150 LET D=0
160 CLS
170 PRINT "M";M;" C";C;
180 GO SUB 510
190 PRINT "M";M;" C";0
200 PRINT
210 PRINT "CANNIBALS=";
220 INPUT T
230 PRINT T
240 IF T=2 THEN GO TO 220
250 PRINT "MISSIONARIES=";
260 INPUT X
280 IF T=0 AND X=0 OR X=1 OR T=2 AND X=0 THEN GO TO 260
290 IF M=2 THEN GO TO 370
300 LET M=M-X
310 LET M=M+X
320 LET C=C-T
330 LET C=C+T
340 LET L=2
350 GO SUB 450
360 GO TO 160
370 LET M=M+X
380 LET M=M-X
390 LET C=C+T
400 LET C=C-T
410 LET L=1
420 GO SUB 450
430 LET H=1
440 GO TO 160
450 IF C=M AND M=X OR D=M OR M=X THEN PRINT "YOU ARE TRYING FOR ZERO POPULATION."
460 IF C=M AND M=X OR D=M AND M=X THEN STOP
470 IF C=0 AND M=0 THEN PRINT "CANNIBALS EVERYWHERE WILL STARVE"
480 IF C=0 AND M=0 THEN STOP
490 IF H=1 THEN LET H=2
500 RETURN
510 IF L=1 THEN LET K="*"
520 IF L=2 THEN LET K="|"
530 FOR R=1 TO 8
540 PRINT K$;
550 NEXT R
560 RETURN

```

```

2 DIM A(5)
4 LET A(0)=0
6 LET A(1)=0
8 LET A(2)=0
10 LET A(3)=0
12 LET A(4)="YOU"
14 FOR K=0 TO 1
16 FOR L=0 TO 19
18 FOR F=1 TO 6
20 CLS
22 LET B=" "
24 LET R=RD(50)
26 LET S=(R>24)-(R>38)-(R>42)-(R>44)-(R>48)-(R=50)
28 LET A(K)=A(K)+S
30 LET H=RD(6)
32 IF H<6 AND M<6 THEN GO SUB 88
34 PRINT "A TV CRICKET"
36 PRINT
38 IF N=6 THEN LET A(K)=A(K)+1
40 PRINT "YOUR SCORE:";A(0);"/" A(1);":ZX-80:";A(3);"/" A(1)
42 PRINT
44 PRINT "O. ERG:";L;" .";M
46 PRINT
48 IF N=1 THEN PRINT "BOUNCER";
50 IF N=2 THEN PRINT "YORKER";
52 IF N=3 THEN PRINT "SWINGER";
54 IF N=4 THEN PRINT "SPINNER";
56 IF N=5 THEN PRINT "FULL TOSSE";
58 IF N=6 THEN PRINT "NO BALL";
60 IF N=6 THEN LET M=M-1
62 PRINT "A RECEIVED";B
64 PRINT
66 PRINT A(4);B SCORED:";S;
68 INPUT D
70 IF A(K+2)=10 THEN GO TO 76
72 NEXT M
74 NEXT L
76 LET A(0)="ZX-80"
78 NEXT F
80 IF A(0)>A(1) THEN PRINT "YOU WIN"
82 IF A(0)<A(1) THEN PRINT "YOU LOSE"
84 IF A(0)=A(1) THEN PRINT "DRAW"
86 STOP
88 LET A(K+2)=A(K+2)+1
90 LET R=RD(5)
92 IF P<5 THEN LET B="CAUGHT"
94 IF P=5 THEN LET B="LBW"
96 IF P=4 THEN LET B="BOWLED"
98 IF P=5 THEN LET B="RUN OUT"
100 RETURN

```

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# ZX80/81

## Kill The Duck

By Jeffrey Chi Poon

THIS GAME begins with a grid of 5 by 32 'O's, not zeros. Hidden in one of the rows of the first column is a duck.

At the bottom of the grid on the left hand side shows the Roman numeral 'I', which indicates you should enter the row number you think the duck is in (1-5). After entering this, 'I' appears indicating you should enter the column

number (1-32).

The duck travels between 1 to 5 squares per shot and as it lands, leaves a track behind. Shooting at one of these tracks reveals a dollar sign. Shooting at an empty square gives you a space.

The duck shows itself at the end of the game when you have shot it or when it has reached the last column. The duck does not ever leap rows. Line 46 could be changed for different abilities.

```

1 LET G=0
2 DIM A(160)
3 FOR K=1 TO 160
4 LET A(K)=8
5 NEXT K
6 LET R=RND(5)
7 LET P=R*32
8 LET M=1+(R-1)*32
9 GOSUB
10 IF M>P THEN LET M=P
12 FOR L=1 TO 160
14 IF L=M AND M=P OR L=M AND M=G THEN GO TO 26
16 IF L=G AND A(L)=8 THEN LET A(L)=1
18 IF A(L)=9 AND G=L THEN LET A(L)=3
20 IF A(L)>>7 THEN PRINT "O";
22 IF A(L)=1 THEN PRINT "Δ";
24 GO TO 28
26 PRINT " ";
28 IF A(L)=3 THEN PRINT "D";
30 NEXT L
32 IF M=P THEN GO TO 56
34 IF G=M THEN GO TO 52
35 PRINT "I";
36 INPUT X
38 PRINT "1"
40 INPUT Y
42 LET G=(X-1)*32+Y
44 IF G=M THEN GO TO 9
46 LET M=M+RND(5)
48 LET A(M)=9
50 GO TO 9
52 PRINT "CAUGHT"
54 STOP
56 PRINT "ESCAPED"

```

## Display Border By Douglas Fahbusch

THIS IS a subroutine to print a border around the edges of a display screen.

Instructions to alter it for different screen sizes are included in the listing. At present it is set up for a 40-character, 20-line screen.

rent screen sizes are included in the listing. At present it is set up for a 40-character, 20-line screen.

```

10 REM *****
20 REM * CHANGE THE TITLE IN LINE 170 *
30 REM * CHANGE THE TITLE IN LINE 170 *
40 REM * CHANGE THE TITLE IN LINE 170 *
50 REM * CHANGE THE TITLE IN LINE 170 *
60 REM * CHANGE THE TITLE IN LINE 170 *
70 REM * CHANGE THE TITLE IN LINE 170 *
80 REM * CHANGE THE TITLE IN LINE 170 *
90 REM * CHANGE THE TITLE IN LINE 170 *
100 REM *****
110 REM *****
120 REM *****
130 REM *****
140 REM *****
150 REM *****
160 REM *****
170 REM *****
180 REM *****
190 REM *****
200 REM *****

```

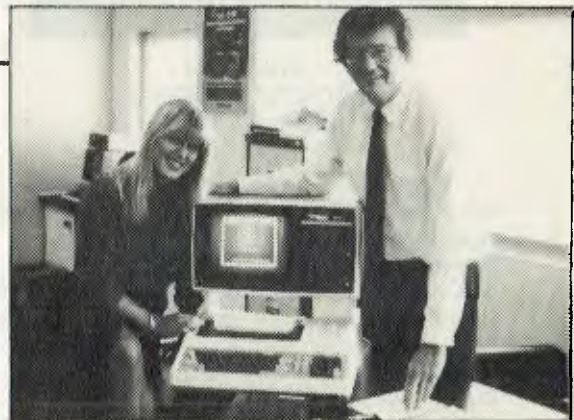
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Original development took place in England, with Barry Meredith and John Perry of Padmede in Australia making extensive changes to suit local requirements. This included use of the advanced Sigma/OKI facilities such as high resolution colour display and inbuilt 80 cps printer.

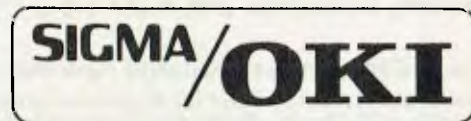
Sigma/OKI Personal Computers also have a large library of software from other suppliers. These include Digital Research, Micropro, Sorcim, and Australian applications from Cyres, Boulevard, IMS, John F. Rose and others.



Kathy McLean and Barrie Meredith from Padmede

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# SYSTEM 80

## Death Trap

By Tony Hinde

THIS IS a maze game that includes a very large maze, an audio signal when you hit the wall of the maze, and an appropriate death scene.

The program was written on a System 80 and so is easily adapted to the TRS-80.

By replacing the graphics at the end of the program and changing the PEEK locations (to register a keypress) the program will work on most machines.

```

10 CLS
   CLEAR1000
20 PRINT "THIS IS A MAZE GAME WHERE YOU MUST GET FROM ONE SIDE OF
30 PRINT "A TIME LIMIT FOR COMPLETION."
40 PRINT
   PRINT "YOU USE THE FOUR ARROW KEYS TO CONTROL YOUR MOVEMENT"
50 PRINT
   PRINT "HIT ANY KEY TO CONTINUE....."
60 IFFEEK(13359)=0 THEN G60
70 CLS
   FORK=15360 TO 16383
     R=RND(5)
     IFR=30RR=4 THEN R=120 ELSE R=RND(63)+120
80 POKEK,R
   NEXT
     FORR=0 TO 47
       RESET(127,R)
90 NEXT
   Y=23
   X=127
   W=0
100 SET(X,Y)
     W=W+1
     P=PEEK(13359)
     IFF(=) THEN RESET(X,Y)
     GOTD140
110 IFR=0 THEN R=2000
120 RESET(X,Y)
     IFRND(4)+4 THEN SET(RND(128)-1,RND(48)-1) ELSE RESET(RND(128)-1,RND(4)
6)-1)
130 GOTD100
140 ON X
     L=Y
     IFF=0 THEN Y=Y-1 ELSE IFF=16 THEN Y=Y+1 ELSE IFF=32 THEN X=X-1 ELSE IFF=64 THEN X=X+1
150 IFX(127) THEN X=127 ELSE IF Y(0) THEN Y=0 ELSE IF Y(47) THEN Y=47
160 IFF(0) THEN X=X-1 THEN X=X+1
     Y=Y-1
     OUT255,255
     OUT255,33
170 IFX(0) THEN X=190
180 GOTD100
190 CLS
   PRINT
   PRINT
   PRINT
   PRINT "CONGRATULATIONS"
200 PRINT
   PRINT "YOU SURVIVED!!!!"
210 PRINT
   PRINT
   PRINT "AFTER" INT(W/6) "MINUTES"
220 FORT=1 TO 200
   NEXT
   PRINT
   PRINT "HIT ANY KEY TO TRY AGAIN."
230 IFFEEK(13359)=0 THEN G30
240 CLS
   GOTD70
2000 CLS
   PRINTSTRING(27,128)CHR(191)STRING(61,128)STRING(2,131)CHR(191)STRIN
   NG(2,131)STRING(56,128)CHR(160)CHR(184)STRING(3,188)CHR(191)STRING(3,188)
   CHR(176)
2010 PRINTSTRING(52,128)CHR(184)CHR(190)CHR(143)CHR(131)STRING(7,128)CHR(

```



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## Removing REMarks

By Clyde McLennan

WHEN writing BASIC programs, it is advisable to put in plenty of REMark lines so that it is possible to follow and maintain the program.

However, if remarks are used liberally, there is a possibility of running out of memory and, in time-critical applications, of the program running more slowly.

What is required is the best of both worlds — that is, a program source that has comments, and a program for processing that has no comments.

On the Apple computer it is relatively easy to produce, from a properly documented program, one that has no REMark lines that can be used for processing.

There are two levels of complexity:

- If all REMarks are on a line by themselves then the solution is very easy. It is preferable that a REMark line is never referenced in a GOTO or GOSUB.

- If it is desired to remove REMarks that are on the end of a line, then the problem is somewhat enlarged, but yet still simple in concept.

The method of approach is to add extra code into your program that will examine the code in memory, and write an EXEC file record for every line that has a REM statement. This EXEC file is then executed, which uses the editor to delete the REMarks.

If REMarks are on a line by themselves and never referenced, then the EXEC file simply contains a lot of line numbers which will be deleted.

If REMarks are on a line by themselves but referenced, it is easier to replace that line with an empty REMark line.

If REMarks at the end of a line are to be removed, then it is necessary to write out the line minus the REMark. However, to do this requires decoding the decimal tokens for keywords (see Appendix F in the Applesoft manual).

The structure of the BASIC program in memory is straight-forward. Each line of the source code is preceded by the byte address of the next

line of code. Following this reference are the two bytes that contain the line number, followed by the actual source detail. Any keywords are converted to a number in the range of 128 to 234.

An easy way to check this structure is to type in and run the following program:

```
10 REM PROGRAM STRUCTURE
20 X = PEEK (103) + 256 * PEEK (104): REM START OF PROGRAM
30 FOR J = X TO X + 200
40 PRINT J, PEEK (J), CHR$ (PEEK (J))
50 NEXT
```

## The Actual Code

The code required to generate an EXEC file to remove REMark lines that are on line by themselves is:

