your computer

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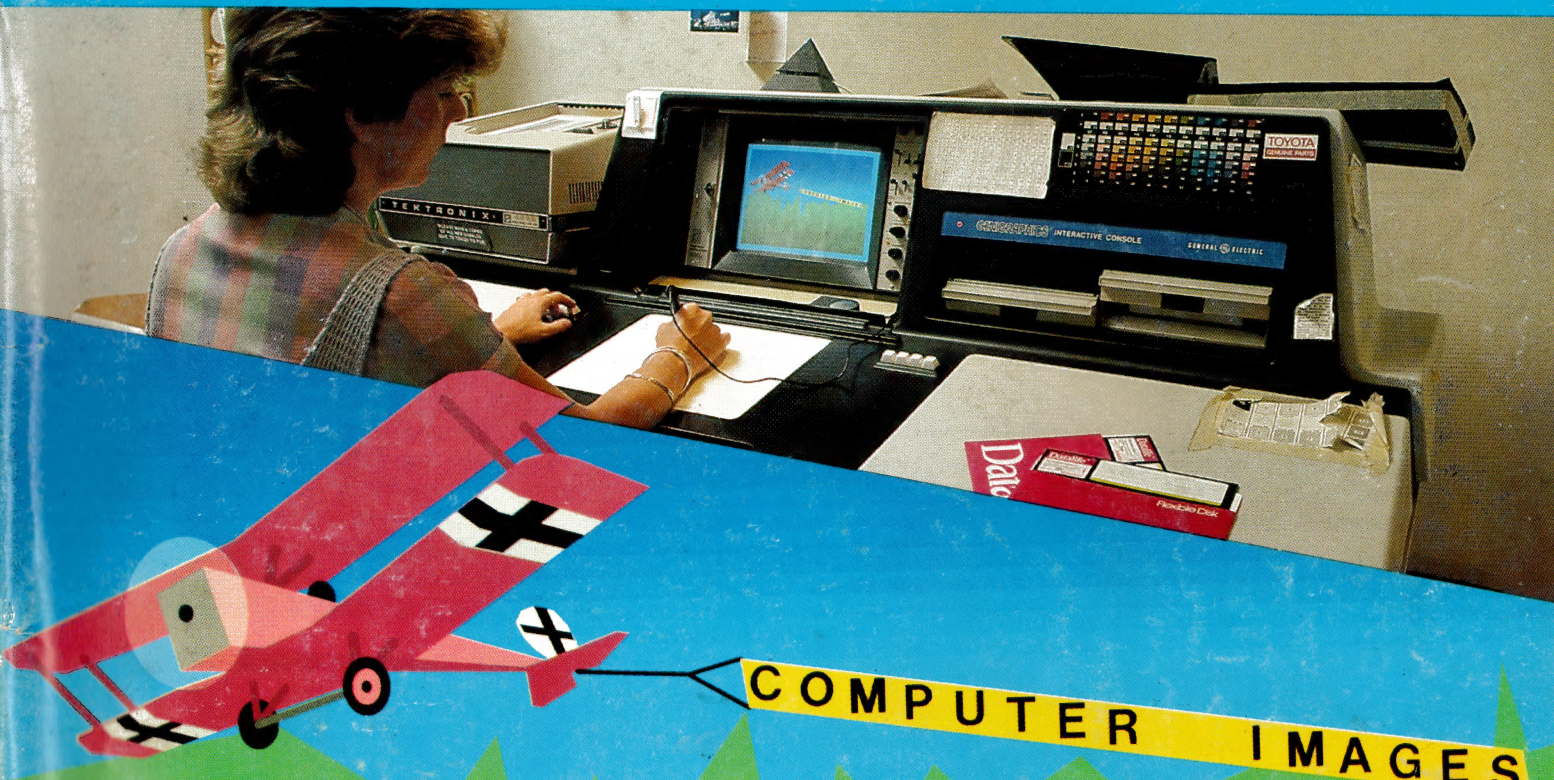

COMPUTER IMAGES

The Graphic Truth
— Graphics Systems Large and Small

C64 COMMUNICATIONS • POCKET PROGRAMS — 16 PAGES • POPULAR SYSTEMS COLUMNS

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The Archives PC provides powerful processing capabilities in a compact package designed to meet the most comprehensive needs of serious computer users.

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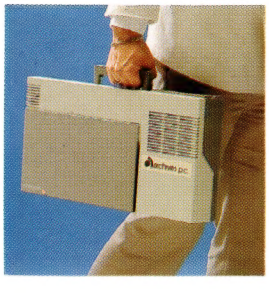

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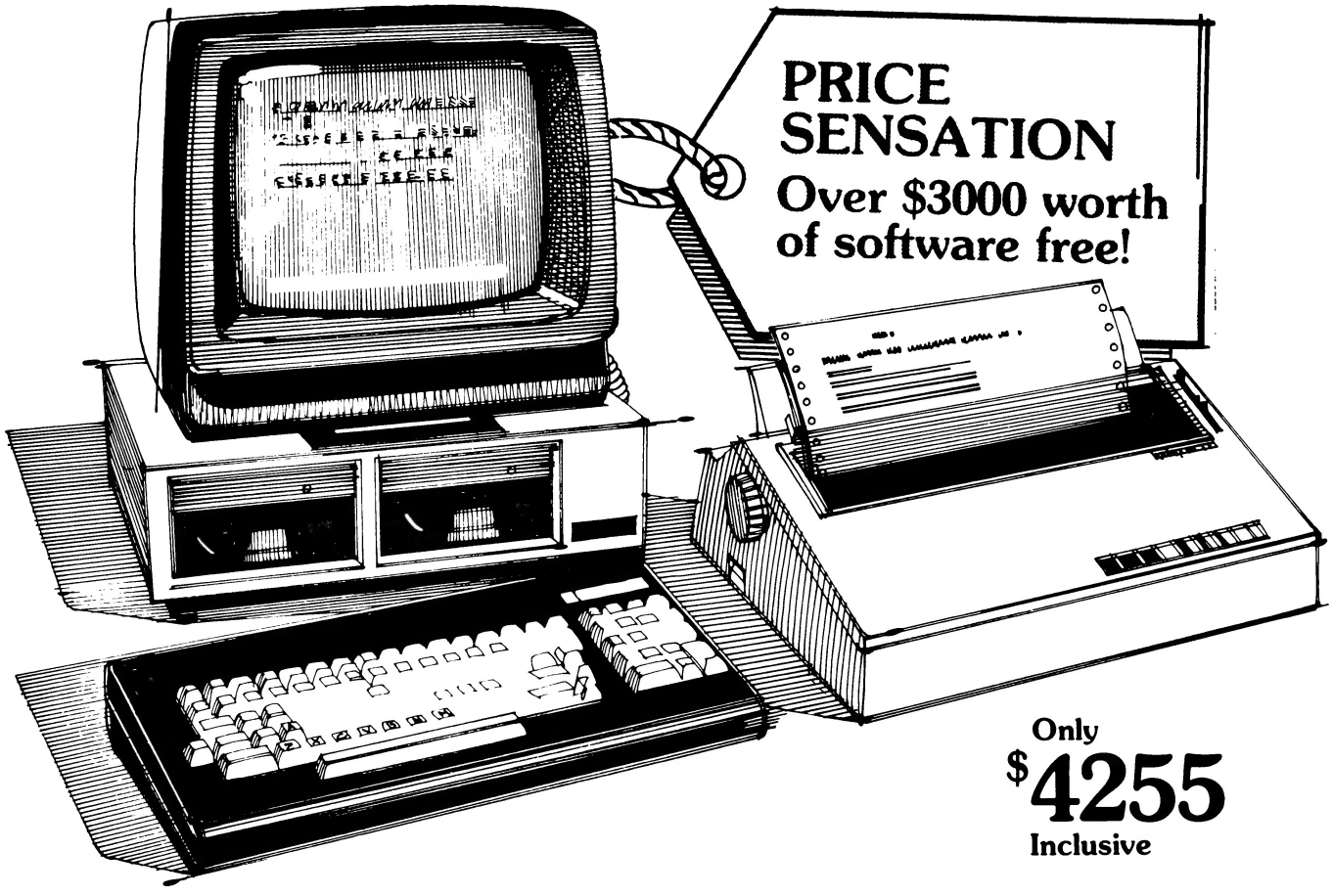

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Offer includes: • Dedicated word processing computer • 10 software applications and programs • Industry standard CP/M operating system • High quality, full feature visual display terminal • Letter quality printer • Installation and systems familiarisation • Easy to follow instruction driven user interface

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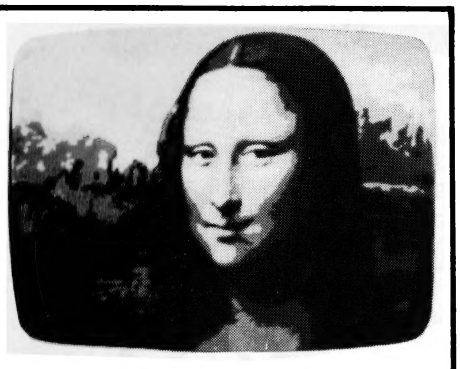
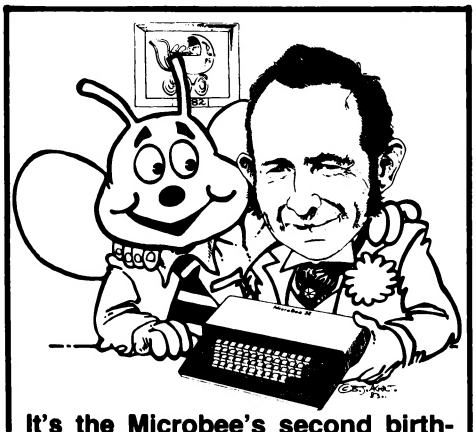
inside your computer



Computer graphics are the fastest-growing area in computing, both on micros and larger systems. Find out why, how, and all about the equipment.



It's the Microbee's second birthday, so we take a look at where this remarkable computer came from, and where it's going next.

Giant pocket programs special

Sixteen pages of great Pocket Programs!

Special

Vol. 3, No. 8. March, 1984

features

news

departments

next month

your computer MAGAZINE'S personal computer of the year

April *YC* is a really special issue – it's time for our 'Computer of the Year' award again, and this year there are two awards – for hardware and software released in 1983. The name of the winner will be a well-kept secret until presentation day, March 29, so the only way you'll find out who's the best this year is to buy the April issue!

Other features will include our regular bi-monthly issue of *Your Business Computer*, which will include a review of Digital Research's new Windowing CP/M and an account by Bill Bolton of what *really* happened to Osborne Computer Corp. We'll also continue our tutorial series on dBase, assembly and logic (if poor Mr Bell can surface from the Computer of the Year judging long enough to write them) – apologies again for their omission from this issue. And of course there'll be our usual reviews, news and columns on popular micros. Don't miss it!

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editorial

The software copyright issue continues to hold the attention of those in the industry, as the situation continues to decline. For the benefit of readers and advertisers, here is where ***Your Computer*** *stands on the matter.*

For a long time, we have described the act of copying software for distribution to others as piracy – a word which, to most of us, is comparatively weak in meaning and redolent of high-spirited shenanigans which are excusable. This has encouraged a dangerous situation.

The time has now come to call a spade a spade. Giving copies of software to people who should buy it is theft. It's that simple.

Software costs money to produce, as those who have written any well know. Developers of software for commercial sale are entitled to the just and fair rewards for their work. Copying software deprives them of their income.

It is merely a side-effect of the nature of software, and the media on which it is distributed, that software is able to be copied at all. Until the advent of the photocopier, literary works were protected by copyright mainly to protect authors against organisations making profit through deceitful practices. There was no problem with individuals copying works.

To argue that software should be free for all is simply ludicrous, as the result will be that no more software will be written. Some of the software available on the market involved up to fifty man-years of work – that is a lifetime's work for one man. Nobody – but nobody – is ever going to do that for nothing.

Therefore, we stand firmly against software theft. We want to see intellectual property rights – either through copyright or other mechanisms – restored to computer software, and we believe that when Parliament resumes, this is likely to happen.

Right now, we consider those who are copying software for distribution to others – at a profit – to be morally guilty of theft, and hope that the situation will soon be clarified so that they are also thieves in the legal sense.

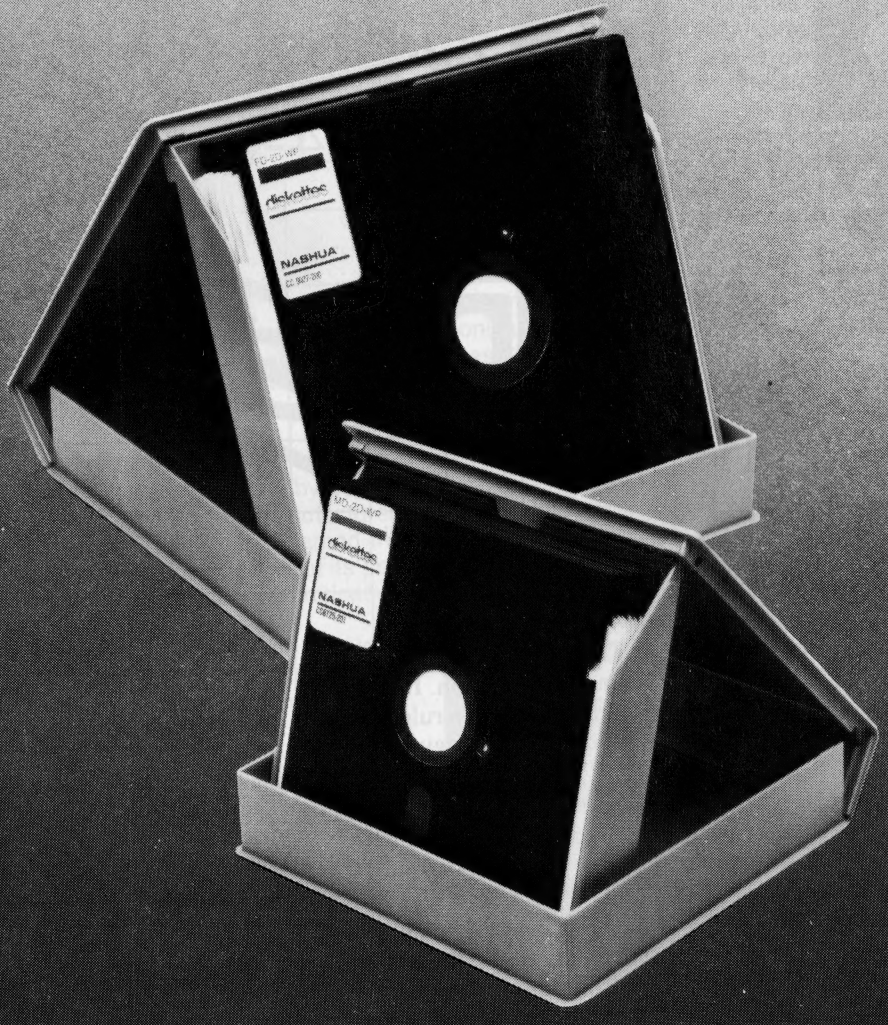
At the same time, we state that we are opposed to the copy-protection of software. Having purchased some software, the owner is entitled to put it to use without hindrance and with certain assurances as to the continued operation of the software. Magnetic disks wear out; the software is an entity separate from the medium on which it is sold, and so the owner must have every right to make back-up copies for his own use. This has been established in a case in the US.

To date, we have coped with this problem by simply refusing to buy copy-protected software (we haven't had to – one of the joys of CP/M!) – but neither have we given the manufacturers the ammunition they need to justify protection by cracking that protection or otherwise obtaining copies of the software. However, what others do is up to them; the US decision seems to lead the way in this area.

So our position is clear; morally, we feel the owner of software should be free to copy it for his own use, but giving away software to others is theft and should, in an ideal world, automatically invoke the fires of hell or worse. Legally, the rights of an owner need to be resolved, and for the time being software thieves are legally able to make hay – but remember, the haymaking season is followed by winter; in this case, a legislative freeze is on the way. Personally, we wouldn't object too strongly to retrospective legislation in this case.

— Les Bell

"Quality Circle" Diskettes



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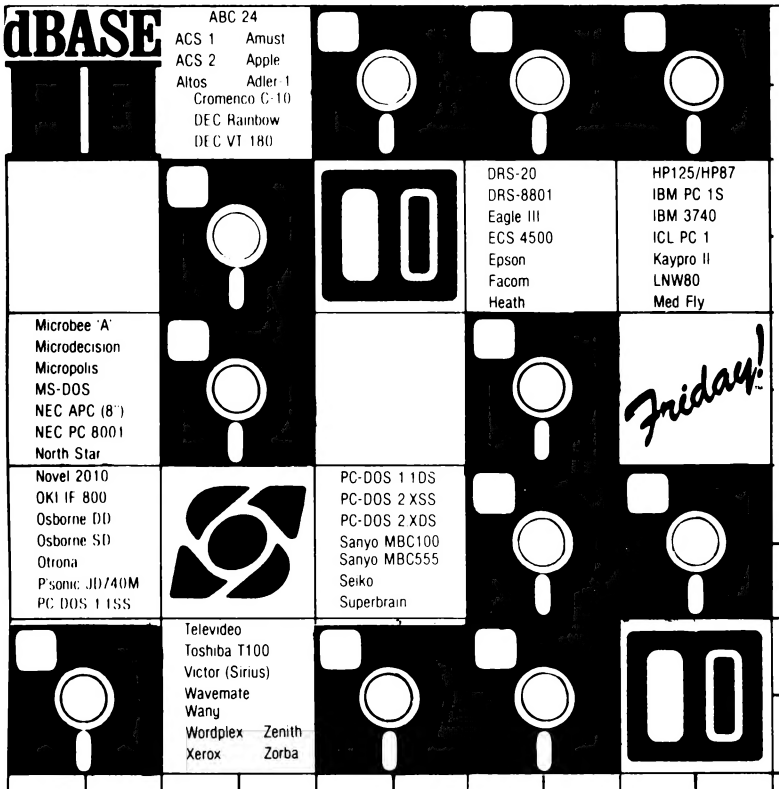

The 2nd Australian Personal Computer Show

Centrepoint Sydney

14-17 March 1984

See you There

Stay up-to-date

Concurrent CP/M from Digital Research allows you to work with your computer the way you think, switching rapidly from task to task. Up to four (4) programs can now be run simultaneously. Make your personal computer really work. Concurrent CP/M with windows.

Logo from Digital Research is the "hot button" in education. It is the learning language of the future. Students make their own rules, their own syntax. Your microworld is a space for ideas. Intrigued? See it, try it, use it.

GSX from Digital Research is currently the only device — independent graphics systems for personal computers. It is available for most 16 bit micro computer systems. GSX opens up graphics to the business world.

dBASE II from Ashton-Tate is the industry standard which everyone tries to copy. It is complex and extremely powerful, yet even the novice will feel comfortable. Many software houses are using it to write sophisticated packages for the business market. Endorsement in itself.

FRIDAY! from Ashton-Tate is another powerful information manager. Written in dBASE II, it is even easier to use, and is around half the price. The mailing system alone, justifies its use in many situations. FRIDAY! is the office assistant you've been looking for.

Get with the leaders

Contact Arcom Pacific for the name of your nearest dealer. Arcom Pacific are Australian Distributors for Digital Research, Ashton-Tate and other leading software companies. Arcom Pacific provide disk formats for over 50 different micros.

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your computer news

The Apricot — compact and stylish, it folds up into an easily-carried package.

Apricot – Into The 'Fourth Generation'

THE APRICOT COMPUTER, distributed in Australia by Barson Computers of Sinclair fame, is claimed by its manufacturer, Applied Computer Techniques of the UK, to have earned the title of 'Fourth Generation Computer' on the strength of its providing "an almost total shielding of the user from the intricacies of computer operating systems".

In other words, the first-time user of an Apricot is said to be able to switch on and get straight into the job in hand, without having to worry about the loading and operation of various levels of operating systems, languages and applications software.

The feature mainly responsible for this 'shielding' is the Apricot's microscreen, a two-line liquid crystal display on the top right-hand side of the keyboard, which is associated with six touch-sensitive function keys next to it. When first turned on, the microscreen displays the day, date and time, and this display can be returned to whenever desired.

However, the microscreen can also be used with the numeric keypad as a calculator, without necessitating exit from the program operating on the computer, and the results can be entered directly into the program running – extremely handy for spreadsheet calculations. The microscreen can also be used for direct data entry if the Apricot is being used 'in the field' without a monitor.

Using the function keys and the system utilities provided with the basic system, the microscreen can also be used to reprogram the entire keyboard, for example to turn Wordstar's two and three-character commands into simple one-keystroke ones by re-assigning the meanings of all the command and calculator keys. All the instructions and options available are displayed on the microscreen as the user works through the changes.

The Apricot's 23 cm (9 inch) monitor sits in a special groove on top of the system, and allows for full swivel and tilt facilities. There is a wide range of communications protocol emulations, and a modem with auto-dialler option is available.

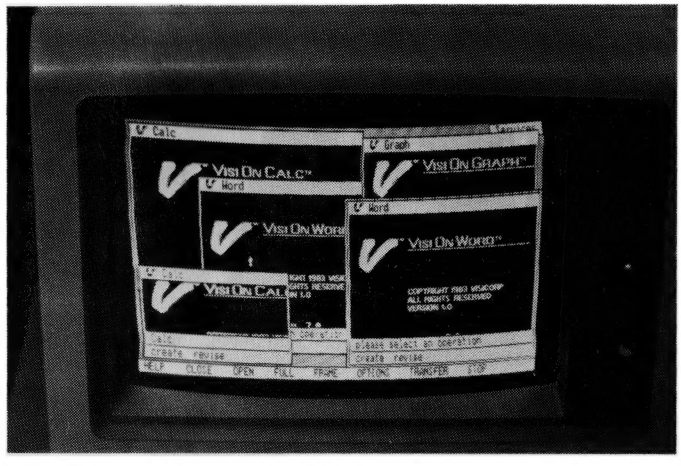
The standard system comes with CPU/keyboard unit, monitor and one microfloppy disk drive; a second disk drive is already built into the system, making expansion simple and possible without increasing the size of the system – an important consideration in this era where several manufacturers are fighting for domination of the 'desktop' computer area.

The Apricot runs three microprocessors: the 8086, the 8089 I/O processor, and optionally the 8087 maths processor. It comes with three operating systems – MS-DOS II, CP/M-86 Plus and Concurrent CP/M-86 – and the UCSD p-system, BOS and XENIX are all optionally available.

The Apricot is completely compatible with the Sirius (also manufactured by ACT), and is claimed to run 90 per cent of IBM-PC software using its IBM emulator. As well as the three operating systems, included in the price of the system are a full range of utilities, System Manager, Digital Research's GSX Graphics, asynchronous communications pack, print spooler, Supercalc and Superplanner. The utilities include a character font generator, disk copy routines and a keyboard table generator.

An enormous range of specially configured and third-party software is available for the Apricot, including all the most commonly used business packages, such as Wordstar, Mailmerge, dBase II and Delta.

The Apricot's recommended retail price is $4444; for more information contact Barson Computers, 335 Johnston St, Abbotsford 3067. (03) 419-3033. ❑



VisiOn on-screen, showing its various integrated packages.

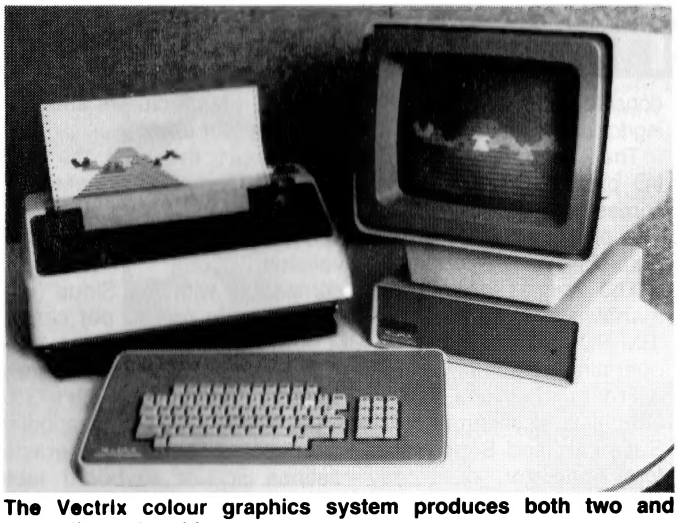
Middle-Management For Your Computer

THE LATEST release from VisiCorp is claimed to make computers do what you want, not what they want you to do. VisiOn is an integrated package with word processing, spreadsheet and graphics functions, and a high degree of data portability. The commands in each program are similar, so it is not necessary to learn a large number of them.

Support for the product includes Visicare (a software support service), Visitraining (classes to teach you how to use VisiOn more effectively), and the Visipress library with books for people from novices to experts. And, of course, VisiOn uses a mouse.

Retail prices start at $780 for the basic VisiOn Application Manager. Then you get Calc for $630, Word for $595 and Graph for $395. You can purchase packs for less: Pack A (On, Graph, Calc) costs $1395 and Pack B (On, Graph, Calc, Word) costs $1695.

For more information, contact Imagineering, 579 Harris Street, Ultimo 2007. Phone (02) 212 1411. ❑



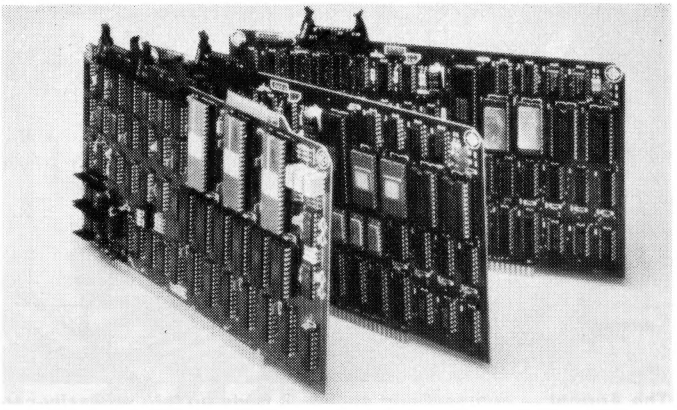
The Vectrix colour graphics system produces both two and three-dimensional images.

Vectrix Colour Graphics

THE VECTRIX colour graphics system for business and professional use has been released by Microprocessor Applications. Priced at under $10,000, it is a high-resolution product with both two- and three-dimensional capabilities. It has a wide variety of applications software, and is capable of video animation, low-cost business and presentation graphics, computer-aided instruction systems, medical image analysis and computer-aided design.

Vectrix features AUTOCAD, a two dimensional general purpose CAD system suitable for architectural and landscape drawings, mechanical, electrical and chemical drafting, structural and civil engineering, and electronic circuit design. There is also a device for attaching a Polaroid camera to produce 35 mm slides. Colour printers can be interfaced and there are 16.8 million colours to choose from. Screen resolution is 672 by 480 pixels.

For more information, contact Microprocessor Applications, 48 Rutland Road, Box Hill 3128. Phone (03) 890 0277. ❑



Microprism is made up of a set of GDC-512 graphics boards.

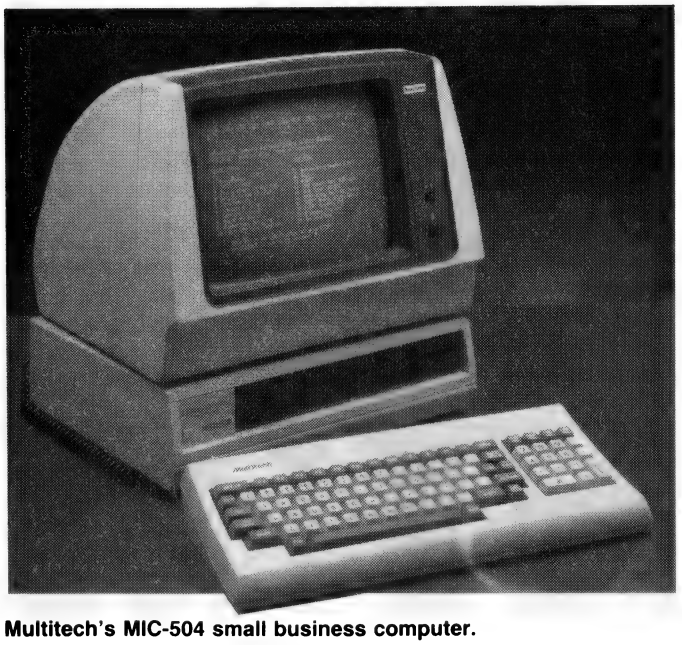
Cheaper Graphics

THERE IS A NEW, low-cost graphics system on the market. Called Microprism, it is a versatile multi-colour graphics system for S-100 bus computers. Similar to, but a little more sophisticated than the U.S. Michaelangelo cards, Microprism consists of a set of GDC-512 graphics boards connected through a

CMC-100 colour palette board, and appropriate software and firmware. It is claimed the Prism system can be used on any S-100 mainframe computer or any computer with an S-100 adapter.

The system's boards have on-board firmware which translates commands such as 'draw vector' to be performed by the on-board computer. The graphics are then displayed in a 512 by 490 pixel resolution format on a standard video monitor. A full eight-colour card system can choose and display 256 colours out of a palette of more than 16 million colours. A two-board system can display four colours, four boards can display 16, and so on.

The boards are priced at $825 each, for the GDC-512 and the CMC-100. Therefore, a typical eight-colour system would cost $3,300 (excluding tax). The colour system is available from SME Systems at 22 Queen Street, Mitcham 3132, or its interstate distributors. Phone (03) 429 2977. ❑



Multitech's MIC-504 small business computer.

Small Business Computer

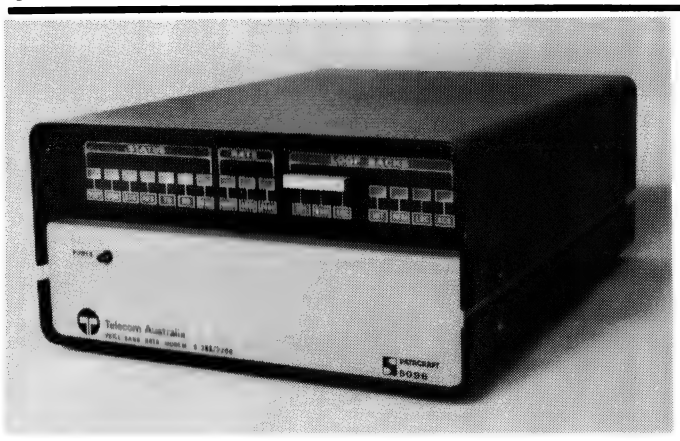
MULTITECH has entered the small business computer market with the introduction of the MIC-500 series of computers.

The MIC-504 is described as being particularly suited to the Australian market and to business users who are "not computer experts". A single board Z-80A-based computer, it incorporates two 13 cm double-sided, double-density floppy disk drives which provide two megabytes of storage; two full duplex RS-232 serial ports with baud rates programmable from 110 baud to 19.2 kilobaud; and one parallel port with a Centronics interface.

The MIC-504 also has 64K of RAM and 4K of ROM for bootstrapping and firmware debugging. A 4 MHz clock rate is said to enable programs to run in half the time of conventional microcomputers.

A productivity software package, produced by the Structured Systems Group, is offered with the MIC-504. It includes Word Right (a word processor), Spell Right (a user expandable 20,000-word dictionary), Magic Worksheet (a spreadsheet system), Qsort (a sorting utility), Analyst (a database management system with report writing) and NAD (a name and address file and Word Right merge).

For further information, contact Emona Computers, CBC Bank Building, Suite 204/661 George Street, Sydney 2000. Phone (02) 212 4815. ❑



Datacraft's 5096 Modem

DATACRAFT recently won contracts worth a total of $7.5 million with Telecom Australia for its Australian designed and built high-speed data modem, the 5096.

While a trend is emerging in local industry to spend less on research and development, Datacraft's 5096 is said to reflect the company's intention to spend a greater proportion of its revenue on these activities every year.

The 5096 modem is designed to be a single, economical replacement for three separate modems operating with specific performance ranges, currently in wide use around the world.

It is claimed the modem can automatically adjust its electronic signals to suit different conditions in telephone circuits, thereby making the product suitable for applications ranging from small, in-house operations to data transfers across international circuits.

For further information, contact Adrian Wescott (03) 726 9911. ❑

New Eagle Computers

ASIA/PACIFIC TECHNOLOGY MARKETING has introduced the Eagle PC Plus and the Eagle Spirit to the Australian market.

The systems will be marketed through retail computer stores, business equipment suppliers and systems houses.

The new Eagle models offer what is said to be an enhanced IBM keyboard with 84 keys, ten function keys and a ten-key numeric pad. They are powered by a 16-bit Intel 8088 microprocessor and feature slimline 13 cm floppies and Winchester hard disk drives. The machines' standard 128K RAM is expandable to 640K on the main CPU board, without the need for adding printed circuit boards.

For further information, contact Asia/Pacific Technology Marketing on (02) 929 8455. ❑

A Different Kind Of Rodent

WHAT IS A RABBIT? How many of you said it was a cartridge that speeds up the transfer of data to and from the Commodore Datassette recorder?

The Rabbit is a stored program which uses about one fifth the length of tape used in the normal Commodore mode. Ordinary link-up of the Rabbit does not eliminate the use of the Datassette in the normal Commodore Load, Save and Verify modes. The Rabbit adds its own commands to those of the Commodore.

The Rabbit can also append a program to one already in the computer's memory provided there is no duplication of line numbers in the two programs, can test computer memory and is well documented. It retails for $75.

For more information on the Rabbit, contact Jikes Electronics, 97 Denmark Street, Kew 3101. Phone (03) 861 6986❑

Sendata 2000 Direct-Connect Modem

COMMUNICATIONS ENTHUSIASTS will be pleased to know that Sendata Communications has expanded its range of direct-connect modems to include the multi-purpose, high performance Sendata 2000.

The 2000's features include automatic answer and disconnect, selectable speeds (75, 300, 600, 1200 bps) and selectable CCITT or Bell transmissions. The direct-connect modems have functions which can be provided on cards for incorporation into individual units, such as terminals or computers. The Sendata BG modem cards are in such current use and include an autodialling function.

The Sendata 2000 has Telecom approval No. C83/37/1068 and carries a twelve-month warranty.

For further information, contact Electro Medical Engineering, 69 Sutherland Road, Armadale 3143. ❑

WP And Business Accounting Packs

ARCHIVES AUSTRALIA has released two new total system packages, one dedicated to word processing and another designed specifically for business accounting.

Both packages are said to include the full range of software likely to be needed by the buyer and all the hardware to make it run. Both are selling for under $5,000 (including tax).

The word processing package is based on the Morrow microcomputer and includes a Freedom terminal (screen and keyboard) and a Brother daisywheel printer.

It is a dedicated WP system and is said to be easy to use and fast, while maintaining the flexibility to be used for other computer applications.

Software for the package includes Wordstar word processing, and Correctit, a spelling checker. A main feature of the system is a utility called Smartkey, which allows all commands to be allocated to the dedicated keys. The user may also re-set the keys to include a whole string of commands for, say, the formatting of a much used report.

Other software in the pack includes Personal Pearl (a database manager), Logicalc (a financial planner spreadsheet) and three languages (Microsoft BASIC 80, BASIC and an educational language called Pilot). Modem 7 communications software, which allows direct phone line access, completes the package.

The second system, the Archives PC Business Pack, sells for $4995 (including tax) and is said to have all the ingredients to enable a business to go directly onto computer for all its accounting. The system also includes word processing, financial planning and database software.

For more information on these two packages, contact Archives, 163 Clarendon Street, South Melbourne 3205. Phone (03) 699 8377. ❑

Graphics Package And More From Microcomp

BS MICROCOMP has released Graftalk, a graphics package developed for the IBM-PC. The package was developed over a number of years and incorporates some features not available on other microcomputer-based graphics software.

Graftalk boasts an easy to use command structure. Commands may be issued from the keyboard, strung together in disk files for repetitive tasks, or via Graftalk's own menu-driven system for novice users. It can use information in a wide variety of formats for data and graphics, and it has a comprehensive help file. There is also an integrated mini-spreadsheet, to allow for adjustment of data within Graftalk.

Graftalk costs $630, including sales tax.

Another release from BS Microcomp is a software package that allows the IBM-PC to be used as a Burroughs TD830 terminal. The package, called Handshake, has been developed by the Californian Burroughs systems house, Masterlink. Handshake is a complete implementation of a Burroughs TD830 or MT983.

BS Microcomp has also developed an implementation of Ethernet for the IBM-PC. The package is a combination of hardware and software collectively known as EtherSeries. It was developed by 3Com Corporation of Mountain View, California. 3Com was founded by Bob Metcalfe, one of the co-inventors of Ethernet, who is now the company's chairman. EtherSeries is said to incorporate Metcalfe's five criteria for a successful network. These are: plenty of applications software, a low connection cost, ease of installation, high performance and multi-vendor compatibility.

For further information on these packages, contact BS Microcomp, 561 Bourke Street, Melbourne 3000. Phone (03) 614 1433. ❑

Sydney-Style Touch-Typing For The US

TYPEQUICK, a microcomputer program developed in Sydney to teach business people to touch-type, has been launched on the US market.

Noel McIntosh of AID Systems visited the States in October and showed the course of ten lessons to major software distributors, who were impressed with its capabilities.

Typequick employs a new speed forcing technique which has proved to be highly successful. It is also uncommon in its ability to run under all major operating systems used by business micros – MS DOS, PC DOS, CP/M and CP/M86. The program is recommended for several computers, including DEC, Hitachi, NEC, Toshiba, Sanyo, Sirius, JB3000, Wang, Televideo and Sharp.

For further information, contact Noel McIntosh on (02) 498 7428. ❑

Kids' Computer Camp

THE SOUTH EAST Computer Enthusiasts' Group is organising its first computer camp, to be held in the south east of South Australia on the 24th and 25th of March.

Children from seven years of age are welcome to attend and a special invitation is extended to girls and handicapped people. Parents of handicapped children are invited to ring the club to discuss attendance. Adults with computers and a desire to help youngsters gain computer skills are welcome to attend as supervisors.

The cost of the camp is $5 plus food, and $4 plus food for club members and helpers. A registration fee of $2 (part of the final fee) and a 30 cent stamp should be sent to Glenn Mibus, 3 Millard Street, Mount Gambier 5290. Phone (087) 25 1046 to effect booking. The camp will be held at the Karnkendi Conference Centre, Nelson, Victoria. ❑

News From Burroughs

TARZAN, Edgar Rice Burroughs' fictional hero, made him one of the century's best selling authors. Burroughs Limited claims no relationship to Edgar or his macho mate on the vine, but has released an education software system called the Author, which it believes will also be a best seller in the field.

According to a Burroughs spokesperson, "The Author is an authoring system and not a programming language. A computer novice can begin producing courseware after only a few hours study."

Designed for use on the Burroughs B20 computer, the Author turns the B20 into a personal teacher to meet a variety of educational and training needs. The designer can author an unlimited number of lessons on any topic, with over 1000 frames available for each lesson package.

Burroughs has also announced an Australian-designed system which it believes will significantly cut school administration costs and free more teacher time for student interaction.

The system, Computer Based Administration System for Schools (CBASS), performs all the major administrative tasks involved in running a school or college. Student admissions, class timetabling, maintenance of assessment and examination records, and fee management are a few of the system's capabilities. Designed to run on a Burroughs B20 with one workstation, the package can be upgraded to allow for up to 17 workstations.

Finally, Burroughs ET 1100 workstation received high marks in ergonomic tests recently completed by Professor Etienne Grandjean of the Institute for Hygiene and Ergonomics in Zurich, Switzerland.

Ergonomics is the study of how humans relate physically with the machines they use in their work.

In a letter to Burroughs, Professor Grandjean said, "I am very happy to tell you that the tested model ET 1100 is, from an ergonomic standpoint, a perfect terminal."

Burroughs currently has 600 ET 1100 terminals installed in Australia.

For further information, contact Jana Pearce on (02) 46 5451. ❑

Cheaper and New From Ozi Soft

DUE TO increased sales of Vic-20 Computers and of Vic-20 software, Ozi Soft has announced price cuts on its entire range of Vic-20 software. Some packages have been reduced to as little as $9.95.

Ozi Soft has also announced three new business packages from Southern Solutions for the Commodore 64. These fill a gap in the accounts payable, accounts receivable and general ledger accounting areas, and it is believed they will pave the way for Commodore 64 owners to turn their computers into inexpensive business systems.

Also for the Commodore 64 is Insta-Write, a word processor and information management package. Insta-Write acts as the integrating package between Insta-Mail (a mailing list) and Insta-File (a powerful database). The total package is available on cassette or disk, and as a special offer the disk version comes with a complimentary financial spreadsheet.

For further information, contact Ozi Soft, 50 Clarence Street, Sydney 2000. Phone (02) 29 6330. ❑

1984 Business Efficiency Fair

OFFICE EQUIPMENT valued around five million dollars will be on display at the 1984 Business Efficiency Fair. The Fair is to be held at the Sydney Showground, from March 19 to 23, between 10 am and 6 pm, and until 9pm on Wednesday.

The Fair will be the largest exhibition of office equipment ever staged in Australia.

Equipment, including the most sophisticated office computers, typewriters and word processors, will clearly demonstrate the direction business is taking towards the paperless office.

For more information, contact Business Efficiency Fair, 167 Dowling Street, Woolloomooloo 2011. Phone (02) 356 4270. ❑

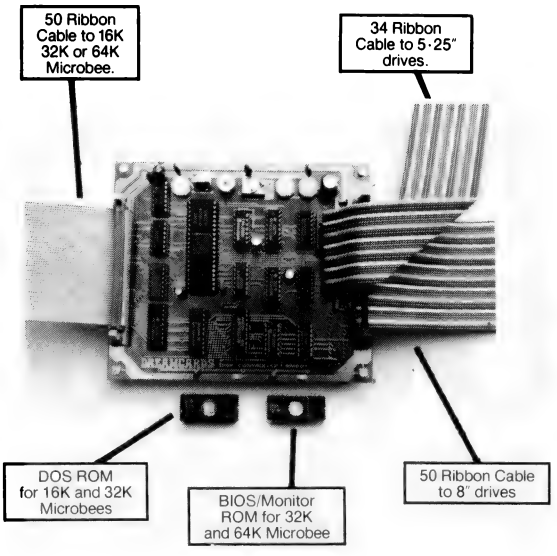
1984 Personal Computer Conference

THE AUSTRALIAN COMPUTER SOCIETY will run its 1984 Personal Computer Conference in conjunction with the 2nd Australian Personal Computer Show. The Conference will be held in Sydney, at the Masonic Centre, from March 14 to 16.

Heading the list of speakers is Microsoft's Bill Gates. Among other subjects, the Conference will take a close look at software. Enquiries should be directed to George Walker (02) 233 2079. ❑

SHIFT YOUR MICROBEE INTO HYPERDRIVE WITH DREAMCARDS LOW-COST "DREAMDISK CONTROLLER"

$299.00 inc. tax



NO OTHER disk system can match the quality, versatility, performance and sheer value for money of our DREAMDISK! Some of the features offered by the "DREAMDISK" are:

1. Runs on 16K, 32K and 64K Microbees. A versatile operating system ROM is plugged into 16 or 32K Bees to give full access to the disc system, whilst retaining all existing cassette options. You can later easily upgrade to a full 64K system with our memory upgrade at a very reasonable cost. BIOS/Monitor ROM also comes standard to run CP/M on the 32K and 64K machines (CP/M optional extra).
2. Handles up to 4 drives; 8", 5 · 25" or mixed (with connections on board for both). Plug in the drives and away you go—it's as simple as that. Single or Double sided, Single or Double density, giving capacities from 96K to a massive 1 · 6Meg.
3. Shugart compatible controller board can handle drives such as Teac, Mitsubishi, Sony, Hitachi, M.P.I., etc.
4. Under CP/M it's the only system compatible with Applied Technology, Kaypro, Xerox, TRS-80, and Osborne disks (thereby giving you access to 1000's of pieces of software).

CIRCUIT BOARD, DOS, BIOS, AND MANUAL FULLY ASSEMBLED & TESTED $299.00 INC. TAX

Complete Single Drive Unit $699.00 inc. tax
and Dual Drive Unit $999.00 inc. tax

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PROGRAMMERS WANTED! TOP RATES PAID!
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G-PASCAL

for the Commodore 64

Fully supports the Commodore 64's graphic and sound effects capabilities in a self-contained, easy-to-use programming package. Available on disk or cassette for $79.50. Disk version includes free demonstration program and arcade game, written in G-Pascal.

Other G-Pascal programs available on disk or cassette (source code supplied):

- Sprite Editor – makes editing of sprite shapes easy! – $25
- Sound Editor – allows you to experiment with the SID chip! – $25
- Adventure Game – see how to write an adventure in Pascal! – $29.50

G-Pascal owners who return their Warranty/Registration Card receive two FREE copies of 'G-Pascal News' – the newsletter with hints, suggestions and programs in G-Pascal.

See your dealer today, or send a cheque, money order or Bankcard/Mastercard number to:

Gambit Games
P.O. Box 124, Ivanhoe, Victoria 3079
Phone: (03) 497 1283.

bankcard

PHEW! WAR AND PEACE IN FOUR HOURS FLAT!!

The new PI is an extraordinary machine. It is essentially an 18 pin, dot matrix printer, designed for use where multi-mode printing is required.

This makes it perfect for personal computers, OEMS, systems integrators and end users who require high-speed output and high quality at the same time.

And it can print!

180 single characters per second! 36 words a second.

With international character sets, original and two copies printing capability and the famous NEC reliability that has rapidly become the industry standard of comparison.

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The very fast, very new Pinwriter.

To find out more about the remarkable NEC Pinwriter P1 phone Sydney (02) 438 3544, Melbourne (03) 267 5599 or write to NEC Information Systems (Aust), 99 Nicholson Street, St. Leonards, NSW 2065.

