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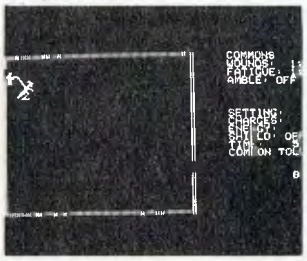

Enjoy role-playing? Look for more Adventure games reviewed on page 40.

Learning BASIC — the first of many *Your Computer Tutorials.*

editorial

YOU'VE probably noticed this issue is cover-dated September/ October. There's a simple reason for it. We've been coming out in the last week or two of each month, and we plan to continue doing so — but we want a current cover date for the full month.

Rather than simply calling this issue October, we opted for the dual date to avoid the confusion of a "missing" month.

We think we've now settled into the groove after launching the magazine, and our production schedules should be regular (fingers crossed — life is never easy in the magazine business), so look for Your Computer *on the news-stands around the last week of every month.*

Another thing you'll probably notice about the issue is the predominance of reviews, both software and hardware, We've had several requests for reviews, so we've taken the opportunity to answer these and "clear the decks" in preparation for the arrival of several upcoming new releases.

Most of the requests have been answered in our main story, the giant review of the colour home computers which starts on page 20. We couldn't get hold of a Commodore VIC for this one, but we did get an advance look at NEC's new personal computer!

Another feature of this issue is the introduction of the Your Computer Tutorial *series, something you'll see a lot more of in future magazines. This time it's the start of our Introduction to BASIC series, but coming topics will be wide-ranging. We'll take you right through from the absolute beginner stage to mastering those tricky pieces of programming you'll have wondered about but dared not attempt.*

New developments around the world will also receive more comprehensive coverage from this issue on. We are accessing a lot of American news through The Source (the US-based consumer database we connect with via OTC's MIDAS satellite hook-up), and we've also extended our feelers across the Tasman so you'll hear more about New Zealand in the future.

Les Bell

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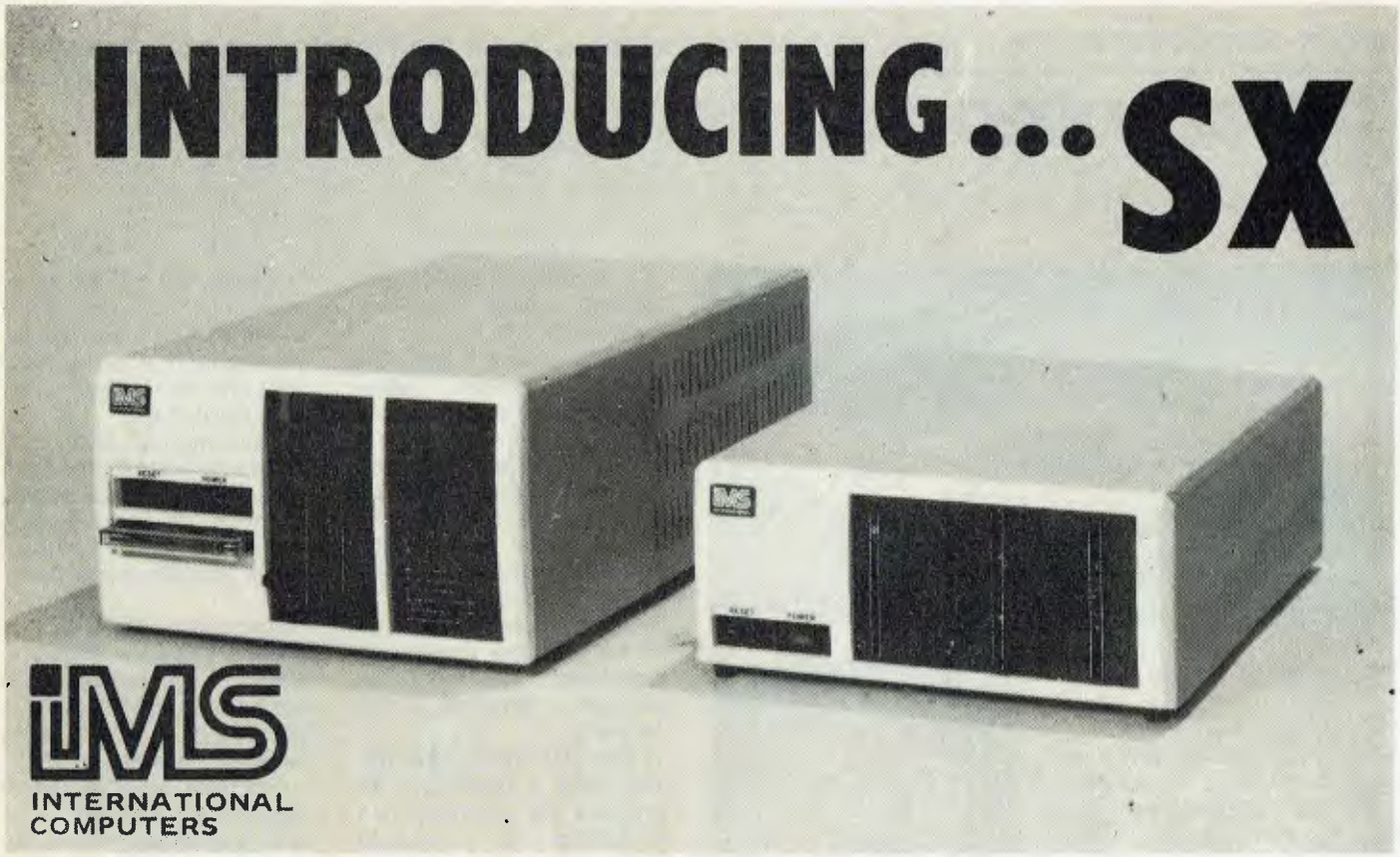
INTRODUCING...SX



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EXTRAS: You'll be glad you have them. The 5000SX comes standard with lots of extras, starting with a fully terminated 12- slot S-100 Motherboard, (on which there are 7 spare slots for your use!). Add to that, 64K Dynamic RAM modules with parity of course, and receptacles for your CRT and Printer that turn on with the main power switch. Plus a convenient up-front reset switch, built-in mains line filter and more.

EXPANSION: Room for expansion is so important. You can add multi-processor boards, memory, terminals, printers, up to three hard disks, in fact most any S-100 compatible sub-system.

SOFTWARE:

OPERATING SYSTEMS: There's one to suit your needs exactly. TurboDOS - the operating system that is single-task, single-task with spooling printers, multi-tasking and multi-processor networking, can handle up to 2 Gigabyte of on-line disk storage, gets up to 35% more data on a disk, is completely CP/M compatible, and allows random access files up to 67 Megabytes in size. It is many times faster than CP/M, and yet it does read-after-write and verify-after-seek. — Something that other operating systems cannot do without intolerable performance degradation.

CP/M, MP/M — of course.
MARC — the Unix style (CP/M compatible) operating system.
UCSD Pascal 1V — for both 5000 and 8000 systems
MVT-EFAMOS — single processor multi-tasking system
Micro-COBOL — the professional COBOL system for micros

LANGUAGES AND APPLICATIONS PACKAGES: Too numerous to list here, call us!

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your computer news

Personal Graphics Tablet

HEWLETT-PACKARD'S Personal Graphics System, based on the Series 80 personal computer, now incorporates a graphics tablet for creation and manipulation of graphics on the display.

Drawing schematics, floor plans, overhead transparencies, and digitizing existing graphics is simplified with the introduction of the software pack for the HP 9111 Graphics Tablet.

Software that comes with the HP 9111 Graphics Tablet gives it powerful, easy-to-use capabilities in three main areas, tracing and digitizing existing designs or logos, creating new designs, and measuring areas and lengths of lines directly off maps or charts.

By selecting commands from the menu included with the software, the user can build up a design on the CRT from a library of drawing elements including lines, rectangles and polygons.

Changing the scale of a drawing, zooming in on small sections, panning across the drawing and selective erasing are all possible with the menu-driven software. Because no programming is required the user can begin solving problems almost immediately.

The HP 9111 Graphics Tablet has a recommended price of $2419 excluding tax,

and is available from dealers who sell Hewlett-Packard personal computers.

HP Series 80 personal computers have recommended retail prices of $2678 excluding tax, for the HP-83 and $3868 excluding tax, for the HP-85.

In addition to the computer and tablet, an HP 82901M flexible disk drive ($2975 excluding tax) and an HP 7225B Graphics Plotter ($3776 excluding tax) may be added to fully utilize all the capabilities of the software.□

Telemarketing Study Released

THE AMERICAN Marketing Association says telemarketing is the delivery method of the future.

The system which can involve 800 number programs, teleconferencing, all forms of video, computer-assisted technology, cable and virtually any technologically-based delivery system (like The Source, for instance), will be big in the years to come.

Teleselling is expected to replace many direct-mail campaigns.

It is expected that the tradeoff between sales-related travel and telephone marketing will soon shift in favour of the telephone, and that as energy costs continue to soar, terminals-on-premise will be joined by more and more terminals in the home.

This trend is expected to influence growth in the area of stay-at-home employees, connected to their workplaces through terminals and modems.

The AMA warns, however, that such a trend also increases the likelihood and probability of increased computer-related crime.

They also warn that psychological factors will be at work, with marketing managers forced to relearn the new marketing technology, and seat-of-the-pants managers outmoded. They say, "With facts and figures much more available and transmittable, winging it just won't fly anymore."

Post Office Wants To Get Into Electronic Mail

AS STANDARDS for ECOM (electronic mail) are being developed by the National Bureau of Standards, the US postal service's enthusiasm for NBS research and the economic advantages of ECOM continues to grow.

The Postal Service will initiate its ECOM system in about six months.

The NBS specs will suggest that ECOM be divided into specific "fields", including an originator, recipient and text field.

The US Postal Service's ECOM will initially serve 25 Post Offices in almost as many cities. They expect a daily minimum of 200 computer-originated messages, each averaging about 1200 characters.

Mailers will be able to directly dial the post office, where ECOM hardware developed by RCA will remotely print and mail messages for next-day delivery.

Users will pay a $50 annual ECOM fee and maintain a deposit account. Postal unions, needless to say, are quite concerned about this non-labour intensive development.

"Computerworld" Seems to be TV Success

A NEW weekly, half-hour news magazine called "Computer-World" is being telecast on 13 major US TV stations.

Produced by CW Broadcasting of Framingham, Maryland (a subsidiary of Computerworld, a widely-circulated computer industry newspaper), it's been on the air since April, and covers stories about computers at work, the rapid technological growth, new products, and the state of the art today with forecasts for tomorrow.

It has its lighter moments too: it recently featured a story on "Interlude", the software package which is advertised as a sexual game/aid for adults.

Faster Electron-Beam System. . .

AN ELECTRON-BEAM tool which produces wiring patterns on computer logic chips at a rate two to four times faster than any previous IBM E-Beam system is now under production.

The tool fabricates wiring as narrow as one micron (1/40 to 1/100th the width of a human hair), compared with the two-micron wiring of previous IBM E-Beam systems.

Chip designers strive for smaller dimensions to allow more circuitry to be put on a single chip. This compacting of circuits cuts the distance an electrical signal must travel and reduces the num-

ber of times a signal must leave one chip to go to another to complete a function in a machine. These reductions improve computer performance.

The tool, called EL-3, directs a narrow beam of electrons onto 10 to 20 thin, round wafers of silicon per hour. A typical wafer has more than 100 circuit chips.

EL-3 exposes each square centimeter of wafer area with about three quintillion electrons. Electrons are tiny building blocks of matter, so small that 16 quintillion (16 billion billion) of them pass through a 100-watt light bulb each second it is on.

The metallic patterns produced by EL-3 conduct electricity through the computer circuits on the chip. These circuits are made up of devices such as transistors and resistors. The interaction among such circuits is the means by which computers perform functions such as adding and subtracting.

These interconnections can be produced by the direct use of electron beams or by projecting light through masks, which are similar to stencils. Fabricating a mask can be time consuming and expensive, but once fabricated it can be used repeatedly. Thus masks, which can be manufactured by EL-3, are most effective where large numbers of the same chips must be mass produced.

The use of electron beam is particularly advantageous where small volumes of parts are involved; or in the development of a new computer, where design changes are made frequently. To shorten this design cycle, IBM uses the electron beam to make the interconnections directly on the chips, eliminating the need for making new masks each time there is a design change. The speed of EL-3 further reduces this cycle time.

One of the most important features of EL-3 is called variable spot shaping. The process allows wiring widths to be altered while the electron beam is writing on a chip. This technique substantially improves speed and resolution.

Another important feature is called subfield vector writing, a technique which divides the chip into small areas. Speed and accuracy are improved because the electron beam avoids areas on the chip that need no wires.

Previous IBM electron-beam systems passed over all the chip while turning on the beam only at the appropriate places. □

Low-Cost Printers

A NEW FAMILY of low-cost thermal printers and a low-cost impact printer from Hewlett-Packard are designed for use with desktop and personal computers.

The thermal printers feature 120 character-per-second bidirectional printing, and the thermal print mechanism contributes to quiet, reliable operation.

The dot-matrix printer is intended for use with HP Series 80 personal computers. It has graphics capabilities and a suggested retail price of $1185, excluding tax.

Designed to sit on top of the new HP 9826 computer System, the thermal printer's hard copy and the HP support make them suited for other desktops, HP Series 80 personal computers, the HP 2640 family of terminals, automated test and measurement systems, and a wide range of non-HP personal computers.

Standard features include HP-IB interface (HP's interface upon which IEEE-488 is based) and national character sets. Serial and parallel interfaces are optional.

The thermal printers range in price from $1293 to $2237 excluding tax, and offer entry-level capabilities as well as high-resolution graphics, and printing and form-drawing enhancements.

The entry-level printer, the HP 2671A, offers the full 128-character ASCII set plus a line-drawing character set for creating forms and a Roman Extension set for national characters.

Normal print mode of 80 columns per eight-inch line, and compressed print mode of 132 columns per line, are standard.

The HP 2671A is priced at $1293, excluding tax.

The HP 2671G features high-resolution raster graphics. The 90 dots-per-inch resolution makes possible precise dot-for-dot copies of graphics from screen to hard copy. The HP 2671G is designed for applications requiring text and graphics printing.

The 2671G is priced at $1529, excluding tax.

Designed to run with HP Series 80 personal computers, the new HP 82905 features a graphics mode which can print a dot-by-dot version of CRT graphics onto hard copy.

Eighty cps bidirectional printing and variable columns (from 40 to 132 per 8½" page) are standard. Price of the HP 82905 includes HP-IB interface. Plotter/Printer ROM and HP-IB interface Module, for operation with HP Series 80 personal computers, are not included.

Apple Crumble

APPLE COMPUTER'S ex-president, Michael Scott, recently ended his tumble from power when he submitted his resignation as an Apple director and employee.

He reportedly had difficulty relating to the rest of the Apple board of directors and management.

Apple says it will double the workforce in its Carrollton, Texas, manufacturing plant to 1100 employees.

Income for the quarter ending June 26th soared to $11.8 million — up from last year's $2.74 million for the same period. Sales were nearly $91 million, against $32.5 million for the same quarter last year.

New Computer Mag

COMPUSERVE INFORMATION Service (which offers MicroNet, a competitor to The Source) has a new publication for its 12,000 users called "Today".

The slick, four-colour magazine has many interesting articles on personal telecomputing, including features on home banking, computer CB simulation (CIS's answer to "Chat" on Source), computerized stock quotes for the home, modems, QUBE cable news, and info on services.

The magazine will be offered free to CIS customers but is also available by subscription.

The first issue seemed to have no trouble attracting advertisers.

IBM Moves In!

AT LAST. . .the long-awaited IBM personal computer has been announced in the United States (though not expected here for some time), and we have been able to take our first look at its specifications.

Developed at the Information Systems Division's Boca Raton, Florida, facility, the machine is scheduled to be delivered from October. Although we've never been real fans of IBM, this machine seems fair set to change our minds. It looks like this:

The processor is an Intel 8088, which can address up to 262,144 characters of memory (256 Kbytes); the standard machine has 16K. Microsoft Extended BASIC is supplied (presumably in ROM), and the display can show 256 different characters in any of 16 foreground and 8 background colours. It is also capable of displaying graphics in four different colours.

The 83-key keyboard is detachable on a 1.8m coiled cord, so that it can be used on a desk or in your lap without moving the computer itself. There's a speaker inside the typewriter-sized mainframe, for either music or tone generation. The box also features self-diagnostics.

The system is backed up by a number of peripherals. There's an 80 cps bidirectional printer with 12 typefaces and self-test facilities (it sounds awfully similar to the Epson MX-80). IBM can supply an anti-glare green screen, or the unit can be plugged into a domestic TV via a modulator. Disk drives will be 5¼-inch types.

On the software front, everything seems rosy.

"We intend the IBM Personal Computer to be the most useful system of its kind," said CB Rogers, an IBM vice-president.

"Besides making it easy to set up and operate, we are offering a program library that we expect will grow with the creativity of the Personal Computer users".

Mr Rogers said IBM had established a new personal computer software publishing department for the system. It will publish progams written by IBM employees working on their own time and those accepted from independent software companies and outside authors.

Several well-known programs will be available almost immediately for the IBM machine. For example, Easywriter (originally an Apple word processor from Information Unlimited Software), VisiCalc and Microsoft Adventure will be available in new versions. Naturally, there will also be an accounting package for the machine.

But more significantly, IBM has set out to cover its options in the operating system department. Although the operating system supplied by IBM is an adaptation of Microsoft's UNIX-like OS, IBM has also contracted with Digital Research and Softech Microsystems to implement CP/M-86 and the UCSD Pascal system on the new machine. This should allow a vast number of applications programs to be transported onto the IBM fairly quickly.

The pricing of the new machine seems reasonable too. A basic system for home use, attached to an audio cassette recorder and a television set, would sell for approximately $US1565 from IBM's Product Centres, while a more typical system for home or school with a memory of 64 Kbytes, a single disk drive and its own display would be priced around $US3000. An expanded system for business with colour graphics, two drives and printer would cost about $US4500.

The system will be sold through participating Computerland dealers, Sears Roebuck's new business machine stores, IBM Product Centres and a special sales unit in the company's Data Processing Division.

Several things are interesting about this new product. Firstly, the adoption of outside-vendor software, particularly CP/M-86 and UCSD Pascal, represents a major move away from IBM's previous stance as a setter of standards. Unlike Texas Instruments, with its 99/4, IBM has bent to market forces, and in our opinion will benefit markedly from it. Meanwhile, TI is trying to drum up support for the failing 99/4.

Secondly, the machine is perhaps down-market from where many observers predicted IBM would enter, assuming that IBM would stick with a purely business-oriented system. The announcement of Microsoft Adventure for the machine clearly indicates the company sees it as finding its way into the home. . .

Thirdly, there's nothing innovative in the design. What is significant to us is the marriage of nice friendly features, such as the colour display, speaker and software like VisiCalc, which have previously only been found on home computers such as the Apple, with properly done, professional features such as an 83-key keyboard, 16-bit processor and powerful software like CP/M — previously the province of S-100 and professional machines.

Several things are likely to delay the appearance of the new machine in Australia. There's the PAL problem; in other words the colour display circuitry, which will have to be redesigned to drive Australian colour TVs, as well as the different power supplies which will be needed. There's the establishment of a service network, and the selection of distributors (if IBM Australia decides to use them).

The pricing will be interesting to see, as well. Certainly the US prices look good —in comparison, with say, Apple, the base unit seems to be more expensive (and much more powerful), but the cost of expansion and add-ons seems to be lower. We'll be waiting to see how it stacks up in Australian terms. □

Computer Phone Book

THE COMMUNITY Computerists Directory (P.O Box 405, Forestville, CA 95436) is a new "phone book" for computerists. Complete with yellow pages.

The white pages contain names, addresses, phone numbers, a listing of interests, and, where applicable, Source and/or MicroNet ID numbers for electronic mail.

The yellow pages are for commercial listings and advertisements by category. Other sections list computer bulletin boards and clubs/user groups.

APPLE BUSINESS SYSTEMS

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AUSTRALIAN PAYROLL	720.00
MEDICAL PACKAGE	745.00
INSURANCE BROKERS PACKAGE	1345.00
Other Business Software:	
VISICALC - the most useful management tool available on any computer (DOS 3.3)	$ 220.00
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SANDY'S WORD PROCESSOR	195.00
DESKTOP/PLAN	125.00
TIME MANAGER - the most powerful time management/analysis program we've seen	150.00
D.B.MASTER, database from Stoneware	230.00
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	2939.80	3354.92
OPTIONS:		
PASCAL LANGUAGE SYSTEM	470 25	540.00
MICROSOFT 16K RAM CARD	220.50	245.00
MICROSOFT Z80 CARD WITH CP/M	325.00	375.00
CENTRONICS PARALLEL PRINTER I/F	209.00	240.00
80 COLUMN DISPLAY CARD	400.00	460.00

*** Tax included prices calculated at 15%. Stock will be adjusted to 17.5% as renewed.**

ATARI COMPUTER SYSTEMS

FEATURES & SPECIFICATIONS – THE ATARI 800

Console: FCC approved, with built-in RF modulator. Connects to any TV

CPU: 6502 Microprocessor. 0.56 microsecond cycle. 1.8 MHz.

Colour: 16 colours, each with 8 intensities.

Sound: Four independent sound synthesizers (in addition to audio through TV) for musical tones or game sounds. Four octaves. Variable volume and tone. Internal speaker.

Memory: 16K bytes of Random Access Memory is included. The ATARI 800* may be expanded up to 48K RAM with user-installed 8K or 16K ATARI Memory Modules*. The system includes a 10K ROM Operating System. ROM may be expanded with user-installed cartridge programs.

Keyboard: 57 full-stroke alphanumeric keys plus 4 function keys. Upper/lower case. Inverse video. Full screen editing.

Display: Highest graphics resolution 320 x 192, 24 lines of 40 characters. Three text modes.

PERIPHERALS & ACCESSORIES

ATARI 410* PROGRAM RECORDER
ATARI 810* DISK DRIVE†
ATARI 815* DUAL DISK DRIVE
ATARI 820* 40 COLUMN PRINTER
ATARI 822* 40 COLUMN THERMAL PRINTER
ATARI 825* 80 COLUMN PRINTER
ATARI 830* ACOUSTIC MODEM
ATARI 850* INTERFACE MODULE
8K RAM MEMORY MODULE* (CX 852)
16K RAM MEMORY MODULE (CX 853)

* TRADE MARK

Vista V200-E for Exidy*

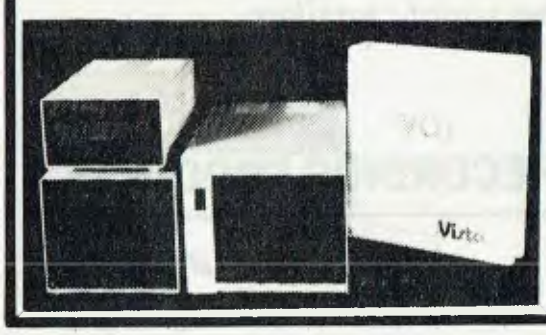
Minifloppy Disk Systems

Description

The V200-E for Exidy/Sorcerer* is a dedicated system and a long needed powerful tool to complete the Exidy Computer

The V200-E for Exidy is a completely tested and assembled modular system that does not require the S100 Expansion interface and plugs directly into the expansion connector

The fast-access, on-line storage of the V200 and V200-E system gives you instantaneous program loading and dumping, sequential and random file access, context editing of programs and text, dynamic debugging of programs, program assembly, batch processing and much more.



Here are three options available.

V200E-10 200K single drive, in a dual drive case to allow for expansion, ready to plug into the Sorcerer with CP/M, BASIC E, full documentation and a box of disks. * $990.00

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Software Patents

FORMULAS for chemically-produced goods and the computer programs which define them are now being patented in the US, opening the way for Australian companies to protect software developments.

The case which established the precedent was made in favour of Federal-Mogul Corporation South, which makes rubber-based seals for car engines and other machines which rely on lubricants.

The US Supreme court decided by majority decision, against the wishes of the US Patent Office, to grant patent protection for a process for curing the rubber founded on a well known mathematical formula.

The computer is required for tight controls in the manufacturing process.

A thermocouple relays temperature readings from inside a hot mould to a computer which alters the temperature. The precise controls are needed because under-curing makes the rubber seals unserviceable while over-curing gives a sub-standard product.

The mathematical equation for proper curing is based on a formula written by Svante Arrhenius, the father of modern physical chemistry and was the centre of his Nobel Laureate in 1903.

The US Patent Office had turned down the original request to cover the formula saying laws of nature could not be patented.

Patent officials feared a rush of applications for every change in an item of computer software.

In the US, companies have been pushing for incentives for investment in computer aided manufacture and are looking for more freedom to protect their developments.

The decision could be the first step in computer-based patenting and it may not be long before such a scheme arrives in Australia. □

Electronic Phone Books

TELECOM AUSTRALIA is currently investigating the long range possibility of replacing telephone books with a home-based computer directory system.

The system, similar to one proposed in France, would mean telephone subscribers could dial up a name on a screen and be given the name and address of the subscriber they want to reach.

The cost of such a project would obviously be huge but Telecom realises the coming of the computer age, the cost of paper and the excessive size of present telephone books have made this proposal the only solution.

The home-based terminals, of course, could be used for other purposes such as present microcomputing uses.

A multi-faceted terminal in the home is an inevitable result of the new industrial era and Telecom is keen to cash in on what will obviously be a lucrative deal.

Telecom believes the system could be in operation within 10 years.

A Telecom spokesman said: "There is pressure for us to change to electronic directory service.

"This replacement will be the result of the increasing inconvenience of telephone books that cost $53 million a year to publish." □

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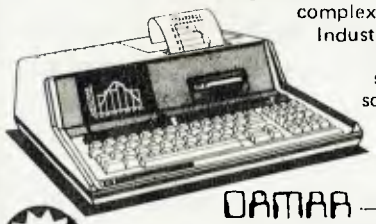

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Vector Multi Share

DICKER DATA projects of Caringbah NSW has introduced a new multi-user, multi-tasking hard disk system for general business and word processing applications.

The new system, the Vector 5005 Multi-share, offers 5 Mbytes high speed, highly reliable Winchester disk together with Vector's Automatic Error Correction Feature.

The system supports up to five users, with each of the users doing any kind of work on each terminal.

The system allows one user to be doing ExecuPlan for financial planning while a second user is entering sales information using Peachtree accounting software and a third user is typing a letter using Memorite III word processing. Other systems currently available are limited to the extent that three such processes cannot be done at the same time.

System response remains good, even when the operator is carrying out "computer intensive" work while other operators are doing "interactive' work such as typing or entering data.

Like all Vector systems, two printers can be attached without having to make any alterations to system hardware or software. One printer must be a parallel printer such as a Vector's system printer, and one must be an industry standard serial printer.

The 630 Kbyte floppy diskette drive is used to copy the contents of the hard disk onto floppies, even if a particular file is longer than the one floppy can hold.

The 5005 Multi-share includes the CP/M operating system and its utilities, and also includes Microsoft BASIC, the SCOPE editor and ZSM assembler.

The system is priced at $9820 for a one-terminal configuration. Each additional terminal is $1995. □

Beauty and the Beast

HAVING computers around has become second nature to most people, and more and more of the machines these days are creeping into the animal world.

Not that zoo inhabitants have commissioned any computer analyses, but it is not uncommon to find data banks brimming over with the lowdown on various species. Just as technological advances have on occasion improved the quality of human life, computers are often used with profound effect on animals.

Some prime examples of the computer/beast connection were reported by IBM. For instance, the US Department of Agriculture has found a way with its computer to give Mother Nature a hand in getting milk from cows.

At the Animal Improvement Program Laboratory outside Washington, meticulous records are kept on the milk production of dairy herds in the USA. Matching genetically superior cows and bulls, the USDA's computer system optimizes the amount of milk that will be generated in the future.

This computerized mating service has kept milk production at the same 120 billion pounds a year that it was 30 years ago, although there are half as many cows.

In addition to milking cows for all they're worth, there are other computer systems — both government and private — in use to produce bigger and better livestock.

Such favourite American meat products as beef and turkey often reach maturity and market with the guidance of Old McDonald's computer.

Outside of the barnyard, the scientific community has begun to team up two of its most important research tools, animals and computers.

One of the most striking examples comes from the North Carolina Department of Mental Health, where researchers have long suspected correlations between the effects of narcotics on humans and — of all things — spiders.

It was only after a computer was brought into record the hoards of data that a web of knowledge started to emerge.

Dr. Peter Witt, director of research for the Department of Mental Health, projects time-lapse photos of one of the few species of spiders that live together onto a grid both under normal conditions and after drugs are given. An IBM computer busily scouts for changes in distances, distribution patterns and activity rates. The conclusion, explains Witt, is that spiders, like people, communicate by how close they get to their neighbours, and, in the case of a stoned colleague, that's as far apart as possible.

While such conclusions could eventually better mankind, computers are also sometimes put to work on the behalf of animals.

For instance, every year the migration patterns of nearly 800 bird species are plotted through a computerized bird banding program managed by the US and Canadian Wildlife Services.

The Bird Banding Laboratory can over a long term get a bird's-eye view with its computer system of changes in flight behaviour, and, in some instances, detect bird migrations that avoid cities and entire areas. Said Bill Bauer, computer manager at the Office of Migratory Bird Management, "The computer identifies the trends for us, then researchers can only speculate as to the reasons for the birds' behaviour."

The banding data is also considered by Bauer's office when it makes recommendations for annual migratory bird hunting regulations.

Similar computer networks aid in the observation and protection of many endangered species. □

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FUNPACK I (approx 6K RAM)

CUBE (16K RAM)

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First Applesoft. Now Applesex?

THE AUGUST 12th issue of "Management Information Systems Week," a trade publication for professional data processing managers tells about a "computer consultant" being charged with running a prostitution ring using an Apple II computer to keep track of over 4000 clients.

Sgt. Dan Felix of the Santa Ana, California police said that Joseph Allen Harvey used the computer both for keeping track of billing and of the girls.

Computer files of prank callers, violent clients, non--payers and vice officers posing as customers were also kept.

Harvey's software has been impounded by the police.

And. . .

Along the same lines, the Wall Street Journal's front page for August 13 carried the following quote: "Sex manuals — more than 10,000 so far — are being sold in cassette and diskette form for home computer buffs by Syntonic Software Corp. in Houston, Texas.

The product, "Interlude," is advertised as 'the most stimulating computer game ever conceived' "

Sales figures represent a volume of over a quarter-million dollars.

For readers not familiar with "Interlude," here's a synopsis: through a computerized interview with you and your partner, a sexual scenario (complete with props) is set up for later acting-out.

These scenarios range from Interlude 1 ("A Bed of Roses") to 99 ("The Ultimate Experience"). The computer analyses your likes, dislikes, fantasies and makes all the decisions for you.

Applied Technology Takes On the Big Boys

APPLIED TECHNOLOGY, pioneer in the Australian personal computing field, has formulated a number of 'package deal' systems, tailored to meet the needs of the expanding personal computing market.

The heart of all these systems is the now famous DGZ80 single board S100/-Z80 computer. With over 1000 DGZ80 systems now in use, Applied Technology claims to have the most popular S100/Z80 kit on the Australian market. It has found wide acceptance in universities, schools, technical colleges and industry.

Customers include computer companies such as IBM and ICL as well as Department of Defence, CSIRO and Telecom. The DGZ80 offers a combination of features which really put it in a class of its own. It has 2K on-board ROM, 2K on-board RAM, Zilog PIO and CTC, power-on-jump, and is supported with a powerful monitor program (DGOS) in ROM.

Applied Technology's 'base system' is its Super Instructor 90. It includes the DGZ80, the MW640 VDU and Keyboard. The VDU is memory mapped with a 64 character by 16 line format, and has upper and lower case. Printer port and elaborate I/O facilities are available. Expansion is 'free' in that the system is S100 right from the start. Price is $399.

The base system has been taken a step further with the addition of the 'BASIC 80' pack. This includes Microworld BASIC in ROM and 16K of RAM. These two S100 boards are offered together for $269 — a saving of $90 on their usual prices. Applied Technology points out that this system competes very favourably with American and Hong Kong mass-produced competition yet offers tremendous advantages in terms of low cost expansion and technical backup.

The photograph shows Super Instructor 80 with 12K BASIC in ROM plus 16K RAM. As an introductory offer, this is selling for $399 plus $269. For further information contact: Applied Technology Pty. Ltd. Phone (02) 487 2711

Demise of the Calculator?

THE UBIQUITOUS pocket calculator may soon become a thing of the past, if the plans of one of Japan's leading component manufacturers are any indication.

The company, Tateishi Electric, has recently announced it has placed a major order for Sord Micro computers, so by 1986 no less than one in every five of its 5000 employees will have direct access to a Sord system.

At an estimated total investment of $A6 million, the Tateishi personal computerisation decision focuses attention on the inroads today's low cost computers can make into the day-to-day operation of industry, commerce and government.

As Peter Jarman, general manager for Sord's Australian distributor, Mitsui Computer systems, says: "Just as the electronic calculator became a low-cost accessory for every businessman, so too will the personal computer

"Already, there are many managers who invest in their own 'home computers', which they bring into their offices to assist in their day-to-day work. The question then remains as to whom should actually invest in such equipment — the employee or the employer."

"Today, most companies have come to accept that they should bear the $20 — $30 calculator expenditure for staff directly associated with accounting and administrative functions.

"However, what those same organisations may have to accept within the next two to three years is that these people, together with other employees, may well expect equal access to their own personal computer systems."

Computer Kit Companies

ANYONE who has ever put together a model car or a do-it-yourself kit knows the frustration of losing one tiny — but crucial — piece.

The Rust Engineering Company asembles models with hundreds of thousands of pieces that can take up to a year and a half to build.

The models, which often fill up a whole warehouse floor, are working blueprints of massive factories and industrial plants.

The Birmingham (USA) based architecture and construction firm also often builds the actual structure (with price tags that can reach $300 million dollars), such as paper mills.

To keep track of all the parts and bends in a complex piping system, for instance, the engineers have turned to a computer. Production of the models is tracked and recorded on an IBM 8100, which can also produce piping isometric drawings in minutes that used to take days to draw by hand.

Although the computer-assisted models, which cost $4 to $6 million add to the initial costs, " It's a lot easier to move a piece of plastic around than to make changes in concret and steel," said Tony Potocnik, Rust's chief piping engineer.

Even with over 200 engineers working feverishly on the models, Rust estimates that it saves four months engineering time with the help of its computer.

In addition to time savings, there is a cost cut of between two and three percent of installation costs with the use of the computer/model concept.

In putting its computer into the "jigsaw puzzle" business, Potocnik explained, Rust also happened onto an innovative use of optical wands, such as the ones used to scan retail merchandise. Tagging even the tiniest part of the model, Rust uses an optical scanner to record key measurements, such as size, length and location.

After this numerical data is sent through the IBM 8100, it is converted into plot data, and is then produced as a piping isometric drawing. Each model generates between 3000 and 5000 drawings, to be used by the construction crews in the field.

In addition to producing isometric blueprints of small sections of the model, the computer comes up with a "material laundry list," said Potocnik. Printouts can also explain how to assemble parts and where to add supports and bends. □

Random Access in Sydney

HAVING EXPANDED from its native Adelaide into Melbourne, Random Access has now opened a Sydney store.

Located at the corner of Berry Street and Pacific Highway, North Sydney, the store will supply Apples and a range of add-ons and software.

At the opening ceremony we were treated to a demonstration of the Alpha Syntauri music synthesizer, graphics tablet demos, and were exposed to the terrors of snoggling. To find out more about snoggling, visit Random Access — and check the stunning introductory prices!

Burroughs Corp. Acquires Memorex

BURROUGHS, THE Detroit computer manufacturer, has shelled out over $100 million for the Memorex Corp. in what insiders are calling the "ailing caring for the sickly."

Memorex lost $24 million in the second quarter of this year alone.

Burroughs has its own financial problems, with a 49 per cent earnings decline in the last quarter

Twisty Computer Store

THE RESIDENTS of Roseville, NSW are now able to buy their Apples locally.

Moebuis Computer Products opened its doors on 9th September at 96a Pacific Highway, Roseville 2069. Manager John Hall told us that the store will specialise in supplying Apples for first time users.

Other products will include the range of Apple software and a choice of printers, including the Epson MX—80 and the NEC Spinwriter. After-sales service for the first-time user will include educational courses and seminars.

Phil's Cheap Editor

CYBERNETICS RESEARCH (CYRES) which recently released GRAFPAK 1.0 has, just announced its second software product for the Apple II.

Phil's Cheap Editor will allow the user to edit and manipulate any DOS 3.3 or DOS 3.2 text file.

The Editor has flexibility in the editing and de-bugging of BASIC or Assembler program source text, and the preparation of tables and other documents.

The major features of the Editor include global or selective string search and exchange, ability to move and copy blocks of text and a "memory" which can be used to execute a pre-set sequence of editing commands. The Editor also provides true screen windowing, a large text buffer (32K), a wide range of movement and deletion functions and is able to handle lower case.

Minimum hardware required for the use of the Editor is an Apple II or Apple II Plus with 48K RAM, Applesoft in ROM or Language Card and a single diskette drive. A printer is also supported by the Editor, but is optional.

Supplied complete with a comprehensive manual, and two copies of the Editor diskette, Phil's Cheap Editor retails at $95.00. □

Australians Pay More

THE AUSTRALIAN computer user pays more than his US colleague for equipment and that is an inescapable fact of life, according to Mr Julian Barson, director of consolidated Marketing Corporation.

CMC, which distributes and markets Sinclair computers, believes that Sinclair equipment has been singled out as the only computers hit by the price hike in Australia.

But Mr Barson points out that the per centage increase in the retail price of Sinclair equipment is about the same (and less in some cases) as all other market leaders.

Mr Barson used as evidence a comparison of hardware lists gleaned from *'Creative Computing (US) 1981* and the recently released *"Australian Microcomputer Handbook"*.

Model	Country of Origin Price (in $A)	Australian Price	Per cent Increase
Sinclair ZX81	$150	$230 (adap. removed)	53% (not 80%)
Apple II 16K	$928	$1395	50%
Apple 48K	$972	$1495	54%
Atari 400 16K	$310	$599	93%
Atari 800 16K	$707	$1399	98%
TRS-80 II 64K	$2872	$5999	108%
TRS-80 III 16K	$742	$1399	88%

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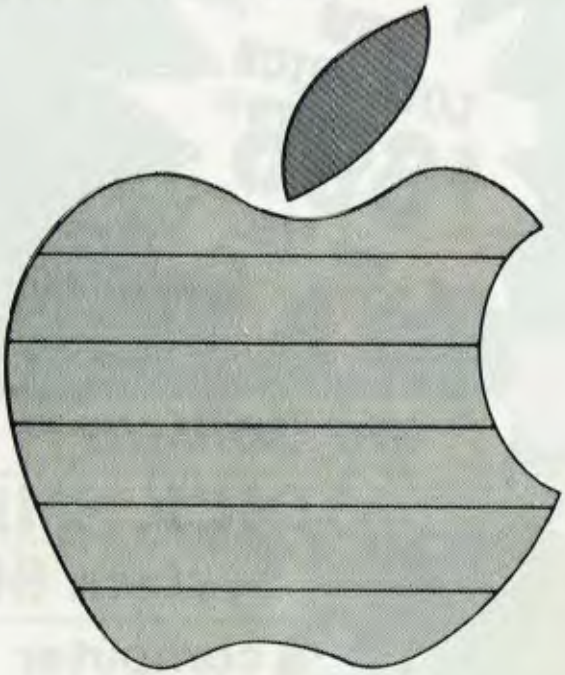

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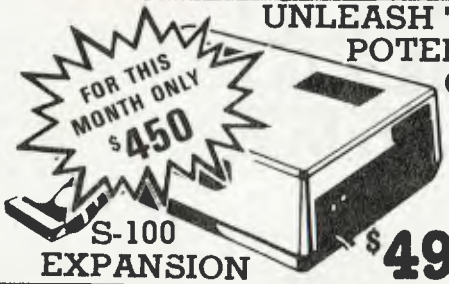
Compare the features – then compare the prices!

PARAMETER	SYSTEM-80	TRS-80 (Level II)
1 CPU type	Z-80	Z-80
2 Speed	1.7MHz	1.7MHz
3 S-100 compatible (with expansion unit)	Yes	No
4 Amount of RAM (basic computer)	16K	16K
5 Built-in cassette recorder	Yes	No
6 Built-in video RF modulator (use with any TV)	Yes	No
7 Capacity of BASIC ROM	12K	12K
8 Cassette recorder ports (basic machine)	2	1
9 Motor control for cassette recorders	Yes (2)	Yes (1)
10 Cost of basic unit with 16K RAM including monitor and cassette recorder	**$844.50**	**$1169**

*The basic SYSTEM 80 computer costs only $695. As this computer has an output for direct connection to your TV set a video monitor, as a separate entity, is not required, making the possible savings on Tandy prices even greater



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There are personal computers to suit all tastes. In this special feature, we look at personal computers that have a distinguishing characteristic — colour graphics.

The Colour Machines -Computers come to Life

Back in the early days, a personal computer was a maze of circuit boards, linked by a tangle of wires, which was difficult to use and almost dangerous to touch. We've come a long way, baby.

Today, personal computers are available off the shelf, with features that advanced experimenters hardly dreamed of then. In this issue, Les Bell has focussed on the newer personal computers; what are often termed 'home' computers. Their distinguishing features are their ability to display colour graphics in some manner, musical or tone generation facilities, games accessories such as joysticks or paddles, and documentation aimed at the complete beginner.