```
60000 REM CODE TO DELETE REMARKS
60100 D$ = CHR$ (4): PRINT D$: OPEN REMEXEC*
60110 PRINT D$: WRITE REMEXEC*
60111 PRINT "MON C.I.O.": PRINT D$
60120 X = PEEK (103) + 256 * PEEK (104): REM PROGRAM START ADDRESS
60130 NX = PEEK (X) + 256 * PEEK (X + 1): REM NEXT LINE START
60135 IF NX = 0 THEN GOTO 60210: REM END OF PROGRAM
60140 LN = PEEK (X + 2) + 256 * PEEK (X + 3): REM THIS LINE NO
60150 FX = PEEK (X + 4): REM KEYWORD
60160 IF FX < > 178 THEN GOTO 60190: REM IS IT A REMARK LINE
60170 PRINT D$: WRITE REMEXEC*: REM YES
60180 PRINT LN: PRINT D$
60185 PRINT LN
60190 X = NX: REM START OF NEXT LINE
60200 GOTO 60130
60210 PRINT D$: WRITE REMEXEC*
60211 PRINT "DEL 60000+60390"
60220 PRINT D$: CLOSE REMEXEC*: PRINT D$
60230 END
```

The code is executed by GOTO 60000.

If the REM lines are referenced in the code, then they cannot be deleted. In these cases by writing 'empty' REM lines considerable space savings are achieved. To do this, line 60180 above is changed to:

```
60180 PRINT LN: "REM": PRINT D$
```

If it is desired to delete REMark lines at the end of other lines, then it is necessary to decode the Keyword values.

To the above code is added the following:

```
60000 REM CODE TO DELETE REMARKS
60010 DIM KW$(110)
60020 KW$(0) = "END": KW$(1) = "FOR": KW$(2) = "NEXT"
```

and so on — see Appendix F of the Applesoft manual. Line 60160 is replaced by:

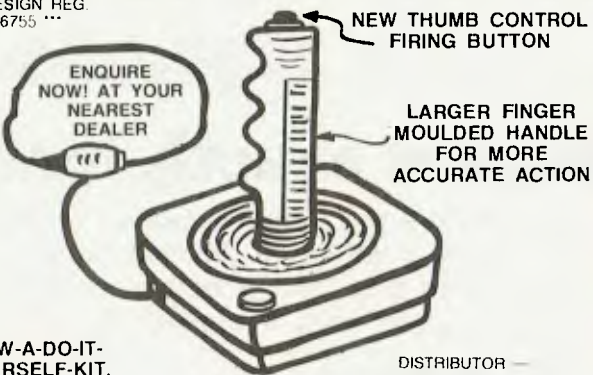
```
60160 IF FX < > 178 THEN GOSUB 60300: GOTO 60190
```

And the decoding subroutine at 60300 is:

```
60300 A$ = "" : J = 0
60310 Z = PEEK (X + J + 4): REM GET EACH CHAR IN LINE
60320 IF Z = 0 THEN RETURN: REM END OF LINE
60330 IF PEEK (X + J + 5) = 178 THEN GOTO 60380: REM IS NEXT WORD A REMARK
60340 IF Z < 128 THEN A$ = A$ + CHR$ (Z): GOTO 60360
60350 A$ = A$ + KW$(Z - 128): REM DECODE KEYWORD
60360 J = J + 1
60370 GOTO 60310
60380 PRINT D$: WRITE REMEXEC*
60385 PRINT LN: A$: PRINT D$
60386 PRINT LN: " " : A$:
60390 RETURN
```

Note: A further use can be made of the above decoding where it is necessary to change the keywords to suit some other computer or runtime system. One example of this is the &GOSUB.FAST used by the GRAFPak software. To achieve this conversion KW\$(48) = "&GOSUB.FAST").

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# VIC-20

## Chopper Pilot

By Ric Kube

THIS PROGRAM, called Chopper Pilot, is for the VIC 20 (unexpanded) and needs a joystick (Atari type) to work.

When the program is run, instructions are put up and then upon pressing the Y key the program appears. The helicopter doesn't appear, however, until you move the joystick.

Then you have 15 seconds to land the helicopter on the ship (in the correct position). To give more or less time, change the TI\$ variable in line 10069.

The program makes use of the

ability to redesign the computer's graphics. This produced the ship and the helicopter.

I've put the program in modules with REMs explaining each section. The program uses all but about 700 bytes.

```
0 REM (C) RIC KUBE, WAIKERIE, SA 5330 **CHARACTER DATA** (085)412375
1 GOTO 50000
2 DATA 254,16,124,71,68,124,16,114
3 DATA 127,8,62,226,34,62,8,62
4 DATA 0,0,0,0,127,63,31,15
5 DATA 28,28,28,29,255,255,255,25
6 DATA 127,103,195,219,195,219,219,215
7 DATA 128,192,224,224,254,252,258,240
8 FOR I = 7424 TO 7431: POKE I,0: NEXT
9 REM **SET UP SCREEN AND JOYSTICK**
10 DD = 37154: P1 = 37151: P2 = 37152: Y = 768
11 POKE 56,25: POKE 52,24: B = 0: J = 0
12 FOR I = 7168 TO 7488: B = 0: NEXT
13 READ D: POKE I,D: NEXT
14 FOR J = 7432 TO 7436: READ R: POKE J,R: NEXT
15 POKE 36879,110: POKE 36869,255: PRINT "(clr) ***"
19 TI$ = "000000": REM ** SET UP SCREEN AND START CLOCK**
20 FOR Q = 0 TO 18: POKE B+Q,31: POKE B+1+Q,44: POKE B+2+Q,35:
POKE B+3+Q,36
21 GOSUB 10000: FOR D = 1 TO 255: NEXT
22 POKE B+Q,32: POKE B+1+Q,33: POKE B+2+Q,32: POKE B+3+Q,32: NEXT
23 FOR C = 16 TO 0 STEP-1: POKE B+4+Q,33: POKE B+5+Q,40: POKE B+6+Q,33:
POKE B+7+Q,36
24 GOSUB 10000: FOR D = 1 TO 255: NEXT
25 POKE B+Q,32: POKE B+1+Q,33: POKE B+2+Q,32: POKE B+3+Q,32: NEXT:
GOTO 20
1000 POKE 36876,6: POKE 36877,124: FOR X = 1 TO 15: POKE 36878,X
1001 RETURN
9998 END
9999 REM **JOYSTICK CONTROL**
10000 POKE DD,127: P = PEEK(P2)AND1: J = -(I=7)
10010 POKE DD,255: P = PEEK(P1)
10020 J1 = -((P AND 8)=0): J2 = -((P AND 16)=0): J3 = -((P AND 4)=0):
J4 = -((P AND 32)=0)
10030 IF J3 THEN POKE X,32: X=X-2: POKE X,1: GOSUB 1000
10040 IF J1 THEN POKE X,32: X=X+2: POKE X,1: GOSUB 1000
10050 IF J2 THEN POKE X,32: X=X-1: POKE X,0: GOSUB 1000
10060 IF J0 THEN POKE X,32: X=X+1: POKE X,1: GOSUB 1000
10069 IF TI$ = "000015" THEN 30050
10070 IF X = (B+2+Q)-22 THEN 20000
10071 IF X = (B+Q)-22 OR X = (B+1+Q)-22 OR X = (B+2+Q)-22 THEN POKE X,4:
GOTO 30010
10080 IF X = 8142 THEN 30000
10090 RETURN
0099 REM CHOPPER PILOT CONT'D **MIN** BY RIC KUBE, WAIKERIE, 5330 (085)412375
20000 PRINT"(home)(rev)(yel) CONGRATULATIONS YOU HAVE SAFELY LANDED"
20001 PRINT"(rev)(dwn) IT TOOK YOU " (RIGHT(TI$,2)) " SECONDS"
20009 REM **PLAY AGAIN**
20010 PRINT"(rev)(wte) ANOTHER GAME?"
20020 GET A$: IF A$ = 'Y' THEN 20020
20030 IF A$ <> 'Y' THEN POKE 36869,24: POKE 36876,7: PRINT "(clr)(b1) ":
END
20040 RUN 2
29999 REM **MISS AND SINK**
30000 PRINT"(home)(cyan)(rev) TOO BAD YOU'VE SUNK : GOTO 99910
30009 REM **CRASH ON SHIP**
30010 PRINT"(home)(gre)(rev)OOPS YOU CRASHED"
30020 POKE 36877,220: FOR L = 15 TO 1 STEP-1: POKE 36878,L: FOR S = 1 TO 75:
NEXT M,L: POKE 36877,0: POKE 36878,6
30030 GOTO 20010
30050 POKE B+Q,14: POKE B+1+Q,14: POKE B+2+Q,14: POKE B+3+Q,14
```

```
30055 POKE 36877,220: FOR L = 15 TO 1 STEP-1: POKE 36878,L: FOR S = 1 TO 75:
NEXT M,L: POKE 36877,0: POKE 36878,6
30060 PRINT"(b1 dwn)(rev)(cyan) YOU FAILED TO LAND IN (yel) 15 SECONDS":
30061 PRINT"(wte) THE SHIP HAS SUNK :P"
30070 GOTO 20010
50000 REM **INSTRUCTIONS**
50001 POKE 36876,1: PRINT"(wte)(clr) 30 SECS TO LAND ON THE SHIP.
50002 PRINT"YOU HAVE (rev) 15 SECONDS (off) TO LAND ON THE SHIP AND
SAVE IT FROM SINKING"
50003 PRINT" YOU HAVE TO LAND ON THE SHIP (rev) 15 SECS (off) ON THE
SHIP"
50005 PRINT" (dwn) USE YOUR JOYSTICK TO MOVE THE HELICOPTER"
50050 PRINT"(b1 dwn) READY TO BEGIN GAME?"
50055 GET A$: IF A$ = 'Y' THEN 50050
50060 IF A$ <> 'Y' THEN 50050
50065 GOTO 20010
50050 END
```

# MICROBEE

## MicroBee Games

By John H Cameron

HERE are two programs I have written for the MicroBee.

The first is a game of skill called 'Shooting Gallery'. It makes use of the MicroBee's ability to poke screen memory directly to produce graphics. Here is a list of the variables used:

N = Shots fired  
Q = Score  
P = High score  
A = Gun fire step size  
G = Gun position  
M = Aim marker  
X = Initial target pos.  
Z = Target speed  
D = Delay  
S = New target pos.  
F = Gun fire

Note if you want to change the

number of available shots then alter the value 20 in LINE 540 and (for the sake of presentation) LINE 70 which is part of the instruction page.

It may also be a good idea to exclude the command in LINE 100 'POKE 220,20' until you have sorted out any punching errors, as an error is hard to edit with no cursor on the screen.

The second program is called Tables. I wrote it for my nine year old to test herself on her multiplication.

It generates two random numbers between 0 and 12, multiplies them together and compares the result to a user input. The program could easily be modified for addition or even subtraction if required.

```
00090 REM Shooting Gallery.A program by J.H. CAMERON 1982
00100 N=0:G=0:CLS:POKE 220,20:REM blanks cursor
00110 UNDERLINE:CURS 17,1:PRINT"*****SHOOTING GALLERY*****:NORMAL
00120 CURS 1,2:PRINT"HI! THE LITTLE MAN ( ) TO WIN"
00130 POKE 61524,7:REM generate bell char.
00140 CURS 1,3:PRINT"USE [L] KEY TO AIM MORE TO THE LEFT"
00150 CURS 1,4:PRINT"USE [R] KEY TO AIM MORE TO THE RIGHT"
00160 CURS 1,5:PRINT"USE SPACE BAR TO FIRE"
00170 CURS 1,6:PRINT"YOUR GUN IS LOADED WITH 20 SHOTS". "Good Luck!"
00180 CURS 20,15:PRINT"hit any key to start the game"
00190 F1$=KEY:IF F1$="" THEN 190
00200 CLS
00210 UNDERLINE:CURS 17,1:PRINT"*****SHOOTING GALLERY*****:NORMAL
00220 CURS 9,2:PRINT"SCORE SHOTS FIRED HIGH SCORE "
00230 CURS 10,3:PRINT Q:CURS 31,3:PRINT N:CURS 51,3:PRINT P
00240 A=-128:G=62431:M=0-768:X=61696
00250 POKE M,11:REM prints aim marker
00260 Z=INT(RND*20)+1:POKE G,S:REM sets speed of target
00270 FOR S=X TO X+Z:REM move target left to right
00280 POKE S-1,S:POKE S,7:POKE S+1,Z
00290 FOR D=1 TO 2:NEXT D
00300 GOSUB 430
00310 NEXT S
00320 POKE S,Z
00330 REM
00340 FOR S=X+62 TO X:STEP -1:REM move target right to left
00350 POKE S+1,Z:POKE S,7:POKE S-1,Z
00360 FOR D=1 TO 2:NEXT D
00370 GOSUB 430
00380 NEXT S
00390 POKE S,Z
00400 REM
00410 REM
00420 GOTO 260
00430 IF P=0 THEN 430 GOTO 10
00440 IF P=0 THEN 430
00450 IF P=32 THEN 430
00460 IF P=64 OR P=128 OR P=256 THEN LET A=A-1:POKE M,S:LET M=M-S:POKE M,11
00470 IF P=512 OR P=1024 OR P=2048 THEN LET A=A+1:POKE M,S:LET M=M+S:POKE M,11
00480 RETURN
00490 LET N=N+1:FOR F=0-64 TO 0-32 STEP A
00500 POKE F,F
00510 IF F=0 THEN POKE S,24:PLAY 3:POKE S,7:REM 0:1:REM hit
00520 CURS 10,3:PRINT Q:CURS 31,3:PRINT N
00530 POKE F,Z:POKE G,S:NEXT F
```

