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Details inside

BITS & BYTES

August 1984: \$1.50

Wordprocessing —

Comprehensive round-up of packages available from IBM PC to Spectrum.

Texas Instruments talking business computer

The IBM compatible Eagle

Pulsar kitset computer

Star Gemini Printer

Plato educational software

Columns for 11 different computers

Wellington Computer Show catalogue inside



Tandy arrives! — and takes on IBM

458PEHG3&Iden201

ICGHO
BLXON

One bright day, some particularly bright engineers at Apple Computer had a particularly bright idea. Since computers are so smart wouldn't it make more sense to teach computers about people, instead of teaching people about computers?

Introducing Apple Macintosh. The personal business computer that's so simple to operate, if you know how to point, you already know how to use it.

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Simply call Auckland 399-300 (Collect), it will put you in touch with the Apple Dealer nearest you, and see for yourself.

For those of us who don't understand computers Apple introduce Macintosh



apple computer
SIMPLY GOOD BUSINESS

FEATURES

Word processing

A guide to what word processing software is around for what machines. Plus a look at word processing through three different sets of eyes — Gordon Findlay dissects word processing; Jenny Phillips tells how she trebled her writing productivity with a word processor; and Derham McAven looks at specialist and micro packages. **12-23**

Hardware reviews

Radio Shack has headed upmarket and unleashed the Tandy 2000 in New Zealand. John Slane runs his rule over this latest IBM workalike. **26**

We've had Apple's mouse and H P's touch-screen. Now Texas Instruments has tried to upstage those acts by adding a speech synthesis and recognition system to its new TI Professional. Peter Ensor reports. **24**

Described as a portable, the Eagle Spirit XL is one of four computers from the stable of MEC, a subsidiary of the whiteware giant, Fisher & Paykel, Ltd. John Slane put the XL to the test. **29**

Pulsar's Little Big Board is a kitset, single-board "make-your-own" computer. Peter Ensor tried his hand at the computer construction game and tells how he got on. **34**

Business

Anything the computer can do, humans can do better. In business forecasting anyway, say researchers at the University of New South Wales. John MacGibbon has the story. **42**

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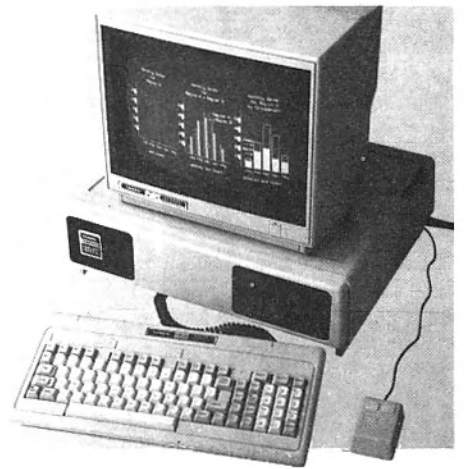
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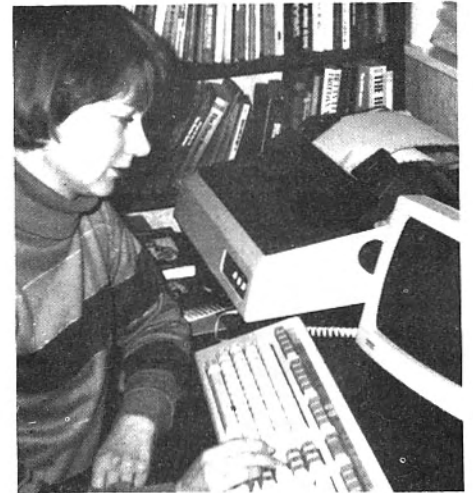
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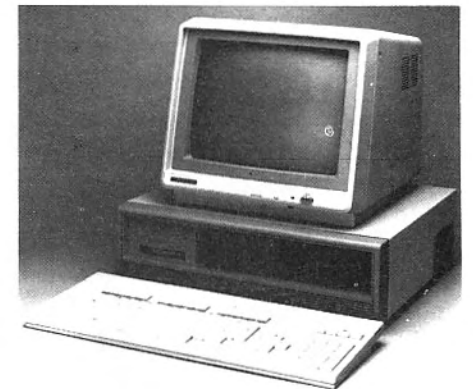
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BITS & BYTES is published monthly, except January, by Bits & Bytes, Ltd.

Head Office: First Floor, Dominion Building, 91 Cathedral Square, P.O. Box 827, Christchurch, Telephone 66-566.

Auckland Office: Daytone House, 53 Davis Cresc., P.O. Box 9870, Newmarket. Telephone 549-028 (advertising and editorial inquiries only).

Advertising

Co-ordinator — Paul Crooks, telephone 66-566, Christchurch.
Representatives —

Auckland: Paul O'Donoghue, telephone 549-028 (w), 699-050 (h), P.O. Box 9870, Newmarket.

Wellington: Marc Heymann, telephone 721-644 or 844-985. P.O. Box 27-205.

Editorial

Editor — Neill Birss, P.O. Box 827, Christchurch.

Consulting editors —
Cathy and Selwyn Arrow
Representatives —

Auckland:
Gaie Ellis, telephone 549-028, P.O. Box 9870, Newmarket.

Wellington:
Pat Churchill, 5 Lucknow Terrace, Khandallah, telephone 797-193 (h).
Shayne Doyle, 18 Holdsworth Avenue, Upper Hutt, telephone 280-333 ext. 892 (w). 278-545 (h).

Merchandise

Book club and software manager: Dion Crooks.

Subscription

Subscription rate: \$12 a year (11 issues) adults and \$10 a year for school pupils, subscriptions being from the issue of *Bits & Bytes* after the subscription is received.

Overseas subscriptions:

Surface mail — \$23 a year.

Airmail — Australia and South Pacific, \$45 a year; North America and Asia, \$72 a year; Europe, South America, the Middle East, \$94 a year.

Subscription addresses: When sending in subscriptions please include postal zones for the cities. If your label is incorrectly addressed please send it to us with the correction marked.

Distribution

Inquiries: Bookshops — Gordon and Gotch, Ltd.
Computer stores — direct to the publishers.

Disclaimers

Opinions: The views of reviewers and other contributors are not necessarily shared by the publishers.

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Production

Production Manager: Dion Crooks.
Assistants: Roger Browning, Graeme Patterson.
Cover and graphics: Sally Williams.
Typesetting: Focal Point.
Printed: in Dunedin by Allied Press.

MICRO NEWS

Tramiel at Atari helm

Atari just might be on the road to the top again with the news that Jack Tramiel has taken the firm over from Warner Communications.

Tramiel, a very aggressive businessman, helped found Commodore International, which he left in January. Since then he has spent up a \$US75 million to set up a computer assembly line in Hong Kong.

"Newsweek" says that Warner "all but gave Atari away". In fact Tramiel put up \$US240M in promissory notes, carrying below-market interest rates, and got an option to buy a million Warner shares at \$22 each. Warner in turn got an option to buy 32 per cent of the new Atari operation.

Tramiel has begun the re-organisation of Atari by laying off virtually the whole of the marketing and research staffs and is expected to reduce the total number of employees from about 5000 to about 1500.

The pundits are predicting that he will use his Hong Kong operation to drop costs and prices of the present Atari line and then to bring out something for the American market in the range of the Macintosh and the PC Junior.

Devaluation

As *Bits & Bytes* went to press it was still unclear how seriously the 20 per cent devaluation was going to affect the price of microcomputers, peripherals and software in New Zealand.

However, a check with some microcomputer distributors in New Zealand revealed that the initial price movements at least may not be large and in some cases, where distributors had expected a devaluation and had not passed on price decreases from overseas, there may be no change in price.

Below is a list of probable retail price movements compiled from distributors immediately after the devaluation was announced. However, these prices could change overnight depending on future currency movements, overseas price movements and how much can be passed on under the price freeze regulations.

Commodore 64 — back up \$100 to \$995.

VIC 20 — increasing by \$50-\$100 to \$450-\$495.

VZ200 — no price change for a month at least.

CAT — up \$100 to \$1295.

Spectrum — holding at present.

Electron — up \$100 to \$895.

BBC — probably increasing by \$300 to \$1995.

Apple — unclear at present.

IBM — no price change in personal computer range at present.

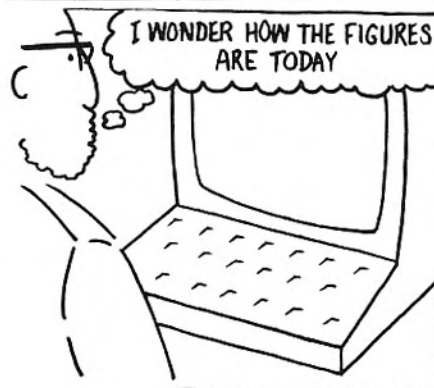
Apricot/Sirius — still to be decided.

On the software side the devaluation should help New Zealand produced software as its overseas competition will be dearer. However, the price of overseas software made here under licence is not expected to increase greatly.

One ironic side effect of the devaluation is that wholesale prices on which sales tax is calculated will in most cases increase and so the government's tax take will also increase. This at a time when overseas governments are putting more and more effort into encouraging their respective computer industries.

MICRO MOMENTS

BY MATT KILLIP



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Landmark decision

Interest in the Court of Appeal's decision on Barson Computers, Ltd, versus John Gilbert Electronics, Ltd, is high, not only in the computer industry but in the wider field of companies with sole agency rights in New Zealand.

An interim injunction served against Gilbert on the basis of copyright infringement will be tested in the Court of Appeal within the next few weeks.

Barson is claiming that computers are no different to books or records when it comes to copyright, and a sole agency brings with it the manufacturer's copyright.

Gilbert has been sourcing US originating product including the Electron, from a retail outlet in the United Kingdom and selling it here, undercutting local retailers' prices. Barson claims it too could sell the product for less if it were not supporting a dealer network for the agency and providing support advertising and servicing.

If the court decision goes against Barson, it will be a clear indication that the field is wide open for

CAD on a micro

By Pat Churchill

A configuration of microcomputer hardware and software suited to computer-aided design (CAD) applications was recently demonstrated to dealers by the NEC APC distributor, Scollay Communications.

The software package, AutoCAD-86 (from Autodesk, of California) makes good use of the NEC APC graphics features, while running under the standard CP/M-86 operating system.

The output from a drawing session is produced in multiple colours on a standard flat-bed plotter. Input from existing drawings is convenient when a digitising tablet is used. The normal facilities for drawing lines, circles, rectangles, arcs, and so on, are easy to use.

Once an object has been drawn, it can be named and stored away for future use in any drawing. It is this library of standard designs which increases productivity. The designs can be incorporated at any angle.

NEC dealers saw a series of demonstration designs of considerable complexity at their recent Wairakei conference.

Through the use of the ZOOM feature, items scarcely visible at first sight were expanded to fill the whole screen. PANNING enabled examination of portions of a drawing initially positioned off the edge of the screen.

SNAP and GRID features enabled points to be located exactly on a pre-defined measured grid. Any point placed near the grid was automatically moved onto it.

According to Scollay Communications products manager, Mr Peter Schmitz, packages such as this are now making much fuller use of the potential of the 16-bit micros.

"On the NEC APC, AutoCAD-86 can use 512K of memory, colour graphics, an arithmetic processor chip and a hard disk."

distributors to open retail outlets selling any machines they can purchase overseas at prices lower than those of dealer networks.

Course for women

Two Wellington women are running what they believe is the first "Computers for Women" course next month. Anne Else, a journalist, and Anne Flower, membership secretary of the BBC User Group, say their course is designed to show absolute beginners that computers are easy to understand and simple to use. They've organised six Saturday morning sessions around computer applications which they see as especially relevant - for example, running clubs, writing and education.

Some overseas research shows that while men can become so "hooked" on their home computers that divorce is the result, women generally have little to do with them. But women should not miss out on learning to use computers in ways which improve their lives and extend their horizons. The course is designed to show them what the options are.

The course will start on Saturday, September 27, and will run for six weeks (missing out Labour Weekend). It will be held at Erskine College, Island Bay, 9.30 to 1.00, lunch included, and is limited to 30 women. Anyone interested can


phone Wellington 759-958 (ask for Anne!) or write to "Computers for Women", 8 Woburn Road, Northland, Wellington 5.

Franklin


Franklin computer imports are continuing "relatively as normal" despite the parent company's filing for bankruptcy under America's chapter 11 provision, which grants companies protection from creditors while they try to trade their way out of difficulties. (It also has some other measures, such as allowing companies to renegotiate union contracts; hence its popularity in recent times with many American airlines). A spokesperson for the firm which handles the New Zealand distributorship of Franklin for the Educational Trading Society said just before this issue of *Bits & Bytes* went to press that in the meantime imports and distribution were continuing as before.

Mice dormant

To date, the Wellington Micro Computing Society has only one contender for its Micro Mouse contest. However, the society's Mr Bill Parkin recently took that mouse, Daisy, to Auckland to show her running through her paces there. The result was a list of 17 people interested in having a go at making maze running micro mice.

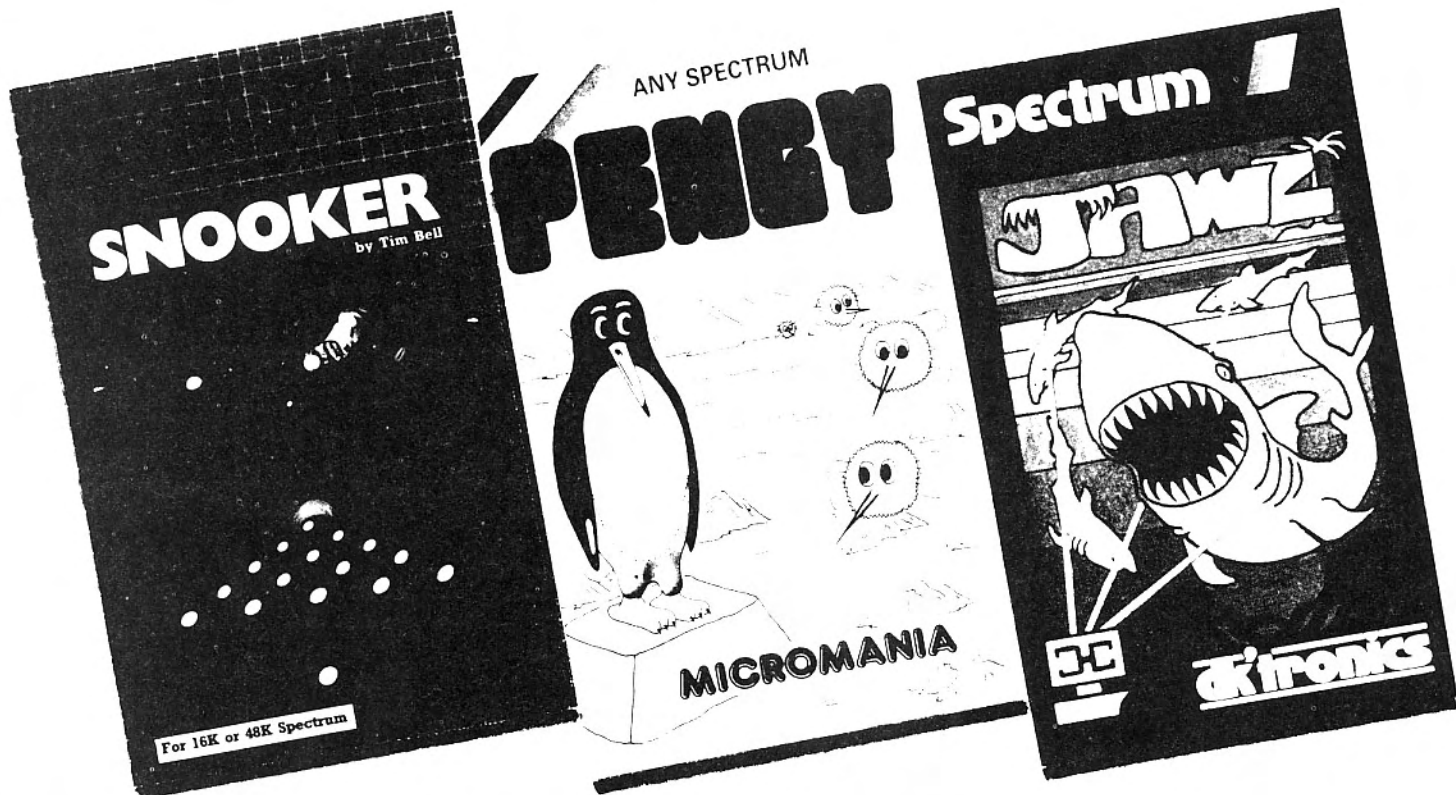


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Why are there more good games tapes for the ZX Spectrum than most other computers put together? Easy – because the world's best programmers write for the world's most popular micros. And where do you find New Zealand's best range of Spectrum games at New Zealand's lowest prices? Even easier – at your SOFTSHOP dealer's! For example:

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Pushy Pengy vs the deadly Sno-bees ... yes, it's the Spectrum version of the arcade favourite – and a cracker for just 16K! All the usual features: harmless blue blocks, bonus purple blocks, threatening yellow blocks etc. Multi-level. \$24.95 value
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Jumbly DK Tronics
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Nightflite II Hewson Consultants
Yes of course, it's even better than Nightflite II! So realistic – taking off, climbing, banking left and right, accelerating and decelerating, descending, taxiing, instrument navigation – all with full cockpit displays. Hours and hours of enjoyment. Some people charge \$34.95 for a game like this, but ...
16K SOFTSHOP PRICE \$19.95

Golf DK Tronics
No need to venture out in the rain – just sit back in your armchair and reveal your prowess as the new Bob Charles! Full 18 holes, club selection, wind effects etc etc. \$14.94 value
16K SOFTSHOP PRICE \$9.95

DEALER ENQUIRIES WELCOME

Manic Miner Software Projects
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48K SOFTSHOP PRICE \$19.95

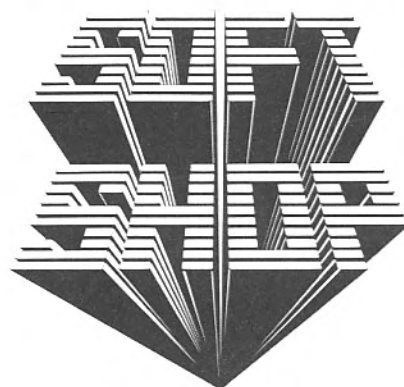
No dealer in your area? Then order direct from us: Softshop, Box 6457, Wellesley Street, Auckland 1. Please add 35c postage to orders totalling under \$10. Over \$10, postage free. Don't forget to name your computer – many of our games come in several versions
Softshop Wholesale Ltd, 421 Queen Street, Auckland.

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Jawz DK Tronics
Can you rid the depths of hordes of marauding sharks, while yourself avoiding the lethal sting pellets of the dreaded giant jellyfish? In short, can you lick the underwater Invaders? \$14.95 value
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Snooker Visions
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"Full-functions" PC

The new Epson PX-8 personal computer, released at Systems 84, is being billed as a full function PC with all the specifications of a desktop computer. It has 64K RAM and 80 x 8 character display with a microcassette for data storage, and comes with peripheral interfaces which include acoustic couplers for telephone communications and a bar code reader.

The screen will display graphics and can be split into two separate halves for comparison purposes. It comes with business software for word processing, spreadsheet and communications and custom programs will be available on plug-in ROM units.

It runs on a standard CP/M operating system, and is available from Microprocessor Developments, Ltd.

Accounts & Solutions

Two new business software packages have been added to Rakon Computers, Ltd's range.

An Accounts package, from the Australian software house, CMS, has been written to meet specifications put together by a group of chartered accountants. It can be run in a multi-user environment on small machines and has a multi-task capability.

The modules, which cover the full spectrum of accounting tasks, have been developed into a package of compatible products using Microcobal programming language.

Solutions, a package for importers, wholesalers and distributors is also from CMS and runs under BOS.

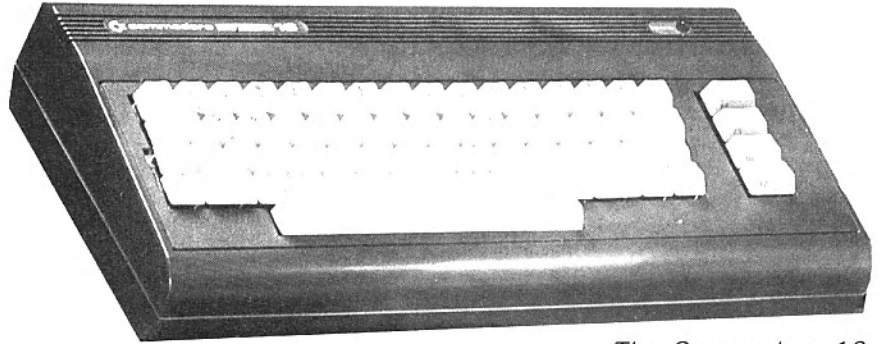
A "windows" enhancement allows insets to be shown on the screen referring to related data without removing the information being worked with.

IBM-PC chip for BBC

Boasting a team of workers with Torch experience, Data Technology has announced an Intel 8088 second processor for the BBC micro. Called the Graduate, the cheapest option is a 128K processor with its own floppy drive working under MS-DOS. The product prices from £599, far cheaper in Britain than buying an IBM-PC or comparable machine. This product means that in the last two months the BBC Micro has suddenly acquired upgrade paths to Z-80, 8088, and 68000 chips and operating systems.

Aimed at 'low end'

The Commodore 16, due to be released here by the end of the year, is aimed at the "low end" of the micro market in tandem with the VIC-20. The C16 — which hasn't yet been released in the US — has 16K RAM and "vastly extended BASIC" language. A 40-column machine with full colour and sound features, it has more than 75 program demands, program editing and plotting facilities, and a "HELP" key.



The Commodore 16

16-bit released

Montek Equipment has just released its 16-bit Casio FP-6000 personal computer to dealers and it will be available generally within the next month.

It has a standard MS DOS operating system, 256K RAM, runs in BASIC and will take two 5in drives (each 320K RAM), two 8in drives (each 1.2Mb) or a maximum of two hard disk drives (each 10Mb).

The latest 'Word'

Microsoft has released an updated version of "Word" in New Zealand, through its distributor, Interactive Applications, Ltd.

Designed to be easily adapted to future hardware requirements, this word processing package has the ability to print form letters that can be customised with variable text while printing. It can also merge a complete file with another during printing, which means a main document file can be kept small even though the final printing document may be long.

This package includes a mouse for pointing and command execution, an "undo" command, advanced word wrap features, direct formatting, and a "context sensitive online 'help' system."

The Word 1.1 package is being offered as an update on Word 1 for \$50. For those not able to trade in, the package costs \$1354 (with the mouse) or \$754 without.

Army contract

Progeni, the Lower Hutt software company, and Delhi Industries, the Auckland electronics manufacturer, have been awarded a contract to develop a prototype of a microcomputer-based equipment-testing system for the New Zealand Army. The contract includes the option to manufacture 17 sets of equipment worth about \$1 million on successful completion of the pre-production phase.

CCL/Sperry

Computer Consultants, Ltd, has signed an agreement with Sperry Computers, under which it will distribute the firm's microcomputers, terminals, superminis, and mainframes in New Zealand. CCL will also develop a national computing service offering on-line access to MAPPER, a Sperry developed systems which enables, says CCL, business applications to be designed, developed, and made operational by those without computer experience.

Atari cartridges

Monaco Industries, the New Zealand Atari distributor, has started to manufacture Atari cartridges in New Zealand. "Marketing Atari cartridges in New Zealand will bring the price down considerably," said the divisional manager for Monaco.

Cartridge games are now expected to sell at between \$60 and \$90. In some cases prices for cartridges will be \$30 cheaper. The New Zealand made cartridges are expected to be selling in the shops in mid-August.

More videotex

Andas has established links with Telematics N.Z. Ltd, to set up a videotex service in New Zealand based on French technology and using Teletel protocol. Telematics and Andas are shortly, in association with General Finance, to install 80 terminals for Waikato dairy farmers to access the Dairy Board database at Hamilton.

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Business Enquiries Welcome

MICRO NEWS

32-bit lap machines?

Motorola has produced a true 32-bit microprocessor, the 68020, which uses CMOS (complementary metal oxide semiconductor) technology, and thus will make 32-bit lap computers possible. The 68020 bears the same relationship to the earlier Motorola 68000, which powers the Lisa and the Macintosh, as the true 16-bit chips, such as the Intel 8086, do to the earlier 8088, which powers the IBM PC. The Lisa/Macintosh's 68000 processes data in 32-bit chunks but exchanges it in 16-bit chunks. The new 68020 brings the input-output rate of the microprocessor up to the rate of the internal processing. It is expected to bring another major advance in personal computers next year or in 1986. CMOS microprocessors use extremely low power, and generate very little heat, therefore are ideal for lap, or tablet computers. National Semiconductor has had a true 32-bit microprocessor available for some time, as has Intel, but it is believed that neither firm has a 32-bit CMOS microprocessor near sale stage.

AT & T personal

American Telephone and Telegraph, a firm with vast turnover, assets, and research facilities (its scientists invented the transistor and the laser), has entered the personal-computer market. It will sell its new machine, the 6300, in America. It is the same machine as the Olivetti M24, and Olivetti will be making the machine for AT & T. The American firm has a number of mini-computers in its product range, and was the developer of Unix. Mr Steven Jobs, the chairman of Apple Computer, has been quoted as saying that he believes AT and T will be moderately successful in the personal computer market, but will be forced to operate "under IBM's umbrella". However, he believes that AT and T will beat IBM into the market with a local area network, giving it a major edge in the office personal-computer market.

Nashua disks

The Nashua brand, already synonymous with copying machines in New Zealand, will now be allied to the computer industry. Nashua Wellington, Ltd, a duly appointed franchise of the Nashua Corporation, New Hampshire, in the United States, has announced the introduction of the Nashua range of computer media. The company will carry a full range of products from

5¼ inch floppy diskettes through to 300Mb disk packs. All Nashua diskette products are available in library cases at no extra cost. Nashua Wellington, 193 Vivian Street, Wellington, welcomes dealer inquiries.

British magazines

There are now more than 150 magazines in Britain devoted to personal computers. One of them, *Personal Computer World*, holds the record for the thickest edition of a British magazine - 408 pages last December. (Still well short of America's *Byte*.) *Personal Computer World* has recently been sold to a Dutch company.

Peanut shell-out?

It is said that the technical specs of the IBM Peanut may have been a little too watered down. Sales are below projections in America and IBM has slashed its prices. Meanwhile Apple's Macintosh (and less predictably the Apple II series) continue to exceed sales expectations and according to *Time Magazine* were both in short supply in June.

Surprise time

A not unexpected query in the British computer press: "Where is the Sinclair QL?" It was being said that not one of Sinclair's new beasts had actually hit the streets yet. Would the wait rival the microdrive saga? However, May saw the first dispatched: the waiting list may be large but supplies have long since started.

GM in computing

General Motors, the world's biggest industrial firm, has diversified into computing, with the \$US2.5 billion purchase of Electronic Data Systems, of Texas. EDS was formed with an investment of \$US1000 in 1962 by a former employee of IBM, Ross Perot, who realised that people who bought computers were worried about how to cope with the associated management problems.

Plotters

If you've filed the *Bits & Bytes* plotters feature (May), note these two additional flat-bed machines. They are the Roland DXY101 and the Roland DXY800, priced at \$1250 and \$1495 respectively. The agent is E.G. Gough, Ltd, P.O. Box 22-073, Christchurch.

COMPUTER BREAKTHROUGH!

The Incredible DICK SMITH CAT

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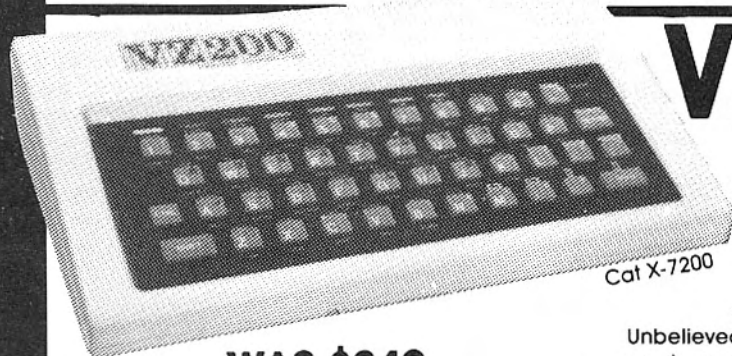


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MICRO NEWS

POLY WP

Polycorp New Zealand, Ltd, has released a student oriented word processing system, Polyword. It will be useful for students wanting to become familiar with commercial word processing practice or key-boarding using the computer. Screen menus assist operation and full use is made of special keys. A help function provides explanatory text without interfering with current work. Other features include automatic word wrap, complete editing, control of margin, block mark and move, selection of alternative print formats, automatic search and replace of words and strings and a file merging option for

customised form letters. At \$90, Polyword comes with manual, example file, key-by-key tutorial, and a wall chart showing the command menus.

Babel continues

While indications from the United States are that the small home computer market may be beginning to plateau and the many machine makes are being "shaken out" the British market continues to spawn new 8-bit machines. The Oric-1 has been replaced by the Oric Atmos, and Amstrad, a company with video connections, has released the grotesquely titled (but rather stylish) CPC4 64 based on the Z-80A.

Presumably the British market is maturing a little later than in the States.

Health Micro-Net

The British Department of Health has announced a project for a network of microcomputers allowing electronic mail and access to central data via the telephone system and modems. The terminals, to be used widely in hospitals, health centres and homes, have the code name Merlin but are essentially an Acorn Electron with an impressive expansion box (including disk, printer, modem and 32K of battery-backed RAM) with a complete price tag of about \$2200. The main aim of the system is to allow fast communication and to reduce time spent in administrative paper work.

CAD PC

IBM has released details of a new personal computer that can be used for CAD (computer-aid design). The 3270 PC, while a stand-alone machine, will need almost always to be connected to a mainframe computer. But it allows individual users to retrieve a complete diagram and individual parts without going back to the host computer. The new machine will sell in America for from \$US9535 to \$16,785, depending on the configuration.

British awards

When the microcomputing and general press in Britain made their annual awards, ATC's Apricot made the front running, claiming awards for both the "British Innovation of the Year" and the (open) "Micro-computer of the Year". Other category winners included the Lisa's operating system and the Lotus 1-2-3 business package. The special category award went to CP/M Braille, a hardware/software package for the blind and visually disadvantaged that includes large text representation and extensive use of voice synthesis.

Optical disks

A Colorado based company, Information Storage, has announced plans for a poor man's (well, relatively speaking) laser disk for storage. The company plans to market a disk the size of a micro-floppy but with 100-300 megabytes capacity by early 1985. The important part is that cost should be on a par with current floppy drives. The initial disks are non-erasable and are less attractive due to software re-writes required by this. The full read/write version may have to wait another six months.

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Word processors: an introduction

How can you tell if an idiot has been using a word processor?

Twink on the screen.

By Gordon Findlay

Word processing is one of the most common applications of personal computers — after games that is! Many people buy computers just for use in word processing, while others soon find that overtyping on a screen is a lot easier than re-typing on paper, or using a six-inch paint brush and Twink! This feature sets out to describe word processing in general, and to (very briefly) outline some of the word processors available.

What is WP?

What exactly is word processing? We are all familiar with food processors. Put some food in to a food processor, and it gets processed, or changed in some way. Whole peanuts can get changed to peanut butter. Cabbage into coleslaw. It's the same with a word processor. Put in words, and they get changed around — printed perhaps, the order might be changed, or spelling corrected. An unhappy phrase can be replaced. Names can be changed, as can other things. I once wrote a long report and covering letter to a person whose first name was Jean. You guessed it — a male Jean. Just one simple command and all female pronouns became the male equivalent.

A word processor processes words, or text in general. There are two quite different beasts by the same name involved here. One is the DEDICATED WP — a piece of hardware, usually \$10,000 or more, which does little other than process words. These devices are fast, and convenient, with lots of keys labelled "INSERT BLOCK" and things like that.

A WP may also be a program, which allows a computer to do the same sort of tasks. Usually the computer hasn't got the range of keys available, so combinations are

needed. Usually, too, the speed is slower, and the capacity lower — but then, so is the price, and you can do other things on a computer.

All the same?

There are many word processors (the program kind) around for many types of computer. None of us can have used them all. I have used, extensively, three for the TRS80, each more sophisticated than the last. I have tried many others for a few weeks or days. Each has its own features, and quirks. None is ideal; but some suit me better than others. Let's run over the features and characteristics you might look at in a word processor. When it comes to choosing one, try to isolate the features you need, and the operations which are most important to you, your application, and the way you like to work.

There are four phases in preparing

and form letters can be stored for use when required, just needing names and addresses and the like to be added. (This recall of paragraphs and blocks of text is called "boiler-plate".)

Some WPs have a number of "modes" — say for inserting text, overtyping, and deleting. Others are always in an overtype mode, or are always in insert mode, unless a special command is given to change modes.

While thinking about the entry phase, think about typing speed. I have seen a good typist press keys faster than they could be accepted. Even I can type faster than some packages can cope with.

WPs differ in the amount of text they can handle at a time. They differ, too, in their ability to handle different types of file: ordinary text, BASIC programs, and assembler files have different formats. A WP which



Word processing . . . food for thought

text using a WP — entering text, editing, saving, and printing. We can take each of these in turn, and look at the most important points.

1: Entry

Entering text into a WP is almost like using a typewriter. Normally you don't have to hit RETURN at the end of the line — the machine should automatically move to the next line, taking any unfinished words with it. This is described as "word wraparound" — heavens knows why. This means that there is no need to think about the ends of lines, immediately increasing the typist's speed. (Speed is also increased by the ease with which errors can be corrected, or revisions made.)

Many programs allow entry of text from disk. Thus commonly used paragraphs may be recalled in whatever order they are required;

can read and edit data files is a real treasure, and brings us close to the new "integrated software".

2. Editing text

Once you've got some text in, you will want to change it around a bit. You will need to correct spelling and typing errors, change words, sentences, or whole paragraphs which are unclear, or which you have had second thoughts about, and so on. There are quite a range of manoeuvres to choose from.

Inserting text — adding material into the middle of your text — is basic, and all WPs have a facility for doing this. Some allow insertions letter by letter, while others open up gaps in the text, accept the additions, and then close everything up again.

Replacing text is usually done by overtyping. Some WP programs

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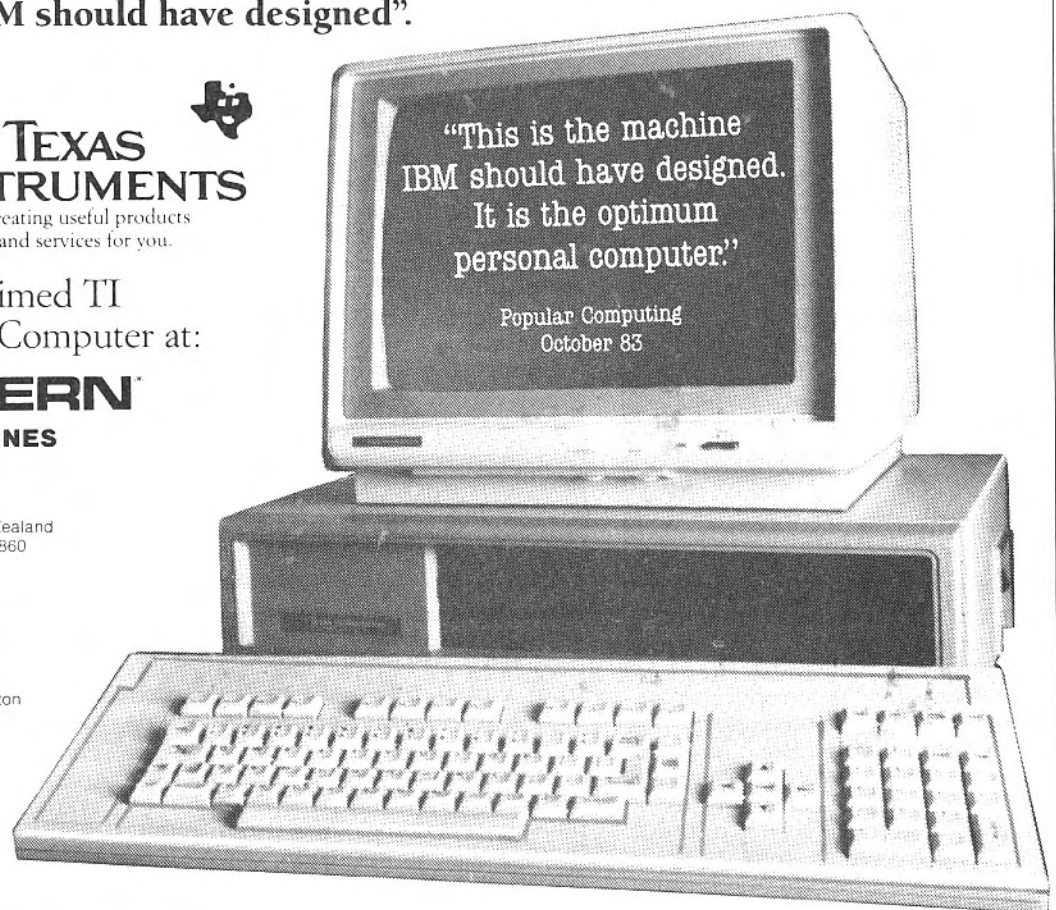
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WORD PROCESSORS

have a special mode for this, so that it cannot happen by accident. Others are always in this mode. Neither is "better" — but one might suit you better than another.