In most cases, the manufacturers have succeeded in their attempts to aim at the home (as opposed to hobbyist or office) market. These machines are generally not suited for business applications, but for the beginner to computing, they will give the understanding that will lead to new relationships with the larger and more sophisticated machines.

Five computers have been reviewed: the Apple II, Atari 400, APF Imagination Machine, TI 99/4 and the new NEC PC-8001B. We have made no attempt to directly compare the machines. Although aimed at a broadly homogeneous market, they vary widely in approach and capabilities. We encourage the reader to find out more about each machine, as well as about his requirements, before making a choice between them.

Japan's biggest-selling personal computer is the NEC PC-8001, with over 50 per cent of the market — something Apple would love but just aren't going to get. One reason they won't is the recent introduction of the PC-8001 into the US, UK and Australia.

NEC's Next

NEC (Nippon Electric Company) is one of the world's largest electronics companies with an enormously wide range of products, from microprocessors to telephone exchanges.

Their latest product to be introduced into Australia is the NEC PC-8001 personal computer, which has already been on sale for some time in Japan.

In Australia, it will be distributed by Hanimex, and should be available from computer stores by the time you read this. Courtesy of Hanimex, I was able to examine the first PC-8001 in the country, and get an impression of its capabilities.

The computer itself is organised in a

similar way to the Tandy TRS-80 Model I. That is, the processor and memory are integrated into the keyboard unit, with a separate display. In the case of the PC-8001, the unit has the power supply built into it, contributing to its substantial weight and the feeling of solid construction.

The unit is supplied with 32 Kbytes of RAM as standard. Although this might seem like a lot, it should be remembered that graphics take up a lot of memory, and not having to worry about running out of memory can make it possible to perform tricks like rapidly updating the screen.

The video output of the computer is under considerable operator and program control. The screen width for example, can be set to 40 or 80 characters, as well as some values in between, simply by using the WIDTH statement.

Normal screen depth is 24 lines, but there is a display area at the bottom of the screen which is used to show the functions of the five user-definable keys at the top of the keyboard. These default to standard functions to save the user some typing work, but can be changed using the BASIC KEY statement.

Two intensities are available for highlighting text or graphics. In the graphics mode, each character position is broken up into a 2 × 4 matrix, and 8 colours are available. There are 248 characters and graphic symbols in addition to the 160 × 100 pixel mode.

The COLOR statement will set the colour used in subsequent graphics and text commands, or in the monochrome mode will set the character attributes to flash the character, invert it, or hide it from view.

The graphics abilities of the PC-8001 are impressive. It draws lines very quickly for a BASIC system, and has an extensive range of special graphics commands.

For example, the GET@ and PUT@ statements enable the user to save any rectangular area of the screen into an array for storage on disk or tape, and reload it. The LINE statement will draw a line of characters between two points in text mode, or will set or reset the line in graphics mode. PSET and PRESET statements can turn on or off individual points, while the POINT statement will test the status of a particular point on the screen.

Overall, this is a comprehensive set of graphics commands which make it easy to create graphic displays. Because of the speed of operation of the system, moving graphics would be fairly easy, even from BASIC.

Unfortunately, at the time that I tried the PC-8001, Hanimex had not yet received the colour monitor which was on its way from Japan, so I didn't see the quality of the colour graphics.

Photographs I've seen show the resolution to be good, and the colours were very pure indeed. The colour output of the computer is as separate RGB (red/green/blue) drives, so that very high quality displays are possible.

The BASIC used in the PC-8001 is our old friend Microsoft BASIC, under the name of NBASIC. There's a full range of functions, as comprehensive as you're ever likely to require.

The PC-8001 has a few other tricks up its sleeve, however. The TERM command turns the machine into a serial terminal which is ideal for accessing services like The Source. Word length, parity, auto-LF are all dynamically configurable, and the communications baud rate is easily settable.

Adding Disks

The system that I tried out was fully expanded, with an NEC green phosphor display, the PC-8012B I/O unit, PC-8031B Mini-disk Unit and the matching PC-8000 series printer. The I/O unit adds extra memory and I/O ports, and is not strictly necessary to use the disk drives.

The disk drive unit included a pair of 5.25" floppy disks, each with 160 Kbytes of storage. NEC's DOS for the system is reminiscent of Tandy's TRS-DOS.

Unlike CP/M, which automatically logs in disks on a warm boot, NECDOS requires the user to specifically log disks in by using the MOUNT command, which I presume loads the directory (NEC call it the File Allocation Table) into memory.

Once a program has run, before taking the disk out of the drive, the REMOVE command should be used, presumably to close any open files and update the FAT. Most of the demonstration programs I tried included a REMOVE command, which meant that once they had run, a subsequent FILES command (to find out what else was on the disk) had to be preceded by a MOUNT command. It's annoying to have to do so much typing.

Although the NEC DOS is perfectly workable, I'm glad to report that Hanimex insisted that NEC should also provide CP/M for the system, thus making a much wider range of software available to the user.

The NEC printer is a nice addition to the system too, with the ability to support the graphics on the PC-8001, as well as provide straight listings at 120 cps. It's got full self-test and carriage alignment test built in, and runs quite quietly.

How To

The PC-8001 manuals are fairly good — nothing special but workmanlike, and written in good English. I thought they were rather terse for the first-time user, but they are well organised, and not too difficult to find your way about in. And of course, the only way to learn about computers is to use them, not to read the manuals.

The PC-8001 will be available in three configurations from retailers, probably by the time you read this.

A basic system, of the computer with

Specifications and Report Card

Unit:	PC-8001 Personal Computer
Made By:	Nippon Electric Company
Processor:	Z-80
Clock Speed:	4 MHz
RAM:	32 Kbytes
ROM:	4 Kbytes
I/O:	DMA expansion, RS-232C
Languages:	BASIC, plus CP/M-supported languages
Keyboard:	Full typewriter-style with numeric keypad and user-definable function keys
Display:	80 × 24, 40 ×24, etc, software switchable
Graphics:	160 × 100 pixels
Peripherals:	Disk drives, printer, colour monitor
Expansion:	6 I/O ports in I/O expansion box, up to 64K RAM
Best Points:	High quality construction, Microsoft BASIC combined with colour graphics, CP/M
Worst Points:	Could use higher-capacity disk drives in business applications, perhaps even a mini-Winchester

Ratings:	**excellent**	**good**	**well, maybe**	**poor**
Documentation		✓		
Ease of Use	✓			
Functionality	✓			
Support		✓		
Value-for-money		✓		

Extras included:	NA
Options:	Colour monitor
Price:	$1700 for starter system with 32K and green screen
Review unit from:	Hanimex

green phosphor high-resolution screen will sell for around $1700. A larger system with disk drives and printer will sell for around $4350, while a fully-expanded system with colour monitor and the I/O expansion unit will be priced at around $5000

The PC—8001 offers excellent colour graphics capabilities with the capability of running CP/M and its 'serious' software.

It seems likely that it will find a way into many small business and technical applications.

* * *

The Atari 400 is bound to be a very popular computer, combining colour graphics, sound and a comprehensive BASIC in an under-$600 package.

Atari 400

THE ATARI 400 is the closest thing I've yet seen to a true home computer. It's not intended for use as a business system, and the dedicated computer hobbyist would probably find it a bit unsatisfying, but it's ideal for the complete beginner in computing.

The first thing that strikes one about the 400 is its keyboard — it has a touch sensitive keyboard not unlike that on the Sinclair ZX80, although it is larger and each 'key' has a raised edge, which makes it quite easy to use.

A small speaker inside the computer beeps each time a keystroke is accepted, so the user knows when he fails to provide adequate pressure.

Above the keyboard is a cover, under which is a socket for a ROM cartridge. This can contain the computer's BASIC interpreter, or a game such as Star Raiders or chess, or an Educational System Master Cartridge. If the cover is raised, a microswitch automatically cuts off power to the computer, making it safe to change the cartridge.

If power is applied to the computer while no cartridge is inserted, it will still operate in its 'Memo Pad' mode. The low-level keyboard and screen I/O routines are resident in ROM at the top end of memory, and there is a simple 'TV typewriter' routine which is brought up if there's no cartridge in the slot. It doesn't do much, but it's better for the beginner than being confronted with a totally blank screen and unresponsive computer.

At the front of the computer, under the keyboard, there are four sockets for games controllers. There are three types of hand-held controllers for the Atari: a joystick controller with a 'fire' button, a twist paddle for tennis-type games, and a numeric keypad. The addition of these controllers makes a tremendous difference to the games capabilities of the computer.

The computer is powered by an external power supply, which plugs into the side of the machine. Also at the side is the on-off switch and a peripheral connector which attaches to the first 'daisy-chained' peripheral device. Successive peripherals plug into each other.

The 400 is supplied with 16 Kbytes of RAM as standard. This is enough for most programs, and in fact, makes it possible to run a short-form version of the Atari DOS (disk operating system). The processor is a 6502, as used in the Apple, CBM and other popular personal computers.

Trying It Out

Powering up the Atari with the BASIC Language Cartridge in place immediately brings the system up in BASIC. The display is a fairly light blue background with white letters, and while I thought at first that this would be difficult to read, in practice it wasn't.

An interesting point is that if the computer is left switched on but unused for some time, it starts to change the colours on the display. Officially, this is so that it won't damage the phosphor coating on your colour TV tube, but I suspect that the fact that it makes the computer look better in shop windows may have something to do with it!

Atari BASIC is Microsoft-like in some ways, but with a few omissions.

For example, one of the first programs I wrote to try it out used the TAB function, but the Atari couldn't make sense of that. Instead, it uses the POSITION statement to set the cursor to the specified position on the screen. While this is quite an elegant technique, it meant quite a bit of re-writing of my program.

All the usual BASIC statements are provided, such as PRINT, INPUT, PEEK and POKE, GET and PUT, etc. DATA statements are provided, as well as ON . . . GOTO and logical operators.

The major area where the Atari deviates from the 'standard' BASICs is in its provision of graphics operators. In fact, the Atari's grpahics capabilities are its outstanding feature. There are nine graphics modes.

Mode 0 is a full-screen mode, while 1 to 8 are split-screen. Adding 16 to the mode number will over-ride the split screen, while adding 32 will prevent the GRAPHICS command from clearing the screen.

The various graphics modes take quite a bit of learning, and frequent reference to the manual while programming graphics at first. And of course, the higher-resolution graphics modes eat up memory at a great rate, so there may not be enough left for your program!

The COLOR statement (The PAL version doesn't have a COLOR statement, by the way) sets the colour to be used in subsequent commands which write to the screen.

In text modes 0 to 2, the colour is determined by the two most significant bits of each character, so that only 64 different characters can be displayed. In the pure graphics modes (3 — 8), only one or two bits are required for each pixel, depending on the number of colours being displayed. displayed.

The number in the COLOR refers to a colour register which has been previously loaded with a hue and luminance using the SETCOLOR statement. Thus, the COLOR statement only refers to a colour indirectly, and this can be a bit confusing at first.

Once the colour has been set up, the user can use the PLOT statement to plot points, and the DRAWTO statement to draw lines between points.

The LOCATE statement can read data from the screen, and the POSITION statement can be used in conjunction with the PUT and GET statements to both output and input data from the screen (which is device number 6).

Having mastered all these commands, the resulting graphics can be quite startling. The Atari standard software makes good use of the graphics abilities of the machine. The display is bright and clear, and the resolution is adequate to produce quite small characters.

Game Playing

The Atari graphics really come into their own when the optional ROM games cartridges are used. In particular, we found the Star Raiders game to be compulsive. In this cross between Star Trek and Star Wars, you hyper-warp your ship around the galaxy trying to zap the Zylons before they zap you or your starbases.

It's a tricky game at anything above the novice level, involving high-resolution 3D animation and perspectives as you chase and fire at the Zylon craft. The colour is excellent, with fast screen updates and flashes, and the sound effects are great, too.

The Atari BASIC also allows excellent control over the generation of sounds and musical notes. The SOUND statement provides control over 4 voices, each with settable pitch, distortion and volume.

The Atari doesn't interface to a conventional cassette recorder. Instead, there's a

special recorder which is designed to daisy-chain in the same way as the other peripherals. While this is a nice scheme, it does make the cost of what is an essential peripheral, not an option, rather higher than need be.

Read All About It

The documentation supplied with the Atari is excellent. It's not really documentation in the traditional computer sense, as it keeps the technicalities to a minimum, and concentrates on teaching the user to get the best from his machine.

The Atari 400 Operators Manual provides the basic instructions on setting up the machine, changing cartridges, adding

peripherals and so on, as well as an introductory tutorial on BASIC.

The BASIC Reference Manual is well organised, with the statements categorised for easy reference. There are some very useful appendices, which give such information as a memory map and useful locations in memory, the ATASCII (Atari's modified ASCII) code and a selection of useful and educational BASIC programs.

Overall, I was impressed by the Atari. It works well, its manuals explain how to use it in clear English for the non-technical reader, and when you get bored with writing cheque-book balancing programs at 3 a.m. it plays some very entertaining games. A good machine for the beginner.

Specifications and Report Card

Unit:	Atari 400
Made By:	Atari Corp, Sunnyvale, California
Processor:	6502
RAM:	16 Kbytes
ROM:	10 Kbytes
I/O:	Connector on side unit for cassette, disks, etc.
Languages:	BASIC
Keyboard:	Elastomeric pressure-sensitive type
Display:	40 × 24,
Graphics:	5 modes, 80 × 48 up to 320 × 192
Peripherals:	Data cassette unit, Disk drives, games controllers
Expansion:	Memory to 32K
Best Points:	Good documentation, plug in ROMs, game-playing ability
Worst Points:	Keyboard

Ratings:	**excellent**	**good**	**well, maybe**	**poor**
Documentation	✓			
Ease of Use	✓			
Functionality		✓		
Support		✓		
Value-for-money		✓		

Extras included:	NA
Options:	Games controllers, games ROMs, memory, cassette unit, etc.
Price:	$699
Review unit from:	Computer Wave, Myer Sydney

* * *

Before TI released a personal computer, rumours were rife and the technical press confidently expected an earth-shattering announcement. When the TI-99/4 finally arrived, everyone was baffled.

Is God a Texan?

TI IS ONE of those companies that sometimes seem to think it's God, and consequently moves in mysterious ways. Occasionally, its actions are obvious, as they were when TI forced down prices in the watch and calculator markets, but at other times it leaves industry observers totally confused. TI's 99/4 home computer has had that effect.

The 99/4 was widely billed as the most advanced home computer to be released. It's a compact console with built-in keyboard and video output, which has been sold, both in the US and here, with a matching colour monitor. In Australia, the monitor has been a modified TV set which can still work in the way it was originally intended, so the cost is not as high as otherwise appears.

At the right-hand end of the console is a slot which is intended for plug-in 'Command Modules', which are really read-only memories containing games and applications programs. As well as these plug-in ROMs, the computer will accept programs and data through a cassette interface.

The processor inside the machine, for those who are interested, is one of TI's 9900 family of 16-bit processors. This should mean high performance, but in practice, TI BASIC seemed to me to be a bit on the slow side. This may have been due to video output timing considerations, however.

TI's marketing philosophy called for heavy reliance on the plug-in command modules, and initially at least, discouraged the support of the machine by outside software authors. No technical information was released to enable innovative programmers to provide software,

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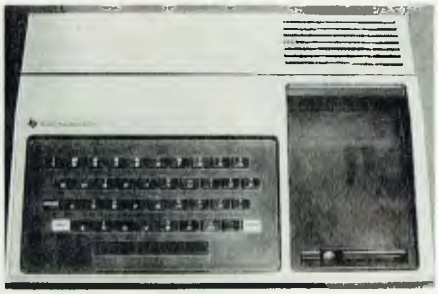
and even if they could write the programs, few software publishers could afford the minimum quantities of ROMs required.

Owners of Apples, TRS-80's etc. all know that if it wasn't for the supply of software outside surces, the manufacturers would hardly sell a machine. Unfortunately, this is what happened to TI. Hundreds of the machines are still stockpiled in warehouses in the US, even after drastic price cuts.

Fortunately TI is starting to react to the situation, and beginning to realise that the 99/4 is not God's gift to the home computer purchaser. They're ploughing a lot of money into the development of software for the machine, and they're even starting to support (or at least remove some of the obstacles facing) outside software vendors.



Performance

When first switched on, the computer displays a colour bar chart and tells you that it is the TI Home Computer. Pressing any key kills that display, and offers the user the choice of TI's equation calculator or TI BASIC.

The equation calculator seems to me to be pretty useless. It doesn't do anything you can't do in BASIC, and generally more easily, and on top of that, it takes up ROM space that could have been used on providing more BASIC functions or monitor features. If you want a one-dimensional Visicalc, this is it.

TI BASIC is much more rewarding. It's quite a comprehensive BASIC, with all the usual functions. The BASIC provides high recision, usually to 13 or 14 digits — TI take the calculator heritage seriously.

The colour graphics commands are not actually part of the BASIC language, but instead are accessed through CALL statements. Since each function is called by name, e.g. CALL COLOR, it would seem to be very little extra overhead to do without that redundant CALL.

To erase the screen, for example, one types CALL CLEAR. Sixteen colours are available through the CALL COLOR statement, enabling the background colour for each character to be individually set.

The satement CALL CHAR enables the user to define his own character set, using an 8 × 8 dot matrix. This is an extremely powerful facility for creating chess pieces, etc. The HCHAR and VCHAR functions will place a character anywhere on the screen. Optionally repeating it in a horizontal or vertical line.

The 99/4 has a SOUND function similar to that of the Atari. A maximum of three tone channels and one noise channel can be activated simultaneously. Special functions enable single-character input from the keyboard or a joystick, so that the sound channels can be 'played'.

The TI-99/4 has a simple keyboard which uses soft-feeling keys. Although this has been criticised as difficult to use, I had no difficulty with it. In any case TI is soon to release a new version, the 99/4A, which will have a more conventional keyboard. Incidentally, TI in the UK is selling a version of the machine with PAL colour, so that the additional cost of a monitor may soon be a thing of the past.

The 99/4 can accept two joysticks through BASIC's JOYST function. The operation of this function is a little odd, and doesn't fit in well with BASIC's syntax. For example,

```
CALL JOYST (1,X,Y)
```

will assign the x and y positions of joystick 1 to variables X and Y respectively. Surely

```
X = CALL JOYST (1,X)
Y = CALL JOYST (1,Y)
```

Would be more natural?

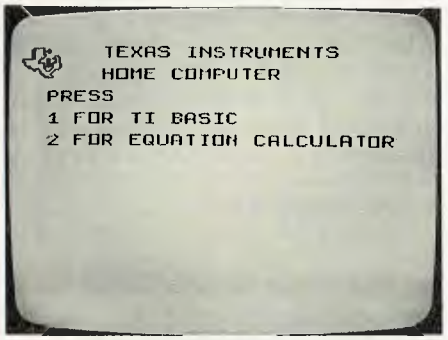
The video display is arranged as 24 rows, each of 32 characters. Since each character can be defined as an 8 × 8 matrix, this gives a graphics capability of

Specifications and Report Card

Unit:	TI-99/4
Made By:	Texas Instruments Incorporated
Processor:	9940
RAM:	16 Kbytes
ROM:	24 Kbytes
I/O:	Cassette interface, expansion port
Languages:	BASIC, Pascal, LOGO
Keyboard:	QWERTY, strange feel
Display:	32 × 24,
Graphics:	256 × 192
Peripherals:	Disk drives, printer, speech synthesizer
Expansion:	6 Extra RAM, ROM modules
Best Points:	Excellent documentation for beginnerf
Worst Points:	TI's go-it-alone approach

Ratings:	**excellent**	**good**	**well, maybe**	**poor**
Documentation	✓			
Ease of Use		✓		
Functionality		✓		
Support				✓
Value-for-money			✓	

Extras included:	NA
Options:	Solid-state software command modules
Price:	$999
Review unit from:	Chris McDowell



256 × 192. The graphics were sharp and clear on the unit I tried out, although the colours were not very brilliant, rather pastel in fact.

Add-ons

TI released a whole host of add-ons for the 99/4, including a speech synthesizer, printer, disk system and other peripherals. I haven't had an opportunity to try out the disk system as yet, but we will have an in-depth review by an experienced user in a future issue.

the Documents

The 99/4 is supplied with a 200+ page User's Reference Guide and a Beginner's BASIC Guide. Both are well written, the BASIC intro being written by Don Inman, Ramon Zamora and Bob Albrecht, three very experienced authors indeed. The Reference Guide is comprehensive and well laid out — by digging into it I was able to find the information I needed to get started into graphics very quickly.

The TI-99/4 is a mystifying machine, largely because of TI's marketing philosophy. As this seems to be changing, it is possible that we shall see the 99/4 become a major force in the home computer market.

If you've been involved with personal computers for more than a week, and nobody's mentioned Apples to you, then you must be living a very sheltered existence. The Apple is one of the most popular computers in the world, and has some very seductive features.

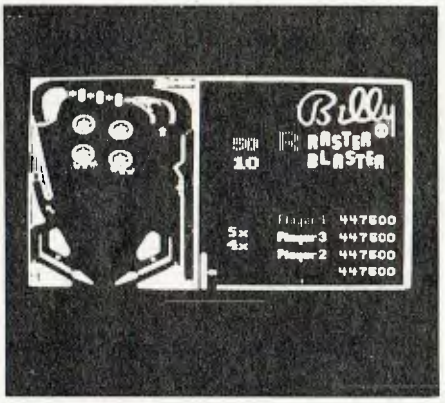
Polished Apple

THE APPLE has become something of a personal computing phenomenon. To many people, there is no other kind of personal computer.

There's not much point in describing the Apple — there's bound to be a photo of one somewhere in the magazine. Here's a few thoughts arising from my efforts in programming Matt (All of Adventuredom salutes him) Whelan's Apple for him — he hasn't time to program himself because he's still got to finish Zork!

The Apple display as standard is 40 × 24 which is fine, but it follows that format in listing to the printer, which to my eyes leads to almost illegible listings. With an optional 80-column card, this problem is overcome.

The low-resolution graphics allow a 40 wide by 48 down matrix of colours to be displayed, with a choice of 16 different colours. This is fine, except that these days, nobody uses it. Instead, they all opt for the high resolution (hi-res) mode which gives a width of 280 dots and a depth of 192 dots in a choice of six colours.



There is a limitation on the choice of colours for each dot: dots in even columns must be black, violet or blue, while dots in odd columns must be black, green or red. Furthermore, each byte must be either a violet/green byte or a blue/red byte, and never the twain shall meet; and two coloured dots side by side always appear white, even if they are in different bytes.

To make matter worse, on Eurapples, these rules apply, but the colours may be different. Despite all these limitations, I've never seen an Apple graphics display that seemed to suffer from them.

The Apple is the most expandable of the colour graphics 'home' computers reviewed in this issue. The range of peripherals is enormous: disk drives (including 8" and hard disks), printers, graphics tablet, plotters, a number of languages (PILOT, FORTRAN, Pascal), music synthesizers, video digitizers — you name it, it seems as though somebody somewhere is selling it!

The graphics tablet in particular is a very useful input device. We turned cartoonist Brendan Akhurst loose with the graphics tablet and he had more fun than a barrel-load of monkeys; the result was this month's cover.

As you can see, the Apple's high-resolution graphics can be impressive. It's BASIC supports graphics in a simple, but impressive, manner. The HPLOT command, with a single (X,Y pair) argument, plots a point, while in the form

HPLOT x1,y1 to x2,y2

it will draw a line between the coordinates specified. The line need not be vertical or horizontal.

Colour is changed with the HCOLOR statement. The hi-res mode is entered

Continued on page 82

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Les Bell

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If you've never used a computer before, and if you're unsure where to start, editor LES BELL can point you in the right direction in this new series.

How to Learn Basic in Only 500 Easy Lessons in the Comfort and Privacy of Your Own Home
or

Basic for Birdwatchers

WHEN YOU buy your first home computer, and take it home and unwrap it, plug everything together and switch on, the temptation is to load in the games that were supplied and spend some time trying them out. But once the novelty wears out, you're set to start developing that record cataloguing system or household accounting package — and that's when the horror starts.

How do you do it? Where do you start? That's what this series of articles is intended to teach, not just the rudiments of BASIC, although we'll cover that to start with, but how to program; how to design programs and how to build them.

We're going to start off with the very basics (if you'll pardon the pun) — with BASIC itself.

Not Just for Beginners

In the sixties when Kemeny and Kurz were developing a new computer language for teaching at Dartmouth College, neither of them realised it would become the most widely-used language in the world. The deviously acronymically named Beginners' All-purpose Symbolic Instruction Code has now left behind its humble origins, and become the world's most popular computer language.

But BASIC is no longer the simple language its originators conceived — it's grown teeth, sharp ones. Recent microcomputer BASICs — notably Microsoft (used in the TRS-80, System 80, Apple, PET and other computers) — have a wide range of extensions which make them as powerful as earlier 'big system' languages such as Algol or FORTRAN.

The big thing BASIC has going for it is that everybody has it on their system. Virtually every personal computer sold these days has BASIC built into the machine. Just plug it in, and you're programming straight away. When I first started working with microcomputers, BASIC was rumoured to soon be announced for the 8080, but many people maintained it was impossible to run it on a microprocessor!

What is Basic?

Two things really:

- it is a language you use to write programs for your microcomputer, and
- it is a program used to enable the microprocessor to make sense of your BASIC program.

Lets start with a quick look at the program itself first of all; then the features of the language make better sense.

The program which accepts your BASIC input and follows its instructions is called the BASIC interpreter. It examines your program line by line, and does what the program says. In fact, the BASIC interpreter doesn't need a program in order to be able to do something useful. For example (if you have access to a computer try this), type in PRINT "HELLO" and the screen should look something like this:

```
READY
PRINT "HELLO"
HELLO
READY
```

The computer executed your command as soon as you typed carriage return (this is called 'enter' on some machines.) This command mode, as it is called, is useful for quick calculations. But if you were to type a lone number at the beginning of the line, the computer wouldn't execute your command, but would instead store the line away as part of a program to be executed later. For example, type:

```
10  PRINT "HELLO"
20  END
```

The computer should have done nothing except accept your lines and store them. Now, type RUN, and the computer should type HELLO. Type RUN again, and the computer should type HELLO again. In fact, you can type RUN as many times as you like, and the computer will keep on typing HELLO.

Of course, this is a trivial example, but it does illustrate the difference between command mode and execute mode.

Background

The example above will work on just

AH...AT LAST!...I CAN LEARN TO USE A COMPUTER; JUST FOLLOW LES BELL'S LEAD...
Type in PRINT "HELLO"
...the screen should look something like this:
READY
PRINT "HELLO"
PARDON?
...the computer executed your command as soon as you typed RETURN...
...I SAID PRINT HELLO!
...of course, this is a trivial example...
DUMB BLEEP!
WHERE IS THE PLEASE"?
BLAM!
...the computer will patiently wait in case you want to type something else as well
1,2,3....
UP YOURS
...let's write a simple program.....
YAWN
...if you make a mistake while typing a program, don't worry about it...
SNAP!
HEY! DOAP! KARNT YOU SPEL?
...if you want...
[UH OH!] WAIT ON... ...LET'S BE FRIENDS...
...just hit return...
SWING
...that will get rid of it...
PANT PANT PANT

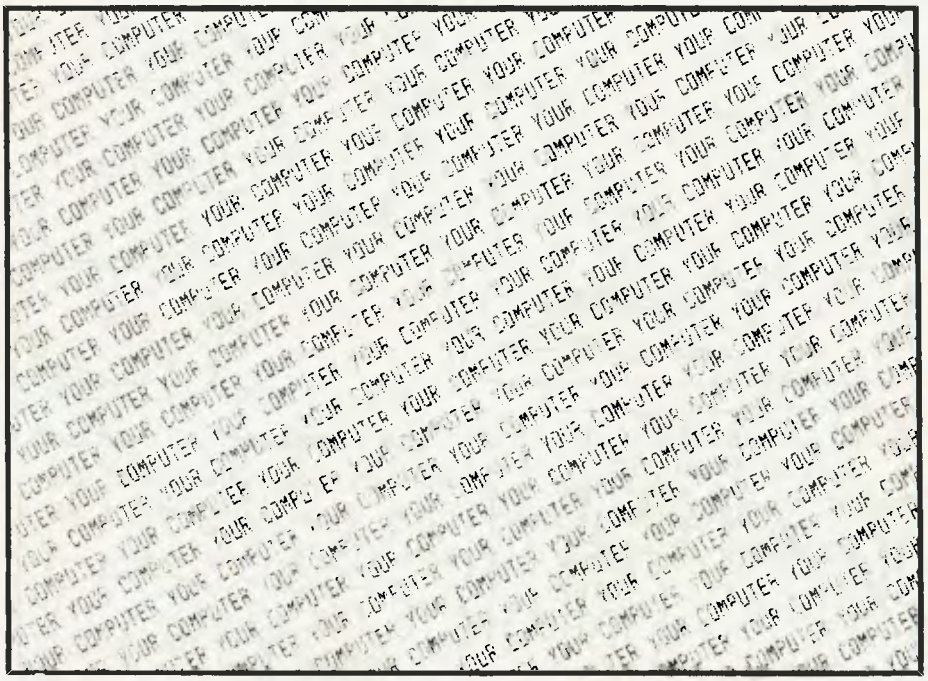

Fig 1

about any computer, particularly the TRS-80 and similar personal computers. But there are different versions of BASIC, and so programs written in one dialect of the language will need to be translated or re-written to run on a computer with a different version.

The most common dialect in the microcomputer world is Microsoft BASIC (also known as MBASIC). this is the BASIC used in the TRS-80, the PET and other popular personal computers. But there are others, and it's as well to know about them, in case you come across one which behaves in a strange manner.

For example CBASIC is a compiler, rather than an interpreter like MBASIC. This means that there is no command mode, and you can only write programs. You do this by typing your program into a text file stored on floppy disk. Then by typing CBAS2 YOURPRO you instruct the CBASIC compiler toread through your program and create an intermediate file, which is what the computer will actually use as its instructions when the program is run.

You then type CRUN2 YOURPROG and the CBASIC run-time package will load and execute the intermediate file. As you can see, it's rather more complex than using a BASIC interpreter.

There are also different BASIC interpreters. Another popular one, for example, is NorthStar's; it's similar to MBASIC, but has some differences in string handling which can sometimes throw the beginner.

There is a standard version called ANSI BASIC (American National Standards Institution), but it really only covers the basics, if you'll excuse the pun. Almost every personal computer BASIC exceeds the standard, and that is where the incompatibilities lie. For example, some BASICs have matrix arithmetic functions, and programs using these can be quite tricky to translate into a language that doesn't have them.

Some extensions can't really be said to be part of the language. A few computers have a TIME or TIME$ function, for example, which reads the computer's internal clock. If your computer doesn't have a clock and a similar function, you may find it difficult to translate a program to run on your computer.

But the biggest area of difficulty is the different types of graphics used by different computers. For example, the TRS-80 uses SET and RESET statements to light up individual points on the screen, while the Apple has HLIN and VLIN statements which enable it to draw a line in one go. Translating Apple graphics programs to run on the TRS-80 is very difficult indeed, even disregarding the incompatibilities in their hardware.

Because of these difficulties, you may find that some of the examples in this series will not run on your computer. However, wherever possible, where differences exist between different computers we will point them out.

Getting Down to It

If you've got a computer, a piece of paper and a pencil, that's all you'll need to work through the examples we'll be giving. You will find the journey enlightening and interesting.

Computers are really just like glorified adding machines. You type in some information, the computer crunches it around in various ways, and gives you back your answer, either through the printer or on the display. We'll generally use the display.

The keyboard on your computer is similar to an electric typewriter, but there are a few new keys.

At the right end, you should see a key (perhaps bigger than the others or coloured differently) marked CARRIAGE RETURN or RETURN or CR. On some computers it's called ENTER. This is the key you hit at the end of each line. It tells the computer that you've finished typing a line, and that you want it to take a look at what you've typed and do what you've asked. For example, when you want to run a program, it's no use just typing RUN, because the computer will patiently wait in case you want to type something else as well. You've got to hit the RETURN key to make it do something.

If you're typing in a program, then each line will start with a line number, and the computer will automatically put each line in memory, and keep the lines in numerical order. That's why we generally type in lines by tens: 10, 20, 30 and so on. This way, if we want to add a line between lines 10 and 20, we just number it 15, and it will go in the right place.

If you make a mistake while typing a program line, don't worry about it — just hit RETURN and retype the line (with its line number, of course).

The new version of the line will overwrite the old one. If you want to delete a line, just type its line number and hit RETURN. That will get rid of it.

Our first job is to get information in and out of the computer. After all, it's easy to write programs that don't do any input or output, but then you can't tell if they're doing anything! For example, type in this program

```
10 GOTO 10
```

and then type RUN followed by RETURN. What's your computer doing? Not much of anything useful, that's for sure. To stop it, look for the BREAK key and press it. If there's no break key, then find the 'control' key, and hold it down while you press the C key. That should stop it. Make sure you know the standard way to stop a program

while it's running — usually BREAK or control-C.

Now let's get on and do something useful.

To get rid of that useless program, type 'NEW' followed by RETURN. That tells the computer that you're about to start typing in a new program. On some computers, the command is SCR or SCRATCH, to get rid of the old program.

As we've seen, whenever you start a line with a number, the computer just stores that line away in sequences, ready for when you want to run a program..Lets write a simple program. Type this in:

```
New
10  PRINT  "YOUR COMPUTER";
20  GOTO 10
```

Don't forget the semicolon at the end of line 10 or the space before the end of the quote marks — it's very important. If you make a mistake, don't worry — just retype the entire line. Later we'll see how to fix errors without wearing our fingers out.

To take a look at your program, type LIST, and the computer will type it all out. It doesn't matter in which order you typed the lines in, the computer will always list them out in numerical order.

Before we analyse how it works, let's see what the program does. Type RUN.

And don't forget the all important carriage return.

Well, what did you get? It should look something like Fig. 1, allowing for the fact that your screen is probably of different dimensions from mine. If it's still going, then stop it by hitting BREAK or control-C keys.

How does it work? Look at line 10. It tells the computer to print everything after thw word PRINT. Then there's the words YOUR COMPUTER (and a space), but they're between quote marks.

These tell the computer that everything between the quotes is a literal string. The computer prints strings exactly as is; so it prints 'YOUR COMPUTER '.

The next mark is the semicolon. The semicolon tells the computer to hold its printing right there, so that the next thing it prints follows right on. If the semicolon wasn't there, the computer would move on to the next line before it started printing again. You might like to try the same program, but without the semicolon, just to prove it.

On to line 20. This is pretty simple; it just tells the computer to go to line 10. It must be very boring sometimes, being a computer.

By the way, you can stop and start a running program like this one quite easily. On my computer the control-S key will stop the review program, and the same key will restart it.

So far, we've learnt that the PRINT statement makes the computer print things, that text between quotes is a literal string, and that the semicolon in a PRINT statement makes the 'print head' hold still. And we've been introduced to the GOTO statement.

Here's a revision of what you've learnt so far.

Exercise 1.

1. Make the computer print your name all over the screen.
2. What will this program print?
   ```
   10 PRINT "HELLO WORLD! ";
   20 GOTO 20
   ```
3. What will this program do?
   ```
   10 PRINT HELLO WORLD! ;
   20 GOTO 30
   ```

The answers are at the end of the article. Let's press on with something a bit more useful.

Doing Arithmetic

You can make your computer work out sums for you and give you the answers. Let's see how this works. This time, instead of writing programs, we'll use command mode, at least at first. Remember, that means we don't type line numbers, so the computer does what we ask straight away.

Try this: PRINT 2+2

Obviously the answer is 4

Now try this one: PRINT 6.5 − 3.2. Your computer should display 3.3.

Incidentally, if you're getting fed up with typing 'PRINT' again and again, some computers will accept the abbreviation ? instead. Others, notably North Star Basic accept '!'. So: ?6.5 — 3.2 should give you the same answer.

Notice that there's no divide key on the keyboard? And the computer doesn't use × for multiply either. Instead, it uses the / (slash) symbol for division and the * (asterisk) symbol for multiplication.

Let's go forth and multiply. Try:

```
PRINT 4 * 5 + 6
```

Notice that the computer starts reading the line at the left and finishes at the right, same as you and me. First it multiplied 4 by 5, then it added the 6, giving 26. Now try PRINT 6 + 4 * 5

What's this? We got the same answer! Shouldn't it be 6 + 4, that gives 10, times 5 makes 50? Not this time! And this is the reason.

Sure, the computer reads from left to right, but sometimes the order in which it does things is dictated by the rules of arithmetic. For example, as it reads from left to right, it will hold off doing additions and subtractions until it's done any multiplications and divisions, unless there are brackets to force the issue. It doesn't matter which way round you write them, as we've just seen, multiplication and division have a higher priority than addition and subtraction, with brackets having the highest priority of all. Let's see how this works:

Calculation	Steps
6*5+4*7	6*5=30
	4*7=28
	28+30=58
6+5*4+7	5*4=20
	6+20=26
	26+7=33

Continued on page 36

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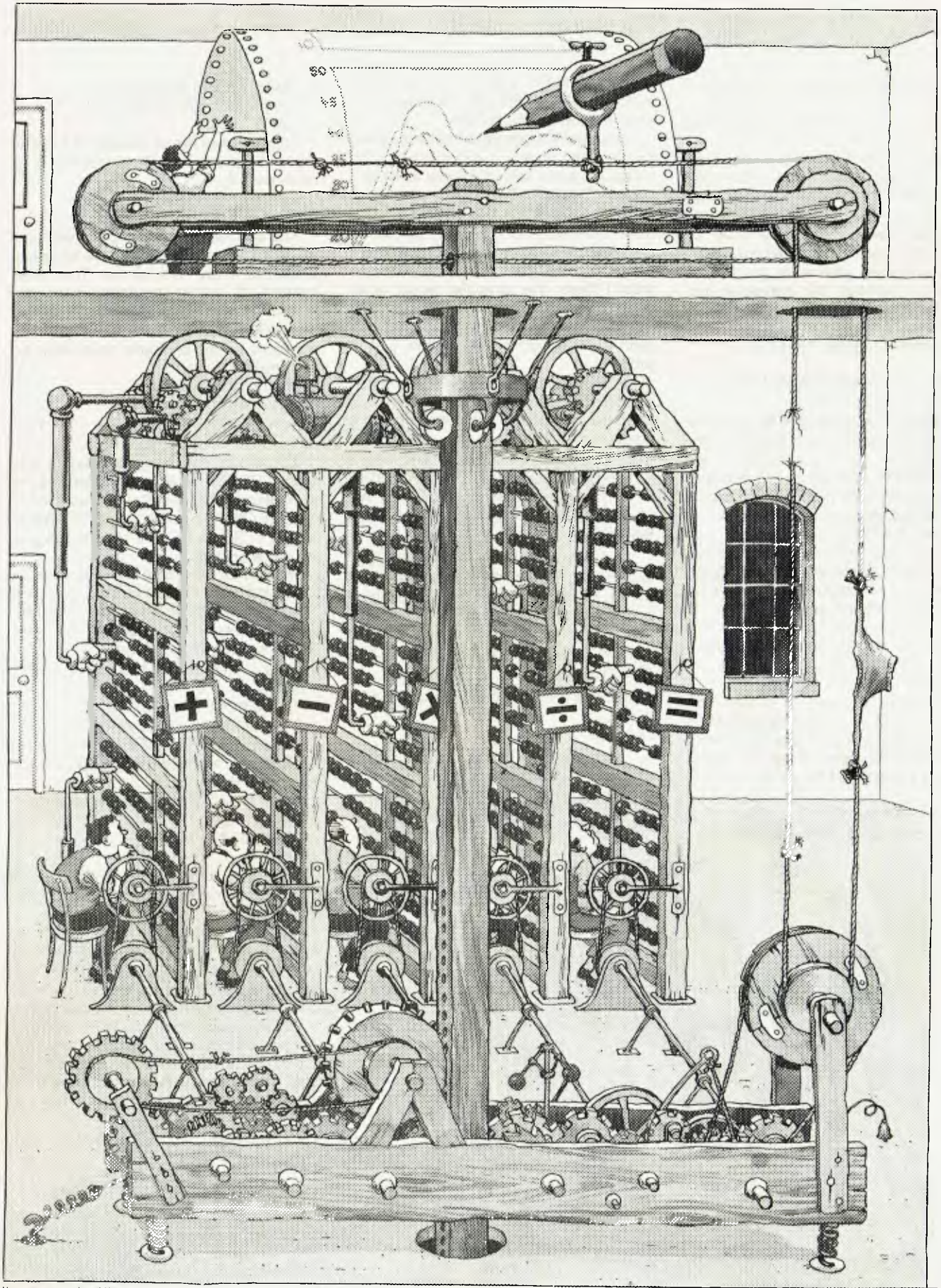

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Continued from page 33

```
(6+5)*(4+7)        6+5=11
                   4+7=11
                   11*11=121
```

See how, in the absence of brackets, multiplication takes precedence over addition. But with the brackets, the additions in the brackets are done first, and then the multiplication. This is called algebraic hierarchy.

I call it flaming awkward at first, but you'll soon get used to it. It's the way you would normally write down any algebraic formula on paper, which makes it easy to write great long formulae without any ambiguities.