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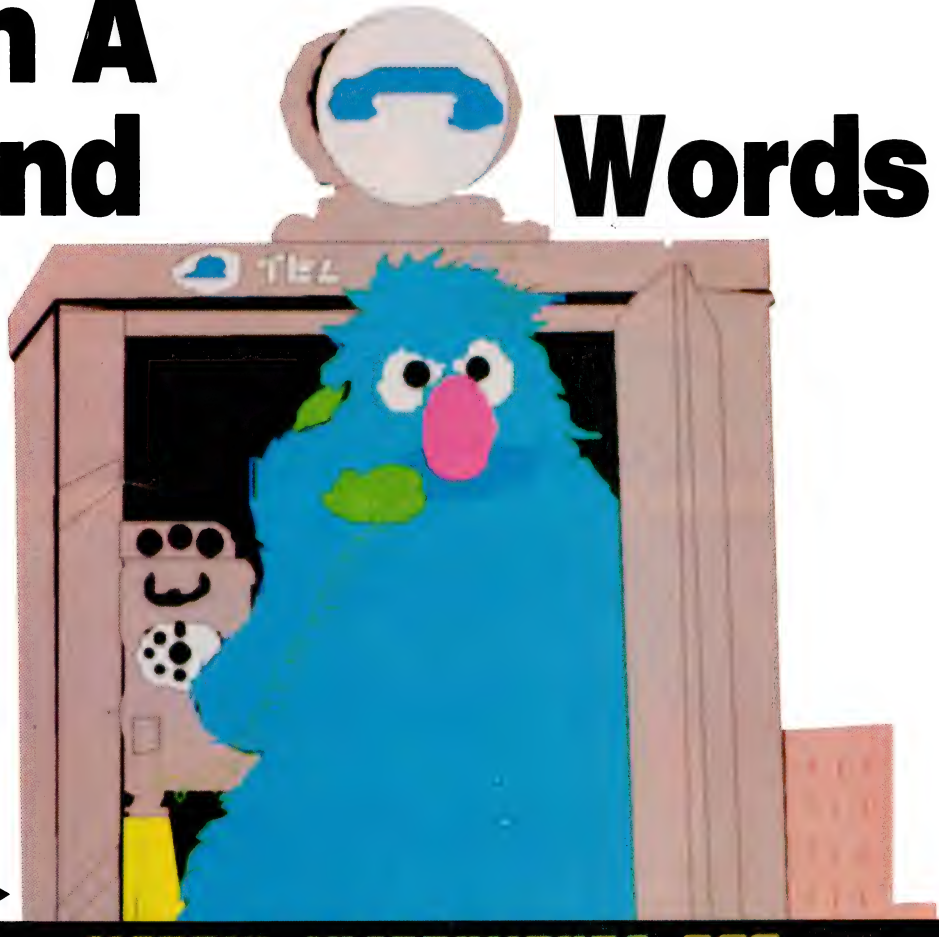
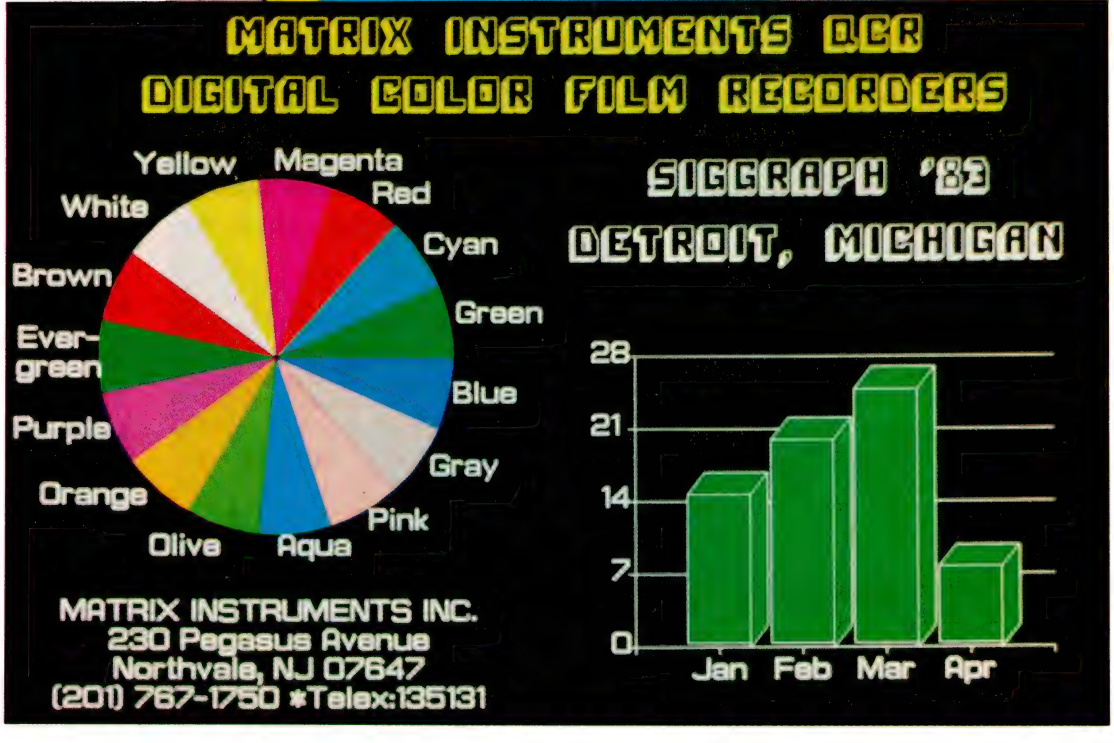
Graphics — A Picture is Worth A Thousand Words

We're all aware of the recent boom in computer graphics, but may be a little in the dark about both the reasons for this boom and the equipment needed to produce all those lovely computer pictures. Robyn Hughes, editor of Graphics Technology magazine, sheds some light on the topic.

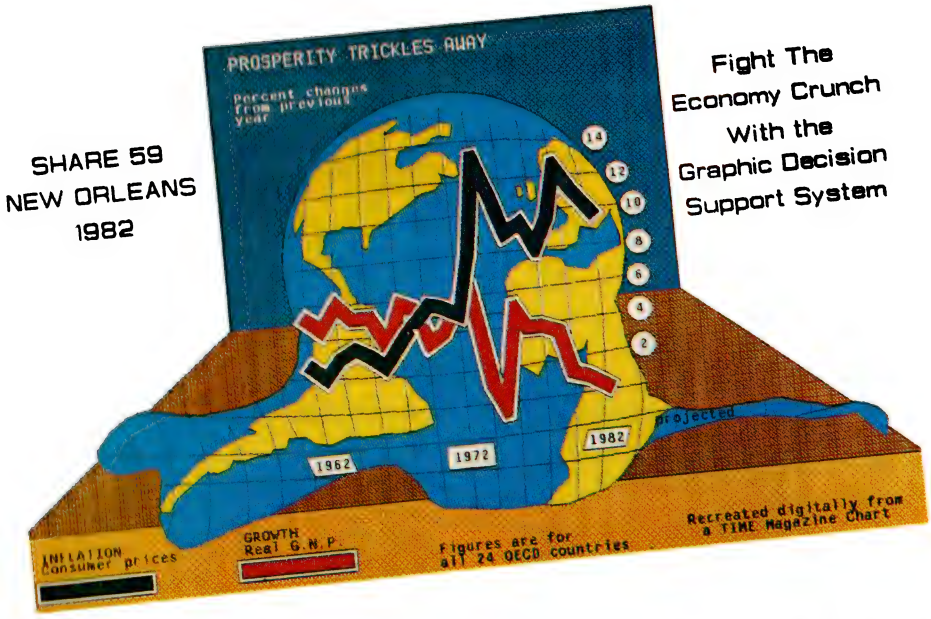
MEDICAL AUTHORITIES have been alarmed by a new disease which is appearing in their case books with increasing frequency. It is called 'printout-itis', and thorough investigation of this new phenomenon by government agencies has traced its origins to the practice, in today's business world, of people being forced to plough their way through pages and pages of computer printout.

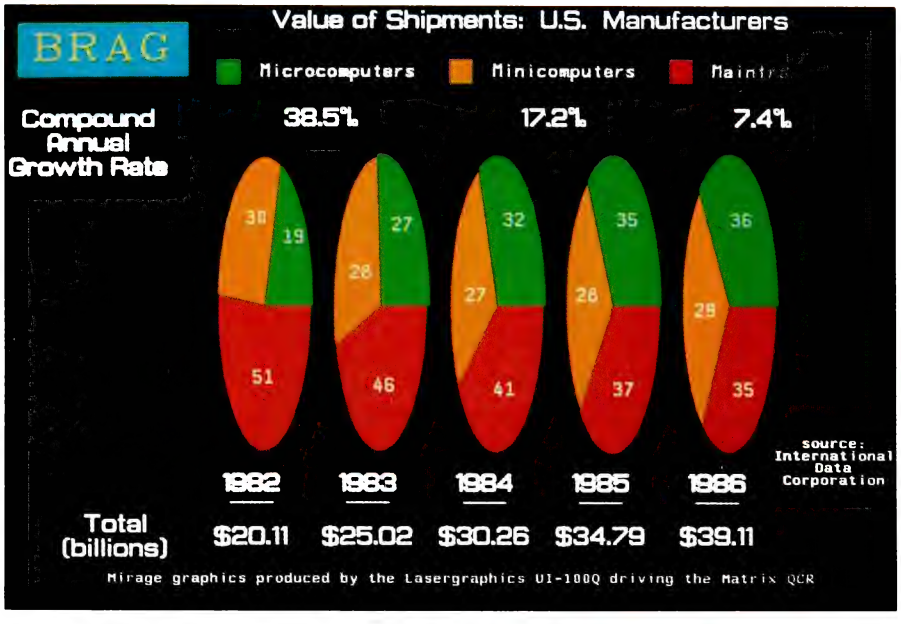
The symptoms first appear as a multitude of tiny dots constantly floating in ▶





Graphics produced by the Mirage graphics package, marketed by Dimension Graphics; not all the images are necessarily business-oriented!





Two examples of graphics produced by the Mirage business graphics package, marketed by Dimension Graphics.

front of the eyes of the sufferer, whose condition deteriorates rapidly until he or she is observed to be in a permanently confused state, and unable to make even the simplest decision, at which time he or she has to be forcibly transferred to the parks and gardens department or anywhere else where they will not come into contact with computerised material.

However, at a recent press conference, it was announced that a cure had been discovered for this disease, which had threatened to eliminate up to 95 per cent of Australia's white collar workforce, and was also showing signs of spreading to our children through the growing popularity of home computers.

The cure is simple, and easily digested. It is called 'computer graphics' and is a painless process which eliminates the use of computer printout instantly by replacing it with 'pictures' – no more dots in front of the eyes, no more pages and pages of paper to wade through, and, best of all, the ability to assimilate the graphical information at a glance and therefore speed up the decision-making process.

Computer graphics is one of the fastest growing areas of the computer industry. In one form or another, it can be used to increase productivity in virtually every field of industry and commerce.

The term 'computer graphics' spans an enormous range of activities, from the production of simple bar and pie charts used for decision-making in business, through computer-aided design and manufacturing, to full-blown real-time on-screen animation. It also includes such diverse fields as medical imaging, mapping, mining exploration, and the processing of information transmitted to earth by satellites.

Personal Graphics

Probably the most widely used form of computer graphics at present is the home video game, which is reaching a high degree of sophistication and gives the user the ability to interact easily with the screen – an ability which, surprisingly enough, is still not perfected on many of the more expensive graphics machines available on the market.

A very high proportion of our population has come into contact with, or actually played with, computer games, either at the profusion of video machine arcades which have sprung up all around the country, or by purchasing a machine to run games on the home television set. Widespread use of these games is the first step in the acceptance of computer graphics as a normal part of everyday life.

Also on the home front is the emergence of videotex services, which enable the consumer to dial up information for display on the television screen.

The consumer can take advantage of a wide range of services such as ordering goods, booking a particular seat in a theatre from a plan shown on the screen, and making travel arrangements. The services are shown on TV screen in the form of a 'video catalogue', with both graphic and alphanumerical information.

Business Graphics

In the business community, computer graphics is an invaluable aid in the process of disseminating information in an easily understood form.

The average business person has a totally impossible amount of written information arrive on the desk each day:

sales reports, stock reports, staff reports, management reports, subsidiary reports, projected sales estimates, sales comparisons, and so on, and so on. To make efficient decisions, he or she must be able to read and assimilate all this information in as short a time as possible. If it is presented in the form of pre-prepared graphical information, instead of in alphanumeric format, the ability to assimilate the information and thus produce quick decisions is greatly enhanced.

Business graphics can be produced from existing information stored in a company's mainframe or minicomputer database, and manipulated by means of graphic software and a display terminal or personal computer connected to the mainframe, or from a stand-alone PC or microcomputer system with its own database and suitable software.

If needed, some form of unit can be connected for the production of hard copy, slides or overhead transparencies for presentation purposes.

A growing use of computer graphics is in decision support, which is used by managers to produce images just for information purposes, not for presentation. A manager can quickly pull up on the screen hundreds of different images from information already in the computer for applications such as financial planning and forecasting. He or she can examine different approaches to a problem without having to produce hard copy.

Hardware

For a business person to produce graphical output from information in a database, three basic pieces of equipment are needed: a screen, a hard copy device, and software which can translate information into graphic format.

The screen may be part of a stand-alone micro or personal computer system, or it may be a terminal attached to the company's mainframe.

Several types of screen technology are available, with the most acceptable for business purposes being the *raster screen* (see box, 'Computer Images – Digital Art' article), as it is easily extended to colour. A screen resolution of 600 by 400 *pixels* (picture elements) is needed to produce reasonable-quality business graphics for display purposes, and this can be found on most of the medium-priced microcomputers.

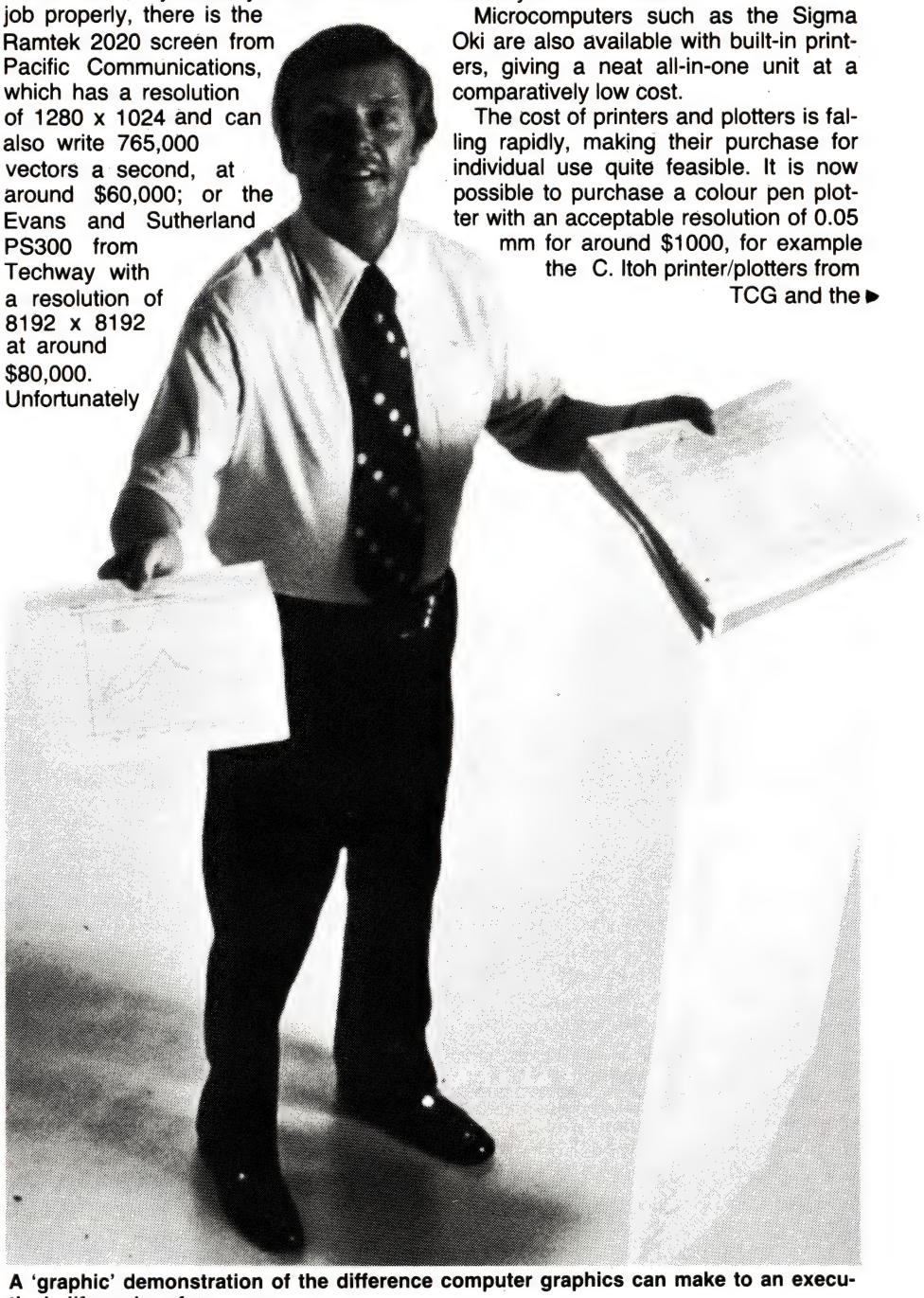
The newest Sigma Oki, Model 30, for example, has a screen resolution of 640 x 400, and can display eight colours simultaneously; the Sanyo Data Systems' MBC 1200 and 1250 both have a resolution of 640 x 400; Digital Equipment Corporation's Professional 350 personal computer has 960 x 240; and the C. Itoh 414 and 4207 from Digital Electronics have 640 x 480. All are well under $10,000. And for around $10,000 you can get the Seiko GR-1104 from TCG, with a resolution of 1024 x 780, or the Intecolor VHR 19 from Anderson Digital Equipment with a resolution of 1000 x 922.

Of course, if you really want to do the job properly, there is the Ramtek 2020 screen from Pacific Communications, which has a resolution of 1280 x 1024 and can also write 765,000 vectors a second, at around $60,000; or the Evans and Sutherland PS300 from Techway with a resolution of 8192 x 8192 at around $80,000. Unfortunately both need a rather large mainframe processor to run them, but, as well as producing your pie charts, you could also have a lot of fun with their real-time animation capabilities.

The hard copy unit can take the form of a printer, plotter or other device such as a camera to shoot photographs directly off the screen, or a film recorder which is interfaced directly to the host computer and produces graphical output of a much higher resolution than is possible by other methods.

Microcomputers such as the Sigma Oki are also available with built-in printers, giving a neat all-in-one unit at a comparatively low cost.

The cost of printers and plotters is falling rapidly, making their purchase for individual use quite feasible. It is now possible to purchase a colour pen plotter with an acceptable resolution of 0.05 mm for around $1000, for example the C. Itoh printer/plotters from TCG and the ▶



A 'graphic' demonstration of the difference computer graphics can make to an executive's life and performance.

"IF LEONARDO DA VINCI COULD HAVE USED A ROBOCOM'S ROBOGRAPHIC SYSTEM, HE WOULD HAVE ACCELERATED PERFECTION"

Leonardo da Vinci was the universal man. His contribution to our civilization was lasting and profound through his influence and expansion of man's understanding of Physics, Engineering, Drafting and Art.

A **Robographic** system will not make you a Leonardo da Vinci but it will help your CREATIVITY & PRODUCTIVITY.

The powerful computer graphic/CAD system allows Engineers, Draftsmen, Architects, Designers, Illustrators, Administrators and Educators to create more effectively by leaving tedious alterations, repetition and other time consuming chores to the **Computer.**

What are Robographic Systems?

Based on the Apple II+ or IIe a **Robographic System** comprises of a "BiT STiK" controller and software packages which interface with a wide range of monitors, plotters, printers and digitizers for numerous computer graphic applications. This **unique** concept means that with some **Robographic Systems, there is no need** to use a keyboard even for "scaling and dimensioning". For storing, retrieving, amending, etc., the "STiK" is the controller.

The **Robographic Systems** represent a new approach to Computer Aided Drafting. They are powerful tools yet easy to use. Prolonged training/ familiarisation is unnecessary because operators do not program; consequently the system will increase productivity.

Such advanced systems are **affordable,** in fact they cost from 1/6th the outlay on comparable systems. This cost advantage means that the system will pay for itself through increased output.

Robocom presently offers three systems answering specific needs:

Robographic 500: for Graphic design, computer art, education etc...

Robographic 1000 & 1500: for engineering, drafting, architecture, civil engineering etc...

The installation of a Robographic System provides an efficient, expandable base to enhance your operation.

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NO DOUBT LEONARDO DA VINCI WOULD BE IMPRESSED BY OUR COMPUTER DESIGNED LOGO

AROB 05

Graphtec (formerly Watanabe) range from Electrical Equipment.

Most other types of plotters, such as electrostatic, which use photocopier technology, and inkjet, which use fine droplets of ink to produce very bright, well-defined pictures, are still out of the price range of the low-cost system user; however, the excellent-quality Tektronix 4695 A4-size inkjet plotter is available for only $2328.

Another way of producing hard copy is to shoot the picture directly off the screen, and the lowest-priced kit for this purpose comes from Kodak, which last year released its Instagraphic CRT imaging outfit. This consists of a Kodak Instagraphic camera with close-up lens, two packages of colour print film, a CRT cone which fits around the screen to block out ambient light, a filter, brackets for adapting a 35 mm single-lens reflex camera to the cone, and an instructional manual, all for around $300. Obviously, for that price, the quality of the hard copy will not be perfect, but it is a good kit for beginners.

Further up the line are the Polaroid Video Printers from Datamatic, which transform video and computer signals into hard copy colour prints or overhead transparencies, and can be connected to most computer/video systems. They can produce images on Polaroid 4 by 5 inch (10 by 12.5 cm) or 8 by 10 inch (20 by 25 cm) films, SX-70 instant film, or any 35 mm film, and sell at around $7500-8000.

Another interesting device which has recently come onto the market is the Lasergraphics UI-100T rasteriser from Dimension Graphics, which is a dedicated microprocessor that allows graphic images to be printed on colour raster printers at high transfer rates and at the printing device's full resolution capabilities. Priced at around $18,500, it eliminates the granular appearance which usually results when hard copy is produced with devices such as Tektronix inkjet plotters, which have very high resolution, from a colour screen with a lower resolution; for example, Tektronix's top-range terminal, the 4115B, has only a quarter the resolution of its 4691 inkjet copier.

The Lasergraphics receives vector graphics information from the host, converts it to a fully scanned raster image, and sends this directly to the hard copy unit, which can then produce a very high-resolution image.

Film recorders were the most expensive hard copy devices, at around $350,000, but last year Quentron Optics released a breakthrough in technology, the Matrix QCR-D2000 film recorder, which generates slide film with a resolution of 2048 pixels by 1366 lines, for around $35,000. The QCR-D2000 works directly off the digital data from a mainframe computer rather than the signals from a video terminal, as conventional recorders do, so output is not limited to the resolution of the terminal.

Software

As readers of this magazine would know, the last twelve months have seen an amazing proliferation of microcomputers, or personal computers, on the marketplace.

Marketing of these machines has been aimed heavily at the business person, with several manufacturers saying that their aim is to have a personal computer on every desk. The majority of the machines have the capability for displaying graphics, but the spread of business graphics has until recently been hampered by a lack of suitable software. It took the acceptance of the IBM-PC to spur software houses into writing graphics software for business purposes, and software for other machines is now coming onto the market.

Recent releases include DR Graph business graphics software, an interactive package which can create graphs and charts on a Vector 4 screen, available from Dicker Data Projects; Graftalk, released by BS Microcomp for the IBM-PC, which supports a wide variety of graph types as well as non-standard user-defined types, and which has been given the seal of approval by the US Army, which recently ordered 18,000 Graftalk packages; and Mousepaint from Apple Computer which, in conjunction with Apple's 'mouse', a pointing device which is used instead of a keyboard, is used to design charts, diagrams, free-hand drawings and other visual aids for reports and presentations.

The mainframe manufacturers, too, are getting into the act, with most of them having released their own versions of the personal computer over the last 12 months, all with graphics capabilities. Most supply some type of graphic software, with the most recent release coming from Digital Equipment Corporation which, in conjunction with the unveiling of its new VT200 display terminals, released two graphics packages for VAX-11 users, DECgraph and DECslide, designed to use with the VT200s. According to DEC, the packages allow users with little or no computer experience to interactively design presentation-quality visuals.

As an indication of the growing acceptance of graphics in all spheres of the market, Australia's first specialist graphics software house, Dimension Graphics, was established last year, and is recording particularly good sales of its business graphics packages. The company markets several business graphics products, including Mirage, from US software house, and Zenographics, which runs on the IBM-PC, Prime, VAX, ICL and Convergent Technologies machines, and is being converted to run on others. Mirage can produce hard copies on any vector or raster graphics device, and combines three application areas in one package: database management; charting maps, word pictures and diagrams; and a graphics editor for graphic arts applications. It was used to produce the pictures on page 19.

But be warned ...

There is only one problem for the user of computer graphics: it can be habit-forming.

Once you have mastered the art of producing bar charts, pie charts, and other comparatively simple-to-produce diagrams which make your life so much easier by enabling you to evaluate information more clearly and therefore simplify your decision-making, you are probably going to find yourself with more time on your hands (which used to be taken up by reading lots of boring printouts).

It is at this point that you will start finding out about all the other things you can do with computer graphics.

You'll probably start off quite simply by writing your own little programs for producing charts of 'Snoopy' for the kids to hang on their wall, then you'll start wanting bigger and better equipment so that you can use CAD (computer-aided design) to design your new house or a robot to mow the lawn or do the washing-up, and the next thing you know, the flat drawings won't be good enough for you, and you'll have to put everything in hock to buy a $5.5 million Cray supercomputer so you can throw out your outmoded television set and produce your own full-length animated movies based on your holiday at The Entrance.

So just be careful! ❑

Computer Images Digital Art

In business presentations, the aim is to impress, to persuade or to inform. A presentation has to be polished and professional if it is going to inspire confidence. Evan McHugh visited Computer Images to see how they produce presentation slides for business which have both these qualities.

THE AVERAGE COMPUTER GRAPHIC isn't fantastic, in artistic terms, but it can put material into forms that are better than just presenting long columns of statistics or text. Even a $300 home computer can produce such graphics. But people demand degrees of excellence beyond mere utility. In business particularly, people try to present the most polished image their money will buy.

This is where a company like Computer Images, with its Genigraph system, comes in. In the area of producing business presentation slides, Computer Images combines high quality graphics with cost efficiency. Clients are able to get their slides substantially cheaper than when using conventional slide production techniques.

The Genigraph system is used to produce slide presentations for business. These presentations can be used within the organisation (for example, at sales meetings), or outside (say, in training courses, or for showing things to clients). The system is capable of producing company logos, organisation charts, maps and art designs. The company has a library of over 2000 symbols, which is continually updated. Any number of these symbols can be used in a slide.

Original pictures may also be produced in freehand, or by tracing over a line drawing laid on a graphics tablet. Images or symbols, part or the whole of a screen can be enlarged or reduced in size as required. All images or parts of images can be edited, stored and retrieved.

The Machinery

The Computer Images Genigraph system comprises two units. The first is the creation unit, where the image is created in a 256 Kbyte RAM PDP 11/34 computer. The memory devices are two 500 Kbyte 20 cm diskette drives and two five Mbyte hard disks. Also running off the PDP 11 is a Decwriter teletype (LA34) and the artist's console. The artist's console has a colour monitor with 512 x 512 resolution, a graphics tablet and a keyboard. There is also a black and white copier that produces low quality but very fast copies of the images on screen.

The resolution of the PDP 11 goes up to 4096 by 4096. The computer interpolates from the tablet to fill in the extra points. It also uses the keyboard instructions to fill in points. That is, if you want colour in a certain area, the screen will be filled in and all those dots not represented on the screen will be similarly filled within the computer's description. This facility is utilised when the slide is being produced. The screen image is limited by technology. That does not have to mean that the image produced photographically has to be of the same poor quality as that on the screen. The screen is therefore used as a reference from which to work, and the finished product has a higher resolution and a sharper image.

The second unit of the Genigraph system is used for recording purposes. It comprises a PDP 11/34, like the creation unit, with an LA34, diskette and hard disk drives also in the same configuration. Instead of an artist's console, the recording unit has a high resolution camera and imaging device. The camera produces images in a large and a small format. The large format produces 18 cm by 23 cm glossy photos while the small format produces images on 35 mm, 46 mm and film strips. The large format uses 4096 by 4096 resolution. In the small format, only the 46 mm film uses this resolution. The 35 mm and film strips have 2048 by 2048 because the film used, high-speed Ektachrome, has a lower resolution threshold than the computer resolution. Using the higher computer resolution produces no improvement in quality and takes about twice as long to generate.

The slides produced can be enlarged

'Raster' and 'Vector' Graphics

The two most common methods used to display information on a screen are raster and vector graphics. Each technique has its own advantages and disadvantages which make them suitable for different sorts of use.

Raster graphics is the more common of the two forms. It involves scanning the screen from left to right a line at a time to cover its width and then repeating this process to cover the whole screen. The correct spots are 'switched on' and the rest remains dark. The 'refresh rate' or speed of scanning is usually about 50 MHz. Raster graphics has the disadvantage that it needs every dot to be stored in memory and the computer to be instructing quite often, but it enables a cheaper interface between computer and screen. The interface can be digital and can run on a normal TV screen.

Vector graphics is the preferred technique when it comes to graphics because it allows the drawing of lines from one point to another instantly. It works by giving the screen a pair of x,y co-ordinates as a start point and another pair as an end point. These are then converted to voltages to start the video spot off and send it to the end co-ordinate voltages. The advantage here is that only the end points of lines are required, representing a considerable saving in memory. The cost is that the analogue-to-digital interface for the co-ordinates to voltages is expensive.

To draw a line in raster scan requires a FOR-NEXT loop to move a point across a bit for every line – a time-consuming exercise. Therefore for graphics the vector method with its instant movement between points is preferred. This higher quality and speed, however, needs a special screen and interface, as opposed to just any old TV set. ❑

to a width of three metres or more without any trouble. The colours don't become washed out and the borders are still sharp.

Colouring Your Presentation

A total of about eight million colours is available on the Genigraph system. The colour range is best described in a three-dimensional sense. The first dimension is the colour spectrum as most people know it: basically, the colours of the rainbow. The second dimension is brightness: if you take a particular colour and turn the brightness up or down, you have different colours. The third dimension is probably the hardest to understand and depends on the degree of black or white mixed into the colour. It means that you take a colour and retain its brightness, but mix in a percentage of white or black, which has a tinting effect. The terms to describe the three colour dimensions are: hue, chroma and tint. This colour description method is called Munsell colour.

It is reasonable to say that you would never use all eight million colors in a single image. You are, in fact, limited to using 64 colours in any one image. If you want more than 64 colours, you have to ask for multiple exposures. In this process, several images are set up and exposed on the same piece of film, gradually building up a complex range of colours into a complete picture.

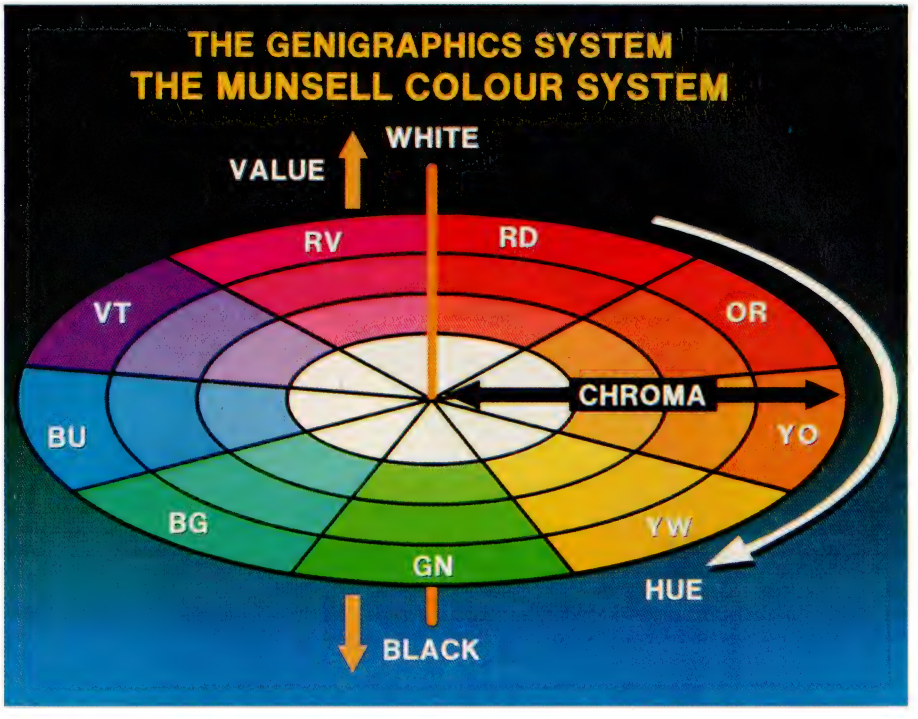
Another limitation is in the way a picture is usually made up. Clearly, you don't want to have to specify the colour of every pixel. On a screen of 512 by 512 pixels, that's around 256,000 separate points. The answer is to specify an object, a group of pixels, and to use this as a more workable area – since the resolution of the image has to be high, but the detail of the picture does not.

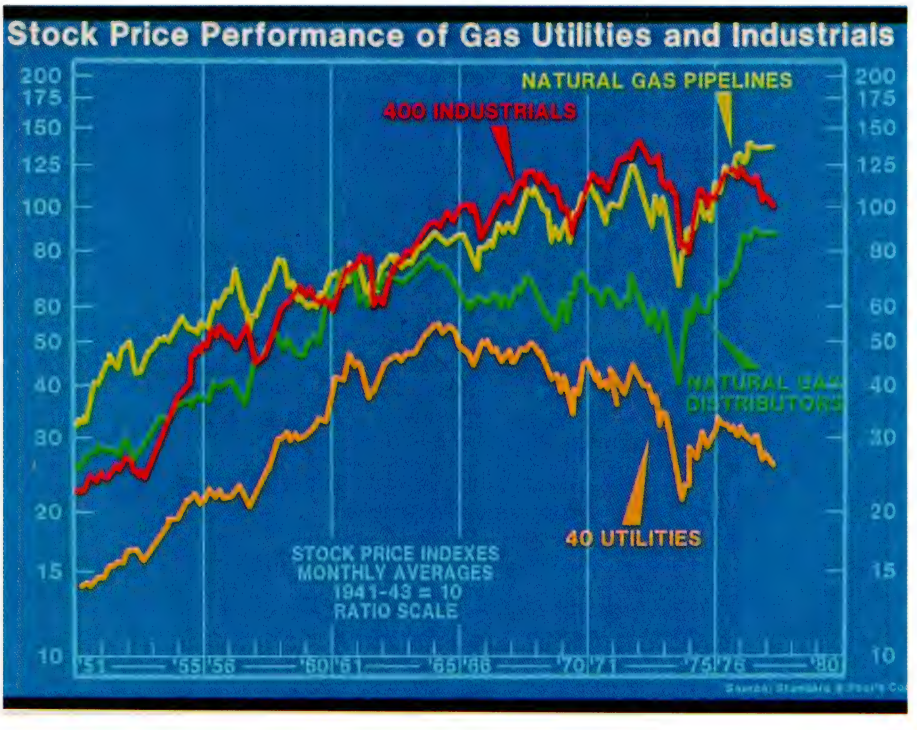
Say you wanted to produce a slide of just the colour blue. The higher the resolution you use, the better it will look. The colour must be represented without appearing to be made up of dots. Therefore, an object is specified and then used to create images. This object can only be one colour, but it can be any size you want it to be, for example, one pixel by 512.

This is not the only way to generate images. Freehand drawing can also be used to do outlines which may then be coloured in or shaded using objects.

From Idea To Slide

The production cycle starts with a customer brief. In some cases this will be an exact specification, in others a vague scrawled note. Either way, the customer's requirements are eventually determined.





Two examples of business graphics produced by Computer Images' Genigraph system.

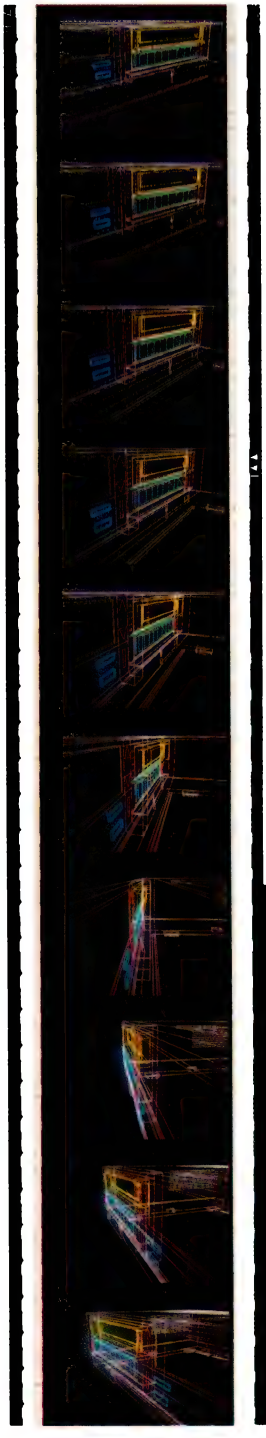
An estimation of cost is then made. This can be from $8 to $800 a slide, depending on the amount of work and machine time used. The average price for a slide is about $35. The people at ▶

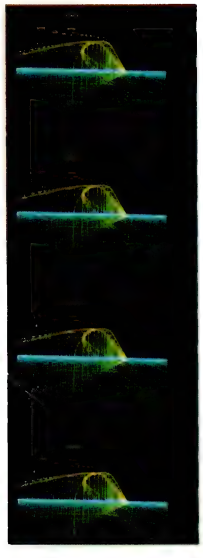
Zap! Zap! Zap!

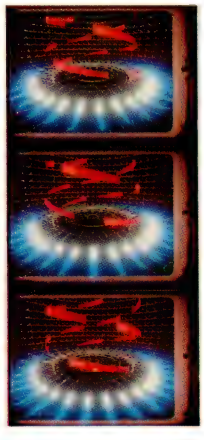
– 3-D Graphics

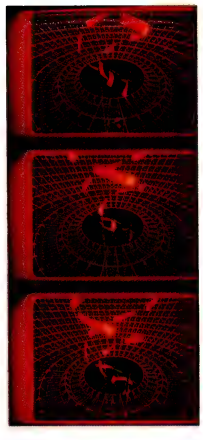
By Evan McHugh

Three-dimensional real time wire frame animation sounds quite a mouthful. It's quite an eyeful too. It's a new dimension in animation which you have probably already seen without even realising it.









Some examples of three-dimensional graphics produced frame-by-frame on the Evans and Sutherland PS300. 3-D computer animation is so complex and time consuming that a finished animation often costs as much as $2000 a second.

IN TELEVISION station promotion, advertising and programs you can see examples of the use of computers in animation. The introductory graphics on the ABC program *Towards 2000*, the Sigma car advertisement and the current opening titles of *Newsworld* are examples of this innovation.

XYZap is a trendy little outfit (sound stage, three-storey building and he calls it little) in Artarmon on Sydney's North Shore. Their system is an Evans and Sutherland PS300 based on a Motorola 68000. The system is linked to a VAX by an RS232 interface. The PS300 does all the graphics manipulation, the VAX all the file storage and management and camera interfacing.

The XYZap equipment is used for advertising production and promotional work, but there are a lot of other uses 3-D computer animation can be put to - such as molecular modelling, studying the dynamics of car suspension, and the design of varied mechanical components in many industries. Various designs can be input and tested before the mechanism is actually built, or plans can simply be stored and manipulated more clearly than on a static piece of paper.

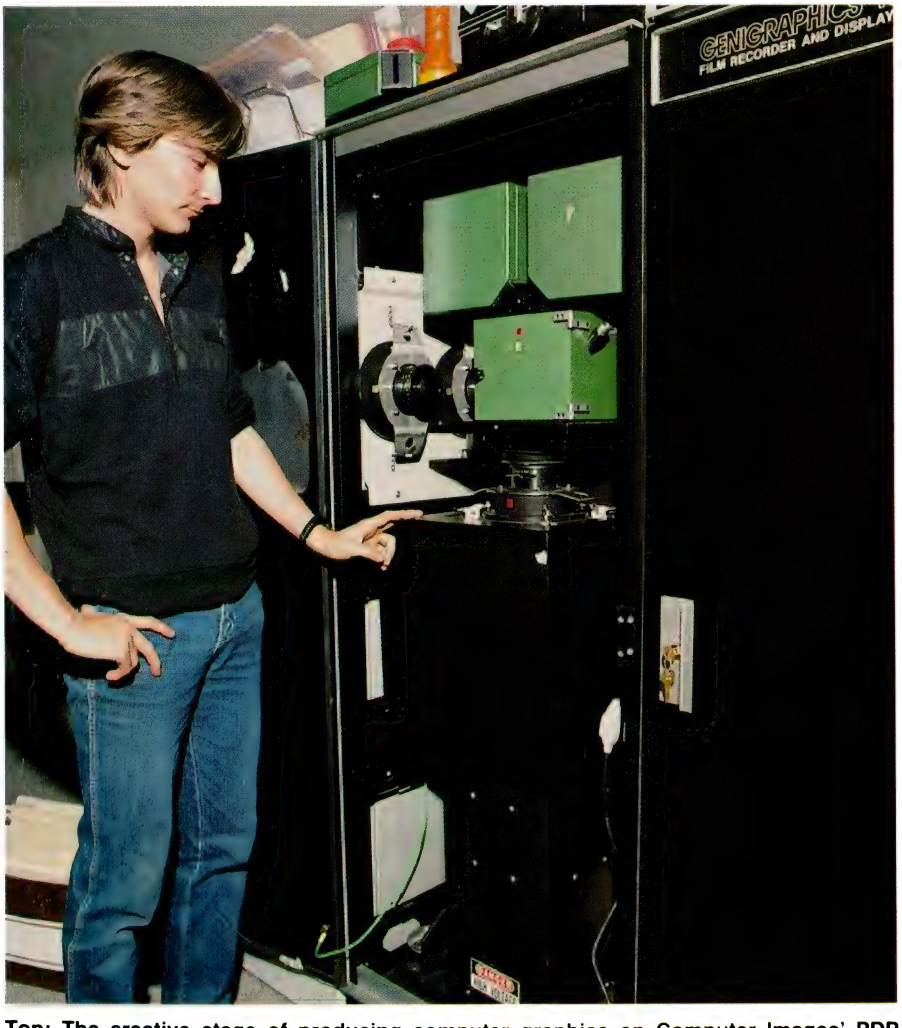
The system gives perfect perspective and allows movement in all directions around the object and through it. The image can also be distorted under software control.

But what is meant by three-dimensional, real-time, wire-frame animation in the computer sense? Cough, spit, sleeves back, what indeed?

Before Your Very Eyes

Let's start with real-time animation, which is simply movement before your eyes. The computer generates images at 25 frames a second and dumps them on screen using vector drawing. Wire-frame graphics are non-solid, so you can see the lines inside the object that represent the edges behind the front 'surface'.

So far so good, but three-dimensional graphics are a little more difficult to understand. Obviously the image on the



Top: The creative stage of producing computer graphics on Computer Images' PDP 11/34 Genigraph system. Below: Evan McHugh examining the storage and recording unit, another PDP 11/34.

Computer Images say they prefer doing expensive slides because it tests their skills more and stretches the capabilities of the machine to the limit.

In the next phase, a trained graphic artist prepares the image. Artists start working for Computer Images with no knowledge of computing. They are trained in the use of the computer graphics package (a process that takes around six months) and can then combine their artistic talents with the processing ability of the computer to produce images at amazing speed.

The system's editing commands are truly impressive. Windows can be used to zoom in on particular areas of an image, to do finely detailed manipulations of colour. Special effects, such as shading, can be called up in a flash to carry out functions that an artist would take days to do.

When the images are completed, black and white proofs are sent to the customer for approval. Changes can be made, and errors or omissions can be fixed before the slides are produced.

The finished slides are then delivered to the customer, ready for presentation.

Cost Effective

The Genigraph system costs $400,000. What makes the system cost effective is the speed with which the mundane tasks of commercial art can be completed. This gives the artist more time spent on creative activity and allows greater flexibility in design. If a piece of artwork does not look good, it is easily changed. Normally, you would have to throw it away and start over.

While most *Your Computer* readers are unlikely to be able to afford a Genigraph system, a new package soon to be released will put this kind of artistic power within the reach of many more people. Made by IBM, the package is compatible with the Genigraph system, and will allow people to generate their own images on their own PCs. When they have images they want to turn into slides, they can send them to a shop like Computer Images where the powerful image processing capability of the Genigraph system will produce slides of higher resolution.

The Genigraph system we saw is not the only one of its kind. Xerox and Dicomed have similar systems, and research is likely to yield still further developments in the form of image scanning and digitising to allow editing.

That ought to wipe the smile off the Mona Lisa's face. ❑

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screen is not three-dimensional, but rather is drawn in a way that gives the impression of being three-dimensional. In fact, the image is a representation of an object that is described within the computer as a three-dimensional one; the object which is to be viewed is stored within the PS300 as an [x,y,z] sequence of three-dimensional vectors, which are either of P (position) or L (line) type. In a reasonably complex image there will be up to 4000 vectors. The vector specification is in the form 'point-line: from this point draw a single vector (line) to that point' or 'point-line,line,line: to draw a continuous line (curve)'.

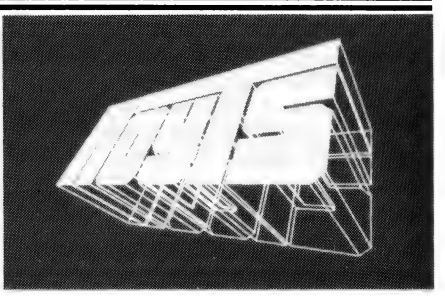
Each vector is specified with three co-ordinates: horizontal, vertical and depth. The viewing parameters controlled by the user, such as rotation, translation and scaling, and the observer's eye location and the direction in which he or she is looking are converted by the resident software into a matrix that represents the viewing transformation.

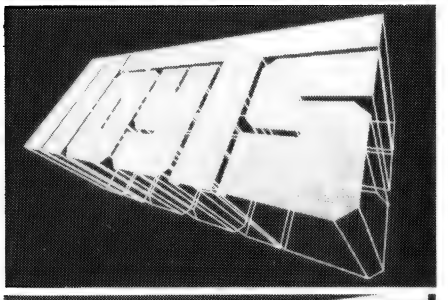
When the computer is asked to display a single image it does so by calculating the positions of all points and lines relative to the reference point of view. It does this based on the position of the reference point of view, which can be considered as a position in the matrix as well.

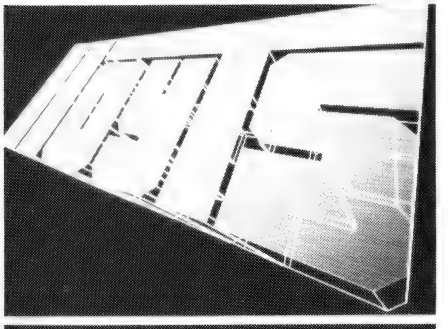
Special-purpose hardware takes this matrix and uses it to transform the original list of vectors that represented the object into a new vector list that, when drawn, shows a new orientation or view. The machine can easily change the viewing transformation over 25 times per second, so a smooth movement can be simulated on the machine (for example, 'flying' through a complex model). However, for the purposes of filming, each frame is recorded separately on a 35 mm camera to allow the complex techniques of colour filters, hand animation and so on to be used to enhance the final product.

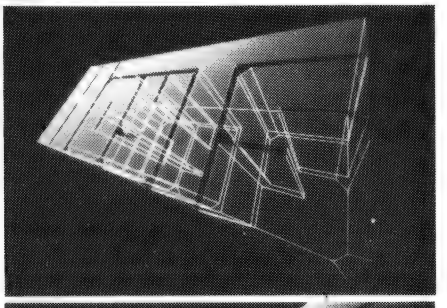
The animation comes in by moving the point of view from one position in the matrix to another through some, or all, of the points in between. The animation is built up of small increments in position that are presented frame by frame, each frame being generated very rapidly (25 frames per second) to produce an impression of movement. Built-in functions allow the image to be rotated, inverted and so on, so that the concept of changing reference points isn't obvious. You look at the screen and you see the object rotate. What you don't realise is that the object is fixed logically within the computer, and the computer is turning the theoretical position, in effect the universe, around the object!

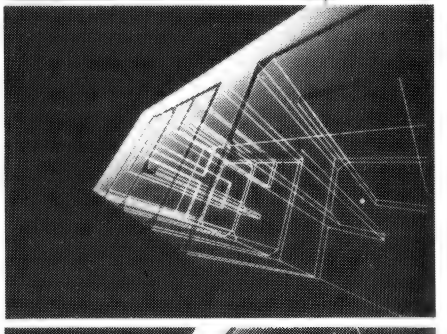
When a sequence has been completed it is regenerated on the PS300 under the control of the VAX. The VAX takes each image and transmits it to the camera, where each frame is shot one at a time, as described above. The models are also generated using a CAD/CAM system – because 4000 vectors is a lot of data to input by hand. This is done at CAD/CAM facilities elsewhere based on specifications and artwork provided by XYZap.