Deletion is also essential. All WPs allow deletion character by character, some allow deletion of words, lines, sentences, paragraphs, pages, or blocks marked in some way. The more options the better, but also the more difficult to learn to use, and some of the more difficult features can be slow going.

Almost all WPs allow you to conduct a search — having the program find a piece of text you nominate. Most will find the first occurrence, then if asked will find the next, and so on. A more useful refinement allows you to search, and replace the found string with another — shorter or longer perhaps. This search and replace may be global, i.e. all the occurrences are replaced, or one at a time. This feature is missing in the most simple programs.

More sophisticated programs allow you to "block-move" — to mark a block of text, and have it moved to another location. The ease with which this operation is carried out varies greatly.

3. Saving text

O.K. — we've entered and edited text. There must be a way of saving it as well — on disk or tape. Tape-based WPs are all right to get a taste of word processing, or for a monthly letter to Aunt Brunhilda, but for documents of any length tape is too slow, too restrictive, and not reliable enough. Text is usually stored in unformatted form, with formatting commands included. Some allow storage of text in formatted form — useful with some operating systems.

4. Printing

There is no point in producing text unless it can be printed on paper. All WPs support "plain vanilla", straight-forward printing. The range of printing options is wide.

The first step is formatting — arranging the text into lines of the right length, with the required number of lines per page. This may be done as text is entered, as a separate operation, or as it is printed. Some features which may or may not be included are page numbering, headers (lines at the top of every page) and footers (at the bottom of the page) and justification. This means making the right margin flush as well as the left one — as newspapers do. Often provision is made for centring text on a line, as for headings, etc.

Printing might allow printing parts only of a document, multiple copies, double spacing and lots of other options. The margins and so on are usually set globally, but can be adjusted for parts of the text.

Printers now have a range of special features — varying type styles, italics, underlining, subscripts and superscripts, even graphics. Unfortunately, the printers achieve these by different means. No worthwhile standardisation has taken place, which might be regarded as irresponsible.

To accommodate these features, many WP programs allow the passing of commands to the printer. Usually these are sequences of special codes, different for each printer. The way printer commands are handled is very variable. The simplest programs don't allow any. Other programs have a number of "printer drivers" — little pieces of code which may be changed to suit your printer. Some programs allow, and yet others require, a printer driver to be written and used by the WP.

"What you see . . . is what you get" is a current catch phrase. This idea means that the appearance of the document on the screen is the same as the finished appearance on paper. This is harder than it sounds. What if the paper is wider than the screen? What about underlining? Italics? Can you see where a page ends — it is useful to avoid a heading being separated from the text it refers to.

Some WPs are much better than others at handling tables, and only the best allow you to (easily) produce documents in two or more columns. "What you see . . ." is an ideal, and only with some sort of bit-mapped display (like the Macintosh and Lisa) can you really get close.

Extras

All sorts of add-ons can be added to some WP programs. One of the most useful is a "HELP" file accessible from within the program: this can save a lot of time, especially in the learning stages.

Spelling checkers, form-letter generators, mailing — label printing packages, all have their uses. Some more esoteric additions allow the integration of graphics and text, or permit calculations as you write. Here you get what you pay for.

One extra which shouldn't be — books explaining how to use the thing! If all documentation was up to even a minimally acceptable standard they wouldn't be needed. They are for many, enough said!

A writer trebles her productivity

By Jenny Phillips

"Welcome to the 20th Century," my brother said to me when I discovered manual indexing last Christmas. I am a writer, not known for my efficiency, and it was a new discovery for me to find out that I didn't actually have to spend days rifling through heaps of paper for vital pieces of information on the backs of old envelopes. There were easier ways.

This discovery that I don't actually have to do life the hard way has gone to my head. Just six weeks ago I bought myself a personal computer — a Digital Equipment Corporation Rainbow 100, and my typewriter has been gathering dust ever since.

I probably did things in the wrong order because I thought about software second. As a journalist and writer I of course had word processing uppermost in my mind. Once I had chosen my DEC Rainbow I had my eye on the Select Word Processing system which went with it. But by buying a C Itoh A10-20 printer I had inadvertently put myself out of the running on that one.

Still, I thought, WordStar is one of the best and I can use that on my CP/M 86-80 operating system.

WordStar is good, but it is designed to be used on any CP/M operating machine and doesn't know what my machine can do. As a result I would have been hitting several keys to command my machine to do something it was designed to do using only one key. My supplier gave me a week's trial and I was doing my best to learn the set of instructions for WordStar, when WPS-80 arrived in the mail for its trial run.

WPS-80 is designed for my computer. That means it is simple to use. It speaks English as I know it. If I want the index I press "I" and hit RETURN. A number of my keys now have WPS-80 labels, some green, some red. If I want to set a page ruler I press the "red" key and the "R" key (labelled with the word "ruler" in red.) WPS-80 speaks my language and I haven't stopped writing since I bought it.

I haven't used WPS-80 to full capacity yet. I'm too busy writing. And that's the good thing about

WORD PROCESSORS

WPS-80. Other writers, journalists, and editors will understand exactly what I mean when I say I don't want the technology to get between me and my writing. Using WPS-80 I have trebled my productivity and produce results which are crisp, professional, and error free.

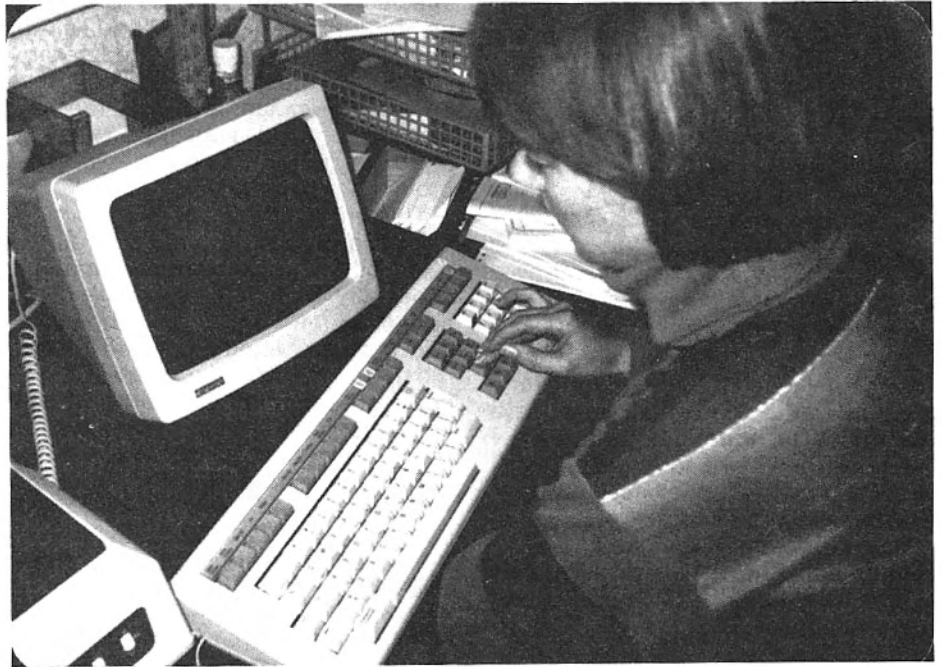
I edit as I write. I don't need to type any special command to insert text. Text can be inserted into the space left of the cursor as I go along. I can bold-type text simply by placing the cursor on the letter and pressing the key labelled bold. In the same way I can underline or turn text into upper case (capital letters.)

A friend viewing my new purchase the other day said: "It's all this computer jargon. I could never understand it." She was wrong. The only jargon in WPS-80 is the jargon familiar to all journalists, writers, and editors. When I cut out a piece of text, then replace it in another section of text I simply hit the keys labelled "cut" and "paste," which are the terms I am familiar with.

Some could find it a disadvantage not to be able to abandon a document. All documents must be filed on disk. Later you can call them up and delete them if you wish but there is no abandon facility. Personally I find this useful. It is important that I don't lose my writing and as I am rather absent minded and inefficient, WPS-80 has provided me with a safety device.

The manual looks amateurish, but it describes everything I need to know simply and well. It is easier to refer to and better written than some which have a more up-market glossy appearance.

WPS-80 has all the features most good word-processing systems have these days, and a few extras. I hit the "red" key and "oops" key to restore an accidental deletion. And there is a dandy little device called



Wellington writer Jenny Phillips prepares to load WPS-80 on her DEC Rainbow.

"swap" which lets me turn two letters around when I have typed them in the wrong way around. When my document is filed, WPS-80 tells me how much space I have left on the disk — in pages!

As a writer, I like the fact that I don't have a help screen taking up a large part of the screen in front of me. I want to be able to see as much as possible of what I have written. I can hit the help key any time to get an editing help screen.

WPS-80's simplicity, power, functions, and ease of use, make it a writer's dream.

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- ★ Simple to learn; powerful to use.

Specialist and micro packages

By Derham McAven

The taxi-driver manoeuvring a cab around the city for upwards of 12 hours a day appreciates an automatic gear change. However, most regular drivers manage pretty well with the manual change.

A similar comparison may be made between the specialist word-processing equipment and the general-purpose microcomputer running a word-processing package. In the setting of the large law firm or where the operator spends every hour of the working day churning out the material then the specialist equipment may be justified. For most small businesses, the micro approach is the best deal.

The factors to be taken in to account are quality of print, range of function, ease of use, ease of learning, and cost.

The quality of print may be a dead-heat. The letter-quality daisy-wheel printers which are supplied with

specialist gear are the same as may be bought separately (and under original labels) and attached to any micro. All the fine feature such as dual hopper single-sheet feeders, true super and subscript printing, and micro-justification can be provided.

This brings us to range of function. Few micro packages support all the facilities of specialist equipment, especially in making use of the advanced features of the best printers for example. The better micro packages offer some 90 per cent of the sophistication of the specialist gear, and this covers all of the fundamental requirements. Typical advanced features include:

- Alignment of figure columns (such as money values) by decimal tab.
- Built-in arithmetic for proof checking of figure columns, horizontal block move (for transferring columns of text or figures).
- Multi-column lay-out with each column right and left justified.
- Management of footnotes.
- Creation and support of indices.
- Simple chart drawing (e.g., for organisation charts or flow diagrams).
- Spelling checker.
- Work station networking.

Probably the most useful

supplementary feature of the best word processors is in file management. Many operators have difficulty keeping track of their document files and benefit from catalogue service which provides time and date stamping and extended file descriptions. Some even cater for file summaries which are accessible by topic search, for example: "Find me all documents in the last 12 months which refer to 'Inland Revenue'." Several of these facilities may be found in the better packages and in a very few cases, the enormous popularity of a package (such as WordStar) creates a range of complementary software which adds more of the advanced features.

Ease of use and ease of learning are often confused. One cannot expect a really sophisticated system to be easier to learn and to use than a simpler facility.

However, it must be conceded that specialist systems while no easier to learn than some of the more difficult packages are somewhat easier to use. In particular, they have custom keyboards with many powerful commands handled by single keystrokes. The micro packages require rather more user knowledge of the operating system. This may not be a bad thing, because in conjunction with familiarity with a general-purpose keyboard the operator is better equipped to take advantage of the basic flexibility of the microcomputer and use relevant items from a vast range of other software. Christchurch Polytechnic at present bases all its word-processor training on a micro-package and finds its students quickly adapt to any alternative system because they understand the principles well.

The bottom line is cost. Micro-package based systems are typically 60 per cent of the price of specialist units. They provide almost all of the facilities with minimal disadvantage and have the further benefit of flexibility for use in a host of other applications. IBM itself is reported to be dropping the single-user Displaywriter in favour of an equivalent package available with its PC. The message is, even if your tasks require advanced features check out the economical alternatives.

Footnote: For single-station systems the more expensive 16-bit micros offer few advantages over their adequate 8-bit rivals.

Derham McAven is head of the Computer Resource Centre at Christchurch Polytechnic.

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What's available for what

The following is a brief tasting of the word-processor software available on a number of the better-known microcomputers. It is not all encompassing but may broaden the perspective of the user familiar with WPs for his or her own machine.

Apple

There are probably more WPs for the Apple than for any other micro. Be careful — there are often different versions of the same program for the II+ and the IIe, to allow for things such as shift key being different. The programs differ, too, in the ways they accommodate the Apple's narrow (40 character) screen. Assume that II+ versions won't work properly on the IIe, and almost certainly won't use the IIe's 80 column card.

Magic Window comes in two versions. The 40-column version scrolls horizontally, so the effective screen size is 80 columns. Unfortunately, of course, the typist cannot see all of a line at once. Many menus are used — in an easy-to-use format. Limited control over printer functions, unless you can get a special printer driver written. The final form of the document, including page breaks, can be seen on the screen. Block moves are done by "killing" lines, moving to another part of the document, then "recovering" them. That works, but only 15 lines at a time. Limited search and replace.

Applewriter II is not to be confused with the original Applewriter. Very versatile, on-line help is available; may be configured to your requirements easily. Good documentation, but difficult to see final printer form on screen. Applewriter has an associated programming language, WPL, which can be used for generating mail lists and form letters, "boiler plating", and so on.

Sandy's Word Processor. Views vary on this one — some say its beaut, others don't like it. It can be used with a wide variety of 80 column cards. Good for merging files together, and built in mailing list feature. Limited, rather clumsy,

search and replace — clumsy because the prompts, and the manual, are unclear.

WordStar (see under CP/M) can be had for the Apple provided you have an 80-column card, and a Z80 card.

Atari

If you are serious about word processing a good idea would be to purchase an 80-column display board for your computer. This vastly improves word processing on the Atari.

More than 15 word processors are available for the Atari, but most are expensive and are not available in New Zealand. They are, however, of the highest quality and can be interfaced with a wide range of non-Atari printers and utility programs, such as Atspell. A new Atari word processor, the Atari Writer, is discussed in the Atari column in this month's issue of *Bits & Bytes*.

BBC

Word processors for which BBC computer? Apart from the standard machine the arrival of the various second processors for the BBC has dramatically widened the choices available. Perhaps it should just be noted that for the more serious user the Z-80 second processor opens up all the CP/M word processors, including well-known products such as Perfect Writer and WordStar. The 8088 IBM DOS compatible option just released offers significant further options, too, while the added memory of the 6502 option will attract new disk-based products.

For the standard BBC the choice lies between disk-based and ROM-based programs. The former are cheaper but, because they use up memory space for the program, are less powerful and will handle only small documents. The ROM-based options are faster and more powerful. The best is VIEW, which is a good combination of ease of use and power. It is a very good home, school, or small-business word processor with 80-column capability. Its main rival is Word Wise which has a simpler form of printer control but is less powerful. Both are recommended over disk-based versions, because they can be immediately accessed by a single command regardless of which disk is in current use.

Commodore 64

Numerous word processors are available for the Commodore 64.

They range from simple public domain programs to expensive, top-notch programs, such as "The Word". So far, fewer than half these word processors are available in New Zealand; nevertheless, we have a wide selection to choose from.

In New Zealand the most popular program for the 64 is Commodore's own Easyscript. It is a full-capability word processor with a good range of facilities. Using the screen as a window, Easyscript can display up to 240 columns, and it is possible to do a print-out to the screen which shows where the page breaks will occur. Easyscript makes provision for many different kinds of printers, including Centronics-type printers connected to the user port. The program comes with a good user's manual, and it is relatively easy to use.

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WORD PROCESSORS

In America, the biggest-selling word processor for the 64 is Wordpro 3+. In many ways it is very similar to Easyscript, but it has a smaller text area and it lacks the ability to display more than 40 columns. Moreover, Wordpro offers fewer editing options and cannot use as many different types of printer as Easyscript. However, one advantage which Wordpro has is that it can do column arithmetic.

Other high quality word processors available in New Zealand are Vizawrite, Mirage, and Homeword. However, the best word processor for the 64 is not yet available here. The Word is a full 80-column word processor, and it comes with a special video cartridge to display 80-columns on the screen. The Word has a wealth of facilities, including column arithmetic and sorting. It is very flexible and can handle even the most demanding word processing requirements.

At the cheaper end of the market are several word processors for under \$100, but they are all pretty limited. The best value for money among the cheaper programs is SpeedScript, which appeared in

COMPUTE!'s Gazette. The full listing is in the January issue and additional details are in the May issue. SpeedScript is entirely in machine language, and it provides a huge text area and a reasonable range of facilities.

CP/M's war horse

There is probably a greater range of word processing packages for the CP/M operating system (and hence for a wider range of machines) than for any other, though the MSDOS/PCDOS world of IBM PC and clones is catching up fast.

From the crowd, a few front runners emerge and each of these is a worthy competitor of the specialist word-processing systems. The phenomenon of loyalty to the first product you learn is well-known and I have to strive to overcome that. However, allowing for my bias I still find WordStar a leading product. It's been around a long time and hasn't developed enormously but had such a start in its range of functions that few of its rivals match up. I frequently find reviews of newer products which are compared

favourably with the old war horse by critics who obviously do not know many of WordStar's features.

The main shortcomings of WordStar are:—

- Its range of functions makes it a little difficult to learn.
- Many operations require multi-keystrokes.
- No support for true proportional printing.
- Clumsiness of re-formatting multiple paragraphs — especially including indentation.

Against this must be counted:

- The adoption by many other products (e.g. dBASEIII) of its cursor conventions.
- The near-universality of its implementations.
- The range of complementary products including texts, training aids, and supplementary software which variously supply virtually any function not already provided.

For particular tasks individual word processors (and text editors) have strengths which attract devoted fans. However, for the user who wants to learn just one product for the widest variety of services then WordStar is hard to beat.

New Zealand Educational Software for the BBC Micro

Barson Computers introduces a new range of educational software for the BBC. These programs have been designed in New Zealand specifically for New Zealand schools and are available only from Whitcoulls Education Branches.

MUSIC Provides computer assisted testing and development for a class of up to 50 users. Difficulty levels from 1 to 99 — from primary school to university. \$110.

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The BBC Microcomputer System

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SOME MIGHT CALL ME PROMISCUOUS.
All I've got to say to that is #**@**!!

It's jealousy.
There aren't many printers around that can
team up with a wide variety of personal computers.
There's every chance that your computer and
I would make a very handsome couple.
I prefer to call my behaviour compatible rather
than indiscriminate.

Of course, my excellent performance attracts
a lot of people. My printout capacity of 80
columns for standard letter-sized sheets
outshines most printers.
But then who am I to brag?

I've got to admit though, my best feature
is my size...I'll go anywhere with you.
(I'm also loyal).

Measuring about the size of a standard letter sheet
and being extra light means I can fit in your
briefcase. I'm also battery powered...perfect
for personal computers like hand-held and home
computers.
I'm also very quiet.

So, that's me!
Well, some of me. I'm not one of these "tell all
on the first advertisement" types.
Ask your dealer for the real nitty gritty on me

the Brother.

brother HR-5



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WORD PROCESSORS

Digital

Digital Equipment Corporation has three word-processing systems for personal computers which it supplies and supports. Micropro's WordStar, one of the most popular of all word processing systems to date has been configured for DEC machines. It costs more, but you may think it is worth it for the 12 months support and help line (the Auckland phone number DEC users can call collect) that goes with it. SELECT 86 has been the system DEC has promoted up till now. Just recently SAMNA ii has been added to the stable.

WPS-80, from Exceptional Business Solutions, is available in New Zealand and has a lot to offer (see the article, "A writer trebles her productivity", in this issue of *Bits & Bytes*). It is not currently supplied

and supported by DEC but will be soon.

Five American word-processing systems are popular with Digital users. These are Lex II, Mass II (originally mini-computer products), Finalword, Peachtext Word Processor, and Memo Plan. The magazine, *Digital Review*, usually includes advertisements for these.

IBM

Leading Edge is probably the easiest to use of the WP's for IBM-PC's and compatibles. It has excellent documentation, and its features are impressive. Microsoft Wand uses "mouse" technology.

Multimate is a new WP for the PC. It is menu driven and has powerful features.

Displaywrite is from IBM and includes a 100,000 word dictionary.

WordStar is also available for the machine and another older-generation program is Spellbinder. It has perhaps the most features of the MS-DOS/PC-DOS WP's.

(IBM-PC word processors will be the subject of a further article in a forthcoming issue of *Bits & Bytes*.)

Sord

Sord has one word-processing package which has been progressively updated. It is a powerful, easy-to-use business system, which appears to be not unrelated to those of the Wang machines. However, the Sord WP does have some surprising omissions for a package at its end of the market. Lack of pagination is not present, for example.

However, a powerful new package for the machines, WP2, is due to be released soon.

The latest version of Sord's lap computer, the IS11, has a specialised WP of its own.

Spectravideo

JustWrite Jr. is an extremely user friendly word processor designed for Spectravideo computers. Based on a ROM cartridge it leaves virtually all RAM available for text. It uses the function keys to select editing options like change, find, format, colour and block commands. It also features scrolling, extensive printer options as well as tape saving and retrieving capability. This means that words, lines and blocks of text can be stored for later retrieval into another document.

TextPrint, which is available on tape or disk, is a menu-driven editor. It allows the user to set the number of characters per line as well as the screen colours. TextPrint will find and change text easily and lets the user look at the total document. TextPrint provides the home user with all text-editing facilities at a very low price (\$25 or \$35).

Spectrum

Several excellent word-processing programs are available for the 48K Spectrum. The main limitation of this low-cost means of word processing would be its small keyboard; for serious word processing, touch-typists would want to connect a full-size keyboard.

A Spectrum word-processing program which is available in New

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WORD PROCESSORS

Zealand, and which is generally considered to be the best on the market for the machine, is Tasword Two by Tasman Software (Britain). Tasword Two uses 64 or 32 characters per line at the user's choice. Thirty-two characters suits the small ZX printer, but Tasword Two is best used at 64 characters per line with a full-size printer, for which an interface is required (such as Interface One). Up to 320 lines of text can be stored, which is about 10 A4 pages. Automatic word-wrapping and line justification can be turned on or off at will. Text files may be saved on Microdrive cartridges or cassette tapes, and merged into other files. Editing consists of deletion, insertion, or replacement. Formatting is possible, as is auto-centring, large text, string-finding, and block transfer of text. Several type-faces such as cursive script are available as a separate purchase.

TRS80/System 80

There are many word processing programs for the TRS 80 Model 1 and 3.

Scripsit is beginning to show its age, and must now be regarded as a basic, but usable and very friendly, WP. Its limitations reflect its age — very limited control of printers, fairly basic string searches and so on. A number of enhancements, in the form of add-on programs, have been produced to overcome some of these limitations. However, despite its age, Scripsit is still worth considering. Written documentation is poor — you are supposed to learn by doing, while listening to audio tapes of instructions. Updated versions have been published for the Colour Computer and the Model IV.

Electric Pencil is another early program, and is very simple to use. Again, it has limited control of printer special functions, and only a limited range of block operations. Good documentation. Updated for the IBM PC! Has an annoying habit of losing characters as it wraps words around to the next line, so not for fast touch-typists.

Lazy Writer has more features than can conceivably be listed here. It has a very wide range of editing and formatting options, complete control over printer special functions, but at a price — it's difficult to learn and needs to be set up correctly for each printer type. It allows programming of 10 "function" keys, formatted saves to disk, and many, many more features. Add-ons allow for calculations, graphics and text, fancy printing (on graphics printers) and more. Good documentation.

Machine or DOS	Word processor	Price (pre-devaluation) \$	Characters on screen	Wrap around	Justification	Screen display matches printed font	Search for string	Global search & replacement for string	Column work possible	Merges text from disk into file	Can modify printer drive routine	Can issue special printer commands	Mail merge facility	Mailing labels	Additional equipment needed to use	Any additional comments
Apple	Sandy's WP	\$150	40/80	Y	Y	N	Y	Y	Y	Y	?	?	Y	Y		
	Magic Window	\$325	40	Y	Y	Y	Y	N	Y	Y	Y	some	N	Y		
	Apple-writer II	\$300	40/80	Your Choice	Y	N	Y	Y	Y	Y	Y	Y	Y	Y		
	WordStar	\$595	80	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	80 Col card Z80 card	
Atari 400/800/800XL/600XL	Atari Writer	\$199	38	Y	Y	-	Y	Y	Y	N	Y	Y	Y	Y	Tape or disk drive & Atari compatible printer	Very easy to use & understand
	Atari Word Processor	Over \$200	40	Y	Y	-	Y	Y	Y	Y	Y	Y	Y	N	Disk Drive & Printer	Not available in N.Z.
	Data Perfect	Over \$200	40	Y	Y	-	Y	Y	Y	Y	N	Y	Y	Y	Disk Drive & Printer	Compatible with Letter Perfect
	Text Wizard	Over \$150	40	Y	Y	-	Y	Y	Y	?	?	Y	Y	N	Disk Drive & Printer	Excellent manual
BBC/Electron	Letter Perfect	Over \$200	40	Y	Y	-	Y	Y	Y	?	N	Y	Y	Y	Disk Drive & Printer	Can display 80 columns with board
	View	\$198	20 min 80 max	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	ROM based additive
	Word Wise	\$188	40 wkg 80 rev	Y	Y	N	Y	Y	N	Y	Y	Y	N	Y	N	ROM based
	Word Pack	\$48	40	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Disk based

WORD PROCESSORS

Machine or DOS	Word processor	Price (pre-devaluation) \$	Characters on screen	Wrap around	Justification	Screen display matches printed font	Search for string	Global search & replace for string	Column work possible	Merges text from disk into file	Can modify printer drive routine	Can issue special printer commands	Mail merge facility	Mailing labels	Additional equipment needed to use	Any additional comments
Commodore 64	Wordpro 3 plus	\$195	40	N	Y	N	Y	Y	Y	Y	N	Y	Y	N	-	
	Easyscript	\$145	40 col window on 240 col	N	Y	Y	Y	Y	N	Y	Y	Y	Y	N	-	
	Write Now	\$110	40 col	N	Y	Y	Y	Y	N	Y	N	Y	Y	N	-	
	Hes Writer	\$95	40 col	Y	Y	N	Y	N	N	N	N	N	N	N	-	
	Papermate	\$89	37 col	Y	Y	N	N	N	N	N	N	Y	Y	N	-	
	Totl.text	\$59	40 col	N	Y	N	N	N	N	N	N	N	Y	N	-	
	WordStar	\$NZ 595	80	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	Most advanced features available
CP/M	Spellbinder	\$US 269	80	Y	Y	N	Y	Y	?	Y	Y	Y	Y	Y	-	Macro building available
	Peachtext (alias Magic Wand)	-	80	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	-	Lacks hyphen help. Files limited to RAM
	Palantir	-	80	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	-	
	Perfect Writer	\$US 259	80	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	-	Split screen and multi-file operations possible
	WordStar	\$935	80	Y	Y	N	Y	N	N	Y	Y	Y	Y (with mail merge)	Y		Digital version support help-line available 12 months
	Select 86	\$473	80/132	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y		Runs on CPM or MS/DOS Dig support and help-line avail 12 mths
	Samna II	\$800	80/132	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Runs on MS/DOS Dig support and help-line avail 12 mths
Digital	WPS-80	\$500	80/132	Y	Y	Y	Y	Y	Y	Y	Y	Y	N (but coming)	N		Lists/sort math/and com additions coming soon

TI PROFESSIONAL

The one that talks and hears

By Peter Ensor

Texas Instruments (TI) has always been known for large commitment to research and development, so for it to produce a professional computer to compete with the IBM Personal Computer comes as no surprise.

Many competitors have added "user friendly" devices to entice consumers to buy their computers. These have taken the form of the mouse for the Apple computers and the touch screen for the Hewlett-Packard personal computer.

TI has tried to go one better with the addition of a speech synthesis and recognition system, and from the performance of the review unit it has been successful. The system comes as an add-on option sub-system which, like all the extras, is user installable. The price for the minimum configuration with the speech system is \$12,650.

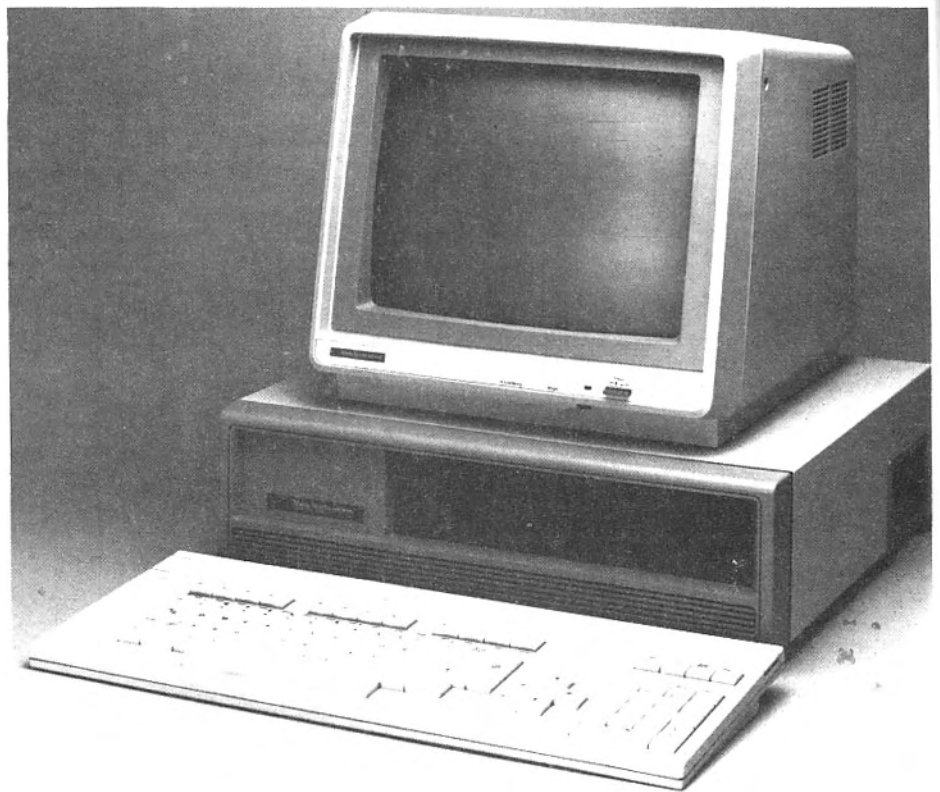
Before discussing the speech option of the computer in full, the basic unit will be reviewed.

The computer contains a 16-bit 8088 microprocessor with provision for a 8087 arithmetic co-processor. A memory of 64K is provided as standard, but a minimum of 256K is required if the speech option is to be used. The computer comes complete except for the monitor in a fawn case, about 480mm wide by 400mm deep.

The front face of the cabinet has space available for two full-height 5¼ inch floppy drives. One floppy disk drive comes as standard. The other of these positions was taken up with a 10Mb Winchester (hard disk) drive on the reviewed unit.

The keyboard is a low profile unit that connects via a telephone-type coiled cable to the main computer unit. The slope of the keyboard is adjustable from 5 to 15 degrees. The keys are divided into logical areas. The main area contains a 57 QWERTY style lay-out with five cursor control keys placed slightly to the right. On the far right are 18 keys for data entry. The top row of keys contains 12 function keys and four dedicated keys. The F and J keys have slight indents on them to aid in speed typing while the number 5 on the numeric keyboard has a raised pin-head to help hand positioning during data entry.

The graphics are available in two options. The first is a single-plane, two-



TI's Professional

colour or two shade, monochrome controller, and the second is a three-plane, eight-colour monochrome shades board. The same software is used for both options, saving expense when upgrading the graphics. Good definition is achieved with a 720 by 350 pixel resolution. Both options piggy-back the standard video controller to save on expansion slots.

Now to the speech. With programs such as Knight Rider and Buck Rodgers being shown on television, where characters talk to computers as if they were people, we are led to believe that one day this might be technologically possible. Some of the problems that designers have had to battle with include methods to reduce the large data rate required and creating the ability to recognise the required words from a sentence.

TI has made large inroads into both of these areas. By using an in-house 32-bit processor, it is able to obtain 16 minutes of storage on the 320K floppy disk drive that comes with the system and over 8 hours using the 10Mb hard disk.

The dealers' demonstration package uses digitised speech to talk the customer through the features of the machine. This program runs using interpretative BASIC to present a full audio-visual display. The replayed speech was found to be slightly detached, as if there was no smoothing between each of the samples as they were replayed. Despite this, however, the speech was very easy to understand, and the time taken to retrieve information from the disk was not noticeable during the commentary.

REPLAYABLE IN SPEECH FORM

The speech-recognition portion of the option can be used to produce the data files necessary for the replayed speech. This feature is used in one of the supplied utilities to simulate a dictaphone. The messages are recorded on to the disk and can be replayed, varying the speed using two of the function keys. Instead of sending the disks to the typist for typing, the information could be stored on the hard disk to form a verbal notepad. The data files can also be integrated into other programs to produce voice prompting for input.

An extension of using replayed speech, is the auto-dialling facility of the computer. By using the pre-recorded speech and the clock facilities, the computer will automatically dial a number and deliver the message at a predefined time. It is expected to be particularly useful for making use of cheaper night rates and for calling other time zone areas.

The auto-dialling program also makes use of the speech recognition to dial calls on a spoken command. For instance if you want to call John Smith, then saying, "Call John Smith" will cause the computer to dial the number and keep dialling until the called phone answers.

The speech, however, has much more use than just as a smart phone.

The speech-recognition programs run under the MS-DOS operating system to interface with most application programs. Programs do not have to be specially written to make use of the

speech recognition as the speech command software (SCS) overlays the keyboard driver program to become transparent to the user. The keyboard is not disabled and so speech may be freely interspersed with keyboard commands.

Two of the programs supplied, TI stated, that will not run under the SCS are the back-up and restore programs for the hard disk. This problem, however, has been corrected with the current release of SCS.

One of the advantages of TI's speech recognition is that normal sentences may be used and the computer will pick out the words it knows from the sentence. The words or phrases that the computer recognises are called "key words".

In the example "Call John Smith", the phrase, "John Smith", may be the only key word and so the first word will be ignored.

SCANS SENTENCE FOR KEY WORDS

Alternatively, the word "call" may be a separate key word for another operation. The computer will scan the whole sentence for as many words it can detect and when a pause occurs it will then produce the keyboard depressions. Each phrase can be up to 2.6 seconds long which is enough for about five to six words. The overhead for each vocabulary takes up 3000 bytes of memory with 330 bytes extra for each phrase used.

In producing a vocabulary, several factors must be taken into account. The surroundings must be the same as the location that will finally be used, as this will affect the sound of the words. Also words such as six and sixteen will be confused, as the computer will pick out the word six and thereby not recognise the larger word.

Since the computer uses only a voice pattern to recognise the words, the phrases can be said in any language. It was noted that turning the microphone on or tapping the microphone with a ring while handling it, was sufficient to produce reliable voiceprints.

While the speech is fairly sensitive to the way the word is said, the system cannot be used as a security system. Other people can use your vocabulary, re-trying each word until it is successful.

The accuracy of the system is quoted as 99.56 per cent. Difficulty was experienced when first using the system, but after the initial nervousness subsided, talking to a computer became natural and very few errors were produced.