The PRINT statement will work with numbers, as well as strings. The computer can add, subtract, multiply and divide, and it obeys a strict set of rules of priority between these operations. A quick test:

```
1. PRINT (13 - 7) ] 6
2. PRINT 24 + 3 * 4
3. PRINT 24 + ( * (4 - 2))
4. PRINT "15 + 7 * 3"
5. PRINT 18 / (3 + 6) * 4
```

Enough of this hard work. The answers are at the end of the article. But you shouldn't need them.

More Printing and Calculating

Let's set about incorporating what we've done so far into a program. We'll work out the circumference of a circle and its area, and print them, with appropriate labelling. We'll assume the radius of the circle is 5cm. Remember the formula for the circumference of a circle is

```
c = 2 * pi * r
```

and the formula for the area is

```
a = pi * r * r
```

so our program looks like this:

```
NEW
10  PRINT " THE CIRCUMFERENCE
    IS"; 2 * 3.14159 * 5
20  PRINT " THE AREA IS"; 3.14159 * 5
    * 5
30  END
```

Both the first two lines print the string first, followed by the answer to the calculation. Line 30 just marks the end; on most computers it's not needed, and you can leave it out if you prefer.

RUN the program and let's see what we get. On my machine, I got:

```
RUN
THE CIRCUMFERENCE IS 31.4159
THE AREA IS 78.5398
Ok
```

Instead of 'Ok', you may have a prompt of some sort, but otherwise, you should have a pretty similar sort of result. Let's try another example.

To convert Centigrade degrees into Fahrenheit, the formula is: F = 1.8 * C + 32

To convert 37 degrees C to Fahrenheit, our program is really very simple:

```
NEW
  10  PRINT "37 DEG. C = ";1.8 * 37 +
      32;"DEG.F"
37 DEG. C = 98.6 DEG. F
Ok
```

Notice how you can mix strings in before and after the answer to the calculation.

Variables

Do you get the impression, somehow, that we're still not using the full power of the computer? You're right, and the things we need to really get going are variables.

A variable is a location inside the computer's memory where it can store values away and recall them when needed.

Every variable has a name, and every time you use a new name, the computer sets away a bit of storage space for it.

There are some rules about what you can call variables. Generally, in the 'standard' BASIC, variable names are either a letter, or a letter followed by a single digit. So these would be okay to use:

```
A B C Z A1 A7 A9 Z6 Q2
```

while these would not:

```
12A 45 NUMBER FRED FRODO
```

There are several good reasons for this; firstly, to BASIC a number is just a number, unless it's at the beginning of a line, in which case it's a line number.

While the BASIC interpreter might not throw out long names like 'NUMBER', it would just disregard the '—UMBER' part, and confuse it with the variable N you've used elsewhere. Likewise 'FRED' and 'FRODO' would mean the same thing to many BASICs.

Of course, there are exceptions that prove the rule; for example, Microsoft BASIC actually recognises two letters at the beginning of a variable name, and just disregards the rest. Other BASICs use the whole name up to 32 or more characters in length. You might like to experiment and investigate what your BASIC will accept and recognise.

Let's rewrite our circle circumference and area calculator to use a variable:

```
NEW
10  R = 5
20  PRINT "THE CIRCUMFERENCE
    IS" 2 * 3.14159 * R
30  PRINT "THE AREA IS"; 3.14159 * R
    * R
40  END
```

Running this program should give the same result as before. But best of all, to redo the calculation for a circle of 10cm radius, you just retype line 10:

```
10  R = 10
RUN
THE CIRCUMFERENCE IS 62.8318
THE AREA IS 314.159
Ok
```

Now try changing line 10 for other values of R. Calculate the circumferences and areas of circles with radii of 2, 7, 4.638 or 20.0001. Each time you change line 10, the computer can recalculate the figures you want.

Another simple example. Let's print a table of squares.

```
NEW
10  N = 1
20  PRINT N;"SQUARED IS";N * N
30  N = N + 1
40  GOTO 20
```

Run the program and see what you get. Remember, BREAK or control-C will stop it.

By now, you should have a good idea of how the program works; the only line that's a little hair-raising is line 30. When we write 'N = N + 1', we don't actually mean that N is equal to N + 1 or that 9 = 10, or that 2 = 3 or whatever. What we are doing is reading the value stored in N, adding one to it, and then storing our answer back into N again. We are assigning N that new value, which is why '=' is often called the assignment operator.

When you use the assignment operator, bear in mind that you can only have one variable name on the left side of it. The computer can only store the answer to a calculation in one variable at a time.

Now we know about the assignment operator, and what a variable is, and how to name variables. Another short test.

Which of the following lines make sense:

```
1:  10 PRINT N + 20
2:  25 PRINT 20N
3:  20 N = N * 2
4:  20 * N
5:  D = B * B - 4 * A * C
6:  GOTO 20 + 5 * N
7:  A * B = D
```

Getting Some Input

There's still a lot more we can do to make that circle calculations program a lot easier to use. The next big step is the INPUT statement.

We already know how to output our results; that's the job of the PRINT statement. But INPUT makes everything so much easier. Here's version three of our circumference/area calculator:

```
NEW
10  INPUT R
```

```
20  PRINT "THE CIRCUMFERENCE
    IS"; 2 * 3.14159 * R
    30  PRINT "THE AREA IS ";
        3.14159 * R * R
40  END
```

Try it out. The first thing the computer prints is a question mark.

Now you type in the value of R (say, 5) and hit RETURN.

```
? 5
THE CIRCUMFERENCE IS 31.4159
THE AREA IS 78.5398
```

Now, every time you type RUN, the program will ask you for your input. Or is it the computer that's asking for it? Let's do the same improvement on our Centigrade to Fahrenheit converter.

```
NEW
10  INPUT C
20  PRINT C;"DEG. C =; 1.8 * C +
    32;"DEG. F"
30  END
```

Now try running this program a few times. It should follow the same pattern of stopping to ask you for input, waiting until yu hit RETURN, and then printing your answer.

Deluxe INPUT

Leave the C to F converter program in memory, but retype line 10:

```
10  INPUT "WHAT TEMPERATURE
(C)";C
```

Now run the program again. This time, it will ask you for what it wants!

Answers to Exercises

Exercise 1

1. 10 PRINT "your name":
   20 GOTO 10
   I guess we're also forced to accept the command line
   PRINT "your name all over the screen"
2. It prints HELLO WORLD! and then hangs up.
3. The computer prints:
   0
   Undefined line number in 20
   Ok
   (or a similar message), because it thinks 'HELLO WORLD!' in line 10 is the name of a variable, and the target of the goto in line 30 doesn't exist.

Exercise 2

1. 36
2. 26
3. 30
4. 15 + 7 * 3
5. 30
6. 8

Exercise 3

1, 3 and 5 make sense. 2 is wrong because it contains an implied multiplication, which won't work on most machines except some Hewlett-Packard desk-top computers and the Sharp pocket computer. 4 is just meaningless, as it doesn't tell the computer to do anything. In 6, most computers cannot goto the result of a computation (except the Sinclair ZX80 and a few others). In 7, there should only be one variable to the left of the equals sign. Note that although some machines can make sense of some of these, I still call them wrong, as they are not transportable code, and thus not good programming practice. □

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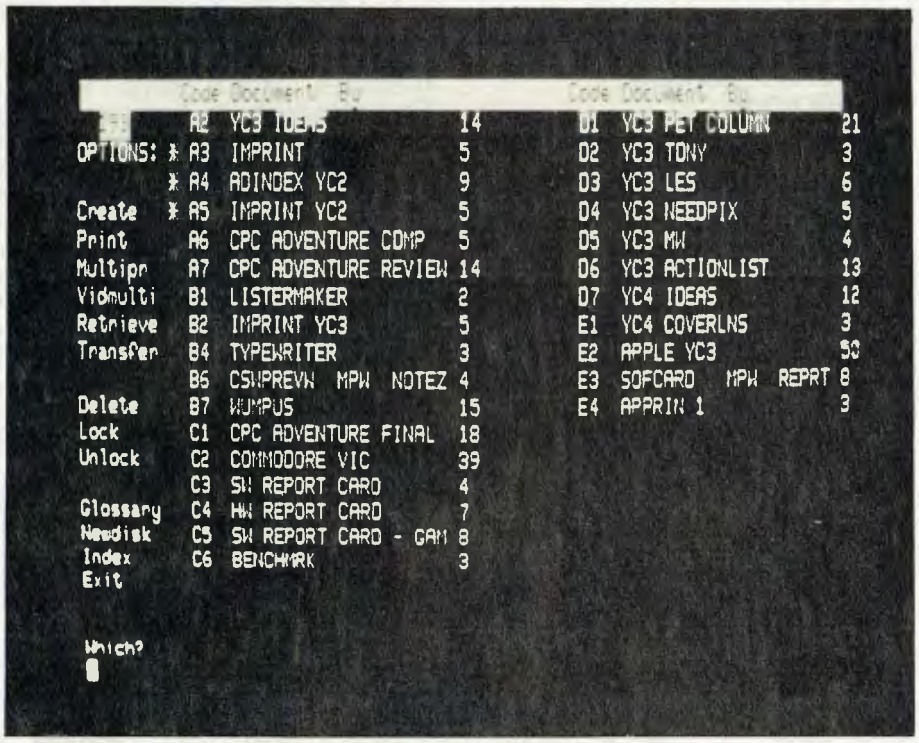
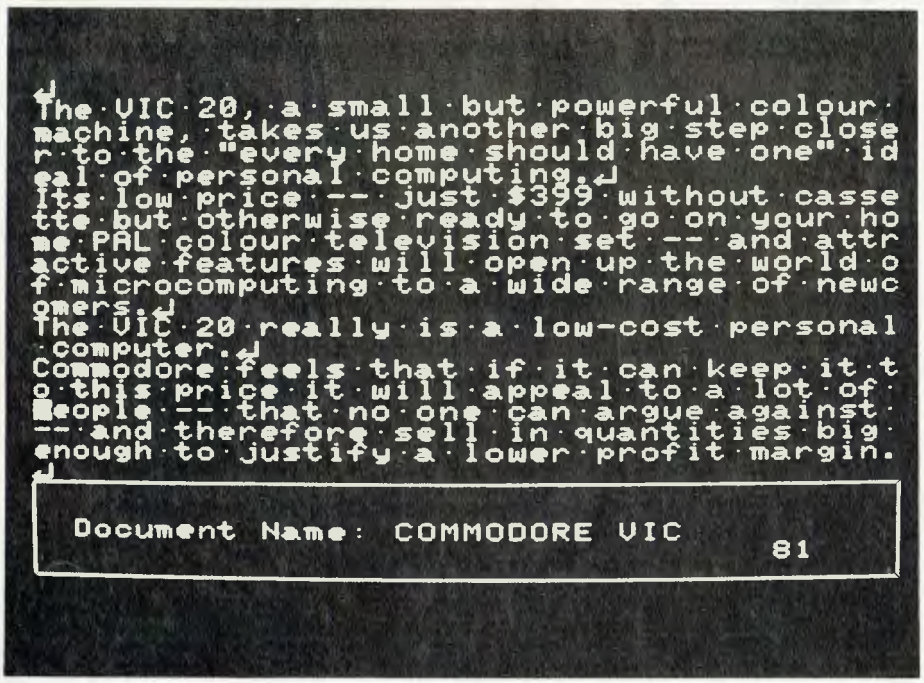
SOFTWARE REVIEW

Australian companies are producing some top-class software, especially in the business and education fields. Brisbane's Computer Solutions is another to prove the point with its CS Word Processor for the Apple. . . MATT WHELAN reports on:

WORD POWER





I WOULD dearly love to know enough about programming to write a comprehensive word processing package — it would leave everything else on the market for dead with its ease of use, wide range of features and incredibly powerful editing capabilities.

It would be brilliant, I assure you — and I can probably be just as confident that it wouldn't sell.

Even if there was some memory left for editing space after runing such a heavily over-written program, there would only be a handful of people who really wanted to use it.

That's the problem people like Computer Solutions — or Sandy Donald, the five programmers who wrote WordStar, or the creators of any word processing package for that matter — face, and why software in this class will never be perfect: you simply cannot hope to satisfy every different user's personal preferences and individual work needs with a single package.

A writer working on a reference book will want different features to a novelist, they'll both be unhappy with a program set up specifically to suit a journalist, while an office environment will create different word processing demands yet again.

That's why the CS package, known also as WordMaster, is both better and worse than its rivals. This Australian-designed word processor has several outstanding features and some significant faults, but overall it is a competent, professional package.

I didn't really like it at first; it didn't suit my style of writing. But the closer I looked at it the more I appreciated its value.

Its biggest single advantage over most word processors on the market is its menu-driven simplicity and elegance. It is extremely easy to use, from the start, even if you know relatively little about computers or word processing.

Clearly you couldn't take full advantage of its capabilities without working with it and the comprehensive (if a little hard to find your way around in) manual for a while, but you can at least get straight into it and start learning.

It doesn't have the power of a WordStar, nor does it have the complications.

The make-it-easy-to-use approach is obvious from the start — it's the only Apple word processing package that doesn't need a lower case chip (although it does require a minor keyboard modification to obtain a shift key). Instead it loads a hi-res character set when the disk is booted, and uses this.

There are two interesting results. The first is an attractive lower case which also uses fine dots to mark inserted spaces (sounds strange, but it is quite useful and effective); the second is a loss of memory.

The hi-res character set costs the user

around 8 Kbytes of document space, although that is returned to you if you use an 80-column card (they have their own lower case). We can't see how anyone can stand using a word processor program *without* an 80-column display anyway...

Nevertheless even the standard set-up (which must run on a 48K machine with a disk drive) offers 14 Kbytes document size; that goes up to 22 Kbytes with the 80-column card, and a whopping 30.5 Kbytes if you have the RAMcard or Language System as well.

The fact that it is able to take advantage of this extra RAM space is a significant plus.

So is the 'user-friendly' menu-driven operation, although it is limiting in some ways. When you boot the word processor, it catalogues the disk's text files and labels each with a single letter-and-digit code. From there on any operation from the menu listed in the left margin requires entry of only the first letter of the command and the code letter of the document.

Main menu commands include creating, retrieving and printing documents; transferring files to another disk; and deleting, locking and unlocking files.

Unusual operations include the Glossary command, which allows you to load into memory a pre-prepared glossary of up to 26 words, phrases or paragraphs: the Newdisk, which allows formatting of a fresh diskette; and Index, which lists the catalogue (again, only the text files as shown on the screen) to your printer.

If you're creating a new file, it even comes up and asks you for a file name, the author's intitials and any reminders. It tabulates these neatly in three columns, and shows you your document name continuously in a box under the text window.

From that stage you're up and operating in edit mode, but can return to an inner menu at any time by hitting the escape key. This menu gives you a choice of functions such as saving, renaming, videoprinting, printing or draft printing (in the case of form letters and so on) the document in memory, or returning to the main menu.

Returning to the main menu supposedly loses the document in memory, although in practice hitting the reset key usually finds it again.

The menu operations introduce their own limitations, however. Most significant is the use of the escape key to get from edit mode to the inner menu — it effectively prohibits inserting an embedded escape character in the text.

Some printers, such as the popular Epson MX-80, use escape as a control code in switching between typefaces, or providing other functions such as variable line spacing.

I found this one particularly annoying, as we normally print our copy double-spaced to allow room for sub-editing marks — it isn't provided for in the embedded dot-commands, and you can't insert a printer command for the Epson, so it's single-spacing only.

Also unfortunate is the fact that there isn't a print menu, so each document must be formatted separately using the dot commands and embedded controls. This is reasonably common in word processors, however, and at least with this one you can include common print command groupings in your glossary and call it in with a simple two keystrokes.

Other shortcomings include the lack of provision for merging files in memory, the lack of block move and block delete functions (they're on the way) and the inability to make use of a second disk drive.

It atones for these with quite powerful mail-merge abilities which allow the construction of detailed personalised 'cut-and-paste' form letters, contracts and so on plus a labelling facility.

Unlike some of the more powerful word processors — notably WordStar — these features aren't extra-cost options, which makes the $295 retail price tag seem quite reasonable. It is also one of the few 'down-market' packages which will drive a precision printer, in this case the NEC Spinwriter only (it does have problems pushing a Diablo along properly).

Overall, the CS Word Processor is a good package. It would seem to suit an office environment better than many of its competitors, while it must give ground to some of them on power and practicality for the author or journalist.

It does well what it sets out to do... □

Software Report Card

Program:	CS Word Processor (Wordmaster)
Made By:	Computer Solutions, Brisbane
Useful For:	Word processing, mailings
Hardware Reqd:	Apple II 48K disk drive

Ratings:	**excellent**	**good**	**well, maybe**	**poor**
Documentation		✓		
Ease of Use		✓		
Speed		✓		
Functionality		✓		
Support	✓			
Value-for-money		✓		

Extras included:	Software lower-case, mailer
Options:	N/A
Price:	$295
Review copy from:	Computer Solutions

The Datestones and Starquest... The Adventures Continue

your computer SOFTWARE REVIEW

As our office Aristotle likes to say, there are two things that are inevitable in the office serial. The first is that publisher Whelan will eventually free the heroine (read secretary) from the rails, before the 9.37 train rounds the curve. The second is that Flash Gordon devotee CHRIS CAROLAN will dash through the door at 6.02 sharp each evening, ready to stave off the aliens in his latest adventure-type game. Put simply, he's been hooked since he tested/played Adventure for his review in our August issue.

For this issue, Chris has tested another three games; they involve everything from searching a dungeon, through catching a wizard in a dungeon, to a real sci-fi save the hostages job, complete with a High Tollah. . .

LAST ISSUE we looked at several adventure games where you could take your time to solve the mysteries presented to you: This time we look at games of a similar type, but games where you are playing in 'real – time'.

This means, simply, time passes even if you sit and make no move — the opposition will come and get you if you wait long enough!

To introduce the idea we decided to review a three-pack from Automated Simulations, containing two games from it's Dunjonquest series — The Datestones of Ryn and Morloc's Tower — and one from the Starquest series, Rescue at Rigel.

The principles are the same for each game, and each one is more complex than the previous one. The series is available for Apple, TRS-80 and Pet, although the disk/tape/memory requirements vary from game to game.

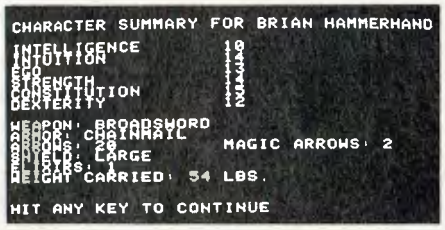
It is also worth noting that the quality of the graphics vary widely, depending on the hardware.

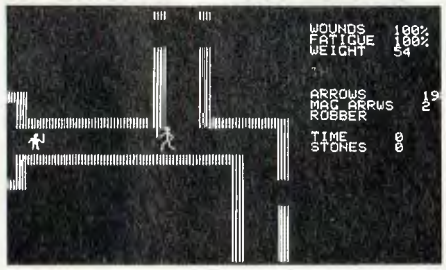
Anyway, here are the games we tried. .

The Datestones of Ryn

While this is the simplest of the three games, it serves the purpose of introducing the newcomer in this area to the various things to expect as you work your way through the other games in the series.

The display is divided into two sections. The left two-thirds of the screen is a graphic map of the room in which you are standing, your position within the room, and that of anything else in the room with you. The right-hand third contains details of your 'physical' condition, and any other relevant details of the status of the game at that point in time.





Both displays are updated approximately every second, so as you become tired or wounded or move around, you can remain aware of possible problems by keeping an eye on this display.

The object of the game is to search the dungeons and remove as many Datestones as possible within 20 minutes, without being killed. The obstacles likely (no, bound) to slow you down or stop you completely are the robbers who stole the stones in the first place and are now avidly guarding their ill-gotten gains, and the various monsters which lurk around the place, waiting for some mis-guided fool to come wandering into their lair.

Of course, it is possible to overcome these nasties, but you have to be careful that they don't overcome you first!

You only score points for removing the stones from within the complex, not just for locating them. There are a few traps and hidden doors to find before you really have this game conquered.

You direct all your activities with single letter commands, which are echoed on the right-hand display. It takes a bit of getting used to the timing of moves, as the command you enter is not displayed or acted upon until the display is next updated. So at first it is very easy to want to do too many things too quickly, making the game tricky to follow, especially when you are attempting to dispose of an assailant.

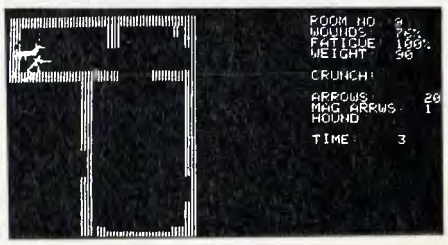
There are three levels of play available: Start with level one, until you get the hang of it. Take it easy at first, and you shouldn't have any real problems.

Morloc's Tower

The next step along is to Morloc's Tower, where the object changes slightly. Treasures are to be found, and they do have uses, but do not have any points value. The only objective is to find and kill Morloc, — the wizard who lives in this six-storey tower.

There are 12 treasures to be found, some have magical powers, others have no use at all. Finding out the use of each treasure is part of the game, and will make your quest not only easier, but even possible!

Of course there have to be obstacles to slow your progress. . .The guardians of the tower can be founding skulking



around the place — the magic suits of armour, wolfhounds, vampire bats, ogres and the like ready to render your trip a waste of time, and your life a little shorter.

As in "Datestones', the display is split into sections; the left-hand part showing where you are within each room and the

right-hand part showing time, physical condition, and so on.

Apart from killling Morloc, the only other way of increasing your score in this game is by remaining alive for as long as possible. Again, there is the choice of three skill levels.

To help you stay alive a little longer than might otherwise be possible, there is a certain amount of magic healing potion, which you can use to make yourself better. But the amount available decreases when you get to the higher levels of play. Then it's just a case of staying out of trouble, as much as possible.

Rescue at Rigel

The third game of the three-pack takes us out of the realm of magic and into the world of science fiction. You are cast into the top room of a six-storey 'building', beneath the surface of a wandering asteroid.

Somewhere within the complex are ten human captives of the Tollah. It is your task to locate them and beam them up to the waiting mother-ship (Star-Trek style).

You are equiped with a few wonders of

modern science to assist your quest — a blaster, a powergun, a force shield, an AMBLE system (it does have a meaning, but suffice to say that it allows you two moves for the enemy's one) and a power-pack, to make these goodies work.

As for the enemy, there are varying genetic deformities lurking about the place, awaiting the opportunity to frustrate your noble efforts.

Among these creatures are Common Tollah, High Tollah (no there isn't a Higher Tollah), Plasmoids, Cerbanths, Sentry Robots and Thornets. I won't bore you with intimate descriptions of each of these. I'll just warn you that it is better to get them before they get you!

If you are feeling in a kind mood, it is possible to 'negotiate' with them, which may result in you being able to pass by as a 'friend'. But be patient if you try it, and if you do get past, don't under any circumsances attack 'under the white flag'. the creatures are mean and nasty when you try to out-smart them.

Of course the other option is to run away . . . not a bad policy some of the time.

As well as all these aliens to contend with, there are other problems which may slow you down. You can get tired, or wounded, or maybe even run out of power in your power-pack (even in hi-tech sci-fi they don't last for ever). If you do get tired, resting for a while, or moving slowly, will restore your fatique level.

If you are wounded there is a medikit, which will assist the healing of (some of your wounds. . . Again it can only be used a certain number of times. However, if your battery runs out, you really are in big strife. Only the blaster works without power, and there is only one last chance for you to get back to safety (it's a fairly slim chance too). No, I'm not going to tell you how!

Like the previous games, all the details of time, fatique, wounds, power left, and so on are continually displayed and updated on half of the screen, along with the map of the room you are in. As you move through the doors between rooms, the next room is displayed, with all that it has in store for you.

There are a few doors which are not obvious. . . And to confuse you even more, some doors take you onto a different level without you even noticing it!!

The ultimate aim is to rescue all ten prisoners within an hour. Again there are three levels of play to test your skill.

Time Out. . .

Probably the most tricky aspect of each of these games is getting used to the idea of time passing, and not trying to do too much, especially when there is an opponent approaching fast.

Certainly these games are different to both the adventure-type games (where you have plenty of time to make up your mind) and to the space-invaders type where you don't have any time at all! In fact, they are quite an interesting compromise between the two.

Typically, we haven't devoted as much time as we should have to learning the intricacies of each game. It's fairly certain those of you who try these games will find points we have missed. Feel free to pass on any comments you have about any of the games we review, or suggest others you think might be of interest. □

Games Software Report Card

Program:	Three-Pack — Datestones of Ryn, Morloc's Tower, Rescue at Rigel
Made By:	Automated Simulations, California
Available for:	Apple, TRS-80, System 80, PET
Reviewed by:	Chris Carolan

Ratings:	**excellent**	**good**	**okay**	**well, maybe**
Ease of Use		✓		
Speed			✓	
Entertainment value		✓		
Educational value				✓
Documentation	✓			
Value-for-money		✓		
Suitable for (ages)	Most			
Price:	$59.95			

GLOBAL SOFTWARE NETWORK

SORCERER SOFTWARE

UTILITIES:

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Resolution of 128 x 90. Fantastic demonstration includes screen motion, X-Y-Z plotting, bar charts, circles and stars. Figures can occupy the entire screen if desired. $25.95

GRAPHICS 2
Resolution of 512 x 240 using X and co-ordinates. It is parsimonious. May be accessed from other BASIC's besides Exidy's Rom-Pac Basic. A dedicated interface is provided for the convenience of Rom-Pac users. Includes superb demonstration. $25.95
Both Graphics 1 and 2 include point and line drawing features in machine code.

SUPER DISASSEMBLER
This is a very fast two pass disassembler written in machine code. It produces a Z-80 assembly language source file with labels that is directly compatable with the Sorcerer Development Pac.
The disassembler has a Displacement function which allows any program residing anywhere in memory to be decoded, whether it is at its normal address or has been moved to be decoded.
The output can be sent to video, printer or cassette. The cassette file can be read into the Editor or Assembler of the Development Pac.
Several versions on tape at different memory locations. (N.B. Development Pac not necessary). $21.95

EZYFILE
A general purpose database system for handling alphanumeric data. Written in Z-80 machine language and useful for catalogueing/filing data, mailing lists, music libraries, club membership etc. etc. Files may be stored on disk under the CP/M 1.4 or later operating sytems. Commands available: Create, Load, Merse, Save, Add, Delete, Edit, Sort, List, Report, Total, Printer, Tabset and more.
Cassette $35.95. Vista, FDS etc. floppies $39.95.

4 VOICE MUSIC SYSTEM

The software enables you to easily write music as it displays both the treble and bass staffs on which one moves the cursor up and down to place the desired notes for each four-part chord. Features include: • hearing • hearing a note before it is selected • transposing • copying refrains o tempo control • full editing to insert and delete notes in the music file • key signature selection • graphical notes and musical symbols. Includes three music files, hardware which connects to your stereo and thorough documentation. The music generation machine code easily interfaces with your programs. $54.95
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SPELLGUARD

—your prayers answered

IT'S EASY to make spelling mistakes — I do it all the time. As a writer, when I'm churning out copy in the heat of the moment, finger-a-blur (I'm a fast one-finger typist), it's easy for me to hit the wring key (see what I mean). Sometimes, too, you can just not know you're mis-spelling a word, and never realise that it's wrong. And mis-spelling is a bit like BO; sometimes even your best friend won't tell you you have a problem.

Computers, though, aren't bothered by social niceties like the rest of us. If you make a mistake they tell you in no uncertain manner, with much beeping and blinking of cursors, no matter whether your feelings might be hurt.

The latest way in which computers are keeping us straight is by checking our spelling. Several programs are now available on the market to perform automated proofreading, and we have chosen to review what seems to be the most popular: Spellguard, by Innovative Software Applications.

Spellguard is designed to run under CP/M with most of the common word processors on the market today. It seems to know about the special characters which these word processors insert into files; for example, WordStar sets the most significant bit of the last letter of every word, in order to calculate proportional spacing, and Spellguard just ignores this.

There are several parts to Spellguard. First, there's the program itself, SP.COM, which actually does the spelling checking. Then there's the dictionary, SP.DIC, which contains 20,000 words as supplied, though as we'll see later, this can be added to (or subtracted from).

SP/ISA is an overlay file which contains both some code and also a number of Spellguard's screen messages and prompts. Finally there is MAINTAIN.COM, a program which can be used to check the integrity of the Spellguard files and update them simply.

Using It

Spellguard is simplicity itself to use, and requires no technical knowledge whatsoever — in fact, that's one of the beauties of the whole system. To run Spellguard you type in SP, and the program will start. The initial menu offers a selection of things to do.

At this stage, you can proof spelling in a text file, alter the default tables, reorganize and examine dictionary(s), change the prompt level from expert to beginner, ask for help, in the form of user instructions, or exit back to CP/M.

If you enter P (or 1) for proofing a file, Spellguard will look for the dictionary file on the currently active drive, then ask for the name of the text file to be proofed. You have the option now of naming the file, or of replying with just a drive name, in which case Spellguard will give a directory listing of files on that drive.

After you've named the file to be proofed, Spellguard will then display a table across the bottom of the screen, showing the number of words read, the number of unique words, the number of words that do not match with the dictionary, and so on. It then starts to read the text file.

As it reads, Spellguard ignores the second and subsequent occurrences of words, so that the word 'the' for example, is only entered into its table of words for checking once. Should you have typed

'tha' at some stage, however, that's different, and is a unique word, which will be entered into the list for comparison.

After it has compiled a list of all the unique words in the file, Spellguard then starts reading in the dictionary for comparison with the unique words. As it goes, it will periodically update the display to show the number of mismatches, the percentage of mismatches, and the percentage of proofing done.

Spellguard is fast. On my system, with a 2MHz 8080 CPU and Discus 2D disk system running double density with 1024 byte sectors, it proofread a 4,500 word file in 67 seconds. Of course, once the proofreading is done, the job is not yet finished. Just because Spellguard can't match a word with an entry in its dictionary doesn't mean the spelling is incorrect. It just means that Spellguard doesn't know it.

Which is why Spellguard will now enter Word Review mode. In this mode, each of the words that Spellguard picked up is presented to the operator for a decision. Again, a menu offers the operator a choice. Generally he/she will want to do one of three things: either add the word to the dictionary (it's correct but not presently in the dictionary), mark an incorrect word in the text file, or ignore the word.

Other options are available: the operator can return to the previous word for re-viewing (a very useful feature indeed), ask for help, or enter a special word review mode.

Special word review gives some other, less generally useful options. For example, you can add all the remaining mismatched words to the dictionary, or mark them all, or ignore them all. Finally, the operator can ask for help, return to regular word review, or exit, abandoning all word review and returning to the main menu.

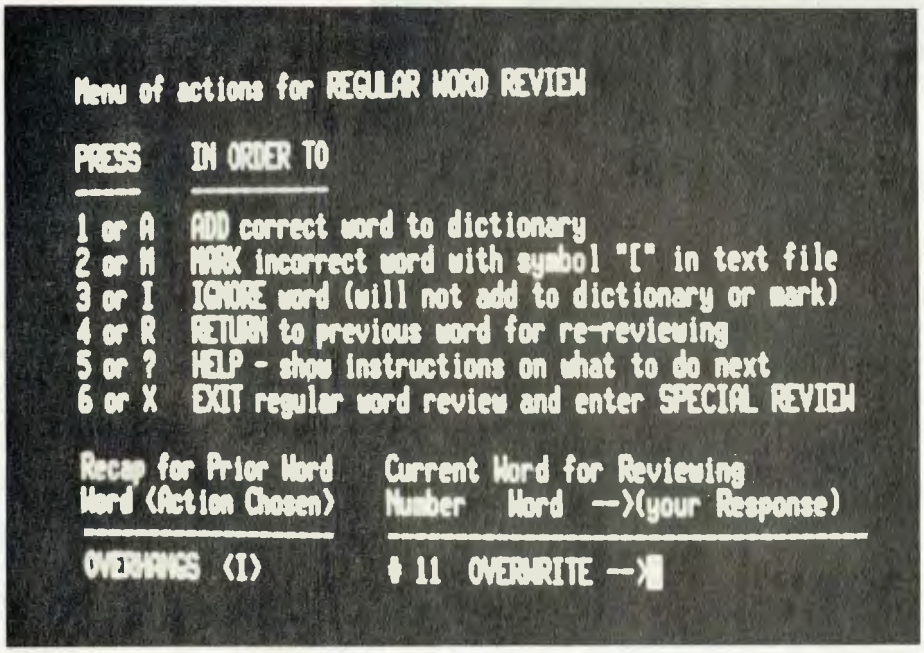
Spellguard does some pretty smart things when scanning the input text. For example, it understands the plural of words when they are constructed by simply tacking on an 's' at the end. It seems to understand the possessive case, and generally copes with punctuation without any problems.

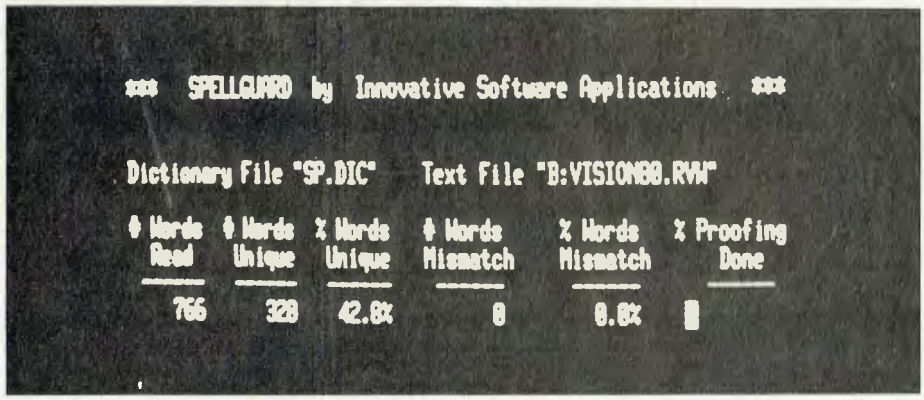
Hyphens at the ends of lines don't bother it either. Occasionally during word review, it will present a hyphenated phrase and ask you to consider it as if it appeared all on one line.

One natural consequence of the program's US origin is the fact that it will accept American spellings but not 'proper' English ones. For example, the program accepted 'harbor' but not 'harbour'.

After word review is completed, the program then goes on to update the various files involved. The dictionary will be updated by the addition of any correctly spelt words which have been flagged for addition, while the mis-spelt words will be marked in the text by changing the last letter of each word set to a square bracket. Words appear on the screen as they are marked. It is possible to interrupt the marking process should you suddenly realise you've made a boo-boo. You then use the word processor's global search function to find the marked words.

Normally, Spellguard marks a copy of the original document, and the original is preserved as docname.BAK, but it is possible for the program to operate on the original only if required — if there's a shortage of disk space, for example.





Behind The Scenes

Using Spellguard in this way is as easy as apple pie — you can give it to a completely non-technical user to operate with complete confidence. In particular, a secretary who is conversant with a word processor program such as WordStar will have no difficutly in using Spellguard, as it prompts the user at each stage of its operation with a menu of choices.

But it is possible to do a lot more with the program than is apparent from this first level of operation. Spellguard gets a lot of the information it needs to run from a table of default values which can be changed by the user. In fact, there are three Default-Tables which can be examined and modified by the user. Generally, Default-Table number 1, the Standard Table, is active, but another, called NO FILES can be activated, or the third table, called TEST.

The Default-Table contains information such as the name of the dictionary which is to be used in proofreading, the name of the document to be proofed, the character which will be used to mark the mis-spelt words, whether or not to back up the original file, whether or not to show words on the console as they are being marked in the text file. A selection on the main menu allows the user to examine and change the values in the Default-Tables, and again, the system provides menus with a high degree of help and prompting.

Dictionaries are obviously updated while proofreading by nominating words to be added, but it is also possible to operate on dictionaries directly, by combining them or subtracting one dictionary from another. This means that the user can keep several dictionaries for different types of work, say for business correspondence as opposed to technical manuals.

Dictionaries can be listed, and Spell-

guard also includes a special routine for making backup copies of dictionaries. The dictionary is maintained in alphabetical order for fast proofreading, and occasionally Spellguard will reorganise the dictionary in order to increase its speed. It is possible to force the reorganisation of the dictionary from the menu, but most reorganisation will be automatic.

Maintenance

Maintenance is really French for handholding, and the author of Spellguard (believed to be at Stanford University, though I'm not certain) has made a leap forward in providing service to the software user. The MAINTAIN.COM Program supplied as part of the Package has several functions.

Firstly, MAINTAIN can check the Spellguard program files to make sure that they are correct. I presume that it does this by a checksum system of some sophistication, because not only does it verify that a program is okay, it also says what updates have been added to the program and in what order!

MAINTAIN also allows the user to update the software by entering code from Software Revision Sheets provided by Innovative Software Applications. The program guides the user through the entry of the code, and again, uses checksumming procedures to ensure the entered code is correct before actually performing the update. The system must be well-nigh foolproof.

The documentation supplied with the program is superb. It is well-written, clear and well-organised, and has been designed with the non-technical user in mind.

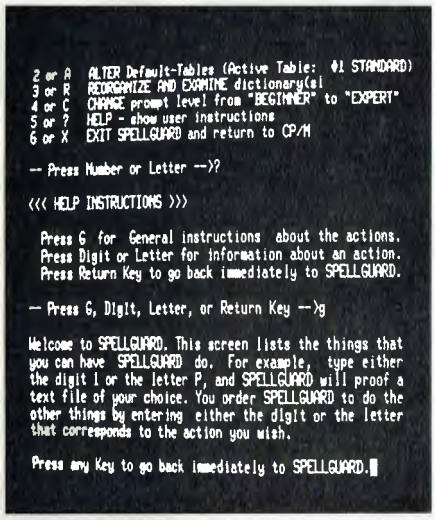
Summing Up

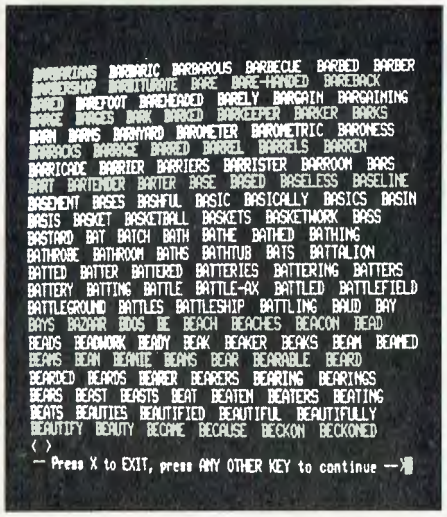
Spellguard is one of the best-conceived and executed packages I have seen on a microcomputer. It works as well as is claimed, if not better, and is a delight to use. The designer has foreseen many of the problems which the small-system user can encounter, and has taken steps to eliminate them.

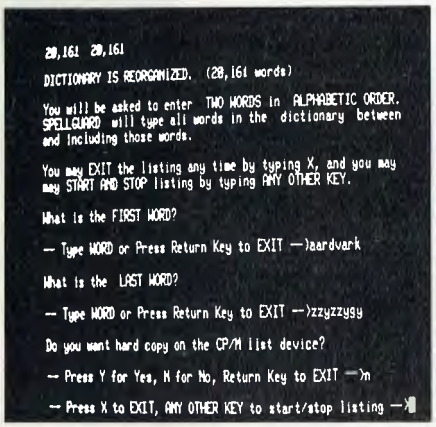
The speed of the system is quite amazing. It is sufficiently fast that using it is no inconvenience or delay at all, and so it does not get forgotten about. It becomes a matter of habit to Spellguard all documents on your system.

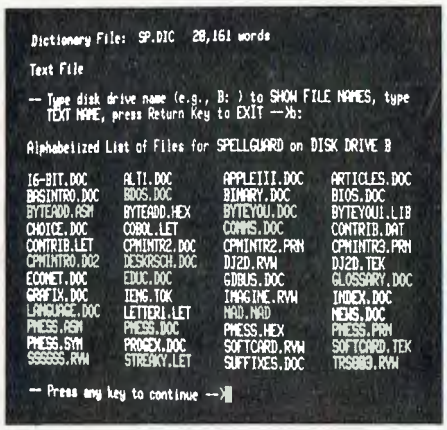
As a matter of interest, when I received the program I re-proofed several documents which I had previously checked myself, and — horror of horrors — found several errors in each file! From that moment on, I was sold on Spellguard.

Our thanks go to S.I. Microcomputers, agent for ISA, who supplied us with a review sample. for further information, you can contact S.I. on (02) 231 4091.









Software Report Card

Program:	Spellguard
Made By:	Innovative Software Applications
Useful For:	Writers, secretaries — any proofreading
Hardware Reqd:	8080/Z80 CPU, CP/M

Ratings:	**excellent**	**good**	**well, maybe**	**poor**
Documentation	✓			
Ease of Use		✓		
Speed	✓			
Functionality		✓		
Support	✓			
Value-for-money		✓		

Extras included:	NA
Options:	NA
Price:	$295

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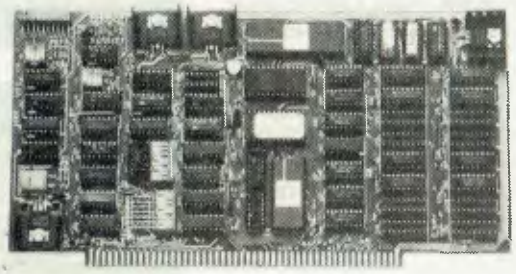

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OTHER OFFICE IDIOSYNCRACIES

by GREGG BORSCHMANN

IT WAS with some trepidation on a fine Sydney morning that I became an instant expert on computers.