```

00540 IF N=20 THEN 560
00550 RETURN
00560 CURS 28,10:PRINT"GAME OVER"
00570 PLAY 0,12:10,2:5:5:7,2:5,2:10,2:9,2:110,2
00580 CLS:UNDERLINE:CURS 17,1:PRINT"*****SHOOTING GALLERY*****":NORMAL
00590 IF 0? THEN LET P=0
00600 PRINT:PRINT:PRINT"YOU SCORED "Q" POINTS"
00610 PRINT:PRINT"WOULD YOU LIKE TO PLAY AGAIN?"
00620 PRINT"Hit RETURN to continue"
00630 PRINT"Hit any other key to end"
00640 K1$=KEY$:K1$=""
00650 A0$=""A1$=KEY$:IF A1$="" THEN 650
00660 A0$=A0$+A1$:IF ASC(A1$)=13 THEN 100
00670 POKE 220,111:END
    
```

```

90100 REM Multiplication test. A program by J.H. AMERON 1982
90110 REM
90120 LET R0=0:REM score
90130 FOR Q=1 TO 20
90140 CLS:PRINT"Question "Q:REM question #
90150 LET A=INT(RND*13)
90160 LET B=INT(RND*13)
90170 LET C=A*B
90180 CURS 29,8:PRINT A " X " B " =?"
90190 INPUT Q1
90200 IF Q1=C THEN 200
90210 PLAY 8,4:4,4:CURS 20,10:PRINT"Wrong answer."
90220 PRINT"Try again!"
90230 PLAY 0,15:NORMAL
90240 CLS:LET Z=100TO 100
90250 NEXT Q
90260 PLAY 1,2:3:4:5:6:7:8:9:10
90270 S1=FOR100/20
90280 CLS:CURS 29,8:PRINT "Your score is "S1" %"
90290 IF S1=100 THEN CURS 28,10:PRINT "EXCELLENT WORK! PLEASE RE-
90300 PORT 200
90310 CURS 29,10:PRINT"More work needed."100TO 200
90320 IF 0? THEN CURS 20,10:PRINT"OK, last one!"15:PLAY 24:00TO250
90330 IF 0? THEN CURS 20,10:PRINT"that is correct."15:PLAY 24:00TO250
90340 PLAY 24:00S 20,10:PRINT"that is correct! try this one!"
90350 PLAY 0,15
90360 IF 2? THEN LET R0=R0+1
90370 LET Z=100TO 250
90380 PLAY 9,25:CLS
90390 CURS 17,10:PRINT"Would you want to play again? (hit any key)"
90400 IF 0? THEN 100:IF 1? THEN 400
90410 IF 1? THEN 2? OR 3? THEN 110
90420 END
    
```

## SUPER 80

### Super-80 Clock By D G Dutton

THIS PROGRAM turns your Super-80 into a clock displaying hours, minutes and seconds. The program works in the following manner:

LINE 400: This sets the desired time. The same as putting a clock on the right time.

LINES 402-420: This is where the time is displayed on the screen.

LINES 422-434: This is where the seconds are counted from 0 to 59. LINE 426 controls the time interval between seconds. If the clock runs inaccurately change the number appearing after the step command.

LINES 430 and 436: Update SECONDS display on screen.

As can be seen from LINE 432, after 60 seconds have been counted the program enters the MINUTES mode. The minutes are incremented by one, the display updated and then it returns to LINE 422. The HOURS mode follows the same format.

This program should be able to run on a System-80 and TRS-80 by changing THEN commands to GOTO and also deleting the CURS function and replace with PRINT@.

A lot of patience may be needed to achieve a good degree of accuracy.

```

400CLS:INPUT"HOURS"HO:INPUT"MINUTES"
MO:INPUT"SECONDS"SO:CLS
402GOSUB460
405GOSUB470
410GOSUB480
420GOSUB490
422S=S+1
426FORA=1TO14STEP.10/4760
428NEXTA
430GOSUB490
432IFS<60THEN436
434S=S
436GOSUB490
438M=M+1
439GOSUB480
440IF M<60THEN442
441M=M
442GOSUB490
443H=H+1
444GOSUB470
445IFH<13THEN442
446H=H+1
447GOTO405
450CURS105:PRINT"00:00"
462CURS112:PRINT"10:00"
464CURS121:PRINT"5:00"
465RETURN
470CURS138:PRINTH:RETURN
480CURS146:PRINTM:RETURN
490CURS153:PRINTS:RETURN
    
```

This Program is a combination of most of the Programming techniques I know. It even includes on board sound effects using the cassette indicator light. So I hope it will be of some use to your readers.

P.s. The hood your magazine is written in is Great.

Tom Hinde  
Brisbane, QLD.

```

1 CLEAR1000:CLS:V=10
2 REM ***** WARNING *****
4 REM THIS PROGRAM HAS TAKEN MINUTES TO MAKE
5 REM SO THE AUTHOR WOULD LIKE NO COPIES
6 REM MADE WITHOUT HIS CONCENT. OR ELSE....
7 REM
8 /
9 /
10 PRINT" THIS IS 'THE POKIES'"
20 PRINT"-----"
30 PRINT:PRINT:PRINT
40 PRINT"BY TONY HINDE....."
50 FORZ=1TO1400:NEXT:CLS
51 FORW=0TO127:SET(W,0):NEXT:FORW=1TO47:SET(127,W):SET(126,W):NEXT:FORW=126TO88T
EP-1:SET(W,47):NEXT:FORW=46TO1STEP-1:SET(0,W):SET(1,W):NEXT
52 PRINT@67,"YOU START WITH $10.00."
53 PRINT@196,"AT 20 CENTS A GO YOU PLAY AS LONG AS YOU HAVE MONEY"
54 PRINT@388,"2 OF A KIND WINS 50 CENTS."
55 PRINT@316,"3 OF A KIND WINS $5.00."
56 PRINT@644,"3 XXX B A R XXX'S WINS $28.00."
57 FORM=1TO89:SET(M,15):SET(M,48):NEXT:FORM=16TO39:SET(88,M):SET(89,M):NEXT:PRIN
T@772,"2 XXX B A R XXX'S WINS $1.00.";PRINT@928,"PRESS 'NEW LINE' TO CONTINUE.
..";INPUTW:CLS
58 PRINT@320,CHR$(157)STRING$(62,148)CHR$(174)CHR$(149)STRING$(62,128)CHR$(170)C
HR$(159)CHR$(133)STRING$(60,128)CHR$(138)CHR$(175)CHR$(149)STRING$(62,128)CHR$(1
70)CHR$(141)STRING$(62,140)CHR$(142);FORW=29TO47:SET(8,W):NEXT
59 FORK=1TO126:SET(K,34):SET(K,47):NEXT:FORK=17TO27:SET(42,K):SET(84,K):NEXT:PRI
NT@668,"X X T H E P O K I E S X X";PRINT@770,STRING$(60,42);PRINT@834,STRING$(2
6,42);" B A R "STRING$(27,42);PRINT@898,STRING$(60,42);RANDOM
60 PRINT@79,"ANY 2 OF A KIND WINS 50 CENTS.";PRINT@143,"2 XXX B A R XXX'S W
INS $1.00";PRINT@287,"ANY 3 OF A KIND WINS $5.00";PRINT@813)" 3 XXX B A R
XXX'S WINS $28.00";FORI=1TO35:RND(10):B=RND(10):C=RND(10)
61 PRINT@468,CHR$(130)CHR$(159);PRINT@489,CHR$(138)CHR$(159);PRINT@80,STRING$(
78,191);PRINT@112,STRING$(30,191);PRINT@176,STRING$(30,191);PRINT@240,STRING$(
30,191);PRINT@176,STRING$(30,191);PRINT@240,STRING$(30,191);PRINT@384,STRING$(
16,191)CHR$(157)
64 PRINT@135,"###";PRINT@182,"###";FORI=1TO35:RND(10):B=RND(10):C=RND(10):G
=AB+HB+BB:IB=C#
65 ON A GOSUB1000,1010,1020,1030,1040,1050,1060,1070,1080,1090
75 ON B GOSUB1100,1110,1120,1130,1140,1150,1160,1170,1180,1190
85 ON C GOSUB1200,1210,1220,1230,1240,1250,1260,1270,1280,1290
90 D=LEN(A#):E=LEN(B#):F=LEN(C#)
100 E=E/2
120 PRINT@451,G#;
123 PRINT@515,J#;
125 PRINT@387,A#;
130 PRINT@480-E,H#;
133 PRINT@351-F,K#;
135 PRINT@423-F,B#;
140 PRINT@389-F,I#;
143 PRINT@373-2#E,L#;
145 PRINT@438-E,C#;
147 J#=#K#K#H#L#I#
160 NEXTI
161 FORJ=1TO1700:NEXT
165 V=V-.2
170 IFG#H#ANDG#I#THEN200
180 IFG#H#ORH#I#ORH#I#THEN400ELSE700
190 REM ** BIG WIN **
200 IFG#="XXX B A R XXX"THENH=400ELSEH=200
205 IFG#="XXX B A R XXX"THENV=V+.2ELSEV=V+.5
210 FORS=1TOH
215 IFS/2=INT(S/2)THENLETI=35ELSEI=255
220 OUT255,I
222 PRINT@6,STRING$(50,191);PRINT@6,STRING$(50,128);PRINT@966,STRING$(50,191);
PRINT@966,STRING$(50,128);
230 NEXT
240 GOTO700
400 IFG#="XXX B A R XXX"ANDH#G#THENH=100
410 IFG#="XXX B A R XXX"ANDI#G#THENI=100
420 IFH#="XXX B A R XXX"ANDI#H#THENH=100
430 IFS<100THENH=50
440 IFS=100THENV=V+.1ELSEV=V+.5
500 FORP=1TOS
505 IFF/2=INT(P/2)THEN0=35ELSE0=255
510 OUT255,0
512 PRINT@70,STRING$(50,191);PRINT@70,STRING$(50,128);PRINT@982,STRING$(50,191
);PRINT@982,STRING$(50,128);
520 NEXTP
530 GOTO700
700 CLS:PRINT"PRESS 'NEW LINE' BUTTON TO PULL AGAIN.";PRINT:PRINT
703 PRINT@106,"MONEY =";
704 Y#="#####";PRINTUSINGY$,V;
705 PRINT:PRINT:PRINT:PRINT:INPUT "PUNCH IN 'STOP' TO STOP",D#
706 IFD#="STOP"THEH712:IFV<0THEN712
707 CLS
708 PRINT@40,CHR$(191)CHR$(191)STRING$(62,128)CHR$(191)CHR$(191)STRING$(63,128)C
    