The list of phrases the computer can recognise is limited to 50 at one time. Any of these words can cause another vocabulary of 50 words to be used. A maximum of nine vocabularies may reside in memory at once, facilitating fast switching between them.

If more than this is required then more vocabularies can be loaded from the disk. As the key strokes are assembled

Microcomputer summary

Name:	Texas Instruments Professional Computer.
Manufacturer:	Texas Instruments.
Processor:	16-bit 8088.
Clock speed:	5MHz.
RAM:	64K, expandable in 64K blocks to 768K.
ROM:	8K expandable to 16K.
Input/output:	Keyboard, parallel printer.
Display:	80 x 25 lines. Upper and lower case.
Operating systems:	MS-DOS, CP/M-86, USCD P System, VOS.
Languages:	All languages available for above operating systems.
Graphics:	720 x 350 pixels.
Sound:	7-octave, single-voice, with tempo control.
Cost:	\$5690 including 1 floppy-disk drive.
Options:	Synchronous/asynchronous communications, \$495. RAM Card \$685; 64K \$440. 1-plane, 2-colour graphics \$725. 3-plane, 8-colour graphics \$1350. Clock and analogue, price on application. Z80 card, price on application. Voice recognition and synthesis, \$6250. 2nd floppy disk drive, \$1365. 10Mb Winchester (hard disk) drive, \$6505. Colour monitor \$1200; 150 cps printer \$1490.
Peripherals:	

Reviewer's ratings (out of 5):	Documentation	5	Ease of Use	4
	Languages	N/A	Expansion	4
	Value for Money	4	Support	5

Review unit was supplied by Southern Business Machines, Ltd. of Auckland

once a pause is encountered, a pause must be made for the new vocabulary to become active, otherwise the speed of normal speech may be used.

The vocabularies were very easy to set up and to use. The key word or phrase is entered and then the key strokes are entered.

An initial voice print is taken of the phrase. This one print, or template, is sufficient to operate the system, but TI recommends that three copies be taken. A maximum of nine copies is possible.

These updates of the initial phrase are best said in a sentence so that the correct inflexions are registered. The templates can then be tested, the computer giving a 1-10 answer, depending on how good the recognition is. A good idea is to take a printed copy of the phrases so that you don't forget them.

ACCURATE AND EASY TO USE

The speech is very easy to use and accurate. Two programs must be installed to enable the speech, but these can form part of a command file that the system executes when it powers up.

A main use for the speech may be with senior management or children who don't want to remember all the key strokes to make use of the system.

Presenters could also profit from having the computer monitor their speech to bring up the next display instead of having to remember to press buttons.

Typists would not have to lift their fingers from the keyboard to find a delete key, for example. Wearing a headset similar to the modern light-weight models used by telephonists, they would say "delete word" and keep on typing.

Another big advantage could be made with quadraplegics or other people with serious physical disabilities. Since no hand movement is required they would have full use of the computer. The only drawback would be the entry of data: this would become tedious.

The computer performed very well and is likely to make a big impact against other competitors, especially with IBM terminal emulator software also being available. The speech worked without problems and is likely to prove that it is more than just a gimmick. This computer is going to be a trend-setter.

30% Apple

Apple computers will have an estimated market share of 30% in New Zealand, according to CED's marketing manager, Brian Eardley-Wilmott.

HARDWARE REVIEW

TANDY 2000

A lot of computer — at a price

By John Slane

TRS-80s were among the first home computers in the New Zealand marketplace in the 1970s but were not marketed as aggressively or as

competitively as some of the other brands. This, along with the fact the cheaper Models I and III (and now IV) were monochrome and low-resolution, has meant Tandy has not had anything like the success here it has had in the U.S. and Canada.

The Radio Shack colour computer, for example, is practically unknown in New Zealand — apart from what one reads about it in overseas journals. The Models 12 (CP/M) and 16 (UNIX) have fairly low profiles in the marketplace.

Consequently, TRS-80 tends to be rather less well known in New Zealand than it probably deserves — particularly among the business community.

With the arrival of the Model 2000, the Tandy Corporation and the New Zealand TRS-80 agents hope to put that right. However, Tandy is dithering a bit on how to present this computer. At its launching late last year, it was put forward as a hardware and software system of great sophistication — a complete system which was really all a business user needed. But not long after this, the glossies appeared and there was the familiar performance-comparison with the IBM-PC.

So the Model 2000 does claim to be an IBM workalike. Even on its 720K slimline drives, it can read IBM single density disks; and where the source program is written to conform to basic MS-DOS, the program will run on the 2000. However, you can't write to the IBM disks so programs have to be read into memory and then saved on to Model 2000 — formatted disks. Yes, it works. I've tried it.

Basically, two main features can be claimed superior to the IBM-PC (and to most of the clones):

- High capacity floppies (nearly 1.5 Meg total in two drives)
- Fast clock speed (8 Meg) with a full 16-bit 80186 microprocessor that shares some compatibility with the IBM's 8088.

The disk drives appear to do what they claim. I found them fast, quiet and had no read errors. Writing 1000 records to a new file took only half the time for other IBM-types I have used. Retrieving records at random took less than half a second each. Again, superior performance.

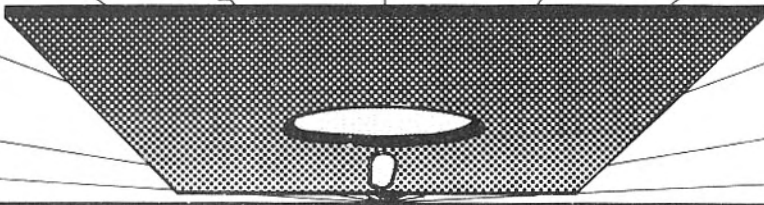
On my own benchmark tests, the Tandy was consistently three times faster than IBM, Eagle, and Challenger. The Model 2000 tested for and found all the primes from one to 50 in under 35 seconds. (A review in PC magazine quotes a time four times longer for this test, but I assume this is an error in testing or reporting.)

So the Model 2000 is fast. That's going to be useful for some computing activities and for running the new, complex software using windowing and a mouse. There's a lot of housekeeping to be handled in those programs and plenty of internal memory and high processor speeds are very desirable. In this connection it's worth noting that a speed-up option is available for at least one other computer, for example, the Eagle.

The Model 2000 is not cheap. Pre-devaluation price for the basic unit was around \$7500. That's with 128K RAM and one RS-232 and one

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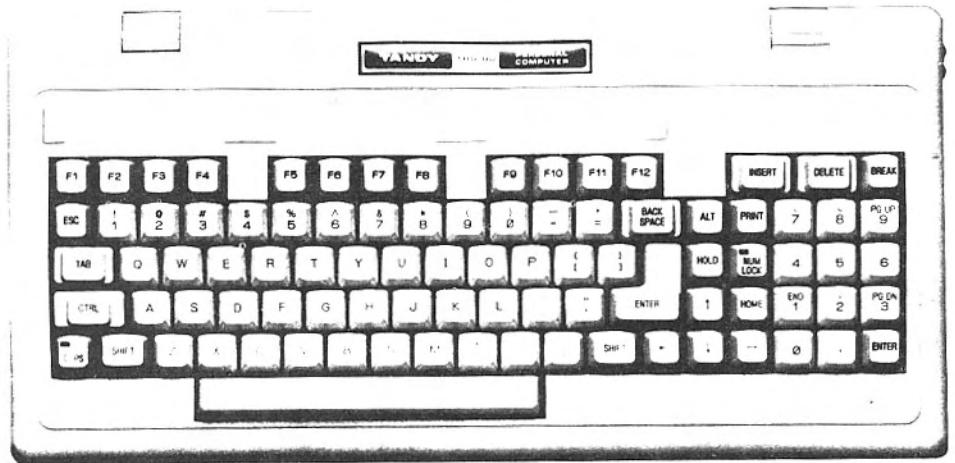
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HARDWARE REVIEW

Centronics parallel port, and four (empty) user-available expansion slots. But without monitor, without graphics, and without colour! Upgrading to 256K, high resolution colour monitor from Radio Shack, and graphics and colour card, push the (July) price up to \$11,600. That's for a single-user system. But for your money there's nevertheless a lot of quality sitting on your desk!

I did not have the opportunity to try the colour capability, but overseas reviews comment very favourably indeed on it. Full colour is available with 640 x 400 resolution, and that should speak for itself. The green screen monitor draws power directly from the main processor unit and for an extra \$200, you can have the monitor on a swivel/tilt stand.

The character generator is outstanding — sharp, detailed and attractively formed characters. A huge number of alternate characters are available through ASCII codes, including foreign language and maths symbols, and graphics characters. Spacing between lines is very good. Scrolling routine is fast and efficient, yet it's also possible to put scrolling into slow motion if you wish.



The Tandy 2000 Keyboard

The keyboard has a fairly robust feel. The keys clatter somewhat under heavy use such as touch typing but are positive in operation — except the larger RETURN key which jams if pressed right off-centre. Capital and numeric locks have indicator lights.

One minor irritation is that this and other PCs I have used don't boot up with the numeric pad active for numeric input. Also, although there is a decimal/period on the keypad, the date and time data won't accept

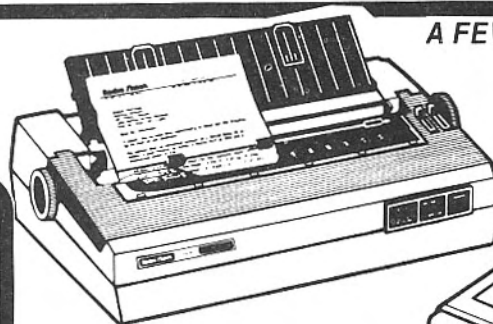
this character as a delimiter. (My own DOS will, so I suppose I'm spoiled!)

It's a pleasant surprise to find Tandy hasn't slavishly copied the IBM keyboard layout. Separate cursor keys are provided but the advantage of this is partly destroyed by placing them in a triangular group making it impossible to use four-finger control! I was forever hitting a direction I didn't want. Tandy didn't do so well, either, by putting the ALT key by the keypad.

The provision of HOLD and PRINT

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HARDWARE REVIEW

keys is excellent and there are 12 soft function keys. It's a very full keyboard indeed. It angles up on retractable legs, and can slide under the processor unit if you want it out of the way.

The processor unit is around the usual size for 16-bit PCs, perhaps a little lower than some. Power switch and reset are recessed on the front panel.

MS-DOS and BASIC are provided. The manuals have had no expense spared — all are typeset, two-colour jobs in robust ringbinders, and are very well written and referenced. Even the MS-DOS manual makes reasonable sense. The manuals give a very upmarket image of the product.

For the do-it-yourself operator, a generous 62.3K is available for your GWBASIC programs. The HOLD key is an excellent feature when listing long programs or data. Error messages are appropriate and intelligible.

Several commercial programs were supplied for trial with the review unit. These included MULTIPLAN and MULTIMATE and a tutorial for LOTUS 1-2-3. The interesting thing was that an attempt had been made to customise these programs to the Model 2000 —

Microcomputer summary

Name:	Tandy Model 2000.
Manufacturer:	Tandy Corporation.
Microprocessor:	80186 16-bit/16-bit data path.
Clock Speed:	8 MHz.
RAM:	128K, expandable to 768K.
User RAM:	62K under Disk Basic.
ROM:	12K (for system startup).
Input/Output:	Centronics-type parallel printer, RS-232C, four expansion slots.
Keyboard:	Detached unit, 90 keys, typewriter style.
Display:	25 x 40/80.
Languages:	MS-DOS, GWBASIC. Pascal, Cobol, Fortran available.
Graphics:	(if provided): 640 x 400 with eight colours.
Sound:	Inbuilt speaker, sound and play commands.
Cost:	(All pre-devaluation prices): Basic unit, including 2 x 720K drives, 128K RAM, no graphics, \$7495; hard disk version, \$11,995. No application software is included.
Software:	See text for range currently available.
Options:	Graphics, colour, joystick, mouse, communications, additional RAM, monitor and processor stands.
Reviewers ratings:	(out of 5, 5 being highest): Documentation, 5; ease of use, 4; value for money, 3; language(s), 4; support, 2 (at present); expansion 4.

including use of the reference to the special keys on the keyboard.

MULTIMATE is being released before all its features have been implemented for the Model 2000 — no spelling checker yet, and the text

highlighting feature is not yet working. I was amused to see the only printers for which drivers were provided were for the printers from Radio Shack!

However, all this suggests there are at least some major software houses that confidently expect the 2000 to be widely used. When that is the case, a computer doesn't need to be merely a copy of something else just so that it can be said it has software support.

The catalogue from Porterfield Computers lists programs already available in the 2000 format. These include assembler, compiler, Fortran, Pascal, Cobol, mainframe communication, videotext, spreadsheets, data management, business applications and word processors. Prices range from \$125 to \$2000.

The Model 2000 is a good looking package. It has some features which set it apart, and ahead, of many of the IBM workalikes. Already, it is clearly being supported as a computer in its own right with customised software available.

It is a good unit to operate and screen presentation is excellent. The high storage capacity is notable. The fact it can read and run some IBM software is a bonus.

I would expect buyers to have few if any complaints about the Model 2000's performance. It is a quality machine. Prospective buyers will have to do their sums to see if the Tandy package will do what they want at the right price for them.

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HARDWARE REVIEW

EAGLE SPIRIT XL

Portability, power and Visi On to boot

By John Slane

The review machine is one of four models in the Eagle family distributed by the Microcomputer Electronic Company, Ltd, a subsidiary of the whiteware manufacturer, Fisher and Paykel, Ltd. MEC has been well known for sales and support of Japanese computers, notably National Panasonic, and the American Zilog. The Eagle is produced in Los Gatos, California.

There are two portables, one with two floppies and the other, like the review machine, with one floppy and one 10 megabyte hard disk. There are two standard models, again either two 5¼in floppies or one floppy and one hard disk of 10 Mb.

The Eagles use the same 8088 chip as IBM, and although there may be some cosmetic changes to firmware to make possible patent suits less likely, this computer probably comes as close to being IBM compatible as any of its competitors. To help me appreciate this, the distributor provided a copy of the IBM-PC flight simulator program. This type of machine language program with its calls to ROM is popularly considered to be a suitable benchmark to gauge IBM-PC compatibility. Yes, it worked just fine — but then caused a significant system problem that I'll discuss later.

The Eagle Spirit XL is described as a portable. You can see straight away from its size that you aren't going to take it along on a tramping trip, but for lugging from office to car to airport, etc, the



The Eagle Spirit XL

Eagle is better than some. As well as a robust-yet-soft carrying handle at point of balance, the computer can be slipped into a nylon bag with its own shoulder strap. The combination of shoulder and hand makes short distance carrying quite feasible.

The Eagle Spirit XL, for \$11,584, has one 5¼in disk of 360K, a 10 Mb hard disk and 256K RAM as standard. At back are two serial communications ports, the parallel printer port, power cord outlet, fuse and optional keyboard cable connection. A side panel contains four interface board slots. Three of these are filled already with control boards for colour video, hard disk, and floppy disk. The video board includes sockets for composite video and RGB.

On the front, a 9in P31 green screen monitor is built in with brightness and contrast controls conveniently alongside. The right-hand front side has the floppy and the hard disk drive. Both are aligned vertically. When set up for

transporting, the screen and disks are covered by a neat clip-in arrangement for the keyboard. The keyboard then becomes the base of the package as the handle is at the opposite end where the I/O ports are. The case is of good old-fashioned steel. The keyboard is plastic.

VERY COMPACT FOR ITS CAPACITY

For its capacity the Eagle is really remarkably compact — so much so that a high speed fan is deemed necessary to keep the inside temperatures at an acceptable level. In a typical noisy office environment the fan noise mightn't worry you, but in a quiet home my family and I found the roar disconcerting.

Two recessed latches lock or release the keyboard, which is permanently connected to the main unit by a coiled lead that disappears down a tunnel into the main unit. If you are one of the types

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HARDWARE REVIEW

that likes to put the keyboard on your lap, you won't like the Eagle because the lead has to be under considerable tension to do that. However, once stretched a bit, the lead is long enough to put the keyboard in any reasonable position near the monitor.

The keyboard can sit on a pair of snap-on plastic feet to tilt at a suitable angle. Apart from the fact that I don't like the IBM-type keyboard layout (which the Eagle copies in most respects) it is really impossible to fault the action of the Eagle version. The designers should have ignored the IBM key "islands" on Return, Alt, etc, and given them full-sized surfaces because these keys on the Eagle operate flawlessly from any off-centre press position. Operation is quiet and positive and will please professional touch-typers. Capitals and numeric lock are signalled by indicator lights. The usual 10 function keys are provided.

To improve the viewing angle, the front of the computer itself can be tilted up on plastic feet. If you are demonstrating it on the polished boardroom table, don't let the chairman pull the unit around for a better view. This set of feet are very badly designed:

the weight is carried on slim knife-edges of hard plastic which will damage a wooden surface. If the distributor won't do it for you, you will probably want to file a bevel on the feet.

On power-up, the system first searches for a system floppy disk, and if none is found then defaults to the 10 Mb hard disk and runs MS-DOS which is resident on it. CP/M-86 can be used on this machine provided you don't wish to access the hard disk.

There are no surprises in the operating system. The characteristics have already been described for the IBM-PC and for other computers based on the same configuration and using MS-DOS, CP/M-86, GW BASIC, or BASICA. GW BASIC as supplied on hard disk for the review model would not implement major graphics commands such as LINE and CIRCLE, I am sure this is a non-typical aberration.

A point of interest for BASIC users, is that although like other machines in its type, only 64K is available for BASIC, on the EAGLE a good deal of disk BASIC is loaded outside this reserved area and about 60K is still left available for the user. Some of the competitors leave as

little as 49K available. However, I was unable to find a reference to any spool memory available to the BASIC user.

The screen display and graphics resolution is standard as for the IBM. But what's this I see on the screen? Is it the same ugly character font as I have commented on earlier (*Bits & Bytes June*) for the Dick Smith Challenger? Yes indeed it is, and the same clumsy scroll routine that means your BASIC program can be listed only at the rate of about two lines to the second. For a machine which reflects quality in nearly every department the selection of this screen management chip is quite inappropriate.

The small screen is seen at its best when running the Visi On software. The Visi On designers bypass the resident character generator entirely, and produce their own fonts, which are clean, elegant and outstandingly readable.

In operation, the Eagle is efficient and easy to manage. The floppy drive worked well. The hard disk is a good example of where technology has got us to, with 10 Mb in a very compact volume and with completely silent cylinder access. From a BASIC program, 1000 records of 200 bytes each were written to a new random access file in 1 min 14 sec. Retrieving and screen printing randomly selected records averaged just under 1 sec each.

The compact size and high performance of the latest hard disk has come from smaller head gaps and closer tolerances all round. The fractional sagging of the platters when not kept ultra rigid by centrifugal force may be enough to touch a head. A minute pulse at power-on may be enough to glitch a byte or two under the heads at that moment. The obvious answer is to park the heads clear of the data before power down and EAGLE provides such a power down routine called from MS-DOS.

One of the techniques in protecting software is to shut off ways a user might get into the system. This can involve intercepting and diverting certain keys or key combinations. Faults in software or incorrect operator commands can also unexpectedly lock up the keyboard so that the reset command is not available.

The Flight Simulator was both protected and didn't provide a quit command to get back to DOS. On a floppy system, merely pull out the disk, switch off, and go to bed. On the Eagle XL the hard disk requires the PD routine to be run.

It would seem obvious that any modern hard disk system should provide a system reset button on the main unit and it should be so wired as to work under all circumstances. As a result of my referring this matter to the New Zealand distributor, it has now advised that a manual reset will be provided as standard on the machines it sells with hard disks.

The PD routine is necessary. The directory on the review unit became damaged and the disk had to be reinitialised - resulting in the loss of 114 files totalling about 3 million bytes.

GW BASIC TERMS

ABS	HEX\$	POS
ASC	IF . . . THEN and IF . . .	PRESET
ATN	GOTO	PRINT
AUTO	INKEY\$	PRINT USING
BEEP	INP	PRINT#
BLOAD	INPUT	PRINT# USING
BSAVE	INPUT#	PSET
CALL	INPUT\$	PUT (for files)
CDBL	INSTR	PUT (for graphics)
CHAIN	INT	RANDOMIZE
CHR\$	KEY	READ
CINT	KEY (n)	REM
CIRCLE	KILL	RENUM
CLEAR	LEFT\$	RESET
CLOSE	LEN	RESTORE
CLS	LET	RESUME
COLOR	LINE	RETURN
COM(n)	LINE INPUT	RIGHT\$
COMMON	LINE INPUT#	RND
CONT	LIST	RSET
COS	LLIST	RUN
CSNG	LOAD	SAVE
CSRLIN	LOC	SCREEN
CVI,CVD,CVS	LOCATE	SGN
DATA	LOF	SIN
DATE\$	LOG	SOUND
DEF FN	LPOS	SPACE\$
DEFINT - DEFSNG -	LPRINT and LPRINT USING	SPC(
DEFDBL - DEFSTR	LSET	SQR
DEF SEG	MERGE	STICK
DEF USR	MID\$	STOP
DELETE	MKI\$, MKS\$, MKD\$	STR\$
DIM	NAME	STRING\$
DRAW	NEW	SWAP
EDIT	NEXT (SEE FOR . . . NEXT)	SYSTEM
END	OCT\$	TAB(
EOF	ON COM(n) GOSUB	TAN
ERASE	ON ERROR GOTO	TIME\$
ERL, ERR	ON . . . GOSUB and ON . . .	TROFF
ERROR	GOTO	TRON
EXP	ON KEY(n) GOSUB	USR
FIELD	OPEN	VAL
FILES	OPEN "COM. . .	VARPTR
FIX	OPTION BASE	VARPTR\$
FOR . . . NEXT	OUT	WAIT
FRE	PAINT	WEND
GET (for files)	PEEK	WHILE
GET (for graphics)	PLAY	WIDTH
GOSUB . . . RETURN	POINT	WRITE
GOTO	POKE	WRITE#

HARDWARE REVIEW

There's a lesson in there about the importance of back-up.

Three manuals are supplied: User's Guide, BASIC Manual, MS-DOS 2.0 Manual. These are typed, tabbed and indexed and bound in sturdy, attractive ringbinders with matching storage boxes.

The Eagle chuggs along quite adequately at 4.77 MHz but the 8088 is clearly slower than others in the 16-bit family when it comes to doing something a bit complicated. In an informal benchmark exercise, for example, the Eagle took twice as long to identify integer roots as another modest unit running the same clock speed but using an 8086 chip. Interestingly, Eagles that are not at present being stocked in New Zealand include ones with a switchable clock speed. Double speed is selectable. These versions will also be available in N.Z.

Options offered by the distributors are local-area networking, high-resolution colour monitor, and memory expansion in 64K chips. As mentioned earlier, no packaged software is offered with the Eagle basic price apart from the operating systems.

VISI ON FRAMES IMPRESS

I was given the opportunity to work with Visi On Graph and Calc program and was very impressed. This important software development (bearing a more than co-incidental resemblance to Apple Lisa and Macintosh) ran flawlessly on the Eagle. The full package is the subject of a detailed review in a coming issue of *Bits & Bytes*.

Visi On is an interactive file and screen management program allowing simultaneous accessing and transfer of data from among a variety of filed or keyboard sources. Each current working area can be a frame of any size on the screen, and in any position on the screen. Several frames can co-exist on the screen. The current frame overwrites any others.

An extensive dynamic menu is available on screen particular to each frame and changing as a different range of processes is entered. A standard menu of functions is permanently on the 25th line.

The framing is one clearly distinctive feature. The use of the Visi On mouse is another.

The mouse has to be used on an etched aluminium sheet. On a cold day your wrist gradually gets frozen as it inevitably rests on the aluminium. As you move the mouse, a pointer moves in a corresponding way on the screen. The correspondence isn't perfect and suffers badly if the mouse isn't kept reasonably parallel to the sides of the aluminium sheet. As the tip of the screen pointer touches one of the many command functions pictured, the command lights up, a definition of the command appears in a window, and a touch on the mouse "Select" key instantly makes the command active.

Microcomputer summary

Name:	Eagle Spirit XL
Manufacturer:	Eagle Computer Inc.
Microprocessor:	8088 16-bit
Clock speed:	4.77 MHz
RAM:	256K, expandable to 640K.
User RAM:	60296 under disk BASIC
Disk storage:	1 x 5¼ in floppy, double sided, double density — 360K 1 x 10 Mb hard disk
Input/Output:	2 x RS-232 serial ports. 1 parallel port. Additional keyboard socket.
Keyboard:	Moveable unit. 84 keys, typewriter style
Display:	25 x 40/80
Languages:	CP/M-86, MS-DOS, BASICA
Graphics:	320 x 200 and 640 x 200 Colour capabilities
Sound:	Inbuilt speaker. Sound and play commands
Cost:	\$11,584 Other models from \$7465 to \$11,878
Software:	Claims to run "most" IBM-PC
Options:	Local area networking
Reviewer's ratings:	(Out of 5): Documentation 4, ease of use 4, value for money 3. Other ratings apply to the whole IBM-PC work-alike field as the Eagle is just another example: language 4, support 5, expansion 4.

It is a very impressive demonstration indeed. I have never found a calc sheet as easy to use as the Visi On version.

There is an enormous amount of overhead and housekeeping involved in the management of formatting, file handling, accessing, presenting, etc., and on the Eagle at least, Visi On will not run efficiently in less than about 500K RAM; and 1.5 Mb is the minimum necessary on the hard disk.

When the initial "Gee Whizz" has worn off, one becomes very conscious of the frequent and relatively long wait periods while Visi On gets its housekeeping organised. Is Visi On therefore really just an executive's toy? The marketplace will finally answer that question, but in the meantime if you want to impress your friends and business acquaintances, run a demo Visi On for them — and the Eagle will run it just fine.

Summary — The Eagle range doesn't include the cheapest IBM-PC workalikes around, particularly as the machines,

come bare of any applications software. However, the review unit ran commercial software well and physically was robustly constructed. For a lot of keyboard work such as entering masses of data and text the keyboard operates smoothly. On the review machine the 9in screen was found perfectly satisfactory.

MEC has been in the computer business for a while and customers should be able to expect informed service. Buyers would probably get their applications software by shopping around.

I am left with the impression that the designers of the Eagle didn't quite know where they were going. The Spirit XL, for example, is a strange mixture of quality and mediocrity. Yet the main points of irritation or concern reported in this review could be rectified quite inexpensively. The Spirit would then be better value for \$11,584.

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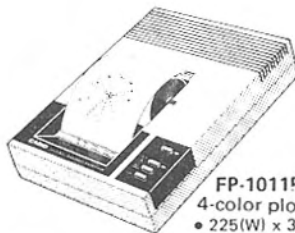
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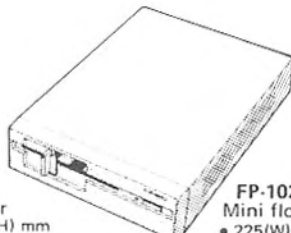
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PRINTER REVIEW

Gemini 10X: Sold! To the reviewer

By Shayne Doyle

Over the last two years I have had the opportunity of using many dot matrix printers, ranging in price from \$300 to \$3000, and while each of these units has had a lot of good features, each has had some drawback. I made up my mind not to buy a printer until a unit came along that had all of the good features as standard. In my opinion that printer is now available, and I have bought the unit under review here.

Falling into the "Epson emulator" classification, the Gemini 10X has every possible feature as standard. Print fonts available are pica (normal), elite and italics. Each font may be printed in condensed (17

Examples of the Gemini 10X output.

MICROBEE & GEMINI 10X o
The GEMINI-10X printer
It is stocked by MOONSH

MICROBEE & GEMINI 10X o
The GEMINI-10X printer
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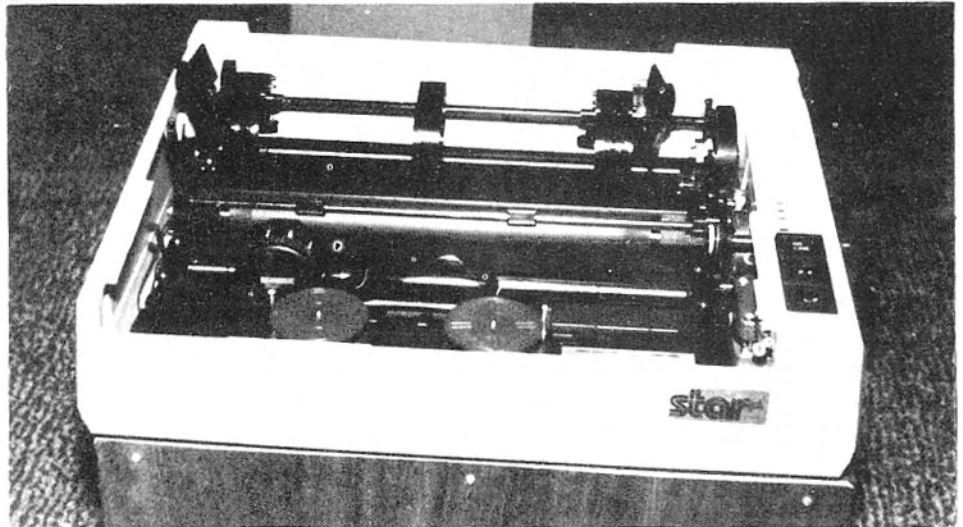
PRINTER REVIEW

characters per inch), enlarged (5, 6, 8.5 c.p.i.), double-strike, or emphasised mode. Emphasised and double-strike modes may also be combined. Other effects are underline, subscript, and superscript modes.

Full graphics capabilities are provided: column scan bit image graphics mode in 60 (dots per inch), 120 d.p.i. and 240 d.p.i. The 120 d.p.i. mode may also be run at double speed. Gemini also has a programmable character generator, allowing the user to define and download up to 96 customised characters into the PCG RAM. Although these cannot be mixed on the same line with normal characters it is a most useful feature.

Another nice addition is the "macro instruction" — you may define up to 16 printer control bytes as a "macro" or subroutine, and these are executed together when the macro call function is issued. Full control over page formatting is provided with comprehensive line feed, page length, line spacing, vertical and horizontal tabulating, left and right margin setting, and skip-over perforation features. There is also provision for software control of seven or eight-bit incoming data formats.

The Gemini 10X is about the same size as its competitors, what could be called "Epson sized", and is fairly substantially built. It offers both friction and tractor feed, using fanfold, single sheet, or roll paper. The tractors are proper removable units, and either a feed/separators rack or a roll feeder hangs off the back. Inset on the rear is a four-



The Gemini 10X printer.

position DIP switch for changing the most often used parameters. The printer, while not quiet, generates what I feel is an acceptable noise volume in my lounge and the non-hinged plastic sound cover is fairly effective. While the printer is nominally 120 characters per second, a time test of printing 100 solid 80 character lines took 102 seconds — a respectable 80 cps. In practice, it seems to print faster than this, and the subjective printing speed is dependent on the type of material being printed.

One of the good features is the use of a standard Underwood style typewriter ribbon — \$5 to \$7 to replace, no expensive cartridge!

The user manual, while covering every one of the 72 control codes, is a bit short on examples, particularly for the graphics facilities. To be fair,

the manual was marked "preliminary", so I can only assume a more comprehensive version will be released. On the other hand, it contained more useful data on the interfaces than some others I have seen.

In summary, at \$885 retail, this printer offers the most comprehensive range of facilities and performance that I have come across. I have no hesitation in recommending it to both home hobbyists and small-business users.

Printer Summary

Name:	Star Gemini 10X.
Type:	Dot matrix.
Character format:	Alphanumeric 9 x 9 matrix. Block graphics 6 x 6 matrix. Bit-image graphics 7 x 8 matrix.
Character sets:	96 standard ASCII characters, 64 special characters, 32 block graphics characters, 96 user programmable characters.
Print speed:	120 characters per second.
Print direction:	Standard characters — bidirectional, logic seeking. Graphics mode — unidirectional.
Graphics density:	Normal — 60 dots per inch. Dual — 120 dpi. Quad — 240 dpi.
Line spacing:	1/6in, 1/8in or programmable by n/144in or n/72in.
Columns/line:	80, 96, 136, 40, 48, 68 in enlarged mode.
Paper handling:	Fanfold 3in to 10in wide. Roll paper 8.5in to 10in wide. Single sheet 8.3in to 10in wide. Copies — 3 carbonless sheets.
Ribbon:	Standard 2in Underwood typewriter style.
Interface:	Centronics parallel standard RS232C serial optional.
Buffer size:	816 characters standard. Optional 4Kb or 8Kb.
Dimensions:	13.5in W x 12.5in D x 6in H. 15.5lb.

Review model supplied by Moonshine Computers and Peripherals, Lower Hutt.

Spectravideo

Computer Distributors, Ltd, has announced a new expander for the Spectravideo. The SV605A includes dual 160K disk drives, parallel printer interface and a further six expansion slots. It retails at \$1845. CDL is also offering two bundled systems: The Family Pak, at \$695, includes a SV318, a cassette system, and four cassette programs. The VIP Pak, at \$1995, comprises a SV328, an expander, a disk drive and controller and CP/M. Two new word processors are available for the machine, JustWrite Junior and Textprint, and business software packages such as CARPE and Peachtree. Evidence of interest in the machine came from the attendance of more than 80 people at the initial meeting of the Auckland club.

Stats display

A statistical computing display was held at Victoria University of Wellington during June. Organised by the New Zealand Statistical Association, it featured a range of statistical data analysis and graphics systems.

HARDWARE REVIEW

LITTLE BIG BOARD

Pulsar's make your own

By Peter Ensor

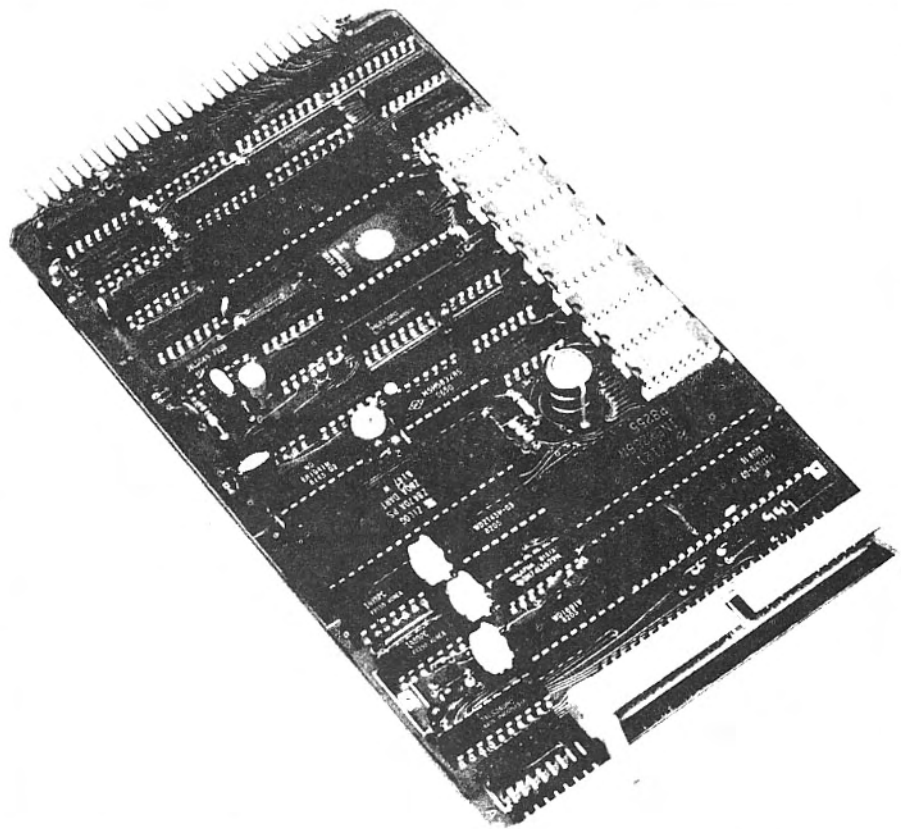
For the hobbyist and the professional, GTS in Auckland, has available a kitset single-board computer that is able to run the CP/M operating system. It is called the Little Big Board.