I arrived late at the office, as usual, trying desperately to make my entry inconspicuous. No use. The features editor had spotted me.

Ordered to grab my notebook and the waiting photographer, I was soon heading for the suburb of Wyde, to the headquarters of the electronics and gadget retailer Tossel Jones.

Apparently Mr Jones' marketing manager, Dreg Stonjohn, had phoned the boss that morning babbling on about an amazing new home computer.

No Future Shock or Star Wars fantasy here. No vague talk about what the revolution might look like. We were being offered the genuine item. Mr Stonjohn had one in stock (in fact, he probably had hundreds) and would organise a demonstration.

He probably confidently told the boss this 'thing' was about to revolutionise the domestic environment. You know, be an honest household accountant, help with the shopping and maybe even calculate how much energy is needed per square foot of green plastic bag to put the garbage out.

Computers? What did I know about computers, I thought on the trip to Wyde. How would I bluff my way through this tricky assignment as an informed, articulate member of the establishment press? I needn't have worried.

Ignorance is not necessarily a problem, especially when you don't advertise.

A background briefing session was, of course, most necessary for this reporter.

What Mr Stonjohn was about to show us was a machine called a system 08. It's manufactured for Tossel Jones in Hong Kong, hit the market around the middle of last year, and was selling for around $700.

It's remarkably similar to another machine called a GTS 08, marketed in this country for about three years by a company called Danty.

It looks something like a cross between an electronic typewriter and a cassette recorder. For an extra $149 from Tossel Jones ("you'd probably pick one up from Mannor Ssor for $89" according to one candid aside from Stonjohn) you can also buy a home computer monitor screen. This is, in fact, a black and white TV set.

As it turns out, you don't particularly need to buy it. The system can use your normal TV set at home (be it black and white or color) as a monitor. Providing, of course, you're not watching Don and Bert giving the wheel a whirl.

The technology represented by the machine, Mr Stonjohn told us, was the equivalent of "a fairly sophisticated computer of the early seventies." For those who can only talk, or think, in monetary

terms, a piece of metal, a few micro-chips, a bit of circuitry and a flashing light that would have been worth maybe (again Mr Stonjohn's estimate) $200,000.

Certainly, times have changed. These units are the third generation of the computer family. The first were the basic valve computers. The second generation started to hit the big business and government bureaucracies in the sixties, big frame jobs that you definitely couldn't push around. The latest generation, and the technology to produce them is evidenced in everything from pocket calculators and watches to computers that calculate how to fire nuclear warheads more accurately and other similarly socially useful functions.

Mr Stonjohn kept on referring to his System 08 as a home computer. This appears something of a misnomer for what is at present nothing more than an expensive games set.

Yes, of course there are a thousand variations (limited only by the amount of software, or programs available in Australia; apparently software programming hasn't caught on here in any more than a cottage industry fashion). Some involve programs which can teach children how to spell and do basic arithmetic. One even requires a child to complete a simple addition before he can fire at the enemy warships in a Space Invader variation.

Of course, the big jump in usefulness is made once you connect your unit at home to larger data banks in the outside world. This is possible at the moment via the telephone, but frowned upon by Telecom. Another problem for Australians here is that there just aren't too many local data banks to plug into.

Mr Stonjohn's major theme was how simple and practical, fun and educational these machines are.

Gosh, maybe within eighteen months a large department store or supermarket chain will have set up a system which domestic units could plug into. Overburdened mums ("driving the Volvo to the supermarket is *such* a drag") could then do all their shopping from home — check the prices, the specials, and even order at the touch of a keyboard. "Shopping will become very scientific," Mr Stonjohn predicted.

"These appliances are now no longer the domain of business. This is one of the first to go into a domestic situation where kids can play with it." Mr Stonjohn assured us they were simple — something he would later surely regret. "People have to be able to understand them."

He estimated approximately 10,000 of the units had been sold in Australia. However, most of these would be in business use. He even predicted 100,000 would be in Australia by 1984 (someone tell George Orwell to relax, please).

The office of Tossel Jones is large. A neat desk in one corner, like a large rock on the carpeted desert-scape. At the other end of the room, a much larger table, perhaps used for board meetings.

Running off the same end of the room in its own little alcove was a mini-kitchen. This was to become very important later on for the photographer. It had most of the hardware Betty Fulton would need for an impromptu session — a stove, microwave, a fridge, a knife or two. However, it looked like Sir Phillip Lynch and other Razor Gang cronies had supervised the shopping expedition for provisions.

The office became, for no particular reason, our demonstration area. Mr Stonjohn had organised for a System 08 to be taken from stock. It was unpacked before our very eyes. For some reason, it didn't seem like the birth of a Brave New World.

It soon became apparent Mr Stonjohn was in danger of sinking in a sea of superlatives.

At the other end of the room, behind his disk, Mr Whizz himself wasn't getting involved. No sir, lunch had just arrived, heated in the micro-wave. No-one was going to stop Tossel Jones from eating his Big Ben pie. With tomato sauce. Served tastefully, mind you, with silver cutlery on a white china plate by his middleish (as opposed to youngish) secretary.

Yes, Mr Stonjohn was in very real trouble. He'd been caught out a little. Enough, anyway, to admit "I don't know very much about this. . . it's like everything else. No one wants to read the instructions."

We were experiencing some, ahhh, minor difficulties loading the pre-programmed cassette into the computer's memory. All we wanted to do was play one of the video games.

Mr Stonjohn told us it takes up to five minutes to load the tape's information into the machine's memory.

("Its rather like a player piano. You play the role once and it remembers the whole piece of music in its memory"). As we waited. Memory capacity is 16,000 characters, we were told. As we waited.

Mr Stonjohn explained to us that "computers are very silly in some ways. They will not interpret anything. You have to tell them everything." In other words, if you

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don't know how to work the brutes, they're not going to jump right to and help you.

"I can see what is going to happen here. I am not going to be able to get this thing to load."

More fingering and fumbling. A poke here and a command there. Apparently Mr Stonjohn had done the wrong thing and the machine didn't know where to put the information in its memory.

"I just got this one straight out of stock, and it could have a minor flaw in it. It's very infuriating." Of course, we were assured, all stock is checked before being shipped off for delivery.

With that, however, Mr Stonjohn decided it was time to send an SOS for a more technically minded member of staff. Tossel had by this time demolished his workingman's spread, but his interest in the confusion hovered around zero

We did eventually get the thing to perform one of its video variations. It even had written responses which came up on the screen after every play. These included: "Fair Go; Turkey; Blimey; Fantastic; Hells Bells; Greasy Joe."

Drab Tonbol, my photographer co-hort, was getting restless. Enough of this fooling around. He had to go back to the office with a photograph. And he could hardly go back with a picture of a video game on a screen. The pictorial editor would have probably accused him of wasting his afternoon in a 'fun' parlour somewhere along George Street.

Dreg Stonjohn came up with a good idea. We'd print a 'shopping list' onto the screen. You know, butter, bathroom antiseptic and the various processed, gastronomic nightmares you can spend your dollars' worth on at the local supermarket.

Ahh. Another problem. Our marketing manager can't even get the machine to print the words 'Shopping List' at the top of the monitor. He explains: "You can't just write it in. It doesn't understand English." apparently the machine's Syntax (or rules governing sentence and word construction) is what is called BASIC language (Beginners All-Purpose Symbolic Instruction Code). These syntax rules are very strict and narrowly defined. Stonjohn: "It has no discretion. If you try and adopt any poetic licence, it cannot make any allowances. So you have to be exactly spot-on (with your commands)."

Goodness, if we were having this much trouble just getting the thing to print the words onto the monitor, imagine poor old mum actually trying to get the groceries ordered and delivered. Lucky the corner shop is not far away (even if they're not on computer).

More exploratory presses here and there. And then Mr Stonjohn decides: "There is something wrong with this machine. There is definitely something wrong with this machine." He disarmingly admits he must be doing "something bloody stupid" and heads off with another SOS for "one of our experts."

Yes, we eventually did get the shopping list onto the screen. Placed the monitor and its umbilical keyboard in the mini-kitchen. Grabbed one of the young, female workers who had to pretend she was a happy, contented, unhassled mum standing in front of her home computer doing the shopping. There was even an open cupboard with a few cans and other oddments in it. I guess to prove a machine really could fill your larder.

The ritual was done. The photographer had his pic. I had a notebook largely full of quotes I wouldn't be able to use. It's hard to tell the truth sometimes.

Life never appears to make as much sense as everyone requires. □

HAVE YOU HEARD?

The new COMMODORE VIC 20 will be released in Australia during October/November this year. The VIC connects to any television set or monitor, provides 5K bytes of memory and has the following features:—

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COLOUR:	8 character colours, 8 border colours, 16 screen colours.
SOUND:	4 internal amplifiers including 3 tone (music) generators, and 1 sound (white noise and sound effects generator). Each amplifier has 3 octaves. The sound is available with the television or separate speaker.
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KEYBOARD:	Full typewriter keyboard with special screen editing and function keys.
GRAPHICS:	Full PET keystroke graphics.
LANGUAGE:	PET BASIC
FUNCTION KEYS:	4 programmable function keys (8 separate functions).
EXPANSION PORT:	For 3K direct plug-in memory expanison and for program cartridges. To expand memory further a separate "motherboard" with slots for memory expansion and programmed cartridges will be available.
ACCESSORIES:	Will include a Single Disk Drive, Printer, Tape Cassette, Joystick, Paddles and Lightpen.
PROGRAMS:	Will be available on cassette and "VIC ROM Packs".

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THE IMAGINATION WINNER

SINCE WE launched the APF Imagination Machine Competition in the first issue of *Your Computer* we've been wading through entries containing hundreds of thousands of words on reams of paper, a nightmare task — but finally after sleepless nights a winner was finally chosen.

Congratulations Mr John Forshaw of Camberwell, Victoria, you are now the proud owner of an Imagination Machine.

Mr Forshaw's winning entry pointed out, among other things, that he wanted to use the APF to track down his wife's lover. With a plea like that how could we refuse to give him the prize. . .

Of course he answered the question correctly and summed up the uses of home computers adequately in his 50 words.

There were many other good and/or amusing entries which are worth mentioning, it's just a pity there weren't a few more APFs to give away.

It is obvious that a great deal of time and effort went into most of the entries we received.

The entries came from all over Australia, from Sydney, Melbourne, Brisbane, Hobart, Adelaide and Perth and all stops between.

A quick review of the more interesting entries:

Freud would have had something to say about the entry offered by **J.F. Watson** of Newtown, Sydney, who said he wanted a home computer to; "peek at it's mammary bank." Now that's a little kinky.

There was a **Mr S.A. Nix** of O'Connor, ACT, who said he would like to use a home computer to initiate his program for world domination. But, who are we to get into politics and revolutions. . . sorry you lose.

There was also some interesting poetry from **Mrs B. Griffiths** of Blackmans Bay, Tasmania, who wrote:

"There is a teacher of commerce without a computer
Her knowledgeable students said 'Why don't you shoot 'er.
Her faint hope of magic,
Will prevent something tragic,
With 'Imagination' she'll be an astuter, computer tutor."

Mr S. Christensen of Five Dock, NSW, had a simple message: "I want to see what kind of thing thinks it will take over my job."

And we were interested in what **A. Bita** of Dulwich Hill, NSW wrote:

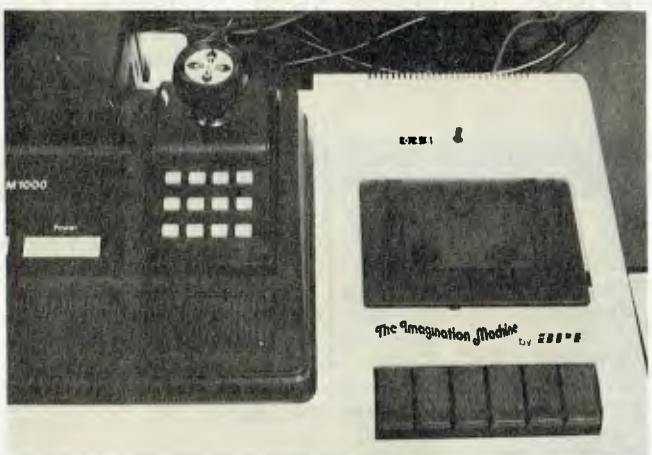
"I'd develop nice programs with clever wit.
And I'd clear up my finances a little bit,
But were one so bold,
And the truth be told,
I would just like to sit down and play with it."

The word power of some of the entrants was clearly displayed as they attempted to find every possible combination of the letters.

Some people provided us with up to 10 pages of words — clearly unacceptable as the limit was 21 letters in all.

Still for those of us who are Scrabble fanatics the lists will be a handy reference guide.

An example of this was a word offered by **Mr Ralph C Willy** of Chatswood, NSW, suggesting Ai was the name of a three toed South American sloth. Good try, Ralph.



Persistance awards must be given to **Mr Peter W. Poten,** of Coffs Harbour, NSW, **Mr Norman Ryder** of Rivett, ACT, and **Haran Karadagli** of West Brunswick, Victoria. They all sent a large number of entries and showed they were buying a number of *Your Computer* magazines (thank you).

Mr Poten said he wanted the APF to use as a display in his new computer store. An interesting way to go about getting stock.

There were also some very worthy entries like that from **Mr John Corcoran,** of Gooellahah, NSW, who wanted the machine to help in the education of intellectually handicapped children.

The **Reverend A.R. Peile,** of Balgo Mission, Via Halls Creek, WA, who is a missionary linguist, wanted the APF to help with his educational work among the Aboriginal people.

Thank you for your entries, most were very good and that made the final decision very difficult. All those mentioned here were on the short list after weeks of consideration and that they didn't win relates only to the fact that there was only one prize.

CYBERNETICS RESEARCH

announces a second software release for the APPLE II:

PHIL'S CHEAP EDITOR

MORE POWERFUL EDITING FEATURES THAN MOST WORD PROCESSORS

MINIMUM REQUIREMENTS:

48K APPLE II or APPLE II PLUS APPLESOFT in ROM or Language Card
1 Diskette Drive (Printer is optional)

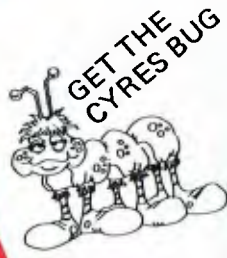
PHIL'S CHEAP EDITOR can be used to easily create and edit any DOS text file. Text files can be loaded and saved, and most other DOS commands can be executed directly from the Editor's file command mode.

ALLOWS THE USER TO EDIT-

- APPLESOFT programs as text.
- ASSEMBLER text files.
- EXEC files.
- Tables of numbers or other data.
- Simply formatted documents.
- Letters, etc

THIS IS A POWERFUL EDITOR FEATURING-

- True screen windowing.
- Insertion mode editing.
- Large (32K) text buffer.
- Upper and lower case.
- Wide range of movement and deletion functions.
- Block copying.
- Global string search.
- Global or selective string exchange
- Remember and execute a sequence of key strokes Fast auto-repeat of editing functions.



PRICE $95.00 (Includes 2 disks and manual)
Please specify DOS 3.2.1 or 3.3 when ordering.

GRAFPAK 1.0

FOR 48K APPLE II

brings PRINT USING to the APPLE

The first major enhancement to APPLE Basic since APPLESOFT!

GRAFPAK is an Australian software package from CYBERNETICS RESEARCH which extends the power of APPLESOFT for the programmer and computer hobbyist. Designed as a 1.5K boot program GRAFPAK extends the range of BASIC commands to give you the power and features normally only available to experienced assembler [illegible]

into five categories:

1. Screen Handling
   12 New commands allowing FULL graphics/text intermixing with OVERWRITE, OR, XOR
2. Tape commands now available with DOS- STORE, RECALL and SHLOAD with DOS
3. PRINT USING from Basic
   Print Using with COBOL picture formatting, Zero supression, decimal point alignment, floating dollar signs, etc.
4. ENHANCED APPLESOFT commands
   Fast GOTO and GOSUB with up to 40% [illegible]
   RESTORE to line number
   16 bit PEEK, POKE Addressing
   Input strings with leading blanks, commas and colons preserved.
5. Miscellaneous Commands and Utilities
   Sorting Alpha string arrays
   Music routine emulating the One on Programmers Aid.
   Demonstration programs
   Enhanced disk control with direct [illegible] access
   Graphics utilities including
   Shape Maker
   Examine/Alter character set including lower case
   Function Plotter

GRAFPAK is a cheap but powerful extension to APPLESOFT BASIC that enables you to utilise features of your APPLE II computer previously unavailable with current software. GRAFPAK has had a great deal of work put into it and at $95. recommended retail it represents great value for professional and amateur programmers alike.

Write to: CYBERNETICS RESEARCH
P.O. Box 138
Chippendale
N.S.W. 2008

or phone: (02) 698-8286

or visit: 120 Lawson Street,
Redfern, N.S.W.

CYBERNETICS RESEARCH is an Australian software based firm now specialising in microcomputer programming, consultancy and software development.
We give consultancy and advice to any interested parties buying computers — especially micros.
We are also very interested in assisting any amateur programmers who would like to develop new software products — particularly on personal computers.
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- Long life ribbon cartridge
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The new 445 gives you the reliability and performance you expect from the Paper Tiger family of printers.

It comes with a rugged ballistic-type print head and an advanced cartridge ribbon that lasts up to four times longer than most cassette or spool ribbons. Two separate heavy duty motors d print head and advance the pa you get true tractor paper fee

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The *pfs:* software series

A Personal Information Management System.

Your APPLE* computer really can track purchase orders and inventory, analyze your investment records, maintain client and patient histories, or even catalog magazine abstracts and your stereo collection. Software Publishing Corporation has the answer and it doesn't require programming!

We call it the PFS software series – an easy to use yet powerful set of programs that let you design a system that's versatile enough to manage almost any kind of information.

PFS, the personal filing system, lets you design your own form on the screen for organizing information. Once it's created you just fill in the blanks. Looking up what you've filed is just as easy. PFS can search for a number, a single piece of data, a word within a page of text, or any combination. All forms that match are displayed on the screen for browsing, updating, expanding, or printing. PFS can even create mailing labels.

PFS: REPORT, the personal report system, uses the files PFS creates to produce a report tailored to your specifications. Just mark the information you want listed and PFS: REPORT will sort it and let you specify headings, totals, averages, counts, and calculations. You can save your report design for use on a regular basis.

*requires a 48K, 16-sector disk based APPLE II system

PFS and PFS: REPORT come with simple self teaching manuals plus a support plan that includes program updates and factory experts ready to answer your questions. And all of this at an affordable price. Each program is priced **at $145 (includes backup disk).**

The PFS software series is different. It is not a specialized application package nor a complex programmer oriented data base manager. It's a personal information management system that lets you store, retrieve, and report information your way without programming.

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Yes, PFS sounds great.
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☐ MORE INFORMATION ☐ FULL CATALOG

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Sendata Easily

As you might already know, the source of all good things is located in the US and accessed through a phone link and OTC's MIDAS service. But to get that phone connection onto your computer, you'll need a modem. We opted for the Electromed Sendata 700 acoustic coupler. Here's a full report.

THE SOURCE, a large database and electronic mail service for computer users, is located in McLean, Virginia. Australian users can access it through OTC's MIDAS (Multimode International Data Acquisition Service), but to connect your computer to the phone you'll need a modem (modulator/demodulator). This converts the electrical data signals from the computer into acoustic bleeps that can be sent down the phone lines.

There are basically two types of modem — direct connect and acoustically coupled. The direct connect modem is more reliable in use, but generally is used in conjunction with a private leased line to connect a remote terminal to a computer (or a terminal to a remote computer, ha, ha). Furthermore, you will generally have to rent a direct-connect modem from Telecom, which is a fairly expensive undertaking for the average personal computer user. In fact, you can buy a computer for less than one year's rental!

The acoustic coupler is a cheap and verstile alternative. Instead of being wired into the phone line, it uses a loudspeaker and microphone, which are situated in plastic cups which attach to your telephone handset. This means that there is no direct connection — a much safer proposition for the Telecom linesman.

A modem will attach to your computer via a serial interface. Generally, this is of the RS-232C standard (although there are more recent standards, they are not yet widely adopted). If you have an RS-232C interface on your computer, you're set.

The Electromed Sendata 700 acoustic coupler is supplied assembled and tested, for obvious reasons, and is type-approved by Telecom. It's really a very simple device. At one end of a ribbon cable is an RS-232C connector, ready to attach to your computer, and at the other end is the acoustic coupler.

The two halves of the coupler are separated by an accordion-fashion piece of plastic, which allows the coupler to bend so that it can mould itself to the shape of the telephone handset. At the opposite end to the ribbon cable is a switch, which sets the coupler in either answer or originate mode.

In answer mode, the coupler emits a high-pitched carrier tone, and the originating modem at the other end will not transmit until it detects this tone on the line. The originating modem transmits on a lower frequency so that the two modems don't interfere with each other. This means that the modem can send and receive simultaneously — a situation that is termed full duplex.

The Sendata 700 can be powered in several different ways. On the ones we have, we use two different methods. On the Apple, the coupler gets its power from an external 9V adapter, while on the S-100 system, the computer supplies plus and minus 12V from its motherboard up the RS-232C cable.

We've had the couplers in use for a couple of months now. Although we've had noisy lines, and the usual trials and tribulations of trying to communicate with a computer in the States, both modems have worked reliably, and we haven't been able to trace any errors to the couplers themselves.

The instructions supplied with the unit are quite clear, and include advice on operating the telephone handset on its side to avoid compaction of the carbon granules in the microphone. This is not always possible with other models, and users have reported problems with them.

The Sendata 700 is fully approved for use in Australia, and strikes us as an excellent way to access The Source. □

Specifications and Report Card

Unit:	Sendata 700 Acoustic Coupler — Answer Originate
Made By:	Electro-Medical Engineering, Melbourne
Best Points:	Quality
Worst Points:	We're still testing...

Ratings:	**excellent**	**good**	**well, maybe**	**poor**
Documentation		✓		
Ease of Use	✓			
Support		✓		
Value-for-money		✓		

Extras included:	None
Options:	9V Power Supply (if needed)
Price:	$350 plus $61.25 tax
Review unit from:	Electro-Medical Engineering

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A REAL COMPUTER FOR $399

With the NEW SUPER INSTRUCTOR 80 we offer you the finest take-off point in personal computing today. If you need a machine which offers unparalleled facilities for learning computer basics and the ability to expand as your needs and interests grow, then the INSTRUCTOR 80 is for you. The INSTRUCTOR 80 is a complete Z80 computer, fully expandable on the $100 bus, backed a wide range of powerful software now available.

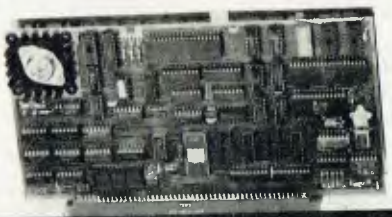
Compare the INSTRUCTOR 80 with virtually any similarly priced machine and there really isn't any comparison. The heart of the computer is the incredibly powerful DGZ80 single card S100 CPU. It gives you on-board RAM, a brilliant monitor program in EPROM, an 8-bit input port, two programmable 8-bit input/output ports, power-on-jump and of course uses the powerful Z80 microprocessor at 2MHz or more. No wonder the DGZ80 has become Australia's fastest selling Z80/S100 computer! In the video department, the INSTRUCTOR 80 is no slouch either. The MW640 S100 video display unit (VDU) gives you the full set of upper and lower case characters with true descenders with a crisp display of 64 characters wide and 16 lines on the screen and as a further bonus, the MW640 offers user programmable graphics in a 128 × 64 format. Watch out for cheap imitations offering upper case only, 32 characters per line and 'flickering' displays: they are far too restrictive for today's demanding world of computers.

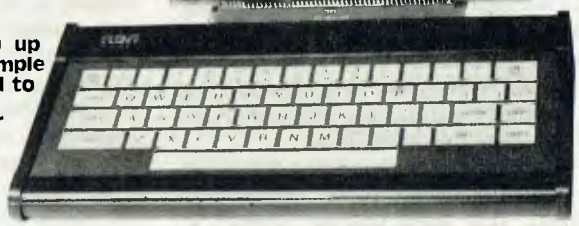
The Super INSTRUCTOR 80 includes

***RCA touch keyboard with audible feedback**	**$89.50**
***4 slot motherboard with two S100 sockets**	**$45.00**
DGZ80 CPU card kit	**$199.00**
DGOS monitor ROM with manual	**$40.00**
***New improved MW640 VDU (Built and tested)**	**$159.00**
Normal full price:	**$532.50**
Package deal price:	**$399.00**
Save:	**$133.50**

To get your INSTRUCTOR 80 up and running you need a simple 8 volt/2A power supply and to connect it to a TV monitor. An optional 8V/2A power supply and a modulator are available if required.

The INSTRUCTOR 80 is supplied with a full set of manuals, a unique programming course and our full technical and warranty support. We won't let you fail! Most of the INSTRUCTOR 80 is prebuilt and tested and the assembly of the DGZ80 computer board is a breeze because sockets are supplied for every IC and a top quality, solder masked and plated through PCB will ensure a perfect job every time.



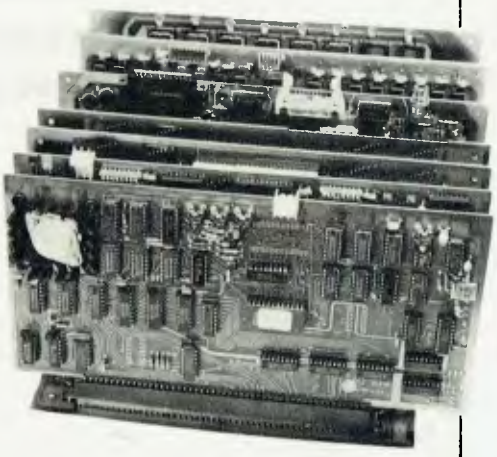


INSTANT PLUG IN EXPANSION ON THE S100 BUS.

One of the strongest reasons for buying our machine is that it gives you proven S100 expandability from the word 'GO' at no extra cost. We supply a full motherboard and S100 sockets—not just 100 holes in a PCB board! All our boards just plug into the S100 mother board. If you need a printer just plug one into the DGZ80 powerful PIO port. There are no hidden costs in expanding your Super INSTRUCTOR 80 and the APPLIED TECHNOLOGY wide range of cost-effective S100 cards make for exciting and painless expansion.

NEED MORE MEMORY? . . . Just plug in up to 64K of super reliable STATIC RAM. Choose from AT16K block locatable RAM at $199 (assembled and tested) or TCT16K 4 × 4K independently locatable blocks at $209 (kit form). The MW2516 S100 ROM card stores programs permanently in up to 16K of low cost 2516 EPROMS. Built and tested the MW2516 costs $99 or $160 complete with MICROWORLD BASIC in EPROMS.

NEED HIGH RESOLUTION GRAPHICS? . . . You need our TCTPCG (programmable character generator) which expands your graphics to a fantastic 512 × 256 bit resolution! You can produce graphs, bar charts and even develop your own TV games! The board comes with extensive documentation, joystick interfaces and controls and even 2 game programs on cassette. Kit price is $140.



INPUT/OUTPUT . . . The powerful DG750 I/O card is now available. This connects 3 further programmable 8-bit ports, 2 serial ports and on-board baud rate generation. Kit price $195.

SERIAL TERMINAL . . . If you need a remote terminal then use the SCVT100 as described in EA Oct 1980. This board offers a serial input and output, keyboard port, cassette interface and RS232 on one board for $190 (kit form).

MISCELLANEOUS CARDS . . . Other cards available include 2650SBC (see ETI Sept 81), Extender card and wire wrap cards and the newly released DIGITALKER card to give your computer a voice for $149.50 (kit form).

EVERYTHING COMPLETE

APPLIED TECHNOLOGY'S commitment to its products means that once you get started, you can get all the extras you need from us. One stop computer shopping is here.

- ☐ USCI CASSETTE INTERFACE ... Designed for trouble free operation with the DGZ80, this interface is supplied tested and ready to go, complete with test tape. Just plug into port B and connect to your tape recorder. A built in relay controls the motor. $30.00
- ☐ MW1550 10 SLOT MOTHER BOARD ... If you intend expanding to a big system this is a wise investment. Quality plated through hole PCB with solder mask and easy access terminals for power and reset ensure that this is a quiet and trouble free mother board. $49.50
- ☐ MS S100 CARD CAGE ... This high quality card frame accepts the MW1550 mother board and MW S100 POWER SUPPLY to produce a solid support for your system with excellent air circulation. $49.50
- ☐ MW EURO STYLE DESK TOP CABINET ... Newly released, this top quality cabinet houses your system and matches any commercial computer on the market. Stocks are expected on September 22. The MW EURO STYLE Cabinet costs $189.00 complete with quality anodized front panel.

GIVE YOUR COMPUTER A VOICE FOR $150

Give your computer a voice for less than $150!! Why pay over $300 to experiment with the latest speech synthesis technology?

The MICROWORLD DIGITALKER is based on a speech processing unit and encoded ROMs from NATIONAL SEMICONDUCTOR. Although it is on an S100, the MICROWORLD DIGITALKER is port oriented and can be readily adapted to interface with virtually any microprocessor such as INSTRUCTOR 80, TRS80, Sorcerer or SYSTEM 80.

The DIGITALKER is supplied complete with technical application notes on the state of the art in speech synthesis and typical software to drive it under machine code or BASIC. The DT-S100 has a master word list of 143 individually addressable expressions and these can be combined to produce a vocabulary limited virtually by your imagination. National Semiconductor have given us advance information on the soon-to-be released expansion ROM set and the DT-5100 has provision to accept these optional ROMs as soon as they are released. These extra ROMs increase the basic library to 256 expressions on one board! Actually this is all stored in 32K bytes of ROM using the new maxiroms.

DIGITALKER type speech synthesis one of the fastest growing areas of microprocessor technology now is your chance to learn about this fascinating area. Applications include keyboards for the blind, control systems and computer games. The DT-S100 is an ideal project for school and is also sure to impress all who hear the high quality speech with natural inflection and emphasis.

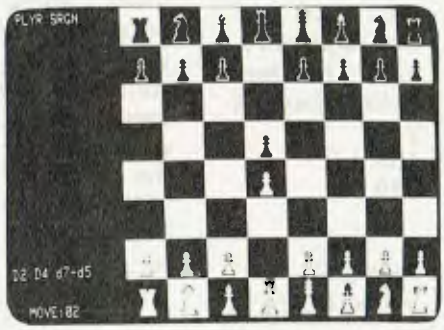
DT-S100 DIGITALKER kit complete with technical notes and full instructions. $149.50

POWERFUL SOFTWARE-!!! WITH FULL SUPPORT

Unlike other companies who either "buy in" ready packaged software or give you little or no support, we at Applied Technology realise that a computer product is only as good as the software program behind it. Subsequently, we support our products with a continuing program of software expansion and improvement.

The INSTRUCTOR 80 is fully supported with a wide range of software available world wide. You can select from the wide range of games and utility programs in machine code, add the MICROWORLD EDITOR/ASSEMBLER and write your own programs. Or you can add the MICROWORLD 12K LEVEL II BASIC (available in ROM or cassette) and enter the fascinating world of BASIC using prepared programs or writing your own.

NEW MicroWorld Level II 12K Basic. New, incredibly powerful Basic. Has advanced error reporting—you can correct errors as you proceed. MicroWorld Basic is fully interactive and gives you a powerful tool whether you're learning or writing programs. Cassette version $20 including tape and manual. S100 ROM Basic $160



As your needs may grow you can add disk drives such as the 315K MICROPOLIS 1043 and enter the world of word processors, business and other data base systems. INSTRUCTOR 80 will support CP/M 2.2 and consequently the world wide software base associated with it.

No wonder INSTRUCTOR 80 is the fastest selling S100/Z80 based kit computer on the AUSTRALIAN market today!

ADVANCED 16K BASIC SYSTEM

Expand your Instructor 80 to suit your needs and interests. Add MICROWORLD LEVEL II BASIC in ROM and own a system superior to virtually any on the market today. With the BASIC 80 PACK you get MICROWORLD BASIC in EPROM plus 16K of RAM, housed on two S100 cards (MW2516 ROM PACK and AT16K RAM). We are offering these for only $269.00– a $90 saving over the normal price for the two boards.

Your INSTRUCTOR 80 with BASIC 80 PACK outclasses TRS80, SYSTEM 80 and SORCERER **and** you don't have to spend $500+ for S100 expansion to disc etc. For further memory, printer or disc expansion you only buy the peripheral. There are no hidden costs with INSTRUCTOR 80. For our full range, send for our Catalogue **Now.**

INSTRUCTOR 80	$399 plus
BASIC 80 PACK	$269 equals

POWERFUL 16K/BASIC S100/Z80 processing!!

YOU NEED TO YOUR SYSTEM

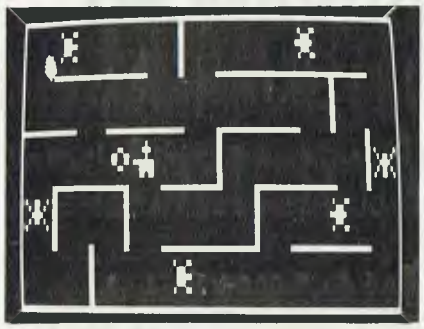
☐ Micropolis 1053 DUAL QUAD DENSITY DISC SYSTEM.
Plug in the S100 card supplied and you have 2X315K of disc memory. Includes diskettes and software documentation package. New low price $1595 complete.

☐ PRINTERS ... We have a wide range of quality ITOH printers ranging from Model 8300 dot matrix at $875.00, to 8500 dot matrix with GRAPHICS for $895.00 right up to the word processor quality 1500 DAISY WHEEL unit at $1895.00

16K RAM + 12K ROM BASIC $269

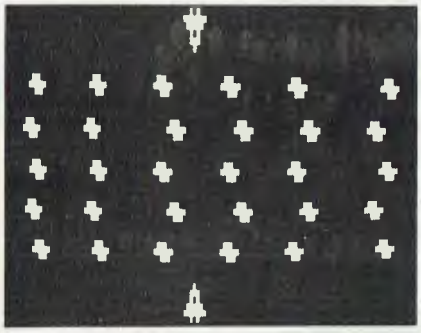
ARCADE FAVOURITES
for trs-80/system 80

* 4 GAMES, ALL BASED ALONG THE SAME LINES AS THE NOW FAMOUS BIG FIVE SOFTWARE
* ALL GAMES WRITTEN IN MACHINE CODE FOR FAST REAL TIME GRAPHICS
* ALL GAMES HAVE SOUND AND ARE BASED ON AN ARCADE FAVOURITE



KILLER BEETLES

In this game you have to trap and bury killer beetles before they get you.
16K LII
$19.95

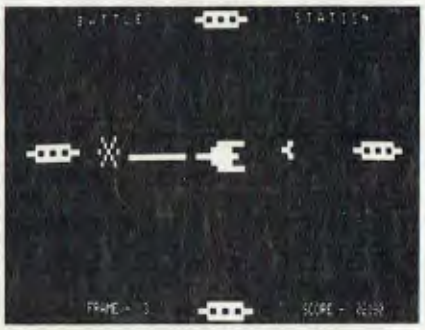


SPACE SHOOTOUT

This is a 2 player game. Each player has to shoot through a meteorite belt at the other player.
16K LII
$19.95

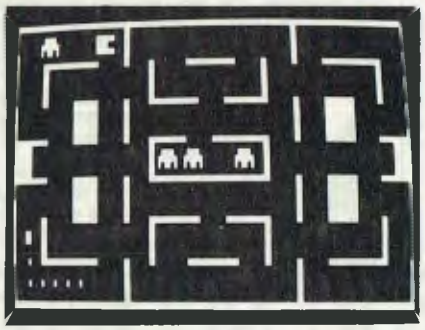
BATTLE STATION

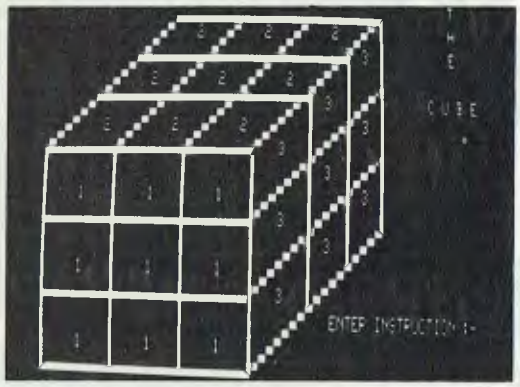
Four alien space ships have attacked your space station. Only speed and skill will fend off the attack.
16K LII
$19.95



GHOST HUNTER

Eat up all the dots before the ghost gets you. Eat a power pill and it's your turn to chase the ghosts.
16K LII
$19.95





CUBE CURE

A Computerised version of the famous Rubik's cube. This program also contains a solution for those that need help.
16K LII
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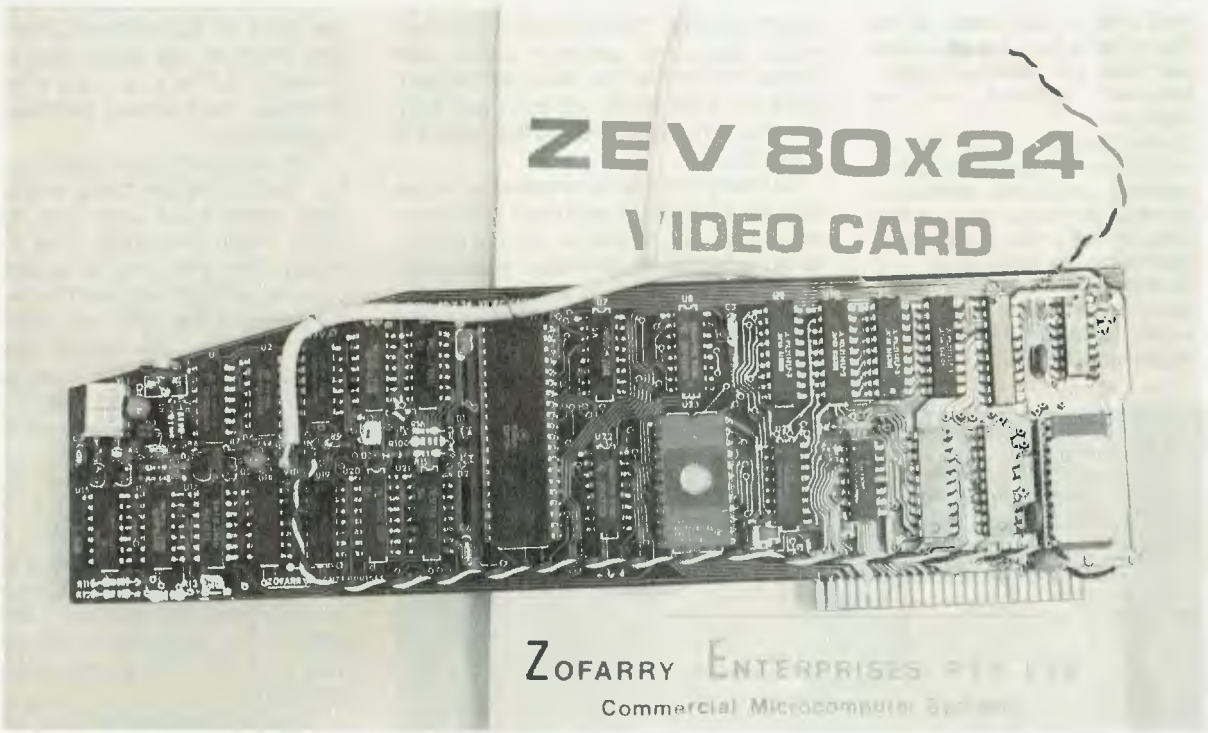
Battle Station		19.95	
Space Shootout		19.95	
Ghost Hunter		19.95	
Cube Cure		19.95	
		TOTAL	



Despite his well-known prejudices, even LES BELL has to admit the Apple isn't a bad little computer. Its major drawback, in his opinion, has been its upper-case only, 40 character wide display. It seems many would agree, given the rash of add-on video cards for the Apple — and the top of the crop is Australia's own. . .

THE VISION 80 —An Australian Winner!

IN THE world of professional data processing, the standard screen size is 80 characters wide by 24 rows deep. This seems to be a convenient standard, both from an ergonomic viewpoint, and in view of the fact that so much software is written to take advantage of the 80 × 24 screen (in fact I'd be willing to bet that the screen width is a hold-over from the days of 80-column punched cards).

The more conventional 'home computer' display is 64 × 16, and while you can live with it, most people experience occasional frustration when assembly listings wrap twice around the screen or, worse,

your computer REVIEW

overwrite the beginnings of lines. The Apple's display of 40 characters wide by 24 lines deep then, is a bit of a drawback. Having 24 lines on the screen is fine, but the width is a limitation.

Even well-written BASIC programs can suffer and become almost unintelligible, while languages that use indentation, like Pascal, just will not fit on the display. In fact, Apple Pascal lets the user switch the display between the left and right halves of a logical 80-character screen — a crude fix, but what else could Apple do.

The answer in recent months has become obvious with the introduction of a number of plug-in video cards for the Apple. Particularly popular, as it is an Australian-designed product, is the Vision-80 card, previously known as the Zofarry ZEV 80 × 24.

The Vision-80 is a large card which overhangs the Apple main board by a good few inches. It plugs into slot 3 of the Apple, two wires connect to the Apple's

video output pins on the right-hand side of the main board and, finally, a cable which goes to your monitor. This part of the installation is a snap.