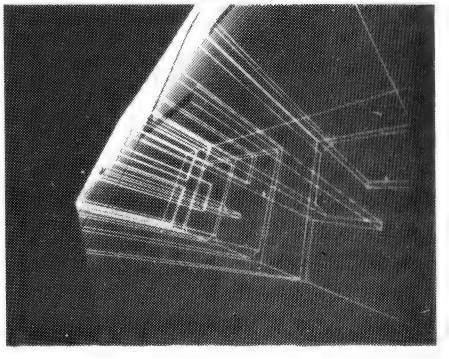






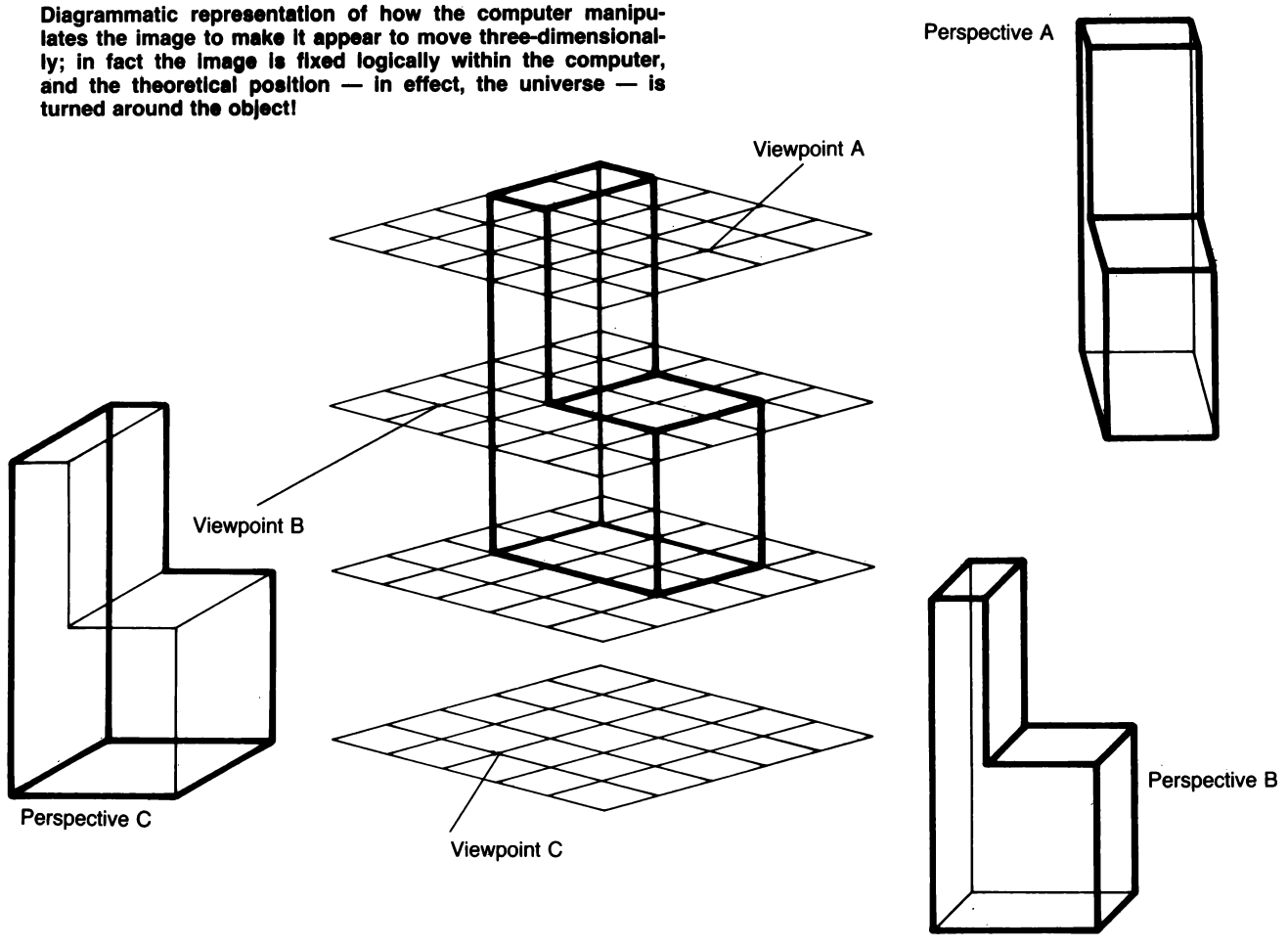






The Evans and Sutherland PS300 in operation (above); right: black-and-white 3-D animated graphics produced for Hoyts.

Diagrammatic representation of how the computer manipulates the image to make it appear to move three-dimensionally; in fact the image is fixed logically within the computer, and the theoretical position — in effect, the universe — is turned around the object!



Self-Made Software

There are some limitations to what you can do using three-dimensional computer animation. For the PS300 system one of these is the lack of available software. Just about everything that is done on XYZap's system has to be programmed on site.

The system also can't handle solids. Simple line drawings are a lot easier to deal with than solids because the calculations to determine what you can and cannot see are huge compared to the assumption that you can see everything. The present trend in computer graphics software is to aim for 'solid' objects that look as 'real' as possible. This involves looking into shadows, shading, reflections, texture – in fact all the elements that make everyday objects not look like computer images. The addition of these elements into a computer scene adds enormously to the cost of computation; the calculation of just a single frame can take a machine like a CRAY-1, one of the biggest computers in the world, somewhere near to 40 minutes. And that, boys and girls, is a lot of computin'.

The production cycle for animated sequences is particularly lengthy. There are numerous checkpoints where clients go over what is being produced to approve it. The process of generating images and manipulating them and then smoothing the movement so that it doesn't jerk from one direction to another also adds time to production. The result of all this effort is that a typical 3-D computer animation will cost about $2000 a second.

Where a computer is often a time-saving device, in this instance it is often more time-consuming than normal animation. The end product, however, is far superior to manually produced animation, and could never even be attempted by a human animator due to the incredible complexity and perfect manipulation of objects that can be achieved.

Future systems of this kind will be linked with a computer-controlled camera movement system. A series of movements will be determined in a 3-D animation, and then the necessary movements will be shot with the 'real' computer-controlled camera. The advantage of this is that a computer-controlled camera can be moved in all sorts of directions around an object in ways that a cameraman could not hope to do; he might trip over or drop the camera or not hold the camera steady or not move smoothly. All these problems can be eliminated with a computer-controlled camera, and in addition exactly the right kind of movement required by the director can be programmed with ease.

This kind of technology is already with us; you can see this sort of camera control in films like *Star Wars*. But in a way the technology used is becoming more exciting than the end product – although now, at least, we can see the back of Mona Lisa's head, if we want to. ❑

Graphics On A Home Computer

Digitised Mona Lisa, using eight levels of grey per pixel and three Matrox ALT-2562 boards.**

In our special graphics feature we've looked at quite a variety of systems, most of them way out of the price range of a home computer enthusiast. However, you can get some pretty impressive graphic results on small computers like the Apple and the Microbee. Evan McHugh takes a look at some of them.

FROM THE AIRY heights of half million dollar systems to the home computer, graphics can be found. Surprisingly, many of the effects a home computer can produce are not much different from the full-blown systems the professionals use.

A look at the command set of a machine like the Apple II with its Microsoft-enhanced Applesoft shows that the commands, while rudimentary, are capable of a considerable amount of graphic presentation.

The ability to use a high-resolution graphics mode (HGR) to get resolution of 280 by 193, to select colours (HCOLOR) and to plot points (HPLOT) means that the small computer user can produce his/her own graphics in a number of styles. He can draw solids, three-dimensional images, combinations of solids and line drawings, and graphs and charts. Even animation is possible. All the user needs is a considerable amount of patience and time and he or she can do almost whatever they want.

The appearance of numerous graphics packages on the market means that no programming experience is needed, and that now far more can be done much more rapidly. The arrival on the scene of Apple products such as the Macintosh and the Lisa means that the average person can do all sorts of attractive presentations without a great deal of effort of either time or thought.

In the Apple command set the shape table manipulation commands are also very useful in producing changes in the described image.

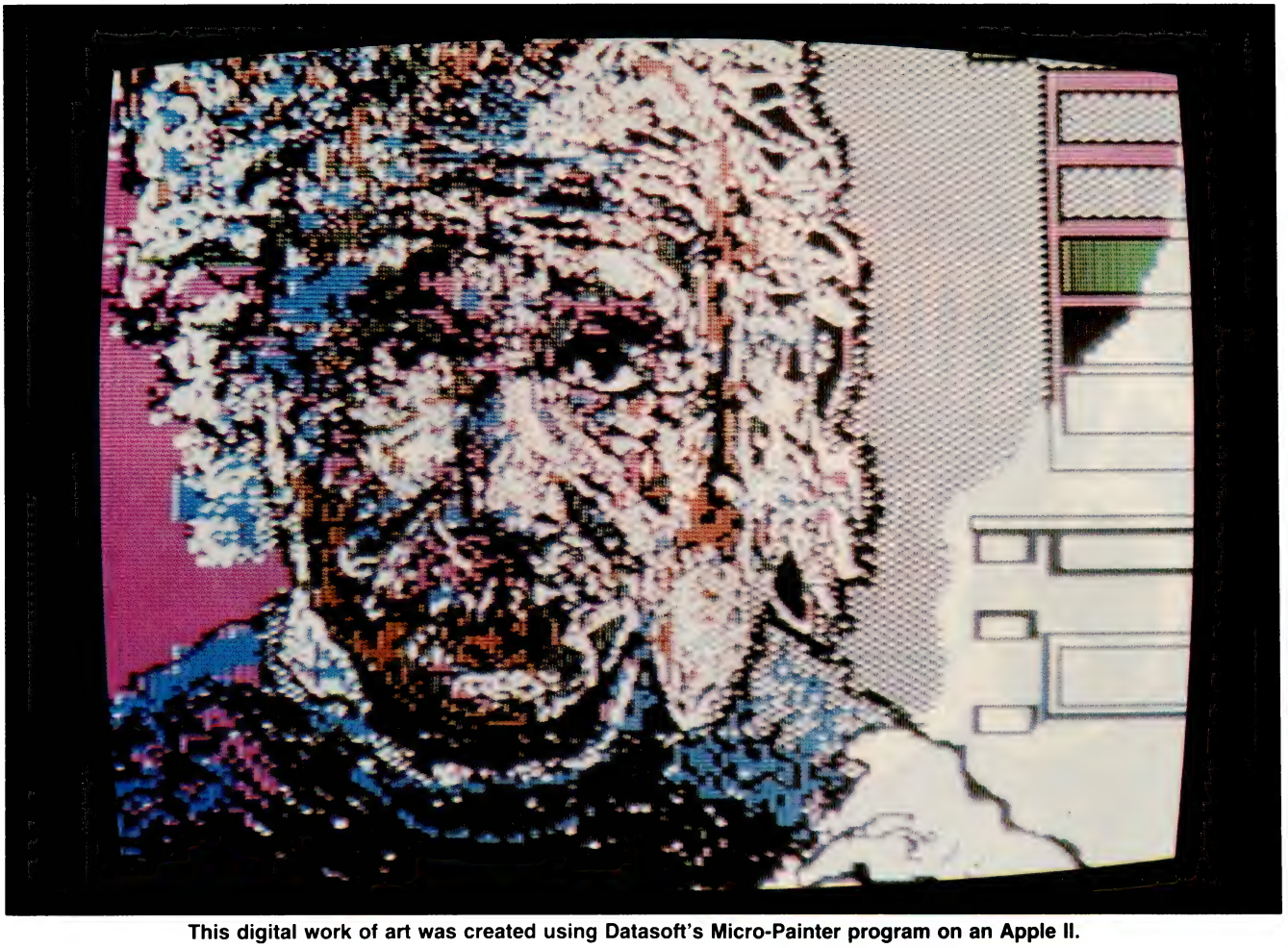
That Elusive Quality

The difference between what the top systems and the Apple et al systems can produce is centred around that elusive concept 'quality', and some hard facts will help point to the key to higher-quality graphics.

First, the smaller systems don't have the same resolution. The Apple II with its 280 by 193 has to compare with the 4096 by 4096 of the Genigraph system, which even on its screen displays 512 by 512. Next, the editing features of the Apple II are not anywhere near as diverse and controlled as the Genigraph. Finally, there is neither the quality or quantity of graphics creation facilities available for the smaller system.

Of course, it has to be realised that the comparison of these two systems is not entirely fair – it's a classic case of comparing apples with pears. One, after all, costs around $400,000 and is designed purely for use in producing a certain kind of graphics. The other is aimed at the home or personal user who may want to do anything from word processing to spreadsheets as well as graphics.

Consequently, this machine is not going to go anywhere near as far in its graphics capabilities as the dedicated systems. However, it should be noted that the Apple II is a small fraction of the



This digital work of art was created using Datasoft's Micro-Painter program on an Apple II.

price and yet can do so much of what the other system can do. Truly, Jeremiah, 'tis a thing to marvel at.

The range of abilities the Apple has includes drawing straight lines, curves and plot graphs (vector graphics command control). It can rotate and scale images, shade them, produce three-dimensional images, and in some cases manipulate them. Wire-frames and solids are, therefore, possible on this computer.

When *Your Computer* visited XYZap (see the article elsewhere in this issue, 'Zap! – 3-D Graphics') we learned that the wire-frame animation that was presented could have been done on a micro like the Apple, the only difference being in the speed of the imaging.

The enthusiasm with which the public has pursued computers in order to play games has been a considerable incentive to the development of graphics. Particularly in the two-dimensional graphics area there has been a lot done in the animation of screens. Now, also, animation in three dimensions is starting to appear. A game for the Apple IIe, 'Wayout', demonstrates this. It allows you to walk about in a maze, mapping it as you go. The graphics are astounding: as you approach walls they grow larger, if you walk to the side of a corridor the angle of the corridor changes accordingly. Within the limitations of the presentation the perspective is almost perfect.

The design for this program is brilliant yet elegant and efficient. It demonstrates that the basic principles of quite complex areas of graphics are within the scope of the micro.

People using machine code can of course produce very good-quality and fast graphics. The above game is an example, and the shoot 'em up games are also typical. Packages make it possible for people to draw pictures or produce graphs and then save, edit and copy them. Particular shapes such as boxes, grids and circles can be called up and placed anywhere they are desired in any size, all this under the control of a graphics tool such as a mouse, bit pad or light pen.

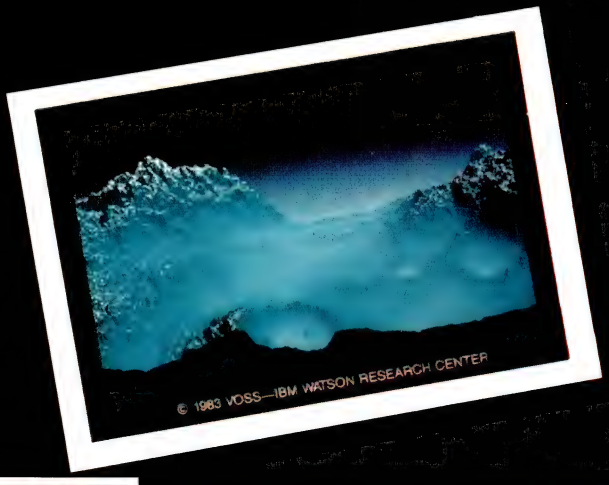
The power of some of the systems available is impressive. Naturally, it will improve as time goes on. The only real limitations are, or will become, the means of presentation: the use of TVs with low-resolution ability and printers with similar problems. Perhaps these will be overcome. As is pointed out in the 'Computer Images – Digital Art' article, however, it will become possible to produce graphics on micros and then send them off to a large installation for image processing. No matter what happens, as the saying goes, you ain't seen nothing yet.

The number of graphics packages available for the popular home computers is large and ever-growing, and too numerous to list here – just go into your local computer store or read your supplier's catalogue, and your only problem will be choosing which one to buy. ❑

COMPUTER GRAPHICS FEATURE

American Graphiti

This page shows some of the peaks of graphic computer art, created by various computer artists in the US. It shows just what the medium is capable of in the right creative hands.



NEC's APC Videograph Package

The NEC Advanced Personal Computer is made for use as a graphics terminal. With the addition of graphics equipment and a software package, it becomes a full-fledged graphics facility suitable for many business applications. Evan McHugh played with it/reviewed it for us.

THE GRAPHICS PACKAGE for the APC is called Videograph and is made by Xiphias software. It is a menu-driven suite of programs that permits a range of input modes and devices. Written in UCSD Pascal, it makes full use of the graphics capabilities of the APC.

The APC, which was *Your Computer's* Personal Computer of the Year in 1983, becomes a graphics terminal with the addition of a Summagraphics Bit Pad One. If you want to see your Videograph creations on paper, you'll also need a full colour printer. A photographic unit will turn your masterpieces into slides.

Trace Or Write

Videograph will also permit the use of a mouse. We did not see this rodent in operation, since our review machine came with the Bit Pad One and keyboard only.

The Bit Pad One is a 30-centimetre-square tablet with a pen attached. The pen has two types of stylus: one which writes and one which doesn't. This allows you to trace over figures, or write things on a piece of paper. The tablet works on the magnetostrictive principle. If you want to know exactly what that means you'll have to go to the public library, but basically, it results in the Bit Pad returning x and y coordinates to the APC.

Not all the surface of the Bit Pad represents the screen. A section across the top is reserved for selecting a range of options. The options are identified by placing the supplied identification sheets over the top of the Bit Pad (in exactly the right position, or markers won't correspond to the right options). I advise you to do two things: photocopy the pieces of paper several times, because they wear out (particularly the reset square); and put four little crosshairs on the Bit Pad, so you can tell exactly where the sheet goes. You might also try putting a plastic coating or sleeve on the sheet, to reduce wear.

Videograph has two input modes: graphics and text. Because it is a graphics package the weight is towards the graphics mode, but the text mode also has some useful features. You can, for example, select a range of fonts for labelling and headings and there is a variety of graphics characters you can call up in addition to those on the keyboard.

Apart from its graphics software, Videograph supports file management, text editing and the running of external programs. This makes the system more user-friendly because it guides you every step of the way. You never have to deal with anything but the Videograph package. Another advantage of this arrangement is that all operations necessary for the graphics application are included in the one package.

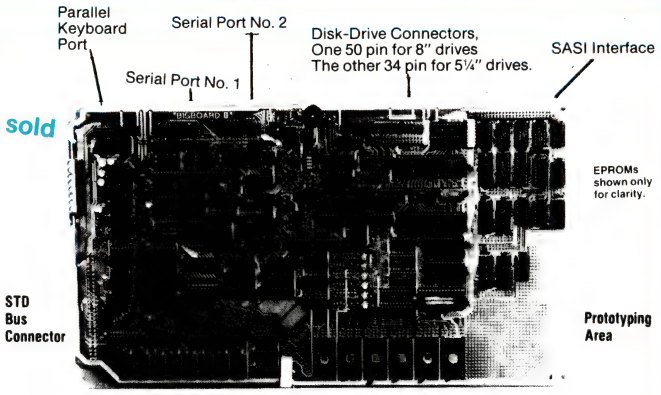
Shapes Of Different Sizes

Within the graphics mode you can call up a range of functions. These allow you to draw circles, arcs, straight lines, grids and so on. You start off selecting the shape you want to draw. Then, move the stylus around the Bit Pad to specify the size of the shape, press down on the stylus to set the shape and away you ▶

Evan McHugh doodling — sorry, being creative — with the APC's graphics and the Bit Pad One.

"BIG BOARD II"

Over 1,000 sold



Jim Ferguson, designer of the "Big Board" distributed by Digital Research Computers, has producing a stunning new Computer, "Big Board II". It has the following features:

4 MHz Z80 - CPU AND PERIPHERAL CHIPS

The Ferguson computer runs at 4 MHz. Its monitor code is lean, uses Mode 2 interrupts, and makes good use of the Z80-A DMA chip.

64K DYNAMIC RAM + 4K STATIC CRT RAM + 24K E(E)PROM OR STATIC RAM

"Big Board II" has the three memory banks. the first memoery bank has eight 4164 RAMs that provide 60K of user space and 4K of monitor space. The second memory bank has two SKx8 SRAMs for the memory-mapped CRT display and space for six 2732 As, 2Kx8 static RAMS, or pin-compatible E(E)PROMs. the third memory bank is for RAM or ROM added to the board via the STD bus. Whether bought as a bare board, a full kit, or assembled and tested, it comes with a 450 nS2732A EPROM containing the monitor.

MULTIPLE-DENSITY CONTROLLER FOR SS/DS FLOPPY DISKS

The new Ferguson single-board computer has a multiple-density disk controller. It can use 1793 or 8877 controller chips since it generated the signal with TTL parts. The board has two connectors for disk signal with 34 pins for 5.25" drivers, the other with 50 pins 8" drives.

VASTLY IMPROVED CRT DISPLAY

The new Ferguson SBC uses a 6845s CRT controller and 8002 Video Attributed controller to produce a display that will rival the display of quality terminals. Characters are formed by a 5x7 dot matrix on 15.75 KHz monitors and 7x9 dot matrix on 15.75 KHz monitors. The display is user programmable with the default display 24 lines of 80 characters.

STD BUS CONNECTOR

The Ferguson computer brings its bus signals to a convenient place on the PC board where users can solder an DSTD, bus cards can be plugged directly into it, and it can as well be connected by bus cable to industry-standard card cages.

A Z80-A S10/0 = TWO ASYNCHRONOUS/SYNCHRONOUS SERIAL PORTS

TWO Z80-A CTCs = EIGHT PROGRAMMABLE COUNTERS/TIMERS

The new Ferguson computer has two Z80-A CTCs. One is used to clock data into and out of the Z80-A S10/0, while the other is for systems and application use.

PROM PROGRAMMING CIRCUITRY AND SOFTWARE

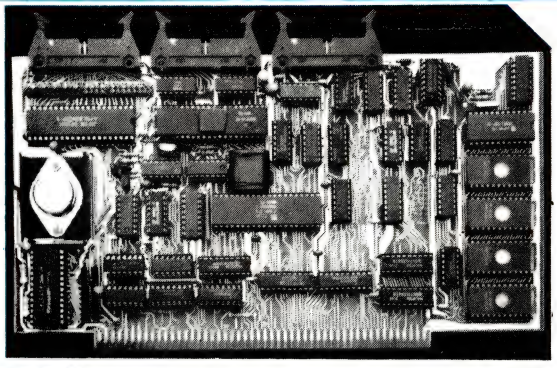
The new Ferguson SBC has circuitry and drivers for programming 2716s, 2732(A)s, or pin-compatible (E)EPROMs. Software $25 extra.

CP/M

CP/M with Russell Smith's CBI0S for the new Ferguson computer is available for **$295**
The CBI0S is available separately for $65.
Actual board size: 39.6cm x 22.2cm. 5 inch BI0S being developed. Approx price $95.

Kit Price
$695 inc. tax
$850 Assembled and Tested

S100 CPU Card

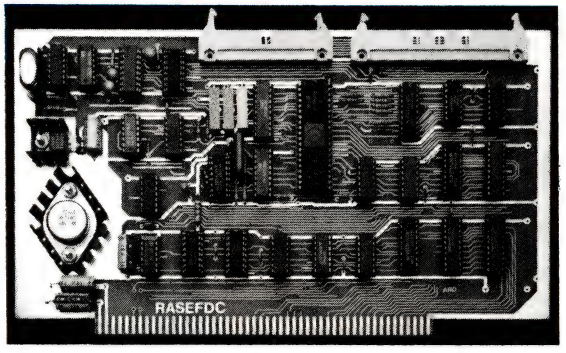


GENERAL DESCRIPTION:

- Z80A CPU running at a full 4 MHz
- Battery backed real time clock and calendar
- 2K of CMOS ram as standard
- 2716/2732 Eprom from 2K to 16K
- Z80A CTC with all 4 channels available to user
- 2-RS232 serial ports available
- Software controlled baud rates on each channel
- 16-baud rates from 50-192200 baud available
- 3-8 bit parallel ports via an 8255A
- Centronics compatible printer port via 8255A
- DMA operations supported
- Power on jump to any 4K boundary in memory
- On board memory enable/disable for full 64K operation
- Vectored interrupt chain via Z80 CTC
- Daisy chain interrupts through system full supported
- Comprehensive 2K monitor available
- Complemented by Disk, Memory and Input/output cards
- Local software and hardware support available
- A QUALITY AUSTRALIAN PRODUCT

Bare Board $180 & tax
Kit Price $295 & tax
Assembled & Tested $350 & tax
Manual Available Separately for $15 inc. Postage.

S100 Floppy Disc Controller



GENERAL DESCRIPTION

The extensive capabilities of the rasefdc are to a large part due to the presence of the Western Digital WD1795 double density controller chip. This device will perform the majority of the timing and control functions as required by floppy disk drives when carrying out the following operations.

1. Head loading and unloading
2. Track seeking
3. Address reading and writing
4. Data conversion during read and write
5. IBM3740 soft sector compatibility
6. CRC error code inspection generation
7. Double density write precompensation.

The board uses the phase locked loop technique when recovering data from disk, the vco of the phase locked loop is under the control of the WD1691 circuit to ensure very reliable data recovery during double density operations. To ensure syncronism between the CPU and the controller card during disk read and write operations the rasefdc will inset wait states until the WD1795 is ready to pass or receive the next byte of data.

Bare Board $150 & tax
Kit price $295 & tax
Assembled & Tested $350 & tax
Manual Available Separately for $12 inc. Postage.

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go. To reproduce the shape anywhere on the screen, you just move the stylus across the keypad until the cursor is where you want the shape to be. Press the stylus down again and there it is, your circle/square/triangle or whatever. You can reproduce shapes as many times as you like, all over the screen.

Should you make a mistake, you can use the erase facility in the same way as the shape maker. The eraser works in rectangles, so you specify the size and shape of your rubber, position it over whatever you want to erase, press the stylus down and the screen below the eraser is blanked out. By making the shape small you can do very delicate erasure, while making the shape big wipes out great blocks of the screen.

Options such as grids are useful for drawing graphs. The dimensions of the grid can be changed to give bigger and smaller boxes. Once specifications for the grid have been given, it can be reproduced anywhere on the screen, as with any of the other shapes.

Colour Your Graphics

There are eight colours available in the Videograph package. (The ink jet printer can actually handle up to 4,913 different colours.) These can be used to determine the colour of lines or of filled-in sections.

In addition to the ability to define and copy shapes, Videograph has an option called 'brush' which allows you to draw free-hand. The thickness of the line you draw can be from one pixel to 33 pixels wide. This option is fun, but is difficult to master without a few hours of play/practice.

... And Save Them

As mentioned above, the package includes file management, which means you can save your graphics on diskette for future editing. It is wise to 'save' often because some graphics represent extensive effort. It's the same with any computer input: if you lose two hours work, you're tearing your hair out. When you have been producing the digital answer to the Mona Lisa, that loss is so much harder to bear.

The system has very few bad points. The printer plays up a bit from time to time, but this is often due to a lack of care in maintaining the ink supply. Ink jet printers like this do need a fair bit of attention to keep them in top form.

The quality of the graphics is better than average due to a resolution of 512 x 640. This will give good resolution on circles of five millimetres diameter or more. The lined effect which occurs on large circles is similarly more subdued than on many machines.

The real test for this system was the amount of use it got during its sojourn in the *Your Computer* office. Anyone walking past – editorial staff, artists and advertising managers – sat down, doodled, drew pictures, wrote nasty things to one another, created intricate patterns and generally had a lot of fun. Nobody really told anyone how to use the system, but we still came up with drawings of a rhinoceros in a paper bag, an ant walking through a puddle of red wine, a rabbit in a snow storm and an aerial view of a Mexican cooking an egg. And then, there was the cake... ❑

Top: the Bit Pad One, used to 'draw' with the NEC APC. Below: the famous cake, drawn by Your Computer staff using the APC and the Bit Pad One after only a few hours of playing with the system.

See what all the fuss is about at The Personal Computer Show.

Personal computers. You know they're causing a lot of fuss, but you don't really understand why.

Well, here's your chance to find out, at The 2nd Australian Personal Computer Show.

It's the most exciting and comprehensive microcomputer exhibition held in Australia.

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The 2nd Australian Personal Computer Show

Centrepoint Sydney 14-17 March

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PC 84

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Second Personal Computer Show

The Personal Computer Show is on again. From 14 March the 2nd Personal Computer Show will be staged at the Centrepoint Exhibition Centre in Sydney. Last year's show was a huge success and the organisers, Australian Exhibition Services, expect another well-supported event.

Australian Exhibition Services' Director, Mr Graeme Selby, said that nearly all of last year's exhibitors were back and that many were launching new products.

"The computer industry requires a special exhibition for personal computers. They want to meet people specifically interested in personal computers.

"PC84 will cater for professionals through to home users, experienced to inexperienced. There will be 1600 square metres of space, with space reserved for the restaurant and clubs. The space was given to the clubs because we believe they have a role to play in personal computers like everybody else," says Selby.

The clubs that will be represented are the Sydney Sorcerer, Apple, Atari and Texas Instruments clubs.

There will be displays from 70 exhibitors and one of the main features will be an audio-visual presentation by Coopers and Lybrand.

According to Mr Selby, "The purpose is to facilitate sales by making benefits obvious and removing fears. It will introduce business people to computers. People will be able to have a hands-on experience as part of the demonstration."

The presentation will run for an hour, starting on the hour continuously throughout the show. There will be four separate topics covered: 'How to use the Exhibition'; 'Hard Decision' – factors to consider when choosing hardware; 'Soft Options' – outlining the various options for software; 'Education' – aimed at the use of microcomputers in education.

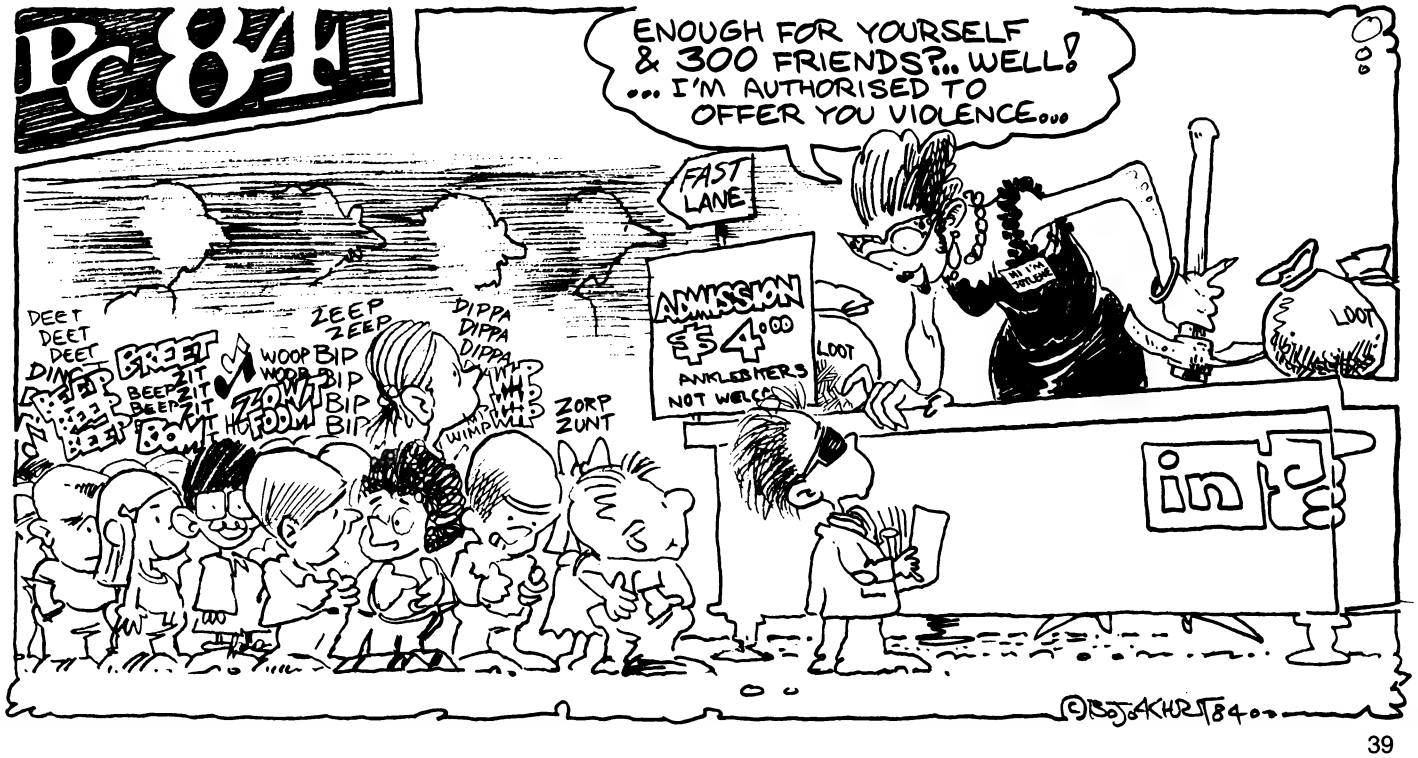
AES hopes that the admission charge of $4.00 will restrict the audience to only those who are genuinely interested in personal computers. This should be a welcome relief to people who have had to struggle through hordes of game-playing brats to see the latest computers.

There will also be a business day, the first day of the show, where entry will be restricted to people who present business identification or other proof of professional interest.

In addition there will be separate entrances and exits in an attempt to ease congestion. There will be a 'fast lane' for people who have purchased Fast Lane tickets before the show. These are on sale now from AES at a reduced rate of $3.00.

The 2nd Australian Personal Computer Show will run from Wednesday March 14 (business day) through until Saturday March 17. It will be open Wednesday to Friday 9.00 am until 7.00 pm and on Saturday 9.00 am until 5.00 pm.

Tickets to the show are available from Australian Exhibition Services, Suite 3.2, Illoura Plaza, 424 St Kilda Road, Melbourne 3004. ❑



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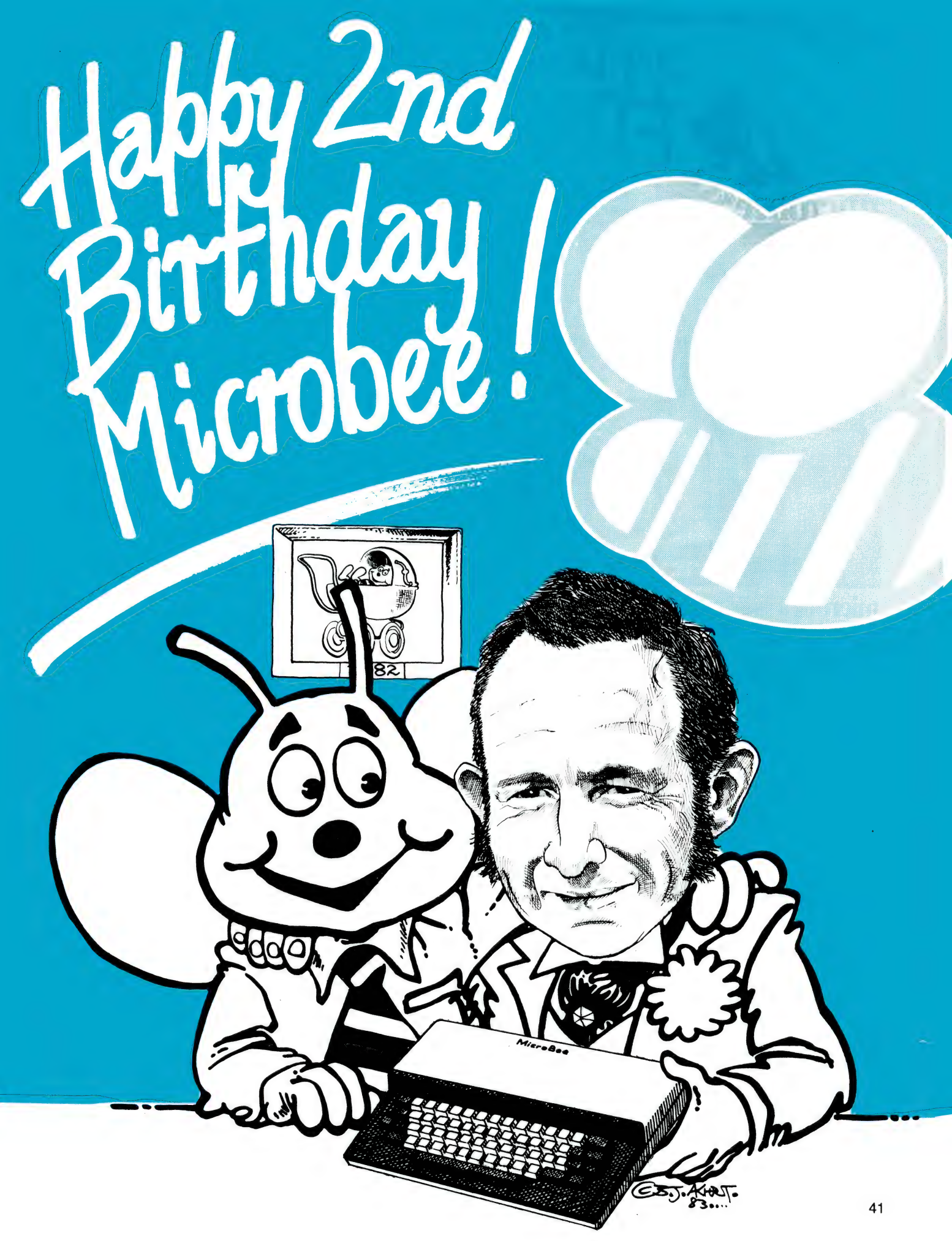
Happy 2nd Birthday Microbee!
82
MicroBee

SERIES 2 EDUCATOR

microbee

APPROVED BY AUSTRALIAN EDUCATORS FOR USE IN AUSTRALIAN SCHOOLS

Specifications:

PROCESSOR: Z80A running at 3.375 MHZ

KEYBOARD: 60 key FULL SIZED QWERTY layout with full travel.

MEMORY: 44K comprising of 16K user RAM (expandable on-board to 32K), 20K ROM software, 4K character ROM, 4K graphics and screen memory.

DISPLAY: Direct video to external monitor or modified TV. 80 by 24 and 64 by 16 character display modes, high resolution PCG graphics to 512 by 256 pixels. Upper and lower case with full programmability at any screen location.

SOFTWARE: MICROWORLD 16K BASIC V5.22 in ROM, MICROWORLD Z80 machine code monitor, built-in diagnostics, NETWORKING with programmable baud rates from 110 to 4800 Baud, 7,8 bit formats, half, full duplex transmission and complete file transfer using the 'HOBBY' standard Christensen protocol.

INPUT/OUTPUT: Programmable 8 bit input/output parallel port, programmable RS232 port, cassette interface, direct video, 50 way Z80 expansion bus.

microbee Series 2 EDUCATOR

The **microbee Series 2** was specifically designed to serve the needs of the EDUCATION MARKET. Let's face it, the primary non-business use for most personal microcomputers is to increase our learning capabilities either about computers (computer awareness) or about life itself. **microbee Series 2** has now been officially approved by Education Departments in NSW, WA and Queensland and is being carefully considered in virtually all other states and by the National Schools Commission at the time this magazine was going to press. Over 5,000 **microbees** are now in constant use in schools, universities and technical colleges throughout Australia and New Zealand and the number is growing daily.

A large and increasing body of highly creative software has now been written for the **microbee** by students, teachers and professional programmers. We are aware of up to 6 new programs a day so you are assured of long term support.

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PROCESSOR: Z80A running at 3.375 MHZ.

KEYBOARD: 60 key FULL SIZED QWERTY layout with full travel.

MEMORY: 36K comprising of 8K user RAM (expandable on-board to 16K), 20K ROM software, 4K character ROM, 4K graphics and screen memory.

DISPLAY: Direct video to external monitor or modified TV. 80 by 24 and 64 by 16 character display modes, high resolution PCG graphics to 512 by 256 pixels. Upper and lower case with full programmability at any screen location.

SOFTWARE: MICROWORLD 16K BASIC V5.22 in ROM, MICROWORLD Z80 machine code monitor, built-in diagnostics, NETWORKING with programmable baud rates from 110 to 4800 Baud, 7,8 bit formats, half, full duplex transmission and complete file transfer using the 'HOBBY' standard Christensen protocol.

INPUT/OUTPUT: Programmable 8 bit input/output parallel port, programmable RS232 port, cassette interface, direct video, 50 way Z80 expansion bus.

microbee Series 2 EXPERIMENTER

By popular request, the low cost **microbee Series 2 Experimenter** has been designed for those who are starting out in the fascinating world of computers or those who want to share the fascination of exploring the exciting developments in the fast moving MICRO WORLD.

Demand for projects using the **microbee** is so great that 'Electronics Today' are now planning to run a **microbee** project every month during 1984. So far ETI has described the light pen, EPROM programmer, a radio TTY printer, the World's first home facsimile receiver and ROM expander board for the **microbee**. Virtually every local computer magazine has run reviews and/or columns devoted entirely to the **microbee**. If you want to be part of the MICRO-COMPUTER GENERATION in 1984 then **microbee Series 2 Experimenter** is the ideal starting point.

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RGB COLOUR MODULE $125.00

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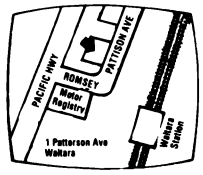

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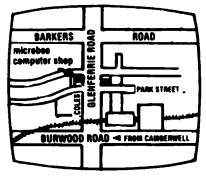

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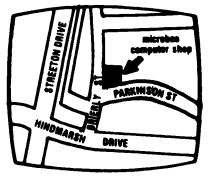

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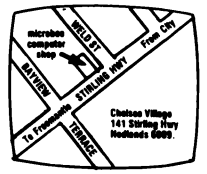

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microbee

What Microbee Did

This month the Microbee will be two years old. Evan McHugh looks at what it has achieved so far, and at what is being planned in the hive in terms of future development.

I WANNA tell you a story, a story about a Bee – the Microbee. The basic model was launched in February 1982. By early 1983, colour and disk systems were available. Today, the Microbee is well entrenched in schools, hobby computing and some small businesses. At the beginning of 1984, Applied Technology, the company that manufactures the Bee, had back orders from schools worth around one million dollars.

The secret to the Bee's success in schools hinged on its acceptance by the various authorities, state and federal, which administer the school system. The Schools Commission, for example, chose three machines as suitable for student use: Apple, BBC and Microbee. One reason for selecting the Microbee was its low price.

Networking For Schools

Applied Technology's special networking package for schools, Beenet 2, makes it an excellent proposition. The classroom network has a 1.3 Megabyte data transfer rate and can cater for 16 or more terminals. Sixteen is considered the optimum number of terminals. This figure is based on the school average of 32 children in a class, giving them one terminal between two.

The cost of the system works out at around $500 for each child, which includes the disks required. That might sound a lot, but isn't when you consider the nature of the resource: it is reusable, resellable, upgradeable and cheaper than other comparable systems.

In talking to Owen Hill, Managing Director of Applied Technology, it was obvious that there are many different ideas on how the computer can be used to aid in the education process.

He says, "It started out with an idea that kids need computer awareness, but for a long time CAI (Computer Aided Instruction) was not really viable or realistic. The real uses have been a lot different to what people expected."

Hill considers that the best computer applications since developed are those produced by the end users – the teachers and the children. "It's teacherware, not software or programmerware.

Owen Hill, Applied Tech's Managing Director.

The real ideas are coming from people who know what they want to teach and how they want to teach it. Initially, it was thought that computers would teach like a book, by taking the text and putting it up on the screen. But many of the concepts that can be presented by a computer don't even have to use words. Graphics were something people didn't even think about.

"Take the map of Western Australia," he explains. "You could tell the computer to show the development of towns from say 1850 to 1950. All the dots would start appearing on the screen and then you would notice them all spreading in lines running inland from the coast. The teacher can then ask, 'Hey! who knows why they developed like that? They're moving out along the rivers, and you can see how the towns developed with the cray fishing industry.'

"That kind of software," he continues, "comes from the people who have empathy with the kids – the teachers. They know at the end of a year if a student has done all right and they can assess whether something works or not. And that's where we are now. Teachers who know the potential and uses of the computer as a motivational tool are important to development in this area."

The networks have other advantages. They impose a hierarchy, like the typical classroom, on computer systems. It extends from the teacher to the students. This allows the teacher to interact with the students; giving time to those who need it. The bright children can fly along at their own pace, being taught by the machine, while the slow learners can work at their own pace without feeling embarrassed when they take a while to pick something up.

The Hobby Market

Development in the hobby market has followed a different trend. While it might have been expected that after a period of time the hobby market would become saturated and sales would drop, a quite different phenomenon has occurred.

"Hobbyists tend to be the forerunners of the next trend," says Owen Hill. "Take RCPMs: they are starting to spring up all over the place and are a definite direction that the market will develop in."

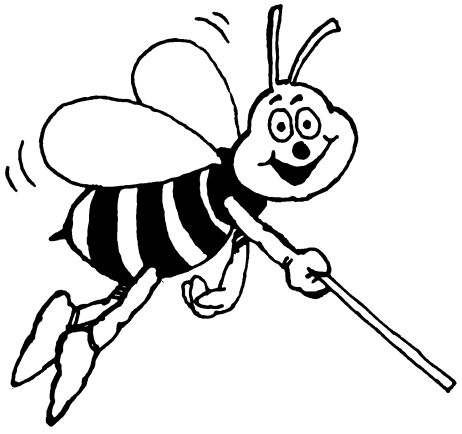
The Bee's development is certainly going to follow trends like this. Applied Technology's machines are beginning to incorporate basic home-to-network ROMs with Modem 7 protocols. The company already has a sophisticated system which allows people to buy software electronically and to make electronic complaints.

"The choice is yours. Do you want to talk to a person or to a computer?" says Hill.

The Microbee is also starting to follow the Auspac with X25 packet node.

Developments currently under way are not just in networking and communication, although these are arguably the most significant. Other developmental areas include machine development.

The latest model Microbee, for instance, will have/has 128K. But that's not RAM, nor is it ROM. It can best be described as quick memory. Due to some bank switching problems it isn't possible to use the extra 64K as program area, but it can be used for tempo-



rary storage for quick data transfer and a few other tricks as well.

The extra 64K can be used in different ways: as a disk buffer or printer buffer or as a storage area for frequently used utilities. This technique will be much faster than disk access since the file, or whatever is being sought, is already in memory. This is really RAM drive – file storage in the computer itself.

With a lot more space to play with the Microbee can now become more user-friendly. It even has icons. The interface with CP/M has been made more palatable to the computer illiterate who knows what he wants to do but can't understand how to tell the computer to carry it out.

"Our software is not integrated like VisiOn or Lotus 1-2-3," says Hill. "Our software could best be described as bundled. You get Wordstar and Multiplan and so on, with the operating system tying it all together. You don't get to switch between one package and another, which few people do, anyway."

One point made by Owen Hill which will be of interest to Microbee owners is that Applied Technology guarantees expandability to upgrades for existing owners, without penalty. So, you can get that extra disk drive for the cost of a disk drive alone; you don't pay for the interface board.

The Bee Overseas

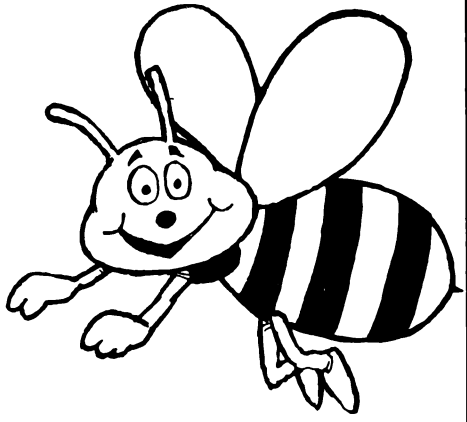
Another area where the Bee is moving ahead is in exports. Markets include Sweden, Norway, Iceland, Denmark, Finland, Belgium, Switzerland, Germany, Holland, Israel (with a Hebrew keyboard), South Africa and Hong Kong. Enquiries have also been received from Poland and Red China.