The board, manufactured by Pulsar, contains a Z80 central processing unit (CPU) running at 4 MHz with 64K of memory, real-time clock with battery back-up, and floppy disk controller. There are also two serial channels available for the terminal and the printer. The board is designed to run on the STD bus, which is promoted by PROLOG. The board size is a small 114mm by 204mm, which makes it slightly longer than the standard STD bus board. By using the bus, the board can be interfaced with the real world using any of the many industrial input/output cards that are available.

The board is available in three versions. The simplest and cheapest version contains the printed circuit board, monitor, EPROM, and documentation.

The second kit contains the same plus a complete set of components. This is the version that GTS recommends, as some of the components are hard to get.

The final version is a complete assembled and tested board. The boards has been promoted in the *Electronics Today International* (ETI) magazine as



Pulsar's Little Big Board.

project 690. This article details the construction of the board and should be kept close at hand when building the system.

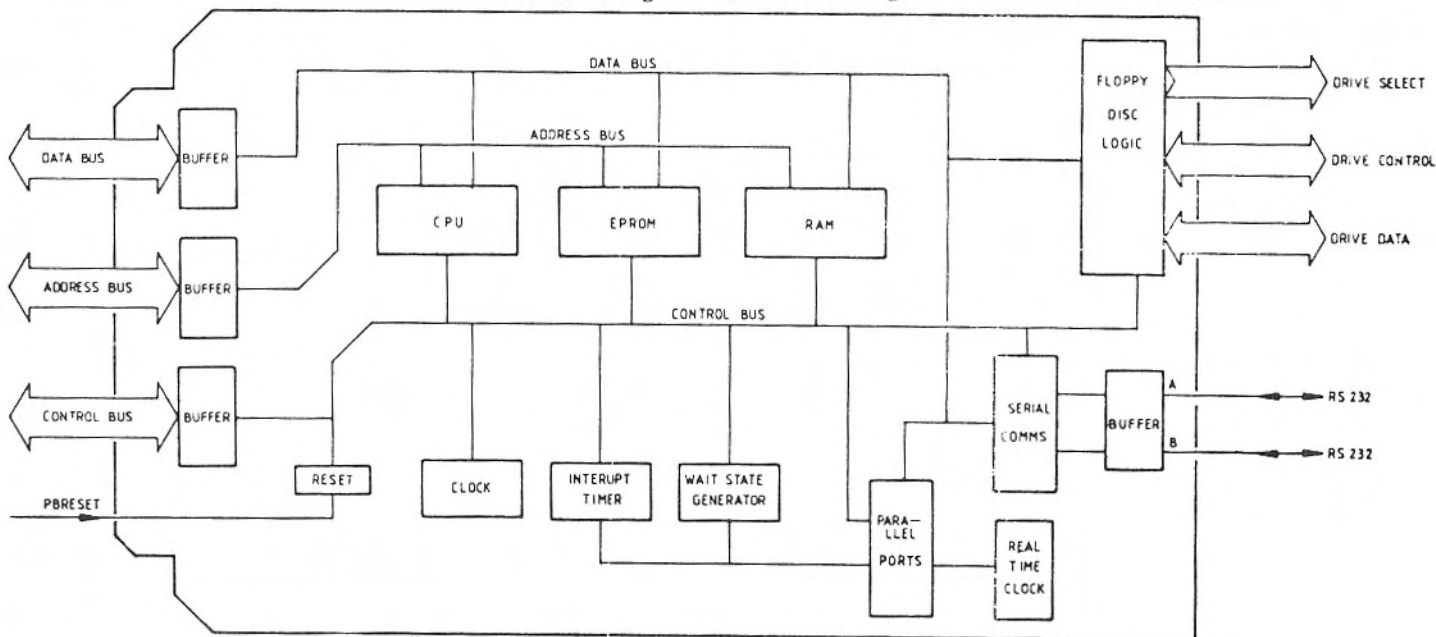
Assembling the board takes a few nights' work, making sure that there are no errors in soldering as work progresses. There are fine tracks used on the board, so only experienced solderers should attempt this project.

Since the board is designed to run in a card cage, Pulsar supplies an edge connector so that power and a push-

button reset may be wired to the board without buying a mother board or a card cage.

Two EPROMs are supplied with the board. One contains a monitor, and the second a bootstrap that will automatically start up CP/M when the power is applied. The monitor is fairly basic, but contains enough to do testing of the board and writing of simple programs.

Once the board is working satisfactorily, the CP/M can also be booted from the monitor.

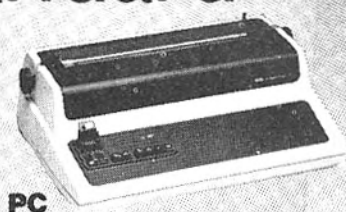


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50 cps — higher density, more formalised look.



LA 100 PC
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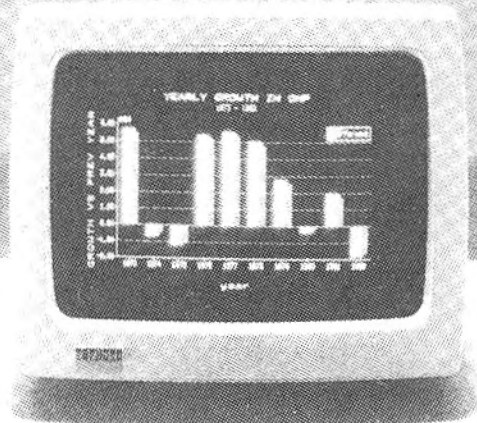
LA 12
This dot matrix printer offers a built in modern or acoustic coupler, bit map graphics printing and 150 cps.



LA 100 CB
The same quality features as the LA 100 PC but including a built in keyboard.

LQ P02
A daisywheel printer with over 25 type styles offering professional yet personalised look in letters at 32 cps.

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HARDWARE REVIEW

Attaching a disk drive is fairly simple, if you own one of the listed drives. For each of these drives, a table is given for the connection of each of the drive links. If you have another type of drive then it's back to hunting through the diagrams to determine how each link should be connected.

While the advertising states that 5 1/4 in drives are supported, it is only the drives that have 8in look-a-like connectors. To use a standard 5 1/4 in drive would be a messy affair, involving the dropping the system clock frequency to 2 MHz and fiddling with the phase locked loop associated with the disk controller.

The CP/M, which is purchased separately, is written assuming double-sided disk drives, as the BIOS part of CP/M can grow fairly large. A single-sided version is available on request. After fiddling with the handshaking requirements of the terminal, the system powers up to show a decorative sign-on banner.

One of the first programs that should be run is called SETTERM. This configures all the Pulsar utilities to make use of the visual attributes of the terminal being used. Once this has been done, the effort that has been put in by Pulsar starts to become apparent. Such things as changing the sign-on message, baud rates, or serial word lengths can be changed without having to reassemble the BIOS.

The system can be made to execute a command on a cold boot or warm start. A recommended example would be to run a program called DATE. This program produces a file with the current date and time in it. Then all programs that are run can access that file to obtain the day's date. If more than one command is required then a command file can be run instead.

The utility will also allow a command to be executed every time a warm boot occurs. While this facility may be good for keeping the time in the date file correct, the date program also performs a warm boot on exiting and so re-starts itself and there-by hangs the machine. The program can be rewritten so that it returns to CP/M without a warm boot.

Another very useful utility is called VERF. This program reads the disk to find bad sectors. It then locks the blocks

Microcomputer summary

Name:	Little Big Board
Manufacturer:	Pulsar Electronics.
CPU:	Z80 at 4MHz.
RAM:	64K, Expandable using bank switching.
ROM:	2K.
Input/Output:	2 serial channels, 50 way floppy-disk connector.
Operating system:	CP/M 2.2, MP/M II, CP/Net, TURBODOS, MULTIDOS.
Power required:	+5VDC @ 700mA, +12VDC @ 100mA, -12VDC @ 60mA.
Bus interface:	STD bus.
Extra features:	Battery backed-up clock/calendar.
Price:	Kit #1 \$294, Kit #2 \$973, A & T \$1533.
Options:	Hard disk interface \$1012. CP/M and BIOS \$200 plus tax. Manual for CP/M \$80. TURBODOS \$1095 plus tax.
Reviewer's ratings:	(Out of 5): Documentation 4, Ease of use 5, Value for money 4, Support 4, Expansion 5.

that contain these sectors into a file which it then hides on the disk where it won't get in the way. If a bad sector is later encountered then the program can run again without destroying the data on the disk and if it finds any more bad sectors, then it will output to the terminal the sector number and the files that are affected. While this program cannot hope to get all the bad sectors without fully testing the disk, it certainly makes a good start.

If you are forced to re-assemble the BIOS for any reason, then there are command files supplied to load the new BIOS with CP/M ready for loading on to the system tracks.

While looking through the BIOS, it becomes apparent that there is more there than first meets the eye. By changing some flags at the beginning of the source, the code for the hard disk, virtual disk, or extra RAM boards can be enabled. So when the system is upgraded no extra software is required to be purchased.

The calls for reading the clock are also written in the BIOS and are accessible by using the standard BDOS call with a function number of 255. While these calls do not appear to be documented anywhere, Pulsar does supply subroutines that enable the clock to be used.

Most of the programs and examples are given in PASCAL MT+ which is fine if you know Pascal and better still if you have a copy of the compiler available. One routine is supplied written in Z80

assembler (same problem) that can be linked with high-level languages such as FORTRAN and BASIC.

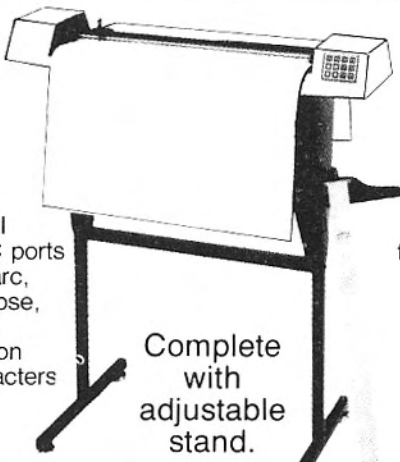
In keeping with PROLOG's goals with the STD bus and its own selection of cards, Pulsar supplies as much information on the disk as it can. The source is given for all the utilities and even a copy of the user manual is there also.

Supplied separately by Pulsar is a hard disk interface board. This board terminates with a SASI interface for connecting to a hard-disk controller. On the same board are two serial channels.

For those wishing to upgrade the system at a later date, Pulsar supplies TURBODOS. This operating system uses a separate CPU board for each user plus one extra board as the master. Each of the Pulsar boards may act as the master or slave, depending on the condition of the links.

The master board controls the disk I/O for the system. Since all the disk I/O, printer, and terminal I/O are buffered, the system operates faster than CP/M.

Summary. — Pulsar appears to have put a lot of time and money into this board to produce a professional standard system. It operates well with no major defects to be found. The customised CP/M is definitely a must for those contemplating using CP/M, as many of the advantages of buying this system are found in the software. This, coupled with good hardware, should prove to be very successful for Pulsar.



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Using Cobol in an MP/M System

Neil C. Gelb

Explains how to design a system for MP/M relatively quickly. Contains example mailing label program and detailed discussion on how it works, describes locking out records for updating file records, spooling print files and printing them without overlapping on the printer, examples of programs with password protection, explanation of relative and moved data files, describes how to perform status testing, access files concurrently, and tells how to create and access a control file.

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Ruth Ashley & Judi N. Fernandez

An outline on how to put COBOL's business computing power to work. Shows how to write and run practical programs. Through numerous examples, exercises, self-tests, and correct answers. Advances to control structure, data file maintenance and instructions to printers, disk drives and other peripherals.

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LOGO: A guide to Learning Through Programming

Peter Goodyear

Introduces educational potential of programming in LOGO and guides you to programming and problem solving. Includes accounts of others' experiences with LOGO, a guide to further reading and suggested projects.

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Introducing LOGO

Boris Allan

Explains philosophy behind LOGO and how it differs from many other computer languages. Shows how to program in LOGO, providing many examples and a detailed look at Turtle graphics and other applications. Guide to what LOGOs are available and what to look for when choosing.

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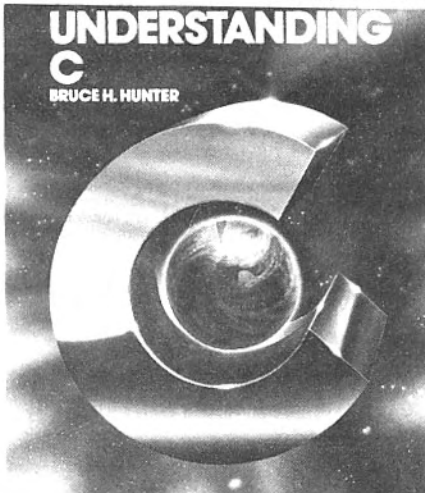
Learning LOGO on the Apple II

Anne McDougall,

Tony Adams & Pauline Adams

Detailed look at LOGO and introduction to program writing, graphics, poetry, mathematical problems, with a host of ideas for experimentation and further projects. Ideal for first-time user or anyone who has already used another language.

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Understanding C

Bruce H. Hunter

Anyone with programming experience can use this book to learn the C language and familiarise themselves with the C environment and C systems in general. Information is especially geared to micros using CP/M and MS-DOS operating systems, and programs cover a wide cross-section of eight and 16-bit C compilers. Also covers data types and storage classes, memory management, UNIX-like utilities, C library functions, number crunching, and compares C compilers.

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PASCAL for the IBM Personal Computer

Ted G. Lewis

Thorough guide to the two major versions of PASCAL available for the IBM PC. Written with both the experienced programmer (who will appreciate the comparison of the subtleties of both versions) and those new to PASCAL (who will find it a complete introduction) in mind.

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Pascal at Work and Play

Richard S. Forsyth

An introduction to programming in Pascal, starting at an elementary level and working up to problems of realistic complexity. Approach is based on two principles — that computing is no longer a specialist subject; and that the second-best way to learn programming is to read non-trivial programs (the best is to write plenty of them).

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Introduction to FORTH

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Complete information of the MMSFORTH version of the language, describing the basic syntax. No previous FORTH knowledge needed, although some exposure to Microsoft Level II BASIC helps. Many program examples and several comparisons between MMSFORTH and Level II BASIC. Designed specifically for MMSFORTH version of Radio Shack TRS-80 model II but most examples can be adapted to other microcomputers using different versions of FORTH.

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Written for anyone who wants to learn how to write computer software using FORTH. Shows how to add new operations (words) to the language and how to manipulate the stack. Describes both FORTH-79 and fig-FORTH, identifying programming differences. Includes more than 50 programs which will execute with little or no modification on any FORTH system.

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FORTH Fundamentals: Volume 1

C. Kevin McCabe

Devoted to explaining FORTH, with a detailed examination of the language and its internal operations. Introduces fig-FORTH and FORTH 79 with full, non-technical descriptions of words and programming methods. Annotated strings of all fig-FORTH language modal definitions. Numerous examples can be combined into more complex operations.

dithium Press

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FORTH Fundamentals: Vol 2

Kevin McCabe

Language glossary companion to Volume 1. Dips into the variations between fig-FORTH and FORTH 79, and lists key core words. Organized by word name in ascending ASCII order. Name, applicable vocabularies, pronunciation and whether or not the word uses or changes the contents of its parameter stack. Shows color definition for each word.

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Valerie J. Calderbank

Easily followed text aimed at those with only an elementary knowledge of mathematics and a basic understanding of the principles of computing. Particularly suitable for science, engineering and computer science students but also fits the needs of experienced programmers. Incorporates FORTRAN 77. Each chapter concludes with problems and solutions.

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FORTRAN 77: A Top-down Approach

Nonna Kliss Lehmkuhl

Guide to FORTRAN with emphasis on good programming style. Assumes elementary algebra knowledge and written at student level. Deals with main topics, and gives quick access to the computer before getting involved with rules of input/output format.

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Larry Nyhoff & Sanford Leestma

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Commodore 64

Basic Routines for Commodore Computers

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Easy-to-use manual which offers access to more than 300 BASIC subroutines — powerful building blocks you can combine and adapt to create programs for a wide range of business, educational and personal applications. Explanations for each subroutine with suggestions for modifying it to your needs. Each program is ready to run on any Commodore system.

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Richard Allen King

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the fields covered. No knowledge of BASIC programming is needed to use these programs.

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PCJr Primer: A Guide to the IBM PCJr

Steve Stern & Greg Young

Complete guide to the PCJr — its components, how to set it up, how to run it, what makes it different from the IBM PC. Discusses printers and peripherals, the infrared keyboard, the how and why of PCJr-DOS, how to talk to other computers through the modem, and the three major pieces of software: HomeWord, Home Budget Jr and Multiplan.

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I Wish I Knew... about the Spectrum & ZX81

Jonathan Chapple

A book to help both parents and children grasp the basic ideas of computing and provide an elementary knowledge of programming in BASIC language. Both can learn together through a "come-on" visual approach attractively laid out and easy to follow.

Pitman **Our price \$17.05. Save 90 cents and earn 1 bonus point.**

Thirty-four Amazing Games for the 1K ZX81

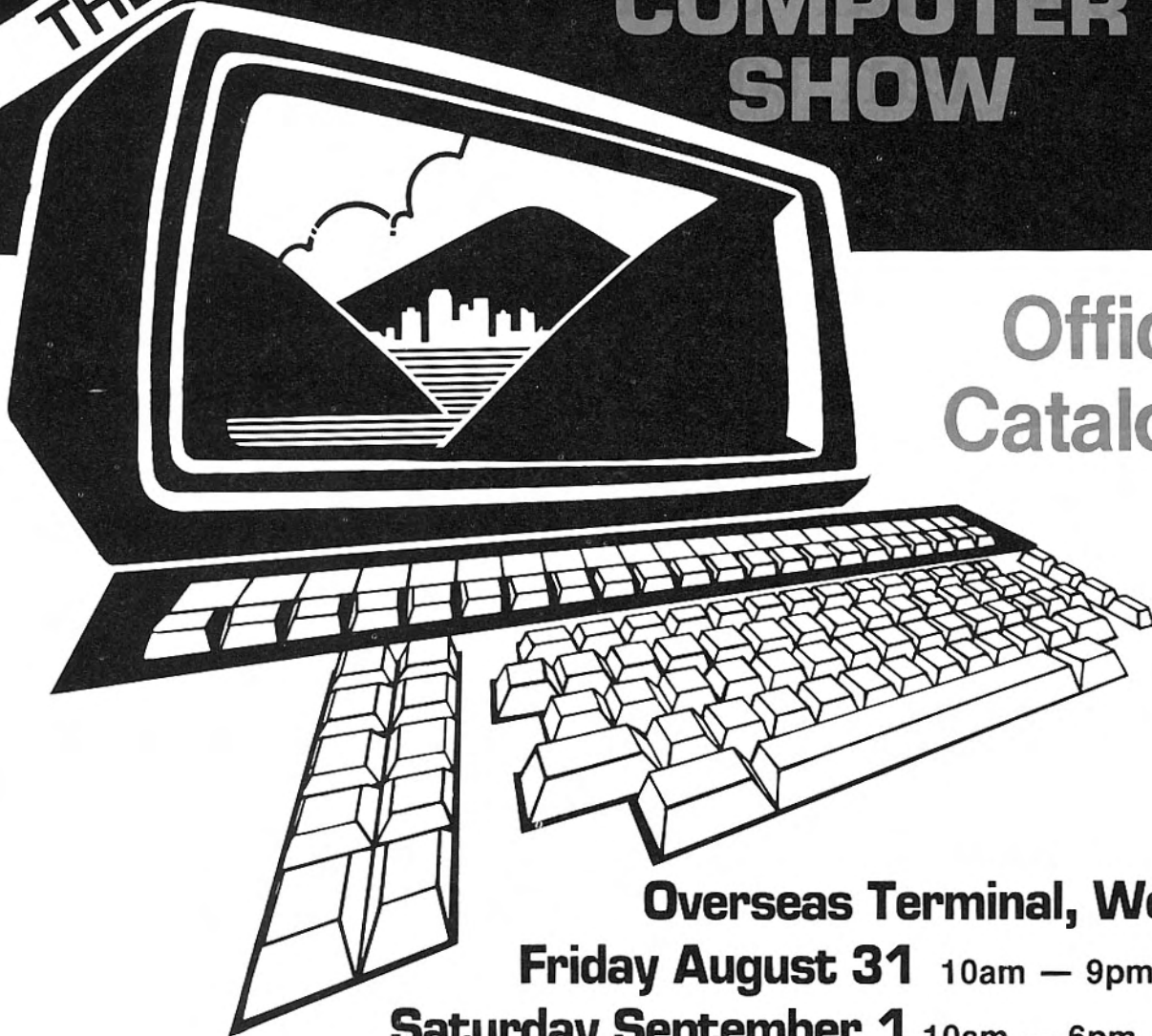
Alastair Gourlay

Claims to be more than just a games collection; maintains it's a guidebook to show you how to make the most of your 1K ZX81. Invites you to enter programs, then improve and modify them with your own stamp. And you can use the author's compressing tricks on other programs.

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Official Catalogue

Overseas Terminal, Wellington

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Saturday September 1 10am — 6pm

Sunday September 2 10am — 5pm

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Public: \$2 per adult, \$1 per child

WIN A COMMODORE 64!! COMPUTER

Details inside

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..BYTES..**

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PERSONAL COMPUTER MAGAZINE

Problems can crop up anywhere. Now your computer can too.



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data retained even when turned off and when you return to the office your IS-11 will input field data into your main frame.

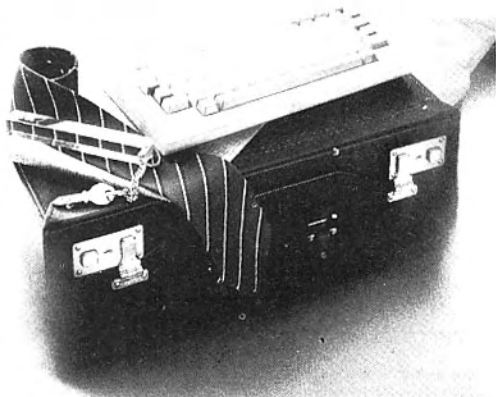
The IS-11, like other models in the SORD range, lets you forget about the hassle of buying the right software for your application.

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New Zealand. Telephone (04) 848-069

See the full range of SORD Computers on Stand 14 at the Wellington Computer Show.

CATALOGUE CONTENTS

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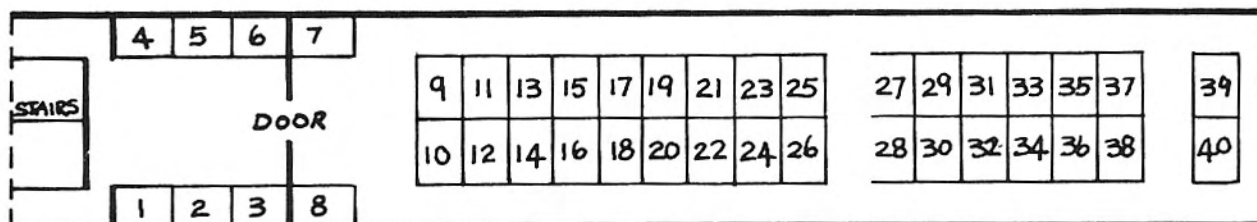
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See the extensive range
of Alpine Software for
the VIC 20, C64 & SX64

STAND LAY-OUT

Upstairs Lounge, Overseas Terminal



EXHIBITORS

Stand Number	Stand Holder
1	Whitcoulls
2	Whitcoulls
3	Whitcoulls
4	BITS & BYTES
5	Andas Centres
6	Andas Centres
7	Business World Computers
8	Personal Computer Power
9	Einstein Scientific
10	Einstein Scientific
11	AVM Electronic
12	Warburton Franki
13	Digital
14	Sord Computers
15	Digital
16	Bell Tech Books
17	Genisis Systems
18	Silkwood Manufacturing
19	Check-Point Computers
20	Philips Electrical Industries
21	The Report
22	Computer Reviews
23	Control Data
24	New Zealand Post Office
25	Datalink
26	Datalink
27	Sanyo/Computers for People
28	Computers for People
29	Dick Smith Electronics
30	Farmers
31	
32	Farmers
33	Microware
34	Moonshine Computers
35	A.V. Electronix
36	Jenness Home Entertainment Centre
37	
38	Jenness Home Entertainment Centre
39	Fountain Marketing
40	Fountain Marketing

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EXHIBITOR DETAILS

STAND NO(s): 1, 2, 3
COMPANY: Whitcoulls Ltd
ADDRESS: 312 Lambton Quay, Wellington
TELEPHONE: 721-921
PERSONNEL ON STAND: Dave Harris, Glen Chadwick & others
PRODUCTS ON DISPLAY: Books, Computers, Peripherals and Software
Hardware: Acorn Electron, BBC Micro plus Peripherals
Software: Acorn Soft, BBC Soft, Micropower, May & Associates Business Software and many more
Other: Computerbooks, Pitman, Prentice Hall and others

STAND NO(s): 4
COMPANY: BITS & BYTES
ADDRESS: P.O. Box 827, Christchurch
TELEPHONE: (03) 66-566
PERSONNEL ON STAND: Paul Crooks, Dion Crooks
PRODUCTS ON DISPLAY: Magazines, Books

BITS & BYTES will be on hand to seek new subscribers for what is by far the largest selling computer magazine in New Zealand. We will also be taking subscription renewals and have a range of back copies available.

STAND NO(s): 5, 6
COMPANY: Andas Centres
ADDRESS: 99-107 Dixon St, (Private Bag), Wellington
TELEPHONE: 850-777
PRODUCTS ON DISPLAY: Apple Computers
Hardware: Apple IIe, Apple III, Macintosh, Lisa 2 series
Software: A wide range for the above hardware

STAND NO(s): 7
COMPANY: Businessworld Computers Limited
ADDRESS: 11 Johnston St, Wellington

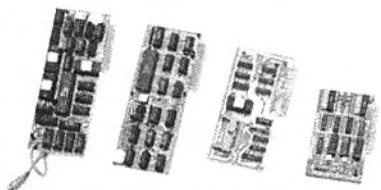
TELEPHONE: 731-152
PRODUCTS ON DISPLAY: IBM Personal Computer Systems, BBC Computers, Hewlett Packard Computer Systems
Software: Various productivity tools, Accounting software and many other applications

STAND NO(s): 8
COMPANY: Personal Computer Power Ltd Trading as P.C. Power
ADDRESS: 420 High St, Lower Hutt
TELEPHONE: 693-050
PERSONNEL ON STAND: Mike Nelson, Marg Mabbutt
PRODUCTS ON DISPLAY: Computers, Books, Peripherals, Software
Hardware: Corona P.C.'s (IBM compatible) print buffers, Okidata printers Available for Commodore 64 and VIC 20 — IBM and compatibles, Apple, Cat, Atari. Covering business, home use, games, education systems and utilities
Software: Nashua and Fact floppy discs, Rediform computer paper, preset forms and labels, books for Commodore, IBM, Apple, etc.
Other:

STAND NO(s): 9, 10
COMPANY NAMES: Einstein Scientific Ltd
ADDRESS: 177 Willis Street, Wellington
TELEPHONE: P.O. Box 27-138, Wellington 844-353
BRANCHES: Throughout New Zealand
PERSONNEL ON STAND: Raju Badiani, Michael Holdsworth and David Thomas
PRODUCTS ON DISPLAY: Hewlett Packard HP150, Apple Macintosh, Apple IIe, Spectravideo SV328, Commodore 64, Commodore SX64, Atari 800XL, Spectrum 48K, BBC, Electron

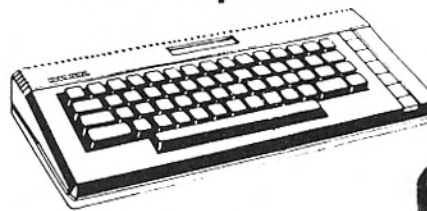
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ATARI computers



SANYO computers



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STAND NO(s): 11
COMPANY: A.V.M. Electronic Group Ltd
ADDRESS: 149 Hereford St, Christchurch
 P.O. Box 2823
 797-279
TELEPHONE: Trevor Luke, Warwick Brown
PERSONNEL ON STAND: Tandy 2000, Radio Shack
Hardware: Model 4P, Radio Shack Model
 4, Radio Shack Model 100

PERSONNEL ON STAND: Datacom Systems Ltd, 89
 Courtenay Pl., Chris Ashman;
 Lyndsay Williams, Capital
 Business Systems, Cuba St,
 Petone; Colin Green, Business
 Control Systems, 69a Dudley St,
 Lower Hutt & Regent Centre,
 Wellington.
Hardware: Rainbow 100 Personal Business
 Computer, Colour Screens, etc.
Software: Demonstrating business
 solutions, wordprocessors, file
 managers, graphics, financial
 modelling.

STAND NO(s): 12
COMPANY: Warburton Franki Limited
ADDRESS: 44 Oxford Terrace, Lower Hutt
 P.O. Box 30651, Lower Hutt
 693-016
TELEPHONE: Daniel Pettengell, Murray
PERSONNEL ON STAND: Wright, Ross Mudie, Phil Eyton
PRODUCTS ON DISPLAY: Logitech Printers, Plotters,
 Shugart Disc Drives, Zenith
 Computers, Peripherals
Hardware: As Above
Software: General
Other: Test Equipment

STAND NO(s): 13,15.
COMPANY: Digital Equipment Corporation
 (New Zealand).
ADDRESS: Head Office: 540 Great South
 Rd., Greenlane, Auckland, P.O.
 Box 17039, Wellington: 169
 The Terrace, Box 1300.
TELEPHONE NO: 728-286 Wellington.

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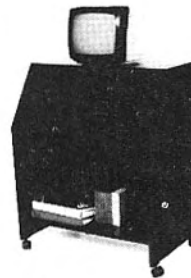
Mobile work station



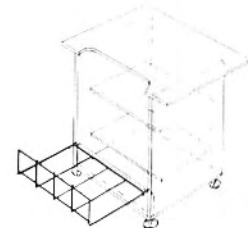
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Typical Work Station



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EXHIBITOR DETAILS

STAND NO(s): 14
COMPANY: Sord Computer Systems Ltd
ADDRESS: 15-19 Wigan St,
 P.O. Box 9447,
 Courtenay Place,
 Wellington
 848-069
TELEPHONE:
PERSONNEL ON STAND: J. Hardwick, I. Woodmore
PRODUCTS ON DISPLAY: Sord M23 Series, M68 Series
 and IS-11
Hardware: PL-200 Multipen Plotter
Software: CAD and Graphics, PIPS
 system (spreadsheet and
 database management system)
Other: Business software

STAND NO(s): 17
COMPANY: Genisis Systems Ltd
ADDRESS: 65 Huia Rd, Otahuhu, Auckland
TELEPHONE: (09) 276-7349
PERSONNEL ON STAND: L.R. Howe, G. McLennan
PRODUCTS ON DISPLAY: Printers
Hardware: Popular Range of Star Printers
 both dot matrix and daisywheel.
 Priced from \$867 to \$2287.
 Star printers are now one of the
 largest selling range of printers
 in the world.

STAND NO(s): 16
COMPANY: Bell's Techbooks Ltd
ADDRESS: Dunbar Sloane, Maginnity St
 entrance, Wellington
 728-544
TELEPHONE:
PERSONNEL ON STAND: Patt Bell and others
PRODUCTS ON DISPLAY: Books, Whitehall agents for
 Prentice Hall and Sams; ANZ
 Books agents for Sybex,
 Dillithium, Duckworth, Wiley.

STAND NO(s): 19
COMPANY: Check-Point Computers
ADDRESS: 36 Main Rd, Private Bag, Tawa,
 Wellington
 326-999, 326-988
TELEPHONE:
PERSONNEL ON STAND: Tony Pointon, John Davies,
 Andrew Chisholm
PRODUCTS ON DISPLAY: Computers, Peripherals and
 cards

Hardware: Sanyo 16 bit MBC555 and
 550, Atari 800, 600 and 400,
 Daisywheel typewriter/printer,
 Dot matrix printers and Apple
 compatible disk drives and
 cards and BBC and Commodore
 compatible disk drives
 5¼" floppy disks
Other:

STAND NO(s): 18
COMPANY: Silkwood Manufacturing
ADDRESS: 8 Tironui Rd, Papakura,
 Auckland
TELEPHONE: (09) 298-7089
PERSONNEL ON STAND: Kevin Shuker
PRODUCTS ON DISPLAY: Full range of computer furniture

STAND NO(s): 21
COMPANY: Eckford Enterprises Ltd
ADDRESS: P.O. Box 3295, Wellington
 753-207
TELEPHONE: V. Eckford
PERSONNEL ON STAND:
PRODUCTS ON DISPLAY: THE REPORT — a
 comprehensive, comparative
 survey of computers available
 on the New Zealand market.

STAND NO(s): 20
COMPANY: Philips Electrical Industries
ADDRESS: P.O. Box 41021, St Lukes,
 Auckland
TELEPHONE: Auckland 894-160
PERSONNEL ON STAND: Mr P. Gillingwater
PRODUCTS ON DISPLAY: P2000 micro computer
Software: "The Last One", Dataplot Plus,
 Executive II

STAND NO(s): 23
COMPANY: Control Data
ADDRESS: 53 Boulcott St, Wellington
 739-505
TELEPHONE:
PERSONNEL ON STAND: Ian Gardine-Wright, Liz
 Dengate-Thrush
PRODUCTS ON DISPLAY: Plato Computer Based Training
 System



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EXHIBITOR DETAILS

STAND NO(s): 22
COMPANY: Computer Reviews
ADDRESS: P.O. Box 295, Auckland
 396-526
TELEPHONE: Clive Mathew Wilson and John
 Schroeder
PERSONNEL ON STAND:
PRODUCTS ON DISPLAY: Latest issue and previous
 issues of Computer Reviews

STAND NO(s): 25, 26
COMPANY: Datalink—
ADDRESS: Fletcher Challenge House, The
 Terrace (through Lambton
 Square), Wellington
 858-669
TELEPHONE:
PRODUCTS ON DISPLAY: Amazing Apple, Lisa and Apple
 Macintosh displayed and
 operating
Software: Microsoft range (MAC) and full
 Lisa range

STAND NO: 24
COMPANY: New Zealand Post Office
ADDRESS: Post Office Headquarters,
 Wellington.
 738-444 (Telecoms ext 980 &
 657)
TELEPHONE:
PRODUCTS ON DISPLAY: A range of Post Office
 equipment for data
 communications use.

STAND NO(s): 27
COMPANY: Sanyo Business Systems
ADDRESS: 124 Dixon St, Wellington
 845-713
TELEPHONE: Ken Davis and others
PERSONNEL ON STAND: Micro computers
PRODUCTS ON DISPLAY: Featuring our new MBC 550
 Series Personal Computer,
 together with the MBC 1160
 Micro, and the MBC-4000



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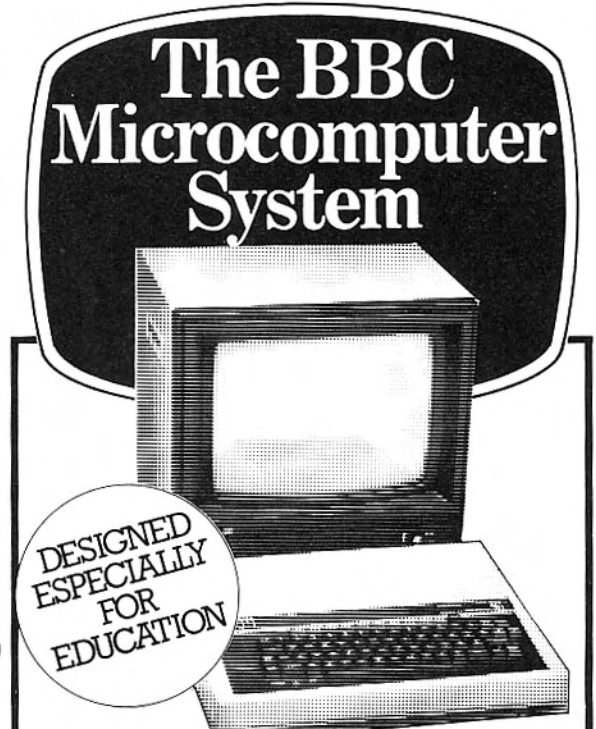
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STAND NO(s): 27 28
COMPANY: Computers For People
ADDRESS: 35 Taranaki St, Wellington
TELEPHONE: 847-628
PERSONNEL ON STAND: John Foot, John Duncan
Hardware: ICL PC's, Kaypro II, Kaypro 4, Kaypro 10, SANYO MBC 550/555, BOSDATA — retail point of sale system
Software: Concurrent CP/M, Charter Series, Agrisoft, dBASE II Applications

STAND NO(s): 29
COMPANY: Dick Smith Electronics
ADDRESS: 98 Carlton Gore Rd, Private Bag, Newmarket, Auckland
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PERSONNEL ON STAND: Maurice Bryham, plus other sales personnel
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COMPANY: Farmers Ltd
ADDRESS: Cuba Mall, Wellington.
TELEPHONE: 843-969
PERSONNEL ON STAND: Phil Kenyon, Greg Harrison, Stephen Tustin.
PRODUCTS ON DISPLAY: Sega range.
Hardware: Sega SC3000 home computer with its new disk drive systems with its large storage capacity and fast operating speed.
Software: Educational software and the full range of Sega software with approximately 50 titles and more coming.
Other: Enrolments for the Sega user group will be taken.