To take full advantage of the Vision-80's lower case capabilities, a small modification is required to the keyboard circuitry. The standard Apple keyboard does not generate lower case characters, and so the Vision-80 incorporates firmware which will input two extra lines from the keyboard, via the game I/O connector.

All that is required is to solder two wires onto the back of the keyboard or the keyboard encoder connector. It's not difficult (even publisher Matt Whelan managed it, but confused things by installing a manifold vacuum gauge while he was at it), but if you have any doubts, your Apple dealer should be able to do the mod for you.

Once it's installed, the Vision-80 is simple to use. After booting the Apple up, just point it at slot 3 and the card is initialised and ready for use in the 80 × 24 format.

Using the Vision-80

The first thing the user will notice about the Vision-80 is the different character set. The Vision-80 has quite a pleasing, easy-to-read set. The size of the characters is obviously much smaller than the standard Apple display.

The keyboard, once modified, works in two modes: 'Apple mode' which is standard upper case only, and 'typewriter mode' which gives lower case characters unless the shift key is pressed. It is possible to toggle between the two modes by pressing the shift and control keys simultaneously; the system signals the change by beeping. The lower case keyboard mod is easy and logical to use — I've used some other keyboard mods and find this one the best.

The cursor character can be defined by the user; as standard, it is a full block. The Vision-80 is fully compatible with the Apple control codes so it is easy to forget it is there. The only problem arises when listing a program; the Apple formats its output for a 40-character screen; if you type LIST, the listing only extends halfway across.

To get around this the Vision-80 has an extra command, Ctrl-Z L, which will allow listing in 80-column mode. Before running a program, though, this mode must be switched off. A complete listing of the Vision-80's control codes is shown in Table 1.

Because the Apple's video output is fed to the monitor through the Vision-80, the circuit provides the capability for the user to toggle back and forth between the two displays by pressing the Ctrl-T key.

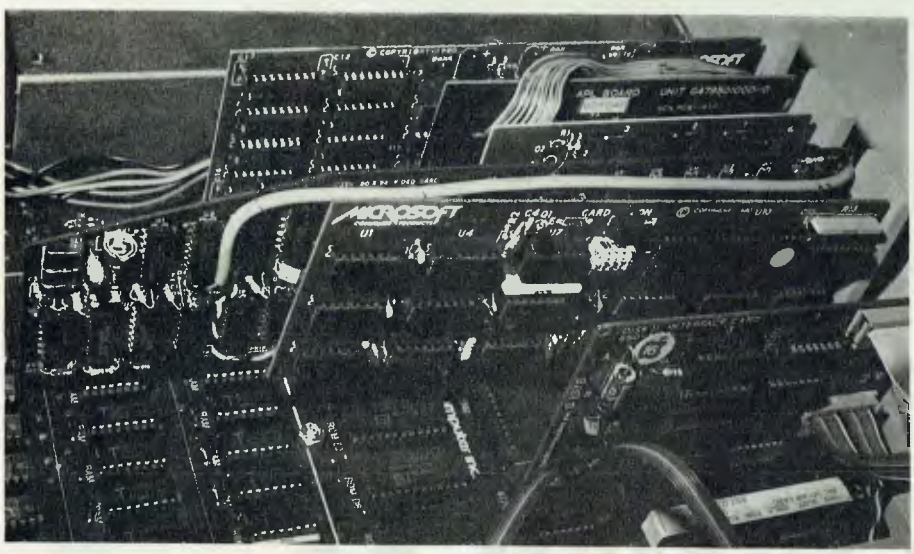
As well as these commands, which can be entered from the keyboard, the Vision-80 also obeys a number of ASCII control codes (Table 2). The codes are all compatible with the Apple.

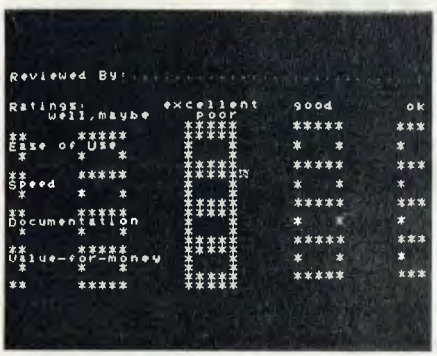
Finally, a number of Applesoft commands are also supported. These include HOME, TEXT (returns to the current screen from graphics mode), GR (enters low-resolution graphics mode) and HGR (high-resolution graphics). The graphics output is generated by the Apple, not the Vision-80. A PR# command returns output to the currently active screen, not slot. The CALL –868 and CALL –858 instructions sometimes used in Apple programs should be replaced by PRINT statements using the appropriate control codes. For example, CALL–858, clear to end of screen, should be replaced by PRINT CHR$(29).

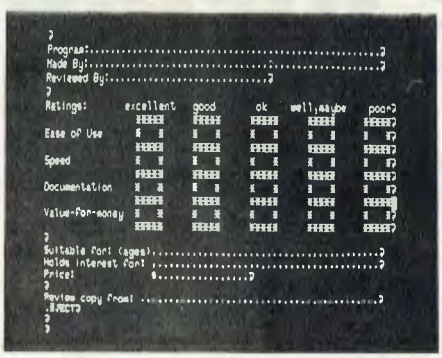
Does it Work?

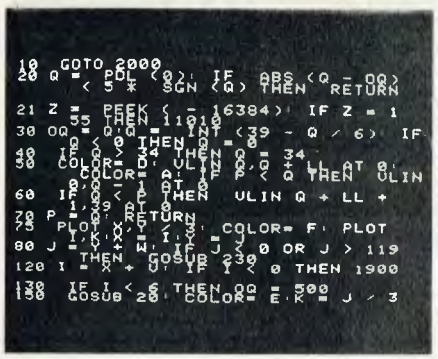
Yes, it works. How could you ever doubt

Below: there's a lot to be crammed onto a video card, so the Vision 80 is big — it protrudes well past the "standard-sized" Microsoft Softcard and the RAMcard.
Centre: Wraparound of the 40-column screen makes word processing particularly difficult in some applications, such as this table format which is all guesswork without a video card.
Bottom: Listing BASIC over 80 columns is much tidier and easier to follow than standard Apple format.









it? We initially tried the Vision-80 with DOS 3.3 and found that it worked just as the manual said.

We then tried the board with the Softcard, and in this case, it was even better, as CP/M initialises the Vision-80 on cold boot, and the sign-on message appears on the 80-character screen.

One characteristic of the system that did cause me some initial concern was the use of the Ctrl-Z character to prefix some commands to the Vision-80. CP/M also uses Ctrl-Z, to indicate the end of a file as well as to indicate the end of a string while using the ED system editor.

Would the two systems become entangled — in other words, would the Vision-80 pass the Ctrl-Z on to ED, and if it did, would it believe the next character was a command to the Vision-80? On tests there appeared to be no interference between the two, and ED worked perfectly.

Of course, many users with both the Vision-80 and the Softcard in their systems would rapidly become disenchanted with ED and would doubtless graduate to more sophisticated sotware, particularly screen-oriented editors such as WordMaster and WordStar.

Communications

As we commented in the last issue, the buzzword around the industry is communications, and as an added bonus, the Vision-80 includes some routines which enable the Apple to act as a smart terminal. The communications commands have been well thought out, and will enable an Apple to communicate with almost any host.

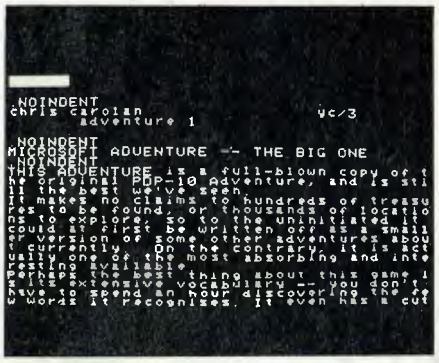
Working through either an Apple communications card or a CCS (California Computer Systems) asynchronous serial card, the communications mode allows the user to specify the number of bits transmitted, the parity and the number of stop bits. Commands allow the user to transmit and receive files, and to take control of a remote Apple (which must also have a Vision-80 card).

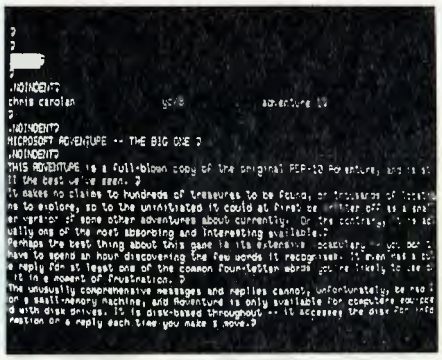
Other commands allow DOS commands to be entered, permit a break to be transmitted and toggle between half and full-duplex modes.

Documentation

The manual supplied with the Zofarry ZEV 80 × 24 was quite difficult to read, and rather terse in places. On the other hand, all the information an Apple owner is likely to require is there and most users will hardly have to refer to the manual once the card has been installed for some time.

The Vision-80 card is a worthwhile addition to the Apple II computer. □





Sandy's word processor without (left) and with the 80-column screen. Despite the smaller type, the wide format is much easier on the eyes and gives a clearer idea of how the final product will look.

Specifications and Report Card

Unit:	Vision-80 Apple 80-column Card
Made By:	Vista Computer Company, California (Designed in Australia by Zofarry Enterprises)
Processor:	6502 and Z-80 compatible
Clock Speed:	4MHz
RAM:	2K video RAM
ROM:	4K ROM
I/O:	video output
Display:	80 × 24
Graphics:	Supports apple screen
Best points:	Communications capabilities, lower-case included, character design, compatibility with Apple peripherals and software
Worst points:	Slow scrolling (designed in to avoid screen flash)

Ratings:	**excellent**	**good**	**well, maybe**	**poor**
Documentation		✓		
Ease of Use		✓		
Functionality	✓			
Support	✓			
Value-for-money		✓		

Extras included:	Programs for design of alternate character sets, macro log-on generator for communications mode
Options:	NA
Price:	$460
Review unit from:	Zofarry Enterprises, Burwood, Sydney

C HOW IT RUNS

What do you do when BASIC programs run too slow, and machine code is just too tough? If you need to quickly write applications programs that must run fast or take advantage of special hardware features, how can you do it? Editor Les Bell's preferred approach is the programming language C using BD Software's C compiler. In this article he reviews the compiler after almost a year's use.

C IS a comparatively new language designed at Bell Labs by Dennis Ritchie to support the UNIX operating system (in fact, all but a few hundred bytes of that OS are written in C). It is a general purpose programming language, and although it is often referred to as a 'system programming language' (probably because so few other languages are good for that kind of work), it is also useful for number-crunching, text-processing and data-base programming.

The language provides the same control-flow constructions as Pascal — tests, loops, grouping and subprograms — and provides a good environment in which to follow the rules of structured programming. It is, for all that, a 'low level' language, mainly dealing with bytes and addresses in memory, and it provides a range of logical and shift operators to enable real 'machine-level' programming. On the other hand, C provides no operators for string-handling, for example, or many of the other high-level storage allocation functions which appear in other languages.

C compilers generally provide no run-time checking of arguments, array subscripts and the like, so the generated code runs fast. For these reasons C is sometimes described as 'Pascal that's not afraid to get its hands dirty'.

Because of the small size of the language, and because of its' low level', compilers are fairly easy to write, and some have started to appear for microcomputer systems. Several months ago, seeking a way to avoid writing scads of blood-and-guts machine code, I purchased the BD software C compiler, and have used it with great success ever since.

What Is It?

The BDS-C package comprises three things: the manual for the system, a copy of 'The C Programming Language' by Kernighan and Ritchie (the 'bible' of C programmers) and a CP/M disk containing the compiler and associated utilities, as well as some demonstration programs.

The system is made up of several programs, as follows:

CC1.COM and CC2.COM: these are the two passes of the C compiler itself. Normally, typing 'CC1foo.c' will run the first pass of the compiler on a file called foo.c, save its results to disk, and automatically load and run CC2 (provided there are no errors). Obviously, the input to the compiler is a source file written in C, and the output is a file called 'foo.crl', where .crl indicates it is 'C relocatable'. This file contains the machine code equivalent of each function in the program each ORGed at zero, and unlinked.

The next stage is to process the CRL file using CLINK.COM, the C linker and relocater. This takes the necessary functions from one or more .CRL files, and patches them together to produce a .COM file which can then be run. Most of the functions required will be pulled from the DEFF.CRL and DEFF2.CRL files (see below), while the stack management, file handling primitives and common arithmetic operation are in C.CCC: the run-time kernel, which is also bound into the program by CLINK.

DEFF.CRL and DEFF2.CRL: are two libraries of pre-compiled functions supplied with the compiler, which are automatically scanned by the linker. These functions include the formatted print function printf, the input functions such as getchar and scanf, and file I/O functions like rename and open. There are also some plotting functions for memory-mapped video boards.

CLIB.COM is the C function librarian, which allows the transfer of a function from one .CRL file to another, deletion of functions and so on.

These are the most important and immediately useful files in the system, but there are some other interesting files on disk, such as STDLIB1(and 2).C, the source code for DEFF.CRL; DEFF2.ASM and DEFF2A.ASM, the source for DEFF2.CRL; CCC.ASM, the source for the run-time package; FLOAT.C A and FLOAT.DOC, a contributed floating-point package; and a couple of macro-packages, one of which allows you to write your own .CRL functions in machine language. There's also a copious quantity of demonstration games and utilities.

Getting Under Way

The compiler installed on my system with no worries, apart from a couple of mistakes I made in PIPping .CRL files onto my work disks. Once there, I compiled a few of the sample programs on the disk. The compiler is very easy to use for simple programs; you just CC1 foo.c, followed by CLINK foo, and then foo to run the program.

The sample programs compiled and ran first time, and when I took a look at them I began to realise just how powerful C actually is. A program to print the contents of a file with line numbers appended, for example, is basically just two lines. The Othello game had no difficulty in beating me, and yet on examining the program I was able to follow how it worked.

The next stage was to learn how to program in C, so I delved into the Kernighan and Ritchie book. After a while, I came across my first major problem — UNIX. The UNIX operating system, of which C is an integral part, offers many sophisticated features, including redirectable I/O. This means that under UNIX, programs are usually written using the console I/O functions, and if you want the program to read and write from/to files, the operating system automatically redirects the I/O.

CP/M, of course, has no comparable facility, and so BDS C has its own special file I/O functions, at two levels — raw binary I/O, and formatted, buffered I/O. Nice though these functions are, it still means that many C programs have to be rewritten, particularly since many of the examples in Kernighan and Ritchie deal with text filtering, which would be lovely to have available for CP/M.

Next problem — the limitation of BDS C to only *char* and *int* variable types. No floating point meant that some of the numerical examples in K & R were a bit pointless. A word here about variable types; in C, variables have to be declared before use, and there are several types: char (byte), int (16-bit word), short (short integer), long (32-bit integer), float (floating point) and double (double-precision floating point).

C functions are automatically allocated their own space for variables, which disappear once the function has been exited. In addition, references to a variable within a function only refer to that function's local copy of the variable — not to any other function's. This avoids one of the commonest errors of all — using N as a counter in two places in the program, only to find that under certain conditions, the two uses of N crunch each other.

Of course, C does let you over-ride this feature by declaring variables to be static, that is, they keep their values between function calls. In addition, variables can be external, that is, outside any function, in which case their values are available to all functions within the program. Finally, variables can be specified as register variables, in which case they will be kept inside the processor registers wherever possible to speed up access (BDS C obviously lacks this feature, as well as statics).

This also means that functions tend not to produce side effects; once debugged they can effectively be used as building blocks in larger programs without reference to their internal operation. Luxury, sheer luxury, after BASIC!

Once I'd got over the hurdle of translating some of the examples in K & R, C proved to be fairly easy to pick up, and I was able to try some of the more advanced features of the BDS C package.

Pointers, Arrays and Structures

One of the most important concepts in C is the pointer. A pointer is a variable which points to a location in memory, usually containing another variable. So if we declare char*n; we really have two types of variables — the pointer n, which will occupy a word of memory, and the char variable *n, which will only occupy a byte. Of course, n still has to be set equal to something so that we know where it is pointing. Subsequently, the operation n++ will increment n to point to the next char, or n-- will decrement it to point to the char preceding what was *n.

Using pointers in this way to step through memory allows us to process arrays of data, and indeed, this is just how C handles arrays. It is also possible to declare arrays like this: char name [8]; which will reserve storage for a name eight characters. Similarly, int temperatures [36]; will reserve storage for an array of 36 integer variables.

As well as arrays, C supports structures, which are simply collections of related variables, grouped together under one name for convenience. Thus

```
struct employee_record{
        char name[25];
        char address1[30];
        char address2[30];
        char address3[30];
        int postcode;
        float payrate;
        float hours;
        int employee_number;
    } emp1, emp2;
```

will keep all the related items of an employee's record together under the name emp1 or emp2.

Then the number of hours worked by an employee can be referred to as emp1.hours and you can have statements like

```
pay1 = emp1.payrate * emp1.hours;
pay2 = emp2.payrate * emp2.hours;
```

which refer to the same members of two different structures.

Complex data types like arrays and structures cannot be copied as a unit, and so functions do not automatically create their own copies of arrays, nor can these data types be passed to functions. Pointers to arrays or structures can be passed, however, and this is the standard method of passing arrays between functions.

It is possible to have arrays of structures, a very useful construction indeed for building up tables. The only problem with BDS C is that it does not allow structures to be initialised when they are created, a problem that I ran across while idly trying to write a small interpreter one day. Instead, BDS C provides a couple of kludges which will fix the problem, though not very satisfactorily, when compared with UNIX C's initialisers.

Performance

The overall performance of the package has been excellent, and I'm convinced it's one of the best software buys around.

A couple of bugs have shown up, but there's generally been a way round them without any difficulty once they were identified. And that's the problem — identifying where your program is crashing.

Although the compiler catches most errors at compile-time, any logical errors will show up at run-time, and the run-time package provides no help whatsoever in the way of error messages.

One way around the problem is to provide plenty of dummy print statements in your program so that you always know what it's doing, and what the key variables are up to. Still, on occasions you can't even do that, and then you're very much on your own.

Once I'd spent some time digging into the way functions passed parameters on the stack, and I'd written a few machine-code subroutines that linked satisfactorily with other C functions, I began to see that it's possible to debug C programs using

DDT or SID under CP/M. The linker will optionally provide statistics such as the addresses of the various functions and the beginning address of the external variables. A symbol table can even be written out to disk which I'd guess can be used with SID.

Fortunately, I haven't had to use this debugging technique in earnest yet, which is a tribute to the compiler's ability to catch my errors !

As far as speed is concerned, C is fast fast. For example, the simple FOR loop

```
main() /* test of for-next loop in C */
{
        int a,n;

        printf("start");

        for(n = 0; n < 30000; n++)
            a = 5;

        printf("stop");
}
```

executes in 4.7seconds in C, while the equivalent Microsoft BASIC program

```
10 PRINT "start";
20 FOR N%=1 TO 30000
30 A%=5
40 NEXT N%
50 PRINT "stop"
```

ran in 1 min 31 sec on the same computer! That's a speed improvement of almost 20 times

It's this speed that tempted me to write some graphics routines for the DG640 VDU in C (See *Your Computer*, Vol.1, No 1). Writing a simple ping-pong game in C turned out to be fairly easy, and to my surprise, it runs fast enough to make such a game interesting.

By writing similar graphics routines for the VB3 board, but this time in Assembler, and linking them to the other C functions, my graphics could be transported between the two machines with no difficulty.

More Good Points

In order to allow C programs to be longer than physical memory, the BDS C package provides a facility to allow segments of code to be swapped into memory as overlays. Although this is a bit tricky, it can be done, and it's certainly an improvement over the CHAIN facilities provided in some other languages but C also provides better versions of them.

Compiler options allow the generated code to be optimised for speed or length, as well as allowing the run-time package to be located anywhere in memory (like 4300H if you've got a TRS-80). Code can be generated to run in PROMs too.

The standard library of functions is quite extensive and well tailored to the needs of the microcomputer user. In includes peek, poke, inp, outp, and machine code calls as well as CP/M bios and bdos calls.

There's a choice of pseudo-random number generators, and block move and fill functions. There's even a 'shell sort' function, and a number of crude graphics functions for memory mapped video boards.

Input/output is fairly close to UNIX C, using the getchar and putchar functions, as well as the higher level scanf and printf functions based on them. There's a fair selection of string handling functions, with which I dare say you could do anything that would reasonably be attempted in BASIC, once you know your way around those functions.

Many of the terminal-and hardware-dependent values such as addresses of UARTs, screen control codes, etc. are defined in a header file which can be incorporated into any program when needed, so that all these fiddly variables can be defined once and then forgotten about. It also means that a program you write for your system hasn't got any of these values hidden in it to cause later confusion when you give the program to a friend.

Documentation

The documentation supplied with the package is excellent. The manual comprises several sections, dealing with the compiler and its operation, the library functions, additional notes to appendix A of the C Programming Language which is a full description of the language, miscellaneous notes and hints for beginners and a description of the dynamic overlay scheme.

A lot of the information that is most useful, though, is buried in the source listings for the function library, the run-time package and other files, and a good rake around in these will turn up all kinds of useful and interesting snippets.

For those who want to have a closer look at BDS C, volume 48 of the CP/M User's Group contains a number of C programs, mostly games, both in source and compiled forms.

To sum up, then, I would highly recommend the BDS C compiler to anybody who wants to get away from BASIC to a more structured and powerful language. It will also be useful for those who write a lot of machine code, as it can do similar jobs with less effort, particularly in debugging.

BDS C is a fairly full subset of UNIX C, and is powerful enough for most system programming jobs. It is excellent value for money.

Software Report Card

Program:	BDS-C Compiler
Made By:	BD Software, USA
Useful For:	Programming language
Hardware Reqd:	8080/Z-80 CPU, CP/M

Ratings:	**excellent**	**good**	**well, maybe**	**poor**
Documentation	✓			
Ease of Use		✓		
Speed	✓			
Functionality	✓			
Support	✓			
Value-for-money	✓			

Extras included:	Several demo programs, including Telnet (intelligent terminal program)
Options:	BDS-C User's Group
Price:	$135
Review copy from:	Lifeboat Associates (USA)

```
/* Lotto simulator written in C for comparison with ZX80 BASIC
game in Your Computer Vol 1 No 3, p 82. Illustrates structured
programming, (after a fashion)! */

#define TRUE 1
#define FALSE 0
#define TURNS 6

int guess[TURNS+1], select[TURNS+1];
int supp;
char c;

main() /* Lotto simulator written in C */
{
        srand(0);
        printf("\n\n*** BDS C Lotto Game ***\n");
        do {
                getguess();
                printf("\n\nAnd now for the draw. . . \n");
                do {
                        draw();
                        result();
                } while ((c = askplay()) && asksame());
        }while (c);
}
```

Fig 1: Structured programming! The main module of this Lotto game, written in C for comparison with the one in BASIC used in our previous issue, details the complete program. It calls separate functions such as getguess, draw and result, which are self contained modules.

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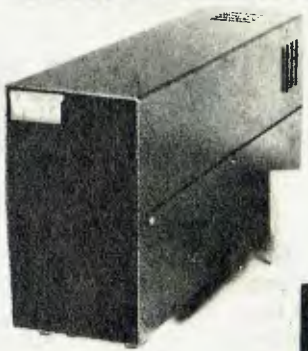

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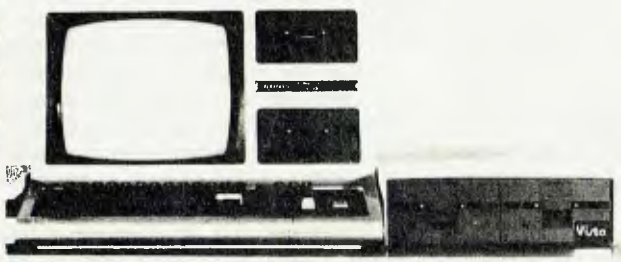

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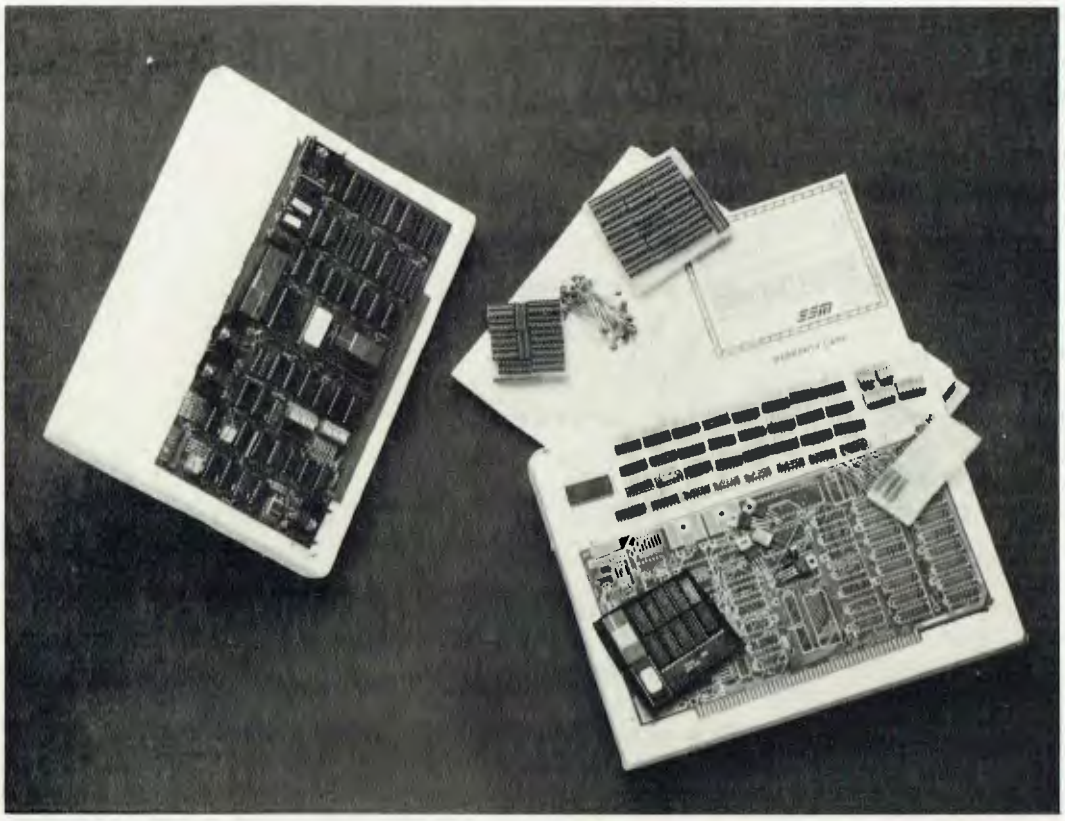


Most hobby computers have a built-in 64-character wide, 16-line deep display. While this is adequate for most games and other software, the professional computer world has standardised on an 80 × 24 screen. How can you join the professionals? for those whose computer uses the S-100 bus, it's easy with the. . .

VB3 VIDEO BOARD

By LES BELL

your computer REVIEW

AS YOU might expect, I spend a lot of time using my computer; just writing these articles on the system takes quite a few hours each month. To me, it's vital that the computer be easy to use, with no strain or effort — otherwise, it's defeating its purpose of saving me work and providing amusement.

The main way that a person interacts with a computer is through the keyboard and display, they're the components that deserve the most attention once you've expanded to a pair of disk drives and printer. A good, high-capacity display allows the computer to present lots of data in a clear and uncluttered format that's easy on the eyes.

Recently I decided that it was time to take another look at the video department on my computer and bring it up to scratch. For some years I'd been running a DG/ETI 640 64 × 16 video board, and it had provided sterling service over that time with software such as WordStar. But several of the utility programs I had on the system were really designed for an 80-character display, and were difficult to read when 'wrapped around' the 64-character screen. In particular, assembly listings tended to wrap around so that they became difficult to make sense of.

The obvious answer was a new video board. I briefly considered the possibility of a serial-connected video terminal, but rejected that idea on grounds of cost and the increased convenience of a memory-mapped video card.

Memory-mapped Video

Many computer systems link through a cable to one or more video terminals. A video terminal is basically just a block of memory with circuitry added to display its contents on a video display like a TV. It also has additional circuitry to determine at what point on the display (what memory location) the next character to be received will be displayed. This is generally indicated on the screen by a moving block (sometimes flashing) or underline called the cursor. As each character is received, so the cursor moves across the screen.

When the cursor circuitry isn't storing new data into the memory, the video timing and control circuitry scans through it, working out which bits of what character will appear on the screen at any time. It passes those characters to the character generator circuitry, simultaneously telling it which lines of the character are to be displayed. The character generator then passes the dot pattern to the shift register, which sends dots one at a time to the video screen.

That, stripped to the bare essentials, is how a video display unit works. I've left out

more than a few important details, such as how the timing of the video generator synchronises with the timing of the video display. You'll just have to trust me.

Memory-mapped video systems are basically similar, except that there is no circuitry or cable to connect the board to the computer. Instead, the board is plugged into the bus of the computer system, and the processor treats the video display memory in the same way as more conventional memory. Well, almost.

The processor can store into any location in the video RAM, which removes the need for a cursor. It is replaced by software instead, as the processor must keep track of where the next character will be stored, as well as scrolling the display up and off the screen.

Solid State Music's VB3

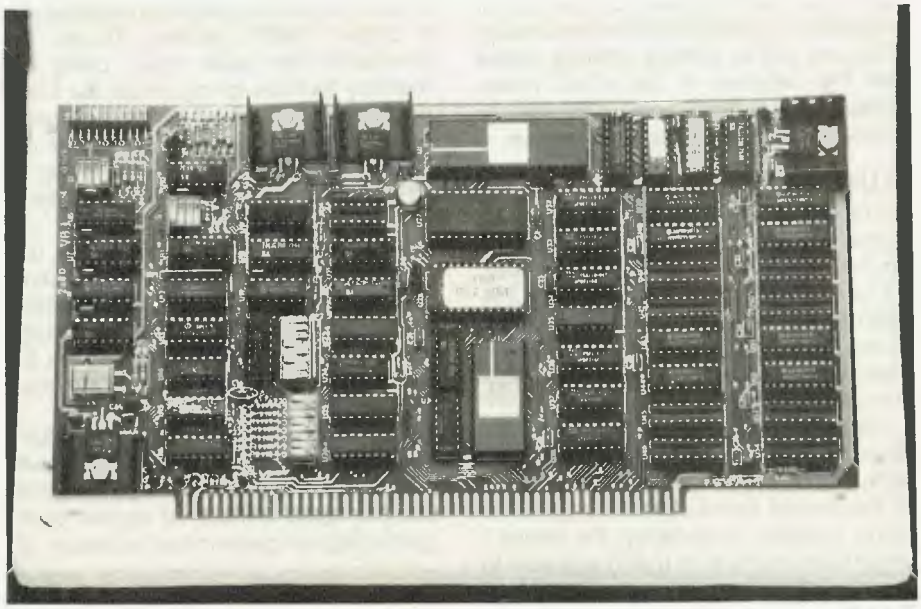
The Solid State Music VB3 board is a bit more complex than that. As you can probably guess, the VB3 is the video board I chose to upgrade my system. It's an S-100 (IEEE 696-1) card, and despite its large size and the use of two LSI (large-scale integrated) chips for the more complex circuitry, it's still very densely populated.

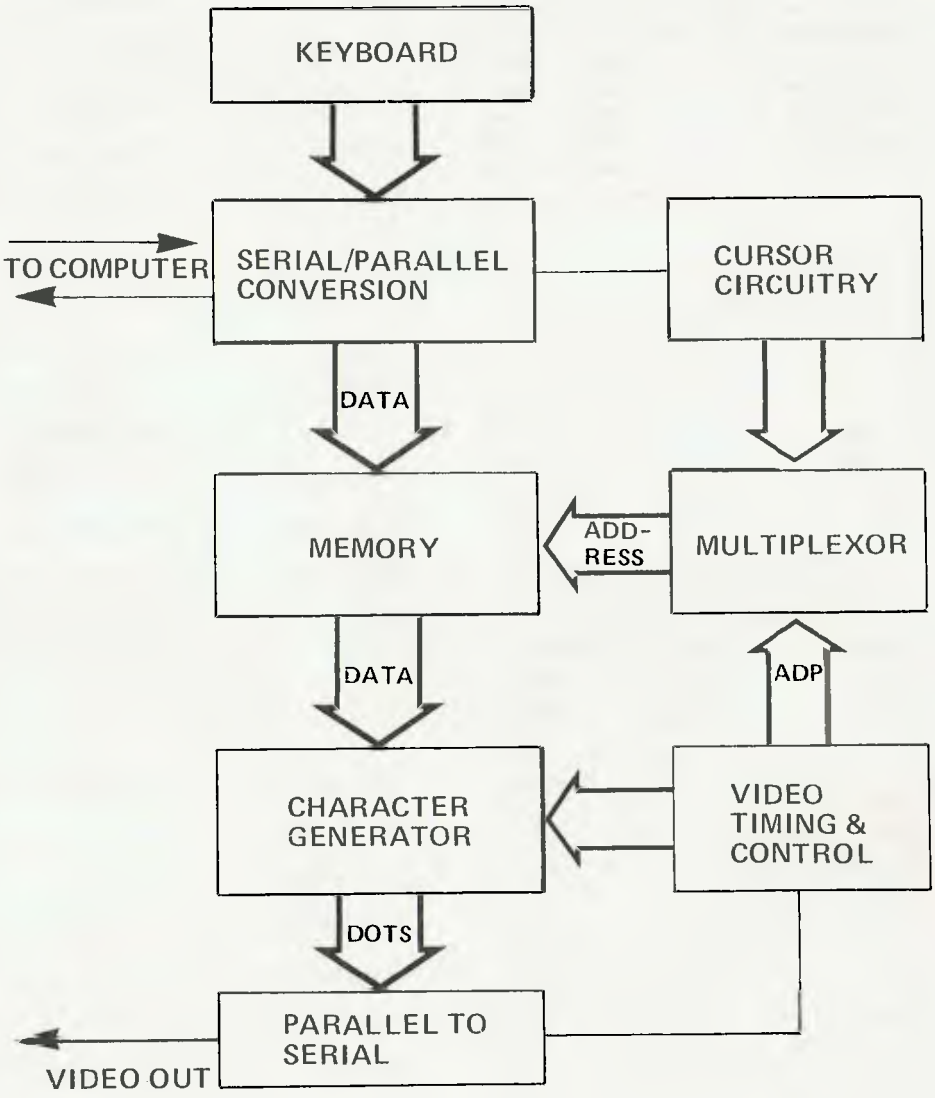
The reason for that is its range of features. Briefly, these include:

- 80 × 24 video display as standard. Optionally, the display can be as large as 80 × 51, just by adding more memory, or by changing two PROMs 64 × 16 is possible; or even, for the power-crazy, 132 × 28!
- Full upper and lower case characters are displayed with descenders (the tails of p's and q's). In addition, two-letter codes are displayed for control characters where appropriate.
- As well as the 4 Kbytes of RAM which store the characters to be displayed, another 4 Kbytes is used to store attributes corresponding to each character in the main video memory. By setting bits in this block of memory, characters can be made to appear in low intensity, reverse video (black on white), with an underline or strikethrough, blinking or completely blanked out.
- There are also two graphics formats, one based on thin lines and the other a 'chunky' graphics set similar to that found on the Sorcerer and other personal computers. Finally, as well as the standard character set, there is a socket for a 2716 EPROM which can contain a character set designed by the user.

Also on the board is an input port for a keyboard, and there is bank select switching to allow the board to overlap with existing memory in the computer.

Because of its use of a software set-up LSI chip to perform the timing and control





functions, the VB3 will run on US or Australian TV standards with no hardware changes, just by loading different values into the registers of the VTAC (video timing and control) chip. The manual provides the right values for 50 Hz use.

In Use

The documentation supplied with the kit is sparse but good. It's not recommended for the non-technical, just as the kit itself; it's one of the most complex boards I've seen in the personal computer marketplace. Despite its complexity, the board went together easily, but getting it to work was another matter.

Here the use of two LSI ICs to hide some of the circuit operation in their internals, combined with a lack of description of the overall circuit operation, gave me some troubles. Fortunately, the dealer I bought the board from (AED) was able to quickly sort the problem out, and I was on the air.

The manual provides listings of two software drivers for the board. VBIOS is a simple driver that provides the minimum functions required to work with CP/M, in less than 512 bytes. ICRT is a much more sophisticated driver that emulates a very smart terminal with the ability to set horizontal and vertical tab stops, insert and delete lines and characters, has full cursor control and control over the graphics modes. This driver is almost 2K in length.

I initially typed in VBIOS, assembled it and patched it into CP/M, and it worked first time. The next job was to get WordStar driving the board correctly. Although this appeared easy, I soon ran into a problem — WordStar will only drive video boards which use the most significant bit of a memory location to set inverse video. It used this technique to display the cursor, and I used it successfully with the 640.

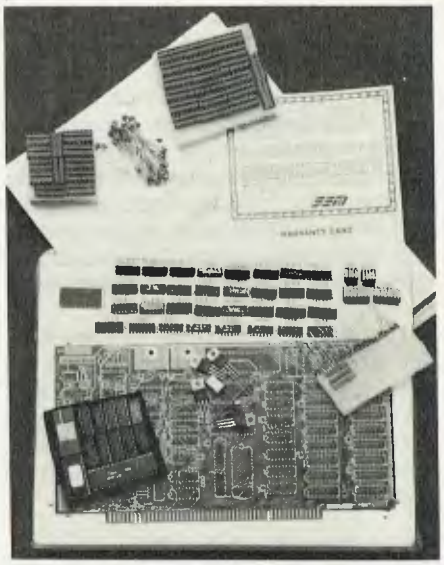
The VB3 ignores the most significant bit in standard text mode; instead the cursor is set by storing its location into two registers in the VTAC chip. WordStar didn't know how to do this. I wrote a routine which updates the registers whenever WordStar moves the cursor, but WordStar doesn't call it when storing characters on the screen. The result is somewhat disconcerting at first: the cursor movement commands all work fine, but the cursor doesn't move as you type in text. I'm still trying to think of an easy fix for this problem.

An easy way out, of course, is to implement the ICRT smart terminal emulator, and set up WordStar as though it's driving a serial terminal, and as soon as I find a spare 2K of memory I'll do that.

The display is clear and stable, and easily readable. Initially I used the board with a converted TV set of considerable vintage and restricted bandwidth, and even on that the display was readable. On a proper 18MHz monitor, though, the characters are quite crisp. Using the memory bank switching circuit, the board is disabled except when actually being driven, so that processor activity on the bus does not cause any flickering or streaks on the screen, a common problem with memory-mapped video.

I presently have two video drivers, one for 80 × 24 and one for 80 × 46 operation. The 80 × 46 mode imposes a bit more eyestrain, but after using it for a short period it looks quite natural, and the 24-line characters appear huge and mis--shapen in comparison.

The line graphics are of dubious value. I haven't seriously tried to do anything with them, preferring the chunky graphics instead, using a modified version of the grafix program given in the first issue. □



Specifications and Report Card

Unit:	VB3 Video Display
Made By:	SSM
Clock Speed:	Up to 5 MHz
RAM:	4K standard, optionally 8K
ROM:	Character generator, optional 2716
I/O:	Memory mapped plus I/O ports
Keyboard:	Input for keyboard
Display:	80 × 24 standard, up to 132 columns, 51 lines
Graphics:	4 × 2 cells in each character position, plus line graphics attaches to video monitor
Peripherals:	Attaches to video monitor
Expansion:	Extra memory
Best Points:	Versatile highlighting options
Worst Points:	Won't work in memory-mapped mode with WordStar

Ratings:	**excellent**	**good**	**well, maybe**	**poor**
Documentation		✓		
Ease of Use		✓		
Functionality	✓			
Support	✓			
Value-for-money		✓		

Options:	Extra 4K RAM, Eprom character generator
Price:	$495 plus tax, (kit), $525 plus tax (assembled)

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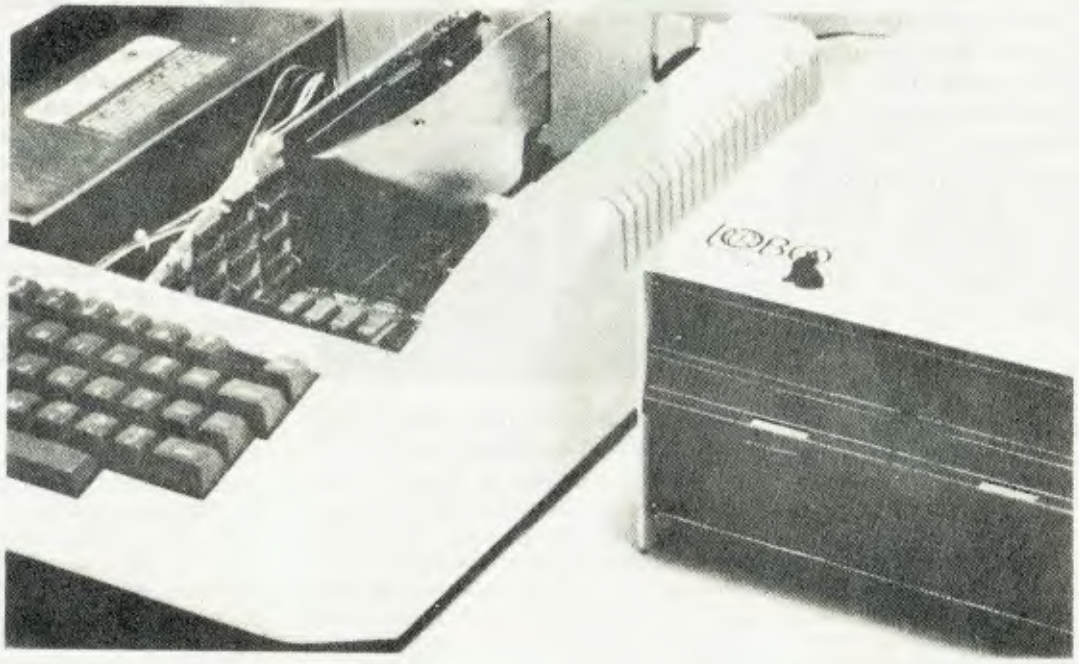

FEATURES

- Runs up to four 8" floppy disk drives
- Runs double-density double-sided 8" floppys at full capacity
- Compatible with APPLE 3.3 DOS and PASCAL (CP/M available soon)
- Runs in slot 1-7

New LOBO Drives LCA-22 fills the gap in the APPLE ™ controller market by providing the means to run double-density drives at their full capacity. This allows use of 2.2 megabytes of storage on a dual double-sided double-density 8" floppy disk drive. These 8" drives, give you 15 times the storage capacity of 5 1/4" drives. This development makes it possible to run true business applications on the APPLE ™ without the constant necessity for swapping out diskettes as they become full.