```



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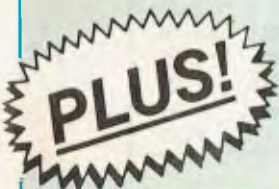
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Sticker

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## Rent-A-Computer

PURCHASING or leasing a computer has been outdated for many companies moving into the computer area for the first time — now they can rent a complete system.

The system, based on a Panasonic microcomputer with software included, has been launched by Parramatta-based Amicron Computer Services as part of its range of business services.

Amicron managing director Doug Allen says the Rent-A-Computer idea was inspired by requests from the company's clients.

"Many businesses, particularly choosing their first computer, upgrading the office equipment, or considering a change in their systems, face a very difficult choice in determining a combination of hardware and software packages," he says.

"They have little opportunity to test both in their own office environment without feeling uncomfortable."

Under the Amicron scheme, companies renting a computer will be provided with a Panasonic Computer and three software packages of their choice, from Amicron's range.

The software packages include debtors, creditors, general ledger, invoicing, inventory, word processing, order entry and indexing, with assets register and payroll soon to be added.

Up to two million characters of file can be stored on disk and can easily be expanded to three or four times this amount.

The rental agreement covers a minimum 12-month period which, Amicron says, allows a fair trial of the system.

At the end of the 12-months rental period, there is an option of continuing the rental or returning the hardware and software to Amicron.

But at any time in the rental period, the system may be purchased outright. Amicron says it will allow 50 per cent of the previous year's rental against the total purchase cost — a saving of several thousand dollars.

The rental cost, covering hardware, software and full maintenance starts at \$1000 per month.

For further information contact Amicron Computer Services at 10 Pitt Street, Parramatta. Phone (02) 633-4922.

## Central Coast Computing

PETER, Bruce and Mary (or should that have been Paul?) are now in control of the newest offshoot of the jolly ComputerLand giant situated in up-town Gosford, on the NSW central coast.

The store is owned and operated by Peter Thorogood and Mary Hendriks, both long-time computer professionals and microphiles who will be available to assist and enthuse residents, teachers and businessmen of the central coast.

Bruce Cook joined the team in August in charge of technical support.

The store, in Mann Street, has its display area on the street level with an equally large area below. ComputerLand Central coast provides computer systems for home, school and business starting with Atari, Osborne and Apple computers and looking to the future with such names as Sirius DEC and IBM.

A wide variety of software including the Six-S business software is available to give users, particularly first time users, a complete turn-key system with no programming hassles. □

## Light Control Film

A MAJOR cause of eye strain for computer workers who use video display terminals can be avoided with a light



control film made by 3M.

The film improves the contrast between images and background reflection, reducing the work on muscles which focus the eyes. Without the light control film the eyes' focusing muscles must work constantly to compensate for flicker at the edges of images, said sales manager Jim Malmgren. Where there are many small images on the screen, such as words or numbers, the eye strain is greater, he said.

Mr Malmgren also said the light control film also cuts out 50Hz flicker and reduces reflection glare from unlit parts of the video screen. He said where a screen uses reverse video — white background with dark images — eyestrain, which normally occurs within two hours, is eliminated.

Mr Malmgren said inability to focus, sore eyes, tearing and blurring are common complaints among VDT workers.

A louvred film which channels light vertically and horizontally, could be supplied so the screen image can be seen only from the front, with the display opaque from

all other angles.

Film surfaces are available in glossy, light matte and very light matte finishes and colours are red, amber, yellow, green, blue, violet, neutral and clear.

For further information contact 3M Australia, PO Box 99, Pymble, NSW 2073, phone (02) 498 0033. □

## Keyboard Letterprinter 120

A KEYBOARD send/receive version of Digital Equipment's Letterprinter 100 serial matrix table top printer has been announced.

Called the Letterwriter 100 it is being offered in three upward compatible models ranging from an international model with Courier-10 English and foreign character sets to one with a multiple font option.

The base model is being priced at just over \$3000.

The Letterprinter 100 is viewed by the company as an appropriate printer for personal computers, video workstations and small business systems.

It provides user selectable 240 character-per-second

draft printing, 80 characters-per-second correspondence printing and 30 characters-per-second high resolution printing. High speed bit map graphics is included as well as selectable typewriter-style print fonts.

For further information contact Digital Equipment Australia at Chatswood Plaza (North Tower), Railway Street, Chatswood, 2067. Telephone: (02) 412 5252 □

### Microprocessor Applications

FOLLOWING on from his popular radio courses on Microprocessor Fundamentals, Dr David Mee, of the University of New South Wales School of Electrical Engineering, will broadcast over the University's radio station, Radio University, a new course on Microprocessor Applications starting early in October.

The great power of the microprocessor chip, combined with its low cost, give it enormous importance in many areas of technology, both simple and complex. These lectures will enable the student to use a microprocessor in his own system for measurement, monitoring or control.

It will be assumed that students will have a basic knowledge of microprocessors derived from the earlier courses or elsewhere.

The course covers applications of microprocessors to a variety of common situations, each exemplifying different aspects of microprocessor systems design. The applications will include: A complete single chip analog data acquisition, display and control system for water heating; EP-ROM programming for a single chip microcomputer; A raster scan terminal; and subsystem for communications and magnetic storage.

There will be eight lectures broadcast over the University's radio station VLSUV at

7pm Tuesdays, repeated 8pm Thursdays. Transistor radios adjusted to pick up VL2UV can be purchased from Radio University for \$10 post paid or \$8 if collected. Students also receive instructions on how to modify their own radio.

One lecture will be transmitted over VITU, the University's television station. There will be two attended seminars held at the University.

The course fee of \$27.50 includes a comprehensive set of notes in addition to the lectures and seminars.

Following broadcast the course will be available on tape, at \$8 per radio lecture on audio cassette and \$30 or \$50, according to format, for the video cassette of the television programme. Three sets of notes are supplied with the tapes, making them ideal for training purposes.

For full particulars on this course, and others offered by the University of New South Wales by radio, television and tape, phone (02) 622 2691 or write to PO Box 1, Kensington, 2033. □

### Education Concern

MORE THAN 100 educators have expressed their concern at the lack of policy and support from the NSW Education Department for computer based activities in Schools.

The first conference of the NSW Computer Education Group, held in August, issued several recommendations with a request for action from the state government.

The recommendations include:

- The release of a (K-12) policy document for computer education in NSW schools.
- The establishment of a structure to coordinate and support computer based activities in Schools.
- An investigation of computer based systems for the

management of teaching resources.

Seventy-five percent of NSW secondary schools have a computer. The introduction of basic computer literacy for all students has been limited by the lack of policy direction and effective support from the department.

The conference directed the executive of the NSW Computer Education Group to establish a state-wide network of computer educators and to pursue the implementation of the conference recommendations. □

### Aid The Disabled

THE Royal Ryde Hospital was the host of the second Technical Aid to the Disabled Seminar on Computer Aided Interfaces on the last day of July. Dr. Keith Watson provided us with the following report:

Thirteen speakers provided papers on a range of topics from use of Apple computers by severely handicapped people to microcomputer access by the physically disabled. Several of the papers were of outstanding quality, and most work was done with low price small scale computers, notably the Apple.

Chairman Dr V S Ramsden (NSWIT) and the other speakers outlined the various aspects and the approaches being made in interfacing computers for the disabled. Dr. Bob Seeger detailed how, in his hospital, the numbers using electronic control to operate wheelchairs had increased from 19 to 57 over the last 12 months.

Paul Lamb, from the Spastic Society of Victoria, outlined progress made in modifying a Sharp 'Memowriter' unit to use a scanning style of operation similar to the 'Possum' unit. Andrew Allan of TAD spoke of progress in developing a portable scanner which will allow use of a variety of devices.

Speakers came from Can-

berra, Victoria, Melbourne and South Australia; one must only offer congratulations for their devoted and earnest endeavours, yet in summary — notwithstanding what is 'on stream' — the greatest problem remains finance.

Bob Gilchrist's (a psychologist from Centre Industries) demonstration of 'information prosthesis', enabling a spastic with possibly only one operative joint, be it a moving big toe or a lower jaw opening or shutting, was a stark reminder of the usefulness of 'home' computers, especially when linked with a voice synthesiser! □

### Pascal Packages

PASCAL programmers do not yet have much software to choose from. A new addition to the field is a local product, a set of utilities for Apple Pascal.

The package enables the user to access the disk directory via a single data structure, to print sorted catalogue listings in labels or normal format, to format numbers for output (like BASIC's Print Using), and to examine or modify absolute memory locations (for example, the system date and the device tables).

A large manual is supplied, and it provides material of educational value, including source listings. The retail price is \$49, and the package is available from dealers or directly from Steven Page, 60 Meiers Road, Indooroopilly, Qld 4068.

The same author has also released a Library Manager package for Apple DOS 3.3, which contains programs to sort the directory track on a disk (so CATALOG commands will list the files in order); and to compile, sort, and print a directory listing of a library of disks. Both programs are fast and simple to use. The retail price is \$35. □

# your TRS80 computer

By Rod Stevenson

LET'S START off with a reader's contribution. Ross Placing has sent me the following one-liner:

```
10 CLS : FOR A = 0 TO 255 : POKE  
15360 + A + A, A : NEXT A : PRINT  
@ 512,;
```

This will display on the screen the total character-set from the character generator, which of course is not revealed by a simple PRINT statement. In particular, it will show if there is lower case present.

It seems some are unaware they have this, since it requires a software driver unless using Scripsit or some of the games with such a driver already built in. And even with a driver some of the characters are not evident — lightning bolts, omega symbols, and who knows what, depending on which ROM version is installed.

Thanks Ross. Others' contributions are welcome — don't let's all re-invent the same wheel...

## System-80 Varieties

Most are aware the System-80 has been upgraded since first released, with the addition of the missing arrow and clear keys. But the additions and modifications are not limited to those initial ones.

In particular, the latest version has more ROM to fill the previous 'empty-hole' (3000H to 37DDH) which is shared by the TRS-80. While this addition is certainly welcome, it does make for even more incompatibilities in what the advertising would have us believe is the same machine. In particular, there are reports of problems with stringy floppies which assume this hole is empty.

At the time of writing there are not enough of this latest version about to get a comprehensive report of the differences — just be aware that there are at least some. And the add-ons from other manufacturers in America (where the System-80 is called the PMC and is different again) may not be suitable. In particular, the EPROM available to fill the hole assumes there is one!

The Adelaide Users' Group is preparing a list of modifications System-80 owners have done to their units, as well as the differences they have found, and will welcome any correspondence on the subject. In return, contributors will receive a copy of the document. And yes, there are some not contained in Dick's technical bulletins, and even modifications to the modifications listed therein.

## Free Programs

Two short routines I wrote for my own use have attracted some local requests for copies, so I hereby offer a listing to anyone who would like to send me a stamped self-addressed envelope. Incidentally, the same offer is open to any who think I may be able to help or make suggestions.

The first offered is a simple screen-print routine which intercepts the keyboard scan to send the entire screen to the printer and then returns to continue whatever was going on before.

It's done this way because often there's a need to print the screen without affecting it in any way. Yes I know DOS and Model III users already have this available, which is the reason for not taking up space by listing it here.

The other routine is to make my daisy-wheel Olivetti typewriter slash the zeros in EDTASM+, which otherwise look exactly like the letter O. And even this is perhaps of obscure value, as I'm aware some whose printers normally slash zero don't wish to and use an O instead.

Of course the same routine will do for BASIC, but somehow it seems more appropriate in EDTASM+. Depends on one's uses I suppose. And on how one's mind works whether one wants to slash or not?

Available to members of the Adelaide Users' Group (I can't give it away since its not mine!) is a detailed explanation of Ian Robertson's (our local Scripsit authority) modifications to the underline and pause patches in July 1982 '80 Microcomputing' to make it overstrike and slash zeros.

And of even value, advice on where to find the various routines within Scripsit itself to make your own changes — for example, a faster cursor-scroll is a great advantage when editing a document.

So is this enough reason to join your local group? We exchange Newsletters with as many Users' Groups as we can arrange, and are always more than willing to add to our list.

## Book Review

*TRS-80 Assembly Language* by Hubert Howe Jr., \$15.95 from McGills Newsagency, Melbourne.

Yes, this is the same Hubert Howe who wrote *MON-3/4*, which would seem to be ample recommendation without further enthusings from me. I do find the price a little out of proportion in comparison to the Tandy publication of Barden's similar book, but as books of this calibre are few

and far between, what choice do we have when such a really good one is available?

We are again paying for the fact if not being in America: the \$9.95 printed on the cover is quite reasonable for the degree of the author's knowledge contained.

As most will have read Barden's book if at all interested in Assembly (and indeed it is still to be recommended as a very good starting point), I can compare this one by putting it on the next step of the ladder to a total understanding and feel for assembly language programming, in particular with the TRS-80. For it is specific in references to our machine, which I find far more useful and readable than some abstract theorising as done by other writers on the same subject.

A warning though — it will entail some work to gain full benefit. But at least it is all there — you won't be left hanging as with Barden's book. And after working through this you'll attain the necessary level where nothing is hard any more: there will still be facts you need to know, but I can confidently say the 'feeling' will be there instead of just a mysterious fog of some foreign language.

A brief list of the contents will show it is indeed comprehensive in coverage, presenting enough concise detail for a good and adequate working knowledge of all the concepts necessary to enable the writing of some not-so-elementary assembly programs.

The first chapter on Machine Language claims not to assume any prior knowledge. Nor does it; although the coverage is not in depth, there is enough to provide a satisfactory grounding before passing on to the more detailed chapters on the Z80 chip and instruction set with a *real* explanation of the stack. Then comes the TRS specific chapters covering Memory Map and use of EDTASM.

The second part of the book is taken up with practical programming techniques, and it's here that Howe's expertise (as revealed in *MON-3/4*) shows.

While the areas covered are all the real ones needed in any assembly program, the explanation is at the elementary level, but by studying the way the author has gone about constructing the code one need not stay at that level. That is to say, the code can be used as it is and modified to suit the particular case, or the method can be studied to gain a true understanding and feel.

From the first steps of reading from the keyboard and writing to the screen, through floating-point arithmetic, to disk

operations with file structures, nothing is left to be (perhaps wrongly) assumed by the reader.

The book seems to be just what so many of us have wanted for many moons — something to lead us through the seeming jungle, but not so easy that we don't learn anything on the journey.

If you're in need of such help, I can strongly recommend this publication. My only reservation is the somewhat high price — but then if you're going to spend \$30 on EDTASM+ it would seem prudent to provide yourself a means of getting good value from it, and maximize your enjoyment available from assembly-writing.

### And Another...

*Level 2 ROM Assembly Language Toolkit* by Edwin Paay of InterSoft, distributed by Micro-80 Products, Adelaide. \$29.95.

Probably the highest recommendation for this package is that the author wrote it for his own use in his assembly-programming. Only after using the material and talking to others did he find there would be a market for such an aid. And indeed there is — it is already being sold in England and America, in competition with the locally produced similars.

The ROM Manual is totally re-written since the first edition over two years ago, with all the extra knowledge Eddy has amassed in that time, as well as all the variations and extras in the Model 3.

The format has been changed to slightly bigger than A5; the plastic comb binding (opens flat) make the 168 pages of really worthwhile material a valuable reference to have next to you as you work.

The various ROM routines are separated into sections at the front of the book, with a numerical list of ROM at the back. And scattered throughout are short (and some longer) routines to illustrate the point.

To be able to write assembly at all some book of this kind is vital; if you have the aforementioned Howe's book, you'll be thirsting for more of the same machine-specific detail. But if you haven't any treatise on assembly programming this won't provide it — you'll need to be at a certain level before you can appreciate and use much of the more intricate detail contained.

Now for reason why I suggest this over any of the American similars. While this ROM Manual alone is well worth the \$30, the DEBUG debugging program that comes free with it is worth \$30 on its own!

DEBUG is not a monitor-program. It's a debugging program; a vital necessity unless you're in the fortunate (and unique) position of having every assembly program always work totally!

The only true way to debug is to be able to single-step and see exactly what is happening at each instruction. The closest I've seen to DEBUG is Step-80, but as Eddy already had this when he wrote DEBUG it's apparent that the deficiencies of Step-80 have been overcome.

The only things lacking are the ability to single-step ROM, and the fast-step function. But the extras in DEBUG more than replace these for me.

In particular, everything is on the bottom of the screen at all times, without having to wonder what shift-key to press to get it, and without affecting the contents of the screen which is still showing the normal operation of the program.

While we all have certain things that appear in our own pet programs and utilities, what I really value is the display of the flags (as well as all the other registers) which tells at all times which are set, and as ZCM for example instead of as some hex value I can't be bothered to decipher — we all know how absolutely vital flags are in any assembly programming, but the actual benefit of this method of display is not appreciated until used, when it can no more be done without.

The other invaluable feature I appreciate is being able to change the value in the registers with ridiculous ease before executing any instruction, or by-passing it. And I (being me) get a tremendous feeling of power being able to control my Z80 with only two fingers — I actually feel a part of it by being able to do so.

If you (as I do) lose control of your fingers with excitement, instead of doing something you didn't want, the display will tell you and not do anything until you regain control of your fingers. Sounds stupid, I know — it does happen!

A brief list of the facilities of DEBUG: display in ASCII (not really useful); set breakpoints; execute a CALL completely; disassemble; edit memory (with its own set of subcommands); goto an address in the PC; increment and decrement PC register; jump to an address; load and save a tape; change memory display of 8 bytes; print work-display on printer; modify registers; clear screen (above work-display); single-step.

When you consider that each of these commands works just as you'd want it to, there can be no doubt why I have no re-

servations in recommending this package to anyone with Assembly aspirations.

### Over Enthusiastic?

I realise I do have a tendency to go overboard when I find a really worthwhile product such as either of the above. And I suppose enthusiasm may put some off my recommendation. But just consider how many similar products I see and say nothing unless asked — because at best I consider them ordinary.

No, I'm not in for a share of the profits of either of the above (nor anything else for that matter, but if someone has an offer...).

I'd like to think that we can all help our fellow hobbyists when we come across something we consider worthy. For if we're going to spend our earnings on something, don't we all want the best value possible? Which is my reason for passing on my good fortune to you. □

---

### Lack Of Support

It appears some Model 3 owners, and some System-80 owners, are annoyed (to put it mildly!) at what they see as a lack of support for their units. For they are comparing with the situation of Model 1s.

It seems to me that we just have to accept that there will never be support from independent sources such as enjoyed by the Model 1, which was the first of its kind on the market. Whatever the merits of the situation, the market-place has become so fragmented by the large number of closely competing 'personal' computers now available that it's totally unrealistic to expect each one to achieve the same support afforded to the first on the scene. And surely there's nothing wrong with a manufacturer (of software or hardware) aiming his product where there is the greatest potential for sales?

Having said this, it follows that the greatest reason for choosing a Model 1 (the support) doesn't follow to the other Tandy models. Which is not necessarily a bad thing — it means the buyer chooses on a given machine's merit, rather than on the emotional appeal of all that wonderful array of software and add-on hardware he'd be able to buy if only he had the money.

# your ZX81 computer

By David Brudenall

ANYBODY WHO has been keeping an eye on their local newsagent's may well have noticed copies of a new UK publication entitled ZX Computing.

This magazine is almost essential reading for the ZX enthusiast, especially if he/she likes games! It's a bit pricey at \$4.50 but it is a quarterly. In fact you may find the advertisements for ZX peripherals and what-have-you the most interesting part of the magazine!

I received an interesting response from AZUA member Bob Mills towards my mention of LOADING problems for the ZXs in this column a few months ago. He said that since he had bought his ZX80 (over a year ago) he had not had a program fail to LOAD properly.

He stated that any problems with LOADING and SAVEing are caused by the tape recorder/tapes/leads — not the ZX. He has found Scotch Dynarange C60 and C90 cassettes to give good results, and he says a cassette recorder with an unworn head is essential.

As a matter of interest, Bob has written a word processor program for the ZX81 or 8K ROM ZX80. This may not seem to be very exciting, but the nifty part is that it prints lower case!

When using the word processor upper case letters are displayed in inverse, lower case being normal upper case letters. When the document (or whatever) is printed the program changes all normal upper case letters to Bob's lower case. This routine (which is incidentally somewhat similar to Tandy's Colour Computer printing lower case routine) is necessary because changing the screen characters would involve a hardware modification.

At time of writing Bob is only selling his program to AZUA members, but he will no doubt expand his business in the near future.

## Quickie Software Reviews

**Space Invaders**— this arcade game is getting on a bit nowadays, but this ZX81 4K RAM version is quite a good imitation of the original.

There are 49 aliens (complete with flapping wings), which move to and fro across the screen, dropping their bombs, and the familiar saucers zip across the top of the screen.

There are shields to protect the player's base, and the player can use the P key to protect the base from the bombs (although this shield eventually wears out). Some concessions have been made, of course, for the ZX81's limited graphics,

but nevertheless the game is challenging to play as well as being interesting visually.

**Winged Avenger**— is another ZX81-16K program also having its roots in an arcade game. This one is reminiscent of the Phoenix arcade game, although lacking the original's colour and high-res graphics.

In this version the player controls a base which fires missiles at the attacking waves of 'eggs' and bird-like aliens. During the course of the game it is usual to be hit twenty or thirty times or more by their bombs, but instead of being destroyed, energy is depleted (total energy left is shown in upper right hand corner of screen).

The base also loses energy from firing missiles. To save energy, a cute trick is to switch on the shield (P key again) and actually ram the aliens. The use of graphics is excellent and the aliens fly around the screen in a most impressive way.

If you survive through the waves of eggs and birds you are presented with a huge spaceship, which you must destroy. As soon as your missiles puncture the wall of the ship, nasty little flying aliens pour out and begin to fire at the base with missiles that don't miss!

If you manage to destroy the spaceship the game restarts, supplying your base with renewed energy. Overall, a very impressive and possibly addictive game. I received review copies of the above two games from: K J Software, 8 Cawrse Street, Elizabeth Field, SA 5113.

**ZX Disassembler** — this program is a versatile disassembler for the ZX81 or 8K ROM ZX80.

Once LOADED, it resides in the upper 2K of memory, and can only be removed by disconnecting the power. This means that various programs can be LOADED into the computer while the disassembler is there and thus it can be used with/for the program.

A few options are provided with the disassembler, like formatting, hex dumps, printer output, inverse printer/screen display, and so on. A demo program is also provided which demonstrates the disassembling and options.

ZX Disassembler is written by Synapse Software and can be obtained directly: write to Synapse Software, PO Box 29, Cottesloe, WA 6011.

## This Month's Program

Here is a game I wrote last year for the

ZX81/8K ROM ZX80 with 16K RAM, called Star Wars.

You must fly your X-Wing fighter down the 'trench' towards the exhaust vent which is the Death Star's weak point. As soon as the vent appears (an asterisk) you must position your X-Wing directly over it and fire.

The more missiles you fire at it the more chance you have of hitting it (and thus destroying the Death Star and saving the Universe). All the time two nasty Tie-Fighters are on your tail and zipping around all over the place, so stay out of their way (you can't shoot them because they're behind you).

As soon as you've fired your missiles use the 'P' key to pull out from the trench before you crash into the wall at the end. Have fun!

### STAR WAR

BY DAVID BRUDENALL