STAND NO(s): 34
COMPANY: Moonshine Computers
ADDRESS: 70 Victoria St, Lower Hutt and Shop 13 McDonalds Centre, Herbert St, Wellington
TELEPHONE: 697-757, 739-146

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the price including a professional keyboard and numeric key pad. Add to this the amazing selection of state-of-the-art peripherals and you have a system you'll grow into, not out of. With built-in Super Extended Microsoft Basic and CP/M compatibility you have immediate access to thousands of existing programs. And as good as all this sounds, what sounds even better is the price.

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What do you want from your computer?

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- Many hundreds of programmes to choose from?

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IMC-640 SPECIFICATIONS

MICROPROCESSOR: CPU4002 at 1.02 MHz
REPROGRAMMABLE CONTROLLER: 2801
DISPLAY MODES: 16 Colour display, 40 Character x 24 lines, 80 Character x 48 lines, Normal, Inverse and Flashing characters

MEMORY:

64K RAM
 128K ROM
KEYBOARD: 51 Key QWERTY typewriter keyboard, 15 Key numeric pad, 28 Pre-programmed function keys, 80 key interface and 16 C.M.U. keys, 4 Keys Cursor control, 3 Speed and track keys

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Stand 33

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EXHIBITOR DETAILS

PERSONNEL ON STAND: Peter Sinke
PRODUCTS ON DISPLAY: Spectravideo and IMC
Hardware: Spectravideo SV318 and SV328 computers and IMC 640
Software: A large range of software for the Spectravideo and IMC computers

STAND NO(s): 33
COMPANY: Microware (N.Z.)
ADDRESS: P.O. Box 6309, Wellington
TELEPHONE: 0553-88940
PERSONNEL ON STAND: Mr C. Penman
PRODUCTS ON DISPLAY: As below
Hardware: For the ZX Spectrum e.g. Joystick interface, Full-size keyboards, speech synthesiser
Software: For the Spectrum, CBM64, BBC & Electron
Other: Also on our stand "Sportsdata" (Mr G. Evans Ph: 722-245) displaying software for the ZX Spectrum of value to sports teams and players and fans.

STAND NO(s): 35
COMPANY: A.V. Elektronik (N.Z.) and D.J. Reid Ltd
ADDRESS: P.O. Box 864, Wellington
TELEPHONE: 278-542, 849-189
PERSONNEL ON STAND: Mr A. Dewsnap

PRODUCTS ON DISPLAY: TRS80 III and as below
Hardware: ZX Spectrums and Interface I and Microdrives
Software: Custom Business software for small N.Z. Businesses

STAND NO(s): 36, 38
COMPANY: Jenness Home Entertainment Centre
ADDRESS: 173 High St, Lower Hutt
TELEPHONE: 661-145
PERSONNEL ON STAND: Colin, Ian & Kevin and 6 others
PRODUCTS ON DISPLAY: Commodore equipment and software
Hardware: C64, VIC20, SX64, printers
Software: C64 and VIC20 software
Other: Video and Television equipment

STAND NO(s): 39,40
COMPANY: Fountain Marketing Ltd
ADDRESS: Maidstone St, Auckland
TELEPHONE: 763-064 Auckland
PERSONNEL ON STAND: Anthony Butler, Jenni Turner
Hardware: Commodore VIC-20, VIC-1541 disk drive, Commodore 64, VIC-0802 Business Printer, SX64 Portable
Software: A range of: educational, entertainment, productivity from the world's leading software houses including Commodore, Computer Classics, Sega, UMI

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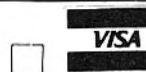
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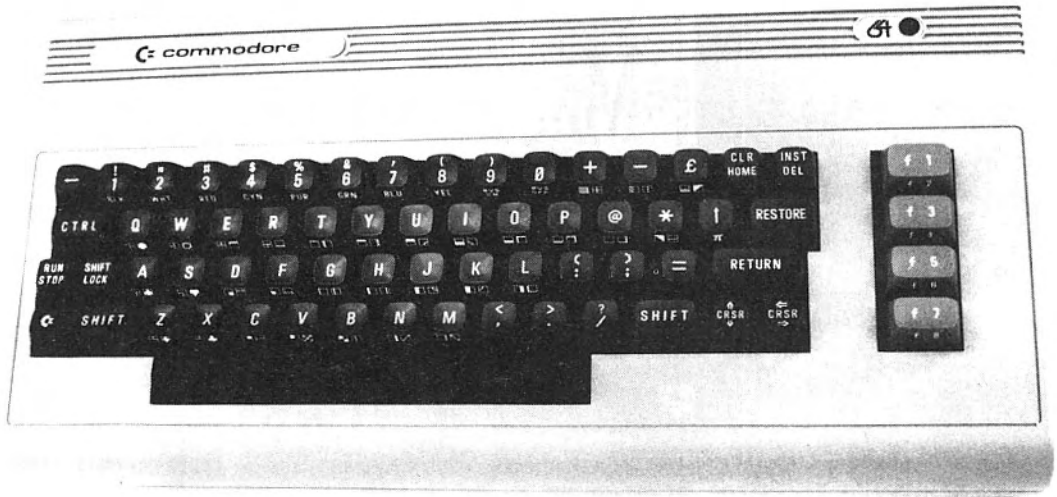
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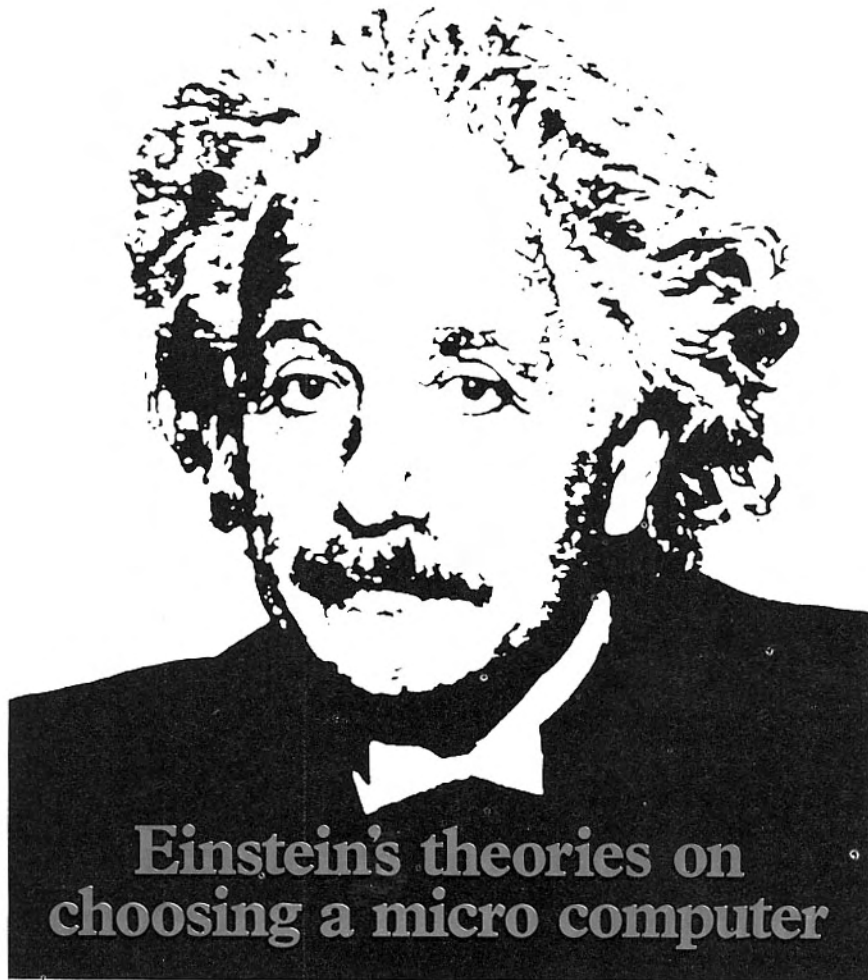
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Question: How much random access memory (RAM) does the Commodore 64 have as standard?

(Clue: The answer is in the name of the computer or ask anyone on the Fountain Marketing stands).





Einstein's theories on choosing a micro computer

Choosing a micro is a daunting task for the new-comer and with an ever increasing number of micros emerging on the New Zealand market. Even up-grading, say, from a ZX81 can be a risky and expensive exercise with the wrong decisions made. At Einstein Scientific Ltd, we believe it is important to look at the real facts and specifications, and check exactly what you get for your money before choosing your micro computer system.

THE PIT-FALLS.

Don't buy a games machine.

Unless you want games and nothing else! With a games computer you are limited. Some computers, however, have the advantage of both games facility plus the whole world of computing to explore as your interest and skills develop. A real computer system will allow you to expand your knowledge of the high technology world, and help earn its keep with its added uses in the field of education, home, business use and communication.

Software.

Make sure the system you choose has a growing library of support software, to enable you to realise the full potential of your machine.

Check the quality of the product.

Low quality components and bad design will seriously affect the reliability of the end product, and lead to false economy. Watch out for unreliable edge connectors, corrosion and poor PCBs. Make sure that your supplier can provide an after sales service in case of product failure.

Don't let the add-ons add up.

A number of outlets are offering packages that seem to be good value at low cost. Unfortunately these offers have a hidden sting in as much as the essential accessories such as power supply, peripherals and

software often carry a very high cost premium. Make sure you get an 'all-up' price to enable you to start operating the system. Software for low cost hardware usually costs between \$50 and \$100 for a ROM cartridge.

KEY POINTS TO LOOK FOR. Computer language.

It is too difficult to programme a computer in its binary language so high level languages are used, the most popular being BASIC. However, there are a number of basics, some being very different from the rest. A de facto standard in the computer industry is Microsoft BASIC. Learn this and you will be able to programme in the majority of computer basics, such as an important point if the home computer is to be used to educate your children to face the technology of the future.

Expansion.

As your interest and knowledge of computing grows you will need a computer system that will grow with you, able to accommodate printer, disk drive, joystick, communications modem and colour monitor as well as produce Hi-Fi sound effects.

Software.

The computer you choose should have a growing selection of utility software to make the most of its capabilities. Remember, computing is here to stay. You can't learn to compute on a toy or a device that does not behave like a real computer.

High resolution colour.

In general most home computers have a poor graphics resolution (or detail). Check on the vertical and horizontal resolution in graphic mode and multiply the two numbers together — if the result is less than 35,000, then the graphics can hardly be considered high resolution. Low resolution graphics displays, such as those used in games, tend to be "chunky" in appearance.

Keyboard.

For accurate entry of programmes and data into a computer it is important that the keyboard has a good tactile feel and operation. A standard computer keyboard layout will familiarise the user with the vast majority of computers which are used in the world of business and professional applications, very important if the purpose of purchasing the computer is educational.

RAM (Random Access Memory).

One of the most important features of a computer is the amount of RAM, or memory included. In general, the more powerful and exacting a computer program, the more RAM it requires. But take care, all computers are advertised quoting the total RAM used in the system. Computers use up a great deal of their own RAM for storing essential data, in particular supporting the graphics display and the CPU (central processing unit). If it is less than 32K, think again, is it enough?

In short look out for a computer which offers all the points above and you will be sure of getting good value for money.

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Computer Dictionary for Beginners Arthur Naiman
A reference with more than 1000 computer terms explained clearly and simply in conversational English. Also gives pronunciation, examples of how terms are used and explanations of where they come from. Cross-references, cartoons, anecdotes and a straight-forward look at how computers work.
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Easy-to-follow guide to connecting your computer system to printers, modems, terminals, plotters — or any other RS-232 peripheral. No expensive tools and only minimal electronic knowledge needed.
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40 Educational Games Vince Apps
Editions for the Commodore 64 and the Electron. Developed with the help of educationalists and a professional programmer, programs have been designed to help younger family members handle the machine and increase their general knowledge. Subjects include languages, geography, mathematics and science. Hints show how program contents can be changed to suit the family as skills develop.
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Step-by-step guide from the first principles of BASIC to proficient programming, with special attention to the Electron's graphics and sound commands. Demonstrates the power and logic of Acorn BASIC, and introduces commands by showing why they are needed and how they are used. Example programs throughout demonstrate techniques and provide a starting point for your programming style.
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Editions for the Apple II and IIe, VIC 20 and Sinclair Timex computers. Each provides a clear, concise reference to key words, functions, commands and statements, along with class designation, required form, conditions, results of use, and token used for internal storage.
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Complete education in Timex/Sinclair BASIC, using 75 short programming examples, including a full-length blackjack game. Covers basic programming, conditionals, random numbers, loops and subroutines, display control and graphics, strings, arrays, keywords, debugging, peripherals, and introduces you to machine language programming.
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21 Games for Electron Mike James, S.M. Gee & Kay Ewbank
The Electron has recently arrived in New Zealand. Now come 21 games with full colour and sound, specially written for the machine. Each game is listed in its entirety with a description of the object and details of how to play it. Typing tips to help you avoid difficulties in entering some programs. All games in BASIC.
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Lucid, humorous and sceptical reading for home computer "micromaniacs". Charts a way through the micro maze language we can all understand. Tells what a home computer can — and can't do. Warns and all look at current models. Investigates the whys, whats, whens and wheres of home computing. Hutchinson

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Apple II Computer Graphics Ken Williams, Bob & Lisa Kernaghan

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Understanding the Macintosh Computer Rick Day

What can a Macintosh do? How does it operate? What are the meanings and uses of the Mouse? Windows, electronic spreadsheets, word processing and high resolution graphics of the Macintosh? Just some of the questions answered. And how to get the most from the software packages — MacPlus, MacWrite, MacDraw and MacPaint. dilithium Press

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Language/programming

Microsoft BASIC and its Files Jacques Boisgontier & Suzanne Ropiequet

Handbook on programming techniques and a guide to data file programming. Reviews fundamentals of Microsoft BASIC programming language and provides more than 24 working programs as building blocks as you learn to design your own programs. Introduces data file programming principles and concepts, and discusses and compares random access and sequential files. Instruction on use of index files to access and sort file records. Lots of examples, programs and figures. dilithium Press

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Structured Programs in BASIC Peter Bishop

Opens with a discussion of program structure and design. The rest of the book comprises example programs, with the complete program design process (from initial specification to final listing) carried out. Excellent source of programming techniques, algorithms, program modules, ready-to-run programs and ideas. Nelson

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C64 debtor accounts package

By Philip Verstraaten

This is the second article in a series on business software for the Commodore 64.

Last month we reviewed a comprehensive business system with a variety of modules to handle most of the basic accounting functions.

As one of the main concerns to many businesses is to keep a record of customer-accounts (debtors), a stand-alone package has been developed, which provides a facility to enter transactions, keep a record of aged account-balances, print statements, invoices, and labels. The programs have been written by a Mr Barkman, of Wanganui, and are distributed by Viscount Electronics Ltd, P.O. Box 513, Palmerston North.

Mr Barkman informs me that his object was to write a system for a small-business user, inexperienced in the use of a computerised accounting package. The programs have been converted by a BASIC compiler and so cannot be accessed at all.

All programs and data are kept on one disk, which means that, except in the case of a back-up, no disk-swapping is required. When loaded, all accounts are kept in main memory, which increases the access speed and reduces the number of disk transfers. Besides a screen and a 1541 disk drive, the system will accommodate the following printers: Commodore 1525, 1526, the MPS-801, and the Admate DP-80.

The package consists of seven separate programs, which may be accessed by means of a menu (list with options). A particular option is chosen by pressing a key which makes one of the programs load into main memory. When a key is pressed the option is immediately accepted, without having to press RETURN. This means in the case of a mistake that one has to wait for the loading to finish, then go back to the main options and try again, which is fairly time consuming. If RETURN must be pressed before acceptance, the user can still change his mind.

The accounts are set up in a file which may hold up to 170 separate customers, with up to 450 transactions per month. More customers could be accommodated by creating another file, which, however, means separate processing runs for each one of the files. The main features of the system are adding/changing of customer-details, print a customer file, enter transactions, print invoices, labels and statements, and the set-up of a new system.

As the package does not provide a separate customer screen listing option, the ADD/CHANGE facility is also used for that purpose. Accounts may be added, deleted, or changed in a very easy manner. Each line has a number, which when entered provides the possibility to make changes in that line.

When a particular account is deleted it still remains in the file, at the end, but has a DELETED notification attached to it. This provides an excellent check in case a mistake has been made. Besides the usual account information, such as address and aged balances, each account contains a "last active" date and a key according to which it is stored. This key may be anything, but it is suggested in the documentation to use the first four characters of the customer name for a meaningful reference.

By choosing the PRINT CUSTOMER FILE option, the user may print details about the customers or their account balances.

There are basically two ways to affect the account balances: through the

transactions option or the print-invoices option. To print an invoice, the system will request for a number of items, such as prices, quantity, discount percentage and any freight and handling charges. The invoice may be included into the transaction-file which will show on the end-of-the-period statement. If, however just a pro forma invoice is required, this option is provided.

By entering transactions, a transaction file is updated, which contains information about the type of transaction, date and a reference, such as, for example, an invoice number. These transactions are picked up by the Print Statements program, which will provide a list of transactions for a particular month. After entering a transaction it is very confusing though to exit the option. If one uses the FINISH option, the transaction option terminates, but the transaction that was entered is lost. If one chooses the CONTINUE option, one saves the transaction, but continues with the next transaction. From here the option may be

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Accounts systems may be set up for different businesses or organisations, and files for the previous two months are retained on the disk.

The programmes have been written to be as "user-friendly" as possible, to facilitate use by non-technical persons with minimal training.

A comprehensive manual is supplied and contains an outline of the accounting procedures used in the programme, to comply with a recent Inland Revenue directive for small businesses.

All programmes have been compiled using the DTL-BASIC 64 compiler.

Equipment required:

- ** Commodore 64 Computer
- ** Commodore 1541 or VC-1 Disk Drives
- ** Commodore 1525, 1526, 801, 802, DP-80, CP-80 or similar type printers.

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exited by pressing F-1.

At the end of a period statements may be printed and account balances are aged, which wipes the current balance, while the system keeps transactions in the accounts for the current month and up to two previous months.

NO ANALYSIS OR REPORTING

Besides the usual accounts and transaction print-outs, the system does not provide any sales analysis and reporting facility. It is a basic recording package, with regular updates according to receipts, payments or credits.

As I wrote before, immediate acceptance of the keys in the options is a bit abrupt and does not provide much room for error. A strong point of the system is the regular prompts for file back-up, which the package handles nicely. If, for example, an unformatted disk is used for the back-up disk, the system provides an adequate error message. The system does not remember the current file and month, which means this has to be entered each time for most options. The system is fairly slow to work. For example "having a quick look at an account balance" is not performed as quickly.

For audit-trail purposes a very useful feature is the existence of deleted accounts, which always provide the possibility of checking an old account.

The screen lay-outs are clear and easy to understand. The accompanying documentation is not so good, as it is very hard to read, due to reduced dot-matrix print, and some areas require further explanation.

The supplier provides a warranty to the programs in regard to quality of workmanship and freedom from manufacturing faults up to six months. During my testing of the programs, I came across some minor errors, which sometimes occurred and sometimes not:

The PAUSE (P) or HALT (F-1) facility during printing did not always perform. When entering a password, I pressed a couple of buttons at the same time, which made the system fall over. And once when entering (F-1) to stop printing and subsequently choosing another option, the package stopped and transferred to the operating system. I have informed the supplier about these matters, and it is to be hoped that something will be done about it.

At \$295, which should include some implementation advice, the system is not very comprehensive and some areas need some working on. New documentation seems to be in the pipeline, but I had not yet received it at the time of completing this review.

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Human judgment better

By John MacGibbon

According to researchers at the University of New South Wales, anything the computer can do, we can do better. At least in business forecasting.

Tests undertaken over a two-year period in the university's School of Accounting have cast doubt on the popular attitude that statistical models outperform human judgment, and that computers are essential for adequate business forecasting.

The study showed that human judgment could beat sophisticated forecasting techniques when forecasting an activity that has been irregular or unstable in the past.

In the study, 200 commerce students forecast more than 100 time series, including demographic, GNP and product sales figures. These were compared with statistical forecasts by computers.

"It turned out that, on average, there was no significant difference between what a human being could do and what a computer could do," said researcher Bob Edmundsen.

Mr Edmundsen said the students were able to use a good deal of judgment, for instance about what past occurrences to ignore, or whether or not they should take a new approach. By contrast, a computer would do its own thing blindly, and was less likely to spot underlying changes.

The study was undertaken after a survey of 10 big corporations in 1981 had revealed general disappointment with computer forecasting.

ICL-Fujitsu

ICL has extended its agreement with Fujitsu to use the Japanese firm's technology in its larger computers. ICL is believed to be keen to tap into the technology of Fujitsu's VP200, a rival for the Cray XMP and the Control Data Cyber 205 in the top-of-the-range super-computer class, used in such fields as meteorology, engineering, and defence.

Mr Edmundsen claims the study shows large companies may be throwing away money on extremely expensive computer forecasting that could be adequately left to the judgment of middle management.

The study was carried out on mainframe and minicomputer systems, using forecasting software such as the Box-Jenkins package. The software was much more sophisticated than personal computer programs such as Visicalc or Lotus 1-2-3, which Edmundsen says contain only "very primitive forecasting methods".

But the computer still has a role to play, according to the researchers. It may not always be accurate, but it is fast. A computer might still be preferable where a company has 1000 lines to forecast and is confident of the accuracy.

"But if you're going to forecast your company's total sales, there's probably no reason to use a computer model," Mr Edmundsen says. "By using his judgment, the manager could do just as well."

One problem in all this, according to Mr Edmundsen, is that while a great deal of work has gone into computer forecasting, very little work has been done on improving forecasting by human judgment. His department is now looking into ways of welding the best computer processes, with the best of the judgment processes, into superior decision-support systems for management.

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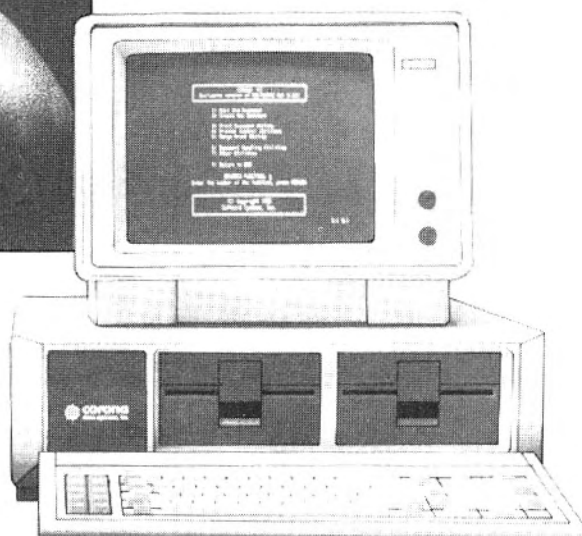
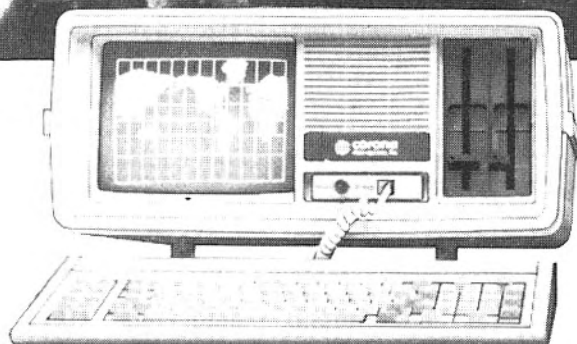
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educational software is now being distributed in New Zealand. This is the Plato system, developed by Control Data, one of the world's largest computer companies. I have spent quite a bit of time looking at some of the first courses to be released; here are some conclusions.

But first, how am I looking at the software? Not as a programmer, but rather as a teacher. Suffice to say on the programming that it works.

The Plato system originates from a very large, mainframe based system in the United States. I gather that the modules of work being marketed are adaptations of some of these courses. The modules I looked at were in the computer literacy and secondary mathematics areas, running, of course, on an Apple 2+ or 2e, it doesn't matter.

Each course comes on one to eight disks, enclosed in a colourful plastic box rather like a video-tape library box, with a manual. The manual is supplementary to what appears on screen. It contains general instructions about operating the system, what to do when (some) things go wrong — all at a real beginner's level. Also included are some suggestions for student activities, and sometimes additional information such as a glossary. The disks are *not* copyable, but permission is granted to reproduce some of the activity sheets if desired.

The programs all use the high-resolution graphics mode of the Apple and a character generator, to allow mixtures of graphics, such as diagrams or graphs, with the text.

Each module begins with a seemingly interminable list of trademarks and credits, even down to a credit for the operating system software and the development tools. This is not very interesting, especially as it all appears to crawl on to the screen.

Within each module is a wide variety of activities, covering a lot of ground. Presentation is always excellent. The lay-out of each screen has really been thought about, and is altogether very professional looking. Some of the material covered in the units I looked at is detailed below. Before getting into them, one or two general comments.

Within each module it is always possible to repeat a section, or re-start. The modules are virtually paged, so that a pupil may go back and forward as he or she needs or wants to. The prompts are clear, and consistent.

There is very little animation, and few sound effects included. Those which are may be turned off — a blessing if you've got a whole class working on this sort of stuff!

The preliminary sequences are slow and repetitive. There is a tendency, especially in the computer literacy courses, to use the same graphics effects time and time again. These will certainly not appeal to Defender/Pacman, etc, victims.

Text appears rather slowly on the screen — a side effect of the use of the graphics mode. This becomes a little wearying, but perhaps I saw too much together, and the effect might not worry pupils. Thank goodness the screen *never* scrolls — the user is always asked to press a key to continue. And thankfully, the various key assignments are consistent within each module, and across the various courses.

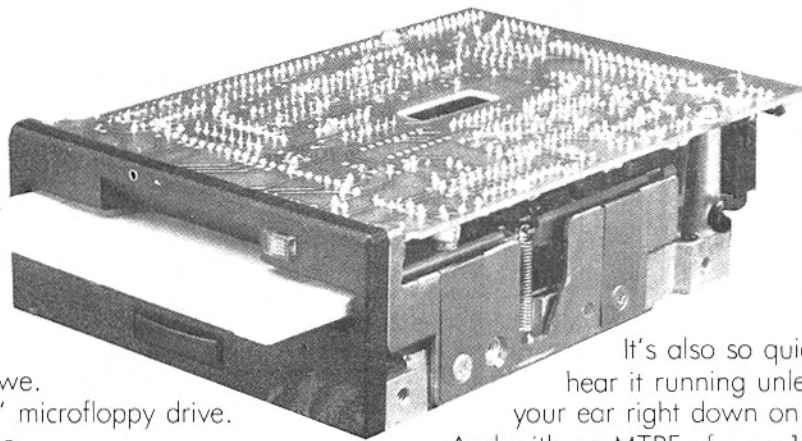
Excellent use is made of every text trick in the book. Names are used — type them in any way you like, they will appear in lower case, correctly capitalised. Text appears in various places on the screen, rather than always in the same place — this keeps the interest level up. However, the basis is words — pupils will need to read, and carefully.

Sometimes the language worried me: each part of a course is called an "objective". Probably American students know, or think they know what these words mean, but not all New Zealand students do. The general level of the language is advanced — the units I looked at were certainly not for bottom stream classes! For example, in the databases unit, pupils are told that they will be able to "initiate searches of existing databases". The overall reading level is quite high for material which will most likely be used at third or fourth-form level.

Occasionally, words are taught for the sake of themselves — there is a whole section, with illustrations and plenty of practice questions on the meaning of the word "character" in the "keyboard" unit. The definition is questionable ("Anything which can be typed" — which excludes graphics characters on the Apple) but isn't really that important, anyway. Similarly, the words, "record" and "field", are emphasised rather too much.

The software is protected, and this will worry many teachers. What happens when Joe Thirdformer drops the disk, and Jane Thirdformer stands on it as she is looking for it? Accidents do happen. Most

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EDUCATION

packages, but strangely not the computer concepts and life skills series, contain back-up copies. The lack of back-ups in these cases is (to my mind) unforgivable. I can understand the need for protection, but no back-up? Damaged disks will be, I am assured, replaced within seven days — stocks are "on hand at all times" according to the importer.

Schools with several computers need several copies — the disk cannot be moved from machine to machine, because it is accessed regularly throughout the lesson. A discount of 5 per cent is offered on the educational price for multiple copies.

Costs vary — depending on the size of the course I suppose. Retail prices range from \$87.50 (most common) to \$171. Schools can expect a discount of around 10 per cent.

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A summary? Difficult. If the material covers what you wish to teach, then you may rest assured that it is covered thoroughly, and professionally, albeit not via an arcade speed game. The material is expensive, so ask your dealer to let you see it in action first.

Plato courseware is distributed in N.Z. by D.R. Britton Ltd., P.O. Box 38400, Petone; through many Apple dealers.

LANGUAGES TO 'LIFE COPING'

A list of 45 courses available now has been circulating. Control Data claims that another 180 courses, in many fields, are under way this year. The courses out now cover some primary and secondary mathematics, French, German, and Spanish languages, physics, computer concepts and life coping skills. Very brief comments on some of those which interest me are listed below: this is not a complete run down by any means — each one would require pages to describe fully.

Computer concepts

1. Computer Literacy: introduction. One disk. \$87.50: A brief introduction to the history, uses, and issues surrounding computers. Covers, with examples, the way in which a computer is used; the roles of input devices, output, memory, the CPU, etc; limitations of computers (an excellent introduction) and some of the social implications. Includes a rudimentary discussion of the origins of computers; this is developed further in the booklet. Good potted summaries of several applications. Involves student interaction by question/answer, with a good positive response even to wrong or questionable answers.

2. Storage and Memory. Two disks, \$121: Two disks is a bit too much for this topic. Illustrates the idea of storing information for later recall, using names and addresses typed in, stored and retrieved for use in letters. Mentions the transient nature of memory, hence the need for disks, the idea of a variable as a piece of information which can be changed.

3. The Computer Keyboard. Two disks, \$121.00: Introduces the keyboard, with the return key, backspace, and so on. Gives plenty of practice at typing accurately through little exercises which are unimportant in themselves, but which expose the user to the keys. The second disk is a number of demonstrations using the keyboard to design letterhead, make designs — based on keyboard characters — and some elementary animations.

4. Files and Editing. Three disks, \$121.00: An introduction to concepts of text files and naming; and the idea of editing text. The second disk describes

and demonstrates the use of an elementary text editor, provided on (copyable) third disk. This is not WordStar, but is good as an introduction and gives some practice in using a editor. There are suggestions for exercises. Each student is restricted to three files — that's enough.

5. Databases. Two disks, \$121.00. Discusses the nature of data, records and fields; the gathering of data, creating and searching databases, and keyword searches. Allows student to add data to a small database, and search it in various ways. Imaginative exercises, could be snappier.

Mathematics

I had a look at two of the mathematics modules. They are straight CAI (computer aided instruction): show them, let them practise, tell them how they are doing then either move on or practise some more — at the user's choice.

Graphing Lines on a Plane. Two disks and back-ups, \$105.00: Graphing points, then equations in gradient intercept form, and recognition of an equation from a graph. Carefully sequenced, good correction of errors with lines added to diagrams to show what's going on. Answer sheets are included in the booklet, and a "personal record sheet". There is also a review module, which I didn't investigate — have to sleep some time!

Rational expressions. Two disks with back-ups, \$105.00: Simplification, addition, and subtraction of rational expressions — mainly with linear or quadratic denominators. Not so carefully sequenced — a tendency to move from simple to complex, then back again to simple examples. Works on the basis of "Watch, then do".

There is also a Diagnostic and Master Tests module to accompany this (two disks, with back ups, \$113.00) with diagnostic tests to determine what a pupil needs to cover, and to determine how well he or she did.

More PCs

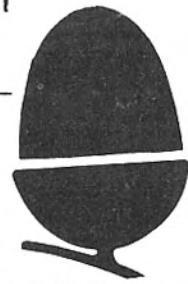
Supplies of the IBM PC are improving significantly and there should be free supply by September 1, according to company spokesman Mr Murray Jurgeleit. While the price in the U.S. has been lowered, no similar movement had followed in New Zealand by mid-July.

"Normally there would have been movement here," Mr Jurgeleit said. "But the dollar position has meant a lot of uncertainty about it."

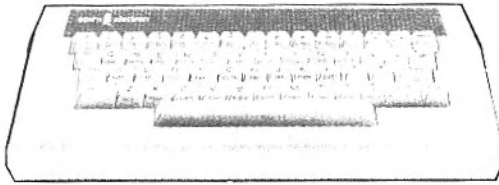
There is still no date for the official local release of the IBM PC Junior. In fact it could be next year before the machine becomes available here through IBM New Zealand.

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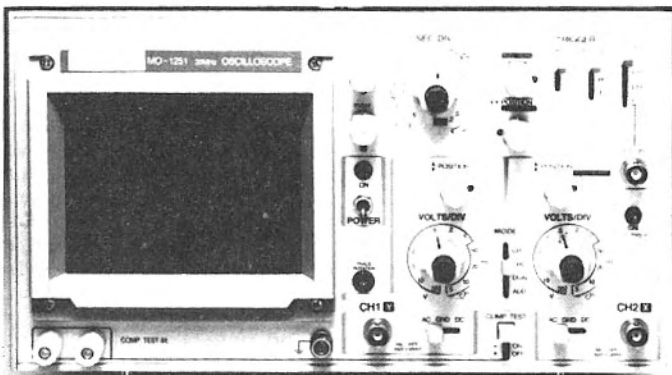
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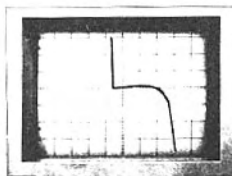
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New disk controller

By Shayne Doyle

This month I want to bring to attention the imminent local availability of the DREAMDISK disk controller for 16K and 32K Microbees, and a really useful set of utility routines developed by Dave Rowsell: TOOLKT is a trio of utility programs, a full screen editor, FSEDIT; a versatile function-key program, FNKEY; and SNAP-S, a snapshot screen-dump program for text and both low and high resolution graphics displays.

FSEDIT enables BASIC programs to be edited on screen in a 24-line mode. The cursor is manipulated using CTRL keys. A number of additional time-saving CTRL keys are provided, such as move left or right in eight character blocks, scroll the listing up or down, etc. As the cursor is manoeuvred around the line, characters being added or deleted, the new composite line being created appears at the bottom of the screen. This might be called a "hold" buffer, and CTRLX (the "X" is in fact the upside down, "V" sign unable to be printed here) will transfer the line into the BASIC source, as many times as required. One little gem buried in with all these text manipulation commands is CTRL Z. This renews a BASIC program that has been cleared by NEW or a cold start.

FUNKEY assigns key words, functions, or statements to each of the keys, A-Z. When TOOLKT initialises, it sets up 26 "standard functions" to the keys and displays a menu of them. Thereafter, the defined function may be invoked by pressing ESC and then the appropriate key. This standard set of functions are those normally used when writing a program, but each key also has an "alternate" function, and these are normally used when modifying or

debugging a program. Any key may be temporarily reprogrammed with up to 18 characters, and restored to its original function.