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CASH

Here Comes ... Supercomputer

Early microcomputers were often designed around the S-100 bus system, an interconnection scheme that allows memory boards and the like from one manufacturer to run with another's type of CPU board. The S-100 'standard' has prospered, and many of the biggest and most advanced personal computers are now based on it. Recently AED Microcomputers introduced a new system, and LES BELL checked it out.

IF YOU WANT the benefits of a huge software base, high performance CPU and an unrivalled selection of peripherals, then most users would agree there's no substitute for an S-100 bus computer running CP/M.

It provides a range of facilities that manufacturers such as Apple, Tandy, et al cannot afford to offer, including some of the best business software around.

AED Microcomputers has been supplying S-100 boards and systems for a couple of years now, generally boards from Morrow, Godbout and SSM, although it has some card designs of its own. Its latest system, the Supercomputer, is based on cards from these manufacturers, installed in AED's own cabinetry and desks.

AED claims the capabilities of the system software it supplies — which includes two unusual products, SUPERAED and Smartkey — makes the Supercomputer the most powerful S-100 system in the world.

The Supercomputer is available in several physical configurations. There is a choice of two desk (perhaps the best for office applications), as well as desk-top cases for the computer and disk drives, or a rack-mount version. The desks were well finished, and contributed to a neat and professional appearance for the system.

The selection of cards dictates the electronic configuration of the system. The CPU can be either a Godbout Z-80 card, running at 4 MHz or a dual 8085/8088 board which offers 5 MHz operation and the ability to run 16-bit software. 64K of static RAM is supplied as standard.

The disk controller is usually a Disc Jockey, which we reviewed three issues ago. Two double-sided YE=Data drives are supplied, for a total disk storage of 2.4 Mbytes. A Discus M26 26Mbyte hard disk can be supplied as an option. Alternatively, a Godbout DMA 1 disk controller can be installed.

Printer I/O varies, depending on the user's requirements. For a Centronics-interfaced printer such as the MX-80, an AED PPI-01 will provide two printer ports, while if word processor quality is required, AED will supply a NEC Spinwriter with a Micropro I/O Master driver card.

The standard console is AED's Unserial Terminal. Based on the SSM VB3 board (reviewed in this issue), the Unserial is actually a keyboard and video display attached to a memory-mapped video board, plus a special driver routine. According to AED, this offers the ability to emulate all the most common serial terminals, while operating at a higher speed.

AED's Wayne Wilson told me that this has already endeared the Unserial terminal to several customers who bought business software only to find it was configured for a different brand of terminal to their standard choice. By reconfiguring the Unserial, they effectively had a new terminal which would respond correctly to the control codes.

A wide bandwidth green phosphor monitor is standard. Alternatively, a Sanyo monitor can be supplied. The keyboard is a high quality Honeywell Hall effect keyboard, with extra user-definable keys (on which more later). This keyboard is very reliable, with no failures reported in over 100 units in the field over periods of up to 2 years.

The Supercomputer is supplied with either a Morrow mother-board or the new Godbout motherboard which is recommended for bus speeds up to 12 MHz. Finally, the system has a 20A power supply designed by AED. Cooling fans keep the temperature inside the cabinet to 7 degrees C above Ambient.

The overall impression is of a solid, well-built unit of advanced design and construction, which will support advanced business and scientific applications.

System Software

The Supercomputer is supplied with CP/M version 2.2, and AED claims that as new versions of CP/M are released, it will be able to support them almost immediately. What makes the Supercomputer stand out from the crowd, however, is the provision of the two custom software packages which add features found on no other computer.

Softkey patches into the CP/M BIOS, and provides the ability to redefine the codes associated with each key on the keyboard.

It is intended to be used with the standard keyboard, which can present the computer with a full 8-bit code. This means that the 7-bit ASCII codes can be left alone while the codes with bit 7 set can be redefined. Thus the top row of function keys on the keyboard can be redefined to provide text editor function strings, or assigned to BASIC keywords such as PRINT, RUN, and so on.

Any of the keys can have a string assigned to it of almost any length (within reason), which saves retyping a lot of command sequences in rather the same way as SUBMIT can save a lot of work. Best of all, though, is the SAVEKEY utility, which will save a set of key assignments for later use. Thus it's possible to have a number of different keyboard overlays available for different jobs.

The Unserial Terminal is really a software product, and so rates a mention here. This routine can simulate the behaviour of the Lear Seigler ADM-3, Soroc IQ-120 and other popular terminals

in software, and since there is no serial link to the terminal, it will run faster in most cases. It turns out that for the computer to manage the screen is quicker, although multi-user systems will start to pay a penalty as the screen management ties up the processor.

Several unusual features make the Unserial even more useful. For example, it can supply an audio feedback 'beep' when a keystroke is captured by the computer — not when the key is pressed, but when the computer accepts it, which is a different thing.

The Unserial has a bell (which the basic VB3 hasn't — its major disadvantage) and for those who need it, the Unserial can be set up to provide an 80 × 46 display. In addition it provides access to all the VB3's highlighting modes and attributes.

But the thing that really makes the Supercomputer stand out is SUPERAED, a special monitor program which can co-exist with CP/M and not interfere with it in any way. SUPERAED Provides a number of unique functions.

SUPERAED lives in the top 4K of memory, and provides the usual monitor commands to examine and change memory, ASCII dump, and execute memory from a location. It also provides the port input and output commands that DDT lacks. There's a search command for either a byte or a word, and a block move command.

SUPERAED also provides some special commands for disk system debugging. The DISK command will bootstrap the disk system, while the DRIVE command will select the drive for subsequent operations. Then the READ and WRITE commands can be used to transfer data to and from the disk from any location in memory.

A unique feature of SUPERAED is a memory test which executes in background mode, automatically informing the operator if memory is faulty. This can be turned off, speeding the computer up slightly.

The system's keyboard can be locked up while the operator is not present, and will stay that way until an appropriate password is entered.

Instead of accepting input from the keyboard, the modified system can input characters from an input buffer maintained by SUPERAED. This can be used to provide a 'SUBMIT-like' facility, particularly useful in the creation of menus for turn-key systems.

Another SUPERAED feature that is particularly useful in turn-keys is the ability to filter out Ctrl-Cs from the keyboard input. This will prevent the operator from accidentally (or intentionally) interrupting programs. As a further aid to turnkey system developers, SUPERAED can automatically run a program after every warm boot.

Finally, SUPERAED has a command which will transfer screen pages from memory to the screen. Actually there are two commands: one does a straight transfer, the other can be used to overlay graphics onto pre-existing text.

All of these functions are available while a program is running under CP/M, without influencing the running program in any way (except to temporarily suspend it while SUPERAED is executing). Even the screen in unaffected. The company claims this was the most difficult part of the whole software development project, and consumed a major part of the budget (which ran into tens of thousands of dollars for SUPERAED alone).

What Do We think?

Even allowing for our predeliction for S-100 systems, we were impressed by the Supercomputer.

The biggest problem with S-100 systems has traditionally been getting all of the boards from different suppliers to work together, and keep working — something no commercial user could afford to do unless he was also a dedicated enthusiast.

The Supercomputer incorporates top-of-the-range boards from several different manufacturers which are guaranteed to work together — AED has taken care of that.

A typical Supercomputer configuration with 64K of RAM, dual floppies, Unserial terminal and so on in desktop cases will cost approximately $6500 excluding a printer. The desk mounted versions are around $250 higher. □

Specifications and Report Card

Unit:	Supercomputer
Made By:	AED Microcomputers, 130 Military Road, Guildford
Processor:	Z-80 or 8085/8088 dual processor
Clock Speed:	4 or 5 MHz
RAM:	64 K
ROM:	2 K
I/O:	24 bits parallel, keyboard, video
Languages:	BASIC, Fortran, Cobol, C, Pascal, Assembler
Keyboard:	Honeywell with user-definable keys
Display:	up to 80 × 46
Graphics:	up to 160 × 196 dot graphics
Peripherals:	2.4 Mbyte floppy disks
Expansion:	S-100
Best Points:	Unserial terminal software, Softkey, SUPERAED, the fact that it's S-100
Worst Points:	No obvious failings

Ratings:	**excellent**	**good**	**well, maybe**	**poor**
Documentation		✓		
Ease of Use		✓		
Functionality	✓			
Support		✓		
Value-for-money		✓		

Extras included:	NA
Options:	Hard disk, Spinwriter printer, desk mounting
Price:	$6500
Review unit from:	AED Microcomputers

HEARD ON THE BUS

By LEON YENDOR

YOU HAVE probably read many reports recently of big name manufacturers who are now getting onto the micro bandwagon and offering the software that many of us have been using for years as if it were their latest hot product.

Bill Bolton mentioned in his CP/M column last month the Xerox 820 and forecast a 'Softcard' type adaptor for the HP-85. By now the news has been broken that Hewlett-Packard has gone the full trip with the HP-125 having CP/M as its standard OS and you will probably see a report in this issue on the new IBM personal computer which runs CP/M-86 on an Intel 8088 based machine. Less obvious entries in the parade of illustrious late joiners include, Advanced Micro Devices (whose Amdos is virtually CP/M, as well as National semiconductor (its Microsystem 6600 runs CP/M on either an 8080 or a Z-80) and Mitsubishi is offering CP/M-86 for use with a 3 board 8086 set.

I'm sure I must have missed someone but there will still be more coming along so what does this portend for the industry?

Those of faint heart and little faith will be quivering at what they see as a takeover by the giants of the microcomputer industry, but I cannot agree. Unless they buy up all, or most of the little companies and independent software writers, the biggies will let us remain ahead, being unable to compete in a field that is developing so fast that we need light-footed entrepreneurs to stay with the trends.

The only people who need to worry as I see it are those who had nothing to offer but a low price. Potential customers for those machines might well opt for IBM's cheapie as the support will be better. Those looking for not quite state-of-the art machines (for example the proven leading edge) will see that in terms of expandable multiply sourced hardware the giants will have little to offer.

IBM was rumoured to be going to use the IEEE 696 bus but I don't think that went over too well in the rarefied atmosphere where such decisions are ultimately made. Imagine the reaction to the thought of some hobbyist offering an add-on board for an IBM product!!

The important question for those of us who decide to stay is whether or not the imprimatur of the mammoths has made

standards of the hardware and software they have chosen to adopt.

Again my opinion is that we will still be a powerful force in charting the future course of micros.

It is established that in the 8 bit world at least, if you want the widest choices of hardware and software potential you will be running an 8080 derivative CPU on the IEEE 696 (S-100) bus and running CP/M. This is an area that any big company could move into with absolute safety and conservatism, but the 16 bit area is not settled yet particularly with regards to operating systems.

Digital Research has modelled CP/M-86 on CP/M 2.2 but has been forced to make major changes in their multi-user philosophy when writing MP/M 86. Some Unix aromas are drifting out but no one can tell yet if their efforts will be enough to head off the pressure for a more portable OS.

You can be sure that by the time the larger companies have found out what you people in the market place want most of you will have had the benefit without their blessing.

Those who have waited for approval from big daddy haven't enjoyed the fun or the benefits the rest of us have had in the 8 bit field and it will be the same with the multi-user and 16 bit machines in the future.

Source for the goose?

Readers of the fine print, (you mean you don't read every word we print?) may have noticed that our editor and publisher both have TCY followed by three digits listed under a heading, 'Source Mail', in the publisher's notice on the Editor's page.

These are not ham radio call signs but a sign of the times and refer to computerised post office boxes in a large computer network called, The Source.

The system is physically located in the USA but can be accessed from Australia via the OTC's Midas link. This wasn't intended as a commercial for the system, so you will have to seek elsewhere for details. One thing you will find out if you want to get on this system, is that Telecom wants to get in on the act.

To communicate over telephone lines you must either have a dedicated line or an acoustic coupler. The high price of a dedicated line would be enough to keep out the average microcomputer user and besides that his equipment probably wouldn't be approved for connection to the modem anyway. That requirement for approval is what stirs me to write on this subject.

As an engineer I have seen enough kludgy bits of gear in the microcomputer world to understand Telecom's rule that only equipment which meets standards should be allowed to be wired into their lines or modems.

A linesman could get an unpleasant shock of the 240 volt kind if some careless twit hooked up the wrong wires but I have yet to see a telephone damaged by noise of the acoustic variety.

Yes, you guessed it, you have to have an approved acoustic coupler and big brother doesn't like two of these talking to one another either.

What a load of bureaucratic nonsense.

There is no justification for this rule on technical grounds. I am sure the bureaucracy is ready to collect fees and maintain the paternalistic hogwash that all wisdom resides with the chosen few who work for the communications monopoly.

My guess is that a lot of hobby computers are already talking to each other using some form of audio signal over the phone lines, and eventually, as with CB radio, the *fait accompli* will just have to be accepted.

Meanwhile, if you feel like ringing Telecom to complain please make sure you are using an approved voicebox, with a metalised mylar approval sticker fitted or they might get you on another breach. □

LINTON-SIMPKINS

Catching 15th Century Ned Kellys with an IBM 4331

THE AMERICANS are a curious people and one more curious than many is Dr Robert I Woods Jnr, a history professor at Pomona College, California.

Disregarding the historic warnings and forgetting recent ones by Damon Runyon, Professor Woods is trying to find out if UK Justices of the Peace during the fifteenth century were on the take.

One recalls Runyon's words, "I never ask anything around this town because pretty soon you will gain a reputation as being a man who wishes to find things out."

Professor Woods was intrigued by the question whether the JPs of his target century were "true spokesmen of the people, or were they a bunch of local politicians on the take?"

As a small comment of my own, let me say that they were probably representative of the people of the times and also on the take, but Professor Woods simply had to find out.

It also seems to me from the reading of history that I have done that the concept of impartial judgement rendered without fear or favour and without payment from litigants to ensure success, is a comparatively new one — so new in fact, that I would hesitate to say that it has yet achieved universal acknowledgement even in our sunburnt country.

Professor Woods prefers a less empirical approach than one's breathless wonder at certain verdicts. He, unlike Diogenes, is using an IBM 4331 computer instead of a lantern in his search for both honest and dishonest men.

Not only is Professor Woods so obsessed with the honesty of JPs that he is using a modern and very fast computer to perform a judicial audit, but he has amassed more than 100,000 records culled from Britain's archives and concerning 2800 JPs who served in the period from 1485 to 1537.

With the aid of his trusty and well-beloved 4331, he has found that the names of these 2800 people crop up a mere 34,000 times in the archives. But that isn't all, because the professor expects the number of mentions to double by the time he completes his, I would have thought, totally unnecessary work.

Professor Woods describes his work as an attempt to reveal the past and the human condition in England's early Renaissance period.

Why JPs one might ask? Well, Professor Woods says that they were a central institution of the low-end politics and that his study could shed light on modern ideas of political bodies and perhaps contribute to an understanding of how modern democracy and law evolved.

The golden rule, as a wise man once said, is that he who has the gold makes the rules and in the fifteenth century it was royalty and the nobility. It hasn't changed a bit, but the personnel and the titles have altered among the royalty.

Already, the computer studies have shown some indication of what any reasonable man might have expected, the JPs appear to have been bought off by the Tudor Monarchy. Admittedly the Tudors were perhaps not the cream of the various dynasties that have passed across the English throne and on occasions passed out on it, but to fix a whole regiment of JPs was a dynastic achievement of the highest order.

The period of the professor's study followed a century of war and the kings and their courts wanted stability and peace to replenish their privy purses, the JPs and their courts could surely help. Accordingly, says Professor Woods, they were willing to pay a price for this peace through a system that may have been a variant of the much-honoured political tradition of one hand washing the other.

The computer has allowed the professor to focus on individual justices and to reconstruct their records over 20 years. The idea is to flush out the indicators that suggest shifts in the justice's income or property holdings.

Professor Woods' algorithm is simply the mental one used by a helpless electorate to analyse the position where a politician recently elected switches from an economy car and a modest home to a limousine and a home in the country.

Using data base management programs and user-friendly software the 4331 can provide the researcher with rapid answers to research questions.

Some of the questions posed by Professor Woods were: Who received royal commissions to be JPs during what dates? With what powers? What were the educational and social prerequisites? Were JPs selected on their landed wealth or liquid wealth? How did Henry VIII's government recognise a qualified justice? Did the real power of the JPs derive from their social influence or from the King's authority?

Speaking of his use of the IBM 4331 Professor Woods said that "You can reach into the middle of a record to get at information. You can see relationships between records, as for example the existence of a marriage, which further helps to identify a particular JP."

Also the computer can automatically correct for calendar differences. One calendar, the Regnal one, expresses dates in terms of the years of a king's reign. Dates expressed in that form are easier to handle if converted into today's Gregorian calendar.

Supposing the study should be done, Professor Woods feels that without the computer the assignment would take 30 to 40 years to complete.

I'll bet that when he gets it all done he'll find that fifteenth century JPs had an approach to life not far different to our most beloved folk hero. □

CASE HISTORY

A LITTLE Apple II Plus is making life a great deal easier for Geoff Tarrant and his 30-or-so design engineers and draughtsmen working 19 floors above the busy streets of North Sydney.

Geoff is design manager of McNiece Engineering Pty Ltd, a subsidiary of the giant Victorian McNiece Bros organisation.

Down there in Bendigo, they've got a HP 2000 series machinebut Geoff and his staff are more than happy with what they're achieving with their micro which they've had for just a few weeks.

The major works carried out by McNiece Engineering are the design and construction of materials handling conveyor systems of often quite gargantuan proportions, like the 6.2km of overland coal conveyors operating between the new Wyee rail balloon loop and Vales Point power station for the Electricity Commission of New South Wales.

Throughout the length of this conveyor system there are five changes of direction. New French technology to which McNiece Engineering has access, will in future eliminate the need for abrupt direction changes with curved conveyor belting. Using this new technology the company is confident of winning major contracts with highly competitive tender prices and reduced construction time.

The problems in designing long, overland conveyors are immense. Required volume and speed of delivery necessitate countless mathematical calculations if the supporting structure, bearings, belt and drive motors are to do their job. These calculations are conditional on the variables of weather, terrain, gradients and quite a few other things.

Naturally, there are books of tables to help with the calculations but, when done manually — either with pencil and paper or on a calculator — each time-consuming step must be taken. And, the more steps in a calculation, the more chance there is for human error. With his Apple, Geoff Tarrant is eliminating this risk factor and significantly speeding up the work of calculation.

In the simplest terms, all Geoff and his design engineers need to do now is feed the variables into the program which contains the calculating tables and out pops the answer.

Well, it's not quite that simple but as neither, I, nor most of you, are engineers, there's not much point in getting right down to the nitty gritty.

It does mean, though, that draughtsmen receive much more detailed information about the section for which each is preparing the plan so that his work is accelerated.

Shortly, it is proposed to produce

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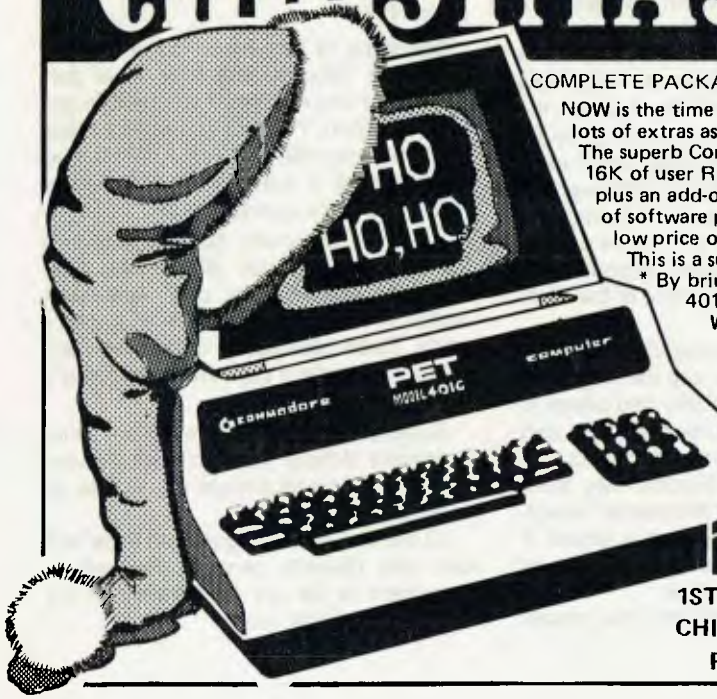

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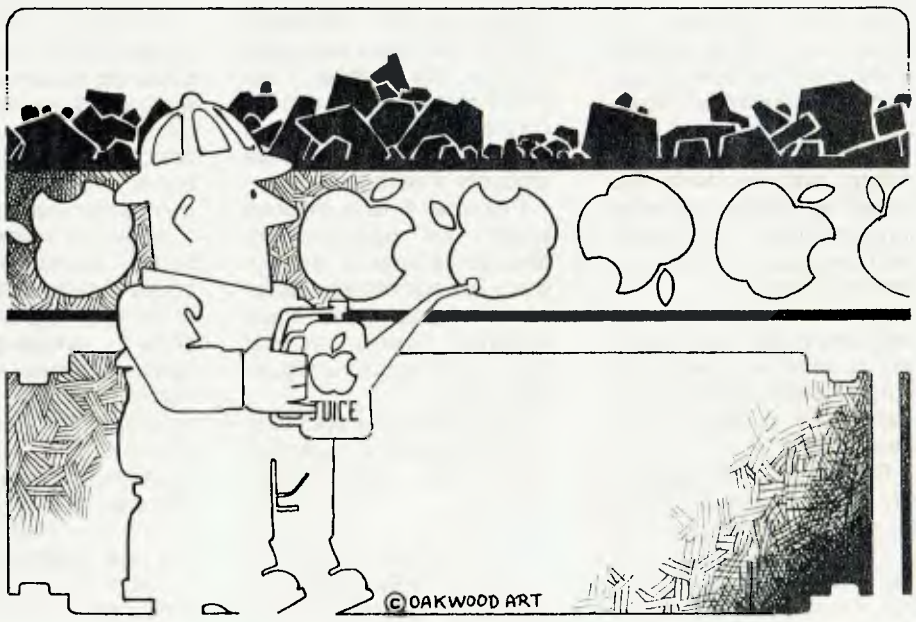
graphic representations in the form of sectional drawings to further clarify the requirements for the draughtsmen.

Geoff Tarrant said he chose the Apple II Plus from City Personal Computers because of the availability of software suitable for his needs and because of its graphics capability.

Geoff says: "What I'm really doing is using it as a test machine so that I can become computer literate at little cost whilst achieving valuable and highly useable output.

"Also, by developing programs on the Apple there will be little time wastage in the transition to a more powerful machine when our demands require the purchase of a mainframe."

He would retain the Apple even if the company did buy a more powerful machine at a later date because of its real value in being available for small tasks that could not economically be run on a mainframe. □



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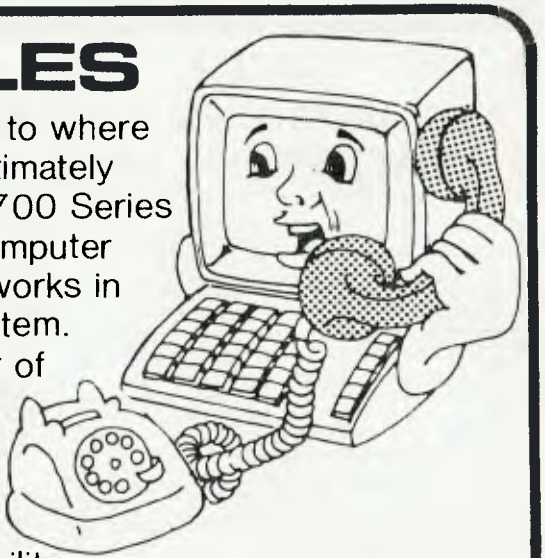

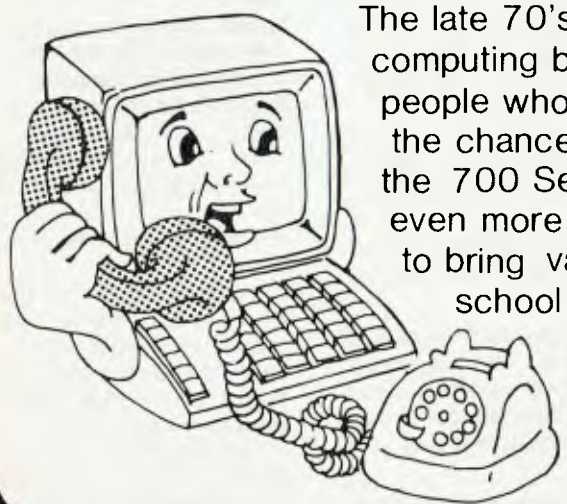

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Flexitime Computers

PRODUCTION control, plant scheduling, job costing and payroll preparation are basic functions which in contemporary Australian industry are being effected more and more scientifically, using computers or microprocessors.

However, electronic technology, even worldwide, has barely recognised the working operatives — the people who are to achieve the programmed output.

In the majority of cases their time is monitored manually by what we know as the bundy clock or the clock card method, a practice dating back to 1810.

But Bell & Howell Australia Pty Ltd, have come up with the most advanced alternative.

The system, known as Plantime 4 is a unique development in the control of time attendance recording and flexible working hours.

"Flexible hours can help staff and management work together to achieve greater overall harmony," said Bell & Howell Australia's managing director, Bill Cutbush, "but only if control is such that accurate records of hours worked are kept without huge amounts of clerical work."

Plantime 4 is a modular system for recording the attendance time of employees — on normal attendance recording, staggered hours working, flexible working hours, shift working and part-time work.

Technically, the system is micro-processor operated and totally electronic in function.

It uses the unique method of a small binary encoded nylon key, entirely suitable for attachent to a conventional key fob or ring.

Each employee carries such a key which is inserted into a time recording terminal on arrival and departure.

As each key is exclusive to its user and his company and since the system will not operate with a non-valid key, all information is kept confidential to the individual employee but is available to management when needed.

When the yellow key is inserted, the terminal's liquid crystal display changes from a 24-hour digital clock to show exclusively key number, actual hours and minutes worked in the period, variance with target hours (or overtime if time attendance recording), infringements or lateness and whether the user is keying in or out.

It also displays a warning signal if the employee has previously forgotten to key in or out.

On the basic system up to 2000 staffers can use any of up to 32 time terminals in office or factory to check in at one and out at another without restriction.

Part-time workers, security staff, telephonists, receptionists, personnel keeping variable hours and fixed hours staff can all be accommodated in the system automatically.

"At the centre each transaction is printed automatically," says Mr White, Bell and Howell Australia's Plantime sales manager.

"Additionally, the printer can show all details of flexible hours rules infringements, the attendance situation at any time analysed by department or types of employee and so on.

"If employee time data is required for salary purposes or incentive schemes, it can be produced for computers on compatible media or as a printout.

"And Plantime can feed all the required information needed for an electronic payroll system."

Mr White says that Plantime 4 employs the RS 232 interface and, being the most common used, is consequently compatible with almost any computer.

"In Europe there are over 1500 installations with the product still selling very strongly."

"In Australia to date 14 installations have been effected and the sales climate is such that we are enthusiastic about the prospective marketplace.

"We are currently talking to organizations with multiple shifts and difficult overtime hours such as clubs, hospitals and airlines."

Mr White says that, although Plantime's capital outlay is slightly more than a conventional bundy clock, its operational costs are minimal.

"We see recovery of capital investment as taking about two years."

For more information; Bell & Howell Australia Pty. Ltd., Time Systems Division, Business Equipment Group, GPO Box 4778, Sydney, NSW 2001. □

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ERA Moves with the times

ELECTRONICS Research Australia, the Canberra based computer hardware manufacturer, is the latest in a long line of computer producers to be enticed to set up operations in Melbourne.

An agreement finalised several weeks ago provides the company with State Government financial assistance to make the move.

It is likely that the company will move its operations to the suburb of Clayton which is near Monash University, centre of a great deal of computer-based research.

The move is part of the Victorian Government's attempt to make Melbourne the computer and technology capital

of Australia to compensate for the move of the money market to Sydney in recent years.

ERA has also recently announced a move to join with Tycho Computing to conduct the first major Australian developed total systems software project.

ERA's success has also reached Asia with the sale of the company's first minicomputer on the highly competitive Singapore market in June. □

Computer Salvage: The New Industry

ADVANCES in technology are breeding a new form of salvage operation.

It's the computer salvage, and a company has already been set up in Brisbane to capitalise on the new industry.

Electronic Salvage, run by Peter Cullen and George Skene, has decided that the home computer buff needs a little help in obtaining components, many of which are relatively hard to get on the open market.

It has been breaking down old computers and revitalising the reuseable parts. These used computer components are then offered back to the home computer builder at what would appear to be reasonable prices.

The firm, which is located in Albert Street, Goodna, says the components which are of most interest are those which are available for building power supplies.

They have a wide range of parts including blowers, memory boards, boards containing useful TTL and IC's as well as keyboards.

It is obviously an industry which will boom with the growth of home computers and a building up of general knowledge about computer use and construction. □

Commodore in Schools

ACCORDING to United States market research quoted in Sydney recently by Commodore's chief local executive, the company is now the world's leading supplier of microcomputers for schools.

Nigel Shepherd of the Commodore Information Centre, Sydney, said the Commodore micro had proved most successful in Australian universities.

In reporting on the company's educational use sales, Mr Shepherd predicted the company would gain market leadership in Australia by the end of 1981.

"State school systems overseas are buying Commodore in bulk, on the basis of low cost related to peak performance," he said.

"Pricing has enabled them to put more computers on student desks without straining tight educational budgets," said Mr Shepherd, quoting examples from Germany, Canada and the USA.

"In Australia, Commodore has been best received in universities and other tertiary educational establishments.

"We are now concentrating on secondary schools by offering a free PET with every Commodore 3000 system.

"The 3000 computer system is for school administrative use — compilation of pupils' records and course programmes — while the PETs are for student use." □

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One of the most incredibly executed arcade games ever for the TRS80. The program features a real time **LUNAR LANDER** which you attempt to manoeuvre across a rugged lunar landscape to a safe landing site. With approximately 10 landing sites to choose from, you select the one that suits your skill. Also included in a hidden ravine is a refueling station and for the grand master a special 900 point landing site. Great sound effects.

Available for TRS80 Model 1 & 3 and System 80 16K tape $19.50. Also for ATARI 24K tape to disk requires joystick $19.50.

THE CURSE OF CROWLEY MANOR

The scene is London in 1913. Scotland Yard is buzzing with the news – there's been a murder at the Crowley Estate! What starts out as a simple investigation turns into a trip into the depths of the occult as you try to solve the CURSE OF CROWLEY MANOR

This program uses many unique plot twists and strange devices to guide you through a victory, or a certain trip to the gates of hell

This adventure is sure to keep you riveted to your computer screen waiting for the next axe to fall!

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A new planet? . . . Maybe!

BRACE YOUR tripods and hold on to your telescopes: the Solar System may have 10 planets, not nine.

No one has actually seen this new planet — nor are astronomers certain it exists.

But recent computer studies and planetary observations by the US Naval Observatory (USNO) have sparked renewed interest in the theory that yet another celestial object — too faint to be seen with the naked eye — is circling the sun.

So far the observatory's "search" has been conducted largely with an IBM 4341 processor, a computer which is routinely fed a rich diet of astronomical data to plot past, present and future locations of the planets for navigational and other uses.

But soon the observatory plans to expand its efforts from the computer room to the night sky to track down this mysterious orb, explained Kenneth Seidelmann, director of the observatory's Nautical Almanac Office.

Seidelmann said he expects the "trial" search to begin "in the next couple of months."

If astronomers should find something, it would mark the first discovery of a major planet since Clyde Tombaugh of the Lowell Observatory discovered Pluto in 1930. □

Computer Drafting Made Easy

COMPUTER-AIDED drafting is being made easier with with publication of *CA Drafting for Australian Industry*, released by the Productivity Promotion Council of Australia (PPCA).

The book is a valuable guide which is written for organisations who are either unaware of the potential, or lack the resources, to evaluate CA Drafting.

It contains extensive checklists for evaluation, selection and use of these systems. A glossary of terms and details on Australian sources of information, suppliers and CA Drafting bureaux is very useful.

Frequent revision, repetition, and complexity are each factors which make CA Drafting cost effective.

Drawings in the building industry typically have between seven and 14 revisions. Most organisations will find their drawings are very repetitive with similar dimensions, components, and component layout. Complex mathematical shapes such as in the aerospace industry are easily and accurately drawn.

Today, even small organisations are taking advantage of CA Drafting. At the beginning of this year there were 30 CA Drafting systems installed in Australia and new installations are averaging two each month.

CA Drafting for Australian Industry was prepared for PPCA by the Association of Computer Aided Drafting (ACADS). It is available from all PPCA State Offices. The price is $14.95.

For further information, contact Chris Guerin on (03) 665 6486.

Vector's New Remote Facility

IN A MOVE toward building distributed data capability, Dicker Data Projects Pty. Ltd. has just announced new communications software which can link up any Vector data or word processor to a remote Vector system, as well as to other makes of data and word processing systems.

The new software, called RBTE — (Remote Batch Terminal Emulator) makes it possible for any Vector system — 3005, 2600, 2800, System B and the lowest priced unit, the VIP (Vector Intelligent Partner) — to emulate a number of IBM remote batch terminals, including the 2780, 3780, 2770, 3741, and 2961.

Primary use of RBTE software is to expedite remote job entry, or data distribution, by transferring complete files between Vector systems; or between a Vector system and another make of data or word processor which is equipped with RBTE software, or compatible terminal emulation capability.

RBTE software requires bisynchronous modems; transmission rates can be up to 240 characters/second over a leased, conditioned line.

The RBTE binary synchronous communications protocol used by IBM remote batch terminals is an industry standard and is used in many mini or mainframe computer installations for communications operations.

"This new software makes it possible to readily expand use of Vector equipment into mainframe based distributed processing or data entry, since it can relieve the mainframe of these tasks, thus making more of its capacity available for higher priority centralized data processing," says Fiona Dicker, marketing manager of Dicker Data.

Vector's RBTE permits sending and receiving several files simultaneously. A transmitting operator can enter all file names to be transferred in advance and the system will send them in sequence. RBTE receives multiple files automatically and assigns them a sequentially numbered name. As an aid to system monitoring, a diagnostic trace appears on the screen while files are being transmitted, enabling the operator to trace and diagnose communications problems without a separate oscilloscope. □

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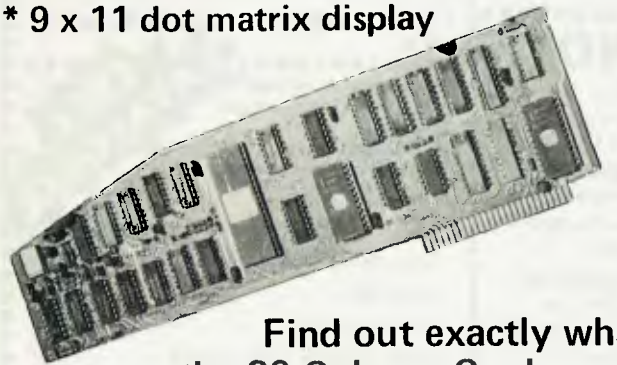

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nz newsletter

YOUR COMPUTER *is now being distributed in New Zealand. So we sent ex-Kiwi FRED SYMES over there to drum up a bit of interest and, between drinks with his old journalist, PR and advertising mates, he probably did. We asked him to tell us what is happening with micros over there. "Costing heaps!" was part of his reply. For the rest of what he said, read on. . .*

THE MICROCOMPUTER scene in New Zealand is a bit like the curate's egg. Some of it is very good, the rest is a real disappointment.

Let's look at the bad part first.

The cost of micros across the Tasman is astronomical compared to prices in Australia. And it's not because the New Zealand distributors and dealers are putting on exhorbitant markups.

No, the answer lies in the rapidly falling value of the NZ$ (it fell by almost one percent during the 12 days I was there in late July) and the government's massive 40 percent sales tax rake-off.

To know what this really means, take the Vector, which Dicker Data Projects advertise in *Your Computer* at a purchase price of $4600. You have to feel sorry for Eycke Zimmermann of the Computer Store in Auckland. He has to sell the same machine for NZ$8653!

The Sinclair ZX80 costs the Kiwi about $400 of his hard-earned cash.

Looking at that another way, it costs the New Zealander close to two weeks pay whereas his Aussie cousin need only fork out about two-thirds of one week's wage.

Small wonder the home-user/hobby market is non-existent in New Zealand. One wonders, too, how many Australian dealers would have to close up shop if the same situation applied here.

The present circumstance suggests it will be a long time before micros find their way into New Zealand homes. Hell, the video cassette is only just appearing on the scene at prices, wait for it, ranging from about NZ$2300 to NZ$3000.

But probably the most disappointing discovery during my visit to Auckland and Wellington was the unawareness of micros at best, and total rejection of them (at worst) by so many people I spoke with. All the old fallacies about machines taking over, people being put out of work, and the fear that you need a Mensa Club IQ to understand computers were trotted out.

In summary, the bad news is it will be a long time before the adult (mark that word) population of New Zealand becomes computer literate.

Now for the good news.

Because the government waives sales tax on computers sold to schools, this area of business is attracting a great deal of attention from dealers. The result is New Zealand children are being exposed to the world of computers in relatively greater numbers than is the case in Australia.

The Department of Education's policy appears to be to make as much use as possible of computers as teaching tools. Right now a quite brilliant and comprehensive program is under consideration by the department.

More Advanced

I saw part of the programe running in the department's head office in Wellington, and could easily believe the claim that it is, quite possibly, more advanced than American school software.

However, there is controversy clouding the ultimate development of the New Zealand program. (This is covered in a separate article.) But whatever the outcome, it is certain the New Zealand education computer-based curriculum will rocket ahead of Australia's.

Of course this could be remedied when Polycorp, the developer and marketer of the system, bring it to Australia later this year to demonstrate to state education authorities.

In the small business sector, the emphasis is on specialised software. With micros costing so much, businessmen insist on getting value for every cent they spend. They tend to dismiss the 'foreign' software, as they find that varying percentages of these programs are not applicable to New Zealand business needs.

The result is a very healthy customising software industry, which is also enjoying good export business. You'd be quite surprised how much of it is sold in Australia as customised software for specific clients or industries.

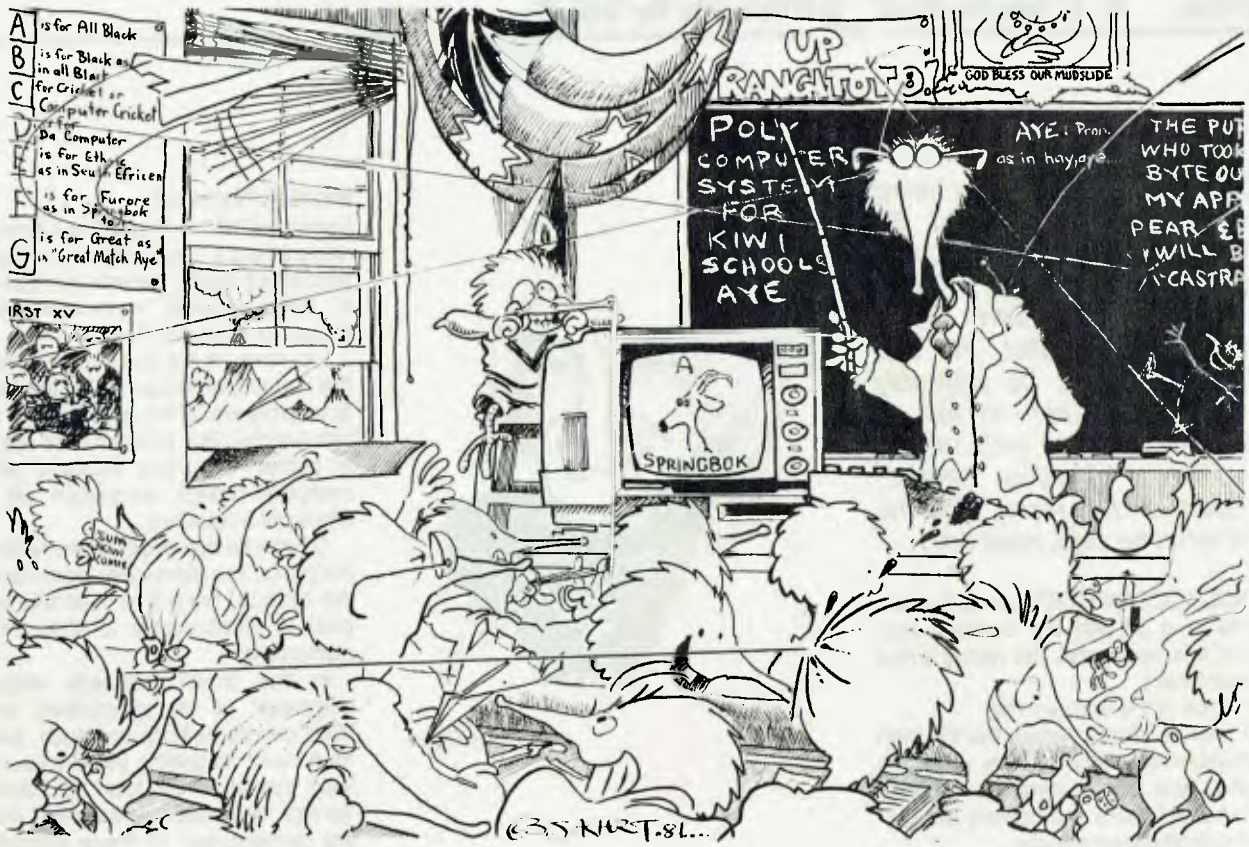
Kiwi Software

Your Computer will describe some of these programs from time to time. As an example, 15 Australian radio stations (including some of the biggest in Sydney and Melbourne) are using software designed by Trevor Forrest, of Wellington's Australasian Business Systems. He regularly comes to Australia to lecture to analysts and programmers.