```

USE THE ARROW KEYS TO MOVE YOUR
X-WING FIGHTER DOWN THE TRENCH
WHILE AVOIDING THE WALLS OF THE
TRENCH AND THE VICIOUS TIE-
FIGHTERS. WHEN THE TIME REACHES
20 OR SO THE VENT WILL BE IN
RANGE. WHEN THIS HAPPENS THE
VENT CAN BE SEEN (AN ASTERISK).
MOVE YOUR X-WING OVER THE VENT
AND FIRE (F KEY) A PHOTON TORPE-
DOE OR THREE (THE MORE YOU FIRE
THE BETTER YOUR CHANCES OF HIT-
TING THE VENT). THEN YOU MUST
PULL OUT OF THE TRENCH QUICKLY
BEFORE YOU CRASH INTO THE WALL
AT THE END (USE P KEY TO PULL
OUT FASTER).
IF YOUR SHOTS ARE SUCCESSFUL THE
DEATH STAR WILL EXPLODE AND YOU
HAVE WON.
NB: WHEN YOU ARE DIRECTLY OVER
THE VENT ONLY THE VENT (*) CAN
BE SEEN.
    
```

### STARWAR

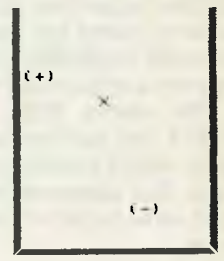
PROTON BOLTS:

3

TIME:

7

7  
A  
5<+>8  
6



```

1 SLOW
5 REM STARWAR:8KROM ZX80/ZX81
6 REM BY DAVID BRUDENALL 1981
10 PRINT "(((( (S T A R * W A
R * ) ) ) )"
20 PAUSE 150
30 POKE 16437,255
40 CLS
50 PRINT "YOU ARE * * * * *
OF THE REBEL ALLIANCE, AND
YOU MUST DE-STROY THE DEATH STAR
*
*
50 PRINT
70 PRINT "YOU WILL BE FLYING D
OWN THE TRENCH TOWARDS THE
ENLIGATION HOLE WHICH IS AN UNP
ROTECTED VENT LEADING DIRECTL
Y TO THE DEATH STAR'S NUCLEAR
FUSION CORE"
80 PRINT
90 PRINT "YOU, LUKE, MUST FIRE
A PHOTON BOLT INTO THAT VENT
AND THEN PULL OUT BEFORE CRAS
    
```



```

HING INTO THE WALL AT THE END.
YOU MUST AVOID THE TIE-FIGHTER
R=0
100 PRINT
110 PRINT "USE KEYS 5,6,7 AND 8
TO CONTROL THE X-WING FIGHTER.
KEY F TO FIRE AT VENT AND KEY
P TO PULL OUT. --PRESS NEW LI
NE --"
120 INPUT N$
130 CLS
135 RAND T
140 LET M=3
150 LET T=0
160 LET A=1
170 LET B=2
180 LET N1=0
190 LET N2=0
200 LET N3=0
210 LET S=0
220 LET X=INT (RND*18)+1
230 LET Y=INT (RND*29)+1
240 IF Z<1 OR X<16 THEN GOTO 22
0
300 FOR I=40 TO 4 STEP -1
310 PLOT 31,I
320 NEXT I
330 FOR I=31 TO 61
340 PLOT I,4
350 NEXT I
360 FOR I=4 TO 40
370 PLOT 61,I
380 NEXT I
390 PRINT AT 0,3;"STARWAR"
400 PRINT AT 4,0;"PROTON BOLTS:"
"
410 PRINT AT 0,0;"TIME:"
420 PRINT AT 10,5;"5<+>6"
430 PRINT AT 10,7;"7"
440 PRINT AT 20,7;"U"
450 PRINT AT 21,7;"6"
460 IF T>=35 THEN PRINT AT 21,1
"
470 PULL OUT PULL OUT"
480 PRINT AT 5,5;M
490 IF T>=20 THEN PRINT AT 15,0
"VENT IN RANGE"
490 PRINT AT 10,2;T
500 PRINT AT A,B;"X"
510 IF A<1 THEN GOTO 800
520 IF A=19 OR B=15 OR B=30 THE
N LET N2=1
570 LET R1=INT (RND*18)+1
580 LET R2=INT (RND*18)+1

```

```

590 LET K1=INT (RND*27)
600 LET K2=INT (RND*27)
610 IF K1<16 OR K2<16 THEN GOTO
620 PRINT AT R1,K1;"(+)"
630 PRINT AT R2,K2;"(-)"
640 IF (R1=A OR R2=B) AND ((K1)
B=3 AND K1<B+3) OR (K2<B+3 AND K
>B-3)) THEN LET N1=1
650 LET T=T+1
660 IF T>=20 THEN PRINT AT Z,X,
"
670 IF T=40 THEN LET N3=1
680 IF (N1 OR N2 OR N3)=1 THEN
GOTO 700
710 PAUSE 100
720 POKE 16437,255
730 PRINT AT A,B;" "
740 PRINT AT R1,K1;" "
750 PRINT AT R2,K2;" "
800 IF INKEY$="5" THEN LET A=A-
1
810 IF INKEY$="P" THEN LET A=A-
2
820 IF INKEY$="8" THEN LET B=B-
1
830 IF INKEY$="6" THEN LET A=A-
4
840 IF INKEY$="7" THEN LET A=A-
4
850 IF INKEY$="F" THEN GOSUB 10
00
900 GOTO 450
1000 IF M=0 THEN RETURN
1010 LET M=M-1
1020 IF A<Z THEN RETURN
1030 IF AND>.6 THEN LET S=J
1040 RETURN
1050 PRINT "YOUR PROTON MISSILE
MISSED THE VENT, UNFORTUNATELY."
2010 PRINT
2020 RETURN
7010 POKE 200
7010 POKE 16437,255
7020 CLS
7030 IF N2=1 THEN GOTO 7100
7040 IF N1=1 THEN GOTO 7200
7050 PRINT "FOOL, YOU FORGOT TO
PULL OUT. YOU'VE CRASHED INTO
THE WALL AT THE END OF THE CHUTE
. YOU SHOULDHAVE STAYED ON TATOO
INE."
7060 PRINT

```