SNAPS-S, the third utility, offers four main formats: Epson RX and FX mode; Epson MX and Mannesmann Tally mode; Logitech FT5000 mode; and Pacesetter mode. If your printer emulates the graphics mode of one of these units, then it will be handled all right. The screen dump may be optionally output left justified, or automatically centred on 8in paper. Depending on the type of printer, further optional graphics densities may be selected, with 80 dots per inch most closely matching the horizontal/vertical ratio of the Microbee screen. The screen dump routine may also be called from BASIC by the USR function. A command is also included in TOOLKT to switch between alternate EPROM sets on machines fitted with the Ochkas paged memory boards. MEMn is similar in operation to the PAK command in 5.22 BASIC.

An extremely versatile package, then, of immense value to the programmer, available either in 2532 EPROM for \$70, or on tape for \$60. A 2764 EPROM version is also available, P.O.A. Contact Dave Rowsell, 11b Barraud St, Avalon, Lower Hutt.

For some five or six months, the DREAMDISK controller has been advertised in Australian magazines, offering owners of 16K and 32K Microbees a low cost route into disks. I had hoped to have one up and running by the time I wrote this, but because of a fault on the master disk, that is delayed until a new disk arrives. I can, however, give you details on it. It runs either its own low-cost operating system, BEEDOS, or CP/M for an appropriate extra cost.

The boot ROM for each version resides in the NET slot, and a 50-pin connector goes on to the system bus socket. The controller uses the Western Digital WD 2793 chip with built-in data separator and handles up to four mixed 5.25in or

8in drives, single or double-sided, single or double density. Depending on the drive you use you can have up to 1.5 Megabytes per drive. A wide range of disk formats can be read: Microbee A, Microbee B, Osborne I, Kaypro II, TRS-80 SD, Xerox 820, and Morrow Decision. It will also run 8in drives in either CP/M distribution standard (SSSD), 128 byte/sector DSDD, or 512 byte/sector DSDD formats.

Recommended drives are Mitsubishi 4851 giving 500K per unit (\$413 includes tax for a bare drive) although Shugart, Teac, Sony, Hitachi, MPI, etc. are all right, too. The boot ROM contains a machine-language monitor and automatically senses machine clock speed to allow tape, RS232 and video routines to function in Plus or IO machines. It will also test the computer to see if it has 24 x 80 video fitted, and if so then this mode is used; otherwise it uses 16 x 64 for CP/M.

Under BEEDOS, commands include DIR, KILL, LOAD, NAME, OPEN, COPY, CLOSE, RUN and SAVE. The latter two have three formats, depending on whether BASIC programs, machine-code programs, or CP/M utilities are being accessed. Data files are handled exactly like tape files, but using data streams 6 and 7. Unfortunately, random files are not supported, but then this is intended to be a low-cost way into disk. All files the DOS creates are in CP/M compatible format. It is worth noting that both WORDBEE and the MYTEK word processor are supported as their files may be written to disk. By using the RUNB command, CP/M utilities may be loaded and run.

Spending a bit extra gives you CP/M, and the extra versatility that goes with it. CP/M utilities include tape-to-disk and disk-to-tape copying, disk formatter, CONFIG, EDASM-CPM, and WBEE-CPM to convert files to a format compatible with other CP/M word processors and text editors. EPROM is the updated EPROM programmer driver while MODEM2 and MODEM3 are intended for use with a modem to communicate with RCPM and CBBS systems by phone. SUB, ZCPR, and ZIP are all improved versions of CP/M's own SUBMIT, CCP, and PIP utilities. XERA and UNERASE delete and recover files. The supplied manual gives just enough information to get started, but most commands will give operating details if called with no parameters. The usual CP/M HELP files are also included on the master disk.

THE DREAMDISK system will be assembled and marketed locally by Moonshine Computers, 70 Victoria St, Lower Hutt.

Finally, I would remind all Microbee owners out there that the fate of a column such as this is very dependent on some feedback, be it original offerings or requests for help. (Write direct to Shayne Doyle at, 18 Holdsworth Avenue, Upper Hutt — Editor).

New double-disk drive unit

Apple Computer has released a new 5¼in disk-drive unit which consists of two half-high 140K drives side by side in a single case, named Duodisk.

The Duodisk is exactly the same width as an Apple II and combined with the Monitor II, will fulfil Apple's vision of an integrated system. Technical improvements (such as a new eject mechanism) and a lower price than two separate Disk II drives makes it a good choice for professional or business applications as well as the more serious enthusiast.

In operation, it works exactly like two Apple Disk II drives and is fully compatible with all Apple II software.

The cost is \$1995 and they are available from all Apple dealers.

Bulletin board

The Wellington Micro Computing Society has come a step nearer its bulletin board goal. One of its two modems is definitely working and the other requires work on the housing. The society has had the co-operation of a local printing firm, Bryce Francis Ltd, and at the July meeting a communications experiment was set up using Digby Turner's hand-held machine.

"David Francis set up a programme allowing us to enter files into the Bryce Francis system and we were able to display files already in that system," a society spokesman, Mr Bill Parkin, said. While there is still a vast amount of work to be done before a bulletin board can be entertained, nevertheless progress is being made.

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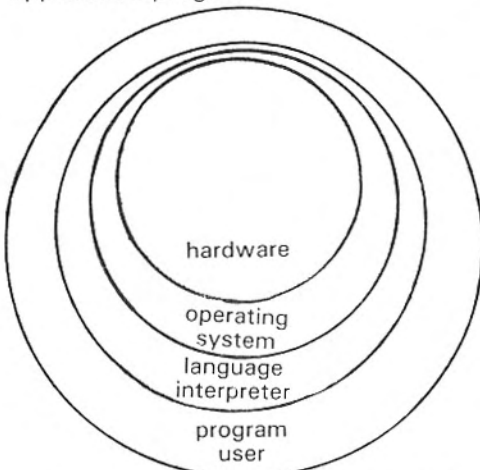
Operating systems

By Gordon Findlay

Imagine you are using a computer for something. It doesn't matter what. I am using one right now for word processing, but it might be for a game, for accounting, for storing information, or for whatever takes your fancy. You press a key, and something happens. A paragraph moves, a missile is fired, an invoice is printed, a record is altered. Let's unravel what happens between your finger hitting the key and the event's occurring.

When you press a key, a switch closes. This allows, or perhaps stops, a flow of electricity. This becomes a signal that something has happened — a key has been pressed. This signal is understood by the program you are running to be an instruction to do something different to what it has been doing, which was probably just sitting waiting for you to press a key! The program is sent off in some direction, and presents a series of commands to the computer. Most likely the program you are using is written in BASIC, so the series of commands must first be translated (by the "interpreter") into instructions the machine understands. These, eventually, get carried out.

You, as the user, see only the program you are using: the application program.



The program is written in BASIC, and itself does not see the computer itself (the central processor), but communicates rather with the interpreter.

The interpreter does not see or

Each article in this series is a gentle introduction to some topic in the computing field. It is written for the beginner, so may appear very simple to the rest of you. If you find it too easy, and so not worth reading, congratulations, you are a beginner no more. Each issue will deal with a different topic, of general interest. Occasionally material may seem to repeat what has already appeared in Bits & Bytes, but remember, new readers are coming along all the time.

communicate directly with the hardware either, but with the operating system. This is a complex program which controls all the other programs (applications, interpreter) and relates them to the hardware of the computer.

What does an operating system do? It *manages*:

- Manages the keyboard, detecting when a key is hit, and which one it was.
- Manages the screen, displaying whatever is required.
- Manages memory, making space available as requested by the other programs, and moving the contents of memory around as necessary.
- Manages mass storage, such as tape cassettes and disk drives. Here it may be required to find a particular program or file, to keep track of how much space is available, to remove programs no longer needed, to shift them around, and to keep track of what is on a particular disk or tape (not all operating systems can do all these things).
- Manages hardware, requiring sound chips to make noises, requiring disk drives to rotate, and so on.
- Manages other software, moving programs around, loading them, merging programs together, transferring them to tape and so on.

Nebulous ("cloudy") isn't it? There seems a great deal of confusion about where an operating system starts and ends. Most people agree that the operating system:

- Detects key strokes.
- Starts a program running.
- Turns a cassette motor on or off.
- Makes the computer system ready to receive a new program typed in.

But what about the time when you are typing in a BASIC program? Are you working with:

- The operating system; or
- an editor program; or
- the BASIC interpreter?

The answer is probably "yes".

It rather depends on the way in which the operating system/BASIC interpreter has been written. In the TRS80, and the Apple, without disks, it is just about impossible to separate the three options out, as they all form one large lump of code.

Where is the operating system? In

a simple computer, the operating system is part of the ROM, or permanent memory built in to the machine. This memory is permanent, in the sense that it doesn't lose its contents when the power is switched off. Every time you turn it on, the programs in ROM — the operating system, BASIC interpreter and possibly others — are instantly available.

With more expensive systems, with a disk drive, a new operating system is needed — a disk operating system, or DOS (pronounced "doss" usually). This is loaded from disk each time the system is "booted" or turned on. ("Booting up" is performing whatever must be done to get a computer ready to run programs.)

Some systems have a choice of operating system. If the system is being loaded from disk, it may be changed easily, just like any other program. This means that the computer has a choice of operating systems. The machine can behave quite differently with another operating system loaded — even down to such fundamentals as the number of characters across the screen. Such is the flexibility.

Some common operating systems are available for several machines. Examples are CP/M, MS-DOS, the P-System, FLEX, UNIX, and the like. There are a number of reasons for making the same operating system run on several machines. It helps program portability — makes it easier to produce a program to run on several machines. This is obviously advantageous for the program writer. Changing machines becomes easier, too. Many of the programs and data files can be swapped across when you upgrade to better hardware. It also means that changing machines is easier on the user — there is less to re-learn.

Programmers need not often worry about the detailed workings of the operating system. Sometimes an operating system routine must be used to alter some settings, such as communication speeds between the computer and a peripheral such as a printer. BBC users will be familiar with operating system calls to enable

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DISKS

DISKS No. 5

Typing file sectors together

By Gerrit Bahlman

While the physical activity of any computer application is staggering in its detail and complexity, the components of the activity are all logical and essentially straight forward.

The essential idea is simple. I want to be able to use a computer to type. I want to be able to correct my typing. I want to be able to shift parts of my typing from one place to another. I want to save my typing. I want to be able to print it out. I want to check my typing for spelling mistakes. I want to be able to type something once and not have to repeat it every time. I want to be able to use a name and address list in letters without having to re-type them every time. I want to be able to find words or letters I have typed without reading the entire typed document. I want to be able to change one word to another throughout the entire document without having to re-type everything.

These simple desires and wants result in the sophisticated software tools used in word processing. Each of them has been implemented in a wide variety of ways, important decisions being made that compromise between speed and efficiency, ease of use and sophistication. The programmers have found ways of making binary switches "click" in the right order to do a job. Significantly, the right order does not mean one order because there is more than one task to be considered. Compromise is always necessary when multiple requirements are to be met.

In the last article I described one method in which data is organised and stored on disk. The method was fast but involved the user in some organisational clean-up work to overcome a problem called fragmentation. Fragmentation occurred when a disk had sufficient space to store a particular file of information but the space was spread over a number of parts of the disk. The system of storage organisation employed insisted that one gap be large enough

to store the file because storage would be contiguous, or, to put it another way, the sectors of information stored would all be next to each other.

In this article I will describe another method of organising disk storage which effectively overcomes the fragmentation problem. What we are faced with is a file of information which is to be stored on a disk under a file name such as "mailing list". The mailing list has a large number of records in it. There are probably a number of records per sector and so the file will involve a large number of sectors. Recall that a sector is the "piece of pie" occupying a particular track on the disk surface and that these tracks and sectors have been labelled and identified by the formatting program.

For a given machine there will be a unique number of tracks per disk and a unique number of sectors per track. The tracks and the sectors are

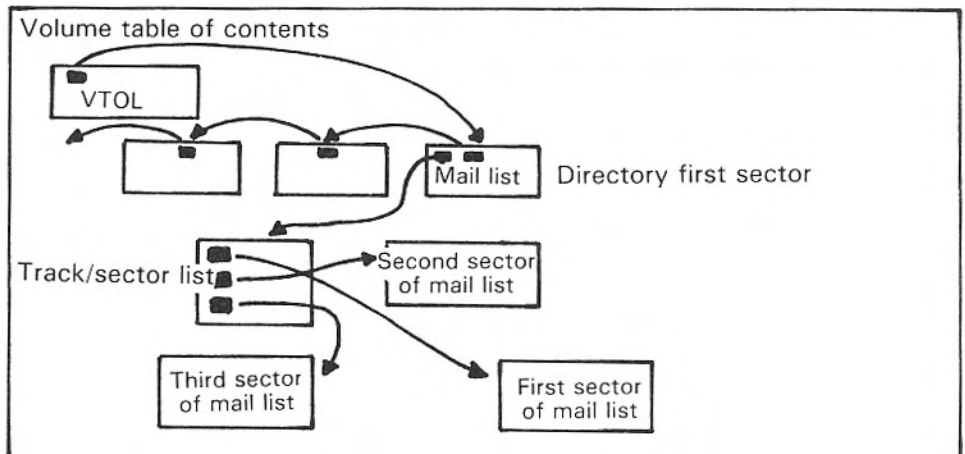
a free sector somewhere it can be used.

There is, of course, some lost space in that if a sector at the end of a file is not filled completely it will be wasted because we allocate space for storage by sector but this ought to be reasonably small.

The other problem you may have considered is the need to keep some sort of track of which sectors are free. What if the pointer in the last sector points at a full or used sector? How are sectors allocated to a file?

In the earlier scheme it was relatively simple to decide if space was there because the directory kept track of the file's first sector and the number of sectors used. A kind of map would show the gaps and the size of the gaps could be found by nothing more complex than subtraction.

The scheme I am describing here will also have to have a directory which stores the file's name and its length



effectively identified by their unique positions. As far as we are concerned we can think of them as being numbered. In fact, they may be identified by physical position in relation to a hole in the disk or indeed by some special pattern of binary digits that signals the start and the end of a sector. The actual method is not relevant to our discussion. All we have to know is that each track and sector is numbered and that it is identifiable.

The storage method involves a series of links or pointers being used to tie all the sectors of a file together. Each sector used for a file has a pointer in it which stores the track number and sector number of the next sector the file will use. By allocating the following track-sector information to the current sector and ensuring that the disk operating system always reads it, we are no longer tied to the requirement that a file be stored contiguously. If there is

in sectors used. In fact there are a number of components to the directory. The most important of these - the first thing accessed by the disk operating system is the volume table of contents (VTOC).

The VTOC is always found in the same place and stores a bit map of sectors free on each track. When a new sector is needed for a file a quick reference to this map identifies a free sector. The free sectors are allocated in a systematic way bearing in mind the time it takes to shift the read/write head to the sector.

The VTOC also stores other information such as the location of the first sector of the directory of files and their length and type. Other information related to the system can be found on that sector as well but that need not concern us. We have the next link.

The directory sectors are also linked together. The first points to

the next, and so on. The number of sectors allowed to be used for the directory may well be limited but it will be large enough to fulfil the task. Each entry for a file will be a pointer to the track/sector list for that file, the name allocated to that file, the file length, and additional information such as file type, or whatever.

The track/sector list is yet another list of sectors which records all those sectors, in order of the file, that are used to store the file. Once the VTOC and directory sectors have been read and the track/sector list has been found each sector used to store the file can be found by simply following the list until some end-of-file signal is registered.

The advantage of this system is that the user is completely unaware of the file management process when using the system. There is no tidying up. When the disk is full it is reported and there is no need to try to overcome the fragmentation problem. There isn't one.

However, there are some important overheads. Access will be slower. Each addition list that must be consulted will take time. Also, extra disk space must be allocated to store the additional sectors used to store track/sector lists. In the simplest case of a single sector file, a sector will be needed for the VTOC (shared by all the files), a sector will be needed for the directory entry (shared by some other files), and a sector will be needed for the track/sector list. So to store a single sector of information at least two sectors are needed. A disk which only contained that one sector file would need four sectors to do it. This is why the actual storage capacity of a disk compared to the physical storage space is different. In the case of the Apple //e disk operating system the physical 560 sectors reduces to 496 sectors when all the overhead is taken into account, which amounts to an 88 per cent efficiency. Effectively, 12 per cent of the disk space is used just to maintain the storage system.

With a little probing into your computer's manual you ought to be able to determine the efficiency of your computer's disk operating system and also find out how it goes about storing its information.

From page 49

or disable editing keys and the like.

Machine-language programmers, who don't have the interpreter's help, need to work very closely with the operating system, especially for input and output.

Joysticks and interfaces

By Gary Parker

What is your Spectrum used for most? It probably spends most of its time entertaining the kids with games. Ninety percent of commercial programs are games for the reason that this is what people want. I don't see this as a bad thing; most kids become interested in computers through games, and soon know more about computers than their elders.

So what does a good games computer require, if it is to approach (and exceed) the standard of coin-arcade games? High on the list would be fine graphics, colour, sound, a reasonable amount of memory, and a joystick. The Spectrum has most of these features, as evidenced by the high quality of its games, but notable for its absence is a joystick.

Simple games such as Space Invaders work fairly well without a joystick, because there are only three keys to press, but the more up-to-date games, with a multitude of controls, are often spoiled by the difficulty of using the keyboard.

So the Spectrum needs a joystick, and for this an interface is required. One way a joystick can be connected is to open the case and solder leads to the keyboard wires, to which a joystick can be connected. Then the joystick is physically part of the keyboard. I have seen this done very successfully, but not many Spectrum owners are that keen to undertake such a hazardous task, and to do so while the computer is still under guarantee would be foolhardy.

Commercially available joystick interfaces plug into the back of the Spectrum. There are two main types: programmable and non-programmable. Because the Spectrum did not have a joystick standard for the first 18 months of its life, games use a large variety of keys. The only interfaces which will work with all games are those that can mimic all keys. Programmable interfaces can be programmed by you, to make the joystick act like the keys you specify, so that a programmable interface will work with all software. Some programmable interfaces contain their own memory, and allow you to specify keys through a program, while others have a grid of plugs, where you specify keys by connecting plugs in certain patterns.

Non-programmable interfaces cost less than programmable ones, because they do not require such complex electronics. Some non-programmable interfaces work by mimicking certain keys, such as the cursor keys, while others use a different system which does not use keys at all, and requires software

designed for them. No non-programmable interface will work with all software, so check how many games will work with any such interface you are considering buying.

Most of the new games coming on to the market are designed to work with the Sinclair joystick interface, Interface 2, which is non-programmable, and allows for two joysticks to be connected, one mimicking the keys one to five, and the other mimicking six to zero. The ability to connect two joysticks is a distinct advantage, in that it allows two-player games to be played. Let's hope that games appear which utilise this. All ROM cartridge games work with the joysticks.

Most joystick interfaces come without a joystick, and with Interface 2 available, a lot of Spectrum owners will be buying joysticks for the first time, so here is a word of advice on these.

TWO TYPES OF JOYSTICK

There are two types of joystick. Those under about \$40 consist of a plate at the base of the stick. As the stick is tilted, the plate is pressed against contacts on a lower printed circuit board. This system is rather easy to break by a person who gets a bit carried away by the game, but will give good service if treated with care.

More expensive joysticks use an identical system to that used in coin-arcade machines. The stick contacts eight leaf switches, producing a system which will withstand rugged use, and which gives a better "feel" to the joystick's movement. The stick has a wider field of movement, and does not click into position. The more expensive joysticks often have more than one fire button, but realise that they are wired together inside the joystick, and cannot be used for different functions.

A game which is excellent with a joystick, but also fun with the keyboard since it allows you to define your own keys, is Gnasher, by R & R Software. It is the best Pacman-type game I have seen, with large, detailed ghosts, and all the little niceties such as bonus fruits. The ghost's eyes even flee back to their den when you catch them. Gnasher works in 16K and 48K, and retails at \$19.95. A cassette of this game has been donated by Software Supplies Ltd, and you could win it by entering this contest: write a short BASIC program which will make a ghost-like character move in a circular path around the screen. I'll be looking for speed and brevity. Send your solution on paper or cassette (although unfortunately I cannot return entries) to:

Gary Parker
(Gnasher Contest)
P.O. Box 4063
Christchurch.

Remember to include your address. Entries close on the 25th of this month. You can also write to me at that address if you have any comments about, or for, the column.

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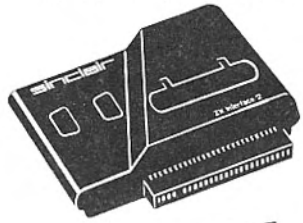
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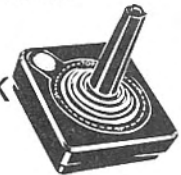
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Centronics interfaces

By Steven Cragg

The USP input/output board and USP Centronics port are part of a range of expansion boards for the Spectrum which include RS232 ports, prototyping boards, and mother boards.

The USP input/output board is

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controlled by a Z80 PIO chip. The USP CENT is an upgrade kit which turns the USP I/O board into a standard Centronics (parallel) printer interface. Supplied with USP CENT is some software to drive the interface via Sinclair BASIC's LPRINT, LLIST, PRINT#3, LIST#3 and to divert all the text normally sent to the screen to the printer, OPEN#2, "p".

The USP I/O printed circuit board is very professionally laid out, being both solder masked and silk-screened. The board is designed to drive two 8-bit ports which can be configured in the following ways:

Port A

- 8 bit input
- 8 bit output
- 8 bit input/output

Port B

- 4 bit input and 4 bit output
- 8 bit output
- 8 bit input

This is a very flexible system, providing just about everything a hobbyist could need.

The board is connected to the Spectrum via two back-to-back edge connectors, bringing to mind the dreaded "RAM pack wobble" that seemed to plague the early ZX81's, as the board is at a slight angle when plugged into the Spectrum. However, the distributors of this system plan to introduce a slightly different connector, joined by ribbon cable instead of being soldered back to back as at present. It is a pity that a better connection system could not have been found, as it is a weak spot in what is an extremely well-designed system.

The documentation is first class with a full-circuit diagram and a complete data sheet on the Z80 PIO. However, it does assume that you know what you are talking about in the first place and is definitely not for the newcomer to computing.

The USP CENT upgrade kit consists of two integrated circuits, a printer cable, a manual and the necessary software. The software works equally as well as some of the dedicated Centronics interfaces and indeed is the only one that supplies a fully commented assembler listing of the printer driver routine. The interface provides only the minimum number of lines. There seems to be no provision for adding more. I am not sure how this compares with other (dedicated) interfaces: this is the only one that tells you the lines monitored or which ports the interface uses.

In summary, it really does show that the suppliers have until recently concentrated purely on boards for the Apple, as these boards are similar to the expansion boards for that computer. The prospect of mother boards, etc, gives the Spectrum almost unlimited expansion possibilities. However, the prospect of having two mother boards with up to seven cards (which mount vertically on the mother boards) extending out the back would be horrific to some people.

If you want only a Centronics interface then I cannot recommend this system, as

there are better dedicated interfaces available. However, if you want a flexible input/output board with future expansion possibilities, then this system is for you.

The USP range of peripherals are distributed in New Zealand by:

Vision Computing
P.O. Box 13455
CHRISTCHURCH.

The costs of the components are as follows:

USP Adapter	\$35.50
USP I/O	\$140.20
USP CENT	\$25.50

INTERFACE - AND A WORD PROCESSOR

Another upgrade option is the Hilderbay Centronics interface, which comes in a small black box that fits firmly on to the Spectrum's edge connector.

There is no provision for peripherals to be added, as there is no duplicate Spectrum edge connector on the box. This is particularly annoying when you own more than one such add-on.

The Centronics output comes via a 26-way flat cable type connector. Apart from the interface itself you are supplied with a 90cm printer cable (with suitable connectors) four pieces of software, including the excellent Tasword Two word processor and all the necessary documentation.

The software for the interface is very powerful with LPRINT, LLIST, PRINT#3; and LIST#3 all being supported. As well as these you can also use OPEN#2, "p" which sends all text that would normally go to the screen to the printer saving you having to tediously change all the PRINT's to LPRINT's, etc.

The software also provides for two types of copy. The first is for a screen of text and the second is for a high-resolution screen dump for the Epson RX80 and look-alike printers. If, however, you do not have an Epson or one of its clones, the interface documentation provides BASIC routines to produce the high-resolution copy.

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Inside the memory

By Brian Gibbs

This month I will try to clear up some of the confusion surrounding the memory map lay-out of the Sega.

As the Sega uses a Z80 microprocessor, the maximum address

video RAM is accessed through a port, and is not to be considered as part of the main memory map.

Thus for normal memory, excluding video RAM, the addresses range from 0000 hex to FFFF hex as in Figure 1.

All the BASIC language cartridges occupy RAM space above hex 8000 depending on the cartridge level. These BASIC language cartridges hold not only RAM but also the BASIC ROMs. There is no ROM on board the Sega. The only on-board memory is the 2K of system-work RAM at C000-C7FF hex, and the 16K of video RAM.

Games cartridges use ROM chips and also make use of the 2K of on-board work RAM previously mentioned.

contain 2 * 27128 EPROMs containing the BASIC interpreter and either two (level 111A) or four (level 111B) 16K by 4-bit RAM chips. These RAM chips are type 4416. It may be possible to upgrade your level 111A cartridge to level 111B by the installation of the two additional 4416 chips. Later machines contain two 16K, 8-bit ROM IC's.

The BASIC operating system apparently uses some of the RAM space for variable and data storage in addition to using the normal work RAM. This would explain why only 26620 bytes are available to the user on the 32K expansion, and proportionally less on the 16K expansion.

The 16K of video RAM is accessed from I/O ports at hex BE and BF. Note the difference in syntax when POKing or PEEKing to video RAM. POKEs and PEEKs to video RAM must be prefixed VPOKE or VPEEK and cover the video RAM address range hex 0000 to hex 7FFF.

Page 148 of the Sega manual gives a reasonable idea of the mapping of the video RAM.

Finally, a Sega users' group has been established in Wellington. At present the group is quite small and informal with meetings once a month. Beginners are especially welcome and anyone interested should contact me at WN 787159 (home) for more information.

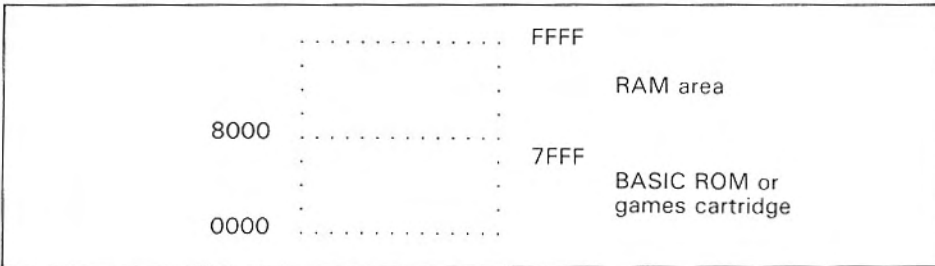


Figure 1

range is 64K bytes, without using bank selection. Confusion exists because the Sega is advertised as having a maximum of 32K useable RAM and 32K of ROM containing the BASIC operating system in addition to 16K of video RAM. This adds up to more than the 64K previously mentioned. The trick is that the 16K of

Internally, on my machine, the BASIC level 111A and level 111B cartridges

SPECTRUM

It is perhaps unfortunate that the COPY command already present on the Spectrum cannot be altered to use the high resolution dump in the way that LPRINT, etc, have been. The third piece of software that is supplied is a simple word processor which is used by storing the required text in REM statements and then typing the simple word processor to print out the text. This is very slow and does not even bear comparison with Tasword 2.

The documentation is very good, telling everything about the software. However, it fails to tell anything at all about the hardware, such as which output ports the interface uses or the pin connection of the connectors (i.e. which pins are monitored). This could be very important to the advanced BASIC or machine-code programmer who wants to write routines.

Although a little expensive at \$236, the inclusion of Tasword 2 makes this package extremely good value and means that the Spectrum can be upgraded by the addition of a full-size printer.

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How to print labels for your disks

By Gordon Findlay

Last month we looked at the memory mapped display of the TRS-80, and how information may be obtained from the screen by PEEKing. This month, an application of this idea, in the form of a disk label maker.

This program prints a label for the front of a disk packet (not the disk itself) with the name of the disk, and the files on it, listed in alphabetical order. One or two explanations are in order:

The directory is displayed on the screen in line 130. Most operating

H-P tape drives

Hewlett-Packard has announced a new format for quarter inch tape drives, that will provide cheap back-up for personal computers with hard disks. The format has been developed in association with Tallgrass Technologies, an American firm that makes hard disks and cartridge-tape back-up systems for bigger computers. The new format enables users to store about 60 megabytes of data on currently available tape cartridges and to access tape using familiar DOS commands.

systems allow this from within a program, although the form may differ.

The key idea of the program is illustrated in lines 150-160. These lines get the name of the disk. The string N\$ is initialised to be empty (line 150). Line 160 moves along the appropriate row of characters on the screen, PEEKing each location in turn. The result of the PEEK is naturally numerical - the appropriate character is found, and added to the end of N\$. This results in the name of the disk being built up as the variable N\$, available for later use (line 390).

Lines 180 to 320 perform a similar trick, reading the file names off the screen one at a time into the array PR\$(I). This is dimensioned with 40 elements, which is enough unless you have extended directory space. Once all are read, they are sorted into alphabetical order, and printed, 3 to a line.

The variable LR (line 85) is set to one less than the number of lines required for the label. The remaining line is a string of "-" signs to act as a separator. The number of blank lines required is found by examining location 4029H, which is part of the printer "device control block", and records the number of lines printed since a form feed. At line 580 this is reset to zero for the next disk. The program as written repeats endlessly, or until you press BREAK.

Only rudimentary formatting of the label is included here. You may want to include other information, either typed in or from the directory, such as the amount of free space, or the date the label was printed. You will also want to make use of the special features of your printer to dress the labels up.

Here is the program listing, and a sample of its output:

For a very full disk, reading the file names from the screen can take a time. Add the line 225 PRINT @ 960,X; if you want to see progress being made.

Disk label listing

```

10 'Disk label maker
20 '
30 'clear a lot of string space
40 CLEAR 20000
50 'array for file names
60 DIM PR$(40)
70 'BL$ is 12 blanks
80 BL$=STRING$(12,32)
85 LR=21 'one less than depth of label
90 N$=""
100 CLS:PRINT"Insert disk, press enter":
110 LINE INPUT X$
120 'get directory - check your DOS
130 CMD="DIR"
140 'get name of disk
150 N$=""
160 FOR I=15371 TO 15378:N$=N$+CHR$(PEEK(I)):NEXT I
170 'get file names from screen
180 ST=15488
190 FOR J=1 TO 10
200 FOR I=ST TO ST+45 STEP 15
210 X=J
220 P=PEEK(X)
230 IF P=32 THEN GOTO 270
240 P$=P$+CHR$(P)
250 X=X+1
260 GOTO 220
270 IF P$="" THEN GOTO 350 ELSE N=N+1
280 PR$(N)=P$
290 P$=""
300 NEXT J
310 ST=ST+64
320 NEXT I
330 'sort them: this is the NEWDOS way
340 'or use my sort routine (May 1983)
350 CMD="D,N,PR$(1)
360 CLS
370 PRINT"Make printer ready, press ENTER":
380 LINE INPUT X$
390 LPRINT "Disk name: "N$
400 LPRINT:LPRINT
410 FOR I=1 TO N
420 PR$(I)=LEFT$(PR$(I)+BL$,12)
430 NEXT I
440 M$=INT(N/3)
450 IF M=3 THEN GOTO 490
460 FOR I=1 TO M STEP 3
470 LPRINT PR$(I); " ";PR$(I+1); " ";PR$(I+2)
480 NEXT I
490 FOR J=1 TO N:LPRINT PR$(J); " ";NEXT J
500 'find line printed from DGB
510 LP=PEEK(2H4029)
520 IF LP=LR THEN GOTO 560
530 FOR I=1 TO LR-LP
540 LPRINT
550 NEXT I
560 LPRINT STRING$(40,"-")
570 'reset lines printed
580 POKE 2H4029,0
590 GOTO 90
    
```