When it comes to exporting, Applied Technology claims to offer some advantages that major overseas manufacturers don't. US manufacturers, for example, are into mass markets and therefore have no interest in specialising or catering to individual needs.

Says Owen Hill, "You can ask for any colour, but you'll get black. Here, if you want it in a velvet lined leather case, you'll get it in a velvet lined leather case. We survive by rat cunning. We have to find out what the market wants and find niches that we can fit into. We're small volume, so we need to be flexible. This is where we have the edge.

"We also have no overseas distributors. The large companies have all that worked out. We haven't got any of it. So, any entrepeneur who wants to sell our product can just come along and do so."

Applied Technology has recently moved its manufacturing operation back to Australia, from Hong Kong. Owen Hill



believes that Australian productivity and quality of workmanship is superior to that in Hong Kong.

In Owen Hill's view the Asian basin production base has three main areas. In Japan you can find high technology: that's where you go to buy memory, liquid crystals and floppies. In other Asian countries you can find cheap labour. In Australia there are highly educated, lateral thinking English speakers. Communications and computing have made the western world one where you must have English to survive. Australia's role may well be to exploit the Asian capabilities, to produce computers of top quality for export to the entire world. Hill expects that in the near future there will be a lot more computer production in Australia and that it may become one of the country's most important industries.

Research And Development

Applied Technology has also received a research and development grant (figure undisclosed) to enable investigation into the possibilities of portability, liquid crystals, 16-bit interfacing, six-centimetre disks, bubble memory and micro drives.

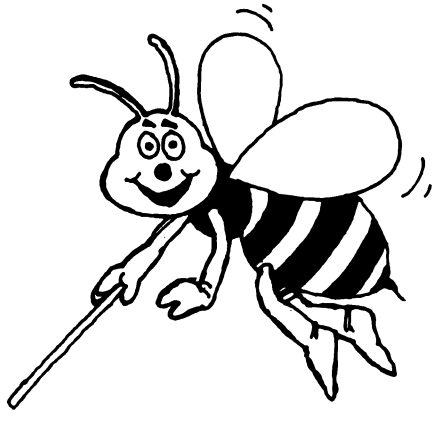
Looking further ahead, Owen Hill sees the future of the Microbee in office networking, with easy switching between MS-DOS, CP/M or CP/M-80. It will have a liquid crystal display of around A4 size with 640 x 200 pixels. It will have 8-bit to 16-bit interface and full keyboard to DIN 2197 standard specifications. Fully ergonomic, it will still have the computer in the keyboard.

Hill believes home computing will move more into the communications area. Banking and shopping are already being done electronically and this trend will become stronger. Current talks between Telecom and Applied Technology are aimed at allowing Microbee owners to connect to a Microbee system from anywhere in Australia for a maximum of $5 an hour (Telecom rates).

With around 20,000 Microbees and 40,000 telexes in use, the potential for communication is astonishing. There is still a long way to go, but the signs are already there. The growth of RCPM is one sign, another is the number of Microbee sales to university students who use them to access mainframes, such as the VAX 11/780.

Applied Technology will soon be making machines available with communications built-in. Features include auto dialling, lots of handshaking, the ability to tailor the machine to suit different uses, and facilities for setting up the communications system so even the most non-computer-literate can use it.

One has to say it. Things are really buzzing at Applied Technology (sorry) and it doesn't look like the Bee is going to lose its sting. I can only agree with Owen Hill's view that the communications revolution being brought about by computers has yet to get into swing. When it does, the whole world could turn on its ear – and the Bee will still be there. ❑



NEW RELEASE

microbee

SERIES 2 PERSONAL COMMUNICATOR

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- **16 programmable baud rates from 50 to 19200 (7/8 Bit)**
- **Auto dialling/hangup for modem**
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- **Super friendly menu driven**
- **Usable as stand alone or through Wordbee or Basic**
- **Now available for all IC or later microbees**
- **World standard Christensen protocol for file transfer**

Now every **microbee** can become a personal terminal using TELCOM 1. TELCOM 1 is a ROM based communications program suitable for all ROM based **microbee** IC and later models. It allows the use of the serial RS232 port at 16 baud rates from 50 to 19200 Baud, provides real time clock with alarm feature, modem control functions such as automatic dialling, BASIC WORDBEE and MACHINE LANGUAGE file transfer via the serial port. Additionally the ROM emulates the ADM 3A and Televideo 912 terminals for connection to other computers. All information can be viewed on the screen and retrieved as a WORDBEE file and even printer-out using the built in screen print utility.

1984 IS THE YEAR OF THE NETWORK . . . . with over 20,000 **microbees** now in everyday use and most with integrated software including WORDBEE, MICROWORLD BASIC and COMMUNICATIONS capability are you missing out on the computing opportunity of the year? Using a low cost modem such as the BEEMODEM you can now talk to other computers around the world, use the public domain bulletin boards, shop electronically, communicate with friends with your own home telex and extend your computing horizons by converting your **microbee** to your personal INFORMATION WINDOW to the world.

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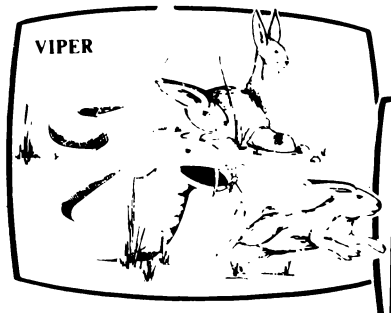

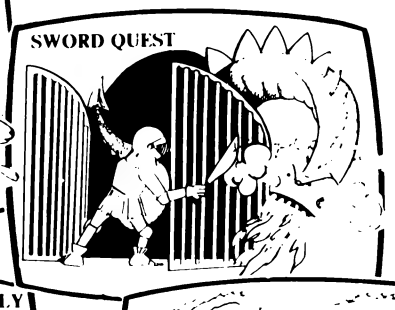

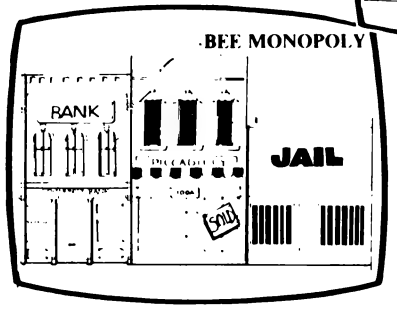

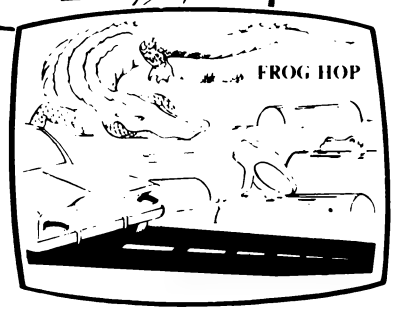

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Now a full graphic version of the old family game of the same name. The entire board, players, Community Chest and Chance cards are displayed as required in this fast moving game. Full details of land ownership and finances. Superb graphics and sound effects. (Requires 32K).
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A most graphic variation of the popular arcade game. You must hop across a busy street (watch out for the trucks . . .) and across a crocodile infested stream before your frogs are safely home. Guaranteed to appeal to all ages.
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ROBOT MAN '84
Now one of the most popular games ever written for the **microbee** has been rewritten with new twists, a joystick and colour option.
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New update of one of the original **microbee** games. Now with full colour and joystick option. Sound and speed controls. Turn your **microbee** into a home arcade machine.
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Now the full series by John Grimley in one value package containing 6 cassette tapes (or 1 diskette). Utilizing well known games such as 'Donkey Kong', 'Frog Hop' and 'Rescue' you can enjoy the game and learn at the same time.
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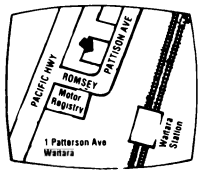

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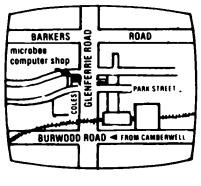

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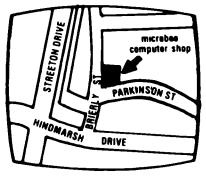

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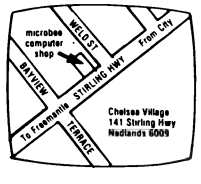

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microbee

What Microbee Did Next

The new Microbee with its two disk drives, topped by a monitor showing its use of icons to make operation user friendly. On the right is a BeeModem and phone (known in the office as the 'Batphone' because of its strange warbling ring) on top of a second set of old Bee drives.

A birthday shouldn't go by without some sort of presentation being made. The makers of the Microbee are offering buyers a new machine. Evan McHugh previewed it.

FIRST, it should be made perfectly clear that this is not a review. It is a preview of the latest Microbee as described by the manufacturer and as seen, in its prototype form, by the author of this article. It is expected that this latest Microbee will soon be released and it should appear at the 2nd Australian Personal Computer Show. As yet, it cannot be properly assessed because there are still a few bugs to be eliminated, but a full review will be given as soon as possible.

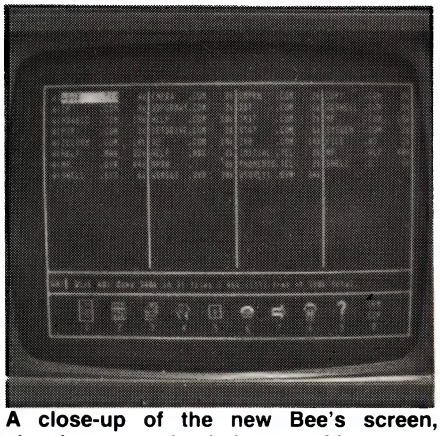
So, let's look at the gizmo.

Bees Are Getting Bigger And Friendlier

The Microbee is getting bigger. The box it comes in hasn't changed much, but its innards have. Its first big feature is 128K of RAM. This is arranged in two 64K banks. The second bank cannot be used for programs, so it becomes a 'virtual' disk drive. Files, data or commonly used functions may be stored there, or it can be used as a buffer. The advantage of this is that it is much faster than disk drives.

The machine's next new feature is user-friendliness. (This obvious following-in-the-footsteps of another computer manufacturer might make you think the Bee has turned into a fruit fly.) The first screen on boot-up shows a list of files on the currently logged drive, a drive status line, and below that a row of icons which permit you to select a range of functions. These include delete, format disks, or move to normal CP/M operation, word processing, spreadsheet or communications. There is also a help function that describes how to use the various choices.

You don't have to encounter any of the normal functions of CP/M if you don't want to. The system will ask what you want to do in plain English and then it issues all the commands necessary to get the job done. For example, to format a disk, press the number corresponding to the function and answer the question by telling the machine which drive you want to format the disk in.



A close-up of the new Bee's screen, showing more clearly its use of icons.

With this system you can use single keys to call programs. To call other programs that are not in the key-controlled functions, just move the cursor over the program in the file directory and it will be executed when you hit return. Movement is controlled by the same up, down, left and right controls as in standard Wordstar.

Programs

One program available for the new Microbee that is worth special mention is the communication program. It supports up to 19 Kbaud, Christensen Protocol, auto dialling and log-on sequences. You can set up the computer so the command 'Dial MiCC' will make the computer phone the MiCC Bulletin Board, and if necessary go through the log-on to get onto the system. You can do this with any number of entries, enabling you to call up a whole range of boards with ease. Other capabilities include unprotected through to fully protected file transfer.

One extremely useful function is 'set drive'. This program sets up the disk drive to read a large number of disks in a range of formats.

You can also switch between drives by pressing a single button, and it is here that the role of the extra bank becomes obvious. The computer knows the bank as 'drive M'. So, to switch to the bank, switch to drive M and file access can be carried out just as with a disk drive, except that it's a lot quicker.

The new Bee costs $1,995, and you get a good deal for your money. Included are the 128K Z80-based Microbee, two disk drives (double density, double sided, 40 tracks) and software. The software alone is said to be worth around $5,000 and includes Multiplan, Wordstar, Microworld BASIC, Microsoft BASIC and Sybiz Business Software (General Ledger, Debtors Ledger, Creditors Ledger, Stock Control, Order Entry, Invoicing, Job Costing, Payroll, and Report Generating). You also get Busicalc, Wordbee, an Editor Assembler and access to the Microworld Support Library. All the relevant manuals are supplied. ❑

C-TECH

SIRIUS

16 bit processor, uses the well known 8088 processor so it comes complete with MS DOS and CP/M 86. The SIRIUS has a huge 600 Kbyte per drive as standard, or double that capacity if required. The graphics on the SIRIUS are super high resolution, 800 by 400 pixels with semitone shading. There are thousands of units installed in Australia as the superior technical capabilities of the machine have been recognised by many large corporations, research teams and educational institutions.

PRICES

Sirius 1 with 1.2 Mbyte drive capacity and 128K RAM is **$5990** inc. tax. **$5250** ex. tax.
Sirius 1 with 2.4 Mbyte drive capacity and 256K RAM is **$7300** inc. tax. **$6400** ex. tax.
Sirius 1 with 10 Mbyte hard disk and 256K RAM is **$10,960** inc. tax. **$9,600** ex. tax.

KAYPRO II

Easy is the most apt description for this model–easily portable, affordable, readable and typeable: Sculptured, high-quality keyboard, and weighing just 13 kilos. A free range of software to the value of $2,500 is included.
The Kaypro is CPM-DOS compatible and driven by a ZILOG Z-80™ micro-processor, making it a most popular system for the small business-person.

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Let us introduce you to our workhorse. This is not a pretty little computer which looks great and does nothing. It's built purely for hard work.
It's our own RITRON computer built on the big board 2.
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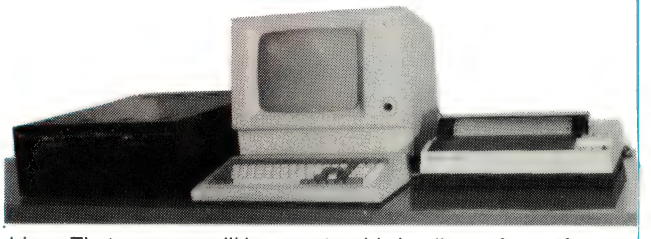

drives. That means you'll have no trouble loading software from other sources.
Other features of our computer include DMA for fast disk access and a hard disk interface for when you want to upgrade your storage requirements.

PRICE: $4740 inc. tax. $3950 ex tax

New Chameleon

8-bit and 16-bit processors: Standard
128K bytes RAM: Standard
IBM-PC® and CP/M-80® Compatibility: Standard
Word processing and spread-sheet software: Standard

SPECIFICATIONS:

STANDARD CHAMELEON - HARDWARE
Processors: 8088 - 16 bit (IBM-PC compatible) Z80A - 8 bit
RAM: 128 bytes (expandable to 256K)
ROM: 8K bytes (expandable to 48K)
Disk: Dual 160K byte 5¼" disks (IBM-PC compatible)
Display: 9" CRT with green phosphor
I/O: One serial RS-232 port One parallel port
Keyboard: 83-key (IBM-PC compatible) with 10-key numeric pad and 10 function keys
Graphics: Black and White: 640x200 or 320x200 resolution Colour (on separate colour monitor): 320x200 resolution, 16 colour, 4 at a time - Portable

STANDARD CHAMELEON - SOFTWARE
Operating system: MS-DOX (IBM PC-DOS compatible)
Development language: MBasic-86 (IBM compatible)
Word processing: Perfect Writer
Spreadsheet: Perfect Calc

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COMMODORE 64

Video Poker – it's no big deal! for Commodore 64

By Ian Forster, Northbridge NSW

Video Poker – for those who avoid establishments where fermented and spiritous liquids are purveyed – is the latest amusement craze to hit the pub scene.

The listing below represents your very own Video Poker Game, which, while it isn't an exact replica of the real thing provides a reasonable facsimile.

You are given $10 to start and may bet from $1 to $5. If you win you are given a "double or nothing" option. A word of warning though – don't try to make money out of your friends. The odds in this game are more generous (and realistic) than the real game, making it reasonably easy to win. However, to reach the target of $2,000 may require several hours and a lot of daring use of the double up option.

```
READY.

 1 REM        ****************
 2 REM        * VIDEO POKER *
 3 REM        *     BY       *
 4 REM        * IAN FORSTER *
 5 REM        *   22/8/83    *
 6 REM        ****************
10 PRINT"■■":POKE53280,8:POKE53281,8
20 DIMCN%(11),CS%(11),CV%(11),CC%(11),CD%(11)
50 DIMA%(3,4,6)
97 REM          **********
98 REM          READ DATA
99 REM          **********
100 FORX=1TO13:FORY=0TO4:FORZ=0TO6
110 READA%(X,Y,Z)
120 NEXT:NEXT:NEXT:GOSUB800
130 FORX=1TO8
140 READB%(X),C%(X):NEXT
190 GOSUB190:GOTO320
190 TT=10
197 REM       ***********************
198 REM       DEAL CARDS SUBROUTINE
199 REM       ***********************
200 FORN=1TO11
210 CN%(N)=INT(RND(0)*52)+1
220 IFN=1GOTO260
230 FORM=1TON-1
240 IFCN%(N)=CN%(M)GOTO210
250 NEXTM
260 CS%(N)=INT((CN%(N)-1)/13)+1
270 CV%(N)=CN%(N)-(CS%(N)-1)*13
280 IFCS%(N)=1THENCD%(N)=65:CC%(N)=8:NEXT:RETURN
290 IFCS%(N)=2THENCD%(N)=83:CC%(N)=2:NEXT:RETURN
300 IFCS%(N)=3THENCD%(N)=88:CC%(N)=8:NEXT:RETURN
310 CD%(N)=90:CC%(N)=2:NEXT
315 RETURN
317 REM       ***********************
318 REM       DISPLAY SCREEN FORMAT
319 REM       ***********************
320 PRINT"■■■■■■■■■■■■■■■"
330 PRINT"■ROYAL FLUSH"TAB(27)"$500 FOR $1"
340 PRINT"STRAIGHT FLUSH"TAB(27)"$150"
350 PRINT"FOUR OF A KIND"TAB(28)"$80"
360 PRINT"FULL HOUSE"TAB(28)"$40"
370 PRINT"FLUSH"TAB(28)"$20"
380 PRINT"STRAIGHT"TAB(28)"$10"
390 PRINT"THREE OF A KIND"TAB(28)"$5"
400 PRINT"TWO PAIRS"TAB(28)"$2"
405 PRINT"ONE PAIR"TAB(28)"$1■":GOSUB410:GOTO450
410 PRINT"■■■■■■"TAB(3)"1"TAB(11)"2"TAB(19)"3"TAB(27)"4"TAB(35)"5"
420 PRINT"  ┌─────┐ ┌─────┐ ┌─────┐ ┌─────┐ ┌─────┐"
430 FORN=1TO7:PRINT"| ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ | ■■■■■ |":NEXT
440 PRINT"  └─────┘ └─────┘ └─────┘ └─────┘ └─────┘"
445 RETURN
447 REM              ********
448 REM              MAKE BET
449 REM              ********
450 PRINT"■■HOW MUCH WOULD YOU LIKE TO BET?■"
455 PRINT"■■■■■CASH IN HAND = $"TT"■"
460 GETA$:IFVAL(A$)<1ORVAL(A$)>5GOTO460
470 IFTT-VAL(A$)<0THENPRINT"■■BUT YOU ONLY HAVE $"TT:GOTO460
480 BT=VAL(A$):GOSUB750:PRINT"■■■■■"TAB(25)"THIS BET = $"BT"■"
500 PRINT"■GOOD LUCK!"
510 GOTO1000
597 REM                ****
598 REM                DATA
599 REM                ****
600 DATA1,0,32,32,32,32,32
601 DATA32,32,32,32,32,32,32
602 DATA32,32,32,0,32,32,32
603 DATA32,32,32,32,32,32,32
604 DATA32,32,32,32,32,0,1
610 DATA50,32,32,32,32,32,32
611 DATA32,32,32,32,32,32,32
612 DATA32,32,0,32,0,32,32
613 DATA32,32,32,32,32,32,32
614 DATA32,32,32,32,32,32,50
620 DATA51,32,32,32,32,32,32
621 DATA32,32,32,32,32,32,32
622 DATA32,0,32,0,32,0,32
623 DATA32,32,32,32,32,32,32
624 DATA32,32,32,32,32,32,51
630 DATA52,32,32,32,32,32,32
631 DATA32,0,32,32,32,0,32
632 DATA32,32,32,32,32,32,32
633 DATA32,0,32,32,32,0,32
634 DATA32,32,32,32,32,32,52
640 DATA53,32,32,32,32,32,32
641 DATA32,0,32,32,32,0,32
642 DATA32,32,32,0,32,32,32
643 DATA32,0,32,32,32,0,32
644 DATA32,32,32,32,32,32,53
650 DATA54,32,32,32,32,32,32
651 DATA32,0,32,0,32,0,32
652 DATA32,32,32,32,32,32,32
653 DATA32,0,32,0,32,0,32
654 DATA32,32,32,32,32,32,54
660 DATA55,32,32,32,32,32,32
661 DATA32,0,32,0,32,0,32
662 DATA32,32,0,32,32,32,32
663 DATA32,0,32,0,32,0,32
664 DATA32,32,32,32,32,32,55
670 DATA56,32,32,32,32,32,32
671 DATA32,0,32,0,32,0,32
672 DATA32,32,0,32,0,32,32
673 DATA32,0,32,0,32,0,32
674 DATA32,32,32,32,32,32,56
680 DATA57,32,32,32,32,32,32
681 DATA32,0,0,32,0,0,32
682 DATA32,32,32,0,32,32,32
683 DATA32,0,0,32,0,0,32
684 DATA32,32,32,32,32,32,57
690 DATA49,32,32,32,32,32,32
691 DATA48,0,0,32,0,0,32
692 DATA32,32,0,32,0,32,32
693 DATA32,0,0,32,0,0,49
694 DATA32,32,32,32,32,32,48
700 DATA10,0,78,99,32,32,32
701 DATA32,78,124,76,77,233,127
702 DATA152,73,32,32,100,127,127
703 DATA152,32,29,32,100,127,127
704 DATA152,103,103,103,78,0,10
710 DATA17,0,78,99,32,32,233
711 DATA223,101,109,76,77,233,233
712 DATA233,73,32,32,100,233,233
713 DATA223,214,214,32,100,233,233
714 DATA233,214,214,214,214,0,17
720 DATA11,0,78,99,32,106,32
721 DATA252,101,124,76,101,128,104
722 DATA252,73,32,32,32,128,104
723 DATA252,32,29,128,128,128,104
724 DATA97,103,103,103,78,0,11
730 DATA160,244,244,160,160,32,160,32,223,244,105,32,32,32,32,32
731 DATA233,234,234,95,160,32,32,160,223,244,244,105,32,32,32,32
732 DATA160,244,244,160,233,105,95,116,105,32,223,160,32,32,32,32
733 DATA160,244,244,160,160,98,226,160,160,124,108,160,32,32,32,32
734 DATA160,244,244,160,160,32,160,95,223,244,105,223
740 DATA17,37,19,63,21,154,22,227
741 DATA25,177,28,214,32,94,34,175
747 REM ********************************
748 REM CLEAR TOP OF SCREEN SUBROUTINE
749 REM ********************************
750 PRINT"■                                        "
751 PRINT"                                         "
752 PRINT"                                         "
755 RETURN
797 REM  ******************************
798 REM  DISPLAY TITLE & INSTRUCTIONS
799 REM  ******************************
800 R=1064:S=54272
805 FORN=RTOR+160:POKEN+S,6:NEXT
810 FORN=10TO28
820 READA,B,C,D
830 POKER+N,A:POKER+N+40,B:POKER+N+80,C:POKER+N+120,D
840 NEXT:PRINT"■■■■■■"
850 PRINT"----------------------------------------"
860 PRINT"YOU HAVE $10 TO START PLAYING. YOU MAY■"
870 PRINT"BET FROM $1 TO $5. SEE IF YOU CAN WIN■"
880 PRINT"$2000 AND BREAK THE BANK! NOTE THAT■"
890 PRINT"ACES ARE HIGH ONLY.■■"
900 PRINT"PRESS ANY KEY TO CONTINUE (NOT RUN/STOP)"
910 GETA$:IFA$=""GOTO910
920 PRINT"■":RETURN
997 REM     *************************
998 REM     DISPLAY CARDS SUBROUTINE
999 REM     *************************
1000 V=1305:S=54272
1010 FORN=1TO5:GOSUB1015:NEXT:GOTO1100
1015 FORY=0TO4:FORZ=0TO6
1020 W=V+8*(N-1)+Y+40*Z
1030 IFA%(CV%(N),Y,Z)=0THENPOKEW,CD%(N):GOTO1050
1040 POKEW,A%(CV%(N),Y,Z)
1050 POKEW+S,CC%(N)
1060 NEXT:NEXT
1070 RETURN
1097 REM       *******************
1098 REM       DISCARD SUBROUTINE
1099 REM       *******************
1100 GOSUB750:PRINT"
1110 PRINT"■■HICH CARDS WOULD YOU LIKE TO DISCARD?"
```

```
1120 PRINT"ONE NUMBER AT A TIME.(N=NO DISCARDS)"
1150 GETA$:IFA$=""GOTO1150
1160 IFA$="N"GOTO1400
1180 N=VAL(A$):IFN<1ORN>5GOTO1150
1190 M=N:CV%(0)=CV%(N):CC%(0)=CC%(N):CD%(0)=CD%(N):CS%(0)=CS%(N)
1200 CV%(N)=CV%(N+5):CC%(N)=CC%(N+5):CD%(N)=CD%(N+5):CS%(N)=CS%(N+5)
1210 PRINT"":FORX=1TO7:PRINTTAB(8*(N-1)+1)"":NEXT
1300 PRINT" -PRESS R TO RECALL THE LAST DISCARD."
1305 PRINT"WHEN FINISHED PRESS S TO SHOW HAND"
1310 GETA$:IFA$=""GOTO1310
1320 IFA$="S"GOTO1350
1325 IFA$="R"THENGOSUB2300
1330 N=VAL(A$):IFN<1ORN>5GOTO1310
1335 IFPEEK(V+8*(N-1))=102GOTO1310
1340 GOTO1180
1347 REM          ****************
1348 REM          SHOW FINAL HAND
1349 REM          ****************
1350 FORN=1TO5
1360 W=V+8*(N-1)
1370 IFPEEK(W)=102THENGOSUB1015
1380 NEXT
1387 REM   **************************
1388 REM   CHECK FOR 2,3,4 OF A KIND
1389 REM   **************************
1400 TV=0:TS=0
1420 FORN=2TO5:FORM=1TON-1
1430 TV=TV-(CV%(N)=CV%(M))
1440 NEXT:NEXT:GOSUB750:PRINT""
1450 IFTV=0GOTO1750
1460 ONTVGOTO1500,1550,1600,1650,1650,1700
1500 FORX=1TO3:PRINTTAB(15)"ONE PAIR":GOSUB2500:NEXT:TT=TT+BT
1510 PRINTTAB(15)"ONE PAIR":WR=1:GOTO2100
1550 FORX=1TO3:PRINTTAB(15)"TWO PAIRS":GOSUB2500:NEXT
1560 TT=TT+2*BT:WR=2
1570 PRINTTAB(15)"TWO PAIRS":GOTO2100
1600 FORX=1TO3:PRINTTAB(12)"THREE OF A KIND":GOSUB2500:NEXT
1610 TT=TT+5*BT:WR=5
1620 PRINTTAB(12)"THREE OF A KIND":GOTO2100
1650 FORX=1TO3:PRINTTAB(15)"FULL HOUSE":GOSUB2500:NEXT
1660 TT=TT+40*BT:WR=40
1670 PRINTTAB(15)"FULL HOUSE":GOTO2100
1700 FORX=1TO3:PRINTTAB(12)"FOUR OF A KIND":GOSUB2500:NEXT
1710 TT=TT+80*BT:WR=80
1720 PRINTTAB(12)"FOUR OF A KIND":GOTO2100
1747 REM ********************************
1748 REM CHECK FOR STRAIGHT, FLUSH ETC.
1749 REM ********************************
1750 FORN=1TO4:TS=TS-(CS%(N)=CS%(N+1)):NEXT
1760 LC%=15:CT%=0:FORN=1TO5
1770 IFCV%(N)=1THENCV%(N)=14
1780 IFCV%(N)<LC%THENLC%=CV%(N)
1790 CT%=CT%+CV%(N):NEXT
1800 IFCT%=5*LC%+10ANDTS=4GOTO1950
1810 IFCT%=5*LC%+10GOTO1850
1820 IFTS=4GOTO1900
1830 GOTO2000
1850 FORX=1TO3:PRINTTAB(15)"STRAIGHT":GOSUB2500:NEXT
1860 TT=TT+10*BT:WR=10
1870 PRINTTAB(15)"STRAIGHT":GOTO2100
1900 FORX=1TO3:PRINTTAB(17)"FLUSH":GOSUB2500:NEXT
1910 TT=TT+20*BT:WR=20
1920 PRINTTAB(17)"FLUSH":GOTO2100
1950 IFLC%=10THENGOTO1985
1960 FORX=1TO3:PRINTTAB(12)"STRAIGHT FLUSH":GOSUB2500:NEXT
1970 TT=TT+150*BT:WR=150
1980 PRINTTAB(12)"STRAIGHT FLUSH":GOTO2100
1985 FORX=1TO3:PRINTTAB(14)"ROYAL FLUSH":GOSUB2500:NEXT
1990 TT=TT+500*BT:WR=500:PRINTTAB(14)"ROYAL FLUSH":GOTO2100
2000 TT=TT-BT:IFTT<=0GOTO2050
2007 REM            ************
2008 REM            LOSING HAND
2009 REM            ************
2010 PRINT"BAD LUCK! LET'S TRY ANOTHER HAND.":FORN=1TO2000:NEXT
2020 GOTO2400
2050 PRINT"BAD LUCK, YOU'RE OUT OF CASH!"
2060 PRINT"LIKE TO START AGAIN? (Y/N)"
2070 GETA$:IFA$="Y"THENPRINT"":GOTO180
2080 IFA$="N"GOTO3000
2090 GOTO2070
2100 IFTT>=2000GOTO2200
2107 REM            *************
2108 REM            WINNING HAND
2109 REM            *************
2110 PRINT"YOU HAVE JUST WON $";WR*BT
2115 PRINT"WANT TO PLAY DOUBLE OR NOTHING? (Y/N)"
2120 GETA$:IFA$="N"GOTO2400
2130 IFA$="Y"GOTO2700
2140 GOTO2120
2200 PRINT"CONGRATULATIONS YOU HAVE BROKEN THE BANK"
2210 PRINT"I HAVE DONATED YOUR WINNINGS TO CHARITY"
2220 PRINT"WOULD YOU LIKE $10 TO START AGAIN?(Y/N)"
2230 GOTO2070
2297 REM        ******************
2298 REM        RECALL DISCARD S/R
2299 REM        ******************
2300 CV%(M)=CV%(0):CC%(M)=CC%(0):CD%(M)=CD%(0):CS%(M)=CS%(0)
2310 N=M:GOSUB1015
2320 RETURN
2397 REM           ***************
2398 REM           DEAL A NEW HAND
2399 REM           ***************
2400 GOSUB750:PRINT"
2410 GOSUB410:GOSUB200:GOTO450
2497 REM            *************
2498 REM            WINNING MUSIC
2499 REM            *************
2500 POKE54296,15
2510 FORY=1TO8:POKE54277,9:POKE54276,17
2520 POKE54273,B%(Y):POKE54272,C%(Y)
2530 FORT=1TO5:NEXT:POKE54276,0
2540 NEXT
2550 GOSUB750
2560 FORY=8TO1STEP-1:POKE54277,9:POKE54276,17
2570 POKE54273,B%(Y):POKE54272,C%(Y)
2580 FORT=1TO5:NEXT:POKE54276,0
2590 NEXT:POKE54296,0
2600 PRINT"":RETURN
2697 REM        *********************
2698 REM        DOUBLE OR NOTHING S/R
2699 REM        *********************
2700 PRINT""
2710 FORN=1TO7:PRINT"|      |":NEXT
2720 PRINT""
2730 CD%(1)=CD%(11):CC%(1)=CC%(11):CV%(1)=CV%(11)
2740 PRINT"IS THIS CARD RED OR BLACK? (R OR B)"
2750 GETA$:IFA$="R"ANDCC%(1)=2THENPRINT"RED":GOTO2800
2760 IFA$="B"ANDCC%(1)=0THENPRINT"BLACK":GOTO2800
2770 IFA$=""GOTO2750
2780 IFA$="B"ORA$="R"GOTO2900
2790 GOTO2750
2800 N=1:GOSUB1015:TT=TT+WR*BT
2810 PRINT""TAB(8)"YOU WIN AGAIN!!":FORN=1TO3:GOSUB2500:NEXT
2820 FORX=1TO1000:NEXT:PRINT"":IFTT>=2000GOTO2200
2830 GOSUB200:GOTO320
2900 N=1:GOSUB1015:TT=TT-(WR+1)*BT:IFTT<=0THENGOSUB750:PRINT"":GOTO2050
2910 PRINT""TAB(8)"BAD LUCK!"
2920 FORX=1TO1000:NEXT:GOTO2820
3000 PRINT"":END

READY.
```

HEWLETT PACKARD

Life Tables for HP3000

Phil Carter, Warrnambool VIC

Life tables are used by actuaries in the insurance industry to help determine the risk of insuring certain people.

The publication 'Australian Life Tables 1975-1977' presents a number of statistics concerning the likelihood of survival, death and life expectancy for Australian males and females aged from 0 to 104.

Using some of this data, I have written a program called LIFETABLES. The 105 DATA values on lines 270 to 500 represent the probability of a person dying within a year. The probabilities are for the ages 0 to 104 and are for males only. For example, the 10th value, .00031, means that a 9 year old male has a probability of .00031 of dying within the next year (or a 31 in 100,000 chance).

The 105 DATA values on lines 520 to 740 represent the average number of years that remain to be lived. For example, the 59th value, 17.82, indicates that a 58 year old male can expect to live for another 17.82 years.

While the subject of death and dying may seem a rather morbid application for a computer, the program nevertheless shows which age groups are most and least at risk. (Its interesting to see how the probabilities go up and down by age group). Its the sort of application that could be put into a hand held computer and used out in the field.

```
LIFETABL
  10 DIM A1[105],A2[105]
  20 FOR I1=1 TO 105
  30   READ A1[I1]
  40 NEXT I1
  50 FOR I1=1 TO 105
  60   READ A2[I1]
  70 NEXT I1
  80 PRINT
  90 PRINT "AUSTRALIAN MALES LIFE TABLES"
 100 PRINT
 110 INPUT "ENTER YOUR AGE?",A3
 120 IF A3<0 OR A3>104 THEN 100
 130 IF A3<>INT(A3) THEN 100
 140 P1=1-A1[A3+1]
 150 P2=A1[A3+1]*100000
 160 PRINT
 170 PRINT "THE PROBABILITY OF YOU LIVING ONE MORE YEAR IS";P1
 180 PRINT
 190 PRINT USING 250;A3,P2,P2/1000
 200 PRINT "CAN BE EXPECTED TO DIE WITHIN THE NEXT YEAR."
 210 PRINT
```

▶

HEWLETT PACKARD

```
220 PRINT "YOU CAN EXPECT TO LIVE FOR ANOTHER";A2[A3+1];"YEARS"
230 PRINT
240 PRINT "IE, YOU WILL LIVE TO THE AGE OF";A3+A2[A3+1];"YEARS"
250 IMAGE "OUT OF 100,000 MALES AGED",DDD,", ",DDDDD," OR, ",.DD.DD,"%"
260 REM**************************************
270 DATA .01501,.00119,.00081,.00048
280 DATA .00051,.00045,.0004,.00036
290 DATA .00033,.00031,.00031,.00032
300 DATA .00036,.00041,.00049,.0007
310 DATA .00108,.00155,.00208,.00217
320 DATA .00201,.00184,.00169,.00157
330 DATA .00147,.00139,.00134,.0013
340 DATA .00128,.00127,.00128,.00133
350 DATA .00138,.00145,.00155,.00167
360 DATA .00181,.00198,.00218,.00241
370 DATA .00267,.00296,.00329,.00366,.00407
380 DATA .00453,.00502,.00556,.00616
390 DATA .00682,.00751,.00828,.0091,.01
400 DATA .01099,.01208,.01327,.01458
410 DATA .01603,.01763,.01935,.02125,.02333
420 DATA .02557,.02802,.03067,.03351
430 DATA .03659,.03989,.04343,.04724,.05137
440 DATA .05585,.06073,.06601,.07177
450 DATA .07801,.08477,.09207,.09995,.10843
460 DATA .11753,.12726,.13765,.14871
470 DATA .16043,.17283,.18585,.19919,.2125
480 DATA .22548,.23784,.24928,.25957
490 DATA .26844,.27578,.28191,.28721,.29206
500 DATA .29682,.30164,.30652,.31146,.31645,.3215
510 REM**************************************
520 DATA 69.56,69.62,68.7,67.76
530 DATA 66.8,65.83,64.86,63.89,62.91
540 DATA 61.93,60.95,59.97,58.99
550 DATA 58.01,57.03,56.06,55.1,54.16
560 DATA 53.24,52.35,51.47,50.57
570 DATA 49.66,48.74,47.82,46.89,45.95
580 DATA 45.01,44.07,43.13,42.18
590 DATA 41.24,40.29,39.35,38.4,37.46
600 DATA 36.52,35.59,34.66,33.73
610 DATA 32.81,31.9,30.99,30.09,29.2
620 DATA 28.32,27.44,26.58,25.73
630 DATA 24.88,24.05,23.23,22.42,21.62
640 DATA 20.83,20.06,19.3,18.55
650 DATA 17.82,17.1,16.4,15.71,15.04
660 DATA 14.39,13.75,13.13,12.53
670 DATA 11.95,11.38,10.84,10.31,9.79
680 DATA 9.3,8.82,8.35,7.91
690 DATA 7.48,7.07,6.68,6.31,5.95
700 DATA 5.62,5.3,5,4.72
710 DATA 4.45,4.21,3.99,3.79,3.61
720 DATA 3.45,3.31,3.19,3.09
730 DATA 3.01,2.94,2.88,2.83,2.77
740 DATA 2.72,2.67,2.62,2.58,2.53,2.48
>


>RUN
LIFETABL

AUSTRALIAN MALES LIFE TABLES

ENTER YOUR AGE?18

THE PROBABILITY OF YOU LIVING ONE MORE YEAR IS .99792

OUT OF 100,000 MALES AGED 18,   208 OR,   .21%
CAN BE EXPECTED TO DIE WITHIN THE NEXT YEAR.

YOU CAN EXPECT TO LIVE FOR ANOTHER 53.24      YEARS

IE, YOU WILL LIVE TO THE AGE OF 71.24      YEARS

>
```

APPLE

Draw for Apple III

By Martin Scerri, Mulgrave VIC

'Draw!' is another drawing program for the Apple II computer. But this is not your everyday drawing program. It utilises the Apple's Lo-res screen, providing you with a range of 16 colours to work with. One of the main advantages of doing this is that large bold pictures can be created with a minimum of trouble.

```
10  REM  MARTIN SCERRI 23/7/83
20  ONERR  GOTO 1240
30 G$ =  CHR$ (7):D$ =  CHR$ (13)
     +  CHR$ (4)
40  TEXT : GOSUB 760
50  GR
60  HOME
70  INPUT "PEN COLOR = ";C
80  HOME
90  COLOR= C
100 PC = C
110  INPUT "STARTING POSTITON (X,
     Y): ";X,Y
120  PLOT X,Y
130  HOME : INVERSE : PRINT "SLCT
     :I J K M U O N , S L B C F Q
      E R X Y": NORMAL : POKE 34,
     21
140  HOME : PRINT "X = ";X: PRINT
     "Y = ";Y
150  GET K$
160  IF K$ = "X" THEN  GOSUB 1090

170  IF K$ = "Y" THEN  GOSUB 1120

180  IF K$ = "S" THEN  GOSUB 650
190  IF K$ = "L" THEN  GOSUB 710
200  IF K$ = "B" THEN  GOSUB 570
210  IF K$ = "R" THEN  GOTO 60
220  IF K$ = "C" THEN  GOSUB 410
230  IF K$ = "F" THEN  GOSUB 470
240  IF K$ = "E" THEN  GOTO 530
250  IF K$ = "I" THEN Y = Y - 1
260  IF K$ = "J" THEN X = X - 1
270  IF K$ = "K" THEN X = X + 1
280  IF K$ = "M" THEN Y = Y + 1
290  IF K$ = "U" THEN X = X - 1:Y
      = Y - 1
300  IF K$ = "O" THEN X = X + 1:Y
      = Y - 1
310  IF K$ = "N" THEN X = X - 1:Y
      = Y + 1
320  IF K$ = "," THEN X = X + 1:Y
      = Y + 1
330  IF X < 0 THEN  PRINT G$:X =
     0
340  IF Y < 0 THEN  PRINT G$:Y =
     0
350  IF X > 39 THEN  PRINT G$:X =
     39
360  IF Y > 39 THEN  PRINT G$:Y =
     39
370  IF K$ = "Q" THEN  GOSUB 1140

380  COLOR= PC
390  PLOT X,Y
400  GOTO 140

410  REM  COLOR CHANGE
```

```
420  PRINT "NEW COLOR (0 TO 15):"
     ;
430  INPUT PC
440  COLOR= PC
450  HOME
460  RETURN
470  INPUT "COLOR TO FILL SCREEN?
     ";SF
480  COLOR= SF
490  FOR I = 0 TO 39: HLIN 0,39 AT
     I: NEXT I
500  HOME
510  COLOR= PC: RETURN
520  REM  END?
530  INPUT "END? (Y/N) ";EN$
540  IF  LEFT$ (EN$,1) <  > "Y" THEN
     140
550  TEXT : CALL  - 1184: END
560  REM  COLOR BORDER
570  HOME : INPUT "COLOR OF BORDE
     R?";BC
580  COLOR= BC
590  VLIN 0,39 AT 0
600  VLIN 0,39 AT 39
610  HLIN 0,39 AT 39
620  HLIN 0,39 AT 0
630  COLOR= PC: RETURN
640  REM  SAVE PICTURE
650  INPUT "NAME TO SAVE  (RETURN
      TO QUIT):";SN$
660  IF SN$ = "" THEN  RETURN
670  PRINT D$;"BSAVE ";SN$;",A$40
     0,L$3FF"
680  HOME : INVERSE : PRINT "
               PICTURE SAVED
              ": NORMAL : FOR PP =
     1 TO 2000: NEXT PP: RETURN
690  RETURN
700  REM  LOAD PICTURE
710  INPUT "NAME TO LOAD?  (RETUR
     N TO QUIT):";NL$
720  IF NL$ = "" THEN  RETURN
730  PRINT D$;"BLOAD ";NL$
740  RETURN
750  REM  INTRODUCTION
760  HOME : INVERSE : VTAB 1: PRINT
      SPC( 40): VTAB 23: PRINT  SPC(
     40): NORMAL
770  INVERSE : VTAB 9: HTAB 10: PRINT
     " BY: MARTIN SCERRI "
780  NORMAL
790  VTAB 12: PRINT "WELCOME TO D
     RAW!  THIS PROGRAM WILL
     ALLOW YOU TO EASILY DESIGN C
     OMPLEX      LO-RES PICTURES,
      AND TO LOAD AND SAVE   THEM
     .  PLEASE READ ACCOMPIANING
           DOCUMENTATION FOR FU
     RTHER INFORMATION."
800  SPEED= 100: INVERSE : VTAB 5
     : HTAB 13: PRINT "    DRAW!
       "
810  SPEED= 255
820  NORMAL : VTAB 4: HTAB 13: PRINT
     "============": VTAB 6: HTAB
     13: PRINT "============"
830  VTAB 20: HTAB 5: FLASH : PRINT
     " ";: NORMAL : PRINT "(PRESS
      ANY KEY TO CONTINUE)";
840  CALL  - 756
850  HOME : INVERSE : PRINT "CONT
     ROL KEYS:-"
860  NORMAL
870  PRINT : PRINT "DRAWING KEYS:
     -"
880  HTAB 14: PRINT "  U  I  O
     "
890  HTAB 14: PRINT "   . . .   "

900  HTAB 14: PRINT "    ...    "

910  HTAB 14: PRINT "J ---*--- K"

920  HTAB 14: PRINT "    ...    "

930  HTAB 14: PRINT "   . . .   "

940  HTAB 14: PRINT "  N  M  ,  "

950  PRINT
960  PRINT "S - SAVE CURRENT PICT
     URE"
970  PRINT "L - LOAD PICTURE FROM
      DISK"
980  PRINT "B - DRAW BORDER OF SE
     LECTED COLOR"
990  PRINT "C - CHANGE PEN COLOR"

1000  PRINT "F - FILL SCREEN WITH
      SELECTED COLOR"
1010  PRINT "Q - SQUARE"
1020  PRINT "E - END PROGRAM"
1030  PRINT "X - NEW X COORDINATE
     "
1040  PRINT "Y - NEW Y COORDINATE
     "
1050  PRINT "R - RESTART"
1060  PRINT : PRINT : VTAB 23: HTAB
     5: FLASH : PRINT " ";: NORMAL
     : PRINT "(PRESS ANY KEY TO C
     ONTINUE)";
1070  CALL  - 756: RETURN
1080  REM  NEW X
1090  INPUT "NEW X=";X
1100  RETURN
1110  REM  NEW Y
1120  INPUT "NEW Y=";Y
1130  RETURN
1140  REM  DRAW SQUARE
1150  INPUT "COLOR OF SQUARE?";CS
1160  INPUT "WIDTH?";W
1170  INPUT "HEIGHT?";H
1180  COLOR= CS
1190  VLIN Y,Y + H AT X
1200  VLIN Y,Y + H AT X + W
1210  HLIN X,X + W AT Y + H
1220  HLIN X,X + W AT Y
1230  COLOR= PC: RETURN
```

APPLE

```
1240  INVERSE : PRINT G$;" ERROR
      #"; PEEK (222);" ON LINE "; PEEK
      (218) +  PEEK (219) * 256;".
      ": FOR PP = 1 TO 2000: NEXT
      PP: GOTO 10
65535  REM ******************
65535  REM WRITTEN BY:
65535  REM MARTIN SCERRI
65535  REM 23/7/83
65535  REM COPYRIGHT (C) 1983
65535  REM ******************
```

VIC-20

Hangman for the VIC-20

By Chris Makowski, Malvern Vic

The object of the game is to guess a word put in by your opponent before a man on the screen (you) is hung. If you lose the VIC plays the 'Death March'. If you win you get some 'victory' sound effects.

To start, type in the number of letters in the word you have chosen and hit Return. A maximum of eight letters is allowed. Next type in the word, hitting Return after you type in each letter.

The VIC then displays a string of numbers from one to eight. If you guess a letter in the secret word, that letter is printed above one of the numbers. The number it is printed above depends on the location of the letter in the word.