```

7070 IF M<3 AND S<>1 THEN GOSUB
2000
7080 IF S=1 THEN PRINT "HOWEVER
YOUR PROTON BOLT DID HIT THE
VENT. DEATH STAR EXPLO- SIGN IMM
INENT. POSTUMOUS CONGRATU
LATIONS, LUKE."
7090 GOTO 7300
7100 PRINT "HA HA HA HA - YOU CR
ASHED INTO ASIDE WALL. YOU'RE DE
AD. BAD LUCKLUKE."
7110 PRINT
7115 IF M<3 AND S<>1 THEN GOSUB
2000
7120 GOTO 7080
7200 PRINT TAB 13;"ZAP"
7210 PRINT
7220 PRINT 'A TIE-FIGHTER HAS JU
ST OBLITER-ATED YOU. TOUGH LUCK
"
7225 IF M<3 AND S<>1 THEN GOSUB
2000
7230 GOTO 7080
7300 PRINT
7305 IF S<>1 THEN PRINT "YOUR MI
SSION WAS AN ABSOLUTE FAILURE
- YOU'RE DEAD AND THE DEATH S
TAR IS STILL IN ONE PIECE"
7307 PRINT
7310 PRINT "ANOTHER GAME? (Y/N)"
7320 INPUT N$
7330 IF CODE N$=62 THEN GOTO 130
7340 STOP
8000 PAUSE 200
8010 POKE 16437,255
8020 CLS
8030 PRINT "SUCCESSFULLY PULLED
OUT."
8040 PRINT
8045 IF M<3 AND S<>1 THEN GOSUB
2000
8050 IF S<>1 THEN PRINT "THE REB
EL ALLIANCE IS DOOMED BECAUSE
YOU HAVE NOT SUCCESSFULLY S
ENT A PROTON BOLT INTO THE REB
EL ALLIANCE. YOU'VE CRASHED INTO
THE WALL AT THE END OF THE CHUTE
. YOU SHOULDHAVE STAYED ON TATOO
INE."
8070 GOTO 7307
9000 SAVE "STARWAR"
9010 RUN

```



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# your PET computer

By Errol The Cat

YOUR favourite feline went to Pommie Land in June, for the third International PET Show.

Suffering severely from jet-lag, having only arrived the previous morning, off I went to the Cunard Hotel in Hammersmith. I had made an assignation with the Intrepid Human Dynamo, alias Roger Davis, Commodore's national sales manager.

Dear Roger arranged for me to become a VIP (Very Important PET) guest. This meant that I could attend the three-day show at no cost, could be looked upon as someone of significance and take advantage of the VIP 'free grog' lounge. Regrettably, I was only informed on the latter of the last day and so did not give it much patronage.

Wandering around that first day was mind boggling. This was partly due to the feeling of still flying high, the unique 80 degree London day and being cramped in an exhibition with no air conditioning.

Roger did not ease my state. He propelled me from stand to stand at a rate of knots equalled only by the QE2's speedy trip to the Falklands.

However, let me get down to the purpose of this article and detail some of the sights I saw.

## Commodore VIC 10

Sometimes known as the Ultimax. It uses a new processor, the 6510, not unlike the 6502.

However, it contains additional input/output lines to handle the processing required by the new system. The display of 40 by 25 and 16 colours gives this model the flexibility for designing unique graphics. Again a new display chip is used, the 6567.

The SID (Sound Interface Device) produces music and effects that rival many of the best music synthesizers. User features include inbuilt cassette port, 320 by 320 pixel resolution, full keyboard, music synthesizers with three voices, programmable tones, wave shapes, filters and noise generator, as well as plug-in cartridges, two joysticks, four paddles and two light pens.

## Commodore 64

It looks identical to the VIC 20 but inside is another story.



Video output to a television or monitor (composite video), 40 by 25 colour text, 320 by 200 pixel high-resolution graphics, 16 colours available simultaneously, audio output of 3 voices of 9 octaves each, user port, memory expansion/cartridge port and get this — 20K ROM and 64K RAM.

Again, the new video chip (6567) is used which enables you to create three-dimensional graphics together with SID and the 6510 main processor chip.

## The Commodore 510

This is a brand new Commodore computer aimed at small businesses, scientific applications, education and entertainment.

Its features include: Video output to a television or monitor (composite video); 40 by 25 colour text; 320 by 200 pixel high resolution graphics; 16 colours available simultaneously; Audio output — 3 voices of 9 octaves each; BASIC 4.0 plus extra BASIC commands; Full QWERTY keyboard (94 keys); 4 Cursor Control Keys; Separate and complete calculator keypad; 10 programmable function keys (20 with shift); IEEE-488 and RS232C Ports; User and Cassette Ports; Second processor capability.

The 510 is compatible with existing Commodore peripherals and of course, allows the use of RS232 devices. A second processor board can be inserted (for inclusion of other operating systems such as CP/M) and the 6509 remains for dual processing.

ROM based software can be added through a cartridge slot. In addition, the addressing capabilities of the microprocessor allows memory expansion to more than 750K bytes. The 6567 and SID is also used. Basically, this is a 28K ROM and 128K RAM microcomputer.

## The Commodore 720

This is the top of the range new Commodore, incorporating most of the features of the 64 and 510.

Differences are the 80 by 25 screen display in a black and white integral monitor with tilt and swivel screen. Twin disk drive units are inbuilt and the keyboard can be moved away from the main unit. It has 28K ROM and either 128K or 256K RAM.

The main processor is a 6509 with a second processor capability (say Z80, 8088 or 6809). Both the 510 and 720 are 8 bit user port but can apparently become 16 bit lookalikes.

Before anyone gets too excited about these new machines, I should stress that they are not yet available. All are due for release in the UK sometime in the last quarter of this year. That means the earliest we shall see them is the first quarter of 1983.

Needless to say, the new Commodore goodies occupied most of my time but I managed to see some of the other stands.

**Stack Computer Services:** A very nice crowd who specialise in a wide range of add-ons for the VIC 20. They make excellent light pens, expansion memory cartridges, extended graphics, low-cost paddles and a variety of interfaces.

The latter includes a 40 by 25 converter for the VIC 20 and I also got to see a prototype of an 80 by 25 converter. I brought back a sample of most of the products which my mates John and Robert are happily devouring.

**Mator Systems:** These people produce the Shark hard disk unit which is now complimented by the Sharkive, a high speed tape backup system. They also make a wide range of protocol converters like an intelligent IEEE-RS232/V4 synchronous converter.

**Dyson Instruments:** From these people, I had a great 'computer-made' cup of tea. They were demonstrating the REXAGAN Interface System and by making a simple

# Star Battler

By Mark Waddell

cuppa, showed most laboratory testing procedures.

**Oxford Computer Systems:** This company wrote the PETSPEED Compiler which has now been adopted by Commodore UK as its recommended compiler. Definitely very fast and seems now to be relieved of earlier problems.

**Taylor Wilson Systems:** I guess this was probably one of the most interesting products I saw. Using a Commodore 8000, these people had written a toolpath simulator program.

The idea being that you train on the Commodore without the risk of ruining thousands of dollars in cutting instruments. But, once you have perfected your tooling, you spin out the input on a tape punch, read it into your actual machine cutter and thereby have safe non-duplicated work. Pure magic.

**Claremont Controls:** Using an 8000 system, these people have produced a Critical Path Analysis Program called Hornet. It contains all the features found on mainframes and can link into Silicon Office. One definitely for me.

Of course, it is impossible to detail all I saw. I caught up on my mates from Compssoft (DMS writers) and the Bristol Software Factory (Silicon Office). □



YOU MAY sometimes wonder if you have done the right thing by spending your hard earned \$14.95 on a tape that may not suit your taste. However, if you are thinking of buying *Star Battle*, you can be sure that you will be making the right decision as long as you have a 16K RAM pack.

*Star Battle* is a challenge and needs a lot of thought and concentration, but is sure to be the liking of most people.

The game may seem a little complicated at first, and frustration will grow when you never seem to be able to sufficiently damage the Klingons. After three or four games, however, you become more experienced and the game becomes more challenging and satisfying.

To win a major victory against four or five Klingons certainly gives one a strong feeling of achievement.

The object of the game is to damage or destroy the number of Klingons you assigned yourself when the game started without the *Enterprise*, the ship of which you are captain, being destroyed.

You can win a 'major victory' by destroying all Klingons, a 'tactical victory' by destroying some or, of course, you may lose *Enterprise* without any loss to the enemy at all.

The game is set within two solar systems. In one, Pollux, the starship is randomly placed each game, while in the other, Arcurus, a planet positioned in the centre destroys or drains power from the *Enterprise* when it is too close. In Pollux the Klingons are more powerful.

*Star Battle* lets you and your opponents fire at each other alternately with one of five weapons: phasers, secret weapon, photon torpedoes and high energy plasma bolts, all with varying ranges and powers.

The number of Klingons picked at the beginning of the game determines what weapons they will use and how difficult it is to destroy each one; if one Klingon is picked, it will have greater weapon capabilities and will be harder to destroy than if it was picked with one or more partners.

At each turn you have a variety of optional moves ranging from doing nothing to self destruction. Other moves include positioning yourself with respect to a particular Klingon, using your variety of weapons, or diverting your power to firming your shields or making repairs.

Although you can try to keep the Klingons at bay, there is no real provision for you to retreat or return home prior to complete destruction of all Klingons.

One of the secrets of success is to con-

your computer



## OWNER REPORT

serve your limited power. At the beginning of the game, you start with zero power overload on the primary circuit, and although some power is generated at each of your turns, power is also expended on what was done.

When a power overload of 20mstroms is reached, the primary fuse blows and you are placed on secondary circuit, which allows a further 10mstroms overload. If this limit is exceeded, an emergency generator will provide an additional overload of 2mstroms, but when this is gone it will implode, destroying the *Enterprise* with it.

It is in this way I suffer most because it doesn't take all that long, if you are not careful, to become a victim of an imploding generator.

A few hits or direct hits from the Klingons start to produce disastrous effects if damages are not repaired. First to go are the shields, second the phasers, followed by your other weapons, a drop in power, and finally the *Enterprise* is lost.

The comprehensive instructions which accompany the cassette makes what would normally be a complicated program into a less complex one, but does leave some aspects to be worked out by experience.

*Star Battle* keeps you interested, and a single game can sometimes last up to about an hour.

If you are only interested in fast moving action graphics, this program will not appeal, as the only graphics is the plotting of the *Enterprise* in one of the two solar systems.

It is a program in which you can become engrossed, and feel strongly about your powers, and very frustrated about your limitations. In all it's a very good production. □

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**For Sale:** Microace computer, 16K RAM, power supply, TV adaptor, documentation. \$190. Phone John, (02) 525 1292 a/h or (02) 517 1851 a/h.

**Hewlett-Packard System 41C:** Quad, maths, stats mod, recharge batt, \$480; card reader \$245; Printer \$430, the lot \$1100. Phone (062) 97 2697.

**Computer terminal:** hard copy, Teletype 43, 1 year old, with new ribbon and \$150 of paper; \$1000. Phone (062) 97 2697.

**ZX81:** Mains adapter, 16K RAM, manual, 30 programs book, ZXChess, still under guarantee, cost \$400, sell for \$275. Phone (02) 570 7130 after 4pm.

**Pocket Computer:** TRS-80 plus printer/cassette interface, including programs (statistics, marketing, business and personal finance). \$290. Phone Maurice (02) 807 6608.

**ZX81:** 15 programs, \$10.00. Cheque, postal order to: Poseidon Software, 72 May Street, Preston, Melbourne, 3072.

**Super-80:** BASIC EPROM, power supply, S100 fully connected, IC sockets, 16K expandable to 48K, tone generator, all documentation. \$339. Ring (053) 32 6733.

**Wanted:** U.C.S.D. Pascal or C.P.M.DOS for System-80/TRS-80, will buy or trade. David Brighton, Franklin road, Huonville, 7109.

**System-80 L2 Mk2:** Perfect condition only 8 months old, plus a GP-80 printer and cable plus and b&w monitor and \$200.00 of software. Sell for \$1100.00. Phone (07) 48 8451.

**Wanted:** Australian Personal Computer, Volume 1 numbers 1,2,3,5,10,12. Hawthorne Box 111, Lilydale, 3140. (03) 735 4441.

**Joystick:** suit TRS-80, interface not needed, unused, in box. \$40. Phone Scott (02) 523 2238 a/h.

**Casio Computer:** Model FX-70 2P BASIC Pocket Computer Programmable Calculator. Max 1680 steps (26 memories); 226 memories (80 steps). With manual and program library. Cost \$250, sell \$200. Phone 528 6538. Adaptions.

**System-80:** 16k, Second Model, V.D.U., games, books, exc. condition. Value over \$1200. Must sell for \$700. Phone Michael (054) 61 2113.

**For Sale:** "The Last One" program generator on 20 cm CP/M diskette with license, manual. Requires Microsoft BASIC Interpreter 5.3 or later. \$495. Phone (03) 598 8129 a/h.

**MicroBee Software:** Nearly 100 diferent titles. Games, adventures, educational, etc. Business software soon. Send 65 cent stamp for catalogue. T Perkins & J Burns, 6 Banksia Street, Townsville, 4814.

**System-80:** 16K, tapes and books, as new. \$550 ono. 81 Mossman Street, Armidale, NSW 2350.

**Wanted:** Members for VIC-20 users club (VIC-ups). Meetings held at Victoria Park Primary School on the second and fourth Tuesday of the month at 7pm. For further details ring Vic (09) 390 7875 or Greg (09) 451 4629.

**VIC-20 programs:** (unexpanded) for sale on cassette. Send SAE to R Kube, McCutcheon St., Waikerie, SA 5330 for free list.

**For Sale:** System 80 (16K) second model, V.D.U., games, books. All excellent condition. Value over \$1200. Must sell \$700. Phone: (054) 61 2113.

**ZX81:** (incl. warranty) 1K RAM only. As new condition. \$175 ono. Phone (063) 62 4652 a/h.

**Apple II:** Othello in compiled or BASIC versions...Send disk (+ \$6 + return postage) or write for free catalogue...Ban-Pit, 79 Lakeside Ave, Mt Beauty, 3699. Phone (057) 57 2097.

**Sell:** Interface cable to connect parallel printer to System 80. \$35. Phone: (075) 39 4895 most nights.

**Ohio Scientific:** Challenger IPII Rs 232 printer port, 10K ROM, 8K RAM, A to D cassette modulator, 8 manuals. \$500 ono. Phone: 607 6228.

**Sinclair ZX81:** 16K RAM. UHF only, includes multi-voltage P.S.U. (1 amp) and manual. \$300 ono. 12" TV available if required. Phone: (075) 57 2615.

**ZX81:** adapter, manual, "30 Programs For ZX81", "Complete ZX81 Course". Games, education cassettes. 45 programs on tapes, 60 on paper, advertisements for software/hardware. Plus cassette recorder, all for only \$265. Ring Michael: (02) 669 3903 (after school).

**Wanted:** TRS-80/System 80 software programs. Phone Tim on (02) 217 2303.

**Teletype KSR-33:** complete with service manuals. \$150 ono. Phone: Bus. (03) 339 8478, a/h (03) 592 5620.

**Backup:** makes backup copy of most system tapes whether non-contiguous or 16K long on 16K TRS-80 Model 1. Note: must have lowercase. Send \$8 to: 61 Cremin Street, Upper Mt Gravatt, 4122.

**For Sale:** Teletype ASR35, 20MA, VGC, \$200 — DEC LA30, Dot Matrix, 30CPS, RS232-C, VGC. \$280 — Philips Oscilloscope, Dual Trace, 120 MHz, VGC. \$1100. Phone: Moorabbin (03) 555 5175.

**HP-41C:** plus card reader, 3 memory modules, games pak, many cards, programs and PPC articles. \$550. Phone: (062) 54 2248.

**ZX81:** 1K-16K programs including; Othello, Draughts. Send SAE for price list to: D Noble, 34 Murri Street, Blackheath, NSW 2785.

**ZX81:** complete with leads, manual, 2 games cassettes. \$120. Phone John: (057) 55 1093.

**TRS-80:** Model I, Level II 16K + approx. \$800 of software + Monitor. Asking \$1450 ono. Phone (03) 560 8629 after 7pm.

**VIC-20:** only 3 months old, to suit new computer buyer. Plus C2N Datasette, 3K and 8K expansion cartridges, Avengers game cartridge, VIC-Trek game cassette, programs and books. Only \$500, save \$200. Phone George: (03) 391 1232 after 6pm.

**ZX81:** complete computer with 16K RAM, game, two books. Sell \$300. Phone George (02) 707 4994.

**Z-80 Assembler programmers only:** Multi-tasking monitor for sale. This means you can run up to 8 programs concurrently and still have control of your keyboard to command the system. What a beauty! Phone: (02) 438 4806.

**Centronics 779:** dot matrix printer (parallel interface). Identical to TRS-80 LP-1. With manual and replacement ribbon. Excellent condition. \$250.00. Phone: (02) 808 1575.

**TRS-80:** Model III, 48K RAM double disk drives, TRSDOS manuals + programs. \$2660. ono. Urgent sale. Phone: (02) 644 2282.

**For Sale:** Apple II software — Apple Writer (word processing system) and Personal Finance Manager — \$60 each ono. Phone: (02) 660 8551.

**VIC-20:** plus C2N cassette, super expander cartridge, manuals, VIC-20 magazines and programs only \$500 (negotiable). John Fawcett (03) 819 5193.

**VIC-20:** Hesplot program on tape. Very fast Hi-res graphics subroutines. Plot 176 X160 on 8K VIC. \$10. 103 Fitzroy St, Surry Hills, NSW 2010.

**MicroBee programs:** Swap my modest original programs for yours. Phone: (03) 741 5534 (6-10pm).

**MicroBee Disassembler:** converts machine language into Z80 nuemonics. cost is \$12.00 and includes tape and instructions. Send money to: 1/117 Macarthur St, Sale, Vic 3850. Or phone: (051) 44 2011 for more details.

# your MICROBEE computer

by Richard Pakalnis

HI MUM! Your son is nearly a media star...(Sorry, Les).

After my last article I'm surprised the Bell Corporation for Subtle Persuasion let me back. You should now be aware of my inability to comprehend anything electronic. I leave the technicals to the technicos.

This column seeks not to teach anyone BASIC, nor do I seek to explain the secrets of life but with your input we can have a lot of fun with our MicroBees, I get a computer education and we get to tell the world what a great little micro we have.

Well, what a month it's been since I spoke to you in August. After I caught this computer bug I've been fired, rehired (the Americans call it deployed and redeployed), given notice to quit my flat, caught in storms off the Queensland coast, tech exams are coming and the bank account is low, low, low. I must have upset the big byte in the sky. All this is another way of saying I've done nothing constructive.

Before I go on to global searches (otherwise known as global exchange) and TV modulator building I want to make some observations. I've learnt a valuable lesson from my time at the keyboard.

## Be Patient. Please!

Yes, patience is a trait I lost a few years ago when I used to deal with the general public. You know the form...Type A1, no, wait, A1\$ — hell! — Press harder on the 1...key's loose; Why is my screen rolling again? Adjust...where was I?...Cigarettes?...what's that smell? Error...unpaired brackets...desk burning...Aarrghh! It's 3.30 am: GOTO BED.

Develop your karma. It's cheaper than Scotch.

What I am saying is if you wish to write good programs don't do it at the keyboard. Sit quietly and write. Check it then key it in. The results for me are definitely more satisfying.

Okay. Global Search or Global Exchange is a facility on the MicroBee which is absolutely marvellous. It allows you to search for a string and replace it with another string you have designated.

It's a powerful editor which corrects errors and can be used to convert other BASICS into Microworld BASIC. An example directly from the manual is best...