We'll be hearing more, too, about Alan Pike of Computer Developments in Auckland. He and his friends have developed a new micro language, which they say beats the pants off any existing language for speed and ease of comprehension.

Your Computer should have the exclusive report on this language development in the next issue.

That then, in very general terms, is the micro scene in New Zealand. □



NZ Schools

INTEREST in computers is running a close second to the almost religious reverence in which the first XV Rugby team is held at many of New Zealand's secondary schools. A good example of this can be seen any day at Rangitoto College on Auckland's North Shore.

A State school established in the 60s to cater for the new suburbs that developed in the area once the Auckland Harbour Bridge was opened in 1959, it was one of the first in New Zealand to "go computer".

That was eight years ago, in the dark ages of school computing. It was a cumbersome black box with blinking lights and strangely mechanical grunts, a digital Equipment PDP-8, which cost $NZ5000 — a great deal of money for a school to spend on such a far-out piece of equipment in those days. Since then both Digital Equipment, and Rangitoto College's computer awareness, have come a long way.

In those early days it was pretty much a case of the blind leading the venetians. No one was all that sure what could be achieved with the computer and with 1200 pupils wanting to "give it a go" it was all a bit of a shambles.

It was a bit like the industrial revolution all over again. There were those doubting teachers who saw the machine as a waste of good money and would have delighted in smashing it with a blunt instrument. Then there were the frustrated kids, many of whom wanted to spend all day playing with the computer to the exclusion of all else.

(Obviously there were a few exceptions. *Your Computer's* occasional contributor, Fred Symes, reports that though his daughter was a pupil at Rangitoto college she never once mentioned the computer and, as recently as July she argued with him, unsuccessfully, that computers are a curse.)

The PDP-8 was not exactly powerful. It had only 4K and 3K of these were required for the language. Still, it was a start, and when the school's funds had recovered sufficiently and the board was confident there was a future in teaching computer awareness, the "old girl" was traded in on six new microcomputers with greater potential.

The micros chosen were TRS-80s. They were, and still are, housed in a tatty old classrom with the windows painted to reduce glare on the screens. But Rangitoto College has been carefully husbanding its funds and work is soon to start on the reconstruction of what the pupils fondly call "the computer complex". It will have drapes and carpet and plenty of power points for the current stable of TRS-80s plus any new equipment that might be bought.

This acceptance of computers and consequent upgrading of the "complex" is reflected in the attitude of the staff. No longer are there any doubting Thomases. No longer do they fear that pupils will become automatons. All those earlier fears have been put to rest by the comprehensive learning scheme devised by the three teachers directly involved in computer usage.

Fourth form pupils (14 yrs) use the computers as part of their social studies course. They confront the machines with a series of games and learn keyboard skills, group co-operation and decision-making.Fifth form students have a range of extra-curricular subjects from which to choose — motor maintenance and media studies are just two — but programming is a popular choice.

Sixth formers can study programming as one of their subjects for the nationally-recognised sixth form certificate. They delve into the details of computer structure, program in BASIC and explore more widely the sociological aspect of the computer in today's world.

Seventh formers (17 yrs) study com-

puting as a compulsory part of the applied mathematics course and are examined in this area for university scholarships and bursaries. During this year they learn to program in earnest and tend to forget about the fortunes of the school football team and the necessity of taking a lunch break.

Many other areas of computer utilization are being planned. Geography students will soon be able to do data analysis in population studies and science experiments will be simulated. More use will be made in the language and music departments. Teaching staff see the possibilities as endless. □

NZ Education

NEW ZEALAND secondary school pupils may soon be using a sophisticated new microcomputer-based learning system, but not before some rumblings within the computer industry settle down.

Known as the POLY system, it has been developed by the Wellington Polytechnic School of Physics, Electronics and Telecommunications Engineering, the Development Finance Corporation and Progeni. This year, Progeni (25 per cent) and DFC (75 per cent) set up a company, Polycorp, as the organisation responsible for development, marketing, production and support services demanded by the POLY learning system.

The system recently underwent a comprehensive six-week trial in a number of New Zealand schools. The results of the trial are being evaluated by the NZ Department of Education and Polycorp is confident that a decision will be made to introduce POLY to all secondary schools.

POLY stems from a system produced by the Wellington Polytechnic in 1980 to support the teaching of specific courses within the curriculum. During the almost three years the system was being developed the potential for widespread application within New Zealand's overall educational system received in-depth consideration by those involved in the project.

However, there are a few problems looming for the Poly System in that NZ microcomputer distributors believe the Government is favouring Polycorp and recommending the system to the schools without taking tenders on the other equipment available.

In fact the whole battle between the distributors and the NZ Government is beginning to hot up and the discussion over who should have the rights to supply the schools with computers is likely to become rather nasty.

Despite the fact the Poly system may be chosen for the job so it is worth looking at it even if it is later replaced by another system.

Our review is not meant to provide anything more than information about the system as we have not been able to do a comparison test between the Poly and other systems with similar functions.

In mid-1980 impetus was given to the concept (codenamed Polywog) when the DFC — a government-owned agency for the encouragement and promotion of economic development — assumed an overall management role with the aim of developing a low-cost, practical and portable system for use in secondary schools.

This policy was in keeping with the education department's desire to introduce comprehensive computer study and learning aids in the field of general subject instruction across the entire secondary school curriculum. DFC provided risk finance, project management and commercial guidance through its Applied Technology Program which exists to encourage worthwhile projects that offer both local economic benefits and potential for significant export earnings.

But, as so often happens, great ideas seldom enjoy a smooth passage to fruition. Progeni has ensured that POLY is compatible only with hardware designed in concert with the software. After all, Progeni is spending NZ$250,000 on the project. However, importers of foreign hardware are not at all happy for they can see that if the New Zealand government decides to go along with the Polycorp product all other other suppliers of hardware — and educational software — would be left out in the cold.

Fuelling the unrest is a statement by Polycorp that New Zealand's potential lead in computer-aided learning processes would "simply not be possible were we, as a country, to import one of the dated (and locally irrelevant) alternative systems which currently influence the educational prospects of many overseas children."

Apple, Commodore and Tandy are already well represented in classrooms throughout New Zealand and the suppliers wonder what will happen to these machines should POLY take precedence. Also, the education market is the major (or just about) sales outlet in New Zealand for microcomputers. □

What's a POLY

THE POLY system has been developed as an integrated package comprising:

- Individual desk-top microprocessor units.
- A teacher-oriented operating system.
- Applications packages covering the New Zealand school curriculum (not just 'traditional' computer preserves as maths and physics)

All initial courseware packages have been designed in such a way that teachers can modify them, without needing any programming experience, to suit local teaching requirements.

POLY permits the use of up to 16 separate console units connected in a loop to a single pair of disk units and a hard-copy printer. Each console has direct access to the disk and printer as required.

Any individual classroom unit may be designated as the master system controller for teaching purposes.

The inherent flexibility of the system will encourage individual student monitoring, group monitoring (with communication by the teacher in both cases) and direct communication between two or more classroom units.

Each unit is equipped with a 34cm colour video screen capable of reproducing material in up to seven colours with sharp graphics definition.

The hardware is predicted by Polycorp to have a classroom life of at least 10 years and will not require system changes that would make the initial courseware packages obsolete.

RAM supplied is 64K with 128K the maximum available. The system firmware ROM size is 20K. Graphics resolution is 480 × 240 and 8-inch disks are standard.

It is possible that Polycorp will bring the system to Australia later this year in an effort to interest educationists here. If the visit does eventuate, *Your Computer* will put POLY through its paces for a test report. □

Continued from page 26

with the HGR statement (which leaves four text lines at the bottom of the screen and displays page 1 of memory) or the HGR2 command, which displays page 2 of memory over the full screen.

In the lo-res mode (entered using the GR statement) uses the HLIN x1,x2 at y and VLIN y1,y2 AT x statements for line-drawing, and the PLOT statement to turn 'dots' on.

Hi-res shapes can be manipulated in the form of a 'shape table', using the special Applesoft commands DRAW, XDRAW, ROT, SCALE and SHLOAD. The use of shape tables is quite difficult, and particularly annoying is the difficulty of saving shape tables to disk. However, shape tables provide the key to some of the extraordinary graphics capabilities of the Apple.

Apples are available in several sizes, but usually today they are sold as 48K (of memory) system with a pair of disk drives.

The disk drives are the major disappointment of the system — only 143 Kbytes per drive (128K under CP/M) is pretty minimal, and lets down the power of the rest of the system.

The documentation supplied with the Apple is superb. All of the manuals are fairly small, and are spiral bound so that they will stay open on a flat surface. They are comprehensively indexed and easy to use, yet convenient for reference.

Specifications and Report Card

Unit:	Apple II Europlus
Made By:	Apple Computer Inc, California
Processor:	6502
Clock Speed:	2MHz
RAM:	16 Kbytes
ROM:	10 Kbytes
I/O:	Cassette interface, games paddle port, plus seven expansion slots
Display:	40 × 24 text screen, NTSC colour (PAL converter card available
Graphics:	40 × 48 GR screen, 280 × 192 HGR screen 2
Peripherals:	Full Range
Expansion:	48 Kbytes on main board, plus 16 Kbytes with language system or Microsoft RAMcard
Best points:	Wide range of software available, good support
Worst points:	the high price of add-ons, lack of standard PAL colour

Ratings:	**excellent**	**good**	**well, maybe**	**poor**
Documentation	✓			
Ease of Use		✓		
Functionality		✓		
Support		✓		
Value-for-money		✓		

Extras included:	NA
Options:	Just about anything you'd want
Price:	$1300 to $1800 basic

APF Imagination Machine

APF ELECTRONICS has been around for quite some time, making a name for itself as a manufacturer of video games and calculators.

The Imagination Machine is based on one its TV games, and it seems as though the 'personal computer' part of it was rather an afterthought. For all that, it works well.

It comes in two main parts — the MP1000 and the MPA10.

The MP1000 is basically a video game which accepts plug-in ROM cartridges. It has two hand-held controllers, which incorporate a joystick, a fire button and a numeric keypad. Thanks to the controllers, quite complex games are possible with the basic machine.

The MPA10 is the add-on computer console, with full alphanumeric keyboard and built-in cassette recorder. The MP1000 sits on top of the console, and the two are joined together by a kind of digital umbilical cord which plugs into the games unit in place of a games cartridge, and allows the computer console to use the CPU chip in the games module.

The ability to play games is not lost, however. At the back of the console is an identical socket into which games cartridges can be placed.

The keyboard is quite well constructed and complete, and the whole assembly is quite solid. A nice touch on the keyboard is the ability to enter BASIC keywords at one stroke using the top two rows of keys. The external power supply unit is solidly constructed, and avoids the maze of cables that can occur with multi-module units of this type by providing all power (including the TV set) from the one outlet.

The APF graphics are good, and are imaginatively used in some of the games. The alphanumeric display is only 32 characters across by 16 lines down, but it provides clear and easily-readable characters.

There are two graphics modes, trading off resolution against colour capability. Mode 1 allows 128 × 192 with eight colours, while mode 2 'steals' one bit of the colour information to provide 265 × 192 with only four colours. Because of the circuitry of the Imagination Machine, it would be inordinately expensive to modify to PAL TV standards, so it is supplied with an NTSC colour TV set. The colours were quite bright and attractive, and the resolution was fairly sharp, with a trace of ghosting.

The cassette recorder built into the machine proved reliable and gave no undue difficulties in program loading. An interesting point is that the cassette save and load commands operate on the whole of memory — including the screen RAM, which is saved or loaded first.

This means that as a program loads, a

title or graphic pattern can be displayed for the user to observe. Furthermore, one track of the cassette is devoted to audio, and can be used to provide a commentary. APF's BASIC course uses this facility to provide a short introductory lecture to each part of the course. After a while, though, the treacle-smooth American voice began to get to us!

Expansion is possible. The basic unit has but 8K of RAM, but this can be doubled, and a disk drive system is now available.

The system's documentation is very good, taking a tutorial, rather than reference, approach. The Technical Reference Manual incorporates a lot of hardware and machine code detail that would be useful to the machine code programmer, and fortunately, the 6800 (on which the IM-1 is based) is easy to program this way.

I see the Imagination Machine as being a good choice for the family man with young kids. With a young family, there's generally not a lot of money to spend on luxuries like computers; fortunately the IM-1 is inexpensive and good at playing games which will entertain young children.

For the more experienced user, the imagination machine will provide a useful working basis on which to build up to a larger system. A few minor disadvantages become apparent when the reference books are used to look up language details. In order to make it easy for the first-time user, all references are oriented towards the BASIC course supplied by APF — to look up machine-dependant features means that you really have to have an understanding of the course. However, once this familiarity is there, it becomes a simple matter to find the information you need. Similarly, if you look up a certain command in the BASIC-language book, there is a reference to a certain lesson rather than a page number. I think that even users who have gone through the lessons might find that it is a bit difficult to locate a required statement in the book without skipping through the chapters, especially after having left the course for some time and returned for a refresher.

As far as the language itself is concerned, there are two levels. of BASIC available. Level I provides all the necessary commands for normal programming, while Level II includes extra commands for certain scientific functions. Most users will find the Level I set adequate. For those who really want to get down to the nitty-gritty, there is also an assembler available. Assembler (or Assembly) language varies according to the hardware being used, and while they may be similar to each other for similar types of machines, they are more complex to use because each instruction (command) has a one-to-one relationship with the function

the hardware is performing. For the general user, the knowledge required at this level is not needed when using a higher level language such as BASIC.

The major advantage of the imagination machine over many of its competitors is the simplicity of its operation, without sacrificing flexibility. A certain person (who shall be nameless other than to be described as the office idiot) came in contact with the APF when the whole computer business was beyond his comprehension. It was the first time he had been able to make a computer work!

We found that this really does get close to the ideal of a machine for the home computer user. The market it is aimed at is every house — a prospect which would bring joy to any advertising executive. However, rather than capitalise on this, the Australian distributors made every effort to keep the price down.

Consequently, there are few micros which can offer for the price the range of facilities of the Imagination Machine. Anybody considering buying a micro should definitely put this one on their list. Step-by-step instructions make everything extremely clear, the BASIC course provides a good grounding for people who have little or no previous computer experience, and for the more experienced user there is room for expansion. The video games provide not only enjoyment but also an investment to the rest of the family. Just make sure you can lock it up, or you may never be able to get to use it yourself.

* * *

Specifications and Report Card

Unit:	APF Imagination Machine			
Made By:	APF Electronics			
Processor:	Motorola 6800			
RAM:	8 Kbytes			
ROM:	12 Kbytesin BASIC cartridge plus 2K in games unit			
I/O:	Built-in cassette and keyboard			
Display:	32 × 16			
Graphics:	Mode 1: 128 × 192, 8 colours Mode 2: 256 × 192, 4 colours			
Peripherals:	Disk Drives			
Expansion:	Through bus connector			
Best points:	Value-for money, game-playing ability			
Ratings:	**excellent**	**good**	**well, maybe**	**poor**
Documentation:		✓		
Ease of Use:		✓		
Functionality:		✓		
Support:		✓		
Value-for-money:	✓			
Extras included:	NA			
Options:	Disk drives, optional games software			
Price:	$995			
Review unit from:	Calculator Supermarket, 435 Bourke St, Melbourne			

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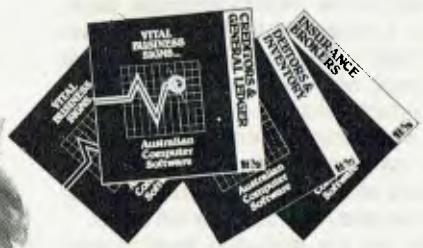

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WOOD 2697 SIX - S

You've probably noticed, in recent issues, advertisements for the Mi-Computer Club. If you're wondering just what it is and who's behind it, here's the story:

Get Purchasing Power!

MANY OF OUR readers may remember that a couple of years ago, Les Bell was best known as editor of one of Australia's electronics magazines. Then he disappeared from view for a couple of years and reappeared in charge of *Your Computer*. What happened in the meantime?

After writing about electronics for the best part of five years, Les reckoned he'd had enough — so he dropped out, lazed by the pool for a while, and then went back to school to learn about advertising and marketing.

A year later found Les working for R.L. Polk and Company the Australian division of the world's largest marketing services organisation, as an account executive.

Polk was formed in Detroit over 110 years ago, and the US headquarters is serious about computers. Its main mag tape storage area holds more than 50,000 tapes (enough to almost stretch around the equator). These contain registration details on most of the cars, trucks and motor bikes in the US, which is how the car manufacturers are able to recall models years after they were sold.

Polk is also serious about clubs. For example, the US auto clubs which are America's equivalent to our RACV, NRMA and so on are mostly operated by Polk, as are travel clubs and other consumer clubs.

Not long after Les had joined Polk, along came *Your Computer* publisher Matt Whelan, who used to work with Les at that 'other' publishing company.

"Is there a market for a consumer-orientated computer magazine in Australia?," said Matt. "Of course," said Les — and then set about checking that there was!

Your Computer really took off, as we all know by now (thank you!), and Les was back into writing, well and truly. But what about all that marketing and advertising stuff he'd learnt?

And so, round the conference table at Polk, the idea of the Mi-Computer Club was born — a club that would help its members by offering quality products at discount prices, and provide the information people need to make the best use of complex items like computers.

The club is now up and running, with Les as technical consultant, and the first newsletter has been sent to members along with their first free subscription copy of *Your Computer*.

The newsletter introduces the club, and includes special offers on products for members. For example, Mi-Computer Club members can buy Nashua mini-floppy disks for only $38.50 a box of 10, including a smart blue library box.

"Polk Australia is ideally suited to provide a service to Mi-Computer Club members," says Polk joint managing director Keith Smyth.

"Our marketing, computer, printing and fulfilment divisions will combine to provide members with high quality products and services at the lowest possible prices. And we will be stocking all the items offered for sale — samples will be on display at Polk Houses in both Sydney and Melbourne".

The newsletter is the primary contact point for the club's scattered membership, and includes answers to technical questions and news of club activities; planned for the future is members' for-sale and wanted advertising.

Les also hopes that as the club grows, it will be possible to organise meetings at which members can come along to have their problems solved or just chat. And Les expects interested members to form special interest groups, to exchange news and hints on their particular computers, with the club providing support through the newsletter.

"What we want to do here is provide the administrative shell within which individual members can do as much or as little as they please," said Les.

"In any club, there's always a huge silent majority, who hardly ever turn up at meetings, never stand for election to the committee, but just enjoy some of the benefits of membership. What we're aiming to do is have a professionally run club, with plenty of benefits and no compulsion to attend meetings."

Les is busy ferreting out other bargains for club members, and has a list of the products he'd like to see in their 'catalogue'. Coming shortly will be book offers and services such as word-processor quality printing from your diskettes or EPROM programming.

Already, members are providing suggestions about what they'd like to see, and Les says the club is examining every possibility.

"I can't see the club selling complete computers at this stage," he said, "but software — cassettes and disks — yes, that's the kind of thing people are always looking for".

Matt Whelan sees the club as a specific benefit for *Your Computer* readers, and was active in its establishment even though the White House Publishing Group is not involved in its operation.

Already growing rapidly, the Mi-Computer Club seems set to take off as its members benefit from bulk buying on their behalf. □

your computer text file

Wot A Wumpus

AS A novice to the 'game', I was pleased with the two pocket programs, Wumpus and the TRS-80 Software Timer. Both worked well on my System 80, after the average amount of time correcting my syntax errors.

I cannot say the same for your rival. Programs which would allegedly work on a TRS-80, would not. It took about two and a half hours of ten-words-a-minute typing and several more frustrating hours to convince myself that this was the case. No more $2 touches for the wrong magazine for me.

JOHN BEUTEL,
Southport, Qld.

Proud But Not Tired

YOUR COMPUTER is just the style and content-value needed. I have recently returned from an extended tour of the US, Canada and the UK where there is a glut of computer magazines.

Yours, by far, surpassed anything there for the novice. May we (and we are a rapidly expanding universe) have a Sinclair ZX80 section with programs, please?

L. BOSTOCK
Leabrook, SA.

Yes. Keep reading — Ed.

Dear Sir,

YOUR publication is to be commended on its straightforward approach to computing. Like many other teachers, I have found myself in the position of having to learn an awful lot of new ideas in a very short time.

I read with interest your article on different computer languages, and I would appreciate being directed to further sources of information or publications on the languages FORTH, APL and LISP.

On the formal education side of things, it would be interesting to read of the range of equipment being used in schools at the moment. An article on the LOGO language, with its emphasis on graphics and lack of reserved words, should be of interest to many.

W. EVERS
Ferntree, Tas.

Layman's Language

CONGRATULATIONS on your first two issues. Great Stuff!

It is good to see a magazine talking in layman's language. Even I understand it!

I have been saying yes and no to myself for the last 12 months on whether to buy a micro. I was afraid of getting out of my depth and being left with something I couldn't use.

Your magazine has given me the extra confidence I needed. Today I purchased my first machine — a 16K TRS-80 Model 3.

Keep up the layman's language for me, or I'll never understand.

KEN SELLORS
Strathpine, Qld

WE WELCOME readers' letters. Not only do we enjoy reading them (most of the time. . .), we want to publish them so other people can look in on your news and views.

Constructive criticism, lavish praise for our efforts, helpful hints for other micro users; if there is something you would like to say, write to *Your Computer* at PO Box 216, Spit Junction, NSW 2088.

Computer Awareness

I WISH to add something to your article "The Versus Syndrome" *Your Computer* July, 1981), to let readers know our institution has also introduced computer awareness into its course for primary school teachers.

Every student will be introduced to programming and how to use computers in the school, as part of the Educational Technology units (not mathematics). Other units within the programme will teach students to use computers for problem solving and teaching.

In addition, we have an Additional Experience Programme in operation. This involves a group of interested students going to a school to which we have lent a computer and working with the children.

BRIAN FOWLER
Lecturer, Darling Downs Institute of Advanced Education, Qld

Compucolor Fan

WOW, not a bad effort for the first issue, but the second one is even better. It's good to know that someone cares about the novice and the uninitiated.

I especially like the "easy to read" style in all your columns, and the contents are great. The article "The Versus Syndrome" by Mark Camm was excellent, and I agree with him.

Fortunately, I am "Computer Literate", and very grateful to the people who introduced me to the world of computers. I have a personal computer — "Compucolor II". Surprisingly, it is not mentioned in *Your Computer,* except in the user's groups section!

You said; "If your machine's not included, it probably will be soon". . . I certainly hope so, and I will keep on *Your Computer* until Compucolor II is included.

TONY LEE
St. Ives, NSW

Good One. . .

I WOULD Like to take this opportunity to congratulate you all on an extremely good magazine. *Your Computer* appears to be just what I require.

R.J. KRUZENGA
Ringwood, Vic

Office Idiot Fan Club

WELL, woddya know! A computer magazine (and staff) with a sense of humour! Please tell the *Office Idiot* he is my favourite writer already!

A year's subscription herewith.

TED BUTT
Parramatta, NSW

The OI says you have impeccable taste; we say you're nuts! (Ed)

Indentifying with the O.I.

I HOPE you will introduce a binder to keep copies in, in the near future.

COMPLIMENTS on a fine magazine, the review of the ZX80 was very good. But I liked the *Office Idiot,* as it sounds like me!

At the present I don't run a computer. However, in the very near future, I hope to be getting a Dick Smith System 80 16KRAM (when I can afford it). Keep up the good work, 1040 PRINT "END".

R.A. BARSTOW
Port Hedland, WA

Pocket-money Well Spent

I MUST congratulate you on your excellent magazine. I became interested in computers just a few short months ago through Computer Maths at school. Almost immediately I began looking round for a magazine which would introduce me to the (then) unfathomable and fantastically complex subject.

I went through all the major American, British and Australian publications, much to the annoyance of the proprietor of our local newsagent who in the end informed me that his shop wasn't a library, and eventually selected *Your Computer* as the only one that had clear, lucid articles. I was told all I needed to get a start on the subject. Two dollars of pocket-money well spent!

Please, keep the sections for beginners going, and don't change the magazine's wonderfully sociable and familiar style.

My personal view on the future of computers is that the education side of things will really start moving. Microcomputers are almost established in high schools now. Soon even a primary school will have its own computer.

I am therefore trying desperately to interest my younger brothers and sisters in the subject, as young people will need the knowledge in the years to come.

Again congratulations on a great magazine and best of luck in the future.

MALCOLM CLARK
Wishart, Qld

Dear Confused...

AN UNOFFICIAL entry that I thought might amuse you:
OH MATE, I'M CHAFING IN PAIN.

G.C. LEEDER
Out West, NSW

Dangling Cognivox

CONGRATULATIONS on your well presented publication. As I have a Sorcerer with dual Micropolis discs, I particularly like the articles and advertisements about this machine.

Naturally, I think the Z-80 is tops in the eight-bit micro field, especially since I read and tried all the extra machine instructions that Zilog have not published.

I have 8080A and 650X machines (POLY, SYM and Microcom), which I use for various purposes, but the Sorcerer is my favourite. The only irritating trick with this machine is the necessity to keep the keyboard contacts clean, to avoid auto-repetition. Otherwise, it has given trouble free operation for nearly three years.

Mostly I use Micropolis extended BASIC and call machine language routines as required, as I find this much quicker to debug than compiled CP/M programs.

Speech input and output is my current interest. Perhaps some of your future articles will tackle this subject. I have a "Speak & Spell" hooked up to the SYM and a "Cognivox" speech unit dangling from the Sorcerer.

These work well, (with some limitations), so I am now working on a "home brew" speech unit, lashed on a prototyping S-100 board. The rig is beginning to utter vaguely human-like sounds.

G.J. WINSBURY
Heathcote, NSW

Standards? Which Standards?

CONGRATULATIONS *Your Computer* on a fine start!

I have read both issues and am most relieved to find that you recognise one of the biggest areas of endeavour in microcomputing, namely CP/M. After all, over half a million computers can or do run this operating system. I will continue to read with interest about hobby-machines and I may even buy one, but my workhorse will remain CP/M or its successors.

On that note, I appear to be in agreement with Les Bell on a number of areas. CP/M is one — this letter is written with WordStar.

However, I do not share his distaste for Pascal. It is, unfortunately, not a complete language, and requires extensions to be useful in several areas. Nevertheless Pascal has the enormous advantage over practically every other language in that the compiler detects many simple errors such as mis-typing and mis-matched parameters, which would otherwise only be found by debugging. Pascal requires a slightly different approach to programming, but the end result is programs which are more reliable, easier to read, and easier to change.

I want to respond to Les on the matter of standards. In the article about the Epson MX-80 printer, he refers to foreign characters and the ASCII code, and to the RS232C interface. While not an expert on the subject, I may be able to shed a little light.

These standards are not current. In the case of RS 232C, the standard actually in use in Australia is CCITT Recommendations V24 and V28, 1972. It defines the use of most of the pins of a 25-way Cannon socket DB-25S or equivalent. While it was never intended to be used to run a printer, there are logic signals such as 'Clear To Send' and 'Data Terminal Ready' which can readily be used to control a character stream.

The 8251 chip in my microcomputer makes these available as bits to be tested by the software, which is much simpler than writing software for a line protocol such as ACK/ETX or XON/XOFF. I use Centronics parallel anyway!

ASCII has also been replaced by a CCITT recommendation, but I am unable to find which one at present. This recommendation is responsible for replacing the up-arrow by caret, the left-arrow by underscore, the vertical bar by broken vertical bar, and other minor changes.

For example, the character we know and love as 'carriage return" or CR is called 'return' or RT, while 'line feed' is properly known as 'newline' or NL. Data General and UNIX seem to be the only people who are aware of these instructions.

The standard character set includes several intended to be used to generate accents, usually by the sequence 'character', 'backspace', 'accent'. These are the caret (circumflex), grave and tilde. The oblique, apostrophe and underscore can also be used, and the comma makes a fair cedilla.

As well as these, the standard leaves several characters ambiguous, to be used as desired within national borders.

Most of these problems have been anticipated by those who devise the standards, and I suspect the main problems are that American computer manufacturers simply ignore standards, especially international (ie not American) standards.

C'est la guerre!

I trust these comments are of some help. Keep up the good work.

D. M. BENNETT
Prahan, Vic

your computer clinic

Integrate the British?

AFTER READING the article in the August edition of your magazine about the Commodore VIC-20 computer, I am considering buying one. However, I would appreciate some more information about it, especially the part relating to the in built PAL interface.

I am asking this because I am returning to England next year and I will be taking the computer so I would like to know if the PAL interface would inhibit the computer's reaction to a British TV set and if it does affect it would I be able to get the computer adapted to allow it to work properly on a British set?

I would appreciate any information you can supply.

A.P.L. BENNETT
North Nowra, N.S.W.

There's no real problem with the PAL colour interface as the UK also uses the PAL system. However, the UK system uses a different vision-to-sound spacing which means that you will be able to get either picture or sound, but not both. In addition, Australian VICs will be supplied set up for VHF Channel 0, while in the UK, VHF TV is being phased out and you may have difficulty obtaining a colour TV with VH channels.

For further advice contact your dealer or the Commodore Information Centre.

Thanks, But. . .

MY FIRST subscription copy of *Your Computer* just arrived and I am very pleased with it — the most interesting journal on the market — congratulations! Some matters which you may be able to advise on in your clinic:

1. A few years ago I bought a Sinclair programmable calculator (with 36 program steps). It operates off 9V DC and performs normal calculator functions. Is there any way I could interface it with my ZX80? This way I could use the calculator floating point arithmetic to do complex calculations. At the moment I can act as a 'human interface' between the Sinclair calculator and my ZX80 but a more direct link would be more helpful.
2. Like most ZX80 users I find the cassette interface a trouble. Is there any way a device such as the 'TC8 System' could be adapted for the ZX80?

J.H. CRABB
Kiama, N.S.W.

1. Yes, this can be done, but only at enormous effort. It's a lot simpler to buy the 8K ROM. If you're interested, Dr. Suding, founder of the Digital Group wrote an article on interfacing a calculator chip to a micro in Dr. Dobb's Vol 1, No 1. National Semiconductor produced a chip called the Numbercruncher, and their application notes also show how to interface it to drive it, and the ZX80 BASIC won't know how to store, print or manipulate floating point numbers, so it will be rather inelegant compared to the 8K ROM (though educational).

2. The TC8 interface seems like a better prospect. You would need to translate the ZX80 interface 'bus' signals into their TRS-80 equivalents, but since they are both based on the Z-80 pins that shouldn't be too difficult.

Then the software would need to be translated across to the new machine, again, not too difficult a job if you watch out for software timing loops etc. Not a one-night project by any means, but certainly not impossible.

And what about Compatability

COULD I please have a written reply to the following questions. If time does not allow an expansive reply then a yes/no/sometimes scribbled here would still be appreciated.

BRUCE BOWDITCH
Bentleigh, VIC.

1. REF. CP/M Users Group catalogue and ignoring any incompatibility between CP/M 1.4, 2.2 and CDOS 2.36 and disk formats (I am using Cromenco 2D with soft sectored minifloppies)
   a. Can I expect to run any CP/MUG .COM file without any massaging?
   b. If I buy a volume with a compiler program, do I automatically "win" a new language, e.g. 50.25 Pascal compiler PPC.COM, 28.10 ALGOLM.COM? If yes, does the same go for an interpreter?
   c. Volumes 13 and 20 refer to BASIC-E. Whose BASIC is it?
2. Can you recommend a reading list for intermediate level — I am OK in BASIC except for PEEK, POKE, USR and other machine level and assembly work on Z-80

Sez Les:

To answer your questions one by one:

1. a. No, even with CP/M you can't guarantee this. Many of the CP/M users group programs (often the most useful) do direct disk I/O and will therefore only run with a particular disk controller. The others (the great majority) are pretty well okay though, and you can't go wrong at $10 per volume. In any case, most are supplied as .ASM versions.

b. Yes, you do get a new language. I haven't looked at volume 50 yet, but the ALGOLM package certainly looks good. It's a compiler-interpreter pair like BASIC-E (below) which includes some extensions to standard Algol. CP/MUG also includes the complete (PL/M) source to BASIC-E and some other languages such as PILOT and STOIC.

c. BASIC-E is the predecessor to CBASIC. Written by Gordon Eubanks, it's a compiler which produces code which is then executed interpretively by a run-time package. It's not fast, but it works and it's cheap (i.e. free). Some disk system manufacturers supply it as standard. It's in the public domain (no copyright) so ask around and someone should be able to give you a copy.

2. If you want to learn assembly language programming, there are a couple of good books. Programming the Z-80, by M.J. Weller (Northern Technology Books) is an excellent introduction, and the Osborne/McGraw Hill books are good too. The best way to learn programming though is by reading well-written programs. I heartily recommend the Tiny-c Owner's Manual, by Tiny-c Associates, as an example of good programming and an excellent project if you want to bring up another language on your system. It gives the complete source code for the Tiny-c interpreter, instructions on installation, and it's the best introductory book on structured programming.

I'D LIKE to talk about computer clubs, or user groups, first. Like most clubs, user groups are a way for people who have a common interest to get together. Wouldn't it be nice to talk with people who own, or at least use, a Sorcerer?

It makes a nice change to get together with other hobby-users, to swap ideas, and to see what everyone else is doing with their machine. You can almost always find someone who will tell you a way around a problem you are having. There is nothing worse than working out the solution to a problem, then discovering someone else has an easier way to do it, which most programmers already know.

Most groups meet at least once a month and have a newsletter of some sort. Both the user groups of which I am a member have libraries full of interesting programs which may be bought by members. You can even have some of your own programs added to the library. (This is very satisfying.)

At its September meeting, the Sydney users group is putting on a major communication demonstration, using the Sorcerer to talk to the large data base The Source. There will be a talk by a representative of the Overseas Telecommunications Commission on the operation of Midas, and a Sorcerer using another Sorcerer as a terminal.

There'll always be something interesting at a club meeting, so look up the club register in the back of the magazine, find out the address of the nearest user group to you, and get involved. I know you will have fun, and you may learn something too!

* * *

Load Problem

Have you ever been given a program by a friend, or bought one that will not load? Getting endless CRC errors can be very frustrating.

Last week a friend of mine gave me a tape that I could not load. I must have spent over an hour fiddling with the volume and tone controls on my cassette, with no luck at all. In the end I had to take my cassette to his place and dump the program from his computer, using my cassette.

After a little thought I came up with a solution, or at least an aid to help me get around this problem with some tapes which had been recorded on another machine. I went to Dick Smith Electronics and bought a VU meter (cat. no Q2050).

I put this meter in series with the lead from the earphone socket of the cassette recorder — that is, with the wire from the centre of the plug going through the meter.

Now when I push the Play button on the recorder I get a reading on the meter. After fiddling around with different levels I have found a reading of around three on the VU meter (around the middle of the meter) will load most of the cassettes which gave me so much trouble before.

The other tapes (those which will not load at this reading) are now easier to load as you can see the level at which you are loading, rather than guessing whether the level should be higher or lower.

* * *

No Escape

Still on the subject of handy operating hints, if you want to abort an operation that a control "C" won't stop — like a cload or csave — you can do this by holding the escape key down and pressing the two reset keys. However DO NOT release the escape key until AFTER you release the reset keys. If you let the escape key go first, the computer will reset, and you will lose what you have in memory. Only use this as a last ditch solution — it sometimes produces strange results.

* * *

Space Battle

I've been looking at Quality Software's Starbase Hyperion. It is a simulation of a space battle, between a defending Terran star-base (you) and an attacking fleet of bug-eyed monsters (the Sorcerer).

The package is of Quality Software's usual high standard. It includes a booklet of instructions, and another booklet of suggested tactics, as well as the tape.

The idea of the game is simple. You must juggle a limited amount of energy, conserving enough to fight off the BEMs for the 15 days (turns) it takes the Terran fleet to reach you. In practice this is not easy.

The screen displays at a glance your situation. Down the left hand edge is the status of your base. In the centre there is a polar display, with the star base at the centre and any star ships, either yours or the BEM's around it. Down the right hand edge there is a list of the status and position of your ships (and the BEM's if you have deployed sensors out far enough).

On every turn you can use your energy in five different ways. You can manufacture space ships, deploy sensor probes, energise your shields, manufacture more power banks or hold some energy in reserve for the next turn. You can then move any ships you have made into combat with the invaders.

The game moves a little slowly, but is a lot of fun to play. Even with all the options it is easy to learn the commands, and almost impossible to walk away from.

That's all for this month. Remember if you want any software reviewed or questions answered, drop me a line, care of *Your Computer*. □

—Paul Beaver

A LOCAL utility program released in August will probably be of interest to many more serious Applesoft programmers. It's GRAFPAK 1.0, from Sydney's Cybernetics Research.

The program supplements Applesoft BASIC, by adding what to many programmers are annoying omissions from the Applesoft command vocabulary. As the name suggests, a goodly chunk of the extra commands provided by Grafpak are related to the use of the high resolution screens on the Apple.

Probably the most useful functions are those for formatting numeric output, enhancing the editing of BASIC source code, sorting strings, and adding some much needed DOS functions.

The graphics code of Grafpak allows you to use Hi-Res pages 1 and 2 just as you would with the page 1 text page — as used by the Integer and Applesoft BASICs. Your Apple II now has, in effect, three text pages, two (Hi-Res 1 & 2) with upper and lower case characters, as well as the normal high resolution graphics.

The new commands of &TEXT, &GR, &HGR and &HGR2 allow you to move between the three text/graphic pages without clearing or altering the contents of same. It is possible with the &SCROLL command to set up a scrolling mode for the text on pages H1 & H2.

Command &INPUT allows all the previously forbidden characters like the leading space, semi-colon or commas to be input directly to simple string variables.

Command &MUSIC allows you to use the Apple's onboard speaker to create musical tones, simply by providing the desired pitch (in semi-tone increments), duration and type of sound (four modes).

The &SYSTEM command allows the execution of 'Monitor' commands from within a BASIC program. This is not to be confused with Applesoft's ability to vector to a machine language subroutine.

The &ALPHA is a neat little machine language sort of routine, which allows you to sort any string array alphabetically, and to create a sorted output string array. To give you an idea of the speeds involved I created a disk file of all the words in this article up to this point read them into an array word by word, then sorted same into an output array. The average time taken over five runs was 6.54 seconds. The total programming code to do the sorting was:
100 &ALPHA=IN$,OUT.

Two commands, &STORE and &RECALL, allow a programmer to store and recall string arrays to or from disk. And &SHLOAD allows the loading of shape tables from disk.

If all GOTO and GOSUB commands in a program are replaced by &GOTO.FAST and &GOSUB.FAST, execution time is claimed to be reduced by up to 40 per cent.

Probably the most useful feature of all is Grafpak's editing facility, which allows the use of format commands similar to ANSI COBOL. These allow you to format and edit numeric output into almost any format.

Gone are the days of columns of numbers with the decimal points about as straight as a dog's hind leg! A 'picture' is worth a thousand words: shown below are some of the editing possibilities with the &PICTURE command.

Valid edit parameters are 'B' bland, 'V' assumed decimal point, 'Z' zero suppress, 'o' zero fill, '9' numeral, ',' comma insert, '*' print * when value zero, '+' '-' '$' 'CR' and 'DR' editing pictures.

```
EDIT PICTURE      12345
-------------     -------

99,999             12,345
9,999,000       2,345,000
99B999B000     12 345 000

                   1234.56
                   -------

999.99              234.56
9999.99            1234.56
999v99              234.56

                   1234.56     -1234.56
                   -------     --------

9999.99+           1234.56+     1234.56
+9999.99          +1234.56     -1234.56
$9999.99          $1234.56     $1234.56
-$9999.99         $1234.56    -$1234.56
$9999.99CR        $1234.56CR
$9999.99DR                     $1234.56DR
$,$$$,$$$.99   $1,234.56
$$$$$$.$$      $$1234.56
```

The &EDIT command is used in immediate mode and allows another method for moving the cursor around the screen, while editing your program. Commands are CTRL N,S,E,W (for North, South, East & West).