The picture of the hangman is printed in thirteen parts so you have thirteen guesses plus any correct guess. If you don't choose a letter within 30 seconds you lose a chance and the next part of the picture is added to the screen.

```
1 REM HANGMAN BY CHRIS      MAKOWSKI (C)1983
3 GOTO1000
4 E=7813:F=22:G=38533:HT=22
5 I=7813:J=1
6 K=38533:L=1
7 R=0:S=0:T=0:U=0:Y=1:Y2=0:M3=0
8 PRINT"▒"
9 PRINT"INPUT THE NUMBER OF    LETTERS IN THE WORD"
10 INPUTB:PRINT"▒"
12 IFB>8THEN16
13 GOTO22
16 PRINT"A MAXIMUM OF 8 LETTERS PLEASE
17 FORG2=1TO5000:NEXT
18 GOTO8
22 PRINT"▒"
23 PRINT"NOW INPUT EACH LETTER   SEPARATELY"
25 FORX=1TOB
30 INPUTA$(X):PRINT"▒▒▒"
40 NEXTX
45 PRINT"▒"
47 PRINT"▒▒▒";"▒READY ";"▒";B;"LETTER WORD"
48 PRINT"▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒";"12345678":PRINT"▒"
50 IFT=7THEN760
51 TI$="000000"
52 GETC$
53 PRINT"▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒";"▒TIMER"
54 PRINT"▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒";TI$:PRINT"▒"
55 IFTI$="000030"THEN100
56 FORX3=65TO90
57 IFC$=CHR$(X3)THEN62
58 NEXTX3
59 GOTO52
62 Y2=Y2+1
65 PRINT"▒";TAB(1+Y2);C$:PRINT"▒"
70 FORX=1TOB
80 IFC$=A$(X)THENPRINT"▒▒▒";TAB(13+X);C$:PRINT"▒":M3=M3+1:IFM3=BTHEN800
90 NEXTX
91 FORX=1TOB
92 IFC$=A$(X)THEN50
93 NEXTX
100 IFR=8THEN590
200 FORC2=1TO8
510 R=R+1:E=E+F:G=G+HT
540 READV
550 POKEE,V
560 POKEG,7
570 DATA106,106,106,106,106,106,106,106
575 NEXTC2
580 GOTO50
590 IFS=5THEN690
600 S=S+1:I=I+J:K=K+L
630 READW
640 POKEI,W
650 POKEK,5
660 DATA121,121,121,121,121
670 GOTO50
690 T=T+1
695 IFT=1THENPOKE7838,103:POKE38558,2
700 IFT=2THENPOKE7860,81:POKE38580,2
703 IFT=3THENPOKE7882,103:POKE38602,2
706 IFT=4THENPOKE7904,80:POKE38624,2
709 IFT=5THENPOKE7905,99:POKE38625,2
712 IFT=6THENPOKE7926,103:POKE38646,2
715 IFT=7THENPOKE7948,78:POKE38668,2:POKE7949,77:POKE38669,2
755 GOTO50
760 PRINT"▒▒▒▒▒▒▒▒▒▒▒▒▒▒";"YOU LOSE THE WORD WAS"
762 POKES3,0:S2=36875:V=36878
763 POKEV,15
764 READP
765 IFP=-1THEN772
766 READD
767 POKES2,P
768 FORN=1TOD:NEXT
769 POKES2,0
770 FORN=1TO20:NEXT
771 GOTO764
772 GOTO827
773 DATA195,800,195,600,195,200
774 DATA195,600,203,600,201,300
775 DATA201,500,195,350,195,300,191,400,195,800,-1
800 PRINT"▒▒▒▒▒▒▒▒▒▒▒▒▒▒";"YOU WIN THE WORD WAS "
801 POKE36875,0:POKE36878,15
802 FORL=1TO100
803 POKE36876,INT(RND(1)*128)+128
804 FORM=1TO10:NEXT
805 NEXTL
806 POKE36876,0
807 POKE36878,0
827 FORX=1TOB
828 PRINT"▒"A$(X);
830 NEXTX
835 PRINT
840 PRINT"▒";"PRESS THE SPACE BAR   TO CONTINUE"
850 GETA$:IFA$=" "THENRUN
860 GOTO850
1000 PRINT"▒"
1020 PRINT"▒▒▒▒▒▒▒***HANGMAN***"
1023 PRINT"▒▒▒▒▒▒▒▒▒▒▒▒▒▒BY"
1026 PRINT"▒▒▒▒▒▒▒▒CHRIS MAKOWSKI"
1028 PRINT"▒▒▒▒▒▒▒COPYRIGHT (1983)"
1040 S3=36876:V=36878
1060 POKEV,15
1080 POKES3,235:GOSUB1100
1081 POKE36879,173
1082 POKES3,237:GOSUB1100
1083 POKE36879,232
1084 POKES3,232:GOSUB1100
1085 POKE36879,255
1086 POKES3,219:GOSUB1100
1087 POKE36879,170
1088 POKES3,232:GOTO1120
1089 POKE36879,222
1100 FORZ=1TO600:NEXT
1105 POKEV,0
1110 POKEV,15
1115 RETURN
1120 FORZ=1TO910:NEXT
1125 POKEV,0
1127 POKE36879,27
1130 GOTO4

READY.
```

Another Story for VIC-20

By Michael Wann, Parkes NSW

This program will run on the unexpanded 5K VIC-20. You and the computer will write a story. You supply the words, while the computer supplies a choice of stories. This program is more of an educational program but it can be quite funny in parts.

VIC-20

```
5 REM QUEER STORIES
10 PRINT"▽"
15 PRINT"          QUEER STORIES":PRINT:PRINT
20 PRINT" WHAT IS YOUR NAME";:INPUT N$:PRINT
30 PRINT" WELL ";N$;" WE"
40 PRINT" ARE GOING TO WRITE"
50 PRINT" SOME STORIES TOGETHER."
60 PRINT" YOU SUPPLY THE WORDS"
70 PRINT" I SUPPLY THE STORY":PRINT
80 PRINT" I WILL ASK FOR :-"
90 PRINT" ABOUT 3 NAMES"
100 PRINT" ABOUT 8 NOUNS"
110 PRINT" ABOUT 8 ADVERBS"
120 PRINT:PRINT:PRINT" ARE YOU READY ";
130 INPUT A$
140 IF A$="Y" THEN GOTO 180
150 IF A$="YES" THEN GOTO 180
160 PRINT:PRINT" WELL TUFF LUCK !!!"
170 FOR X=1 TO 500:NEXT X
180 PRINT"▽"
190 PRINT"       NAMES"
200 INPUT B$,C$,D$
210 PRINT:PRINT"     NOUNS"
220 INPUT M$,U$,O$,P$,Q$,R$,S$,T$
230 PRINT:PRINT"  ADVERBS":INPUT E$,F$,G$,H$,I$,J$,K$,L$
240 PRINT:PRINT"     GET READY"
250 FOR Z=1 TO 750:NEXT Z
260 PRINT"▽"
270 PRINT" CHOOSE A STORY":PRINT
280 PRINT" 1 A WESTERN":PRINT
290 PRINT" 2 A LOVE LETTER":PRINT
300 PRINT" 3 A NEWSPAPER ADD":PRINT
310 PRINT"  WHICH ONE..":INPUT Y
320 IF Y=1 THEN GOTO 400
330 IF Y=2 THEN GOTO 600
340 IF Y=3 THEN GOTO 800
350 GOTO 260
400 PRINT"▽"
410 PRINT" TEX ";B$;" THE "
420 PRINT" MARSHAL OF ";Q$;" CITY"
430 PRINT" WAS IN LOVE WITH"
440 PRINT" ";C$;" HORSE ,";D$
450 PRINT" AND BECAUSE OF THAT"
460 PRINT"";C$;" WANTS TO KILL"
470 PRINT"";B$;" SO HE SAID 'TODAY"
480 PRINT" AT NOON OUTSIDE THE"
485 PRINT"";M$;" SALOON...."
490 PRINT:PRINT:PRINT"PRESS ANY KEY":REM NEXT P
495 GET A$:IF A$="" THEN GOTO 495
500 PRINT"▽"
504 PRINT" WHEN THEY MET ";C$
508 PRINT" PULLED OUT HIS ";S$
512 PRINT" BUT BEFORE HE COULD FIRE"
516 PRINT" IT ";B$;" PULLED"
520 PRINT" OUT HIS ";T$;" AND"
524 PRINT" FIRED.HITTING ";C$
528 PRINT" IN THE ";U$
532 x=INT(RND(1)*10)+38
536 PRINT"";X;" TIMES AS"
540 PRINT"";C$;" FELL TO THE GROUND"
544 PRINT" MUMBLING "$P$;"..."
548 PRINT"       .. THE END .."
552 PRINT"▽"
556 PRINT"  ANOTHER STORY ";:INPUT V$
560 IF V$="Y" THEN GOTO 270
564 IF V$="YES" THEN GOTO 270
568 PRINT:PRINT:PRINT"  NEW WORDS ";: INPUT W$
572 IF W$="Y" THEN GOTO 180
576 IF W$="YES" THEN GOTO 180
580 PRINT:PRINT" BYE":PRINT
585 PRINT" SEE YA  ROUND ";N$
590 STOP
600 PRINT"▽"
610 PRINT"    DEAR ";D$
620 PRINT"     I MISS YOU ALOT."
630 PRINT" YOUR ";K$;" CAT IS A"
640 PRINT" BIG PAIN IN THE"
650 PRINT" ";F$;" ";M$;" PUT"
660 PRINT" BECAUSE HE IS YOURS I"
670 PRINT" DON'T MINED.... "
680 PRINT"  I LOVE YOUR ";B$
685 PRINT" AND I MISS YOUR"
690 PRINT" ";J$;" ";Q$
695 PRINT" I HOPE TO SEE YOU SOON"
700 PRINT:PRINT"  P.S."
710 PRINT" YOUR ";O$;" WAS"
720 PRINT" DESTROTED IN THE"
730 PRINT" ";H$;" EARTHQUAKE"
740 PRINT" KEEP ON WRITING SO I"
750 PRINT" CAN KEEP THE FIRE"
760 PRINT" GOING....":PRINT
770 PRINT"     YOURS WILLINGLY"
775 PRINT"     ";B$;"."
780 GET A$:IF A$="" THEN GOTO 780
790 PRINT" ":GOTO 552
800 PRINT"▽";
810 PRINT"    DAILY ADDS."
820 PRINT" LOST IN THE VICINITY OF"
830 PRINT" TICHBOURNE.A"
840 PRINT" ";I$;" PUSSY CAT"
850 PRINT" IF ANY ONE FINDS HIM"
860 PRINT" BRING HIM TO THE ";O$
870 PRINT" HOUSE. A ";K$
880 PRINT" REWARD IS OFFERED":PRINT
890 PRINT" PRESS ANY KEY"
900 GET A$:IF A$="" THEN GOTO 900
910 PRINT"▽"
920 PRINT"       FOR SALE"
930 PRINT" A ";J$;" CAR"
940 PRINT"  IT HAS A";F$
950 PRINT" PAINT JOB.A CROME"
960 PRINT" ";I$;" ON THE HOOD"
970 PRINT" AND A ";F$;" IN THE"
980 PRINT" BACK SEAT"
990 PRINT" IT IS A ";L$;" DEAL."
1000 PRINT:PRINT" PRESS ANY KEY"
1010 GET A$:IF A$="" THEN GOTO 1010
1020 GOTO 552
```

TANDY TRS80/ SYSTEM 80

Weight Watchers for TRS-80 & Sharp 1211

By Claude Colle, Ingham Qld

Given your age (no cheating, please!), your height in cm, your sex (male or female) and a code number for the kind of bones you have:

1 for light build
2 for medium build
3 for heavy build,

the program will calculate your normal weight. Simply press SHIFT S (for start), answer all the questions asked by the program and you will know your normal weight.

```
*WEIGHT WATCHER*

 30:W=(EXP (EH))
    *7.8501:IF F
    =1RETURN
 31:W=(EXP (EH))
    *6.9956:IF G
    =1RETURN
 32:W=(EXP (124H
    ))*6.3682:
    RETURN
 40:W=(EXP (BH))
    *10.2356:IF
    F=1RETURN
 41:W=(EXP (BH))
    *9.067:IF G=
    1RETURN
 42:W=(EXP (BH))
    *8.166:
    RETURN
 50:W=(EXP (DH))
    *10.4086:IF
    F=1RETURN
 51:W=(EXP (DH))
    *9.2799:IF G
    =1RETURN
 52:W=(EXP (DH))
    *8.3509:
    RETURN
 60:W=(EXP (DH))
    *10.7459:IF
    F=1RETURN
 61:W=(EXP (DH))
    *9.5964:IF G
    =1RETURN
 62:W=(EXP (BH))
    *8.703:
    RETURN
 70:"S"PAUSE "WE
    IGHT WATCHER
    "
 73:CLEAR :BEEP
    1:INPUT "YOU
    R AGE ";A,"Y
    OUR HEIGHT "
    ;L,"CODE (1,
    2 OR 3) ";C
 76:INPUT "YOUR
    SEX (M/F) ";
    K$
 80:IF K$="F"
    THEN 270
 90:B=114:D=115:
    E=125:H=L*E-
    4
100:IF C=3LET F=
    1
```

▶

TANDY TRS80/ SYSTEM 80

```
110:IF C=2LET G=
    1
120:I=INT (A/5)*
    10:IF I>60
    LET I=60
130:GOSUB I
140:BEEP 3:PRINT
    USING "####.
    #";"NORMAL W
    EIGHT:";W;"
    KG":GOTO 73
230:W=(EXP (BH))
    *9.9321:IF F
    =1RETURN
231:W=(EXP (113H
    ))*8.7955:IF
    G=1RETURN
232:W=(EXP (BH))
    *7.9404:
    RETURN
240:W=(EXP (105H
    ))*11.787:IF
    F=1RETURN
241:W=(EXP (DH))
    *10.7718:IF
    G=1RETURN
242:W=(EXP (DH))
    *9.6541:
    RETURN
250:W=(EXP (101H
    ))*12.8834:
    IF F=1RETURN
251:W=(EXP (EH))
    *11.2747:IF
    G=1RETURN
252:W=(EXP (EH))
    *10.1918:
    RETURN
260:W=(EXP (100H
    ))*13.4596:
    IF F=1RETURN
261:W=(EXP (JH))
    *12.0701:IF
    G=1RETURN
262:W=(EXP (JH))
    *10.8852:
    RETURN
270:B=112:D=103:
    E=102:J=99:H
    =L*E-4
280:IF C=3LET F=
    1
290:IF C=2LET G=
    1
300:I=INT (A/5)*
    10+200:IF I>
    260LET I=260
310:GOSUB I:GOTO
    140

    ( 927 BYTES )
```

HITACHI

A Life Simulation for the Hitachi Peach

By J. L. Elkhorne, Chigwell TAS

A short BASIC program supports the machine language routine for speed of execution. Line 150 is a time delay loop which may be altered or deleted by the user.

An enthusiast could write his (or her) own initial cell set-up routine. I was satisfied with random generation and leave that task for others.

To retain the program, first key in the BASIC, then enter monitor and key in the machine code. Note the isolated byte at Hex 70FF, which is a dummy return. After checking the code, return to BASIC, and RUN 9999 to transfer both units onto tape storage.

An initial dump from cassette will see "O" at 28672 Decimal (Hex 7000) and automatically Load the machine language portion. Should a BREAK be effected, the program will RUN again and recognise that the machine language routine is in memory and continue with its automatic generation and evolution. The usual control keys can be utilised to halt the display or continue. The developing patterns are fascinating to watch. Have a happy life!

```
1       REM  Life for the Peach
2       REM  Machine Language version
3       REM  26 September 1983
4       REM  Copyright  J.L. Elkhorne
5       CLS: IF PEEK (28672)=0 THEN LOADM "LIFEM"
6       :
10      PRINT, "LIFE": PRINT: PRINT "is a
        graphic simulation originated by
        John Conway.": PRINT
20      PRINT "It was described in Scientific
        American in 1959.": PRINT: PRINT
30      PRINT "A matrix is generated
        and tested with the following
        rules:": PRINT
40      PRINT "An empty cell with three
        neighbors will be alive in the next
        generation."
50      PRINT: PRINT "A live cell with 2 or
        3 neighbors lives on.  With one, it
        dies from isolation."
60      PRINT "With 4 or more, it dies
        from population pressure.": PRINT:
        PRINT "Hit Return to begin."
70      INPUT I$: G=0
80      :
100     CLS:  DEFUSR = &H 7000: CLEAR 200,
        &H6FFF
120     RANDOMIZE TIME: R=RND(1)*400:
        FOR S=1080 TO 1200 + R: POKE S,
        RND (1) * 31: NEXT
130     :
150     FOR T=1 TO 700: NEXT: REM Time Delay
200     I=USR(1): G=G + 1:  GOTO 150
210     :
9998    END
9999    SAVE "LIFE": SAVEM "LIFEM",
        &H 7000, &H 7200, &70FF


   end BASIC listing


Assembly Listing "LIFEM"


7000    8E 0400     INITL       LDX  SCREEN
7003    108E 7800               LDY  BUFFER
7007    7F 7777                 CLR  EDGE

700A    12 12       POINTR      NOPs

700C    6F A4                   CLR ,Y  BUFFER CELL

700E    B6 7777     L/RTST      LDA
7011    81 28                   CMPA
7013    26 03                   BNE  TOPTST
7015    7F 7777                 CLR  EDGE

7018    8C 0428     TOPTST      CMPX
701B    2D 24                   BLT  DTST

701D    E6 88 D8    BTST        LDB ,X
7020    5D                      TSTB
7021    27 02                   BEQ  ATST
7023    6C A4                   INC ,Y      BUMP BUFFER CONTENTS

7025    7D 7777     ATST        TST
7028    27 08                   BEQ  CTST  IF LEFT EDGE
702A    E6 88 D7                LDB ,X
702D    5D                      TSTB
702E    27 02                   BEQ  CTST
7030    6C A4                   INC ,Y

7032    B6 7777     CTST        LDA
7035    81 27                   CMPA        RIGHT EDGE?
7037    27 08                   BEQ  DTST
7039    E6 88 D9                LDB ,X
703C    5D                      TSTB
703D    27 02                   BEQ  DTST
703F    6C A4                   INC ,Y

7041    7D 7777     DTST        TST
7044    27 08                   BEQ  ETST  IF LEFT EDGE
7046    E6 88 FF                LDB ,X
7049    5D                      TSTB
704A    27 02                   BEQ  ETST
704C    6C A4                   INC ,Y
704E    B6 7777     ETST        LDA
7051    81 27                   CMPA        RIGHT EDGE?
7053    27 08                   BEQ  BTMTST
7055    E6 88 01                LDB ,X
7058    5D                      TSTB
7059    27 02                   BEQ  BTMTST
705B    6C A4                   INC ,Y

705D    8C 07BF     BTMTST      CMPX
7060    2E 24                   BGT  ENDTST

7062    E6 88 28    GTST        LDB ,X
7065    5D                      TSTB
7066    27 02                   BEQ  FTST
7068    6C A4                   INC ,Y

706A    7D 7777     FTST        TST
```

```
706D    27 08                   BEQ  HTST  IF LEFT EDGE
706F    E6 88 27                LDB ,X
7072    5D                      TSTB
7073    27 02                   BEQ  HTST
7075    6C A4                   INC ,Y

7077    B6 7777     HTST        LDA
707A    81 27                   CMPA       RIGHT EDGE?
707C    27 08                   BEQ  ENDTST
707E    E6 88 29                LDB ,X
7081    5D                      TSTB
7082    27 02                   BEQ  ENDTST
7084    6C A4                   INC ,Y

7086    7C 7777     ENDTST      INC EDGE
7089    E6 A0                   LDB ,Y+    INCREMENT BUFFER ADDR
708B    E6 80                   LDB ,X+    INCREMENT SCREEN ADDR
708D    8C 07E8                 CMPX       FINISHED?
7090    27 03                   BEQ  DISFIL
7092    16 FF74                 LBRA POINTR

7095    8E 0400     DISFIL      LDX        OPENING ADDRESS
7098    10BE 7800               LDY
709C    A6 84       DISFIL2     LDA ,X
709E    AB A0                   ADDA ,Y+   GET BUFFER, INCR
70A0    81 03                   CMPA       EMPTY, 3 NEIGHBORS?
70A2    27 0C                   BEQ  SETCEL
70A4    81 21                   CMPA       LIVE, 2 NEIGHBORS?
70A6    27 08                   BEQ  SETCEL
70A8    81 22                   CMPA       LIVE, 3 NEIGHBORS?
70AA    27 04                   BEQ  SETCEL

70AC    86 00       CLRCEL      LDA        KILL!
70AE    20 02                   BRA  PUT

70B0    86 1F       SETCEL      LDA        LIVE!

70B2    A7 80       PUT         STA ,X+    TO SCREEN, INCR

70B4    8C 07E8     ENDFIL      CMPX       FINISHED?
70B7    26 E3                   BNE  DISFIL2
70B9    39                      RET

.....

70FF    39          DUMMY       RET

   end LIFEM machine language listing
```

Wordgame for Hitachi Peach

By Philip Cookson, Doveton VIC

This program was inspired by an old arcade game called "UN-SCRAMBLE" which I used to play as a teenager (back in the days when they didn't have V.D.U.s, and just projected film images onto a screen).

The computer presents you with a series of fifteen, seven letter words. In each word three letters are scrambled. Your task is to unscramble the letters to form the correct word within a six second time limit. Points are awarded for speed and accuracy, and at the end of each game the computer gives you an I.Q. rating. The computer has a library of 100 different words and chooses a different random selection of ten words each time the game is played. The list of words may be altered or added to by changing the DATA statements in lines 1450-1700. Alternatively, the program may be modified to read words stored in a data file. The program can be easily modified to run on most other microcomputers and is a useful educational game, emphasising spelling skills.

```
10 '*************************************************************************
20 '
30 '       THE WORD GAME      By Philip Cookson     Febuary 1983
40 '
50 '       Screen Mode is :  NEW ON 3
60 '
70 '*************************************************************************
80 '
90 '                TITLE DISPLAY
100 '
110 'Set non-interlace mode to output graphic symbols. Remove cursor.
120 'Large characters constructed from graphic symbols [stored in array A$(I,J)]
130 SCREEN,,1:WIDTH 40:LOCATE 0,0,1
140 DIM A$(11,7),X(11),Y(11)
150 FOR I=1 TO 11:READ X(I),Y(I):NEXT I
160 FOR I=1 TO 11:FOR J=1 TO 7:READ A$(I,J):NEXT J:NEXT I
170 COLOR 7,1:LINE(0,0)-(639,199),PSET,2,B
180 FOR I=1 TO 11:FOR J=1 TO 7
190 LOCATE X(I),Y(I)+J:PRINT A$(I,J)
200 NEXT J:BEEP:NEXT I:BEEP:BEEP
210 'Flashing display.
220 FOR C=1 TO 30:FOR N=0 TO 7:COLOR ,N:NEXT N:NEXT C:COLOR 7,0:CLS
230 'Reset interlace mode. Restore cursor.
240 SCREEN,,0:LOCATE 0,0,3
250 'Screen position data [stored in arrays X(I) and Y(I)]
260 DATA 0,0,17,0,26,0,3,0,12,0,21,0,30,0,3,16,12,16,21,16,30,16
270 'Large Character data
280 DATA "
290 DATA "
300 DATA "
310 DATA "
320 DATA "
330 DATA "
340 DATA "
350 DATA "
360 DATA "
370 DATA "
380 DATA "
390 '
400 '*************************************************************************
410 '
420 '                INSTRUCTIONS
430 '
440 LOCATE 12,2:COLOR 3:PRINT"Instructions"
450 DIM CMT$(22):COLOR 6:LOCATE 0,5
460 FOR L=1 TO 22:READ CMT$(L):NEXT L
470 FOR L=1 TO 14:PRINT CMT$(L):NEXT L
480 LOCATE 5,23:COLOR 7:PRINT "[Press any key to continue]"
490 DUM$=INKEY$:IF DUM$="" THEN GO TO 490
500 CLS:LOCATE 12,2:COLOR 3:PRINT"Instructions":LOCATE 0,5:COLOR 6
510 FOR L=15 TO 21:PRINT CMT$(L):NEXT L
520 COLOR 2:LOCATE 0,14:PRINT CMT$(22)
530 LOCATE 10,18:COLOR 4:PRINT "*** GOOD LUCK ***"
540 LOCATE 3,23:COLOR 7:PRINT "[Press any key to start the game]"
550 DUM$=INKEY$:IF DUM$="" THEN GO TO 550
560 '
570 '*************************************************************************
580 '
590 '          Instructions
600 DATA "    Are you a genius or a moron ?"
610 DATA "Discover for yourself by playing this"
620 DATA "educational word game.",""
630 DATA "The object of the game is to unscramble"
640 DATA "letters to form a seven letter word."
650 DATA "Only three of the letters in each word"
660 DATA "will be jumbled but you must unscramble"
670 DATA "them within a six second time limit.",""
680 DATA "The computer will keep track of your"
690 DATA "guesses, and measure your I.Q.",""
700 DATA "No prizes for slow or incorrect answers."
710 DATA "You will be presented with a series of"
720 DATA "fifteen scrambled words. For each word,"
730 DATA "re-enter the jumbled letters in the"
740 DATA "correct order,and then press the return"
750 DATA "key. If you make a mistake use the"
760 DATA "CURSOR or DEL/INS keys to modify your","answer."
770 DATA "THE JUMBLED LETTERS WILL APPEAR IN RED "
780 '
790 '*************************************************************************
800 '
810 '                MAIN PROGRAM
820 '
830 DIM W7$(160):CLS:COLOR 7,0
840 FOR I=1 TO 160:READ W7$(I):NEXT I
850 'Modify the random number system using the internal clock as a seed
860 SEED=VAL(RIGHT$(TIME$,2)):RANDOMIZE SEED
870 CLS:STME=TIME:SC=0
880 FOR J=1 TO 15
890 LINE(5,8)-(30,18),"*",3,B
900 WRD$=W7$(INT(RND(1)*159)+1)
910 COLOR 6:GO SUB 1230
920 NEXT J
930 FTME=TIME-STME:CLS:COLOR 2,1
940 LINE(0,0)-(639,199),"*",7,B
950 LOCATE 10,10:PRINT"SCORE = ";SC;" CORRECT"
960 LOCATE 10,15,1:PRINT"TIME  = ";FTME;" SECONDS"
970 SCORE=INT((SC*4/3)-(FTME-60)/5):IF SCORE<0 THEN SCORE=1
980 INPUT WAIT 1040;3,"",DUM$
990 '
1000 '*************************************************************************
*
1010 '
1020 '            I.Q. DISPLAY
1030 '
1040 CLS:LOCATE 2,0:COLOR 1,0:PRINT"*** YOUR INTELLIGENCE QUOTIENT ***"
1050 X=32:Y=20:DX=340:DY=32
1060 LINE(10,10)-(600,190),PSET,7,B
1070 FOR J=1 TO 5:LINE(X,Y)-(X+DX,Y+DY),PSET,J+1,BF:Y=Y+DY:NEXT J
1080 COLOR 7,0:LINE(23,2)-(23,22),"-"
1090 LOCATE 8,4:PRINT "GENIUS"
1100 LOCATE 6,8:PRINT "INTELLIGENT"
1110 LOCATE 8,12:PRINT "AVERAGE"
1120 LOCATE 9,16:PRINT "SLOW"
1130 LOCATE 9,20:PRINT "MORON"
1140 FOR S=1 TO SCORE:LOCATE 28,23-S:COLOR 2:PRINT "    ":BEEP:NEXT S
1150 COLOR 1:LOCATE 8,25:PRINT "ANOTHER GAME ? (Y OR N) ";
1160 ANS$=INKEY$:IF ANS$="" GO TO 1160 ELSE IF ANS$="Y" GO TO 860
1170 CLS:LOCATE 0,0,3:END
1180 '
1190 '*************************************************************************
1200 '
1210 '          SUBROUTINES USED BY THE MAIN PROGRAM
1220 '
1230 MWRD$=MID$(WRD$,3,3)
1240 A$=LEFT$(MWRD$,1):B$=MID$(MWRD$,2,1):C$=RIGHT$(MWRD$,1)
1250 ON INT(RND(0)*4)+1 GOSUB 1350,1360,1370,1380,1390
1260 LOCATE 13,12:PRINT LEFT$(WRD$,2)
1270 LOCATE 20,12:PRINT RIGHT$(WRD$,2)
1280 COLOR 2:LOCATE 16,12:PRINT JUMB$:COLOR 7
1290 LOCATE 13,14:PRINT LEFT$(WRD$,2)
1300 LOCATE 20,14:PRINT RIGHT$(WRD$,2)
1310 LOCATE 16,14:INPUT WAIT 1430;7,"",GUESS$:CLS
1320 IF LEFT$(WRD$,2)+GUESS$+RIGHT$(WRD$,2)=WRD$ THEN GOSUB 1410 ELSE GOSUB 1420
1330 RETURN
1340 '
1350 JUMB$=A$+C$+B$ : RETURN
1360 JUMB$=B$+A$+C$ : RETURN
1370 JUMB$=B$+C$+A$ : RETURN
1380 JUMB$=C$+A$+B$ : RETURN
1390 JUMB$=C$+B$+A$ : RETURN
1400 '
1410 COLOR 4:PRINT "CORRECT":SC=SC+1:RETURN
1420 LOCATE 30,0:COLOR 2:BEEP:PRINT"INCORRECT":RETURN
1430 CLS:COLOR 7:LOCATE 14,0:PRINT "TOO SLOW":BEEP:GO TO 1330
1440 '
1450 '*************************************************************************
1460 '
```

```
1470 '                SEVEN LETTER WORDS
1480 '
1490 DATA AVERAGE,ANOTHER,LOCATED,SURFACE,RECORDS,EXPOSED,PRODUCT,GLOATED
1500 DATA CHANGED,CONTEXT,DESIGNS,PRIVATE,OYSTERS,WALKING,AUCTION,CAPTAIN
1510 DATA PLEASED,POPULAR,REMARKS,OMNIBUS,EQUALLY,EXPRESS,REQUIRE,AWKWARD
1520 DATA PROVING,EYELIDS,ALRIGHT,BENEATH,ASSUMED,HISTORY,RECOVER,WRECKED
1530 DATA GHASTLY,WATCHED,MANKIND,SILENCE,PROJECT,REPTILE,AMAZING,CLIMBED
1540 DATA EXISTED,CLAIMED,LAUGHED,MISTAKE,CORRECT,UNHAPPY,PROBATE,TREASON
1550 DATA PROTEIN,SPATIAL,PEANUTS,CYNICAL,ABANDON,QUARTER,FLICKER,INQUIRY
1560 DATA RESOLVE,ENQUIRY,NOURISH,VIOLENT,COMPUTE,ANALYST,UNKNOWN,CUSTARD
1570 DATA AGAINST,MEASURE,SUNRISE,PROTECT,CONTROL,SALIENT,OUTSIDE,NUMBERS
1580 DATA CIRCUIT,CONSOLE,CAMERAS,MONITOR,RELAXED,PROGRAM,MUSICAL,STEALTH
1590 DATA THOUGHT,BROUGHT,SERIOUS,MEDICAL,STUDENT,WITHOUT,MACHINE,OBVIOUS
1600 DATA CARTOON,GREATER,BETWEEN,READING,FACULTY,SOMEONE,BARGAIN,CIRCLES
1610 DATA STUDIES,OBSCENE,COUNTED,LEARNED,BRUISED,PASTURE,ADJOURN,LECTURE
1620 DATA BROMIDE,PROCESS,CONSUME,ENACTED,SAUSAGE,COUNTRY,HONESTY,ELECTED
1630 DATA ATTEMPT,REGULAR,CALCIUM,HUSBAND,CONSIST,IMMORAL,DIVORCE,CATCHES
1640 DATA HUNDRED,TURNIPS,PATIENT,HEALTHY,SURGEON,INVERSE,SCIENCE,PREPARE
1650 DATA VIVIDLY,APPLIED,ADVANCE,PROBLEM,RECIPES,DIGITAL,SERVICE,TUESDAY
1660 DATA DRAUGHT,ANOTHER,DRUNKEN,ANIMALS,LEGENDS,SCENERY,AIRLINE,ETERNAL
1670 DATA ANATOMY,GENERAL,DEGRADE,STOMACH,TEACHER,BREADTH,CUSTOMS,SERIALS
1680 DATA ECONOMY,IMPROVE,CITIZEN,INHERIT,PHYSICS,NERVOUS,PACKAGE,DENSITY
1690 '
1700 '*************************************************************************
```

SHARP & TANDY PCs

The Car Computer for Sharp PC-1500

By Phil Carter, Warrnambool VIC

Portable computers are opening up a whole vista of new applications. They can be used in locations hitherto impossible, such as in the garage, in the automobile and even in the toilet! (Not in mine, Phil-Ed.)

This program works as follows:

Before starting out, the driver has the option of entering the towns that lie along the route to be travelled. (See lines 1000 – 1100). Alongside each town is its distance, in kilometres, from the point of departure or, if a negative distance, the town's distance from the destination. The maximum number of towns is limited by the spare memory available, but at least 12 can be entered.

When departing on your journey, type 'RUN' and answer the three questions:- i) distance of trip to be travelled in kilometres, ii) the current speedo reading in kilometres, and
iii) the time you would like to arrive at your destination. This time is entered in 24 hour format. e.g. 5.45 am would be entered as 5.45 and 11:45 pm would be entered as 23.45.

Note that these three questions have optional answers. At least one must be answered, but you have the choice of not answering any one or any two by hitting <enter> for these inputs.

Also note that you do not enter the time of departure. Since the PC-1500 has its own clock, it knows when the trip is started.

At any time along the journey, enter DEF A and you will be asked to enter a single value. This is interpreted in one of three ways by the computer.
i) the distance travelled so far, or
ii) the current speedo reading, or
iii) if a negative value, the distance remaining on the trip.

Based on this entry and based on which of the initial three options were given, the following statistics will be displayed about the journey so far:— the distance travelled so far,
– the distance left to travel,
– the percentage of the trip travelled so far,
– the average speed of the trip,
– the time travelled so far,
– the estimated time left to complete the journey (assuming the average speed is maintained),
– the estimated time of arrival,
– the average speed required for the remainder of the journey if the destination is to be reached by the desired time,
– for each town along the way yet to be passed through, the distance and amount of time till that town is reached.

```
10:CLEAR
20:BEEP 6:WAIT 150:PRINT "***** The Car Computer*****"
30:A$="":INPUT "Enter length of trip?";A$
40:D1=VAL A$:A$="":INPUT "Current speedo reading?";A$
50:S=VAL A$:A$="":INPUT "Desired time of arrival?";A$
60:K=VAL A$:K=INT K+(K-INT K)*5/3
70:IF D1+S+K=0 PAUSE "You must answer one!!":GOTO 20
80:GOSUB 3000:L=X:PRINT "****THANK YOU****"
90:END
1000:DATA "MELBOURNE",0
1010:DATA "SEYMOUR",95
1020:DATA "BENALLA",203
1030:DATA "WANGARATTA",243
1040:DATA "WODONGA",309
1050:DATA "ALBURY",314
1060:DATA "GUNDAGAI",499
1070:DATA "YASS",604
1080:DATA "GOULBURN",691
1090:DATA "MITTAGONG",778
1100:DATA "SYDNEY",902
2000:"A":A=0:B=0:WAIT 300:INPUT "Enter reading:";R
2010:IF S=0AND R>D1AND D1>0 PRINT "Invalid entry!!":END
2020:GOSUB 3000:M=X
2030:IF (R<0AND D1=0AND S>=0) OR (R>0AND D1=0AND S=0) THEN 2070
2040:A=R:IF R<0 AND D1>0LET A=D1+R
2050:IF R>SAND S>0LET A=R-S
2060:BEEP 1:PRINT "Distance travelled=";A;" kms"
2070:IF R>SAND D1>0AND S>0LET B=D1-R+S:GOTO 2100
2080:IF R>D1THEN 2110
2090:B=-R:IF R>0 LET B=D1-R
2100:BEEP 1:PRINT "Distance to go=";B;" kms"
2110:IF A>0AND D1>0LET C=A*100/D1:BEEP 1:PRINT INT C;"% of trip cmpleted"
2120:V=M-L:IF V<0 LET V=V+24
2130:IF V=0THEN 2250
2140:IF A=0THEN 2160
2150:D=INT (A/V):BEEP 1:PRINT "Average speed=";D;" kms/hr"
2160:BEEP 1:PRINT "Time travelled=";INT V;"hrs";INT ((V-INT V)*60);"mins"
2170:IF B=0OR D=0 THEN 2250
2180:F=B/D:BEEP 1:PRINT "Time remaining=";INT F;"hrs";INT ((F-INT F)*60);"mins"
2190:G=M+F:X=INT G
2200:IF X>24LET X=X-24:GOTO 2200
2210:A$="am":IF X>12LET X=X-12:A$="pm"
2220:Y=INT ((G-INT G)*60):B$=STR$ X+":"
2230:IF Y<10LET B$=B$+"0"
2240:B$=B$+STR$ Y:BEEP 1:PRINT "Est. arrival time=";B$;A$
2250:IF K=0THEN 2290
2260:IF K<MLET K=K+24
2270:IF B=0OR (K-M)=0THEN 2290
2280:BEEP 1:PRINT "Required speed=";INT (B ▶
```

```
     /(K-M));"kms
     /hr"
2290:RESTORE 1000
2300:ON ERROR
     GOTO 2400
2310:READ T$,U
2320:IF U=0THEN 2
     310
2330:IF (U>0AND U
     <A)OR (U<0
     AND ABS U>B)
     THEN 2310
2340:IF (U>0AND A
     =0)OR (U<0
     AND B=0)THEN
     2310
2350:IF U>0LET Q=
     U-A
2360:IF U<=0LET Q
     =B+U
2370:BEEP 1
2380:PRINT T$;Q;"
     kms";INT (Q/
     D*60);"mins
     left"
2390:GOTO 2310
2400:ON ERROR
     GOTO 0
2410:PRINT "****T
      H A N K  Y
     O U****":END
3000:X=TIME :W=
     INT X
3010:Y=W-INT (W/1
     00)*100
3020:Z=INT ((X-W)
     *100)
3030:X=Y+Z/60:
     RETURN
```

STATUS 1

1764

Telephone Meter for Sharp PC-1500

By Phil Carter, Warrnambool VIC

My wife works in the field of social welfare and makes a lot of phone calls from home (which she can claim). Living in the country means that most calls are STD and to work out the cost she has to time each call, guess the distance of the call, know the day of the week and the hour of the day and then look up the tables in the front of the phone directory.

This is an ideal application for a portable computer – 'take the computer to the problem and not the problem to the computer'. The Sharp PC-1500 has a built in clock so it knows the time and can calculate the day of the week. All the user has to enter is the distance of the call. The current Telecom rates, times and distances are stored as DATA statements, so any price increases should mean only a few altered values.

The program begins by prompting for the distance of the phone call, calculates the day of the week and, using the current time, displays the charging rate for the call. When the call connects, you hit the S key of the keyboard. The screen changes to a constantly changing display of the elapsed time so far in minutes and seconds and the total time of the call so far in dollars and cents. When the call ends, hold F down. The total time of the call is rounded up to the next multiple of 15 seconds, according to Telecom rules, and this is then displayed along with the total cost of the call.

A few comments about the program. It only just squeezes into an unexpanded Sharp. There is no room for REM's, there are many multiple-statement lines and much use is made of the zero'th element of arrays. Finally, the Sharp's timer doesn't keep the year, so the statement Y=1984 on line 120 will have to be changed once a year (the year is required in order to calculate the day of the week).

```
10:PAUSE "   ***T
   elephone meter
   ***"
15:RA=15
20:DIM TI(1,5),CM
     (3,4),TS(4,1)
30:FOR I=0TO 5:
   READ TI(0,I):
   NEXT I
40:FOR I=0TO 4:
   READ TI(1,I):
   NEXT I
50:FOR I=0TO 3
60:FOR J=0TO 4:
   READ CM(I,J):
   NEXT J
70:NEXT I
80:FOR I=0TO 4
90:FOR J=0TO 1:
   READ TS(I,J):
   NEXT J
100:NEXT I
110:BEEP 6:INPUT "
   Enter charging
    distance:";T
120:Y=1984:M=INT (
   TIME /10000)
130:D=INT (TIME /1
   00)-M*100
140:GOSUB 1000
150:H=INT (TIME )-
   INT (INT (TIME
   )/100)*100
160:FOR I=0TO 5
170:IF TI(0,I)>H
   GOTO 190
180:NEXT I
190:IF W=1LET I=TS
   (I-1,0)
200:IF W>1LET I=TS
   (I-1,1)
210:FOR J=0TO 4
220:IF TI(1,J)>T
   GOTO 240
230:NEXT J
240:R=CM(I,J)
250:WAIT 200:PRINT
   "Charging rate
   =";R;"cents/mi
   n"
260:PAUSE "Hit S t
   o start:";
270:S$=""
280:S$=INKEY$
290:IF S$<>"S"GOTO
   280
300:CURSOR 15:
   PAUSE "S":CLS
310:GOSUB 2000
320:WAIT 60:PRINT
   "Hold F down t
   o finish":CLS
330:A=B
340:CURSOR 3:PAUSE
   "mins   secs
     $"
350:S$=""
360:GOSUB 2000
370:C=B-A
380:IF C=0GOTO 360
390:E=INT (C/60)
400:CURSOR 1:PAUSE
   USING "##";E
410:CURSOR 7:PAUSE
   USING "###";C-
   E*60
420:CURSOR 19:
   PAUSE USING "#
   #.##";C*R/6000
430:S$=INKEY$
440:IF S$<>"F"GOTO
   360
450:E=INT (C/RA)
460:IF E*RA<>CLET
   C=E*RA+RA
470:E=INT (C/60):
   USING
480:WAIT 300:PRINT
   "Total time=";
   E;"mins";C-E*6
   0;"secs"
490:F=C*R/6000:Z=
   INT (F*100)/10
   0
500:WAIT 500:PRINT
   "Total cost=$"
   ;Z
510:END
1000:K=Y-1900
1010:IF M<=2LET L
   =M+10:K=K-1
1020:IF M>2LET L=
   M-2
1030:N=INT (2.6*L
   -.19999)
1040:O=INT (K/4)
1050:W=N+D+K+O-34
1060:IF W<=6LET W
   =W+1:RETURN
1070:W=W-7:GOTO 1
   060
2000:G=TIME
2010:Q=INT (G)-10
   0*INT (G/100
   )
2020:S=G-INT (G)
2030:B=Q*3600+S*1
   0000-40*INT
   (S*100):
   RETURN
3000:DATA 8,12.5,
   13.5,18,21,2
   4
3010:DATA 50,85,1
   65,745,9999
3020:DATA 5,10,17
   ,25,34
3030:DATA 10,20,3
   4,50,67
3040:DATA 7.5,15,
   25,38,50
3050:DATA 6,12,20
   ,30,40
3060:DATA 3,1,3,2
   ,3,1,3,3,0,0
```

STATUS 1

1371

SINCLAIR

Hex to Decimal for ZX81

By R Chalmers, Brisbane Qld.

THIS PROGRAM is relatively simple. If the menu is left out it will just fit into 1K. It is designed only to convert hex to decimal, either from two-bit information, such as FF 10 64 1A ... etc, or from full address locations. (Note that the highest address it will decode is 7FFF (Decimal 32767).

Note: CHR$(9) = SHIFT A. Graphics key.

```
1  PRINT "   (CHR$(9).   31 Times.)          "
2  PRINT "CHR$(9)      29 spaces         CHR$(9)"
3  PRINT "CHR$(9)      29 spaces         CHR$(9)"
4  PRINT "CHR$(9)..HEX TO DECIMAL CONVERSION ..CHR$(9)"
5  PRINT "CHR$(9)......FOR 2 BIT DATA,.....CHR$(9)"
6  PRINT "CHR$(9).............OR.............CHR$(9)"
7  PRINT "CHR$(9)......4 BIT ADDRESS.....CHR$(9)"
8  PRINT "CHR$(9)   29 spaces                CHR$(9)"
9  PRINT "CHR$(9)   29 spaces                CHR$(9)"
10 PRINT "CHR$(9) 31 Times.                        "
12  PRINT
13  PRINT "KEY D FOR DATA CONVERSION."
14  PRINT
15  PRINT "KEY A FOR ADDRS CONVERSION."
16  PRINT
17  PRINT "KEY M RETURNS MENU."
18  PRINT
19  INPUT Z$
20  IF NOT Z$ = "D" THEN GOTO 80
21  CLS
25  PRINT "ENTER THE 2 HEX UNITS.KEY N/L."
30  INPUT M$
40  IF NOT M$ = "M" THEN GOTO 50
41  CLS
42  GOTO 1
50  LET O = ((CODE(M$)-28)*16)+((CODE(TL$(M$)))-28)
60  PRINT M$;"=";O;":";
70  GOTO 30
80  CLS
85  PRINT "7FFF IS HIGHEST LOCATION."
90  PRINT "ENTER HIGHEST 2 UNITS FIRST.N/L"
95  PRINT "ENTER LOWEST 2 UNITS NEXT.N/L"
100 INPUT H$
110 IF NOT H$ = "M" THEN GOTO 120
111 CLS
112 GOTO 1
120 IF NOT H$ = "ØØ" THEN GOTO 150
130 LET D= ØØ
140 GOTO 350
150 LET F = ((CODE(H$)-28)*16)+((CODE(TL$(H$)))-28)
160 LET D = 256
170 LET D = D*5
340 CLS
350 PRINT "ENTER SECOND 2 HEX UNITS."
360 INPUT I$
370 CLS
380  LET E = ((CODE(I$)-28)*16)+((CODE(TL$(I$)))-28)
390  PRINT "HEX.";H$;I$;"=";D+E;".DECIMAL"
400  GOTO 100
```

Rubik's Cube for ZX81

By D W Moore, Nth Geelong VIC

So you have mastered Rubik's cube (or lost it). Now play the same game on the ZX81-1K.

RUN the program and you will be asked to choose a level of difficulty. If for example you choose a level of 5, the computer will print the correct cube and then make 5 random moves to shuffle it. You can watch this being done as every move is displayed.

Now the L cursor will appear and it is your turn to get the cube back as it was. You do this by entering a number 1 to 8.

When you have correctly rearranged the cube enter 0 to see how many moves you took. The cube can be upside down or back to front etc. compared to the way it started. This does not matter as long as the same characters are grouped together at each corner.

```
10  LET S=Ø
20  DIM A$ (5,5)
30  LET A$ (1) ="  00"
                (two inverse spaces two inverse 0's)
40  LET A$ (2) =A$ (1)
50  LET A$ (3) ="XXAA"
                (two inverse X's two graphic A's)
60  LET A$ (4) =A$ (3)
65  PRINT "LEVEL"
70  INPUT L
80  CLS
90  FOR F=1 to 4
100 PRINT F;A$ (F, TO 4)
110 NEXT F
120 PRINT " 5678"
          (space5678)
130 IF L>Ø THEN GOTO 300
140 INPUT A
142 IF A=Ø THEN GOTO 400
145 LET S=S+1
150 IF A>4 THEN GOTO 200
160 LET A$  (A,5) =A$ (A,1)
170 FOR F=1 TO 4
180 LET A$ (A,F) =A$ (A,F+1)
190 NEXT F
195 GOTO 80
200 LET A$ (5,A-4) =A$ (1,A-4)
210 FOR F=1 TO 4
220 LET A$ (F,A-4) =A$ (F+1,A-4)
230 NEXT F
250 GOTO 80
300 LET A=INT (RND * 7+1)
310 LET L=L-1
320 GOTO 150
400 PRINT S
```

SINCLAIR

Maze Programs for the ZX80

By R Chalmers, Brisbane Qld.

This is a simple way of generating a random maze.

This is accomplished by POKEing the random code into memory, from where it is recalled with each input request. The program sets up a screen, and the address is located in memory by the PEEK commands in line 338.