```
100 REM A DEMO IN BANANA BASIC
110 HOME
120 A$="BILL LIVES IN A BRICK HOME"
130 B$=LEFT$(A$,4)
```

```
140 PRINT "HELLO" + B$
150 END
```

Now we all know that CLS clears the screen and not HOME. We all know that string variables should be in the form A1\$, B1\$, C8\$ and not A\$, B\$, C\$. To correct 'HOME', type: GX/HOME/CLS/ then hit return, and the cursor will identify the first 'HOME' it comes to.

If it needs replacing just press the period (.) key and the exchange is done. It will then go on to the next HOME. Do we want it replaced? No? Then press the space bar and nothing is changed. This can go on ad infinitum through line upon line for any string. It can save hours. Experiment with it. It's a joy.

I experimented further with the PLAY mode. I wanted to turn the top two rows of the keyboard into a piano style of operation. Liberace I'm not, so there's no way I can remember what number belongs to what note out of the 24 available.

How do we INPUT without having to hit RETURN all the time? Welcome and meet KEY\$. The KEY\$ function allows the operator to input information via the keyboard without having to hit RETURN all the time. Essentially it returns a one-character string when called; for example:

```
10 CLS
20 A1$ = KEY$
30 IF A1$ = "" THEN 20
40 IF A1$ = "W" THEN 60
50 GOTO 20
60 PRINT "YOU HIT THE LETTER W"
```

Now what I did here was to expand the IF-THEN statement to switch to the right PLAY command. Let's just look at three notes (24 gets a bit long — you can put in the rest):