Example

Disk name: TIMETBLE

```

BLANK/CIM          CHEKLINE/BAS      CLASHES/BAS
DEMOIP/EOF        EDITFILE/BAS     EOFF
FIVE/TKT          JUNIOR/TKT       MISC/TKT
OPT/BAS           OPTIN/SEQ        OPTOUT/SEQ
PRTT/BAS         SETUP/BAS        SEVEN/TKT
SIX/TKT          TICKETS/BAS      TIMTBL/CIM
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Commodore introduces new machine

By Steven Darnold

The last two years have seen Commodore take the dominant position in the home-computer market. This success was based upon a two-prong approach: the VIC 20, which competed against the cheap computers, and the 64, which competed against the more expensive, fully featured computers.

Commodore would be silly to abandon this successful two-prong approach; however, the VIC 20 is long past its prime and it is unlikely to survive much longer. Since the end of last year, Commodore has been grappling with the problem of where to go next. In the April issue of *Bits & Bytes* I described one of the computers Commodore was considering: the 264. This computer would have 121 colours, 60K bytes free, and a fancy new BASIC. Its specifications were so good that it appeared to be a fully featured computer, not a cheap replacement for the VIC 20.

The announcement of the 264 made me uneasy. What Commodore needed was a cheap computer, not a computer which would compete with the 64. It would be silly to withdraw the \$400 VIC, and sell two different \$1000 computers. In fact, in my article I suggested that either the 264 or the 64 would end up falling in price to the VIC 20 level. That

way, Commodore could withdraw the VIC and still maintain its two-prong approach.

As it turns out, my guess was not far from the truth. Commodore has taken the 264, stripped its RAM to 16K, given it a standard VIC 20/64 keyboard, and called it the Commodore 16. By Christmas it should be selling in New Zealand for \$500. Soon thereafter the VIC 20 will disappear.

In every respect the Commodore 16 is far superior to the VIC 20. It has 40 columns, compared with the VIC's 22. It has 16K compared with the VIC's 5K. It has 121 colours, compared with the VIC's eight. Moreover, the C16 has a comprehensive BASIC that includes many things lacking in the VIC: a machine language monitor and special commands for graphics, sound, disk drive, and structured programming. The C16 looks set to give Commodore another strong two years at the cheap end of the market.

The C16 is only partly compatible with the C64 and the VIC. Pure BASIC programs will load and run, but commands such as PEEK, POKE, and SYS will have to be altered. Twenty-two-column programs from the VIC will need more altering than 40-column programs from the C64 or PET. Machine-language programs and cartridges will not work. The C16 will be able to use VIC-20/64 peripherals, although a faster disk drive will also be available for it.

C64 owners have nothing to fear from the C16. The C64 has better graphics and sound, and it will remain Commodore's premier home computer for some time. It is worth noting, however, that the C64's BASIC is the same as the VIC's; in fact, the same BASIC was on the 1978 PET. The new BASIC on the C16 represents a major change for Commodore, and once it becomes established in a year or two, there may be a move to upgrade the 64.

Telecomputing

Every night in America thousands of home-computer users hook their computers to their telephones and communicate with databases, information services, and bulletin boards. They send messages, they ask questions, they play complex multi-player games, they book airline tickets, they check their bank balances, they get up-to-the-minute sports results, they get medical advice, they order goods with their credit cards. The list goes on and on.

Over the last year telecomputing has become extremely popular in America. The biggest information service for home users is CompuServe. It has more than 800 topics on its main menu, some topics having numerous sub-menus. The most popular topic is the Commodore section, where users can get up-to-date information, down-load programs, and leave technical questions for the Commodore staff to answer. CompuServe is a commercial enterprise and it costs \$6 per hour; however, there are also many free services run by user groups and individuals.

In Britain, too, telecomputing is increasing in popularity. As part of the Prestel network, Micronet is available for Commodore, BBC, and Spectrum owners. It offers electronic mail, bulletin boards, up-to-the-minute news, buyer's guides, direct ordering, etc. In addition, Commodore has recently set up its own service called Compunet, which offers Commodore news and information and down-loadable software.

In New Zealand, there is little opportunity for telecomputing by the home user; in fact the commercial use of viewdata has only just got underway. However, I predict that by Christmas, we will see the beginning of telecomputing for the Commodore 64.

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COMMODORE 64

Commodore (N.Z.) already has a suitable modem and has submitted it to the Post Office for approval. It will sell for less than \$500.

The Commodore modem can operate at 300/300 baud, which is the usual bulletin board standard, or at 1200/75, which is what viewdata uses.

Telecomputing is bound to be one of the most exciting aspects of home computing, and I am keen to get on-line. Fortunately for us rural types, the Post Office has established a standard charge of 8 cents per minute for viewdata calls. That means we'll all pay the same rate whether we live in Alexandra or Auckland.

Quality games

In recent months I have reviewed numerous Anirog games. Not surprisingly, some were good and some were bad. This would probably apply equally to most producers of games: the quality varies from author to author and from game to game. Even the producers of the more expensive games sometimes produce a dud. However, Synapse appears to be an exception.

Perhaps I've been lucky and have only seen the very best of the Synapse range; nevertheless, each of the Synapse games I have played is excellent. Invariably, the graphics and sound are good; and, most important, the games are truly challenging and interesting. Certainly, I have my favourites, but I could happily play the worst Synapse game all day long.

My favourite Synapse game is Fort Apocalypse. The graphics are not as nice as some of the others, but the game itself is very nicely paced. There are moments of heart-pounding tension which require split-second timing, and then there are moments of tranquility which need a more gentle touch. A beginner must learn many things before he makes much progress, but the game is gauged very nicely for the player to develop his skills. The game is well executed, although I have two minor niggles: enemy helicopters which suddenly appear out of thin air and men who inexplicably destroy my helicopter as I try to rescue them. Nevertheless, Fort Apocalypse is an interesting, satisfying game.

Almost as good as Fort Apocalypse is Blue Max. In fact the graphics in Blue Max are far superior. However, Blue Max is less appealing to me because of its strong element of luck. In the game you have only one life and the loss of that life is sometimes beyond your control (for example, an enemy plane can bomb you as you sit on the runway refuelling). The longer you play, the more anxious you become about suddenly losing that life, and the more frustrating it is when it happens. Nevertheless, Blue Max is a fun game to play. It's a real thrill swooping down to ground level and strafing everything in sight.

The Synapse game I like least is Shamus. The problem is that the game is mostly luck and reflexes. You wander

from room to room blasting countless little beasties and occasionally getting walloped by the phantom. There's some mapping to do and some obstacles to overcome, but, over all, Shamus does not capture my interest to the extent that the other games do. It's a nice game, which undoubtedly will appeal to some people, but I prefer games with more substance.

Shamus II is a completely different game, and it is much more to my liking. You climb ladders, jump chasms, and dodge snakes. As in the original Shamus, you shoot beasties, but here your bullets ricochet and the effect is more interesting. Most important, however, is that Shamus II has a lot of charm. The little man is quite appealing as he skips around the caverns, and the snakes are cute as they slither across the screen. I particularly like the clever, intricate way the caverns have been designed.

I have also played a brief game of Zeppelin and have seen demonstrations of Zaxxon, Pharaoh's Curse, Slamball, Drelbs, Necromancer, Sentinel, and Survivor. Each of these games appears to be of high quality. If you are looking for the very best in games for the Commodore 64, Synapse would be a good place to start.

Zork II

I have been interested in adventures for several years. Before I got my Commodore 64, I obtained every available adventure for my PET. This included the Original Adventure and the first two Scott Adam adventures. I particularly enjoyed the Adams adventures and was disappointed that he did not translate his other 10 adventures to the PET. Even worse, I couldn't play the Zork adventures because Infocom did not support the PET.

When the Commodore 64 was released, I was pleased to see that Infocom was supporting it. I ordered Zork I the first week I had my 64. Over the next few months I played the adventure to its conclusion. As I commented in the September, 1983, issue of *Bits & Bytes*, Zork I was an excellent adventure. However, it was the first Infocom adventure, written in the days when there weren't many adventures around. There was room for improvement.

Recently, Alpine Computing sent me a copy of Zork II for review. I had always intended to buy it myself at some stage, but there are now so many new adventures for the 64 that I've had to pick and choose. I figured Zork II would be pretty much like Zork I, so I looked elsewhere. As it turns out, however, Zork II is a substantial improvement on Zork I.

Zork I is an adventure in the traditional style. You wander from place to place, picking things up and putting them down. You do a bit of killing, digging, pushing, and the like, but over all the activities are basically simple. Zork II, however, is more realistic. Several tasks require complex sequences of actions.

COMMODORE 64

An example follows.

At one stage in Zork II, I was confronted by a door. I typed: OPEN DOOR. The door was locked. I just happened to have a key so I typed: UNLOCK DOOR. It was the wrong key. There was a window in the door so: LOOK THROUGH WINDOW. I didn't expect this to work, but I was curious to see whether the adventure's designer had catered for this. He had. I was told what was visible through the window. Among other things, there was a key in the keyhole on the other side of the door.

My first reaction to this was to assume that there must be some other way into the room, and that the door was meant to provide an exit, not an entrance. I realised that there is an obvious real-life solution to such a problem, but I doubted whether the program would recognise it. Nevertheless, I fetched a piece of newspaper and typed: PUSH NEWSPAPER UNDER DOOR. It worked! It was then a simple matter of: PUSH LETTER OPENER INTO KEYHOLE. The key fell out on the other side. PULL NEWSPAPER. TAKE KEY. UNLOCK DOOR. Voila!

This is only one example of many complex sequences in Zork II. It is moments like these when the adventure borders on reality. You feel that you can do almost anything and the computer will respond. However, this is an illusion. Everything works fine when you're on the right track. But the rest of the time you keep running into limitations. For example, there is a piece of string in Zork II which I have tried tying to many different objects. On every occasion I am told that it is impossible. This is not a complaint. All adventures have such limitations. Zork II is special because sometimes it transcends the limitations.

I recommended Zork II to all experienced adventurers. It is not necessary to start with Zork I; as far as I can see there is no link between the two

adventures. Beginning adventurers should not play either of the Zorks. They are both extremely demanding, and they offer little help for the inexperienced. Beginners should start an easy adventure and work their way up.

Zork II occupies more than 300K of machine code and, therefore, is available only on disk. The cost is \$90.

Alice in Videoland

I have just received a disk of Alice in Videoland from Viscount Electronics. It is a clever multi-stage game based on the Alice stories by Lewis Carroll.

The game begins with Alice following a rabbit, which disappears down a hole in the ground. Alice jumps into the hole and begins falling. As she falls, various objects drift by, and your task is to steer Alice with the joystick so she can collect them. First she needs to catch a basket to store the objects in. You have to steer Alice very carefully because if she strikes one of the many lamps protruding from the wall, she drops everything.

When Alice finally lands on the floor, she uses the objects in her basket. She can eat a piece of cake to make herself larger. She can drink from a bottle to make herself smaller. She can use coloured keys to open the appropriate doors. Your task is to guide Alice through as many doors as possible.

Eventually Alice moves on to the next stage: the Cheshire Cat and the Caterpillar. Here, Alice jumps around trying to catch bread-and-butterflies and rocking-horse flies. If she touches one of the Caterpillar's smoke rings, she shrinks and loses her ability to jump. She then has to eat a mushroom to regain her normal size.

When Alice has eaten all the mushrooms, she moves to the next stage, where she finds herself on a chessboard. Your task is to move Alice to the top of the chessboard. You also

have control of two white knights, which can be used to help her. Opposing Alice are Tweedledum, Tweedledee, and the Black Queen.

When the chess game is finished, the last stage begins. Alice plays croquet with the Queen of Hearts. You guide Alice around the screen hitting the balls with her flamingo. If the queen gets to a ball first, she bashes it out of play. When all the balls are gone, the game is over.

The best part of Alice in Videoland is the lush graphics and sound. The scenes look like they're out of a child's picture book, and the music is bright and lively. Over all, the presentation is excellent.

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COMMODORE 64

program. However, the instructions for some of the stages are rather complicated, and young children may not cope very well on their own. The program would have been much more suitable for young children if some of the games had been slowed down and simplified.

Teenagers and adults will appreciate many aspects of the game, but I doubt whether they'll find it compelling entertainment. Despite what it says on the box, Alice in Videoland is definitely not an arcade action game. Rather, it is a pleasant collection of minor games, joined together with good graphics and good music.

Competition

The winner of June's competition was Ian McDonald, of Tokoroa. Ian has been sent a copy of Galaxy (donated by Alpine Computing).

A surprising number of June's entries had to be rejected because the New Zealand flags just didn't look right. In particular, many people had trouble displaying red on a blue background. Therefore, I am including a listing of Ian's program.

The prize for this month's competition is a disk of Alice in Videoland (donated by Viscount Electronics). Entries close on August 25. The winner will be selected randomly from among the correct entries. Only one entry per

person.

Your task this month is to make Ian's flag twice as long and twice as wide, using only three POKE commands. Send the three POKEs with your name and address to Alice Contest, P.O. Box 201, Alexandra.

```

100 REM *****
110 REM *
120 REM * NEW ZEALAND FLAG *
130 REM *
140 REM * BY IAN MCDONALD *
150 REM *
160 REM *****
170 PRINT"<clr>"
180 POKE 53281,0:POKE 53280,0
182 REM
190 REM ** SPRITE 1 **
192 REM
200 FOR AD=832 TO 832+63
210 READ DA:POKE AD,DA:NEXT
220 DATA111,150,249,155,150,230
230 DATA230,150,155,249,150,111
240 DATA170,150,170,85,85,85
250 DATA85,85,85,85,85,170
260 DATA150,170,249,150,111,230
270 DATA150,155,155,150,230,111
280 DATA150,249,191,255,254,255
290 DATA255,255,255,255,255,255
300 DATA255,255,255,255,255,255
310 DATA255,255,255,255
320 DATA255,255,255,255,0
322 REM
330 REM ** SPRITE 2 **
332 REM
340 FOR AD=896 TO 896+63

```

```

350 READ DA:POKE AD,DA:NEXT
360 DATA255,255,255,255,251,255
370 DATA255,230,255,255,149,191
380 DATA255,230,255,255,251,191
390 DATA255,254,111,254,249,91
400 DATA249,190,111,229,111,191
410 DATA249,191,255,254,255,255
420 DATA255,255,255,255,255,255
430 DATA255,255,255,255,251,255
440 DATA255,230,255,255,149
450 DATA191,255,230,255,255
460 DATA251,255,255,255,255,0
470 VC=53248
480 POKE 2040,13:POKE 2041,14
490 POKE VC+21,3:POKE VC+28,3
500 POKE VC+39,1:POKE VC+40,1
510 POKE VC+37,2:POKE VC+38,6
520 PRINT"<wht>";
530 PRINT"OUR NEW ZEALAND FLAG
540 PRINT"<b1k>":POKE VC,100
550 POKE VC+1,100:POKE VC+2,124
560 POKE VC+3,100:POKE VC+16,0

```

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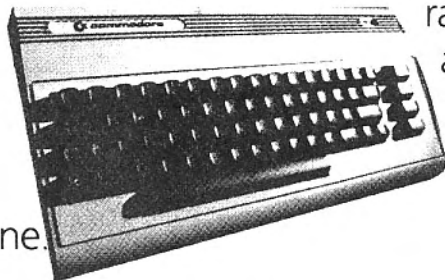
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Bad subscript errors and arrays

By Tony Graham

Commodore's VIC and C64 user-manual definition of a BAD SUBSCRIPT error is: The program was trying to reference an element of an array whose number is outside the range specified in the DIM statement.

For a relative newcomer to programming that is not a lot of help, apart from suggesting that subscripts are somehow linked to arrays.

Arrays are lists of variables. They allow us to store information in the form of a table. How long the list or table is becomes the DIMension of the array. The position in the table is the subscript number, and each position is known as an element.

As actions speak louder than words switch on your computer and enter PRINT A(1). Your computer will print 0. Try again with any number from 0 to 10 within the parentheses, each time the answer will be 0.

Now try PRINT A(11). The result this time will be a BAD SUBSCRIPT error. Why? You are looking for something that does not exist. Your Commodore computer allows subscripts of up to only 10 without the array's having been first DIMensioned.

Enter DIM A(25) into your computer and again try PRINT A(11). This time the answer will be 0, as will any subscript up

to 25. Above 25 the BAD SUBSCRIPT error will re-occur.

At present, PRINTing the contents of any element will always be 0, although we have created an array we have not as yet given it anything to store.

Try this short program, which creates an array and fills it with a number equivalent to its position in the array.

```
10 DIM A(25)
20 FOR X = 0 TO 25
30 A(X) = X
40 NEXT
```

After running the program entering PRINT A(5) will equal 5, PRINT A(12) will equal 12, etc.

The point to note here is we filled the array by using A(X), but are reading the array by replacing X with a numeric value.

It is also perfectly valid to read the contents of the array with a different subscript variable than the one used to fill the array.

Try PRINT A(N). The answer will be 0 because at the moment N = 0. Enter N = 15 and then PRINT A(N). The answer will now be 15, as we will be reading A(15).

In case you are beginning to think that element 15 always contains the value 15 we will try another test.

Enter A(N) = 99, now PRINT A(15). The answer now will be 99 because when we entered A(N) = 99, N was 15.

Experiment with a simple array until you fully understand what is happening, or you will never master the complex situations in which arrays are used.

So far, we have looked only at numeric arrays, but string arrays are also possible and are created and accessed in exactly the same manner.

Type NEW to clear the memory. Here is another program to experiment with:

```
10 A$(0) = "ZERO"
15 A$(1) = "ONE"
20 A$(2) = "TWO"
25 A$(3) = "THREE"
30 A$(4) = "FOUR"
40 FOR K = 0 TO 4
50 PRINT A$(K)
60 NEXT K
```

This program uses direct numeric values as subscripts to store information in the array, and then prints them out using the variable K, in a loop.

The array has not been DIMensioned as we are not exceeding A\$(10). Try PRINT A\$(N) as we did with the numeric array.

Note that there is a zero element in any array although it is frequently not used.

So far we have only experimented with one-dimension arrays. Multi-dimension arrays are possible but are best left alone until the single-dimension variety has been mastered. Another point with a multi-dimension array is it requires more memory than a number of "one dimension" arrays doing the same job.

Check the memory usage of each type by entering DIM A(25) followed by PRINT FRE(0). Now enter NEW followed by DIM B (25, 2) and again PRINT FRE(0). You will see the "two dimension" array uses much more than twice the memory the DIM A(25) array used.

Try DIMensioning larger arrays and see how fast you run out of memory.

ATTENTION ALL AGENTS AND DISTRIBUTORS

Preparations have begun for the annual round-up of microcomputers in *Bits & Bytes*. This year the round-up will be printed over three issues:

1. Machines up to \$2000 November issue
2. Machines \$2000 to \$7000 December/Jan issue
3. Machines \$7000 to \$14,000 February issue

We need your help with material. We do our best to include ALL information, but the onus is on you to ensure we have it. All general information should be sent to the compiler by September 1:

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Changes received after this date cannot be guaranteed inclusion. Remember, we're relying on you to get your information to us. It's no use complaining after the round-up that your information hasn't been printed. Get it in now!

We also welcome regular, routine news on new products, price changes, etc: Put both of the following on your Mailing List:

The Editor
Bits & Bytes
Box 827
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A Mouse for the II family

By Alex and Fred Wong

At last, a mouse in the house!

The Mouse II, just released on the market, kindly lent to us by CED Distributors, is Apple's latest technology (as espoused by the Lisa and Macintosh) translated for the II e, II plus, and II family of computers.

It is a hand-held device that works on any convenient table top in conjunction with the right software (such as Mouse Paint, supplied with the package) to provide amazingly fast and accurate cursor control, on-screen pointer, menu selection, and command input functions.

Fred won the toss so he set it up while I sat uneasily on the sidelines.

The packaging is in the excellent Apple style with the Mouse itself ensconced in moulded foam rubber while the interface card, Mouse Paint disk, and manual, in their various protective enclosures, sit on top of it in a corrugated cardboard box affair.

The opening pages of the user's manual provide detailed instructions for installation, which proves to be very easy for any grown-up. The interface card plugs into slot 4 preferably, and its connector is clamped on to the back of the Apple case, where it provides a strong anchor for the 4ft long mouse cable's mini 'D'-type plug, which is secured by two thumb screws.

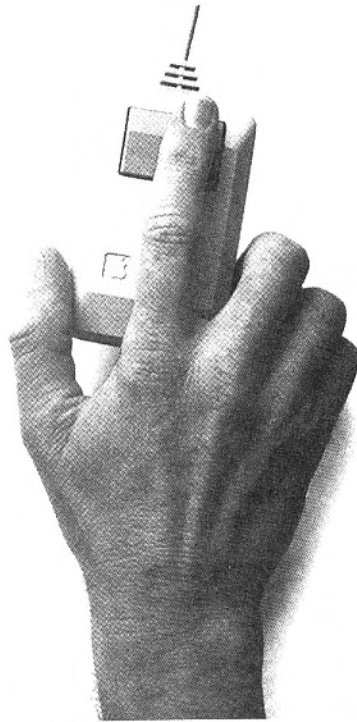
The Mouse itself comes in sturdy cream plastic with the large, single, highly positive and responsive button on top in dark fawn colour. The ball in the Mouse's tummy that provides the basis of its control is solid rubber and very durable. It's easy to clean, too.

Fred was all set to boot Mouse Paint, Apple's graphics creation program written by the assembly-language whiz, Bill Budge, and strongly based on Bill Atkinson's MacPaint.

As soon as it was booted, I knew we should have got two mice — one for each Apple.

Mouse Paint which is ProDOS based (problematic for compatibles!) presents a choice of either a short but effective tutorial on Mouse usage — icons, pull-down menus, and cursor control or goes straight on to the sketch-pad. Fred's artistic impulses ran wild and the program, if not the results, were very impressive.

To say that Mouse Paint is a picture processor (as opposed to a word processor) would be accurate. The Mouse operates the pull-down menus, the drawing tools, pre-defined shapes, pattern and line widths selectors by itself, and the keyboard is left far behind.



Apple Mouse II

With a slight roll of the Mouse it is possible to use a pencil, paint brush (there are many different sizes), spray gun or rule a straight line, not to mention set down any kind of shape, whether solid with a pattern or colour of your selection or just the outline.

Aside from all this, there is an editing box, the placement, size and shape of which is Mouse controllable, allowing the contents of the box to be deleted, inverted, flipped horizontally or vertically, cut and pasted or brought to another part of the picture. In addition, a miniature image of the entire picture (which is larger than the screen) may be displayed or a greatly enlarged portion of the picture may be produced, providing much greater detail working of it.

The picture may be saved to or loaded from disk and a hard copy may be produced by an Apple dot-matrix, Imagewriter or any printer that is capable of doing graphic dumps.

16-bit 6502?

A report in the *Apple Orchard* magazine, announces Hayden Software's new product for all computers that currently use the 8-bit 6502 CPU, for example the Apple II, Commodore, and Atari.

The product — the 65816 — is a 16-bit chip that is totally hardware and software compatible with the 6502. It can replace the 6502 in an existing system simply by removing the 6502 from its socket and plugging in the 65816. It contains the object code of the 6502 as a subset and in emulation mode acts exactly the same. In the 16-bit mode, it eliminates the limitations which had rendered the 6502 unsuitable for

There is no time lag between the Mouse and the on-screen pointer, and all commands have a good response time. All of which contributes to the Mouse Paint program's being the most impressive graphics creation system we have seen on the Apple II, and the very few faults are minor or downright insignificant.

Although it is easy to program the BASIC Mouse, the icons and pull-down menus associated with professional Mouse activity could get a bit tricky. Serious attempts at programming should be done in assembly language, and this is really for dedicated or professional programmers.

Programs and instructions are provided in Appendix A of the user's manual to incorporate the Mouse into BASIC programs and Appendix B describes the assembly routines that are included in the firmware on the Mouse II interface card.

However, independent software manufacturers are being encouraged to develop applications that take advantage of the Mouse. Most future Apple software, whether from Apple or an independent source, will work with the Mouse as well: for example, a new character generator ROM which will facilitate the development of Macintosh-like programs and the Desktop Toolkit, which will let users create pull-down menus and icons. The Desktop software will handle all Mouse interfacing to give machine-language speed and efficiency.

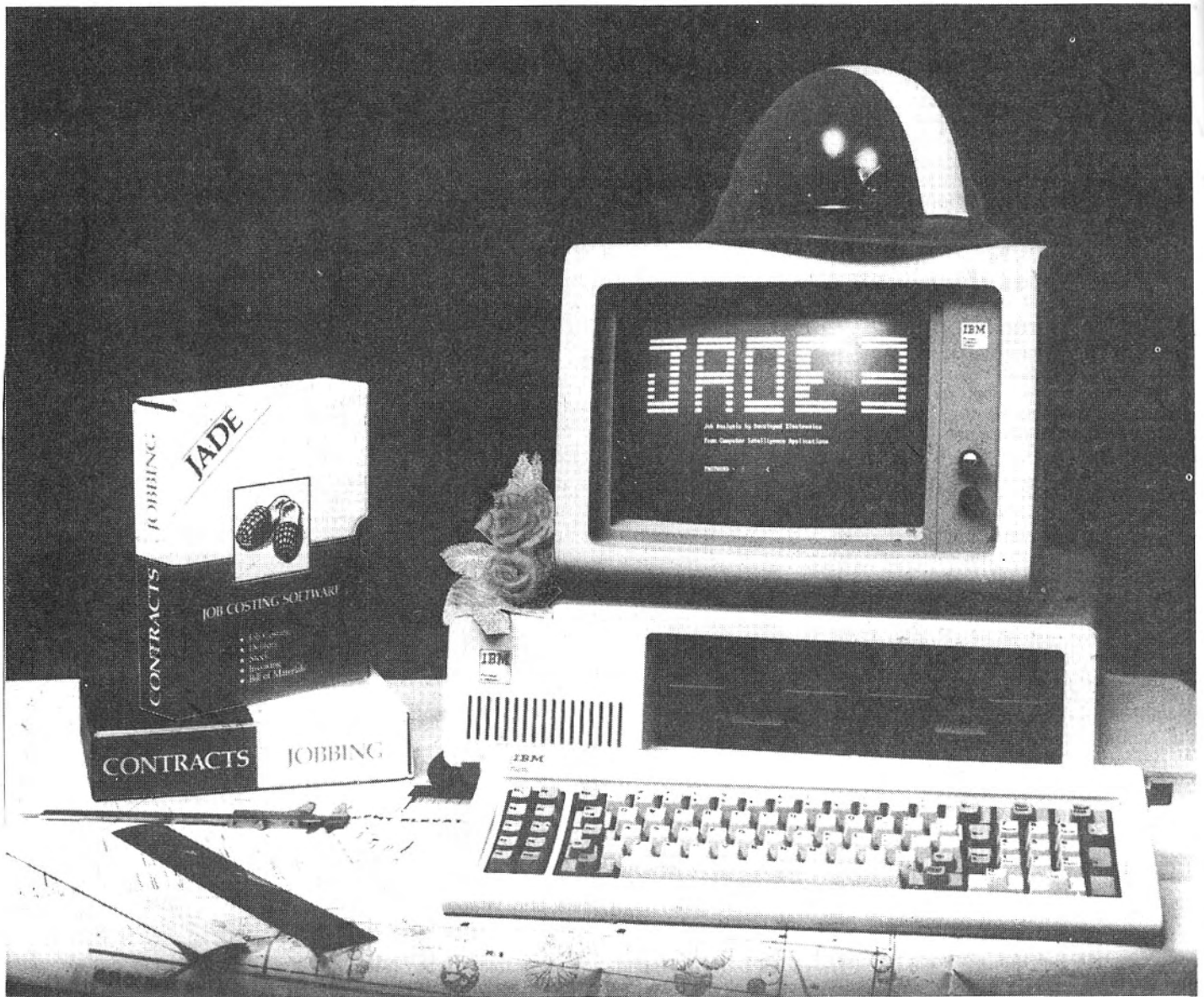
Half of the user's manual deals with the Mouse and the other half with Mouse Paint. There are relatively few instructions but as these products are so user friendly, few are needed. Everything is laid out and written in a clear and concise manner although there is a separate list of changes to the manual to cope with.

Summary: Your Apple will still work without a Mouse II, (although it might not think so) but the full potential of the Apple II won't be tapped without this revolutionary product and appropriate software and what it takes up in table space will be more than made up for with all the advantages that it offers. This product comes highly recommended, even at the price of \$429.

many applications and is a legitimate threat to rival currently available 16-bit chips such as the 8086/8088.

It should be released, with many 65816 software system packages, in the latter part of this year. Contact: Hayden Software Company, 600 Suffolk St. Lowell, MA 01853, USA.

Internally, on my machine, the BASIC level 111A and level 111B cartridges contain 2 * 27128 EPROMs containing the BASIC interpreter and either two (level 111A) or four (level 111B) 16K by 4-bit RAM chips. These RAM chips are type 4416. It may be possible to upgrade your level 111A cartridge to level 111B by the installation of the two additional 4416 chips. Later machines contain two 16K, 8-bit ROM IC's.



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Econet network in action

By Pip Forer

In June, we looked at the general outline of Econet and in July we reviewed the 6502 second processor. This month we see what happens when the two meet in the form of a level II Econet file server.

This should be of interest to schools thinking of upgrading their network, but has wider interest to BBC users interested in machine communication or the likely form of future Acorn disk-operating systems. Apple has upgraded its faithful DOS 3.3 operating system to an enhanced product, PRO-DOS. When Acorn does the same to its inelegant but fast DOS the Econet file server may act as a model.

The file server on Econet II consists of a dedicated BBC microcomputer with a second processor and one or two disk drives. To turn this from a normal two-processor machine into a file server requires booting a program on the normal DOS that alters the entire character of the machine.

For a start, it treats disks differently. While still identically formatted as 80-track disks, the disks for the file server do not distinguish between separate disk sides but manage the entire disk as one storage area. Further more the information on files is stored differently. In place of the limit of 31 files with eight-letter names of normal DOS the network disks can hold considerably more files with what are effectively almost indefinite name length. Out, too, goes the rigid use of space on the disk and the need to compress disks every so often with *COMPACT. The Econet server reserves, frees, and allocates space in a much more flexible way.

The most notable thing for the user is the fact that Econet II offers a complete, hierarchical file structure. It also has a

security system for determining who can even get to use the disk. To access the file server the user must log in at a remote machine with the command *I AM ZOG (or JUAN, or PETER, or whatever you have as a user name). The user is then put into a directory. A directory is a working area of the disk containing one or more files, and maybe other directories. As a management tool for the disk this is an excellent arrangement since similar files (say programs) can be held in dedicated directories.

Since any directory can have a 10-letter name, and any file the same, it becomes possible to provide memorable and meaningful names for all the files on a disk. With lots of users sharing a disk, as happens on a network, directories provide private work spaces on the disk for specific users. In fact if ZOG (or JUAN or PETER) had a directory on the disk the file server would drop them into it as soon as they logged on.

The file server does two jobs. One is simply handling the disk and its files. Here it is acting like an enhanced DOS. However, it also has to act as intermediary in sharing the disk between several users. It does this by allocating caches of its memory for buffers for each user on the network. If someone opens a file or loads a program the file server notes whom the user is, opens the file and loads part of it into that particular user's buffer area in its own RAM. It is constantly scanning to see who sends file requests and administering the buffers accordingly.

GEOGRAPHERS TEST NETWORK OF 8

One advantage of the buffers is that disk access is reduced since frequently accessed parts of files will still be in the server's buffers. Since memory access to a buffer is much faster than disk access this can speed up the entire operation severalfold. The file server also controls who is reading or writing to a file at any time. Any number of people can read from a file simultaneously, but only one (naturally enough) is allowed to write to it and update it at once.

The main problem with networks is usually that their performance degrades under heavy use as too many people compete for disk and network wire facilities. How does Econet stand up to a laboratory test? Over the last month we have tested an eight-station network fairly rigorously at the Geography Department at the University of Canterbury. In general, we have found the following to be true. With eight stations we have experienced fast access and no degradation with tasks requiring low-intensity of disk use. A class loading a simulation or spreadsheet program from disk and occasionally accessing a file of data works well with each user hardly knowing that the network is there. A programming class or people running independent simulations has this sort of work-pattern which would also be typical of current school use.

The worst possible case occurs when everyone wants to use the network file server at once. Access to sequential data files is currently handled rather slowly, and if eight stations are all suddenly wanting to read a data file with, say, a quiz exercise in it as lines of text, the wait can be more appreciable. This seems to be a function of the file server's routines for handling sequential strings and is likely to improve with system updates.

However, a solution is at hand right now in terms of the machine routines available through Econet. One of these allows block transfers of memory from within disk files. When our quizzing authoring program was rewritten using this technique the disk loading time for a single user was cut dramatically to a state where the eight network users were getting faster service than a stand-alone disk user would get.

This is significant, because it points to the power of the advanced Econet commands. As we noted before, the fundamental software unit of the Econet system revolves around memory movement techniques using transmit and receive blocks in particular machines along with some very useful filing system operating calls. Most of these are available to any programmer and work through OS calls independent of BASIC.

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The Econet Advanced Users Guide details these very well. In general the user establishes a small control block in memory which points to another, larger block that is to be sent or is to be the area for receiving information. Depending on the particular contents of the control block and the routine called different effects may occur, including the wholesale 'theft' of an area of someone's RAM or the imposition of your RAM on someone else. In practice the level II routines are very powerful, easy for a programmer to use and very fast. They should prove the foundation for some exciting interactive class exercises when software gets developed further.

In general, Econet II in the flesh is a well-pitched educational network with a lot of potential. If its filing system capabilities are a pointer to the next Acorn DOS it would be a significant advance. There are some outstanding queries such as the arrangements for printer sharing and sequential file access speeds.

Just what is happening in these areas will be reported back on. Meanwhile, next month we look at data structures in RAM and the use of indirection operators, all of which is not quite as bad as it sounds.

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Mastermind

The object of this 16K ZX81 adaption of the peg board game known as "Mastermind" is to solve the hidden combination of four different digits that will be picked up by computer. It has been sent in by Michael Higham, aged 13, of Christchurch. After each guess the computer will tell you how close you are to the correct code. There are four skill levels and as there are 840 possible combinations on level 4 you will need a lot of luck.

A picture of the board is shown and instructions for playing are included in the program. If you are unable to find the code after six guesses then the game is over and you have lost.

The program:
 90-178: Prints board and instructions.
 186-270: Routine for entering guesses.
 350-439: Analysing of inputs.
 455-570: Winning of game.
 1000-1090: Skill level and combination preparing.
 2000-2060: End if you fail.

Note: The poke in line 80 makes the bottom two lines on the screen available for printing on.

```

10 REM MASTERMIND BY M.HIGHAM
40 RAND
50 LET B$=""
50 GOSUB 1000
80 POKE 16418,0
90 PRINT
100 FOR A=1 TO 5
    
```

```

110 PRINT "      [ ][ ][ ][ ]"
120 PRINT "      [ ][ ][ ][ ]"
130 PRINT "      [ ][ ][ ][ ]"
140 IF A<6 THEN PRINT
150 NEXT A
160 PRINT AT 0,4;"MASTERMIND"
170 LET C=1
171 PRINT AT 2,17;"SKILL LEVEL="
";J-3;AT 4,17;"TURN=";C
175 PRINT AT 5,17;"NUMBERS USAB
LE";TAB 20;"1 TO";J
176 PRINT AT 9,17;"Z:CURSOR LEF
T";AT 11,17;"X:CURSOR RIGHT"
178 PRINT AT 13,17;"TYPE WANTED"
";TAB 22;"NUMBER";TAB 17;"PRESS
NEW-LINE";TAB 17;"WHEN READY"
180 DIM A$(4)
181 LET CC=1
182 IF C=2 THEN PRINT AT 19,16;
";CORRECT NUMBER";TAB 16;"CORRE
CT POSITION";AT 22,16;"CORRECT
NUMBER";TAB 18;"WRONG POSITION"
186 PRINT AT 26-C*4,CC*3+1;A$(C)
190 LET I$=INKEY$
195 IF I$="X" THEN LET CC=CC+1
196 IF I$="Z" THEN LET CC=CC-1
215 IF CC=5 THEN LET CC=1
220 IF CC=0 THEN LET CC=4
225 IF INKEY$=CHR$(118 AND A$>")
1233 THEN GOTO 350
230 PRINT AT 26-C*4,CC*3+1;CHR$(
CODE A$(CC)+128)
240 IF I$<"1" OR I$>STR$ J THEN
GOTO 182
245 PRINT AT 26-C*4,CC*3+1;I$
250 LET A$(CC)=I$
270 GOTO 182
350 PRINT AT 10,16;"
360 LET Z$=""
370 FOR X=1 TO 4
380 IF A$(X)=B$(X) THEN LET Z$=
Z$+"[ ]"
400 NEXT X
401 IF B$(1)=A$(2) OR B$(1)=A$(
3) OR B$(1)=A$(4) THEN LET Z$=Z$
+"+"
402 IF B$(2)=A$(1) OR B$(2)=A$(
3) OR B$(2)=A$(4) THEN LET Z$=Z$
+"+"
403 IF B$(3)=A$(1) OR B$(3)=A$(
2) OR B$(3)=A$(4) THEN LET Z$=Z$
+"+"
404 IF B$(4)=A$(1) OR B$(4)=A$(
2) OR B$(4)=A$(3) THEN LET Z$=Z$
+"+"
426 IF LEN Z$<3 THEN PRINT AT 2
6-C*4,0;Z$
430 IF LEN Z$>2 THEN PRINT AT 2
6-C*4,0;Z$(TO 2);TAB 0;Z$(3);
435 IF LEN Z$>3 THEN PRINT Z$(4
)
    
```



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```

440 LET C=C+1
441 IF A$=B$ THEN GOTO 455
442 IF C=7 THEN GOTO 2000
445 PRINT AT 4,17;"TURN=";C
450 IF A$<>B$ THEN GOTO 100
455 FOR Z=1 TO 50
460 FAST
475 SLOW
479 NEXT Z
480 CLS
490 PRINT AT 0,10;"MASTERMIND";
TAB 10;
495 PRINT AT 3,0;"CONGRATULATIO
N";
500 PRINT AT 5,0;"YOU TOOK ";C-
1;" TURN";
505 IF C>2 THEN PRINT "S"
510 PRINT AT 7,0;"AT SKILL LEVE
L ";J-3
520 PRINT AT 9,0;"THE COMBINATI
ON WAS ";B$
530 IF J-3<4 THEN PRINT AT 11,0
;"NOW TRY A HARDER SKILL LEVEL."
540 PRINT "PRESS A KEY TO PLA
Y AGAIN"
550 IF INKEY$<>" " THEN RUN
570 GOTO 560
1000 CLS
1005 PRINT AT 0,9;"MASTERMIND";T
AB 9;
1010 PRINT AT 10,6;"SKILL LEVEL
";J-4;
1020 LET J$=INKEY$
1030 IF J$<"1" OR J$>"4" THEN GO
TO 1020
1035 PRINT AT 10,6;" LEVEL ";J$;
"SELECTED ";AT 12,9;"PLEASE WA
IT";
1040 LET J=VAL J$+3
1050 FOR B=1 TO 4
1055 LET B$(B)=STR$(INT (RND*J)
+1)
1061 IF B>1 THEN FOR F=1 TO B-1
1062 IF B>1 THEN IF B$(B)=B$(F)
THEN GOTO 1050
1065 IF B>1 THEN NEXT F
1070 NEXT B
1080 CLS
1090 RETURN
2000 FOR A=1 TO 23
2002 PRINT AT A,16;

```

```

2000 NEXT A
2001 PRINT AT 3,16;"YOU HAVE FRI
ED";
2020 PRINT AT 5,16;"THE COMBINAT
ION";
TAB 16;
2030 PRINT AT 20,17;"PRESS A KEY
";AT 22,17;"TO PLAY AGAIN"
2040 PRINT AT 20,17;"PRESS A KEY
";AT 22,17;"TO PLAY AGAIN"
2050 IF INKEY$="" THEN GOTO 2020
2055 RUN

```

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Ladybird Computer Series...



By Michael Fletcher

Donkey Kong is one of the new range of Atari games that have just entered the New Zealand market. These programs are mostly arcade transformations and are almost always supplied on cartridges.