The maze is recalled from memory location 18000, where it is stored at the beginning of the program (line 10). The maze is a series of black and white patterns, the idea being to find your way from the top or bottom to the opposite edge.

If you really get stuck, key in 00, and the program will end, showing you the complete maze, and how many moves you made.

IMPORTANT: The program takes a few seconds to load the memory spaces and draw the screen, so be patient. You will need at least 3K to run it.

```
2   REM  MAZE PROGRAM.REMOVE ALL R
      EM STATEMENTS TO RUN
5   REM  SETS UP MAZE IN MEMORY LO
      CATION 18000 +.
10   LET X = 18000
20   FOR I = X TO X + 670
30   LET L = (1 +  RND (2))
40   POKE I,L
50   NEXT I
55   REM  SETS VARIABLES.
60   LET P = 0
70   LET A =  RND (20)
80   LET B =  RND (32)
90   LET F = 0
100   LET W = 0
110   LET Y = (A - 1) * 33 + B
120   LET K = Y
125   REM  PAINTS THE SCREEN UNDER
       WHICH YOU WILL FIND THE MAZ
      E.
130   FOR G = 1 TO 640
140   PRINT  CHR$ (9);
150   NEXT G
160   PRINT "PRESS N/L TO START.(O
      O TO EXIT."
170   PRINT "THEN USE DIRECTION AR
      ROWS."
180   INPUT S$
185   REM  PLACES MAZE SEGMENT ON
      SCREEN,RECALLED FROM MEMORY.

190   GOTO 270
200   INPUT Q
210   IF Q = 8 THEN  LET Y = Y + 1

220   IF Q = 5 THEN  LET Y = Y - 1

230   IF Q = 7 THEN  LET Y = Y - 3
      3
240   IF Q = 6 THEN  LET Y = Y + 3
      3
250   LET F = F + 1
260   IF Q = 00 THEN  GOTO 370
270   IF Y < 1 OR Y > 659 THEN  LET
      Y = Y - Q
280   IF Y < 1 OR Y > 659 THEN  GOTO
      200
290   GOSUB 330
300   LET K = Y
310   POKE W + Y, PEEK (K + X)
320   GOTO 200
325   REM  SETS POINTERS TO BEGINN
      ING OF SCREEN AREA
330   LET P =  PEEK (16397)
340   IF P > 127 THEN  LET P = P -
      256
350   LET W =  PEEK (16396) + P *
      256
360   RETURN
370  CLS
380   FOR I = X TO X + 640
390   PRINT  CHR$ ( PEEK (I));
400   NEXT I
405   REM  IF YOU GIVE UP THIS PAI
      NTS THE COMPLETE MAZE
406   REM  ENDING ROUTINE
410   PRINT "THIS IS THE MAZE,AND
      YOU HAVE"
420   PRINT "MADE.";F;".MOVES.KEY
      N/L."
430   INPUT A$
440   CLEAR
450  CLS
460   FOR I = 1 TO 10
470   PRINT
480   NEXT I
490   PRINT "....DO YOU WISH TO GO
       AGAIN ?"
500   PRINT "KEY Y FOR YES,N FOR N
      O."
510   INPUT A$
520  CLS
530   IF A$ = "Y" THEN  GOTO 10
540   FOR I = 1 TO 10
550   PRINT
560   NEXT I
570   PRINT "THANK YOU FOR PLAYING
      ,BYE BYE."
```

MICROBEE

Utest for Microbee

By Mike Newnham Penrith, NSW

It seems that there are a number of people who are having problems with data transfer between the Microbee and cassette. For some reason, it is the Microbee that is receiving much of the blame. In the main, this criticism is unjustified. The Bee's cassette interface is an exceptional performer. It will tolerate a reasonable amount of noise and distortion before it spits out 'bad load'.

The culprits more deserving of blame are the tape player and the tape itself, the common ailment being the poor signal to noise ratio of either the tape or the player. Dirty record/play heads are on an equal par here, followed by incorrect azimuth adjustment on the tape head. Coming in at a very close third, are the 'cheap' tapes. Not so cheap after the 35th unsuccessful attempt at loading, are they?

One other problem seems to be hum and other mains derived noise. So check all these possibilities out first, before you test the aerodynamic characteristics of your Microbee.

The following program is aimed at providing you with a practical means of assessing the performance of your system. It can be used to check and adjust head azimuth and to derive some indication of the noise levels of both your player and of the tapes that you put in it.

Before you can use this routine, you will need to create a tape of 'U's. This must be done on good quality tape and from a known reliable mono recorder. It seems that some of the stereo tape decks around today tend to do some unpleasant things to data. To create a 'UTAPE' is simplicity itself. About 8K (hex) of 'U's are needed (more if you like). Fill memory from 1000H to 3FFFH with 'U' (55H – 01010101B) using the monitor fill memory command. Next, use the 1200Bd dump 'D' command to send them to tape i.e. D 'UTAPE' M 1000 3FFF. The auto execute address is not needed.

Once you have your UTAPE, place it in the suspect player, enter and execute UTEST. A heading will appear at the top left of the screen, under which will be placed the tape header information when/if it comes in from tape. The message 'INCOMING DATA' will appear further down the screen. As each data byte is read from tape it is placed after this message, in one screen location. If your Microbee is receiving data correctly, you will have a single steady 'U' displayed. About every 2 seconds there may be a very fast, single glitch. This is only the check byte so don't worry. If you have garbage coming from tape, that is, presuming the header loaded okay, then there will be no 'U', but a flickering block which represents the noise. If you do get this flickering, try adjusting the VOLUME and TONE settings on your player. It may be all that was needed. Failing this, try cleaning the head.

If you think you may have an azimuth problem, locate the azimuth adjusting screw, start the UTAPE again and adjust the screw while watching the screen to see if it locks into a 'U'. By this time it is likely that you have solved your problem or realised that cheap cassette tape is just that.

The Microbee cassette interface is designed to work at 1200 Baud. If your tape player is clean and correctly adjusted, and you are using good quality tape, then you should be able to create all your data tapes at 1200 Bd. 300 Bd is for the insecure.

```
ADDR   CODE     LINE   LABEL   MNEM     OPERAND

                00100 ;     ******************
                00110 ;           UTEST
                00170 ;     ******************
                00180
0400            00190           ORG      400H
                00200 ;  Go at ORG address
0400 3E0C       00210 GETHDR    LD A,12
0402 CD2FA6     00220           CALL 0A62FH
0405 1100F0     00230 TITLE     LD DE,0F000H
0408 215D04     00240           LD HL,HEDNG
040B 011600     00250           LD BC,22
040E EDB0       00260           LDIR
0410 3E04       00270           LD A,4
0412 32E900     00280           LD (0E9H),A
0415 CDCBAA     00290 TAPIN     CALL 0AACBH      ;GET HEADER INFO
0418 3AFE00     00300           LD A,(0FEH)
041B 32E900     00310           LD (0E9H),A
041E 1140F0     00320           LD DE,0F040H
0421 21F100     00330           LD HL,0F1H
0424 010600     00340           LD BC,6
0427 EDB0       00350           LDIR             ;INTO HEADER BUFFER
0429 2AFA00     00360           LD HL,(0FAH)     ;GET START ADDR.
042C ED4BF800   00370           LD BC,(0F8H)     ;GET LENGTH
0430 1148F0     00380           LD DE,0F048H
0433 CD8304     00390           CALL DSPHL
0436 E5         00400           PUSH HL
0437 C5         00410           PUSH BC
0438 09         00420           ADD HL,BC
0439 13         00430           INC DE
043A 13         00440           INC DE
043B CD8304     00450           CALL DSPHL
043E 13         00460           INC DE
043F 2AFC00     00470           LD HL,(0FCH)     ;GET EXEC. ADDR
0442 CD8304     00480           CALL DSPHL
0445 D1         00490           POP DE
0446 E1         00500           POP HL           ;KEEP STACK TIDY
0447 1140F1     00510 ONSCRN    LD DE,0F000H+320
044A 217304     00520           LD HL,DMSG
044D 011000     00530           LD BC,16
0450 EDB0       00540           LDIR
0452 2152F1     00550           LD HL,0F000H+338
0455 E5         00560 GETBYT    PUSH HL
0456 CD12B0     00570           CALL 8012H
0459 E1         00580           POP HL
045A 77         00590           LD (HL),A
045B 18F8       00600           JR GETBYT
045D 20         00610 HEDNG     DEFM     '  NAME  START  END  GO'
0473 20         00620 DMSG      DEFM     ' INCOMING DATA :'
0483 7C         00630 DSPHL     LD A,H
0484 CD8804     00640           CALL DSPLA
0487 7D         00650           LD A,L
0488 C5         00660 DSPLA     PUSH BC
0489 47         00670           LD B,A
048A 0F         00680           RRCA
048B 0F         00690           RRCA
048C 0F         00700           RRCA
048D 0F         00710           RRCA
048E CD9704     00720           CALL CNVT
0491 78         00730           LD A,B
0492 CD9704     00740           CALL CNVT
0495 C1         00750           POP BC
0496 C9         00760           RET
0497 E60F       00770 CNVT      AND 0FH
0499 B7         00780           OR A
049A 27         00790           DAA
049B C6F0       00800           ADD A,0F0H
049D CE40       00810           ADC A,40H
049F 12         00820           LD (DE),A
04A0 13         00830           INC DE
04A1 C9         00840           RET
0000            00850           END
00000 Total errors

CNVT    0497    DSPLA   0488    GETBYT  0455    DMSG    0473
ONSCRN  0447    DSPHL   0483    TAPIN   0415    HEDNG   045D
TITLE   0405    GETHDR  0400
```

Screen Dump for the Microbee

By Daniel Wong, Parramatta NSW

The program is a machine language routine to enable any screen dump to the ITOH 8510 printer.

The routine is fully relocatable and can be placed in any un-used RAM area other than screen RAM. For a 32K machine, the routine can be placed at a higher memory location (such as 6000 Hex) so it would not interfere with longer programs. Type the data into memory using any monitor program and save the routine in cassette with file type M and auto-execution address 8021 Hex (ie. BASIC warm start address).

There are two modes of operation:

1. Instant Snap Shot: Load any BASIC program then the graphic screen dump routine. Use the POKE command to put the low order address of the routine into location 00C4 Hex and high order address into location 00C5 Hex. POKE 196,0:POKE 197,32 will put the address 2000 Hex into memory location 00C4 and 00C5 Hex. Then issue the command IN#1. If you are using a parallel interface, also issue the command OUTL#1. When you want the screen content to be dumped to the printer, press the Control V key.

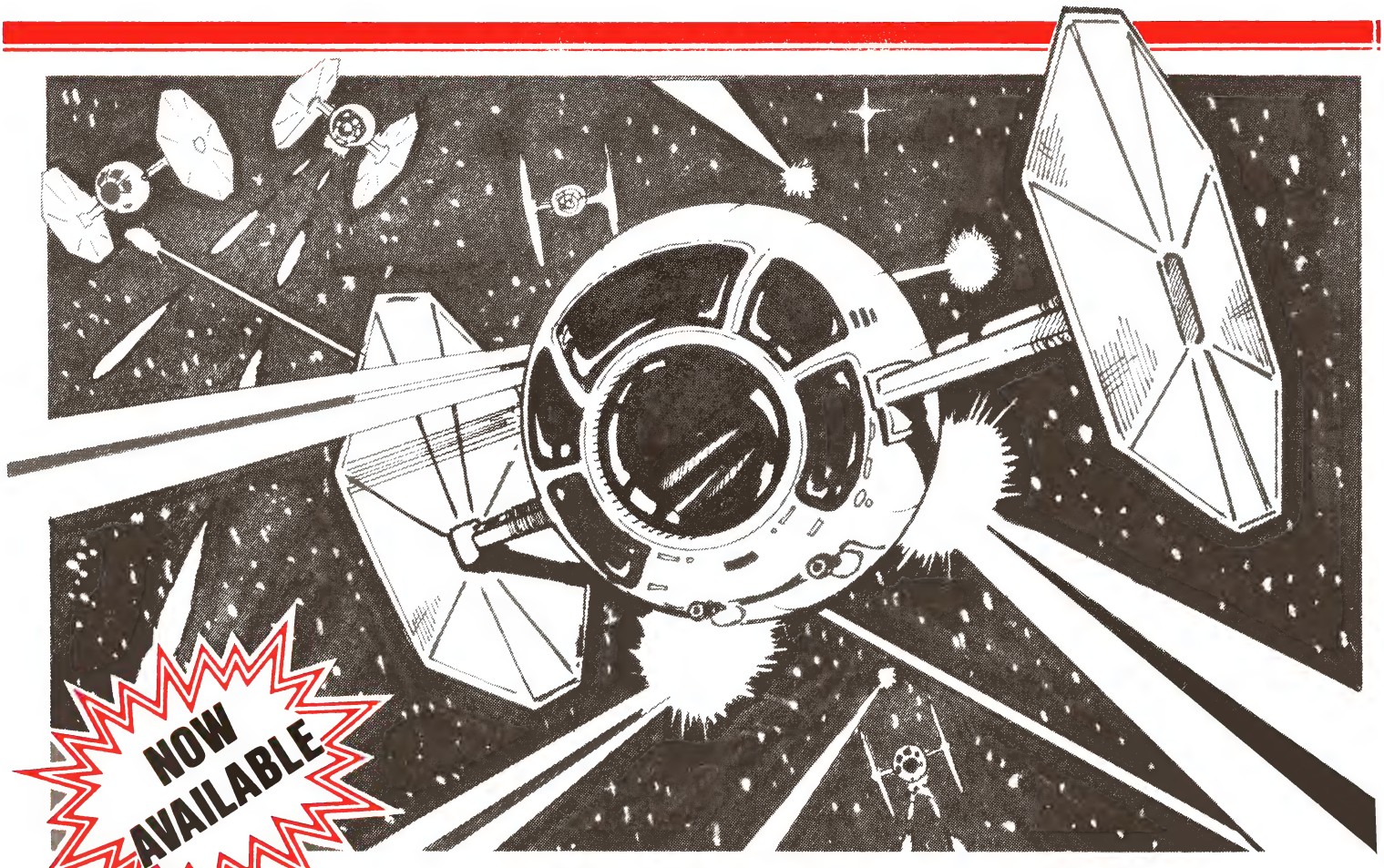
2. Under program control: The program statement containing USR(8208) will invoke the routine at 2010 Hex. Make sure you include the OUTL#1 statement if you have a parallel printer.

```
Addr   0  1  2  3   4  5  6  7   8  9  A  B   C  D  E  F

6000:  CD E9 A3 C0  C5 47 FE 16  28 04 AF 78  C1 C9 C1 B7
6010:  F5 C5 D5 E5  3E 0D CD 45  80 3E 0A CD  45 80 3E 1B
6020:  CD 45 80 3E  54 CD 45 80  3E 31 CD 45  80 3E 36 CD
6030:  45 80 21 C0  EF 11 F0 EF  06 10 CD E9  A3 FE 03 28
6040:  38 C5 D5 D5  06 02 11 40  00 19 D1 C5  E5 D5 06 08
6050:  3E 20 CD 45  80 10 FB 06  40 3E 1B CD  45 80 3E 53
6060:  CD 45 80 3E  30 CD 45 80  3E 35 CD 45  80 3E 31 CD
6070:  45 80 3E 32  CD 45 80 18  06 18 59 18  CE 18 BB C5
6080:  E5 D5 46 3E  01 D3 0B 04  EB 11 10 00  19 10 FD 01
6090:  08 08 E5 C5  11 00 01 06  08 C5 7E 0F  0D 20 FC C1
60A0:  30 03 7B B2  5F CB 22 23  10 EF 7B CD  45 80 C1 E1
60B0:  0D 10 DF AF  D3 0B D1 E1  C1 23 10 C3  3E 0D CD 45
60C0:  80 3E 0A CD  45 80 D1 21  08 00 19 EB  E1 C1 10 AB
60D0:  D1 C1 10 A9  3E 1B CD 45  80 3E 41 CD  45 80 E1 D1
60E0:  C1 F1 C9
```

```
THIS IS RUSSIAN ROULETTE
ON YOUR RIGHT IS THE REVOLVER
```

```
PRESS '1' TO PULL THE TRIGGER
PRESS '2' TO GIVE UP
      YOUR CHOICE IS=?
```



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C64 Communications Program

In this article Nick Gammon describes his modem communication program for the Commodore 64. It is written in G-Pascal for the Commodore 64, and uses the Christensen protocol.

USING THE Christensen Protocol (described in *Your Computer* – May and June 1983) has several advantages – one of which is that it is already widely in use for data transmission. The protocol itself, and various implementations (such as YAM on CP/M systems), are in the public domain, making them readily available.

This program is directly compatible with the Mi-Computer Club (MiCC) bulletin board. Once you have typed in the program, you can directly access public domain software (if you are a member of MiCC) with minimum effort and maximum reliability.

You can also use it to converse with any other remote computer, have conversations between two Commodore 64 owners, or transfer programs between one Commodore 64 and another Commodore 64 or any other computer which has a program using the Christensen protocol.

What You Need

To use this program you will need:

a) A Commodore 64

b) An RS232 serial interface plugged into the user port (these are priced at about $50).

c) A modem connected to your telephone. (There was an article on modems in November 1983 *Your Computer*). You can use a 'direct coupled' or an 'acoustically coupled' modem. Modem prices vary; however, you could expect to get a cheap but satisfactory one for under $200.

d) A cable between the modem and the RS232 interface. As far as the Commodore 64 is concerned you only need to connect to pins 2, 3 and 7 (transmit data, receive data and ground).

e) A copy of G-Pascal – currently available for $79.50 from Commodore dealers.

Other Computers

If you don't have a Commodore 64, this program will not be of direct use to you. However, as it is written in Pascal it is relatively easy to follow – you should find the general methods used helpful in developing a similar program for your own computer.

Why Use A Protocol For Transferring Files?

While it is possible to write a simple 'dumb terminal' program in about ten lines of code, transferring files is a little more complicated. The reason for this is occasional noises on the telephone line may introduce errors, which might be acceptable if you are just having a conversation with someone at the other end of the line, but can cause irritating and hard-to-find errors if embedded in the middle of a program.

Data integrity (correct transmission of files) is not just 'handy', it is essential if you are to have any confidence in using your telephone for sending programs back and forth.

The Christensen protocol provides this integrity in a number of ways:

1. The sender and receiver 'synchronise' by using an agreed sequence of characters to start things rolling. This provides proper synchronisation even if the sender and receiver request transmission at different times (within no more than 60 seconds of each other).

2. Data is broken into 128-byte blocks so that if an error occurs it is only necessary to re-transmit 128 bytes, not the whole file.

3. Each block is numbered to ensure data is received in the correct sequence.

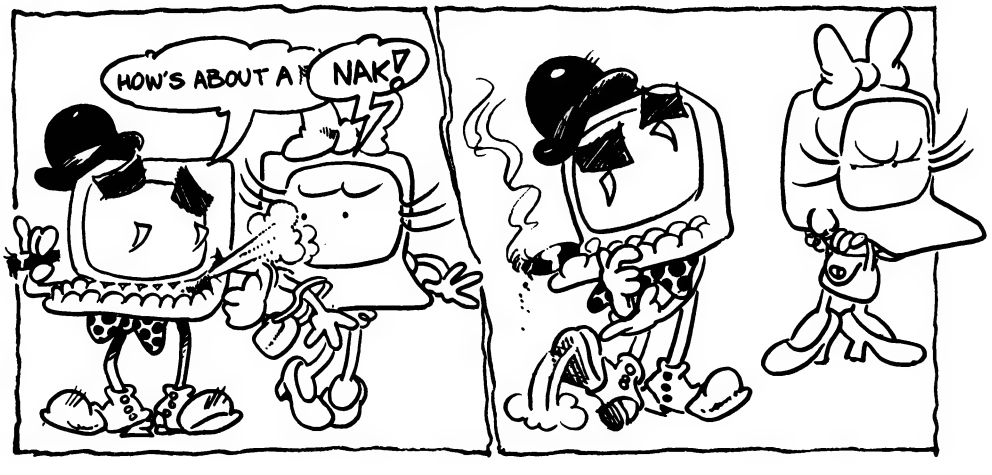
4. Each block has a sum check (optionally a cyclic redundancy check), to confirm that the data in that block is correct.

5. The program has provision for handling 'timeouts' – in other words, if no data at all is received within a predetermined time, the sending end re-transmits the block so that the program doesn't 'hang' indefinitely.

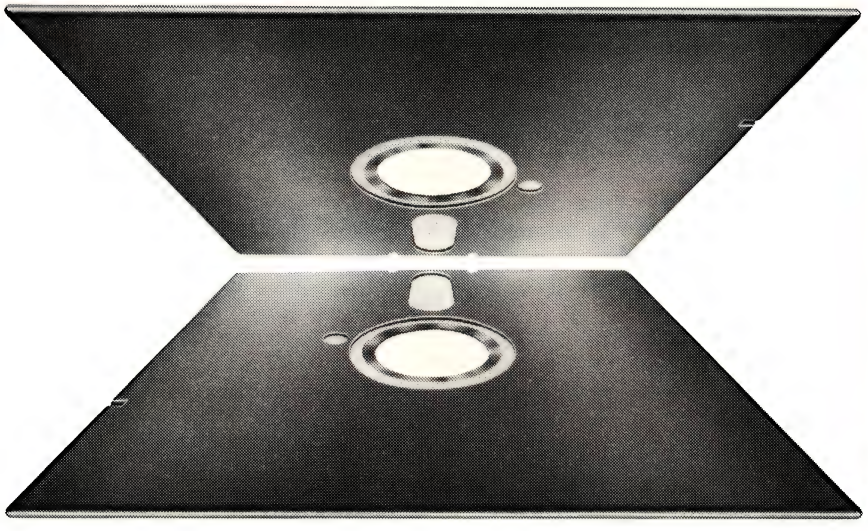
6. The program also performs a cyclic redundancy check on the whole file (as well as on individual blocks), to further ensure that the file was transmitted correctly.

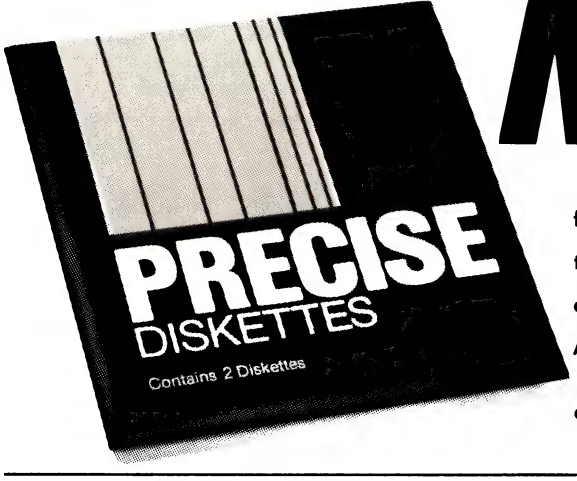
Cyclic Redundancy Checks

The program uses cyclic redundancy checking for ensuring the integrity of both individual blocks of transmitted data and the whole file. A cyclic redundancy check (CRCK for short) is an enhanced method of doing a 'sum check' on a block of data. A sum check is performed by adding up each byte of data and retaining the low-order byte. A CRCK is performed in a more complicated way: in fact, there are various CRCK algorithms. The modem program uses two different methods in order to be compatible with YAM. Both methods involve calculating a two-byte result, by shifting the previous result left one bit and adding in the new bit (or byte), to provide the new result. However, unlike a simple sum check, the CRCK routines have provision for not losing the carry bit when the shift is performed. If the shift ▶



"WHY PAY FOR TEN WHEN YOU ONLY NEED TWO?"





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left produces a carry, the whole sum is exclusively OR'ed with a constant value.

A simple sum check will not distinguish, for example, between 5 4 3 2 and 2 3 4 5 – both will provide the same result. The cyclic redundancy check would provide a different result in this case, making it more reliable.

For the sake of speed, the CRCK algorithms in this program are implemented as machine-code subroutines.

The Protocol

For more details on the Christensen protocol, see *Your Computer*, June 1983. Briefly, however, data is transmitted in 128-byte blocks. Each block starts with an SOH (hex 01), followed by the block number, followed by the 1s complement of the block number (for integrity checking). Then follow exactly 128 bytes of data – all eight bits are transmitted, so object files or data of any kind can be transmitted. Then, there is either a single byte simple sum check, or two bytes of cyclic redundancy check data. The receiving end sends an ACK (hex 06) if it received the block correctly, or a NAK (hex 15) if it didn't. After the last block, the sender transmits an EOT (hex 04) to indicate end of transmission.

Files are transferred at a rate of about 1K per 45 seconds.

What The Program Will Do

The program has the following capabilities:

Full-duplex terminal
Half-duplex terminal
Transmit a file
Receive a file
Analyse a file
Type the last file
Cancel a transmission

These are explained below:

'Full-duplex terminal' is the default mode when the program first commences. It is the correct mode for conversing with a remote bulletin board – such as the MiCC bulletin board. Since Commodore 64s use a non-standard code set (not ASCII), the program automatically converts data typed at the keyboard to standard ASCII. This basically involves reversing upper/lower case, and changing certain control codes (such as backspace, clear screen) to standard ASCII. The only control codes supported are RETURN, clear screen (press SHIFT and CLR/HOME), backspace (press INST/DEL), and the left/right arrow key. To leave terminal mode, press the 'Commodore logo' key.

The 'half-duplex terminal' mode should be used if you are conversing with another Commodore 64 owner. In this case, what you type appears on the screen in light blue; what the other person types appears on the screen in white.

'Transmit' a file initiates transmission of a file to the other end of the line. Before transmitting you should ensure that the other end is about to enter 'Receive' mode (within 60 seconds) or you will get a timeout and the transmission will be aborted. After selecting 'transmit', you will be asked if the file is on disk or cassette, and what its name is. The file will then be loaded, an estimated transmission time (and the number of blocks in the file) will be displayed, and transmission will commence. An asterisk will be displayed as each block is transmitted. Any transmission errors will be displayed in red. If the words 'File transmitted successfully' appear, the file was transmitted correctly. Once the file has been transmitted, the program automatically re-enters terminal mode so you can talk to the other end again.

'Receive a file' initiates reception of a file from the other end of the line. You should ensure the other end is about to transmit a file before entering this mode. In the case of remote CP/M systems (such as the MiCC bulletin board), you should call up XYAM and command it to send the file you want like this:

XYAM S filename

As soon as you have done that, press the Commodore key (to return to the Main Menu) and enter 'R' (for Receive).

Following reception of a file, the program displays a 'file cyclic redundancy check'. This should agree with the value displayed at the sender's end prior to transmission (or, if the other end is using YAM they should type: CRCK filename). If these figures agree, you can be pretty certain that the file was received correctly.

Once the file has been successfully received, you will be asked whether to save it to disk or cassette and to enter its file name. When the file is saved, the program automatically verifies it to make sure that it saved correctly. At the end of this procedure, the program automatically re-enters terminal mode and you can talk to the other end again.

'Analyse a file' loads a specified file into memory and displays its file size (number of transmission blocks), memory size (in K), file cyclic redundancy check, and the estimated transmission time.

'Type last file' types on the screen the last file that was sent, received or analysed. (So, to display the contents of any file, just Analyse and Type it). Press the SHIFT key to temporarily halt the display, and the Commodore logo key to abort the display and return to the Main Menu. Files which are 'tokenised' or not stored as straight ASCII text files (such as BASIC or G-Pascal files) may display a little strangely.

'Cancel a transmission' cancels a transmission that you commenced in error. First, abort the transmit or receive function by pressing RUN/STOP, then re-run the program and select the 'cancel' function. This will transmit three CAN (hex 18) characters to the other end which should cause the program to abort its transmission/reception.

Colours

The program uses colour coding to identify the different messages and generally avoid confusion. The codes are as follows:

Grey and green – messages (not errors) from the program.

Red – error messages from the program.

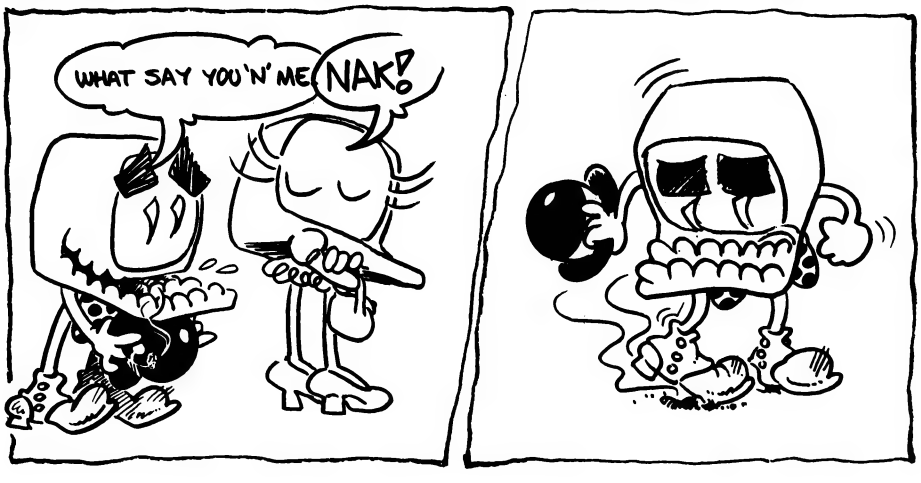
Light-blue – data typed by the user at this end.

White – data sent from the other end.

Limitations

The program cannot handle files greater than 24K in length, as it has to load the whole file into memory at once. Files larger than this will corrupt the G-Pascal compiler.

The program can only handle 'program'-type files (that is, files of type 'prg' on disk). This includes BASIC, G-Pascal ▶



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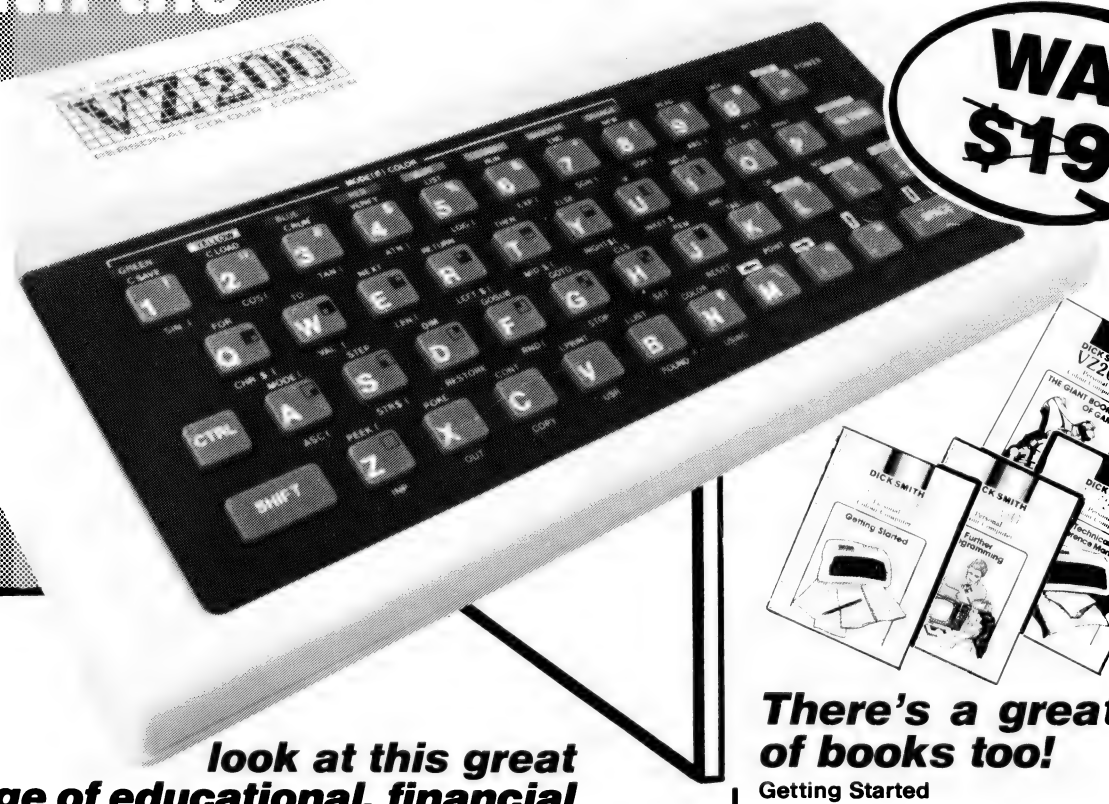

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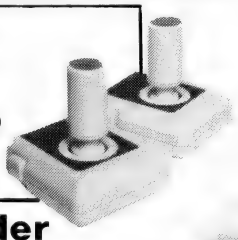

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A690M

and machine-code files in general. With a bit of work you could change from loading files to opening them and reading a byte at a time. This would remove both these restrictions.

The program will not transfer in 'batch' mode (multiple files at one time), unlike YAM.

Future Enhancements

The program could have further features added, but what is presented here is certainly adequate for transferring files backwards and forwards. Once you have this version operational, you can always download improved versions from bulletin boards as they are made available.

Possible enhancements would be:

1. Implement a 'batch' mode compatible with YAM.

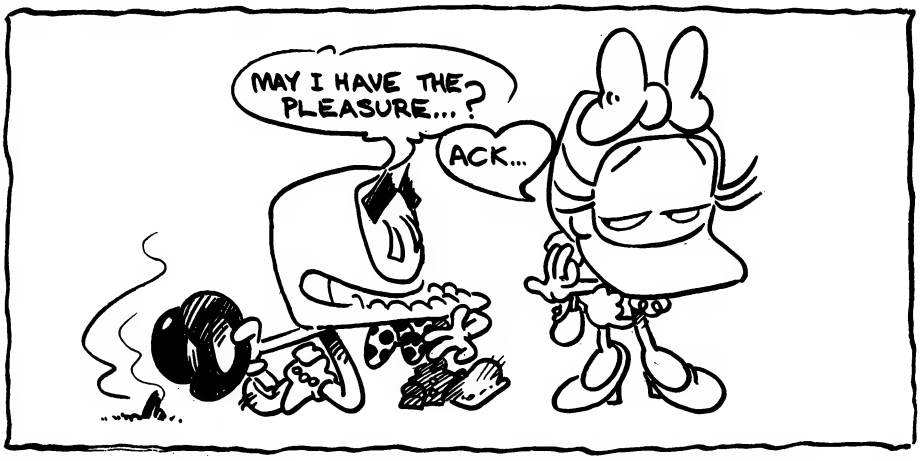
2. Transfer all file types (not just programs) by opening a disk file and reading a byte at a time.

3. Save conversations in memory for later review, with an option to dump a conversation to disk.

Public Domain

Readers are encouraged to give away copies of this program to friends, as we would like to promote the use of the Christensen protocol for data transmission. Do not give away the G-Pascal compiler however, as that is a commercial product and subject to copyright.

If you want to save the effort of typing in the program, copies on disk may be obtained by sending $20 (for postage and duplication costs) to: Gambit Games, P.O. Box 124, Ivanhoe 3079. Computer clubs are encouraged to obtain a copy and make further copies available to members. An Apple version of the program is also available, at the same price, from the same address. ❑




```
 1 (* YAM-compatible modem communication program
 2
 3    written in G-Pascal for the Commodore 64
 4
 5    Author: Nick Gammon.     Public Domain Program.
 6
 7    %a $840  (P-codes start at $840)
 8 *)
 9
10 const
11       bs = 8;
12       ff = 12;
13       cr = 13;
14       fs = 28;
15       ctrlz = $1a;
16       home = 147;
17       true = 1;
18       false = 0;
19
20       display_file = false;
21       receive_with_crck = true;
22       max_retries = 6;
23       charcolour = 10;
24       white = 1;
25       green = 5;
26       light_red = 10;
27       light_green = 13;
28       light_blue = 14;
29       light_grey = 15;
30
31       start_address = $1e00;
32       cassette = 1;
33       disk = 8;
34       areg = $2b2;
35       xreg = $2b3;
36       yreg = $2b4;
37       cc = $2b1;
38       setlfs = $ffba;
39       setnam = $ffbd;
40
41       soh = $1;
42       eot = $4;
43       ack = $6;
44       nak = $15;
45       can = $18;
46       rs232_status = $297;
47       empty = 8;
48
49 var
50     command : char ;
51
52     buffer : array [130] of char ;
53     name1, name2 : array [20] of char ;
54     last_terminal_mode,
55     medium,
56     got_medium,
57     length,
58     bad_result,
59     next_address,
60     final_address,
61     retries,
62     eof,
63     abort,
64     bad_block,
65     seq_error,
66     bad_sum_check,
67     timeout,
68     block_no,
69     inverse_block_no,
70     expected_block,
71     last_block,
72     want_crck,
73     sum_check_received,
74     sum_check_received_2,
75     sum_check,
76     sum_check_2  : integer ;
77     routine : array [35] of integer ;
78
79 function commodore_logo;
80 (********************)
81 begin
82   commodore_logo := memc [653] and 2 <> 0
83 end ;
84
85 function shift_key_pressed;
86 (************************)
87 begin
88   shift_key_pressed := memc [653] and 1 <> 0
89 end ;
90
91 procedure open_rs232_file;
92 (************************)
93 const
94       openit = $ffc0;
95 var name : array [1] of char ;
96 begin
97 (* first set up the file name
98    as per the RS232 paramters *)
99
100   name [1] := 6;  (*  300 baud  *)
101   name [0] := 0;    (*  3-line    *)
102   memc [$f8] := $c1; (* buffer *)
103   memc [$fa] := $c2; (* buffer *)
104   memc [areg] := 2;
105   memc [xreg] := 2; (* RS232 *)
106   memc [yreg] := 2;
107   call (setlfs);
108   memc [areg] := 2;
109   memc [xreg] := address (name[1]);
110   memc [yreg] := address (name[1]) shr 8;
111   call (setnam);
112   call (openit)
113 end ;
114
115 procedure init;
116 (*************)
117 const colour = 1;
118       point = 2;
119       behindbk = 6;
120
121 var i : integer ;
122
123 procedure insert(x, y, z);
124 begin
125   routine [i] := x;
126   routine [i - 1] := y;
127   routine [i - 2] := z;
128   i := i - 3
129 end ;
130
131 begin (* init *)
132   write (chr (home));
133   graphics (charcolour, light_grey);
134   memc [650] := 128;  (* all keys auto-repeat *)
135   writeln ("YAM-compatible Modem Program for C64.");
136   writeln ("Written by Nick Gammon in G-Pascal.");
137   writeln ("Version 1.2  - PUBLIC DOMAIN.");
138   writeln ("G-Pascal is produced by Gambit Games -");
139   writeln (" enquiries: Gambit Games, P.O. Box 124,");
140   writeln (" Ivanhoe, Victoria 3079. Australia.");
141   writeln ;
142   i := 35;
143   (* crck routine for transmission *)
144   insert($8500a9,$5f855e,$854bb1);
145   insert($08a207,$260726,$5f265e);
146   insert($a50c90,$10495f,$a55f85);
147   insert($21495e,$ca5e85,$88e9d0);
148   insert($60e0d0,0,0);
149   (* crck routine for file *)
150   insert($8500a9,$068505,$0506a8);
151   insert($080626,$184bb1,$850565);
152   insert($902805,$97490a,$a50585);
153   insert($a04906,$e60685,$02d04b);
154   insert($a54cc6,$5ec54b,$a5dbd0);
155   insert($5fc54c,$a5d5d0,$4b8505);
156   insert($8506a5,$ff604c,0);
157   buffer [128] := 0;
158   buffer [129] := 0;
159   command := "f";
160   definesprite (32,
161    $ff,$ff,$ff,$ff,$ff,$ff,$ff,$ff);
162   sprite (1, point, 32,
163           1, colour, light_grey,
164           1, behindbk, true);
165   got_medium := false;
166   final_address := start_address;
167   open_rs232_file
168 end ; (* of init *)
169
170 procedure start_error;
171 (********************)
172 begin
173   graphics (charcolour, light_red);
174   writeln
175 end ;
176
177 procedure error;
178 (**************)
179 begin
180 if expected_block <> -1 then
181     write (" on block ",
182               expected_block)
183 else
184     write (" on EOT");
185 writeln (" retry ", retries);
186 retries := retries + 1;
187 graphics (charcolour, green);
188 if retries > max_retries then
189   abort := true
190 end ;
191
192 procedure get_file_name;
193 (**********************)
194 var i, got_cr : integer ;
195     ch : char ;
196 begin
197 if not got_medium then
198   begin
199   writeln ;
200   write ("<D>isk or <C>assette? ");
201   graphics (charcolour, light_blue);
202   repeat
203     read (ch);
204     ch := ch and $7f
205   until (ch = "d")
206      or (ch = "c");
207   writeln (chr (ch));
208   graphics (charcolour, green);
209   if ch = "d" then
210     begin
211     medium := disk;
212     open (15, disk, 15, "i")
213     end
214   else
215     medium := cassette;
216   got_medium := true
217   end ;
218 repeat
219   writeln ;
```

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CP/M MSDOS

BASIC INTERPRETER
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This is the all purpose programming language, especially for people new to computing and people who require a general purpose programming language that is easy to use, learn and debug.
The Microsoft Basic Interpreter is the most popular implementation of Basic, with over a million copies installed in computers around the world. It runs on all the major micro-computers in the world, including Apple, Radio Shack, Atari, IBM, Commodore, NEC, Microbee and many others.
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The Basic Compiler offers all the features of its companion interpreter as well as the greater speed of a compiled program. This program can be used on its own or in conjunction with the interpreter. A compiled program will run from three to ten times faster than the equivalent interpreted version with even greater increases in speed possible if the use of integers is maximised.
All the features of standard Microsoft Basic are included, except those not applicable to a compiler. Accuracy of calculations is increased to sixteen digits. Commercial program developers can release software in object code, which is much more secure than code in interpreted form.

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CP/M 80
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THE WORD PLUS
CP/M 80 CP/M 86 MSDOS
Word processing is made really efficient when a spelling checker and dictionary is used. The Word Plus will note errors, in context, on screen, along with suggestions for the correct word from the built in dictionary. A 45,000 word dictionary is included and modifications can be made to customize it to suit your application. **$245** inc. tax **$220** ex tax.

MULTI-TOOL WORD
MICROSOFT MSDOS
An advanced word processor backed by Microsoft. New features of this word processor include an "undo" command, style sheets to provide standard formats for standard letters and Microsoft mouse, an inexpensive implementation of the most efficent pointing device available. **$499** inc. tax. **$438** ex tax. **$685** incl tax with mouse.

MULTIPLAN MICROSOFT CP/M 80 MSDOS
Small business managers now have access to the power of a financial planning and record keeping tool that will allow them to keep up with the big league. Know in advance the effects of various factors on the whole business and how individual items have affected past performance.

WORDSTAR
MICROPRO CP/M80 CP/M86
This is the most popular word processing program available for small computers. Powerful commands are available to format, underline and enhance text. Numerous options are provided for the control of files, printing and text correction and cursor placement. Right hand justification of text is performed automatically and text can be viewed on screen exactly as it is going to appear on paper. If you don't have an on screen text editor yet you haven't experienced the power of a personal computer. **$666 INC TAX, $595 EX TAX, $879 INC TAX includes Mailmerge.**

WORD PROCESSING - UTILITIES

DBASE II
ASHTONTATE CP/M80 CP/M86 MSD05
Many reviews of this data base program have praised its innovation and usefulness. Put simply, what wordprocessors are to text, DBASE II is to data Entire data bases can be manipulated at will to suit the requirements of the user. The power of DBASE II is derived from its use of a simple programming language to drive different applications. Menu driven programs with aesthetically pleasing displays are easily implemented using the DBASE II programming language. Because file and data handling are managed automatically by DBASE II, much of the time and programming effort needed to implement an application program in a language such as BASIC is eliminated. **$850 INC TAX, $760 EXT TAX.**

FOOTNOTE
This program is designed to enhance the Wordstar word-processor. Add a professional footnoting capability to enhance documents and wordprocessing capabilities. **$125 INC TAX, $110 EX TAX.**

MAILMERGE
Facility for Wordstar to perform production mailing of personalised form letters. Wordstar users will find this utility a powerful enhancement for their computer system. **$376 INC TAX $300 EX TAX.**

DISPLAY MANAGER
CMP/M80 CP/M86 DIGITAL RESEARCH
This handy software tool is designed to work with Digital Research compiled languages to separate screen design from programming. It provides the ability to quickly prepare program modules to format CRT displays and text input which can then be linked with compiled programs. **$465.00 INC TAX, $413 EX TAX.**

A.L.D.S.
APPLE CP/M
The Microsoft Assembly Language Development System is specifically developed for the Apple computer system. It supports assembly language for the 8080, Z80 and 6502 micro chips. This is a powerful assembly, relocation and useful pseudo operations. Also included is a linking loader with useful facilities, a Cross reference program, 6502 Debugger and CPMXFER to allow transfer of programs from CP/M-80 to Apple-DOS format.
No serious programmer can afford to be without an assembly language system. It allows direct access to all hardware and software facilities and the writing of the fastest possible code. Machine code is the language used in the most demanding and critical of programming situations. **$227 INC TAX, $194.00 EX TAX.**

MACRO ASSEMBLER PACKAGE
MICROSOFT CP/M 80
This assembler has become the de facto industry standard, and no wonder. It offers full macro facilities, relocation, Z80 or 8080 mnemonics and useful pseudo opcodes. Other programs supplied include an easy to use linking loader, cross reference utility and a library manager for building and listing subroutine libraries. A complete range of machine language programs can be put together using this assembly language system. **$325.00** INC. TAX. **$485.00** EX TAX.

SORT FACILITY
MICROSOFT CP/M 80 MSDOS
This is a program for the professional computer user. A fast, efficient sort program can be difficult to write, even for a professional. This program will sort and merge files of up to two million characters using the binary insertion technique. It supports all Microsoft file formats and data types and is available as a standalone package or as a support for COBOL. The user supplies the required sort keys for the program to work with. **$315.00** INC. TAX **$277.00** EX TAX.

XLT86
DIGITAL RESEARCH CP/M 80
There is no need to scrap all your favourite 8080 assembler programs when you upgrade to CP/M-86. This programming tool will optimise the code as it translates and preserves all labels, comments and symbols. **$175** INC. TAX **$165** EX TAX.

SID
DIGITAL RESEARCH CP/M 80 CP/M 86
This 8080 Symbolic Instruction Debugger (also available in Z80 format) will set breakpoints and pass points that will interrupt after a predefined number of passes by the program. All registers and memory can be set and examined. Step by step tracing of the program is possible to allow the interactive debugging of assembly language programs. Assembly language can be directly entered into memory and run. The most powerful feature of this program is its ability to use symbols as operands. A symbol table entered with the program to be debugged will enable simpler tracing and comprehension of program flow. 8080/Z80 **$125 $110** EX TAX. 8086 **$175 $155** EX TAX.

DISILOG -
CP/M 80
Disk based disassembler converts Z80 machine code to Zilog standard assembly mnemonics. Permits program counter to be set to any value and disassembly to begin anywhere in the object code. Output is compatible with assembler input and also generates cross reference listing with each label, address and type of reference to it. **$240** INC. TAX **$200** EX TAX.

VSPOOL
CP/M 80 CP/M 86
A useful utility program to permit printing of existing text files during data entry, editing or debugging. Operates with any program that interacts with system console This program that interacts with system console. This program is especially useful for situations where slow printers waste valuable computing time. **$79** INC. TAX **$70** EX TAX

BSTAM
BYROM SOFTWARE
Serial communications between computers can be handled painlessly and simply. BSTAM will work between any two computers using BSTAM. Transfer files using the familiar PIP parameters. Essential in situations where different disk formats are used. **$280** INC. TAX. **$250** EX TAX.