```
100 CLS
110 A1$ = KEY$
120 IF A1$ = "" THEN 110
200 IF A1$ = "1" THEN PLAY 1: GOTO 110
250 IF A1$ = "2" THEN PLAY 2: GOTO 110
300 IF A1$ = "3" THEN PLAY 3: GOTO 110
```

Get the idea? Now the top two rows of my keyboard from 1 to up-arrow and Q to [ (1 to 13, 14 to 24) are instant activators of the play mode. I suspect someone out there can shorten this program considerably.

## The RF Modulator?

Thanks for reminding me. As I mentioned last month I was going to tell you how to build that TV modulator.

Well, it's like this...I went back to Dick Smith's for my short electronics lesson from a very helpful salesman who passed me on to a technico. I walked out \$20 poorer clutching lots of little parts including a new RF modulator and a schematic showing where all the solder goes (he was a better salesman methinks). I was ready to try my new stable, corruption-free screen.

Hours later with burnt fingers and my karma in tatters, my TV was awash with lines and READY glowing faintly in the top left hand corner. Hence the moral of my story. I have trouble changing light globes so I melted down my little creation as an act of revenge and went out and bought a green phosphor video monitor. No modulator required. No power problems. One RCA plug and instant bliss. Take my advice. Spend the bucks. It's worth it.

To digress a little, Les did something really dumb the other day. He handed me a Space Invaders game for the MicroBee, called (strangely enough) Microspace Invaders (copyright Tim Morris-Yates).

Have you ever heard of Alcoholics Anonymous? Les's act was tantamount to giving a graduate member two bottles of Scotch.

You may call me juvenile (you may call me late for dinner) but I was there at the birth of this addictive game in Oz and have been known to spend a dollar since.

This version is excellent. Graphics are great as chunkys go and the response to left and right movement is as quick as your reflexes. Better than TRS-80 (*de gustibus ne disputandum*). I'll be getting their other games shortly (purely for review, mind you!).

My next purchase has to be a printer. I am sick and tired of looking through program lines on screen. A printed copy of all my hard work would be great; easier to debug too.

Speaking of debugging, the MicroBee has a self-test facility which allows you to check its internal workings. Press 'S' and RESET together, and your screen will show the MicroBee testing itself. As more peripherals are added this ability will become invaluable. More on that next month.

I'm going to take this opportunity to deliver a note of appreciation to the staff of Applied Technology up at Waitara. I've had occasion to ring them up and ask some pretty inane questions. They don't know who I am or where I'm from but I've always been treated with patience and courtesy - a rare occurrence in the commercial world. □

# your CP/M computer

By Bill Bolton

IT SEEMS last month's column really hit the spot with many of you, so here's a second helping — this time it's program backup and file maintenance utilities.

I can't stress enough the importance of backing-up the really important programs on disk. The most important of these are your original disk that you purchased for your system...CP/M, WordStar, MBASIC, and so on.

These disks are used once only — for copying! First of all, check to see if these disks are *write protected* before inserting them into your disk drive. Then get the *best* disks money can buy (this could be an article in itself), and make *two* copies of each disk.

After the copy operation, identify each disk with the labels supplied, but mark the labels with a felt-tip pen. No ball-points or pencils allowed if the label is already attached to the disk, as even a slight amount of pressure through the disk jacket will cause damage to the thin oxide coating of the disk itself.

Mark those disks as: master backup and working copy...date the working copy for future reference as to the approximate usage you will be giving it (my WordStar disk gets a lot of use so I 'retire' these overworked disks to the scratch pile after six months of heavy usage).

Also, DON'T use a rubber to change the information on labels...this tends to leave little particles of abrasive stuff floating around the inside of the disk jacket. Instead, peel-off the old label and stick on a new one, and don't paste a new label over the top of an old one...on some floppy disk drives, this changes the dimensional characteristic of the disk which may cause data to be recorded poorly. If you can't peel of the labels easily then you should complain *loudly* to your disk supplier!

Now, file the original disk away in a metal filing cabinet (or wherever you keep important documents). If you are using 20cm disks, Caringbah Sheet Metal in Sydney makes a dandy card file type cabinet which is ideal — I have three of them.

Preferably keep the original at a different site if you are using the computer in your business, or in a room at the opposite end of your home (figuring that only half your house may burn down!), and not somewhere where it may get extremes of temperature and so on. Remember what's on the back of the disk jacket as I mentioned last month.

Keep the master backup accessible, but also in a safe place (for example, another filing/disk cabinet), and finally



you can use your working copy for doing the things you bought your microcomputer for in the first place.

## Splat And Splat Again!

Why two copies? Well, consider this: you're working along late one evening, and *splat*, your disk gets clobbered. Hmmm, that was strange...so you grab your only available back-up disk and *splat* again. It's wiped out as well...ARRGH! Some weird hardware failure got both of them.

You get the point then. You still have your original to go back to, but *never* until you have fixed the hardware problem. Archive storage is a very important part of disaster prevention and recovery.

Diskettes are cheap in comparison to your initial investment (consider the cost of WordStar for instance) and also the hours of work that you put into developing and debugging your own software effort or database.

To help minimise your cost on software back-up, there is a nice package of public domain software called Squeeze and Un-squeeze (actually SQ.COM and USQ.COM). These two programs save as much as 45 percent disk space by (you guessed it) squeezing the files on your disk, to make room for more program storage space.

Written by Richard Greenlaw, you can find SQ, USQ, TYPESQ (type-out squeezed files) and a batch processing 'parameter list builder' called FLS.COM in the BDS 'C' User Group collection.

This is a good place to mention some additional CP/M compatible disk file maintenance utility programs that are in

the public domain, either in the CP/M User Group or SIG/M User collections:

**CRCK.COM** — Written by Keith Peterson, CRCK generates a list (and optional file CRCKLIST.CRC) of Cyclic Redundancy Check numbers for validation and verification of programs on disks.

You don't have to know the specific details of just what a CRC is, just that a unique set of numbers is generated for each file that you run CRCK on. The idea is that you generate the CRC numbers for the files on a disk when you put the disk away for archival storage (or send it through the mail or whatever).

When you want to use the files again (after many months or the tender care of the airport X-ray machine) you generate a new set of CRC numbers and compare them to the original set. If the programs are identical (that is, unchanged), the CRC numbers should match exactly. This is a really convenient way to confirm the program you are using is correct (matches the original) and has not been modified or damaged.

**DU.COM** — Written by Ward Christensen, DU (Disk Utility) is a great 'fixer-upper' for disks that have had the directory areas scrambled or programs inadvertently erased, even disks that you have done 'ERA \*.\*' to!

The features of this handy utility are too numerous to mention here, but this is absolutely a *must have* program for really good system maintenance and disaster recovery. However you can also easily create absolute havoc if you misuse this utility — definitely not one for the kiddies.

**FINDBAD.COM** — Originally written by Gene Cotton, this utility will find bad sectors on a disk, accumulating the group assignments that the bad sectors are in, and then write the bad group allocations to a CP/M directory as a file named [UNUSED].BAD.

Any attempt by CP/M to use these bad sectors is avoided because they are now allocated as any other CP/M file...nifty. This is an absolute must if you have a hard disk. Any floppy disks that have any bad sectors on them go straight into the rubbish bin!

All of these programs are fully compatible with any disk format using CP/M Version 2.2; 20 or 13cm, it doesn't matter. These programs (or very similar ones that I've customised for my own use) are part

of the standard programs that reside on my day-to-day work disk.

### Tidy Is Happy

If you have assembled your own microcomputer (either from scratch or in kit form), carefully examine the various interconnections of power supply wiring, cabling to peripheral devices (printers, disk drives, terminal and so on), for frayed wires, poor solder connections, and inadequate power handling capability — remember, as you add boards to your microcomputer system, the ability of the power supply to support all these cards may be limited by the voltage drop across the wires *trying* to get power to those boards!

The following example from the real world is for an S-100 system but I think the idea is plain enough. A crusty old IMSAI started out initially with six cards in it...then another, and another. Soon, most of the available 22 slot mother-board connectors were used up and the original power supply just couldn't hack it.

It was replaced with a heavy duty supply (25 Amp/+8 VDC!), but still couldn't get enough power into the mother-board because I used the original wiring. Finally the mother board was rewired with very heavy gauge wire. It was wired at both ends of the power distribution buss lines and used the shortest length wire path possible.

This will guarantee minimum voltage drop not only in the cabling to the mother-board, but minimise any voltage drop across the mother-board.

Also consider adding discharge resistors across the power supply +8 VDC filter capacitor. Why? Well, the filter capacitor is an excellent storage battery for a considerable time after power is turned off. It may take as much as a minute for this capacitor to discharge, and it's during this time you may yank or insert another card into the mother-board...*bang!*

My system has an 89 ohm 5 watt ceramic resistor across the +8V DC capacitor and 390 ohm 2 watt resistors across the +-16V DC capacitors. Sure they get hot but a little extra heat is a small price to pay for the extra safety.

Also, make sure *all* the fuses are rated for the power your system is using; there are few things more disconcerting than to see the printed circuit board power etch 'curled-up' on various boards in your system, because it was not fused or improperly fused.

And, finally, re-inspect this power wiring from time to time and look for nicks or cuts in the insulation. I've seen some magnificent pyrotechnic displays from frayed insulation — 25 amps at 8V is a reasonable approximation of an arc welder!

### Program Recovery

We are usually our own worst enemy when it comes to having problems with our microcomputers.

CP/M is a fairly friendly operating system, but at times, we can (and do) defile the bounds of decency, and clobber a disk or two...or three! Remember, save your original disk at all odds\* — that way there is always hope.

But there are always those really dumb times (usually provoked by the late hours) that can really bring out the office idiot in all of us. Like copying disks the wrong way round; putting the blank disk in the A: drive and the disk to be copied in the B: drive, and copying from A: to B:...ARGHH!

So, 'once bitten' and all that stuff. Some times you just have to learn the hard way. But let's not make too many excuses, there are those times you make a fatal error even when you are at your best.

The important thing to remember is, *don't panic*. Short of a fire inside the chassis, don't turn your system off if you need to recover work gently nestled within the RAM of your system. It's still there (usually) if you haven't had a 'brown-out' or lightning strike (and I told you how to avoid that last month!), and just needs to be cajoled out to a disk (or tape, or anywhere that it can be saved...).

So when is the worst time to get clobbered? Probably in the middle of a tedious session with the editor (ED, WordStar, Electric Pencil, whatever you use).

Alright, try this: re-boot your system (preferably with a known good disk), fire up DDT (or SID) and start dumping memory to the terminal while searching for your edited text — it's in there somewhere!

Note the beginning address of the text, then find the end of the text and note that also. Then use the DDT (or SID) 'H' command to get the sum and difference...and note the number of pages (256 bytes/page). Now, move the whole thing down to address 100 Hex with the 'M' command, exit (Control-C or G0) and SAVE the total number of pages that you noted. You may not save all of your work, but you may save most of it!

There are other ways to recover otherwise lost files. Got a bad drive? See if you can swap the unit select jumpers

(usually a DIP switch) to the good one. Be creative during these times...in fact, experiment ahead of time for those situations that *will* arise...

### RCPM News

CP/M User Group volumes 77 through 82 have arrived and are now available for down loading. SIG/M User Group volumes 43 through 71 have been ordered and should be here by the time you read this. (*It's worth noting here that the utilities mentioned above are also available on Bill's RCPM system — Ed*).

Recent additions to the local software collection include two major packages; an 'In Context Editor' written in PL/-80 by Paul Tilden and a 'Touch Typing Tutor' in MBASIC by Richard Berthet.

By now I've sent out a lot of sets of the connection notes. A few of you who asked for the notes have never appeared on the system and I'm intrigued to know why? Did the notes scare you off, did you have trouble connecting? Perhaps you could write me a note letting me know what the problem is?

If you haven't found out what micro-communications is all about yet send a large (A4) SSAE, for the 'RCPM Connection Notes, to:

Remote CP/M System, P.O. Box 80,  
Newport Beach, NSW, 2106

## Free readers' classifieds\*

**Atari 400:** 32K, with recorder, manuals, software. \$850. Phone (02) 683 3383.

**ZX81:** complete as new, with 16K RAM and \$100 worth of software. Only \$300 for quick sale. Phone (070) 61 3460.

**VIC:** software from \$15. Over 100 cassettes. List send SSAE to: 138 Kelvin Grove Road, Kelvin Grove, Brisbane, 4059.

**Super 80:** 16K sound, graphics, 9K BASIC ROM, case, S-100, manual, software and more. \$600. Ph (02) 605 7601 (after 4 pm).

**Wanted:** Commodore disk drive. 4032 software, utilities and adventures. Phone (03) 277 5089. Write 8 Pall Mall, 3149.

**For Sale:** 77 key Microswitch Keyboard less case but with diagrams and key table; extra caps included; inverted ASCII output \$40. Also SSM bare 16K ROM board with documentation \$15. Phone 709 3962 after 6pm. Ask for Norm.

By Shane Andersen



THE SLEEPING giant is now awake! As Promised, Texas Instruments, both here in Australia and in the rest of the world, has had a complete turn-around.

In fact, I understand that even TI in the States didn't realise, until a short time ago, just what an incredible thing it had created when it produced the 99/4 and 99/4A personal computers.

In just a two month period (February/March this year), more than 90,000 99/4 As were sold. The other computer manufacturers have been watching in amazement as TI finally got off its butt and decided to give total support to the home computer area.

With the introduction of the new peripheral expansion box, Mini Memory programmable ROM pack, Editor/Assembler, UCSD Pascal and the all-new TMS9918A video chip which will give our computer 3-D animation — and of course not forgetting that very powerful LOGO\*2 language — there is now no stopping those inventors of the micro-chip from producing constant brilliant new items for our 16 bit home computer.

As 99/4 A users are getting ready to receive many of these developments here in Australia, the user groups are growing in leaps and bounds. There are now groups in Brisbane, Sydney, Melbourne, Adelaide, Perth and Tassie, with a possible new group soon to start in Canberra.

In a recent article in this publication, I mentioned the National 99/4 Aussie Software Awards competition, which will close on the 10th of October. This will be the first real national event to take place within our user groups.

On the last weekend in August, coordinators from every group flew into Melbourne to conduct a national conference, to plan the 1983 Australian TI Jamboree, and discuss other vital issues relating to our network of groups. You'll see a report on the TI Jamboree printed shortly.

The user groups provide their members with discount buying at such places as Computer Wave and other retail outlets, print monthly magazines with world news and programming hints, have monthly get-togethers and offer free club software.

Every month, the group gives away five assorted programs, and with its huge library offers any authors an exchange — for every original program sent to the club, the 99/4 programmer can choose any four programs from the library.

Now let's try some programming hints...

### Number Crunching Accuracy

Evidently TI and Atari will do some arithmetic that Apple, TRS-80 and PET microcomputers will not. Try this program on your computer:

```
10 FOR A = 1 TO 100 STEP .1
20 PRINT A;
30 NEXT A
```

Your CRT should print in increments of

0.1 until 100 is printed. It seems incredible that the high priced computers miss some of the increments! Now let's take a look at the next program:

```
10 FOR A = 1 TO 100
20 IF SQ(A) <> INT(SQ(A)) THEN 40
30 PRINT A
40 NEXT A
```

You should get the following results: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100.

Believe it or not, TRS-80, Apple and PET will print out only six of the above perfect squares between 1 and 100. The above programs were printed in the April, 1982 issue of *Microcomputing*. This information came to me from the Washington Users' Group, credited to Carl Savillo Jr.

The next program will give our non-TI users a glimpse at how we can move a 'Sprite' (fast moving object) in any direction with the direction controlled by the joystick and speed by the fire button.

This program is designed so that two people can move the sprites with two joysticks. The program was sent to me by Jim Schwaller in the Cincinnati User Group:

```
100 CALL CLEAR :: CALL CHAR(96,RPTS("FFFFFFF",8))
:: CALL SPRITE(81,96,5,92,124) :: CALL
CHAR(104,RPTS("FFFFFFF",8)) :: CALL
SPRITE(82,104,7,92,124) :: CALL MAGNIFY(4)
110 CALL JOYST(1,A,B) :: CALL JOYST(2,C,D) ::
CALL KEY(1,F,G) :: CALL KEY(2,H,I) ::
J=J+9-1 :: K=K+9-1
120 IF J<0 THEN J=0 :: IF K<0 THEN K=0 ::
IF J>31 THEN J=31 :: IF K>31 THEN K=31
130 CALL MOTION(81,-(B*J),A*J) ::
CALL MOTION(82,-(B*K),C*K) :: GOTO 110
```

Two new programs have also just been released from the States; one is called *Tunnels of Doom*, and the other is *Parsec*, which is similar to the Atari *Caverns of Mars*.

They should be here shortly.

For further user group information, contact: Shane Andersen, National Coordinator, PO Box KX101, Kings Cross NSW 2011. □

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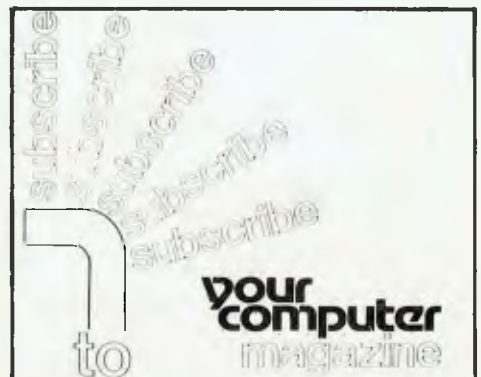
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11

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Standard Features	Char. per Inch	DP-8000A	DP-9500A	DP-9001A	DP-9501A	DP-9600A
Printing Speed (Char. per Sec.)	10	150	150	120	120	200
	12	180	180	—	—	120
	12.5	—	—	150	150	—
	13.3	200	200	—	—	—
	15	—	—	180	180	150
	16.4	—	—	200	200	164
	10	—	—	—	—	100
Enhanced Expanded Print (Double Width)	—	Yes	Yes	Yes	Yes	Yes
Dot Addressable Graphics (Dot/In., H/V)	80/72	60/72	75/72	75/72	72/72	72/72
Max. Line Width (In.)	8.0	13.2	8.0	13.2	13.2	—
Audible Alarm	—	Opt.	Opt.	Opt.	Opt.	Yes
Out-of-Paper Sense	Yes	Yes	Yes	Yes	Yes	Yes
Ribbon, Continuous Loop Cartridge (Yds)	30	30	30	30	30	—
Interfacing: Parallel Cent. Comp.	Yes	Yes	Yes	Yes	Yes	Yes
RS-232-C Serial	Yes	Yes	Yes	Yes	Yes	Yes

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