What is interesting, though, is moving the cursor West (left) on a program line, will shift all the text left of the cursor further to the left, leaving room for text to be INSERTED. Why didn't Apple do something like this in the first place? Another useful command is the &DISK command, which allows the programmer to seek, read, write or format to any sector on the disk.

Apart from the Grafpak utility, three other programs are supplied on the disk.

The SHAPE MAKER Program helps you to create shapes on the screen, and to save whole shape tables to disk. Shapes can be drawn in any of eight plot directions instead of the standard four, as defined in the Applesoft manual. The Grafpak command &RECALL can be used within your own BASIC program to reload the shape table into memory when required.

The CHARACTER SET Program allows you to quickly define your own upper and lower case character set, and then to save the new set onto disk. The character set supplied with Grafpak is exactly the same as standard Apple II text so that the Hi-Res screens may be switched with the normal text page without any discernable difference in text format.

Third but not least is the FUNCTION PLOTTER Program, which will allow the user to examine the shape of any single valued function of X, automatically scaled to give maximum detail.

The Grafpak machine code is only one and a half Kbytes in length and is loaded just above H-Res page 2. Locations $6000 to $62FF contain the upper and lower case character set. The remainder of the code starts at $6300.

In summary then Grafpak can be a valuable aid to the hobbyist and serious programmer alike, by providing you with more inbuilt routines to overcome some of the more serious shortcomings of the Applesoft Language.

On the debit side, I think having to allocate HIMEM at a maximum location of 24576 is an unfortunate restriction on the memory available to the programmer. This is particularly so when dealing with data base type programs, where the available memory for data storage is paramount to overall program efficiency.

Another setback that Grafpak may suffer is the potential impact of the Applesoft compilers, due to be available in Australia in the next few months. It is highly probable that the compilers from Hayden and Microsoft will accept only standard Applesoft instructions, so any programs written using Grafpak may not be able to reap the benefit of the decreased execution time offered by a compiled BASIC program.

New User Tip

To continue on the tack that I began in last month's issue, I have decided to include some information in each issue for the newer Apple II users. I ask the more learned Apple programmers among you to do two things. . .

First jump ahead a few paragraphs, where there may be something more to your liking; or, second jot down and send to me (via the magazine) any of the tricks or routines that you found in the early days of your programming — no matter how silly or trivial they may seem. I want to compile these and make them available for those who are following you on the Apple road.

In this way we may come up with a useful reference guide available to *all* the Apple community.

POKE 33,33 et al

To start the ball rolling, here is something for the absolute beginner.

When writing programs on your Apple, there always comes a time when there is mistake or a 'typo' in some line of your program. Normally this can be fixed by listing the offending line and using the cursor control commands (Esc I,J,K,M) to trace over the correct sections of the line re-keyng only those entries that are incorrect.

But it becomes a pain when there is an error somewhere in the middle of a long print statement. When the line is listed, the Apple edits the line so it looks nice and neat on the screen. But when you run the cursor over the right-hand edge of the instruction, the cursor goes haring off over the blank areas of the screen and then reappears on the left hand side of the following line. The result is all the blank areas the cursor traced over have now been included in our statement!

To overcome this little problem do the following. . . Enter the command HOME. enter POKE 33,33 then LIST the incorrect line number. You will notice now the instruction listed on the screen becomes narrower, as the text is scrunched up onto the left hand side of the screen. If you then use your cursor controls to trace over the correct parts of the instruction, the cursor will not run over any blank areas on the screen, so no blanks will be embedded into your print statement.

When all is well and the print statement says what you want it to say, reset the screen to its normal mode, by entering POKE 33,40.

How it works is by resetting the right text window at decimal location 33, to a size that is too narrow for the Apple to edit the line in its normal edited format.

Stop Autostart ROM

To stop the Autostart ROM Auto-starting, and allow you to go straight into the Monitor, make the following patches.

POKE1010,105:POKE1011,255

or*call-151

*3F2:69 FF

Cassette Duplication Routine

Some Apple users are still relying on cassettes as their mainstay for file and program storage. Cassette loading and saving is slow at the best of times. But trying to create a back-up copy of your files or programs on cassettes can be soul-destroying. If you have two tape recorders capable of recording and loading programs into your Apple, the following routine will help:

Load recorder number one with the tape to be copied, and connect the output jack to the 'in' socket on your Apple.

Load the second recorder with the cassette be written to, and connect the 'out' socket on the Apple to the MIC jack on the recorder.

Type in the following program, and type RUN

```
10  RESTORE
20  FOR LOOP = 2304 TO 2312
30  READ I: POKE LOOP,I
40  NEXT LOOP
50  CALL 2304
60  DATA  32,253,252,173,
    20,192,76,00,09
```

What happens is any signal coming from the first recorder will be remodulated by the Apple II, and output at the same time to recorder number two. The only way to stop the routine is to hit RESET.

Stop Reloading BASIC

One inconvenient aspect of the language card or RAMcard on the Apple is its tendency to want to reload the card every time the system is re-booted. Usually, after the initial load from the master disk, the BASIC loaded into the RAMcard remains intact. The following patch will modify DOS on a newly initialised disk, so the RAMcard re-load routine will not be executed when that slave disk is booted.

Load your desired HELLO program

*vsll-151

*BFD3:FF FF FF

*3DØG

*INITHELLO, Vnnn (nnn = your vol id)

When the slave disk is initialised, it will not try to reload the Language Card. □

—Greg Stringer

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THIS MONTH I want to cover a few small subroutines which can assist you in programming:

Protecting Your Programs

This is one way in which you can protect your programs from prying eyes. It is crude, but effective — however, those who are expert can get around it while those who read this article will also know what's going on! Still, its fun and may help in some way.

Enter a program, like:

```
10 PRINT "Your Computer is only $2"
20 PRINT "Subscribe now"
```

and then enter a nondescript line with a very low line number like:

```
0 REM Top Secret
```

Now enter the monitor (old ROM owners can't do this so you will have to skip this program) by typing SYS1024

You will get a display similar to this:

```
B*.
    PC   IRQ   SR  AC  XR  YR  SP
.; 0401 E62E  32  04  5E  00  F8
.
```

Then type M 0401 0450 (using spaces as shown) and you will see displayed on the screen:

```
.:0401 12 04 00 00 8F 20 54 1F
  0409 50 20 53 45 43 52 45 54
  0411 00 2F 04 0A 00 99 22 59
  0419 4F 55 52 20 43 4F 4D 50
  0421 55 54 45 52 20 49 53 20
  0429 4F 4E 4C 59 20 24 32 22
  0431 00 35 04 14 00 99 22 53
  0439 55 42 53 43 49 42 45 20
  0441 4E 4F 57 22 00 00 00 AA
  0449 AA AA AA AA AA AA AA AA
```

On the first line 0401, the second and third pair of numbers hold the starting point of the next basic line in reverse order.

By changing the value of the first two sets of figures 12 04 to 01 04 you will effectively protect your program.

You can do this by moving the cursor back up the screen to the line 0401 and then across to the 12. Type 01 and then press return. You now have changed the figure.

To get back to basic enter X then press return.

Then list your program. You should get the line 0 repeat down the screen until you stop it by pressing the RUN/STOP key.

What has happened? The lines 12 04 are the links used by the computer to tell itself where the next line starts. If you reverse these two numbers you will get the figure 0412. Look at the line 0411 — you will see that the first figure is 00, and the next is 2F; location 0412 (0411 + 1 space).

By changing the first line number to 01 you are telling the computer that the next line number starts at location 0401 — the start of line 0 — so the computer will list the one line in an endless loop.

However, when the computer runs the program the pointers are not used; it will run normally.

You may think that if you enter another line 0 that you will be able to overcome this protection. Try it. . .

You will find the program crashes and that the only way you can recover control is to turn the computer off. That's what would happen to anyone who tried to use this method to find out what's in your program.

You can also save a program protected this way — the protection will be saved as well.

Self-generating DATA Statements

By manipulation you can get your PET to actually write its own DATA statements. This is done by the use of poke statements.

You can get the PET to print out a line on the screen, then force it to move the cursor up above those lines and make it enter those lines into the computer.

Try the following:

```
5 PRINT CHR$(147)
10 PRINT "500"; CHR$(34); Hi this is a
    test; CHR$(34)
20 POKE 525, : POKE 527,19 : POKE
    528,13
```

Line 5 clears the screen and moves the cursor to the top, line 10 prints 500"Hi this is a test". Line 20 causes the PET cursor to move to the top of the screen, implement a carriage return, and enter the line we had printed on the screen.

You can then enter the command run 500 and you should find that you have the words "Hi this is a test" on the screen.

New and BASIC 4 ROM users substitute the following values:

525 to 158
527 to 623
528 to 624

POKE 525 tells the PET there have been two keys pressed. This tricks it into believing the values it will find in locations 527 onwards were actually entered from the keyboard. It will act in exactly the same way as if you had pressed the keys we wanted.

If you entered line 500 manually then pressed the home key and then return you would have created the same result.

So of what value is this to you, the programmer? I will answer that in more detail, with examples, next issue.

The VIC

Already it is possible for VIC owners in the US to link up with The Source, and the VIC fans are active. For example, look at this letter we saw on one of The Source bulletin boards the same week the first, pre-release test VIC was landed in Australia (months before its local launch):

```
Subject:  BE A VIC COMMANDO!
From:  TCE795                Posted:  Wed
22-July-81  21:45  Sys 10
--More--
Contact me by Sourcemail if you'd like
to become involved in all asspects of
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 and support more sophisticated machine
code programs being sold on cartridge.
Need programmers and saleespeople who
want to sell the"."  Call me
if you're interested or if you just
want to "talk VIC".

MST - VIC COMMANDOS  TCE795
```

Next Month

I hope to bring you some news from my visit to the United States, where I will be looking out for any information that might be of interest to PET users.

I have also been given another method by which to generate sound on the Commodore, by one of our readers — D. Morris.

I have to see what effect, if any, it might have on the machine before I can hopefully pass it on. If it does not have any detrimental effect it will effectively give you another sound port which will be able to be used in conjunction with the CB 2 sound. It uses the IEEE 4888 interface.

—Peter Sandys

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your CP/M computer

by Bill Bolton

We left Bill Bolton's name off the first two YOUR CP/M COMPUTER columns and so Bill threatened to tell the truth about the editor if we didn't get it right soon .

Just to set the record straight Bill is our resident CP/M "hacker" (if you dont know what a hacker is you aren't one) and sometime article writer on other things.

When he's not writing for Your Computer *Bill performs weird and wonderful feats with broadcast video computer systems and does software consulting.*

Now that you're quite certain who to throw the brickbats at, its over to Bill. . .

HERE IS your chance to let me know what you want to know about CP/M. There is no guarantee that your questions will get answered but I will try. Send your questions about CP/M or your comments on the column to Bill Bolton, CP/M Column, Your Computer, PO Box 216, Spit Junction, NSW 2088. Source users can contact me at TCY396.

More Big Names Use CP/M

In a radical departure from previous policy IBM have elected to support CP/M-86 as one of the operating systems for the new IBM Personal Computer (see details elsewhere in this issue). Some people in the "big computer" industry in Australia seem to think that this shows lack of initiative on IBMs part — they have always set the standards.

I think that it was the only logical move that IBM could make and tells me that some people in IBM have a better understanding of the microcomputer market than I credited them for. An important implication is that now Digital Research will have a guaranteed market for a lot of CP/M-86 systems and probably eventually MP/M systems.

The second newcomer to the CP/M stakes is none other than Hewlett-Packard.

Yes, the company that just went to all that trouble launching the HP-85 series of micros has released a CP/M machine.

The HP125 is a Z80 based system built around one of the existing HP CRT terminals, already Z80 based. The HP125 has two Z80 processors. Early reports indicate that some of HP's prospective customers know more about CP/M than HP in Australia does. This machine is not cheap but if it has the full HP product support, that users of the HP calculators have come to know and love it could be a real winner.

Adler is another "name" which has adopted CP/M as the operating system for its Alphatronic range of small systems. Will more "big names" start to bring out CP/M machines? I think so. . . stay tuned for the next exciting episode!

Books Again

This month I have two books which should be of interest to anyone who is struggling to come to terms with business programing in Microsoft BASIC. (I really think there are better ways to fly, even in BASIC, but they do have the only interpreter/compiler pair worth worrying about for CP/M).

Firstly, *Data File Programming in BASIC* by L. Finkel and J.R. Brown, Published by John Wiley & Sons, ISBN 0 471 08333 X, 1981.

This book is another in the Wiley "Self Teaching" guides. The most interesting thing about this book is that the examples are in BASIC-80 or TRS-80 BASIC (both by Microsoft and quite similar).

There is an appendix which covers adapting the example programs to North Star BASIC. The book builds up from lessons on style to using random access data files, including several directly useful examples.

A number of useful file utilities are described and for many BASIC programmers would be worth the price of the book alone. Recommended: I bought my copy at The Technical Bookshop, Sydney for $15.10.

The second book is *BASIC Computer Programs for Business, Vol 1*, By C.S. Sternberg, Published by Hayden Book Co., ISBN 0 8104 5162 X (v.1), 1980.

The BASIC used in this book is a predecessor of the current Microsoft BASIC-80 so the examples are directly codeable.

Topics covered are a Simple Bookkeeping System, Accounts Receivable System, Financial Programs (many interesting ones), Perpetual Inventory System, Periodic Inventory System and Production Programs.

These programs don't have lots of bells and whistles but are still working programs that could be used as is.

I don't know how useful these programs are, none of them were directly useful to me, but there were many examples of techniques and algorithms which are useful for business programming in any language. Buy the other book first then try this one. I bought my copy at City Personal Computers, Sydney for about $12.00

There are several new, interesting sounding books from Osborne/McGraw-Hill, including *Interfacing to S-100 (IEEE 696) Microcomputers* and *CBASIC Users Guide* (co-authored by the writer of CBASIC) though no-one at McGraw-Hill in Sydney seems to know anything about them yet but I'd just love to do a review (hint, hint McG-H).

Digital Research News

MP/M-80 Version 2 and MP/M-86 should have both been released in the USA by the time you read this.

The new version of MP/M-80 should help to fix some of the problems with MP/M-80 1.1. These problems have been mostly due to the awful documentation. MP/M-80 2.0 promises to have better documentation, record locking, multiple printer support, files to 32 Mbytes and other enhancements.

Upgrades to MP/M-80 2.0 will cost US$145 for existing users, contact your local DR dealer for Australian delivery and prices.

CP/M 3.0 is due for "internal" release within DR during October, this puts a probable public release date in December '81 or January '82. DR has started to produce an ISV (Independent Software Vendor) newsletter that goes to all the CP/M software houses that DR knows about and to their dealers.

Hopefully this will mean a better flow of information from DR. This newsletter is not available to end users (so don't ask) but look in this column for details of major items.

Continued on page 101

your computer glossary

Absolute: Located at a fixed address in memory.

Access: To read or write from a location in memory, or a file, or disk.

Accumulator: The major register of a CPU, in which arithmetic and logical functions are performed. Some computers have several registers which can function as accumulators; in others some registers can perform a subset of the full set of operations.

Address: A memory location which can contain data or an instruction.

Algol: Algorithmic Language, an early computer programming language for mathematical applications. Widely used in Europe, embodied early structured programming concepts and was a precursor of Pascal.

Algorithm: A set of instructions which define a method of obtaining some result (usually mathematical). A cooking recipe is an algorithm, as is a knitting pattern.

Alphanumeric: Composed of either letters or numbers or both.

Analogue (Analog): Representation of a value by a voltage or some other measureable datum, rather than a binary or other representation based on counting.

Apple: The Apple 11 computer is a computer based on the 6502 microprocessor with an integrated keyboard. Noted for its colour graphics capabilities, which make it popular with schools.

Application: What you do with your computer.

Array: A set of values under a common variable name, which are accessed through a subscript. For example A[1] is the first item in array A, A[2] is the second, etc. A[N] is the Nth item.

ASM: Assembler. also a suffix added to assembly language file names to distinguish them from other files with the same name.

Assembler: A program which converts assembly language into its corresponding machine (or object) code, which can be executed by the computer.

Assembly Language: A language in which each machine code instruction is represented by a short mnemonic which is much more comprehensible to the programmer. For example, the 8080 machine code

[10010110]

in binary, is

[SUB L]

(subtract L from accumulator) in assembly language. Each line of assembly language becomes one machine instruction.

Assign: To make one thing equal to another, e.g: [A = B] assigns the value of B to A.

Atom: An indivisible component of a data structure.

Attribute: A property possessed by some object, such as a file.Often attributes take the form of restrictions, such as a file being read-only.

Backup: An extra copy of a disk, tape or file taken as a precaution against damage of the original.

Backus Normal form: A special language (a metalanguage) used to describe precisely the grammatical rules of another language.

Base: The lowest number inexpressible in a given number system.

BASIC: Beginners All-purpose Symbolic Instruction Code. Invented in 1970 at Dartmouth College By Kemeny and Kurtz as a teaching language, it has since been enhanced in its more exotic forms into one of the most sophisticated yet easy-to-use languages available on personal computers. Its major rival is Pascal, which has the added virtue of stressing structured program design.

BDOS: Basic Disk Operating System. The major functional component of the CP/M DOS.

Binary: The system of counting in 1s and 0s used by all digital computers.

Binary Search: A method of searching for an entry in a table by successively halving the table until all that's left is the desired entry.

Binary Tree: A form of data structure in which entries are tagged on at the end of the appropriate branches.

BIOS: Basic Input/Output System. The part of the CP/M operating system which is different for each machine and provides any special I/O routines for disks, terminal, printer, etc.

Bit: Binary Digit. Either 1 or 0.

Boot: To load the operating system into the computer from a disk or tape, either initially or subsequently after running a program.

Bootstrap: To use one short program to load a longer loader program which then loads the operating system.

Branch Instruction: A program instruction which causes the computer to jump to another instruction, usually fairly close by.

Buffer: An area of memory used for temporary storage while transferring data to or from a peripheral such as a printer or a disk drive.

Bug: an error in a program. Makes programmers itch.

Bus: A set of wires over which, data, addresses, or control signals are transferred between the central processor and memory or I/O devices.

Byte: A computer word eight bits wide. A byte in memory can hold a character or a binary number between zero and 255 (or — 128 and 127), or a computer instruction.

C: A programming language, developed at Bell Labs, which is particularly convenient for writing system utility programs.

Case Statement: An instruction found in some high level languages which allows control to pass to one of several subroutines depending on the value of a variable. For example, the BASIC statement

ON X GOSUB 100, 200, 300

will jump to line 100 if X = 1, 200 if X = 2, 300 if X = 3.

Call: A jump to a subroutine which leaves the return address on the microprocessor stack, so that when the subroutine is finished executing, control returns to where it left off.

CBASIC: A commercial version of the BASIC language, running under the CP/M operating system. Doesn't use line numbers on every line, and is compiled, rather than interpreted like Microsoft BASIC.

CCP: Console Command Processor. The part of the CP/M operating system that reads a command line and sorts out what it means.

Chain: To automatically run one program after another.

Character: A letter or number, or in some circumstances, a control code such as "carriage return".

Checksum: A running total of the characters in a file, recorded or transmitted with the file so that errors can be detected.

Code:

Absolute: Machine instructions which are intended to be loaded and executed in a particular area of memory.

Object: Machine instructions, as distinct from the source code from which it was generated.

Reentrant: Code which can be used by several users at once, keeping separate variables for each.

Relocatable: Code which can be loaded and run anywhere in the computer's memory.

Source code: A program written in assembler, or a high level language such as BASIC, which must then be assembled or compiled to produce the object code which can actually be executed.

Cold Boot: To start up a system from scratch, loading the operating system from disk or tape.

Cold Start: See Cold Boot.

COM file: In CP/M parlance a command file, that is, a machine code program that can actually be run.

Command: An instruction from the console for the system to do something.

Comment: A note added into a program to help the reader (or programmer) to understand its operation. Does not affect the program's execution in any way.

Compiler: A program which accepts as input a source file written in a high level language, and produces as output an object file containing the machine instructions which are actually executed.

Computer: Are you serious?

Concatenate: To join two strings together, one after the other.

Conditional: A test; for example, is X greater than Y: IF X is greater than Y THEN GOSUB 500 (BASIC)

or, if the carry flag is set, jump to location NEXDIG:

```
JC   NEXDIG   (Assembler)
```

Conditionals are one of the most powerful features of any computer language.

Console: The keyboard and screen from which the operator controls the computer.

Control characters: Codes which perform functions like acknowledging correct receipt of a message or requesting retransmission of an erroneous message. Control characters are defined as part of the ASCII and similar codes.

Copy: To duplicate, usually for backup safety.

CP/M: A disk operating system for 8080 and Z80 based microcomputers. Allows the user to store information and programs in named files, as well as managing disk storage and input/output functions. Other disk operating systems include TRSDOS (on TRS-80) and DOS 3.3 (for Apple).

CRT: Cathode Ray Tube. Usually refers to the screen of a video terminal or the terminal itself.

Data: Information to be processed by, or output from, a program.

DDT: Dynamic Debug Tool. A program that assists the user to find errors in machine code programs.

Debug: To locate and fix errors.

Decimal: Based on ten.

Delete: To erase.

Device: A piece of equipment such as a printer or tape drive which the computer uses.

Directory: A list of the programs on a disk (or occasionally tape) together with necessary information, such as length and location.

Disc: A flat, circular magnetic surface on which the computer can store and retrieve data and programs. Is fast compared with tape, particularly when access is not one item after another.

Disk drive: The mechanical assembly which rotates the disk and positions the read/write head.

Disk Operating System: A program which operates one or more disk drives automatically and mangages the system.

Display: The computer's output device at the console, usually a TV-like display of letters and numbers; sometimes the computer can draw on the display.

Double Density: A method of recording twice as much information on a floppy disk.

Dump: To list out the contents of memory or a disk.

Echo: When the computer inputs a character from the keyboard, it then sends it back to the display so that you can see it was received correctly.

ED: An editor program; part of CP/M.

Editor: A program which lets you alter and correct source files and other documents.

Erase: See delete.

Error Message: Tells you something went wrong, and sometimes what.

Execute: To run a program; to follow its instructions.

FIFO: First in, first out.

File: A continuous collection of characters (or bytes) saved on a disk or tape for later reloading.

Fixed Point: Counting in integers only. Usually limited to small values, and restricted in accuracy, giving rise to ridiculous answers such as 9/5 = 1.

Flag: A variable, sometimes a single bit, which can have only two values, used to indicate some condition.

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glossary

Floppy disk: A disk, made of thin flexible mylar, and enclosed in a card jacket, which can be used for magnetic storage. There are two varieties; eight inch and 5¼ inch. These can typically store somewhere between 140,000 and 3 million bytes (characters).

Function: A sub-progam that processes variables in some well-defined way.

Garbage Collection: The process of going through memory or disk space, reclaiming all the unused space.

Global: A variable which is known to all the parts of a program. See local.

Grammar: The formal rules of a language.

Hard Disk: A disk made of hard material, larger, faster and more fragile than a floppy disk, and capable of storing 70 million bytes or more.

Hard Copy: Printout.

Hardware: The bits of a computer you can kick, as opposed to the programs you can only swear at.

Identifier: A label, or the name of a variable.

Iff: If and only if.

Index: A variable which usually points to an entry in a table or list.

Index Register: A processor register which is used to access tables and lists in memory.

Indirect Addressing: Referring to a variable which actually contains the address of another variable.

Input: To get data into the computer.

Instruction: A step the computer can perform.

Integer: A whole number.

Intermediate Code: A special kind of object code which cannot be run directly on the computer, but must be interpreted.

Interpreter: A program which examines source code a line at a time, decides what it means, and then does it. Compare with compiler.

Interrupt: To electronically drag the computer away from what it is doing in order to respond to some time-critical situation.

I/O: Input/Output.

Jump Instruction: Normally, control proceeds from one instruction to the next, one after the other. A jump instruction passes control, not to the following instruction, but to some other. Jumps can be conditional.

Kilo: Prefix meaniig one thousand.

Kilobyte: 1024 bytes (Kbyte).

Kilobaud: 1000 baud (Kbaud).

Label: A word which identifies the destination of a call or jump instruction, or simply identifies some location in memory.

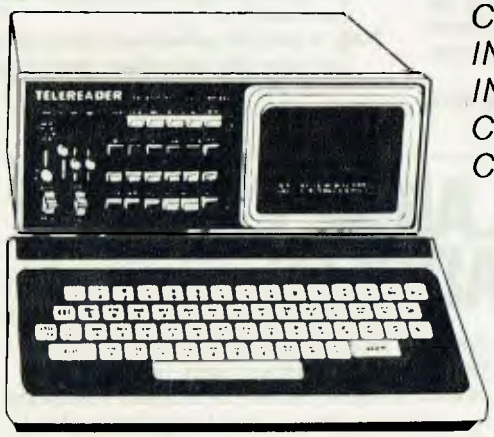
Language: The set of instructions, and rules for stringing them together, which you use to instruct the computer what to do.

Library: A set of programs, or sub-progams.

Line Number: A number at the beginning of a line, which identifies it in a similar way to a label.

Line Printer: A high-speed printer for computer output.

Link: Part of a data item in a list, which tells the computer the location of the next data item.



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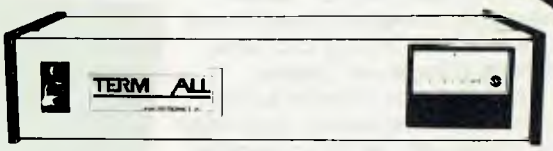

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MBASIC: Microsoft BASIC; the BASIC used in the TRS-80, PET, Apple 11 and so on.
Memory: Where the computer stores data and programs internally for fast acccess.
Menu: A display which offers the operator a choice of several alternatives.
Microcomputer: A small computer based on a microprocessor.
Microprocessor: The central processing unit of a computer, built into a single silicon chip.
Mini-diskette: A 5¼ inch floppy disk.
MP/M: A multi-user version of CP/M.
Numerical analysis: The art and science of number crunching.
Output: What the systems produces.
Page: A length of memory, typically 256 bytes.
Parameter: A constant which sometimes has to be varied.
Parity: An extra bit on the end of a character or byte for error detection.
Pascal: A modern structured language which may eventually rival BASIC in popularity.
Patch: A temporary (ha,ha) fix on a bug.
Peripheral: A piece of equipment the computer uses, like a printer, disk drive, or modem.
Peripheral Driver: A program which outputs data to a peripheral and controls it.
PL.1: Programming Language /1. A good general purpose commercial language.
Pointer: A variable used for indirect addressing.
Program: A sequence of instructions which can be understood, and ultimately followed, by a computer.
Prompt: A message asking the operator to supply information.
Queue: A list in which entries are made at one end, and removed from the other.
R/O: Read Only; cannot be overwritten.
RAM: Random Access Memory.
Random Access Memory: The computer's internal memory which is used to hold running programs and data. The computer can both write and read RAM.
Relocatable Object Module: Part of a larger program consisting of many such modules, all linked together and located.
Resident: Permanently in the system.
Run: To execute a program.
Save: To store a program on disk or cassette (particularly BASIC).
Schedule: To decide at what stage a process should run (of an operating system).
Simulation: Making one system behave like another.
Software: Programs.
Source Code: The original text form of a program.
Source File: A file of source code.
Source Language: The language the source code is written in, e.g. BASIC, Assembler, C.
Sort: To arrange items of data in order.
Spool: To output a file to a peripheral, usually either a printer or tape.
Stack: A list in which both entries and removals are made at the same end.
String: A sequence of characters.
System: A collection of hardware and software, possessed of the property that the whole is greater than the sum of the parts.
Teletype: An electromechanical printer/-keyboard.
Timeshare: Running several programs on a system simultaneously.
Transient: A program that is only in memory for a short time before being overwritten.
Tree: A list in which each data item may refer to several others.
Unix: A multi-user, multi-tasking, multi-programming operating system, expected to appear on microcomputers before long.
Utility: A program of use to most users.
Verify: To check that data written on a disk or tape can be read again correctly.
Warm boot: To reload the operating system a second or subsequent time.
Word: The amount of data fetched from one memory location.
Word Processor: A system for manipulating, editing, printing and formatting texts files.
Write Protect: To remove the cover from the notch in a floppy disk so that it cannot be written on.

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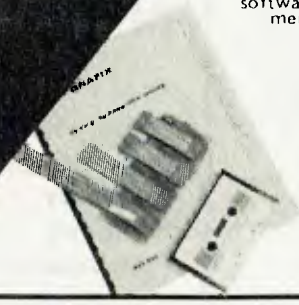

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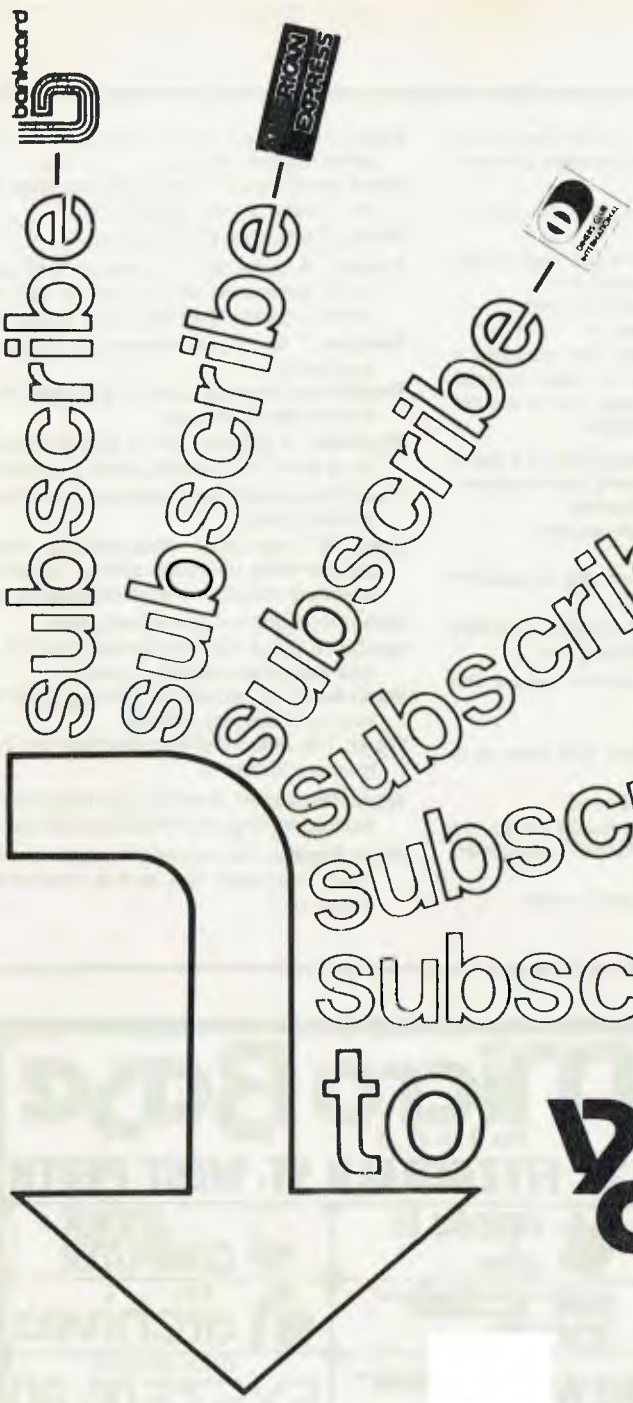

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your computer club news

SEVERAL CLUBS have sent us copies of their newsletters and brought us up to date with their activities, so here's the good oil:

Omega (Ohio Scientific Microcomputer Enthusiasts Group Australia) (but we'll just call them OMEGA, it's simpler) is a Canberra-based group which seems to be very active indeed. Their bi-monthly newsletter is large by club standards, and always full of plenty meaty software and hardware projects. Their June 81 issue, for example, included articles on The Source, modems, an OSI clock/calendar circuit (and software), BASIC Booleans, Type-n-Talk, a Sketch program, and a lot more good stuff. The club also runs a software exchange and an amateur radio subgroup.

Club organiser and Newsletter editor Geoff Cohen has done a lot of work on several hardware projects, which are still available on back issues of the Newsletter. Anyone who has an Ohio Scientific system and isn't in this group is missing out badly. Contact OMEGA, Geoff Cohen, 72 Spofforth Street, Holt, ACT 2615.

NSW 6800 Users Group is publishing a newsletter for the DREAM 6800 called 'DREAMER'. The 20-page newsletter contains 6 new games programs, a teaching program, ideas, machine language subroutines and utility programs, articles on Chip-8 programming, hardware and software reviews and common problem solutions. Again, there's an amateur radio subgroup. The issues of the newsletter which I have seen were interesting and well-produced, even to someone who's never used a DREAM! Issue number 8 had an excellent article describing a sound effects generator for the DREAM. Essential reading for the DREAM owner. Contact NSW 6800 User Group, 27 Georgina Avenue, Keiraville, NSW 2500.

Funnily enough, the Australasian ZX80 Users Newsletter also hails from Keiraville, but even boasts members in Switzerland, Hong Kong and New Guinea! The newsletter includes some interesting software, hints, tips, ect as well as the latest rumours from Sinclair. Contact Australasian ZX80 Users Newsletter, 87 Murphys Avenue, Keiraville, NSW 2500.

The TI-99/4 Users Group of Sydney produces a newsletter called News Digest. It contains information on new products, programs, software hints and more.

The Group operates a program library and will also give assistance to TI-99/4 owners interstate who want to start up local groups. Contact TI-99/4 User's Group of Sydney, PO Box 101, Kings Cross, NSW 2011.

New Groups:

KAOS (Ohio Scientific); David Anear, 49 Millewa Crescent, Dallas, Victoria 3047.
Tasmanian OSI Users Group; David Tasker, 11 Bass Highway, Westbury, TAS 7303.
Superboard Users Group; Ed Richardson, 146 York Street, Nundah, Qld 4012.
Perth TI-99/4 Users Group; Bernie Elsner, PO Box 246, Mount Lawley, WA 6050.
OMEGA (Ohio Scientific Microcomputer Enthusiasts Group Australia); Geoff Cohen, 72 Spofforth Street, Holt, ACT 2165.
NSW 6800 User Group;27 Georgina Avenue, Keiraville, NSW 2500.
Australasian ZX80 Users Newsletter, 87 Murphys Avenue, Keiraville, NSW 2500.
TI-99/4 User's Group of Sydney, PO Box 101, King Cross, NSW 2011.

Your CP/M Computer Continued from page 95

DR also has an interesting ISV directory which you may be able to buy from your CP/M dealer, ask about it. It has a brief description of CP/M software offered by many independent software houses, I found several interesting software products which I was previously totally unaware of.

Buyer Beware 1

As I have said previously there are many different ways to write a CP/M BIOS.

If you buy a disk subsystem with double sided drives be sure that the CP/M supplied with it can properly handle double sided drives in all the densities which the disk controller supports.

Demand to see a thorough test of the system working with double sided disks. A well written BIOS should be able to tell what type (single/double sided) and what density (single/double) disk is inserted in a drive.

The disk parameter should be set automatically after a warm boot (this implies that you may not be able to swap density indiscriminately in your A: drive however). Some locally written BIOS do not meet these standards which are readily achievable and available in many systems.

Buyer Beware 2

Prepackaged software has lots of traps.

It assumes that you will want to operate your business exactly the way the author intended. This may not be a limitation but you'd better be aware of it.

Before buying any expensive "package" system (i.e. several programs that interface together to make a complete system) get the software supplier to let you talk to users who are already running the package. It doesn't pay to be the first kid on the block with a new software package unless you are **a;** brave, **b;** desperate for a solution, **c;** very confident in your debugging abilities or **d;** are a "hacker".

I recently came across a couple of hidden "gotchas" with one well known locally written package.

Firstly, the General Ledger had no way of easily entering starting figures for transferring from another (manual) system. Very few small businesses start out with computer accounts; there is almost always a prior manual system.

Secondly, the component items were supposed to be capable of stand alone operation, but many of the "features" that sold the program only became available when it was integrated into the General Ledger program.

Some friends who operate a small wholesale/retail business in Melbourne have had a hard time since the Federal budget.

They are using a package which had the sales tax rates individually coded throughout the programs. It wasn't just a quick recompilation of the programs by the supplier after altering a few globally defined constants, it was a lengthy search, locate and alter of all the individual sales tax rate constants.

Few complex business programs are bug free, the consultant billing system I wrote and use myself still occasionally throws a minor bug at me after 8 months of careful debugging.

It is simply unrealistic to expect not to have problems with any sophisticated business software, particularly integrated systems; the main thing is to be aware of the general nature of the problems you may face. The only people who can tell you that are the existing users. □

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All Contributions: should include your name, address, and home and office phone numbers (in case we need to check details).

Contributions on disk: Contributions can be accepted on eight-inch disks if prepared using WordStar under CP/M, or on 5¼ inch disks prepared on an Apple using Sandy's Word Processor. Please pack them extremely carefully if posting.

Style: All items should be typed (or printed on a quality prihter) and double-spaced on white paper. Include your name, address, telephone number, and the date on the first page of your manuscript (all manuscript pages should also have your surname and page number in the top right-hand corner). Be clear and concise, and keep jargon and adjectives to a minimum.

Listings: Unless it is absolutely impossible, we want listings produced on the computer. This reduces the risk of error — if the computer typed it, the computer problably accepted it. Print listings with a dark ribbon on white paper. Please provide an account of what the program does, how it works and so on. Any comments on the program should refer to the address, line number or label rather than to a page number. Any comments on modifying the program to work on other machines will be appreciated. Try to include a printout of at least part of a sample run if possible.

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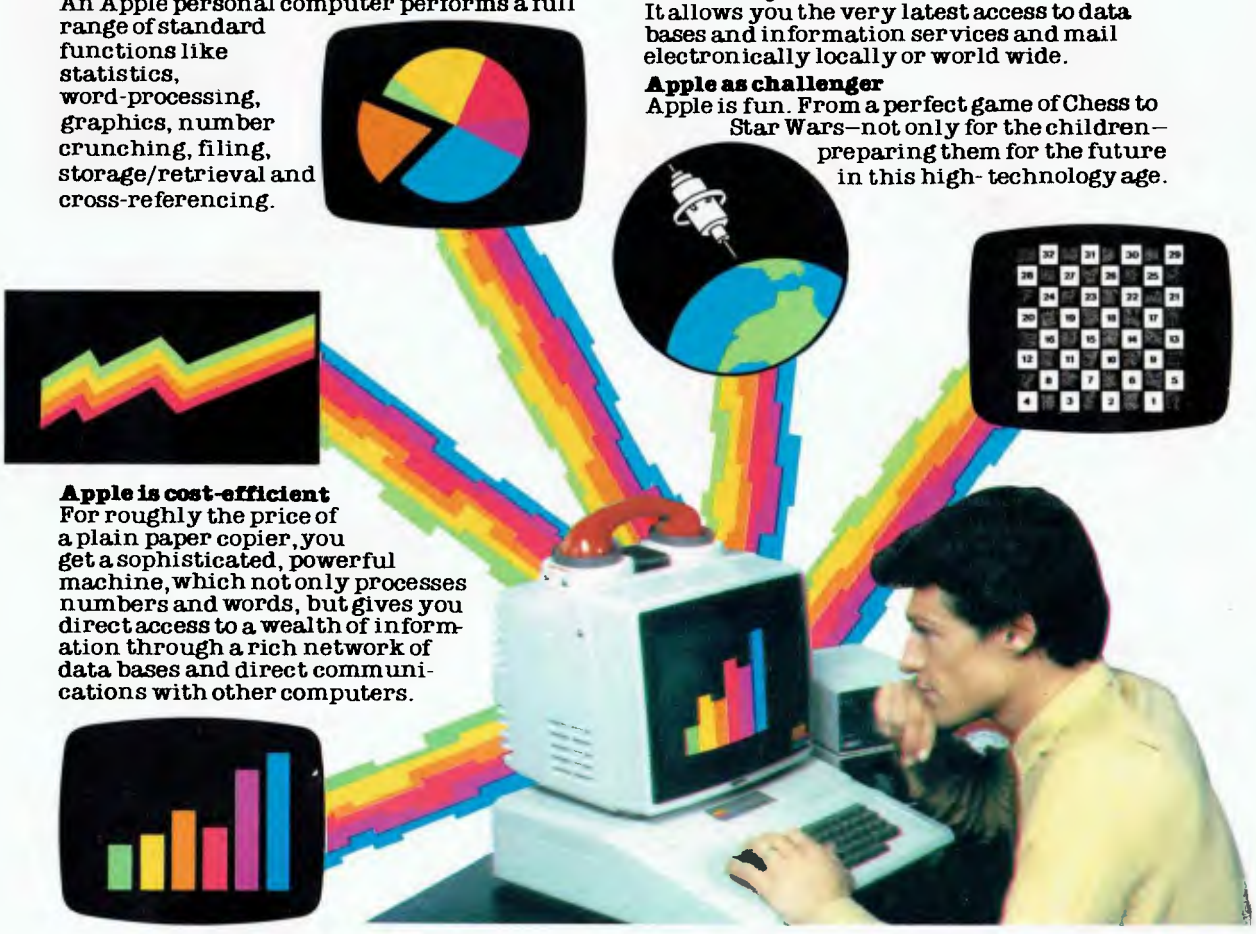

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