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C-TECH pty ltd

FORTH
by MYTEK
cassette **$35.00**
ROM **$39.00**
If you want to break out of the "BASIC" stranglehold, try FORTH. On cassette or handy ROM chip, this language is extensible, You can actually define your own commands and explore the possibilities of an advanced computer language.

WORDPROCESSOR by MYTEK
cassette **$35.00**
ROM **$39.00**
One of the truly useful functions a computer can perform is the manipulation and editing of text. This full featured text editor will make your programming easier and improve your writing. Essays and letters will be enhanced by using this professional piece of software.

BACKGAMMON by MYTEK
cassette **$17.50**
This ancient and challenging game will pit your wits against the computer. Combine your strategic skills, reckoning of odds and luck to win. Old hands can sharpen up their game against a competitor that is never going to make a silly mistake

CHOPPER by MYTEK
cassette **$20.00**
One of the most popular computer games, this version for the Microbee will give you an adventure you'll never tire of. Sound and Hi-res graphics are combined in an action paced game of high tension and drama.

EMU JOUST by MYTEK
cassette **$17.50**
One of the more unusual arcade games. If you've tired of shooting up aliens, try riding around on an emu as a knight jousting with dragons. A popular game with something different.

DEFENDER
cassette **$22.50**
The whole battalion of deadly foes are ready to challenge you in this hot new game. Blast the Landers, destroy the Mutants and obliterate the Baiter. Super action graphics include the high powered radar that gives you a central view of the whole invasion scenario. Five ships are available to defend the threatened planet. All your qualities will be taxed to get the high score in this game.

GHOST MUNCHER AND KILOPEDE
cassette **$20.00**
Mytek gives you two programs for the price of one in this exciting software package. Ghost Muncher is well known by many people for its ability to absorb your attention for hours. The object is simple, eat the dots in the maze, the result is riveting tension as you attempt to evade the pursuing ghosts. Kilopede is the arcade game of tactics and high speed machine gun attack. You can shoot the centipede quite easily, but it splits into two to give you twice the trouble. Dodge the spider and other garden nasties.

MYTEK

THE MYTEK RANGE OF COMPUTER SOFTWARE

Mytek have put together a range of software that has become renowned for its reliability and high quality. The Microbee's capabilities are fully utilised in the arcade games to give high resolution, realistic movement and action. Serious users will be interested in the utilities available for expanding the software base of the Microbee and exploiting its technical facilities.

MACHINE CODE TUTORIAL
cassette **$25**
The technical details of a computer are highly complex, so let the computer teach you about itself. Once you learn all about the fascinating details of the Microbee, you will be able to write programs like the professionals. Have hours of fun interacting directly with the Z80 CPU, the heart of the Microbee computer. Exploit the capabilities of the 6545 video controller chip, the keyboard scanner and parallel and serial interfaces.

LOGO-BEE
cassette **$22.50**
Draw designs and patterns using the Microbee hi-res graphics. LOGO-BEE is a powerful subset of the acclaimed LOGO childrens' learning language.

MICROBEE

FROGGER
cassette **$22.50**
Based on the popular arcade game. Get the frog across the deadly road past trucks and cars. Then negotiate the flooded river by jumping onto anyting that is floating past. Strategy and skill are required to master this game.

METEOR RESCUE
cassette **$17.50**
Another graphics based arcade game, your mission is to rescue earthlings from the planet surface to the mother ship. Dodge the objects that spin by and destroy the ship.

ASTEROIDS PLUS
cassette **$22.50**
There is action galore in this Microbee version of asteroids. The computer controls flying asteroids that fly towards your rocket ship, as well as the intelligent objects, sound effects and smart missiles that combine to put you on the edge of your seat with excitement.

TRSBEE by MYTEK
cassette $30.00
The enormous software base of the old TRS-80's is too large to ignore. Now it can be transferred directly on to the Microbee on cassette using TRSBEE. Basic programs are translated as much as possible into Microworld Basic. Machine language programs are loaded directly into memory for editing.

BASIC TUTORIAL
cassette **$20.00**
There's nothing better for teaching about computer languages than a computer. Put your Microbee to work with this Basic Tutorial cassette and be guided through its nine graded lessons on the ins and outs of Basic. Ideal for the computer novice.

DEBUG
cassette **$17.50**
If it's time to update an old machine language program or time to get a new one going, a DEBUG program is essential. This program will set breakpoints; that is, at any stage in a machine language program the computer can be made to halt to allow memory and CPU registers to be examined under DEBUG control. If your attempts at machine language programming are not working out too well, this program will allow you to trace them to the source of the problem.

TOUCH TYPE
cassette **$20.00**
Since the computer keyboard is the main input device for personal computers, it makes sense to learn how to touch type. Using this graded program will make it quick and easy. In no time at all you'll be rattling off programs at such a rate you'll be glad you don't have to hunt and peck away at the keyboard anymore.

TAPE DOCTOR
cassette **$17.50**
Sometimes cassettes aren't too reliable. Even one bad bit in a file will cause the tape to stop loading. Tape Doctor will help to fix up the damaged or imperfect files and set disk header parameters.

MUSIC B
Anyone who is trying to learn music will find this useful. Tunes can be composed and edited and played. Transpose music instantly. Save and recall tunes using tape. Design a super metronome or tireless backing musician. Cassette **$20.00** Disk Available.

This program is an excellent aid for learning music and musical theory. On screen graphical representation of music helps learning of written music. Play on screen music, edit and transpose it. Cassette **$20.00.** Disk Available.

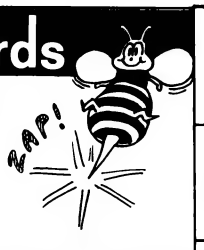
DUO 3 - DREAMCARDS
More two for the price of one programs. Thrill to the mysterious adventure in space of Hyperdrive, play Caverns where you try to find hidden jewels while battling fierce dragons.
32K Microbee
Cassette **$19.95**

KILLER BEES - DREAMCARDS
Save Australia from the dreaded swarm of killer bees. Test your skill at using the secret weapons that will save the country.
32K Microbee
cassette **$14.95**

DISASSEMBLER
by DREAMCARDS $15.00
If you've ever wondered what a computer actually gets up to, this program will reveal all. Just "Disassemble" your target program and all the programming tricks and techniques of the pro's will be revealed.

WILDCARDS - VOLUME ONE $15
There are more tips, hints and programs in there than you would think possible for only $15.00. Topics cover everything from printers, music, utilities and graphics to very useful data sheets and graphics design sheets. Anyone after a handy reference guide or people just wanting to know more about the technical aspects of the Microbee will find this book to be a bargain.

dreamcards
SOFTWARE



MERLIN - DREAMCARDS
Well written adventures are always enjoyable to play. You will travel back in time to ancient England where many adventures await you. No trite tricks are used to make playing this game miserable, your success or failure is entirely up to your skill and cunning. A different scenario is generated every time you play this game, giving you long lasting satisfaction. Cassette **$24.95.**

DUO 1 - DREAMCARDS
Try your coolness in a tough situation with the two popular card games of Poker and Casino. Cassette **$14.95.**

PSYCHOTEC 16
Experimenters into artificial intelligence and mental health will have hours of fun playing with this implementation of one of the oldest and most popular computer games. Will "Eliza" save your sanity or will you destroy Eliza's? This program is written in basic so it can be extended and improved by you. Try it out on your friends and parents. Cassette **$14.95.**

DUO 5 - DREAMCARDS
Two games for the price of one. Millipede is a high-res version of Centipedes, an arcade game combining speed and strategy. Try to escape from the maze in game two. Careful though, the mines will blow you up. Cassette **$14.95.**

PENETRATOR - DREAMCARDS
Fast moving action to test your skill. Blast your way into the enemy planet to destroy the neutron bomb. A special bonus is the facility to design your own custom landscape. Cassette **$19.95.**

MINE DROP - DREAMCARDS
Have fun driving the tank through the maze dodging the dreaded BINGLE. Drop a mine strategically and you will survive to build up a super score. Cassette **$14.95.**

WILDCARDS - VOLUME TWO $16
More information and programs of all sorts from the Microbee owners who brought you volume one. Music, utilities and interfacing are all covered, including tips on getting machine code running. Anyone interest in the amazing technical details of a computer will enjoy both these books.

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C-TECH pty.ltd.

THE BUG
The bug is a programming aid designed to be used as a tool by both the experienced and novice assembly language programmer by allowing the programmer to control the execution of his/her own program. Because each instruction is displayed as it is executed, the programmer may visually observe and make corrections or changes while working! It is easy to stop any program work by just pressing the escape key on your computer and enables the programmer to make use of a large number of register or memory modification and display commands provided to you by The Bug. The Bug also allows programmers the ability to run part of the program at full speed and lets you concentrate on only those program sections that you want to examine. The programmer need not spend time debugging subroutines that are known work. Generally, any programmer will find that The Bug will increase efficiency by decreasing the amount of time wasted on debugging. **$49.95.**

CROSSWORD MAGIC
The program consists of two parts: Making/printing puzzles, and playing them (filling them in). In making puzzles, you may set the number of vertical/horizontal boxes that the puzzle will contain, or you can let the computer expand or contract the puzzle as needed while you enter words. The computer takes the words as you are entering them and fits them into the puzzle. If you enter a word that will not f-'< into the present puzzle, the computer will store it, and if later it can find a location for it, it will be inserted. When all words are entered, you may begin entering clues for the words in the puzzle, and you may then print the puzzle to a graphics printer, save it to the disk, or have another person be given the clues and try to fill in the puzzle. **$49.95**

MUMMY'S CURSE
MUMMY'S CURSE is a full color, high resolution graphics adventure program for the APPLE II computer. You are an explorer in the mysterious and dangerous deserts of Egypt. You are trying to recover the solid gold death mask of King Rutattuttut, and return alive. You can direct the computer by typing one of two word commands, while travelling through over 60 different locations, all displayed in high resolution color on the Apple II screen. **$29.95**

FASTER MASTER
Faster Master is an easy-to-use package of utilities for the serious programmer. Turbo allows you to speed up the DOS commands BLOAD, BRUN, LOAD, and RUN by a factor of five. Other included utilities allow you to date-stamp files, customize DOS command words, copy disks and more. Most importantly, Faster Master works with standard Apple DOS 3.3 files without modifications to the hardware of disk format. **$29.95.**

THE LIBERATOR
Liberate yourself from the tedium of repetitive programming. the Liberator is a unique subroutine library that lets you load as many subroutes as you like into a program with a single keystroke. Gone are those hours of typing the same code time after time. The program comes with 51 prepacked subroutines and allows you to add 39 of your own creation. **$29.95.**

APPLESOFT COMPILER - MICROSOFT
The Microsoft Applesoft compiler converts Applesoft BASIC to fast, efficient native 6502 code. Programs compiled under the Applesoft compiler will execute from 2 to 20 times faster than they would run under the Applesoft Interpreter. Write and debug your programs in Applesoft interpretive Basic, then compile them to make them execute more quickly. High resolution graphics programs will come to life. Source code security will be assured as compilation turns a program into highly efficient machine code. **$279.**

DISK DIRECTOR
Disk Director will eliminate the word "oops" from your computer vocabulary. Some unique capabilities of disk director are restoration of deleted files, special methods of copying, catalog restructuring, and disk integrity checking. Use this program to manipulate and organize DOS files, file names, and entire disks in ways that were previously unavailable. It lets you recover damaged disks and lost files. Disk Director also makes routine tasks easier. **$59.95.**

LUNAR PINBALL
Lunar Pinball is an exciting game specially designed to help you future astronauts to feel at ease when playing your computer game in zero gravity. The best news is that you don't need to take off for the moon to play. That's right...Lunar Pinball has been specially adapted for play right here on earth. So get your electroplasmic force field and antipluton ray gun ready... you'll need them to AVOID THE VOID. **$29.95**

LASER MAZE
Space travel is commonplace in the 24th century and all galaxies within are wearied from war, greed, killing, suffering, and especially the devastating effects of nuclear weapons and radiation. So, a pact was formed and agreed upon where conflicts would be solved with each party in a dispute choosing a Hero to represent them in a special form of one-to-one combat. Each Hero is allowed either a laser pistol or a "throwing bomb" in the arena delegated for final reconciliation. **$29.95**

MIDNIGHT MALADY
As a member of a medieval village you soon discover life is not all renaissance and merrymaking. You awake one morning with a terrible pain in your arm and are quite surprised to find a bloody wound, having spent what you thought was just another ordinary night's rest...or was it? You overhear talk in the marketplace about a werewolf sighting and an attempted attack by the sheriff to wound the beast who got away. In disbelief, you realize that you are the werewolf!!! **$29.95**

DRINKS ON A DISK
Imagine having a whole book of drink recipes at the touch of a button! Drinks on a Disk is an exciting new program that gives you a hundred different recipes without the fuss or bother of a traditional recipe book. Press a button and see a recipe. Press another and have the recipe printed out. Welcome to the age of computerized bartending. **$24.95**

DISAPPLER?
DISAPPLER is a disassembler for the Apple II series of computers. It will translate 6502 object code (machine code) into source code compatible with the DOS Toolkit 6502 Editor Assembler, and a print listing. The source code generated may immediately be re-assembled or may be edited and customized before re-assembling. **$99.00**

APPLE
Cards Also Available

Wordsmith Wordprocessor	**TYPING TUTOR**	**$49**
Sensible Speller	**Mu Math**	**$197**
Spelling Checker	**Mu Math/Mu SIMP**	**$387**

APPLE COMPATIBLE DISK DRIVE

$365

SUPER 5 SPECIFICATIONS

HIGH-SPEED ACCESS, HIGH ACCURACY POSITIONING Instead of plastic CAM positioner or lead screws positioner, a high microprecision metal band positioner is adopted in the mechanism to position the head.
BRUSHLESS DC DIRECT-DRIVE MOTOR Direct drive means that there is no improper belt seating, so the variations in speed and friction-producing side loading can be eliminated which allows motor running lifetime to be over 10,000 hours.
MOTOR'S CLOSED LOOP SERVO Hall effect devices are utilized as speed control sensor in DC motor system, so motor can run stably and accurately.
SLIM, HALF-HEIGHT DRIVE The disk drive is only 41mm high, it is only half the size of conventional models
NO CONTACT WRITE-PROTECTED SENSOR Photo coupler is used as write-protected sensor. It means no damage, long lifetime and good reliability for disk media.

GENERAL SPECIFICATIONS.

Capacity (formatted):	163K (20K bytes more than the original)
No. of tracks:	40 tracks (5 tracks more).
No. of sectors track:	13 or 16 sectors.
Disk rotation speed:	300 rpm.
Track density:	48TPI.
Track to track time:	Less than 6 msec.

CICADA DATA MODEMS

$285

ADVANTAGES OF CICADA 300
1. Internal Power Supply.
2. Carrier and Data Line status indicators on front panel.
3. Full ± 12V RS232 Data Lines.
4. DTR and RTS lines for control from the computer.
5. CTS and CD status lines to the computer.
6. Reverts to phone mode if power is disconnected.
7. Only one internal adjustment (Transmit level). All other circuits are designed to operate without alignment thus improving reliability.
8. All units are run for a "burn in" time to reduce "Infant Mortality" failures in the field.

Designed primarily for the personal computer operator, the Cicada 300 data modems are 300-baud direct-connect units to allow inter-computer communication utilising ordinary Telecom local, STD and ISD telephone facilities.
Both current Cicada 300 modems carry Telecom Authorisation Number C83/37/1011, and are compact answer-and-originate units (203mm x 162mm x 63.5mm) for direct connection to the telephone line. The computer interface is achieved through either an RS232C or V24/V28 interface system.
The cicada 300 base unit is designed for use with a standard Telecom-supplied (or separately purchased) telephone. The new Cicada 300T features an integral one-piece phone designed to sit securely on the modem unit.

$225

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Name .....
Signature .....

Continued from page 72

```
  write ("File name? ");
  graphics (charcolour, light_blue);
  read (name1);
  graphics (charcolour, green);
  got_cr := false;
  for i := 0 to 20 do
    if not got_cr then
      begin
      name2 [20 - i] := name1 [i];
      if name1 [i] = cr then
        begin
        length := i;
        got_cr := true
        end
      end
until length <> 0
end ;

procedure check_result;
(*********************)
const readst = $ffb7;

var i, error_code : integer ;
    result : array [80] of char ;
begin
  if memc [cc] and 1 then
    error_code := memc [areg]  (* got error *)
  else
    begin
    call (readst);
    error_code := memc [areg] and $bf
    end ;
  bad_result := error_code;
  if medium = disk then
    begin
    get (15);
    read (result);
    get (0);
    result [80] := cr;
    if (result [0] <> "0")
    or (result [1] <> "0") then
      begin
      bad_result := true;
      i := -1;
      start_error;
      repeat
        i := i + 1;
        write (chr (result [i]))
      until result [i] = cr
      end
    end ;
  writeln ;
  if error_code then
    begin
    start_error;
    writeln ("File error, code: ",
             error_code)
    end ;
  graphics (charcolour, green);
  if not bad_result then
    writeln ("Ok.")
end ;

procedure load_nominated_file (flag);
(***********************************)

procedure load_file;
(*****************)
const
     loadit = $ffd5;

begin
  memc [areg] := 1;
  memc [xreg] := medium;
  memc [yreg] := 0; (* relocate *)
  call (setlfs);
  memc [areg] := length;
  memc [xreg] := address (name2[20]);
  memc [yreg] := address (name2[20]) shr 8;
  call (setnam);
  memc [areg] := flag;  (* load /verify *)
  memc [xreg] := start_address;
  memc [yreg] := start_address shr 8;
  call (loadit);
  check_result
end ;

(***** start of : load_nominated_file ***)
begin
repeat
  if flag = 0 then  (* load *)
    get_file_name;
  load_file
until (bad_result = 0)
  or (flag = 1)
end ;

procedure save_nominated_file;
(****************************)

procedure save_file;
(*******************)
const saveit = $ffd8;
      register = $6a;
begin
  memc [areg] := 1;  (* file no *)
  memc [xreg] := medium;
  memc [yreg] := 0;
  call (setlfs);
  memc [areg] := length;
  memc [xreg] :=
        address (name2 [20]);
  memc [yreg] :=
        address (name2 [20]) shr 8;
  call (setnam);
  memc [register] := start_address;
  memc [register + 1] :=
               start_address shr 8;
  memc [areg] := register;
  memc [xreg] := final_address;
  memc [yreg] := final_address shr 8;
  call (saveit);
  check_result
end ;

(***** start of : save_nominated_file ***)
begin
repeat
  get_file_name;
  save_file;
  if not bad_result then
    begin
    if medium = cassette then
      begin
      writeln ;
      writeln ("Rewind cassette to save point for");
      writeln ("verification - press <SHIFT> when ready.");
      repeat until shift_key_pressed
      end ;
    load_nominated_file (1)   (* verify save *)
    end
until not bad_result
end ;

function from_modem;
(*******************)
begin
  get (2);
  from_modem := getkey ;
  get (0)
end ;

procedure display_char (x);
(*************************)
begin
  x := x and $7f;

(* Reverse upper/lower case *)

  if (x >= $61) and
     (x <= $7a) then
     x := x - $20
  else
  if (x >= "a") and
     (x <= "z") then
     x := x + $20;

(* Only display if printable *)

  if (x >= " ")
  or (x = cr) then
     write (chr (x))
  else
    if x = bs then
      write (chr (157))
    else
      if x = fs then
        write (chr (29))
      else
        if x = ff then
          write (chr (home))
end ;

procedure to_modem (x);
(*********************)
begin
  put (2);
  write (chr (x));
  put (0)
end ;

function calc_crck;
(*****************)
begin
  memc [$4b] := address (buffer [130]);
  memc [$4c] := address (buffer [130]) shr 8;
  memc [yreg] := 130;
  call (address (routine[35]));
  calc_crck := mem [$5e] and $ffff
end ;

procedure calc_file_crck;
(***********************)
begin
  memc [$4b] := start_address;
  memc [$4c] := start_address shr 8;
  memc [$5e] := final_address;
  memc [$5f] := final_address shr 8;
  call (address (routine[20]));
  writeln ("Cyclic redundancy check = $",
           hex (mem [$4b] and $ffff));
end ;

function next_char (period);
(***************************)
const count_per_second = 145;
var ch : char ;
    counter : integer ;
begin
counter := period * count_per_second;
repeat
  ch := from_modem;
  counter := counter - 1
until (not (memc [rs232_status] and empty))
   or (counter <= 0);
timeout := memc [rs232_status] and empty <> 0;
next_char := ch
end ;

procedure purge;
(**************)
var discard : char ;
begin
repeat
  discard := next_char (1)
until timeout
end ;

procedure send_nak;
(*****************)
begin
  purge;
  if (expected_block = 1)
  and want_crck then
    to_modem ("c")
  else
    to_modem (nak)
end ;

procedure cancel_trans;
(*************)
begin
  purge;
  to_modem (can);
  to_modem (can);
  to_modem (can);
  start_error;
  writeln ("Transmission aborted")
end ;

procedure receive_block;
(**********************)
var ch : char ;
    i : integer ;
begin
bad_block := false;
block_no := next_char (1);
if not timeout then
  inverse_block_no := next_char (1);
if (block_no + inverse_block_no + 1)
   and $ff <> 0 then
  begin
  start_error;
  write ("Bad block no.");
  error;
  send_nak;
  bad_block := true
  end
else
  if ((block_no = last_block and $ff)
  and (expected_block <> 1))
  or (block_no = expected_block and $ff) then
    seq_error := false
  else
    begin
    seq_error := true;
    start_error;
    writeln ("Block number sequence error")
    end ;
if not (bad_block or seq_error) then
  begin
  sum_check := 0;
  for i := 0 to 127 do
    if not timeout then
      begin
      ch := next_char (1);
      buffer [i] := ch;
      sum_check := sum_check + ch
      end ;
  if not timeout then
    sum_check_received := next_char (1);
  if want_crck then
  if not timeout then
    sum_check_received_2 := next_char (1);
  if timeout then
  begin
    start_error;
    write ("Timeout on receive");
    error;
    send_nak
    end
  else
    begin
    bad_sum_check := true;
    if want_crck then
      if calc_crck = sum_check_received shl 8
      or sum_check_received_2 then
        bad_sum_check := false
      else
    else
      if sum_check and $ff =
         sum_check_received then
        bad_sum_check := false;
    if bad_sum_check then
      begin
      start_error;
      write ("Sum check error");
      error;
      send_nak
      end
    else
      begin
      to_modem (ack);
      retries := 0;
      if block_no = expected_block and $ff then
        begin
        last_block := expected_block;
        expected_block := expected_block + 1;
        if display_file then
          for i := 0 to 127 do
            display_char (buffer [i])
        else
          write ("*");
        for i := 0 to 127 do
          begin
          memc [next_address] :=
              buffer [i];
          next_address := next_address + 1
          end
        end
      end
    end
  end
end ;

procedure receive_block_can_eot;
(******************************)
var ch : char ;
begin
repeat
  ch := next_char (10)
until (ch = soh)
   or (ch = eot)
   or (ch = can)
   or timeout;
if timeout then
  begin
  start_error;
  write ("Timeout at start");
```

```
    error;
    send_nak
    end
  else
    case ch of
      soh: receive_block;
      can: begin
           start_error;
           writeln ("Sender CANcelled transmission");
           abort := true
           end ;
      eot: begin
           eof := true;
           to_modem (ack)
           end
    end   (* of case *)
end ;

procedure receive_file;
(********************)
begin
writeln ;
graphics (charcolour, light_green);
writeln ("----- Receive a File -----");
graphics (charcolour, green);
writeln ;
expected_block := 1;
last_block := 0;
retries := 0;
abort := false;
eof := false;
seq_error := false;
next_address := start_address;
want_crck := receive_with_crck;
send_nak;  (* get things going *)
repeat
  receive_block_can_eot
until abort or eof or seq_error;
writeln ;
if eof then
  begin
  final_address := next_address;
  writeln ;
  writeln ("File received successfully");
  calc_file_crck;
  save_nominated_file
  end
else
  begin
  final_address := start_address;
  cancel_trans  (* stop other end *)
  end
end ;

procedure analyse_file;
(**********************)
var
    file_length, blocks, mins : integer ;
begin
writeln ;
load_nominated_file (0);
final_address := memc [xreg] + memc [yreg] shl 8;
file_length := final_address - start_address;
while file_length and $7f <> 0 do
  begin
  file_length := file_length + 1;
  memc [final_address] := ctrlz;
  final_address := final_address + 1
  end ;
blocks := (final_address - start_address)
          / 128;
mins := blocks * 561 / 600;
writeln (blocks, " blocks,  ",
         blocks * 10 / 80,
         ".",
         blocks * 10 / 8 mod 10,
         " K");
calc_file_crck;
writeln ("Transmission time: ",
         mins / 10, ".",
         mins mod 10,
         " minutes.")
end ;

procedure process_can;
(*********************)
begin
  start_error;
  writeln ("Receiver CANcelled transmission");
  graphics (charcolour, white);
  abort := true
end ;

procedure transmit_block;
(************************)
var ch : char ;
    discard,
    i : integer ;

procedure get_ack;
(*****************)
begin
  ch := next_char (10);  (* wait for ack *)
  if timeout then
    begin
    start_error;
    write ("Timeout on ACK");
    error
    end
  else
  if ch = can then
    process_can
  else
  if ch <> ack then
    begin
    start_error;
    write ("Got ",ch," for ACK");
    error
    end
end ;  (* of get_ack *)

begin
sum_check := 0;
for i := 0 to 127 do
  begin
  ch := memc [next_address];
  next_address := next_address + 1;
  sum_check := sum_check + ch;
  buffer [i] := ch
  end ;
if display_file then
for i := 0 to 127 do
  display_char (buffer [i])
else
  write ("*");
if want_crck then
  begin
  sum_check_2 := calc_crck;
  sum_check := sum_check_2 shr 8;
  sum_check_2 := sum_check_2 and $ff
  end ;
retries := 0;
inverse_block_no := block_no xor $ff;
expected_block := block_no;
repeat
  to_modem (soh);  (* start block *)
  to_modem (block_no);
  to_modem (inverse_block_no);
  for i := 0 to 127 do
    begin
    discard := from_modem;  (* ignore any spurious glitches *)
    to_modem (buffer[i])
    end ;
  to_modem (sum_check);
  if want_crck then
    to_modem (sum_check_2);
  get_ack
until abort or ((not timeout) and (ch = ack));
if next_address >= final_address then
if not abort then
  begin
  retries := 0;
  expected_block := -1;
  repeat
    to_modem (eot);
    get_ack
  until abort or ((not timeout) and (ch = ack));
  if not abort then
    eof := true
  end ;
block_no := block_no + 1
end ;

procedure send_file;
(*******************)
var ch : char ;
begin
writeln ;
graphics (charcolour, light_green);
writeln ("----- Send a File -----");
graphics (charcolour, green);
analyse_file;
next_address := start_address;
block_no := 1;
expected_block := 1;
abort := false;
eof := false;
retries := 0;
purge;  (* empty buffer *)
writeln ; writeln ;
writeln ("Awaiting initial NAK");
repeat
  ch := next_char (60);  (* wait a minute *)
  if timeout then
    begin
    start_error;
    writeln ("No response from other end")
    end
  else
    begin
    if ch = nak then
      want_crck := false
    else
      if ch = "c" then
        want_crck := true
      else
        if ch = can then
          process_can
        else
          begin
          start_error;
          write ("Got ",ch," for NAK");
          error
          end
    end
until (ch = nak) or (ch = "c")
   or timeout or abort;
if not (timeout or abort) then
  repeat
    transmit_block
  until abort or eof;
if eof then
  begin
  writeln ;
  writeln ("File transmitted successfully")
  end
else
  cancel_trans  (* stop other end *)
end ;

procedure terminal_mode (half_duplex);
(*************************************)
const active = 7;
var input : char ;
    x : integer ;
begin
last_terminal_mode := command;
graphics (charcolour, green);
writeln ;
graphics (charcolour, light_green);
write ("Terminal Mode - ");
if half_duplex then
  write ("Half")
else
  write ("Full");
writeln (" duplex");
writeln ("Press <Commodore> key for Main Menu");
writeln ;
graphics (charcolour, white);
sprite (1, active, true);
repeat
  x := cursorx ;
  if x > 40 then
    x := x - 40;
  positionsprite (1,
    x * 8,
    cursory * 8 + 42);
  input := from_modem;
  if input <> 0 then
    display_char (input);
  input := getkey ;
  if input <> 0 then
    begin
    if (input >= $c1) and
       (input <= $da) then
      input := input - $60;
    if input = $8d then
      input := cr
    else
      if (input = $9d)
      or (input = $14) then
        input := bs
      else
        if input = 29 then
          input := fs
        else
          if input = home then
            input := ff;

(* Reverse upper/lower case *)

    if (input >= $61) and
       (input <= $7a) then
      input := input - $20
    else
    if (input >= "a") and
       (input <= "z") then
      input := input + $20;
    to_modem (input);
    if half_duplex then
      begin
      graphics (charcolour, light_blue);
      display_char (input);
      graphics (charcolour, white)
      end
    end
until commodore_logo;
sprite (1, active, false)
end ;

procedure type_file;
(*******************)
begin
next_address := start_address;
writeln ;
writeln ("Press <Commodore> key to abort list");
writeln ("      <SHIFT>     key to pause list");
writeln ;
graphics (charcolour, light_green);
while (next_address < final_address)
  and not commodore_logo do
  begin
  repeat
  until not shift_key_pressed;
  display_char (memc [next_address]);
  next_address := next_address + 1
  end ;
writeln
end ;

(* -------- MAIN PROGRAM -------- *)
begin
  init;  (* ready for crck *)
  repeat
    graphics (charcolour, green);
    case command of
     "a": analyse_file;
     "c": cancel_trans;
     "f": terminal_mode (false);
     "h": terminal_mode (true);
     "r": receive_file;
     "s": send_file;
     "t": type_file
    end ;  (* of case *)
    if (command = "s")
    or (command = "r") then
      command := last_terminal_mode
    else
      begin
      graphics (charcolour, green);
      writeln (chr (14));  (* lower case *)
      writeln ("<A>nalyse a file");
      writeln ("<C>ancel transmission");
      writeln ("<F>ull duplex terminal");
      writeln ("<H>alf duplex terminal");
      writeln ("<R>eceive a file");
      writeln ("<S>end a file");
      writeln ("<T>ype last file");
      writeln ("<Q>uit program");
      writeln ;
      write ("Command? < >",chr (157),chr (157));
      graphics (charcolour, light_blue);
      repeat
        read (command);
        command := command and $7f
      until (command = "f")
         or (command = "s")
         or (command = "a")
         or (command = "a")
         or (command = "c")
         or (command = "h")
         or (command = "t")
         or (command = "r");
      writeln (chr (command))
      end
  until command = "q";
  close (2)
end .
```

your TRS80 computer

By Rod Stevenson

Back-ups

I read recently in one of the other user group's newsletters we get in exchange for ours, of one person's problems when making a back-up of her latest creative masterpieces. It seems while she was using the DOS facility to BACKUP from one drive to the other, misfortune struck and she lost the lot.

I was most taken aback by this. My method of making back-ups is from the working copy in memory, as I'm working. Even if I do have a fault while I'm accessing one file, I still have the other untouched.

It matters not whether using tape or disk – the principle is the same. When using tape, I just keep recording successively on the same tape (admittedly not a foolproof idea, as the tape transport mechanism can jam). When I've got the final version, I make a copy on another tape. When using disk, I alternate between drive 0 and 1 – and I write 'protect' on the final version, just to avoid possible future accidents.

I'd never record the new version over the top of the only copy, which seems to be a common practice. Nor do I keep the back-up on the other side of the same disk or tape!

It's even a good idea to keep yet another back-up in a physically different location, as well as a copy recorded in a standard format, if you normally use a non-standard one (if your system fails, at least you may be able to use a similar one borrowed from a fellow-member of your local user group). Obviously, you should save a printed copy, too, just in case your computer fails at the very time the Taxation Department decides to investigate you!

Word Processing

I've mentioned my great regard for Scripsit as a word processor before. I must also stress that it's just as good for tape-based systems. The only features lacking in the tape version are those to save and load the text from disk. Really, the great advantage of any word processor is its ability to easily and efficiently manipulate text; the saving of it is a mere mechanical feature, of no great import as long as it is reliable.

There are plenty of people who buy a computer solely as a word processor. Others use word processing only after discovering the great scope it offers. As you're in the happy position of already having the equipment, you should try word processing, if only to see what it is you're missing.

The Scripsit I use is the initial version (although I admit I've patched it for my particular system and use). I've looked at SuperScripsit and decided it's too 'serious' for me. The value I see in recommending Scripsit (from Tandy) is that, initially, you can just start typing and you will get something out. When you're looking for more advanced facilities, you'll find it's all there. Certainly, there are much more powerful and sophisticated programs about, requiring, as you'd expect, more practice before you can use them proficiently. I'm not against these more advanced word processors, it's just that as I imagine I'm reaching those who've yet to experience the benefits of any such typing aid, I'm suggesting an easy start.

Which of the other word processors to choose? I wouldn't look at a word processor written in BASIC (yes, there are some). Such a thing is undoubtedly a worthwhile programming exercise, but is far from a worthwhile utility program in its own right. If you have a tape system, the choice will be much more limited. Probably the best method is to ask around the members of your user group, even invite yourself around to use their word processors before you buy.

Tape Data Files

The BASIC statement to create tape data files is slow. PRINT#-1 will put a leader on the front of each group of data it records onto tape, but have you considered grouping data to record it in one block? The obvious way is to record several variables within the one statement, thus 'wasting' only one leader on them. As the manual says, the limit is 255 bytes, and consider that you are recording values, not just the variable names. Experimentation will answer your problems.

Apart from the time taken by the leader to be inserted by the PRINT#-1 statement, the actual recording time is the same as that taken by any recording method, whether it be machine code or BASIC. The reason is that the ROM recording routines are written to put out data at 500 baud, and they will do this regardless of the way the data is fed to them.

While there are certainly plenty of good monitors about to record data to tape, they are all extremely difficult (almost impossible for most of us) to access from within a running BASIC program – which is where one would be using PRINT#-1. So probably the easiest way is to jump from the running BASIC program (via USR(0)) into a machine-code routine, to dump a certain section of nominated memory to tape.

I'd have thought the requirement for such a facility as this would have been small. But after receiving requests from three separate readers, I wrote one, and will be pleased to send it to you in exchange for a stamp.

Trends

Have you noticed the newer micros (including the expensive business systems) are favouring 13 cm disk drives? There were claimed to be problems with the 20 cm size (formerly the standard) because of their very size: since they are 'floppy', they attract rough handling and bending. It's easier to store the smaller size, for records as well as daily use. With improved technology, it is now possible to store over one megabyte on a 13 cm floppy, so the earlier advantage of not having so much data to lose when it crashes is no longer valid. There's no real message here – except perhaps not to dismiss the systems using 13 cm as toys.

More in the nature of a rumour than a trend is the report that Apparat is forsaking NEWDOS, and that Logical Systems (of LDOS fame) will no longer contract outside its own in-house resources. Logical Systems has hinted it will support MS-DOS (as used by the IBM-PC). Does this point to a future replacement of CP/M by MS-DOS as the standard operating system for micros?

It's too early to draw conclusions, and pretty unprofitable to do so, anyway. I'm just pointing out that something could happen along these lines in the foreseeable future, and if you've been postponing a particular purchase till a later date, it may be worth re-thinking. If there is a re-organisation, it's likely there will be a 'sale', but if your required item has already been sold out, will the sale be of value?

There's no need for us Model 1, 3, and System 80 owners to despair. Although our systems are no longer manufactured, they're not yet being circled by Dodo Birds – which is why I suggest you get everything you need to be self-sufficient.

Learning BASIC

Last month I expounded on my suggested method for learning Assem- ▶

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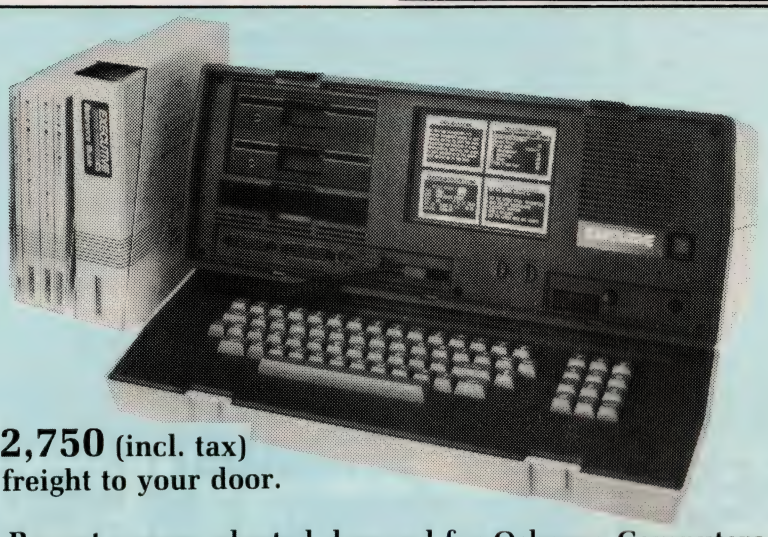

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bly language. Now that you've pored over previous issues of *YC* to find where you'd missed my suggested method for learning BASIC (which you were sure came before assembly), I'll say the reason I hadn't detailed one is because of the similarity of most statements and commands to English. Therefore, I believe the manual is the best way to teach oneself the elementaries.

In most treatises the 'trial and error' method is frowned upon. I'd be less than honest not to admit that most of us learned this way, and at times it is quicker to try the odd thing rather than go through the manual looking for the right way. That's how those 'undocumented' facilities are found.

Having achieved the elementaries of BASIC there may be something to be said for attending an advanced course at the local College of Advanced Education, or user group. But I see this more as a way of gaining technique and efficiency than actual 'grass-roots' learning.

So, my advice is to teach yourself. Magazines such as this are often better to learn from than books because their nature allows them to be topical and up to date.

Poke

The fear of this simple BASIC command and statement is unwarranted. It is only a method of putting a value directly into a memory location (a byte) from within BASIC, either using the keyboard or from within a running BASIC program.

The difficult part of understanding what is being done is you have to recognise the memory address being POKEd. Generally, if the address is above 17128 (for level 2) and there are a number of values being POKEd into successive memory locations, it's likely that a machine code program or routine is being put into memory, rather than a separate load of a SYSTEM program. If the address is below 17129, and a few values are POKEd into separate memory locations, it's likely the operating system is being modified. A poke such as POKE 16396,165, will disable the break key but not shift break.

Understanding the real depth of either operating system modifications or machine code routines requires at least a surface knowledge of Assembly language. But this is no reason to regard all POKE statements as a mystery. I'm saddened that so many people do, and won't try to understand a program with even one POKE. ❑

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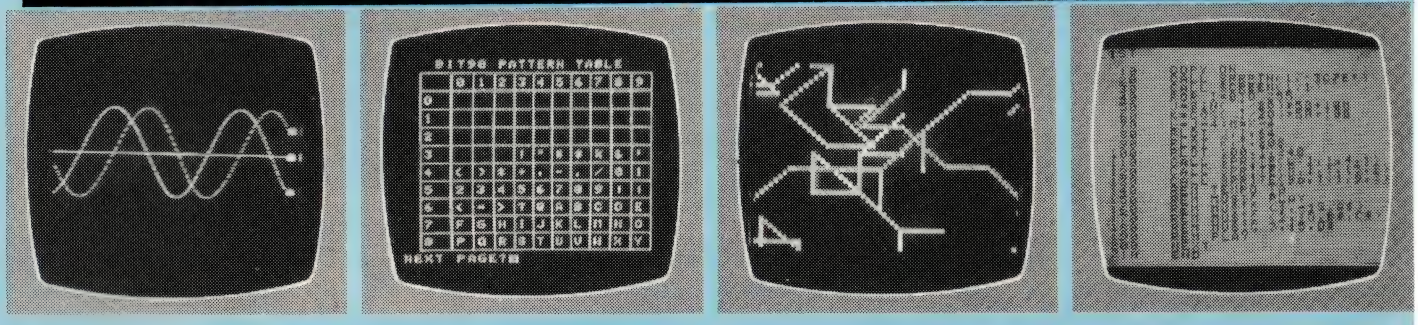

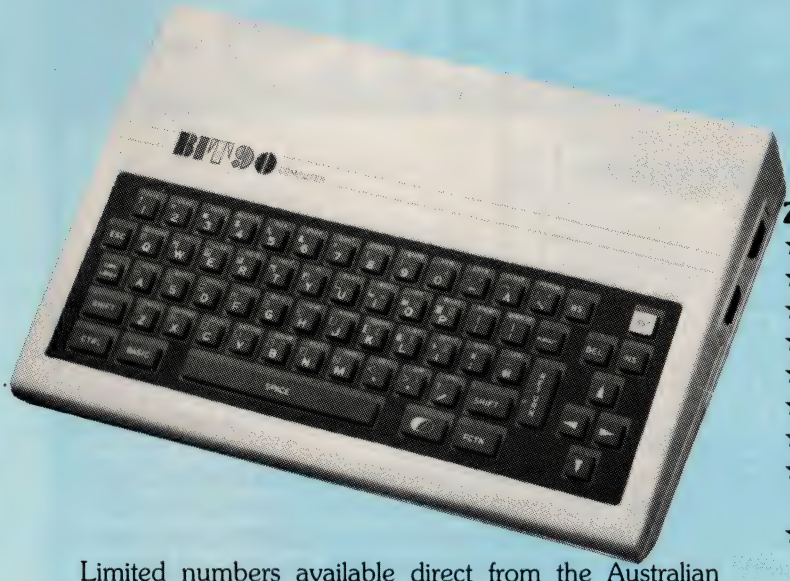

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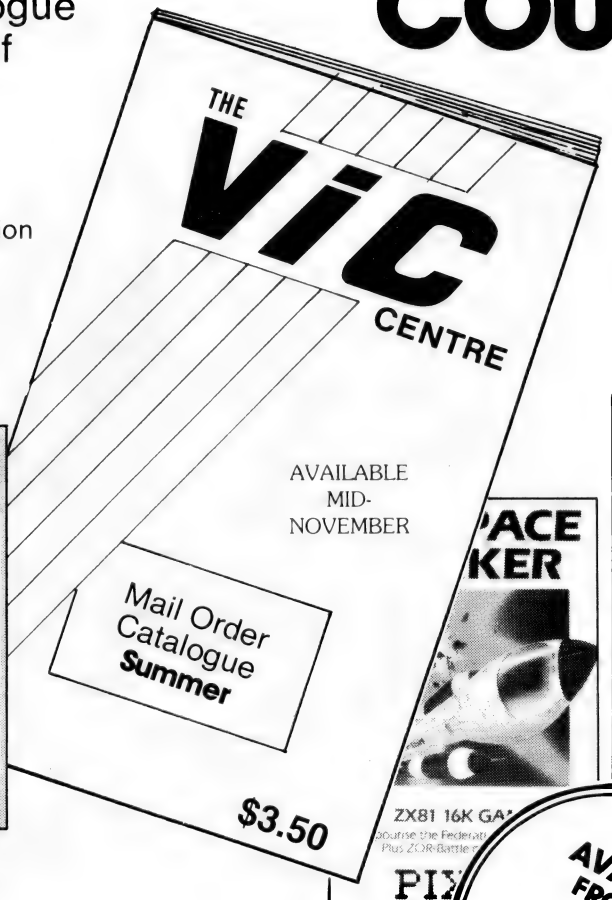

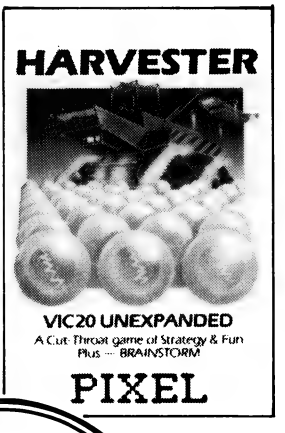

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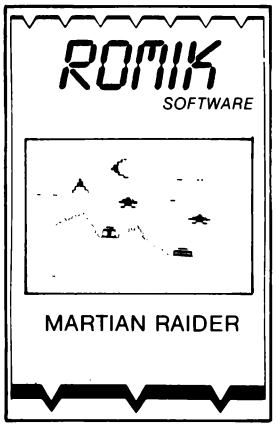

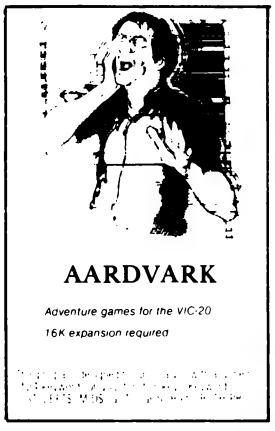

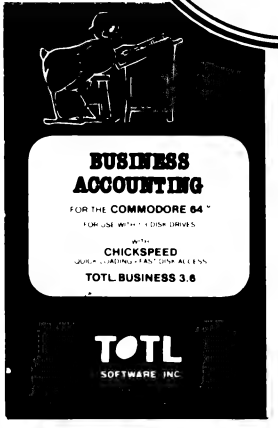

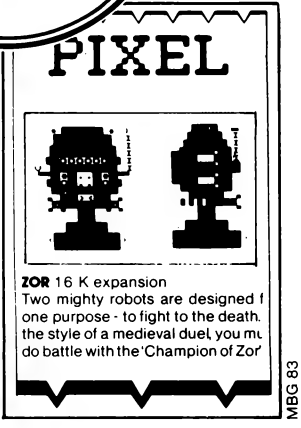

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your VIC 20/C64 computer

By Andrew Farrell

EARLY REPORTS of several new Commodore prototypes are starting to arrive in Australia. None of them appears to be a replacement for the 64; they are instead more up-market versions of the machine.

Well ... that may be a bit close a comparison. A new processor, high-speed drive, no sprites, high-res graphics, a tone generator and built-in word processor and spreadsheet are the main features.

Compatibility has not been maintained and in this area I believe Commodore may be making a mistake. The large amount of 6502 software now available will be wasted if the new processor is much different.

Other major improvements include an enlarged 32K BASIC and built-in machine code monitor, allowing over 60K available to programs. Just what commands have been added will be interesting to see, although rumours have it that they are not graphics-based.

New Peripherals

Computerwave now has its shelves full of some very interesting new products fresh from the States, including a five-slot motherboard and voice synthesiser for the 64.

First on the popularity list should be the new Centronics printer interface selling for $89.95. The unit plugs into the cassette port for power and is similar to the Vicsprint interface available through Ozi Soft.

The manual is very comprehensive, with over 25 pages of documentation. An improved version is also available which supports bit-mapped graphics.

Incidentally, Computer Technics is now offering a special deal on a Gemini 10X printer, selling for $550, including matching Centronics interface. The 10X runs at 120 cps and features a wide range of print styles as well as bit-mapped graphics.

The thing which most interested me was a five-slot motherboard complete with twenty two LEDs for status indication (also known as status confusion) and a reset switch.

The double-sided tape does a great job of holding the plastic cover in place, so long as you don't breath too heavily, but apart from that it is a very useful contraption to the cartridge owner.

For those of you still dubious, I bought one and started to put it to use running Hes-Mon and Vicsprint simultaneously. To switch on a game when programming gets beyond a joke, simply hold reset, flick the necessary switches and release reset.

It just goes to prove that the Christmas tree buried under several tonnes of cable behind my 64 is good value for $119.95 retail. Each of the five slots is switched by an IC and a trusty fuse is mounted at the rear of the board.

Another useful item is a stylish keypad which plugs into the joystick port. The pad includes the required software, which conveniently loads just beneath the cartridge area. Keys mounted are 1-9, '+', '-', '/', '*' and '.'. I wish they would put a comma on one for typing in data statements!