Donkey Kong is an arcade replica. When I plugged the Donkey Kong cartridge into my Atari 400 I was very surprised to see the excellent graphics that made Donkey Kong such a hit in the arcades so well portrayed on my humble Atari computer. The graphics for the legendary Mario is an arcade clone, the girlfriend is as beautiful as ever, but the evil Kong looked like he had been on a F plan diet: for some reason this now notorious ape looked a lot thinner than he did in the arcade.

The game play for Donkey Kong is simple: a gigantic ape has captured your girlfriend and taken her to a building site to hold her captive. You are Mario (a heroic Italian) and it is your job to kill the ape and rescue the girl. This is by no means an easy task. The mighty Kong will throw everything from flaming oil barrels to rivet springs to stop you from taking his prized possession.

There is an added bonus in Donkey Kong for the Atari: a new level has been

ATARI

Boyfriend versus dieting ape

added making four levels instead of three. The new level is one of the hardest in the game. It consists of two conveyer belts with pies and flaming barrels running along them. The object of this level is to travel along the conveyer belts to a series of ladders, climb the ladders, and then rescue your girlfriend at the top of the screen.

The other three levels in Donkey Kong are taken straight from the arcade — these are the three famous stages: each has a separate special name. They are — the Barrel stage, the elevator screen, and the rivet stage. These separate screens are all very similar to the arcade original and come within the Atari promise of the closest arcade transformation possible.

One of my gripes about Atari Donkey Kong is that after completing the first two levels on the easiest stage the game always returns to the first screen (the barrel stage). This is annoying as the barrel stage is a very easy screen to lose a life.

The sound for Donkey Kong is quite impressive. It really shows off how 16 octaves can affect the theme of a cute game. Donkey Kong really has a very catchy tune that plays throughout the entire game. This music enhances the over all theme of Donkey Kong by adding to the melodrama.

Donkey Kong is supplied on an easy-to-use 16K cartridge. This format unfortunately adds a considerable chunk to the price, which is \$89.95. But this program is really one of the best from Atari.

Word processor

The Atari Writer is a new word processor for the range of Atari home computers. It is simple to use and yet it is just as easily suited for use in a business situation as it is for home use.

One of the good points of the Atari Writer is that it is supplied on an easy to Turn to page 76

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POLY

Polys in action at Rotorua

By Derek Williams and Linda Slater-Hayes, of Rotorua Boys' High School.

Over the last couple of years, we at Rotorua Boys' High and three other schools in the district under the same board have participated in phase two of a great experiment: the birth of a New Zealand computer for education.

At the beginning of 1981, a three-member committee was established by the Rotorua High Schools Board to investigate computerised systems as both teaching and administrative aids.

The committee had at its disposal a generous gift from the Ngati Whakaue people which enabled it to consider two inter-dependent systems: a centrally located mainframe linked to networks of 10 linked microprocessors in each of the four schools.

All members of the committee had extensive and diverse experience with computers. Each school also volunteered one staff member familiar with computers to provide specifications relating to how their colleagues thought such equipment could be best used in their school.

The criteria arrived at for the system included:

1. To provide an advanced teaching aid for the classroom.
2. To enable school administration systems to be set up.
3. To allow the board office to update and maintain its financial and accounting procedures.
4. Ability of the microprocessors in the four schools to interface with a central mainframe administrative system in the board office.

Educational criteria included:

1. Good computer programs to provide a high level of computer-aided learning (C.A.L.).
2. Maximum ease of use by students.
3. Ability for teachers to control the presentation.
4. Instructional material to have maximum impact - e.g. colour.
5. More advanced students to be able to write programs so that they could embark on exploratory learning.

Twenty-two companies were invited to tender. Of these, 12 tenders and six proposals were received. Only two companies, Prime and Polycorp, were at that time able to demonstrate either the ability to satisfy these criteria, or the willingness to do so. Subsequent developments have amply justified the decision to accept these two proposals. In this article we shall confine ourselves to the educational experience with the Poly, leaving our administrative

computing experience with Prime for another article.

Not only did we receive tremendous support from Polycorp during the implementation period, but we have since had two vast improvements in the operating system with many advanced features, all under the umbrella of the original deal. Highly significant advances are at present in preparation.

At the beginning of term one, 1982, we received a temporary allocation of four Polycorp microprocessors. We waited impatiently for our entitlement from the 41 ordered altogether and in mid-March the system arrived. This consisted of 10 "Polys", two disk drives, an Epson MX100 printer, and of course, the "floppy disks". These were either for programming (e.g. for our seventh-form applied maths course and for clubs) or contained Poly courseware in computer awareness, science, geography, farming and typing - to get C.A.L. under way.

COMPUTER CLUB RUSHED

We were also in a position to start the Computer Club. The response was so great that we limited membership initially to boys of the fifth, sixth, and seventh forms and started five separate clubs, one for each lunchtime. Membership was also limited to those boys who wanted to learn programming. The many who just wanted to play computer games provided on Poly's Games disk had to miss out. Needless to say, pupils' early programming efforts were often in writing their own games, some so sophisticated as to merit addition to the games menu.

The staff in charge of each club taught the pupils the elements of programming in POLYBASIC (a very powerful form of the BASIC programming language) and the boys soon learned their way around the keyboard and system. Several of the seventh formers became so competent that we allowed them to open up the computer room themselves and so initiate regular before and after school sessions, in addition to the lunchtime clubs.

As with all interests, it was soon obvious which pupils were becoming competent programmers and some of our members drifted off. Their places were soon taken up by several of the younger boys who had nagged so continuously throughout the year to be allowed to join the club.

In 1983, the club continued to grow and in fact became self-perpetuating as the more experienced pupils taught the younger ones. The computer awareness course expanded and developed into a really meaningful addition to the curriculum and the staff, even those with no computer experience, began, at first hesitantly, to bring their classes along for C.A.L.

As 1984 progresses we notice several staff showing interest in Poly's authoring languages. Polytas is a particularly



A Poly in use at Rotorua Boys' High

popular aid in writing class tests. It allows the teacher options of tutorial pages, multichoice, true/false, matching, and completion questions.

MESSAGES IN THE NETWORK

The Poly offers Omegasoft Pascal and PolyBASIC programming languages, and 6809 Assembly Language. 6809 routines can be embedded either directly or in one or more strings in any of the high level languages offered. Authoring languages include Pilot, Pro-Forma, Polytas, Polygen, and the 6809 Text Processor. The Poly operating system is compatible with the Proteus recently introduced by Progeni.

Other features include the ability to send messages from one Poly to another in the network or broadcast one program to the entire chain. Each Poly can operate in stand-alone mode or as an independent unit linked to the system or the mainframe. It is possible, without any rewiring or rearrangement to have for example, some pupils in standalone mode, others in programming mode (i.e. reading from and writing to disk), and still others doing prepared courseware selected from a menu program which automatically loads with the system.

The text editor is organised so that left-right up-down cursor movement can be controlled without the need to resort to escape keys. No matter where along a line of up to 255 characters the cursor may be, the entire line is read. Nor does

cursor movement wipe out any characters displayed. Line and character insert and delete keys make editing a dream. All the other function keys are given meaningful names such as "HELP", "CALC", "NEXT", "BACK", "REPEAT", "PAUSE", "EXIT" and "ENTER" (carriage return). Both upper and lower-case characters are recognised for all reserved words and DOS commands, and are available simultaneously on any text screen. The numeric keypad can be programmed or used as a calculator during the execution of a program. DOS utilities can be executed from within a program without leaving program control.

Five superimposed text and graphics screens can be independently or simultaneously displayed, split and/or scrolled with over sixty variations of the basic eight colours. Seven half-intensity backgrounds are also supplied. Meaningful graphics commands like "DRAW", "FILL", etc, make it very easy for anyone to produce animated pretty pictures and even sophisticated revolving geometrical displays.

Whole or partial text and graphics screens can be saved from any Poly in the network straight on to or loaded from any one of a gang of up to four chained 8in disk drives (or the multi-megabyte mainframe) and/or sent to the printer with one simple command. Any serial, random, graph, or graphics data file can be read simultaneously by all Polys in the chain and random data files can be open on 12 channels for both read and write on any number of Polys.

Although we bought the Polys for educational use, utilities are available for a host of administrative tasks such as printing class attendance registers, timetables, reports, and so on. Maths, English and other languages, music, technical drawing, economics, accounting, history, and many others have since been added to the increasingly abundant courseware provided. We are nearing completion of a teachers' program writer which enables any person to write a program with absolutely no programming language! Also to come is a student learning centre - but more of this in a future article.

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Getting the act together

By Alex and Barbara Bridger

In 1983 there was a proliferation of computers in the under-\$1000 range. The Spectravideo 318 stood out among these with a very favourable price — performance ratio and a number of interesting features. *Bits & Bytes* published an extensive review of this machine in the December, 1983, issue but it is probably worth while to repeat the following key facts.

The Spectravideo 318 uses a Z80A microprocessor for the CPU, which runs at a clock speed of 3.6MHz. It has a 32K Super Extended Microsoft BASIC resident in ROM and 32K programmable RAM, of which 16K is set aside for display information — the VRAM. It is also expandable up to a machine useful in a small business with disk drives, CP/M compatibility, parallel interface (for a printer), and serial interface for modems or networks.

Spectravideo seemed to keep a rather low profile after receiving good reviews when it was first released but that is now changing as users get to grips with their machines. The June issue of *Bits & Bytes* saw the first Spectravideo program printed and there will be more in future issues. Computer Distributors, Ltd, in Auckland, has held a competition for software and a user group has been formed in Wellington. (Anyone interested in joining should send \$10 to the secretary, Don Stanley, c/o Epidemiology Unit, Wellington Hospital. Meetings are held monthly and the first newsletter has been produced which has a number of tips and tricks.)

The Spectravideo 318 sports a distinctive looking built-in joystick and its suitability as a games computer is enhanced with the commands available to form and manipulate sprites and to use input from joystick movements. It is possible to write reasonable games without resorting to machine language. The joystick is also quite convenient for program editing.

However, the documentation could be improved. There is no index to the user's manual, there is insufficient explanation of some functions, and no mention of others. And there are inaccuracies. The short program to demonstrate sprite movement and trigger input is incomplete and has errors. A correct version follows:

```

10 COLOR 15,1,12
20 SCREEN 1,2
30 REM This part reads in the
  e sprites
40 FOR T=1 TO 8
50 READ A$
60 S$=S$+CHR$(VAL("&b"+A$))
70 NEXT T
80 SPRITE$(1)=S$
90 FOR T=1 TO 8
100 READ B$
110 U$=U$+CHR$(VAL("&b"+B$))
120 NEXT T
130 SPRITE$(2)=U$
140 REM This sets the initial
  conditions of the sprite.
150 X=128:Y=96
152 STRIG(0)ON
155 PUT SPRITE 1,(X,Y),9,1
160 D=STICK(0)
170 F=STRIG(0)
180 REM this section makes the
  sprite move.
185 IF F<>0 THEN GOSUB 460
200 IF D=1 THEN X=X:Y=Y-1
210 IF D=2 THEN X=X+1:Y=Y-1
220 IF D=3 THEN X=X+1:Y=Y
230 IF D=4 THEN X=X+1:Y=Y+1
240 IF D=5 THEN X=X:Y=Y+1
250 IF D=6 THEN X=X-1:Y=Y+1
260 IF D=7 THEN X=X-1:Y=Y
270 IF D=8 THEN X=X-1:Y=Y-1
275 PUT SPRITE1,(X,Y),9,1
280 GOTO 160
300 DATA 00011000
310 DATA 00011000
320 DATA 00011000
330 DATA 00011000
340 DATA 00011000
350 DATA 00111100
360 DATA 00111100
370 DATA 01111110
380 DATA 00010000
390 DATA 00010000
400 DATA 00101000
410 DATA 00101000
420 DATA 00111000
430 DATA 00000000
440 DATA 00000000
450 DATA 00000000
460 FOR I=Y-3 TO -20 STEP-2
470 PUT SPRITE 0,(X,I),9,2
480 NEXT I
490 RETURN

```

SOME TIPS ON FUNCTIONS

A useful function BIN\$(exp) which converts a number to a binary string is omitted from the list of string functions in the BASIC Reference Guide. The example of the PSET statement in Chapter 5 has the row and column numbers reversed, etc. However, a new book should become available in August and a full Spectravideo Basic Manual should be available soon. Moonshine Computers has been helpful with assistance for Spectravideo's BASIC.

There are a number of special CONTROL characters which facilitate full screen editing. Among the most useful are:

CTRL E — erases the line from current cursor position to the end, but the erased line is not lost until ENTER is pressed.

CTRL B — moves the cursor back to the start of the previous word.

CTRL F — moves the cursor forward to the start of the next word.

CTRL N — positions the cursor at the end of the line.

A full list is given in the Basic Quick Reference Guide.

There are 10 function keys which can easily be assigned different commands to aid in programming and debugging when particular commands are being repeated often. For example, typing in KEY 1, list 200-300 means that pressing F1 and ENTER will result in a listing of lines 200-300.

When a function key is required to execute immediately, ie. without ENTER being pressed, add CHR\$(13) to the command. For example, typing in KEY 4, load +CHR\$(13) will result in the loading in of the next program from the datasette (if the play switch is depressed).

All the editing commands can be programmed into function keys by finding the ASCII code (n) in Appendix A of the user's manual for the appropriate character and executing chr\$(n)eg CTRL H = ASCII 8 so entering KEY 2,CHR\$(8) enables a CTRL H by pressing F2. (This back spaces, deleting the character on left of cursor.) The default functions of the keys are displayed at the bottom of the screen. This display can be deleted by SCREEN 0, 0 or reinstated by SCREEN 0, 1.

The debugging aid, TRON, results in a printing of line numbers, enclosed in brackets, as they are executed in the program. TROFF stops the listing. These two commands need to be placed immediately before and after a problem area to detect the sequence of program execution. Also, PRINT CHR\$(7) can be used to give a beep to check that a particular part of a program has been executed.

The ON ERROR GOTO (line number) statement can be used for error trapping routines and is also a useful debugging aid e.g. the following statements can be incorporated into a program which will then print out the error number and line number in which any errors occur.

```

10 ON ERROR GOTO 500
500 G=ERR:H=ERL
510 CLS:LOCATE 50,50
520 PRINT G:H

```

The DRAW command is useful for drawing shapes but the graphics pointer must first be set at the location where you require the DRAWing to start. This can be done by the statement PSET (x,y) where x is the column and y the row of the appropriate position.

When in SCREEN 0 mode VPOKE w,z can be used to print a letter on the screen. Z is the code for the letter and w is a number in the range 0 to 959 and determines the position the letter is printed. (Note: This code is a bit different to APPENDIX A). VPOKE w,z can also be used to put the graphics symbols on the screen, here z is in the range 192 to 243.

Topics for future articles include sprite movement and STICK and STRIG functions.

Corrected program from S V318 & SV328 manual Chapter 12.

BOOKS

Elusive quality caught

"Programming the Apple II in BASIC," by Paul Tebbe. Prentice-Hall, \$38.15. Reviewed by Carol Miles.

Of the dozens of books available on Applesoft BASIC, few have that elusive quality of readability! Paul Tebbe's book is clear, and concerns itself not only with the essentials of producing a functioning program, but also with producing a program which is itself as readable as the text and which, in its turn, produces readable output (i.e., is formatted).

Short chapters of five to eight pages are typical, with a set of carefully prepared problems (answers at the back). Each chapter takes up a separate point of programming in Applesoft. A nice touch is the short summary of procedures to be employed before and after the details of any command structure.

Especially pleasing is his presentation of handling random and sequential access data files. This is done in an extremely clear fashion —

as if this were the core of the book, prepared first but incorporated mid-text as chapter 12. The emphasis is not on mathematics, and procedures involving more than simple counting or algebra are relegated to an appendix.

I recommend it as an excellent book for the beginner or the student taking a short course in BASIC. The New Zealand price is not unreasonable compared with other computer books, but more than \$38 is far in excess of what one would expect on an exchange-rate basis. Binding is of good quality paper with sewn signatures glued in a soft (paper) cover.

As always, with any book on computing, it should be used rather than just read, with your Apple computer at hand.

A mixed bag

"The Spectrum Book of Games" by Mike James, S.M. Gee & Kay Ewbank Granada. 146pp, \$19.95. Reviewed by Martin Downey.

This book contains listings of 21 games all written in BASIC. Each is

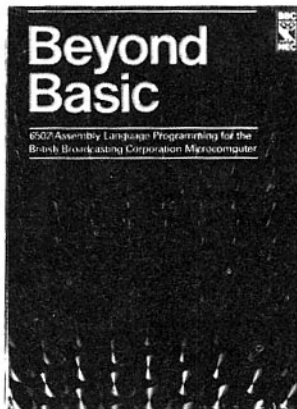
accompanied by a sample of the screen display, instructions for playing and some brief programming details. This means you can learn something about programming as you enter the programs. That is certainly the advantage of typing in programs rather than just buying the cassettes.

However, don't expect games of the quality of the "Horace" series as those are written in machine code and are considerably longer than the programs in this and similar books. But the games are certainly playable and most make use of colour graphics and sound.

Of the 21 games eight are worthwhile, eight are mediocre and five are just "fillers". My favourite is "Spectrum Smalltalk", a simple but elegantly programmed version of computer psychiatrist. The programs vary in length from about 80 to just over 200 lines. All are clearly laid out and well documented.

If you just enjoy playing games, save your money for a good piece of cassette software. If you're interested in writing your own games as well, this book is probably a good place to start.

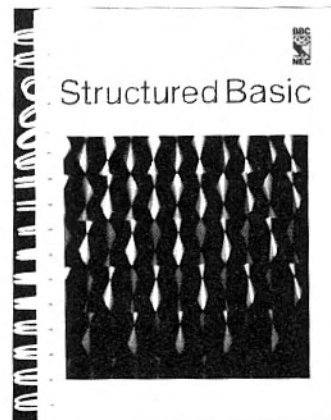
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BOOKS

Keeping it simple

"VIC-20: 50 Easy-to-Run Computer Games" by Edward Burns. Sams, 122pp, \$12.50. Reviewed by Steven Darnold.

Beginners often spend many hours typing in lengthy, complex programs from listings in books and magazines. Such efforts, however, are likely to be frustrating. Most beginners make numerous errors as they enter a program, and they simply don't know what to do when it fails to run.

The solution is for beginners to start with simpler programs which are easier to debug. Then, as they become more experienced, they can move on to more complicated listings. In this respect, "50 Easy-to-Run Computer Games" is ideal for beginners. The listings are short and easy to read, and beginners will need only a few minutes to type in an entire program. If they have made any mistakes, they have to search through only a few lines.

At 25 cents per program, this book is good value for money. However, it is only suitable for beginners. Despite the comments on the cover, the programs are not "packed with excitement" and they are not "good entertainment". The listings are very short, and there is simply no room for developing interesting ideas or displaying interesting graphics and sound. Nevertheless, the programs are sufficiently entertaining to reward the beginner for effort.

Pleasant & thorough

"The BBC Micro for Beginners" by Seamus Dunn and Valerie Morgan. Prentice Hall, \$26.90. Reviewed by Pip Forer.

The number of books offering an introduction to the BBC micro-computer is now considerable. These include a variety covering specific topics such as assembler, graphics, sound, structured programming techniques and interfacing. There are also the general guides — this book is one of them.

One might initially question whether such general works are useful given that the standard BBC User's Guide is a classic of its sort in providing a general background while the experienced user will head for guidance on more closely defined topics from specialist books. Certainly, the reasons for buying a poor general text are few.

Nonetheless, there is always a gulf between the best of machine manuals (which must be useful above all else as ongoing reference texts) and a book written specifically to lead the initiate through the first steps of competence.

Dunn and Morgan is valuable because it covers this form of assistance in a pleasant and thorough manner. Throughout the text, the authors provide plenty of examples and posers against which to test your progress and they give an even coverage of the major components of the system.

The examples used are not outstandingly original but they are coherent and emphasise the practical uses to which many of the BBC's features can be applied. As a general introduction I would rate this quite highly — probably above Cryer and Cryer, an early frontrunner, also from Prentice-Hall.

The book is nicely produced and apart from a tacked-on final chapter called "In The Classroom" (which is transparently an attempt to woo a particular market sector but is in fact, a hindrance to the book overall, a valuable guide. If you want an initial starter on the capabilities of the BBC computer, Dunn and Morgan scores well.

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GLOSSARY

Algorithm: A list of instructions for carrying out some process step by step.

Applications program: A program written to carry out a specific job, for example an accounting or word processing program.

Array: A data type found in high level languages, which is stored in a contiguous block of memory. Accessed by the array name and an index making it easier to process groups of data in many situations.

ASCII: American Standard Code for Information Interchange. An 8-bit code.

BASIC: Beginners' All-purpose Symbolic Instruction Code. The most widely used, and easiest to learn, high level programming language for microcomputers.

Baud: Speed of transferring data, measured in bits per second.

Binary: The system of counting in 1's and 0's used by all digital computers. The 1's and 0's are represented in the computer by electrical pulses, either on or off.

BIOS: Basic input/output system.

Bit: Binary digit. Each bit represents a character in a binary number, that is either a 1 or 0. The number 2 equals 10 in binary and is two bits.

Block graphics: Chunky graphics, built up in small blocks rather than fine points.

Boot: To load the operating system into the computer from a disk or tape. Usually one of the first steps in preparing the computer for use. Short for bootstrap.

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.

Bus: Also called a trunk or highway - a path on which several parts of a computer system may be connected so that signals can be passed between them.

Byte: Eight bits. A letter or number is usually represented in a computer by a series of eight bits called a byte and the computer handles these as one unit or "word".

CAL: Computer Aided Learning CAL programs are written to take different actions on different student answers.

Card: In hardware, a circuit board.

CCIT: An abbreviation for International Telegraph and Telephone Consulting Committee. A standard maker.

Chip: An integrated circuit on a single crystal of semiconductor, far smaller than fingernail size.

CMOS: Transistor technology - when a pair of transistors of opposite type are used together. Means low power use.

Computer language: Any group of letters, numbers, symbols and punctuation marks that enable a user to instruct or communicate with a computer.

Courseware: Name for computer programs used in teaching applications.

cpi: Means character per inch. A common way of describing character density, i.e., how close together characters are in printers.

CP/M: An operating system for Z80 based machines. It is by far the most widely used DOS for Z80 based machines and there is an extremely large software base for it. See also disk operating systems.

cps: Characters per second. A common way of describing speed in printers.

Cursor: A mark on a video that indicates where the next character will be shown, or where a change can next be made.

Daisywheel printer: A printer in which the letters are formed by impact of a letter on a disk rotated until the required character is in position.

Descender: The "tail" of the letters, g, j, p, q, and y.

Disk: A flat, circular magnetic surface on which the computer can store and retrieve data and programs. A flexible or floppy disk is a single 8 inch or 5 1/4 inch disk of flexible plastic enclosed in an envelope. A hard disk is an assembly of several disks of hard plastic material, mounted one above another on the same spindle. The hard disk holds up to hundreds of millions of bytes - while floppy disks typically hold between 140,000 and three million bytes.

Disk drive: The mechanical device which rotates the disk and positions the read/write head so information can be retrieved or sent to the disk by the computer.

Diskette: Another name for a 5 1/4 inch floppy disk.

Disk operating system: A set of programs that operate and control one or more disk drives. See CP/M for one example. Other examples are TRSDOS (on TRS 80) and DOS 3.3 (for Apples).

DOS: See disk operating system.

Dot matrix: A type of print head, made up of a matrix of pins, e.g. 8x8. When a character is to be printed the appropriate pins push out and strike the ribbon to paper forming the character.

Dot graphics: These graphics are individual screen pixels. Used by either turning on or off one pixel.

Double-density: Floppy drives that store twice the standard amount of data in the same space.

Dump: Popular term for sending data from a computer to a mass storage device such as disks or tape.

EPROM: Erasable, user-programmable, read-only memory.

File: A continuous collection of characters (or bytes) that the user considers a unit (for example on accounts receivable file), stored on a tape or disk for later use.

Floppies: Thin plastic disks with a magnetic coating used for storing information. Called floppies because they are flexible.

Font: The complete character set of a style of letters.

Friction feed: A type of paper-feeding system for printers: normal paper in a continuous sheet is gripped between two friction rollers as on a typewriter.

Handshaking: Transferring data across an interface.

Hardware: The computer itself and peripheral machines for storing, reading in and printing out information.

Hex: Abbreviation for hexadecimal notation, a base-16 numbering system convenient to use with computers.

High-level language: Any English-like language, such as BASIC, that provides easier use for untrained programmers.

IEEE: A standardisation based on the Institute of Electrical and Electronics Engineers.

Ink-jet printer: These printers form images by spraying droplets of ink on to paper. Each droplet is electrically charged and is deflected into the required position by magnetic plates.

Input: Any kind of information that one enters into a computer.

Interactive: Refers to the "conversation" or communication between a computer and the operator.

Interface: Any hardware/software system that links a microcomputer and any other device.

I/O "Input/output":

Inverse video: When the background is coloured; e.g. on a black and white screen white becomes background and characters are written in black.

Justified: Printing is justified when the lines are flush on the left and right sides.

K: The number 1024. Commonly refers to 1024 bytes. Main exception is capacity of individual chips, where K means 1024 bits.

Kilobyte (or K): Represents 1024 bytes. For example 5K is 5120 bytes (5 x 1024).

LCD: Liquid-crystal display.

Line feed: A control code character found in the ASCII character set. Its normal purpose is to move the cursor down one line (on screen) or move paper up one line (on printer). Does not return the cursor to the left-hand margin.

Lower case: Non-capital alphabetical letters.

Machine language: The binary code language that a computer can directly "understand".

Mainframe: The very large computers that banks and other large businesses use are called mainframes. Also in microcomputers the term is sometimes used to describe the core of the machine, i.e. the CPU plus memory.

Mass storage: A place in which large amounts of information are stored, such as a cassette tape or floppy disk.

Megabyte (or Mb): Represents a million bytes.

Memory: The part of the microcomputer that stores information and instructions. Each piece of information or instruction has a unique location assigned to it within a memory.

Memory capacity: Amount of available storage space, in Kbytes.

Menu: List of options within a program that allows the operator to choose which part to interact with (see Interactive). The options are displayed on a screen and the operator chooses one.

Microcomputer: A small computer based on a microprocessor.

Microprocessor: The central processing unit or "intelligent" part of a microcomputer. It is contained on a single chip of silicon and controls all the functions and calculations.

Minicomputer: Originally a computer that went with a single equipment cabinet. Now a computer between a microcomputer and a mainframe. Note that the boundaries between mini's and the classes on either side of it are unclear.

Modem: Modulator-demodulator. An instrument that connects a microcomputer to a telephone and allows it to communicate with another computer over the telephone lines.

Mother board: A large circuit board that has other boards attached to it.

Network: An interconnected group of computers or terminals linked together for specific communications.

Output: The information a computer displays, prints or transmits after it has processed the input. See input and I/O.

Parallel interface: A type of communications interface used mostly for printers. It sends a whole character of data down eight (commonly) lines, one bit down each line. The most common type of parallel interface for printers is the Centronics interface.

Pascal: A high-level language that may eventually rival BASIC in popularity. It incorporates the form of structured programmes.

PEEK: A command that examines a specific memory location and gives the operator the value there.

Peripherals: All external input or output devices: printer, terminal, drives etc.

Pixel: Picture element. The point on a screen in graphics.

Plotter: An output device for translating information from a computer into pictorial or graphical form on paper or a similar medium.

POKE: A command that inserts a value into a specific memory location.

Program: A set or collection of instructions written in a particular programming language that causes a computer to carry out or execute a given operation.

RAM: Random access memory is the very fast memory inside your computer. The access time for any piece is the same. Your program and runtime data are usually stored in RAM.

REM statement: A remark statement in BASIC. It serves as a memo to programmers, and plays no part in the running program.

Resolution: A measure of the number of points (pixels) on a computer screen.

ROM: Read only memory. Any memory in which information or instructions have been permanently fixed.

Serial interface: A type of communications interface used for a wide variety of purposes (printers, terminals, telephone corrector etc.). It uses a minimum of two wires, and sends the data one bit at a time down one wire. The most common type of serial interface is RS232C.

Sheet feed: A type of paper feeding system normally used for high-quality document printers. A special device picks up a sheet of paper and feeds it into friction rollers.

Software: Any programs used to operate a computer.

Spike: A disturbance in the power supply - an unwanted pulse of short duration.

SP: Second processor.

Sprocket feed: See pin feed.

System: A collection of hardware and software where the whole is greater than the sum of the parts.

Tractor feed: A type of paper feeding system for printers. Special computer paper with holes along both sides is fed by the tractors gripping these holes.

Word: A group of bits that are processed together by the computer. Most microcomputers use eight or 16 bit words.

WP: Word processor.

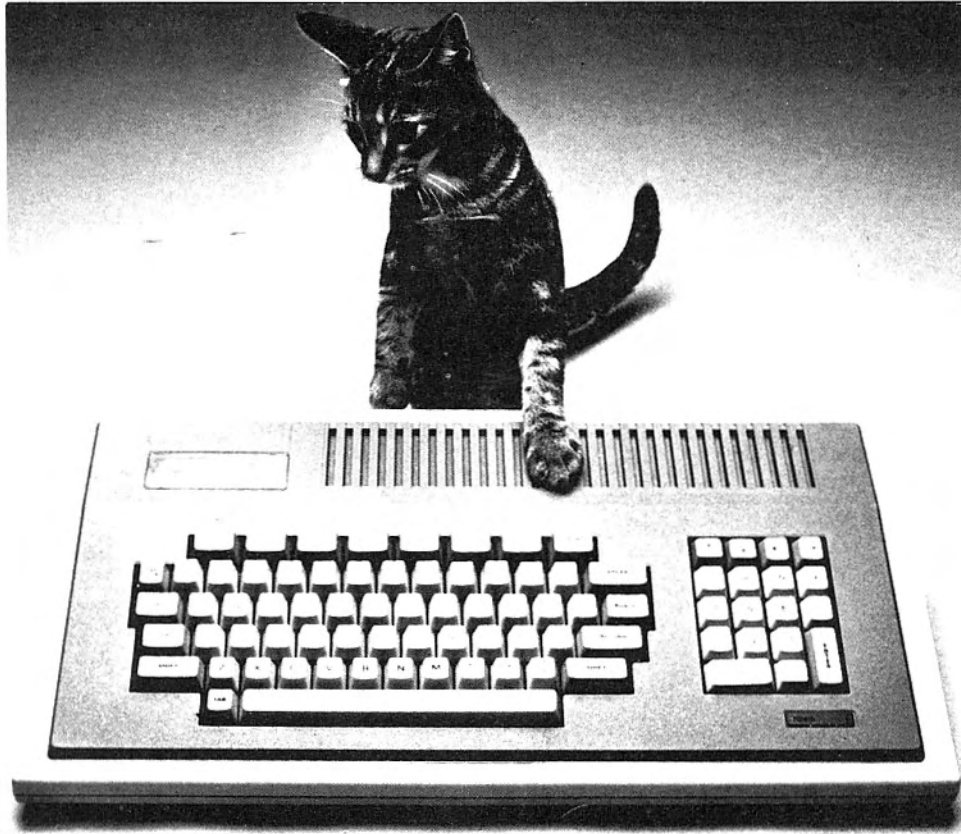
A bit clearer

Some readers have reported problems deciphering the last few lines of the Business Helper ZX81 program in our June issue. For those still battling with it, here are the offending lines:

```
6130 PRINT "+NON-OPERATING
INCOM E";TAB 23; "$"; 0
6140 PRINT
6150 PRINT "NET PROFIT"; TAB 23;''
$"; (O+TOTAL) +SUN
7999 STOP
```

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Question 2 *How much RAM does the CAT have inbuilt?*

Question 3 *How many function keys does the CAT have?*

Question 4 *Name three standard features of the CAT.*

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WANTING: to contact people with 'Wizzard' computers. Contact: Greg Kroon. Ph 679-585 Auckland.

MICROBEE:, Spectravideo joysticks \$40. S.A.E. for details. 14 Roys Road, Plimmerton.

M. VICKERS: of Howick. Please contact editor of *Bits & Bytes* with your address.

FOR SALE: 15 Minidisks for \$75. Ring Ed on ChCh 557-484.

FOR SALE: ZX81, 16K, power supply, joystick, manuals and M/C games. Sell all \$150. Graeme Bowie, Morisons Bush, R.D.1, Greytown.

WANTED: Software or any info. for driving stepper motors in X-Y plotter. Apple II BASIC or 6502 machine code. Write W. Spence, 34 Weatherly Rd, Auckland 10 or ph 403-8789 collect.

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WANTED: Plans for modem suitable for C-64. Ph ChCh 486-655 or write P. Gordon 46 Hinau St, ChCh 4.

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FOR SALE: HP82161A Digital Cassette Drive (\$700 ono), HP82163B Video Interface (\$300 ono), HP82160A HP-IL Module (\$150 ono). (All for HP41C Calculator System). Contact: Colin Southern, EECC, Longbank, RNZAF Base Woodbourne, Blenheim. (or phone Blenheim 28511 ext 790).

COMPUCOLOUR II users contact R.W. Strain, 19 Warwick St., Wilton, Wellington 5. Phone (04)753-326.

COMPUCOLOUR II hardware or any bits and pieces wanted, particularly keyboards and/or keyboard switches. Contact R.W. Strain, 19 Warwick St., Wilton, Wellington 5. Phone (04)753-326.

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FOR SALE: OSI CIP Programmes Magic Mountain, Touch Typing, Wizards City. Contact R. McPherson, 639 Worcester St, Christchurch. Ph (03) 895-431.

WANTED: General correspondence or to swap public domain with any Apple or Apple Compatible users. S. Shearman, Fairway Dr, Kerikeri. Ph 79-882.

COMPUTER MAGAZINES: need back issues of Computing Today (need May and Sep. 83, Jan to April 82, Jun to Aug 82, Nov 82, all 1981) 80 Micro. (need pre Feb 83). Computer & Video Games (need pre 83) also any other computer magazines. Please phone Akl 655-718 or write Nola Huggins, 612 Mt Albert Road, Auckland 3, with price.

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WANTED: student needs donated used or damaged computers and related equipment. Write with offer: T. Howell, 28 Beacon Hill Road, Wellington 3.

WANTED: Jupiter "Ace" and documentation NZ or UK specification; any condition. Write to M. Hucklesby, 77 The Ridgeway, Stoke, Nelson.

THE New Zealand Software Exchange Association is a computer club with members nationwide, and caters for a wide range of machines. The N.Z.S.E.A. publishes and distributes to members a monthly magazine. Send S.A.E. for FREE information package to: N.Z.S.E.A., Box 333, Tokoroa.

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ATARI

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use and load 16K cartridge, and it can use cassettes for mass storage.

The WP is completely menu driven and has a variety of special commands, making it a powerful processor. It can display on 40 columns on the screen, but a simple command (option P) allows it to display an 80 column line and use the window approach to viewing it.

There are more than 25 different formatting commands. The global command will search out and replace any specified string of up to 25 characters.

The manual is simply written and easy to understand. A quick reference card with all the commands used on the word processor is also supplied.

The Atari Writer is compatible with all the Atari printers (1027, 1020, 1029 etc) and is usable with other independent printers as long as a printer driver (\$49.95 from most Atari stockists) is purchased.

On the whole the Atari Writer is a well produced and designed piece of software. It is now available in New Zealand and is priced at \$199.

That's all from this month's Atari column. Next month I'll review Pole Position and Jungle Hunt, the two new cartridges.

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Kiwis the "poor relations"

New Zealand computer software and services companies suffer from lack of government support according to PAXUS' deputy general manager, Mr Neil Cullimore. As a result, their international profile is considerably lower than that of their Australian counterparts.

Business partner



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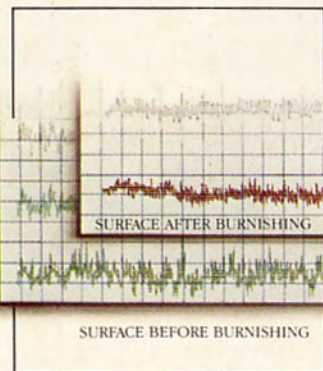
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