There is also a light pen (still as bad as all the others) and an incredibly useful (?) cassette interface which retails for the same price as the Commodore Datasette. Somehow I doubt they'll sell many of those!

All the above items are produced in the US by Cardco and should be more readily available in Australia by the time you read this.

Next month watch for a full review of a great new cartridge game recently released by Commodore called International Soccer. The game features full 3D action with excellent graphics and sounds for $29.95.

Mailbox

Several people have written asking how to copy software. Well, unfortunately I can't reprint full pirating instructions here, but for a complete book of possible ways to break protection why not give one of the software houses a ring and see how they like you!

Yes, the time has come to voice a small yet significant cry from the software industry. Many people have taken sides in the great Apple copyright battles now raging across Australia.

All of us are guilty of small-scale 'pirating' to some degree. However, there are now several 'Penzance Software Companies' who seem to think that people will just carry on spending several months developing programs only to watch them be dispersed amongst the millions for little or no return!

Next time you're offered a bargain software package, think twice. Think about back-up and service, and think about what you'll be able to buy in six months.

Cassette Tips

The most common complaint from Commodore owners is the time involved in cassette loading. This may seem strange, considering the actual speed of operation is very similar to most other computers.

This speed is known as the baud rate and is expressed in bits per second. Therefore the Commodore operating at 300 baud should transfer around 30-35 characters per second.

Each bit is stored as an audio pulse at one of three frequencies. These pulses are all square waves with a mark-space ratio of 1:1. The operating system takes about 9 milliseconds to record a byte of data consisting of the eight bits of data and two extra bits used in error checking.

Since a byte takes around 9 milliseconds to record, 255 bytes should take about 2.29 seconds. However, on timing you'll quickly find that it is in fact almost 20 seconds long.

The reason for this is that every program is recorded twice and also includes a header which contains information about the program, such as its start, end and file name.

When a program is reloaded, the first version is loaded and compared directly to the second. Therefore if a LOAD error is to occur past halfway of the recording, chances are that the program will run with a few simple POKEs.

This technique may also be used to greatly increase loading speed by purposefully producing a load error with the correct commands in the keyboard buffer, forcing an auto run after only half the normal loading time.

I recently had to use the above method to increase the loading speed on the cassette version of Underworld Of Kyn. The original version took almost 15 minutes to load. This was quite a large problem at the time, as the longest tape used by most manufacturers was twenty minutes long.

After a lot of trial and error I eventually got the final version down to just under nine minutes, enough to fit on one side of a C20. The important POKEs to remember are:

```
POKE 46,PEEK(832) :POKE
48,PEEK(832)
POKE 50,PEEK(832) :POKE
45,PEEK(831)
POKE 47,PEEK(831) :POKE
49,PEEK(831)
```

❑

your MICROBEE computer

By Mike Newnham

IT WAS ONE of those 'offers you can't refuse'. "Mike, there's something ..." and so Richard moved on to bigger and better things and I find myself here. Before I take the plunge, I'd like to thank Richard for the effort he has put into this column since it began.

And so to work. This column is for owners and users of the Bee. Your contributions are required for its continued existence. By contributions I mean questions, problems you encounter with the Bee, and any tips you may be able to give others. If the pile of correspondence I have inherited is any indication, the questions outnumber other offerings by ten to one.

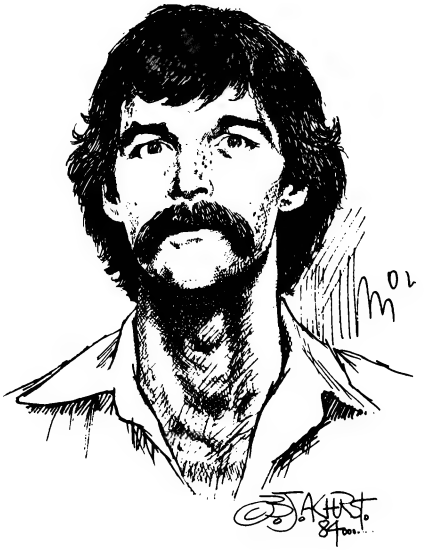
One thing that seems to have a few people stumped is the use of the high resolution plotting and point setting functions from EDASM. It's not difficult, but there are a couple of points to consider. First, the high-resolution initialisation routine will over-write the EDASM scratch and stack areas (200H to 3FFH). These areas are required by the high-res plotting function for its own use as scratch and storage. It is therefore necessary to relocate the EDASM stack to a safe place. The best place for this seems to be in an area of RAM beyond the assembler source file and below the symbol table. I used 7000H (on a 32K - try 3000H for 16K machines). This allows plenty of room for the source file and assembled machine code, and provides 4K for the symbol table.

This relocation is not required in the final version of a program which will eventually be loaded in from BASIC, because the BASIC stack is set up at 7FFFH, well out of the way. The following instructions, placed at the start of an assembler program, will move the stack and place the WARM return address for EDASM on top.

```
MVSTK   LD SP,7000H     ;3000H for 16K
        LD HL,0C08EH    ;Warm return to EDASM
        PUSH HL
```

Once the stack has been moved, you can safely call the high-res initialisation routine at 8024H. Before you can draw a line, you must provide the endpoints for that line, and the plotting mode must also be specified. The endpoint data should be stored at its particular location in 16-bit format. The following addresses are for storage of this data:

0FDH – X co-ordinate start
0FFH – Y co-ordinate start
0F9H – X co-ordinate end
0FBH – Y co-ordinate end



Plot type is specified in one of three modes. These are as follows:

```
Inverse  - 'I' - Data 49H
Reset    - 'R' - Data 52H
Normal   -       Data 20H
```

One of these values must be placed in location 0E8H, to specify the mode.

All that remains is to call the plotting subroutine at 803CH to draw the line.

To manipulate individual points in high resolution mode, it is still necessary to move the stack before calling the high-res initialisation subroutine. Again, this is only necessary if you are in EDASM.

There are four operations that can be performed on an individual graphics point. They and their entry addresses are as follows:

```
  Set  :  8030H
Reset  :  8033H
Invert :  8036H
 Test  :  8039H
```

Each of these four operations requires only two pieces of information to be passed to it. These are the Z co-ordinate of the point in HL and the Y co-ordinate in DE. To use these routines, after initialisation set up the co-ordinates in HL and DE and then just call the appropriate routine. The Test routine returns with the Z flag set if the dot is *not* set, and with NZ if the dot is set or if the co-ordinates are out of range.

When using the point operations, it is not necessary to preset the mode byte at 0E8H.

All preceding information applies to low resolution graphics also, but with two exceptions. It is not necessary to move the stack, and instead of calling the high resolution initialisation subroutine, you call the low-res subroutine at 8027H. Remember also to keep the co-ordinates within the range required for the graphics mode in which you are working.

Back To BASIC

Some of the letters on file are undated and I don't know how old they are. However, because many ask the same questions, I will attempt to find and provide answers.

Some readers want to bypass the 'B' command in EDASM and return to BASIC without cold starting. Easy. If you are in Editor mode, just type Z8021 (CR) and you execute a warm re-entry to BASIC. If you are in Monitor, use G 8021 (CR). Once in BASIC, you can return to the mode you left by pressing RESET. Unless it has been over-written from BASIC, an existing assembler source file will still be intact. *Don't* answer the request, 'Memory Size', if you get it. Just press CR. To prevent a RESET from returning you to Monitor or Editor modes, it is necessary to change the warm start jump address at A2/3H (162/3D). Use the following commands in direct mode:

```
POKE 162,33:POKE 163,128
```

This will change the warm start address to 8021H.

For those who are new to assembly language programming, one of the major obstructions to progress is the entry and retrieval of data, and the conversion of data from one form to another. For example, converting ASCII to binary conversion. In the early stages of learning, these types of routines don't exactly flow freely from the pen. To aid the beginner, I plan to include a series of useful routines, one per month, in this column. Anyone who would like to make a contribution in this area is also welcome to do so.

To start it off, the following routine is an ASCII line input utility, which takes characters entered from the keyboard, echoes them to the screen and stores them in an ASCII buffer. Each line of text, or numbers, entered is delimited (terminated) by a (CR). The routine uses two subroutines within BASIC, the first of which is the keyboard servicing routine that waits for a keypress and returns with the ASCII value of that key, in the A register. The second subroutine takes the ASCII number in the B register, and treats it as a code to be sent ▶

Continued on page 93

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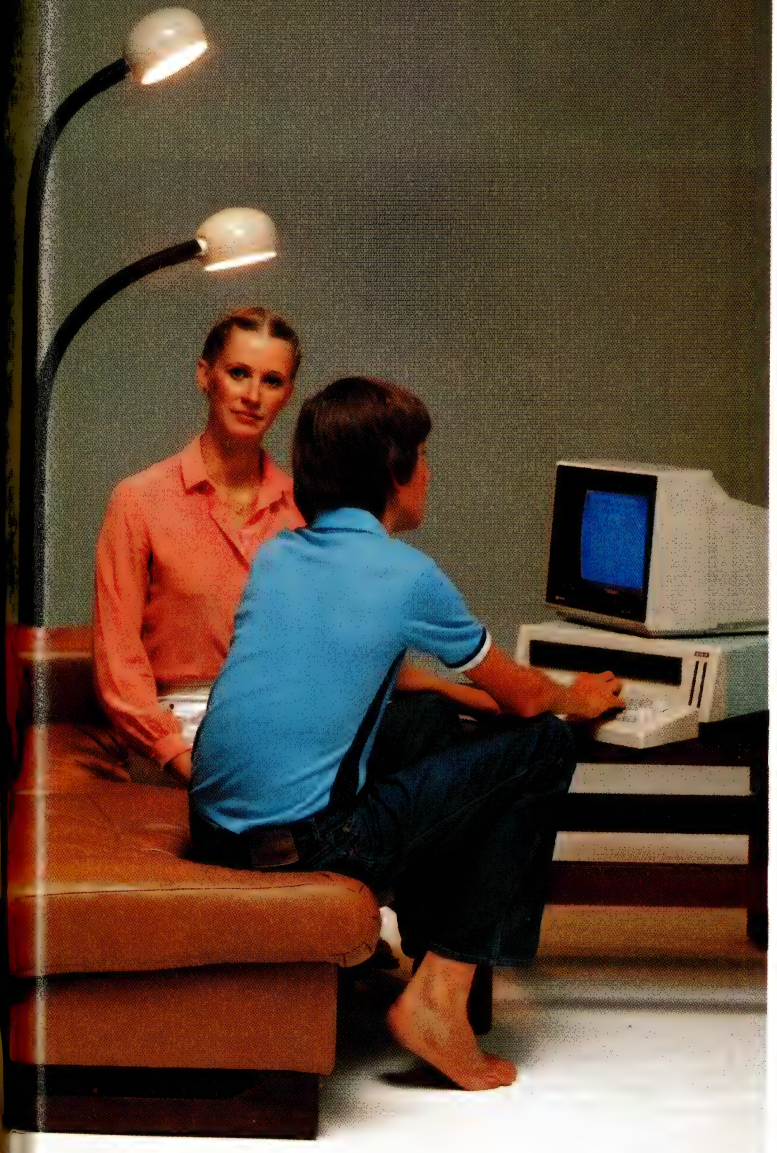

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Continued from page 88

to the VDU. The line input routine is as follows:

```
ØØ1Ø    KWAIT     EQU     8ØØ6H
ØØ2Ø    VDU       EQU     8ØØCH
ØØ3Ø    INASC     LD B,12          ;
ØØ4Ø              CALL VDU         ; clear screen
ØØ5Ø    INIT      LD HL,ASLIN      ; point to start of buffer
ØØ6Ø              LD C,1           ; C reg is char. counter
ØØ7Ø    LIN       CALL KWAIT       ; wait for keypress
ØØ8Ø              LD (HL),A        ; store in buffer
ØØ9Ø              LD B,A
Ø1ØØ              CALL VDU         ; and echo to screen.
Ø11Ø              CP ØDH           ; see if (CR)
Ø12Ø              RET Z            ; entry complete if yes
Ø13Ø              CP 7FH           ; delete last entry ?
Ø14Ø              JR Z,DEL         ; go do it
Ø15Ø              INC C            ; bump counter
Ø16Ø              INC HL           ; and point to next buffer location
Ø17Ø              LD A,C
Ø18Ø              CP 34            ; buffer length is 32 chars max plus (CR)
Ø19Ø              JR Z,EOB         ; to prevent overflow from buffer
Ø2ØØ              JR LIN           ; back for next character
Ø21Ø    DEL       DEC C
Ø22Ø              JR Z,INIT        ; can't fall out bottom end either
Ø23Ø              DEC HL
Ø24Ø              LD (HL),2ØH      ; blank last entry
Ø25Ø              JR LIN           ; back for new entry
Ø26Ø    EOB       DEC C
Ø27Ø              DEC HL           ; point back to last buffer location
Ø28Ø              LD B,7FH         ; for backspace
Ø29Ø              CALL VDU         ; and echo to screen
Ø3ØØ              JR LIN
Ø31Ø    ASLIN     DEFS    33       ; for 32 characters plus (CR)
Ø32Ø              END
```

Note that, in the listing, the buffer length is set to 33. You can change this by redefining the number of bytes reserved in line 0310, and by altering the value in line 0180 to the number of reserved bytes, plus 1.

Next month there will be a routine that does something useful with the data entered using this line input routine.

Rumours Department

I have heard there is a 128K Microbee undergoing tests and that there are plans afoot for a Bee that doesn't run out of high-res PCG characters. The source of this information is impeccable.

By next month I hope to be in a position to bring you news of any new products and answer some of the more recent letters, so keep them coming.

By the way, give or take a few weeks, the Microbee is two years old, and I think that it is safe to say the Bee can now stand on its reputation. There are some 15,000 Bees working in this country and around 5,000 overseas in places such as Israel, Sweden and Denmark. User group membership in Australia is now approaching 3,000 and the third-party support from the hardware and software manufacturers is growing at a breathtaking rate. This reflects a good deal of consumer and marketing confidence in the Bee (we always knew it would be a good machine!) and the figures should be reassuring to current owners and attractive to potential ones. ❑

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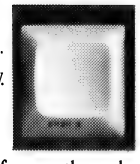

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your APPLE computer

By Bradley Thurkettle

INSIDE YOUR APPLE, doing most of the routine chores, is a program called the System Monitor. This is usually shortened to just the Monitor, but should not be confused with the monitor that sits on your Apple.

To enter the Monitor from Applesoft, type 'CALL-151' and press return. Everything should be the same, except where you had a ']' in Applesoft you should have a '*' in the Monitor.

The Monitor allows you to look at memory locations in your Apple. For example, to look at a place in the text screen locations ($400 – $800) just type the address: try typing '709' followed by a return. You should see something like

0709- xx

where xx is some hexadecimal number. (Don't be too worried if there are some letters in the number, that's just hexadecimal. For more on hexadecimal notation see page 40 of the Apple II reference manual.)

Handy addresses to know are AA72 and AA60. These are DOS addresses which contain the beginning of and length of (respectively) the last loaded binary file. For example, insert your System Master disk and type 'BLOAD FID'. If you did this while you were still in the Monitor, you would have noticed some strange numbers appearing on the screen after your command and after FID was loaded. These numbers are involved in error checking, I believe, and won't effect the loading.

When FID is loaded, get into the Monitor (if you are not already in it) and type 'AA72.AA73'. This tells the Monitor to display the contents of both locations. They should appear as

AA72 – 03 08

This address is read last number first, that is $0803, and marks where FID begins. To read the length of FID, do the same thing for AA60 – type 'AA60.AA61' and read the last number first. You should find the length to be $124E, if you remembered to read it back to front.

If you want to save FID to another disk, type

BSAVE FID ,A$ 803 ,L$ 124E

Use the same procedure for other binary files, substituting where appropriate. This is a lot easier than having to hunt for FID every time you wish to save a binary file.

You're also able to change locations in memory by typing the address followed by a colon and the new value. Try

709:96

You should see a 'V' pop up near the top of the screen.

Applesoft In Machine Language

The Monitor also lets you look at an Applesoft program, but it appears a lot different in machine language.

From Applesoft, type NEW and then this little program:

```
5 HOME : PRINT A$
9 END
```

Now, enter the Monitor (CALL-151) and type 800L and return. You should see what appears to be a page full of garbage: numbers, letters and question marks. They are arranged in neat columns, though.

The column on the far left contains the memory addresses, the machine language equivalent of line numbers. The columns (up to 3) in the middle, display the contents of the memory locations in hexadecimal. The last lot of columns, with things like '???', BRK, ($24,x) and so on, are attempts by the monitor to list the Applesoft program as if it was a machine language program. We won't be concerned with this last section, only the addresses and values.

The first location, $800 in hex or 2048 in decimal, always contains a 0. If it doesn't and you try to run a program, it will crash and print 'SYNTAX ERROR AT 65124'. If this has happened to you before, try POKE 2048,0.

The next two numbers contain the address of the next Applesoft line, which should be $080B. (Remember, the numbers are back to front.)

Then comes the Applesoft line number in hexadecimal. Since five is the same in decimal as in hexadecimal, you should see the five normally. Two numbers, or bytes (as we should correctly all them) are set aside for the line number, allowing line numbers up to 65536. Line five is stored as 05 00.

The next byte, $97, represents the command HOME. Representing the word by one byte is called 'tokenising' and there is a token for each Applesoft command. Next, there is $3A, which is the ASCII code for the colon.

PRINT A$ is represented by three bytes: $ba, representing the PRINT command; $41, which is the ASCII code for A; and $24, representing the dollar sign. The point to note is that all the tokenised commands are greater than $80. In technical terms, their high bits are set, while variables are less than $80. The next byte, $00, indicates the end of the Applesoft line.

The process then repeats itself, with the pointer to the next line followed by the line number encoded in hexadecimal, $80 (the END token) and $00.

The end of the program in memory is indicated when the address which points to the next line reads $0000.

A nice trick with this information is to POKE 2049,1 and try to list it. See if you can work out what will happen before doing it. ❑

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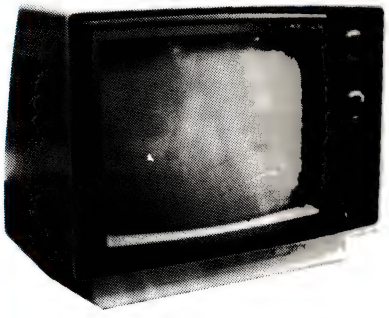

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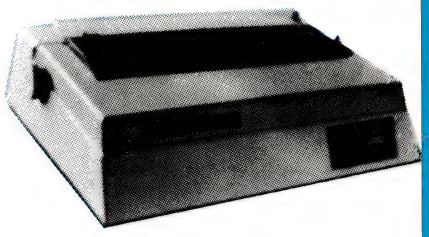

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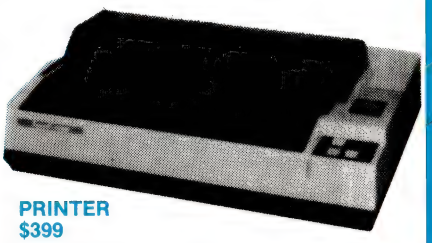

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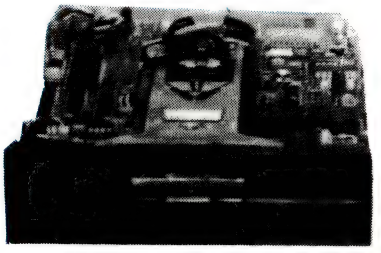

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ANZ

your IBM computer

By Lloyd R Borrett

LOTUS 1-2-3 release 1A is one of the few software packages currently available which allows access to the DOS 2.0 directory structure. Most packages force the user to have all program and data files in the same directory if they are all to reside on a hard disk. The purpose of the following example is to show how some of the features of 1-2-3 can make it even easier to utilise the hard disk fully.

First you will need to install 1-2-3 on the hard disk. The instructions in the manual give clear directions. However, I suggest that you put all the program files in a sub-directory called 123, and create some directories subordinate to C:\123 for use as working directories. For example:

```
C>CHDIR_\
C>MKDIR_123
C>CHDIR_123
C>MKDIR_DEMO
C>MKDIR_TEST
```

Copy all the files on the Lotus diskettes into the directory C:\123 and perform the necessary configuration procedures. With C:\123 still the working directory, start Lotus. Select the 1-2-3 spreadsheet and finish off the configuration procedure by using the command/wgddc:\123~uq to define C:\123 as the current directory at start-up.

Create the following template and save it using the name AUTO123:

```
I1: '/xmmenu~
I4: "123
J4: "A:
K4: "Demo
L4: "Test
I5: 'Use directory c:\123
J5: 'Use directory A:\
K5: 'Use directory c:\123\demo
L5: 'Use directory c:\123\test
I6: '/wey
J6: '/fda:\~
K6: '/fdc:\123\demo~
L6: '/fdc:\123\test~
J7: '/wey
K7: '/wey
L7: '/wey
```

Cell I1 should be given the range name \0. Cell I4 should be given the range name MENU. Make sure that the cursor is at cell A1 when you save the worksheet.

When the 1-2-3 spreadsheet is selected it will automatically search for a worksheet called AUTO123 in the current directory at start-up, and if found, load it. Whenever 1-2-3 loads a worksheet it executes the keyboard macro named \0, so now 1-2-3 should find and load the worksheet just created. This worksheet causes 1-2-3 to execute a menu which allows you to specify the working directory to be used. Quit the spreadsheet and re-enter to see it working.

Unfortunately 1-2-3 still needs more changes before it will fully support DOS 2.0. When Release 1A is installed on a hard disk in this manner the File Management and Disk Management access system functions become next to useless. I understand another release will be available soon which enhances some of 1-2-3's existing functions as well as adding others such as word processing. Let's hope it also completes the support of the DOS 2.0 directory structure.

Epson/IBM Printer Ribbons

About 18 months ago I installed an Epson/IBM printer for the first time. I recall being intrigued by the EXCHANGE TIMES markings on the ribbon cartridge, but never did find any reference to this in the operation manual. Well, recently the time finally came to get a new ribbon and it led to a money-saving discovery.

Obviously it is possible to buy a complete new cartridge, but that is expensive and seemed wasteful. I made enquiries with some local consumable suppliers about a ribbon inker advertised in various US magazines, but alas, no success. By then I had gone off the idea of messing about with ink and ordered some new cartridges. About two days later I received a message from Greg Moyle at Magmedia to say that he had a replacement ribbon for me to try instead of a new cartridge.

I accepted the offer and Greg duly arrived in my office with a Nova Inked Ribbon Refill Pack. He had only just got them and I was to be the guinea pig. It was a simple task to remove the old ribbon from the original cartridge and replace it with the Nova ribbon, and it works just fine. I recommend that you check this option out with your supplier when your ribbon fades.

Book Reviews

Three books were sent my way for review a few months back, and here are the results. The first to be looked at was *Your IBM Personal Computer: Use, Applications, and BASIC* by David Cortesi (Holt, Rinehardt and Winston). The preface says, "This book aims to be a companion and guide to you, the new owner of an IBM Personal Computer." It achieves that aim. Cortesi emphasises practical things such as unpacking and setting up the machine, back-ups, organising a diskette library, and learning to use new programs.

As I've been around computers for a long time, and have been heavily involved with the IBM-PC for well over a year, I expected to gain little from this book. I was wrong. There are a lot of new, and what must appear strange, ideas and concepts for a new user to pick up. Cortesi introduces the subject matter simply, builds on it logically, and leaves the new user at a level where they can safely go solo. He has shown me how to improve the way I introduce these same topics as well as more advanced ones to those I am responsible for introducing to the world of personal computing. I recommend you check it out for yourself.

The second book received was *PROGRAMMING the IBM Personal Computer: BASIC* by Neill Graham (Holt, Rinehardt and Winston). Graham covers all the usual topics found in books with similar intentions; however, he does so in a unique sequence. Features are introduced in the order in which the new user will need or wonder about them. The new user I tried the book out on was surprised at the way Graham consistently managed to second guess him.

The book is full of well thought-out descriptions, warnings and explanations. For those users who already know another implementation of BASIC this book offers an excellent way to learn the traps and features of the IBM-PC version. Each chapter ends with a short list of suggested exercises, which I think would make the book suitable for classroom use. If you intend to program the IBM-PC in BASIC then you would do well to consider reading this book.

The final book received was *How To Program The IBM-PC* by Tim Hartnell (Interface Publications). This is really just another 'How To Program In BASIC' book, and doesn't cover the traps and features of the IBM-PC at all well. The content and presentation of this book leave me with the impression that it is one of those "I Can Cash In On The ▶

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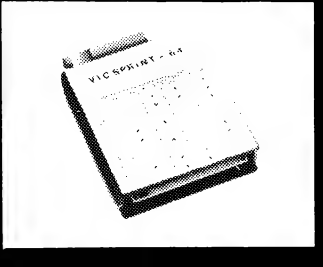

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Market Too' styles of book, which are becoming all too common.

DOS Hints

More than one person I know has been caught by the fact that DOS 2.0 fails to give any warning about the FORMAT command. If a hard disk user types FORMAT without specifying a diskette drive it is possible to erase the entire hard disk. The following procedure will prevent this catastrophe:

```
C>RENAME FORMAT.COM PCFORMAT.COMR

C>COPY CON: FORMAT.BAT

PCFORMAT A:

Press <F6><ENTER> to write the file to disk.
```

It is easy to trick up this batch file to test for various diskette drives, and you may like to include the /S and /V switches.

The DOS TYPE command doesn't accept wild cards (* or ?). The way around this annoying restriction is to use the COPY command, which does accept wild cards, to copy the file(s) to the screen. Create an eXtended TYPE command with the following procedure:

```
C>COPY CON: XTYPE.BAT

COPY %1 CON:

Press <F6><ENTER> to write the file to disk.
```

❑

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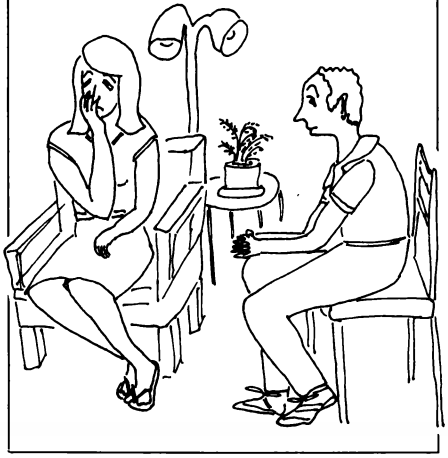

your KAYPRO computer

By Jeff Richards

THIS MONTH we look at how Perfect Calc files can be integrated with Perfect Writer and BASIC.

One of the most useful features of Perfect Calc is the ability to direct output to a disk file. A file created by Calc can be used either as input to a word processor or for further processing in an applications program.

Although the Calc manual describes the manner in which the spreadsheet itself is stored, it does not indicate the format of a Calc output file. In fact this format is very simple, and can be easily accessed by a BASIC program.

The file structure is an image of the print line. As long as the line is shorter than the page width that has been set up during installation of Calc, then the column contents are simply laid out in the record in their printing positions. There are a number of ways in which a BASIC program can access this record, but random access in MBASIC is probably the simplest.

In accessing a file in random mode in MBASIC, two characteristics of the file must be known. Firstly we have to work out the record length, and secondly we have to know the arrangement of items within the record. In the case of Calc output files both these depend on the columns defined and the width of those columns.

Since each line of the report is a record, the record length is the sum of the widths of the columns plus two. The extra two characters are the carriage return and line feed. Thus a spreadsheet that is set up to have two columns each with the default width of nine will produce a print file with a record length of 20. The command to open such a file would be

OPEN "R",#1,"filename.ext",20.

The details in the individual columns are accessed by constructing the FIELD definitions to agree with the column widths. In this example, the statement would be FIELD #1,9 AS COL1,9 AS COL2. Notice that the field definitions come to a total length that is two less than the record length defined in the OPEN statement. MBASIC is not concerned about the extra bytes.

If the spreadsheet has more than one set of column definitions it might be worthwhile to use several field statements. This is not necessary, as the column widths must be constant throughout the spreadsheet, but it may be helpful when dealing with the items within the MBASIC program.

Note that the functions CVI and so on are not used with the fielded variables. The values are stored as simple ASCII, so the VAL function is used instead. Listing 1 gives a full example.

Listing 1 - Random Access

```
OPEN "R",#1,"filename.ext",20
FIELD #1, 9 AS COL1,9 AS COL2
GET #1,1
VAR1 = VAL(COL1)
VAR2 = VAL(COL2)
```

Accessing Records

The records in the file are accessed by their record number. In the case of a Calc report file the record number is simply the line number in the report. Thus GET #1,1 will read into the FIELD variable all the entries for row 1. If BASIC is reading the files to obtain data then it must know which rows of the spreadsheet contain the required data.

An alternative access method would be to open the file for sequential input and to read each record into a single string variable. This is the easiest way to access the file from SBASIC. Parts of the record would then be extracted using the MID$ function. Listing 2 shows an example for the same spreadsheet file.

Listing 2 - Sequential Access

```
OPEN "I",#1,"filename.ext"
LINE INPUT #1,I$
VAR1 = VAL(MID$(I$,1,9))
VAR2 = VAL(MID$(I$,10,9))
```

It is also possible, of course, to use the output of Perfect Calc as a data file for word processing. If you are working on Calc files with Perfect Writer it is not necessary to limit your report width to 70 characters as the manual states. Perfect Writer can operate on lines longer than 70 characters, as long as some care is exercised. The easiest way to ensure that the line length does not matter is to do all work as overwriting rather than inserting, unless whole lines are inserted.

Characters beyond the screen width simply wrap to the next line, so caution must be used to ensure that an end-of-line is not inserted at the screen margin. The report must also be printed under the 'verbatim' option. This can be inserted into the file as a formatting command, or selected as one of the options at print time. Unless you have inserted special format commands to take advantage of printer features, then the 'vanilla' printer should be selected.

It is also possible for BASIC programs to produce input for Calc spreadsheets. This facility would probably be used in conjunction with either the overlay feature or with associated spreadsheets, but it could be used to produce whole spreadsheets. When using overlays, the overlay file is simply read into memory, and any data it contains is copied into the corresponding cells of the current spreadsheet.

Any individual cell can have a numeric or literal value inserted into it from a file created by a BASIC program. The BASIC file should be created as a simple sequential output file and the data written to it using the PRINT# command. WRITE# will not work, as it includes delimiters like commas and quotation marks.

For input files each cell entry is a single record and each record has the same structure. The first character is always '>'. The next character is the column label – 'a' to 'Z'. After this comes the row number ('1' to '255') followed by ':'. The characters after the colon will be entered into the cell. If these characters follow the Perfect Calc rules for numeric entry they will be entered as numbers. If they don't, they will be entered as labels.

Putting Numbers In

Listing 3 is an MBASIC program to put 50 numbers in the first 50 rows of column a. Because MBASIC tends to precede printer numbers with a space, the RIGHT$ function has been used to strip the leading space off the string representation of the number. There are other ways of achieving the same effect, but this is as simple as any. The final format for the record that defines cell a would be '>a1:.2'.

Listing 3 - Input File

```
OPEN "O",#1,"filename.PC"
FOR I=1 TO 50
I$=">a"+RIGHT$(STR$(I),LEN(STR$(I))-1)+":"
PRINT #1,I$;
I$=STR$(I*.2)
I$=RIGHT$(I$,LEN(I$)-1)
PRINT #1, I$
NEXT I
```

The sequence in which the cells are defined does not matter. The file created by this program would be read into the working buffer, either on its own or as an overlay into another spreadsheet that contained headings and formulae. If used as an overlay, then cells in the current buffer that are not referenced by the overlay file will be unchanged. ▶

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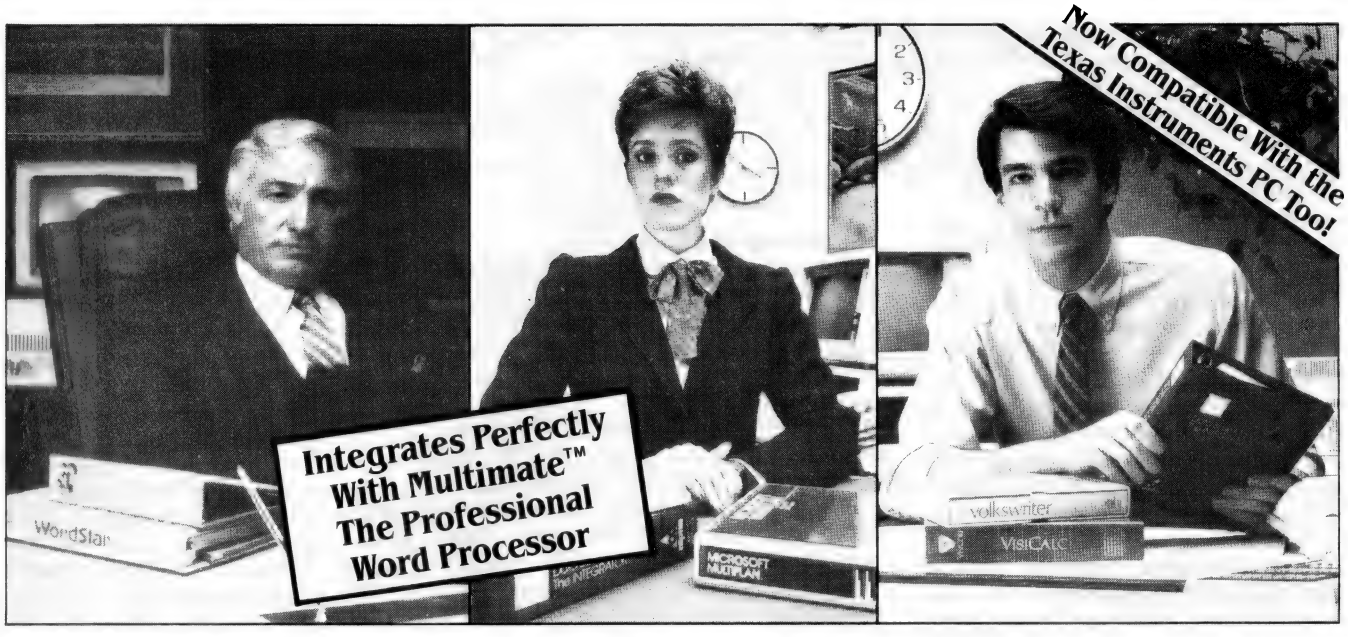

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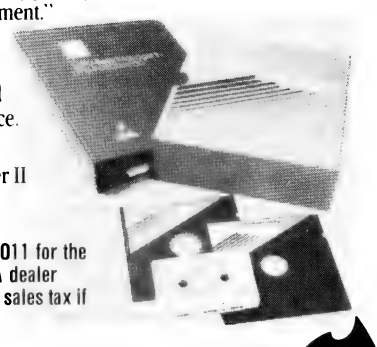

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Because Perfect Calc uses simple text files there is no reason why the data files cannot be processed by Perfect Writer. It may be that Writer is a convenient way to get a large volume of data into a Calc file, but a more practical use would be to clean up a Calc file.

Calc spreadsheets that have been altered a great deal often end up with a number of blank cells. These are cells that contain a label of one or more spaces, and they are indistinguishable from deleted cells. However, they take up room in the data file and they take up time during loading. The easiest way to get rid of them is to edit the file in Writer. Cells with labels can be easily identified, and lines removed if the label is not needed. Deleting such empty cells may mean the difference between a spreadsheet fitting and not fitting in memory.

Another reason for editing a Calc file is to resurrect a data file that will not load. If Calc discovers a line in an input file that it cannot understand it simply aborts the load. This is protection against attempting to load a file that is not in the correct format. But if the file is only partly damaged there may be useful data further along in the file, and Calc will never find this data. If the bad lines are deleted in Writer then Calc can be encouraged to load the undamaged part of the file. Because each line is encoded with the cell location, missing lines simply mean empty cells.

Damaged Files

I have so far discovered two ways in which Calc files may be damaged. Firstly, if you save a file that has 'Error' in any of the cells it may refuse to reload. Secondly, if you get a disk read error on a file Calc will simply abort the load. It may still be possible to copy the file even with its bad data. This can be done (in PIP, say) by typing RETURN at the BDOS error message. If the faulty data is restricted to one or two disk sectors then only a dozen or so cells will have been damaged. In both cases, using Writer to remove the offending lines will permit Calc to load the file so the missing cells can be re-entered.

The ability to create files for input into spreadsheets, and to use the output of a spreadsheet as a source of data for other processing, is a feature that adds significantly to the power and flexibility of Perfect Calc. ❑

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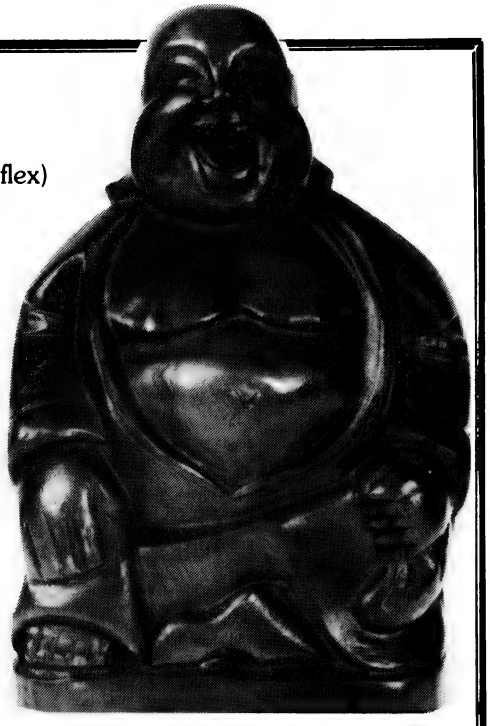

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your CP/M computer

By Bill Bolton

THE SOFTWARE Tools RCPM went back on line on January 16. Those of you who read the whole of the column carefully would have noticed the new number listed in the PAMS list last month. The 'late, final extra' deadline (that's the one the editor *never* admits to) was several days after I'd submitted my copy for the column and as the phone was installed just after my copy deadline, the editor was able to sneak the new number onto the PAMS list.

It's marvellous what Telecom can do when they want to. I put in the application for the new and separate RCPM line at the same time as an application for a second phone on our 'normal' voice line. As I didn't have the TS-72 form for the modem on the day I put in the application, I had to send it in a few days later. I was told that it would be at least four weeks before either job could be done.

About ten days after I'd been at the Telecom business office (why do they have so few in Brisbane?), a Telecom technician turned up looking for the line pair to install the new service. As it turned out, when this house was built about five or six years ago, Telecom ran in a multi-pair line from the street connection pit, so all the technician had to do was trace out a suitable pair and connect it up out in the street. Full marks to Telecom for providing for service expansion when the original service was installed. When I had the second line for the RCPM installed in Sydney, it was a major cabling job including flying the new line across a road.

The following Monday another Telecom technician came and ran the internal cables (very neatly too) and installed the wall sockets, so that evening the RCPM went back on-line. I've had a very helpful follow-up call from someone in the directories branch about a listing for the service, and as a result of that conversation I now know what steps to take to ask for a Public Access Message Systems (PAMS) category to be created for Telecom Yellow Pages. With a bit of luck you should be able to look up PAMS in your 1985 Telecom Yellow Pages and see what services are available in your area.

The Telecom White Pages listing in the Brisbane directory will be under 'RCPM – Software Tools', so if any other would-be RCPM SYSOPs are putting in your service applications to Telecom, you should ask for a listing in the same format.

Normally I don't have too many kind things to say about Telecom, but this time they have done almost everything right and deserve some praise. 'Almost' everything? Well, I'm still waiting for the second phone to be put on our voice line; the internal cable route is the same as the RCPM line, so whoever installs that will have to largely duplicate the work of the previous Telecom technician! Still, I suppose you can't have everything!

A Trap For PC-DOS Programmers

In the February 1984 issue of *Dr. Dobbs Journal*, Ray Duncan (of Laboratory Microsystems fame) points out a fatal trap in PC-DOS. Ray's '16-Bit Software Toolbox' column has all the details and an example piece of code to demonstrate the effect.

The PC-DOS 'CLOSE' function (10H) has a subtle and dangerous bug in that if you CLOSE a file using a file control block that has not been previously activated with an OPEN or MAKE function call, you lose all the data in that file! While this is not the sort of thing most micro programmers normally would do anyway, part of the success of the IBM PC is its appeal to programmers from mainframe environments, and a lot of those programmers have been trained in using COBOL. Now if you have a COBOL background you have probably had it drilled into you at some time that you should close everything in sight if a program aborts due to an error.

This is a crazy sort of bug as the OS has many ways of determining if an FCB has ever been activated. I verified the bug using Ray's example code under PC-DOS, but haven't had time to check out MS-DOS yet, though there is every reason to expect it to be the same. The bug is evident in PC-DOS 1.1 and PC-DOS 2.0. I expect the code to demonstrate the fault will be on some of the RCPMs by the time you read this.

MASM Problems

For a while now I have been struggling to get some code to assemble correctly to run with MS-DOS. I knew the code worked as I had it running on CP/M-86 with no problems, after assembling it with RASM. I had modified the system interface to account for the differences between MS-DOS and CP/M-86 and the system interface part seemed to be working OK, but the body of the code that was unchanged from the working CP/M-86 version was yielding strange results. A few hours work with DEBUG (oh for a symbolic debugger like SID to go with MASM) and it was clear that the assembler was producing incorrect code for some logical operations.

At this point I simply gave up on using MASM and assembled MS-DOS version of the code with RASM under CP/M-86 and transferred it across to MS-DOS with a final session with DEBUG to get the system interface bits right for MS-DOS. This time the program executed correctly.

As I don't have any real wish to use 16-bit assemblers any more than I have to, I mentally filed away the *prima facie* information that MASM appeared to have problems and wasn't to be trusted, with the fond hope that I wouldn't ever have to use it again anyway.

However, another part of Ray Duncan's column (see above) has yielded the answer to problems with MASM. Ray has discovered that the SHL, SHR, EQ, NE, GT, GE, LT, LE, Not and Exclusive OR operators are all suspect and shouldn't be used with MASM, and he hints that there are other problems to be covered in future issues of Dr. Dobbs! There is an example listing provided in Dr Dobbs which beautifully illustrates the problems.

If you are using MASM Ray's advice is to "avoid the use of exotic or complex expressions and perform any calculations involving logical operators at run time rather than assembly time." ▶

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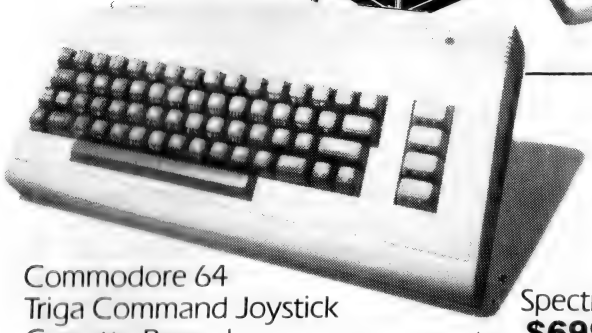

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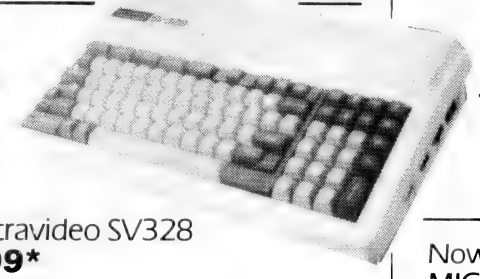

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Books On MBASIC

In the January *Your Computer* 'Textfile' there was an answer to a question about books specifically related to MBASIC. When the editor asked me the question over the phone I couldn't recall any books specifically on MBASIC-80 and said so. On further investigation I have turned up three books on the subject.

The first is *BASIC-80 and CP/M* by Jack Purdum, published by McMillan, 1983, ISBN 0-02-397020-0. I bought my copy in the USA and I'm not sure that I've ever seen it in any of the bookshops here, but that doesn't mean it isn't available locally. The second book is a new one from Osborne/McGraw-Hill entitled *The MBASIC Handbook* by Walter A. Etlin and Gregory Solberg, 1983, ISBN 0-88134-102-9; it costs $30.55 and should be readily available locally by the time you read this. This book is about MBASIC as it appears in all the common implementations, not solely MBASIC-80 for CP/M.

The third book is not specifically on MBASIC but does have many source code examples shown in MBASIC-80 and covers a subject of vital interest to any BASIC programmer: *Data File Programming in BASIC*, by LeRoy Finkel and Jerald Brown, published by John Wiley & Sons, 1981, ISBN 0-471-08333-X (my copy cost me $15.10 back in 1981). This book is one of the excellent Wiley Self Teaching Guide series and is good value for money.

MS-DOS to CP/M

One question that seems to keep coming up is "how do I transfer files from MS-DOS disks to CP/M disks?". Unless you are lucky enough to own a copy of Compuview's CP/M-86 for the IBM PC (which unfortunately is very expensive), the only answer till now has been to have two machines next to each other and use a serial communications program like ASCOM or MOVE-IT which exist for both CP/M and MS-DOS environments.

Compuview has just announced a stand-alone program called SYSTRAN which allows transfer of files from MS-DOS to CP/M disks on "IBM PC and other 8086/8088 based computer systems" (to quote them). SYSTRAN runs under CP/M-86 and does not require a copy of MS-DOS to be available on the host system. It will convert both DOS 1.1 and DOS 2.0 files. The program sells in the US for US$120. Compuview's local representative is Software Source at Bondi Junction, so you should ask them about local availability.

If you own an NEC APC, don't get your hopes up too high on SYSTRAN working for you. I haven't seen a full specification for SYSTRAN but I suspect it relies on the physical disk format for MS-DOS and CP/M-86 being identical, as it is on the IBM PC and most of its lookalikes. With the NEC APC the double density physical disk format for CP/M-86 is different from the MS-DOS double density disk format, so if my assumption is correct SYSTRAN may not work (perhaps it might work on single density disks).

Copyright Situation

The recent decision in the test case mounted by Apple towards importers of lookalike machines has had some interesting spin-offs. An organisation (?) called 'Software Liberation' is suggesting that in Australia there is now effectively no copyright on computer software. While some people may feel there is perhaps some basis for believing that this may apply to actual object code (Apple is appealing the decision and will not give up easily), the matter is certainly not settled yet.

The Federal Government has called for submissions on legislation to specifically protect computer software from unauthorised copying, and has mentioned retrospectivity as an option. In any case any computer program is generally made up of a number of component parts beside the actual code, including trademarks, labels, documentation, packaging and so on, which are all still fully protected by existing copyright provisions. It would appear that anyone trying to make copies of a proprietary program carrying a copyright notice would still be open to successful prosecution on several counts.

PAMS News

It seems the plans for a second Brisbane RCPM system that I have previously mentioned have been shelved for the time being.

Meanwhile activity is hotting up in Sydney, with two new systems becoming close to going on-line. The Micro Design Lab RCPM (MDL-RCPM) system has been off-line for several weeks due to building alterations but should be back in operation by the time you read this. The Sydney Public Access RCPM (SPA-RCPM) is now charging a yearly membership to get access to the file transfer facilities. I only have this information second-hand at this stage so you would need to check with the SPA SYSOP for details.

I'm still very surprised there isn't a Tandy, Apple or Commodore remote access system running yet. There are many Tandy and Apple systems running in the USA and the software is readily available there.

Amust has put up an RBBS service to support users of its computers; you can get the details from Amust in Melbourne.

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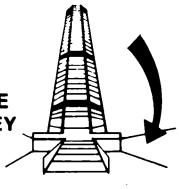

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Contributions By Telephone: Contributors who have modems and suitable software (in the MODEM7/YAM mould – see our stories on Christensen Protocols in the May and June 1983 issues) can arrange direct transfer to our computers, or obtain special contributor access to the Mi-Computer Club Bulletin Board system, which is on-line 24 hours a day, seven days a week.

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