

NEW ZEALAND'S PERSONAL COMPUTER MAGAZINE

BITS & BYTES

October 1984: \$1.50

Windows on your computer?

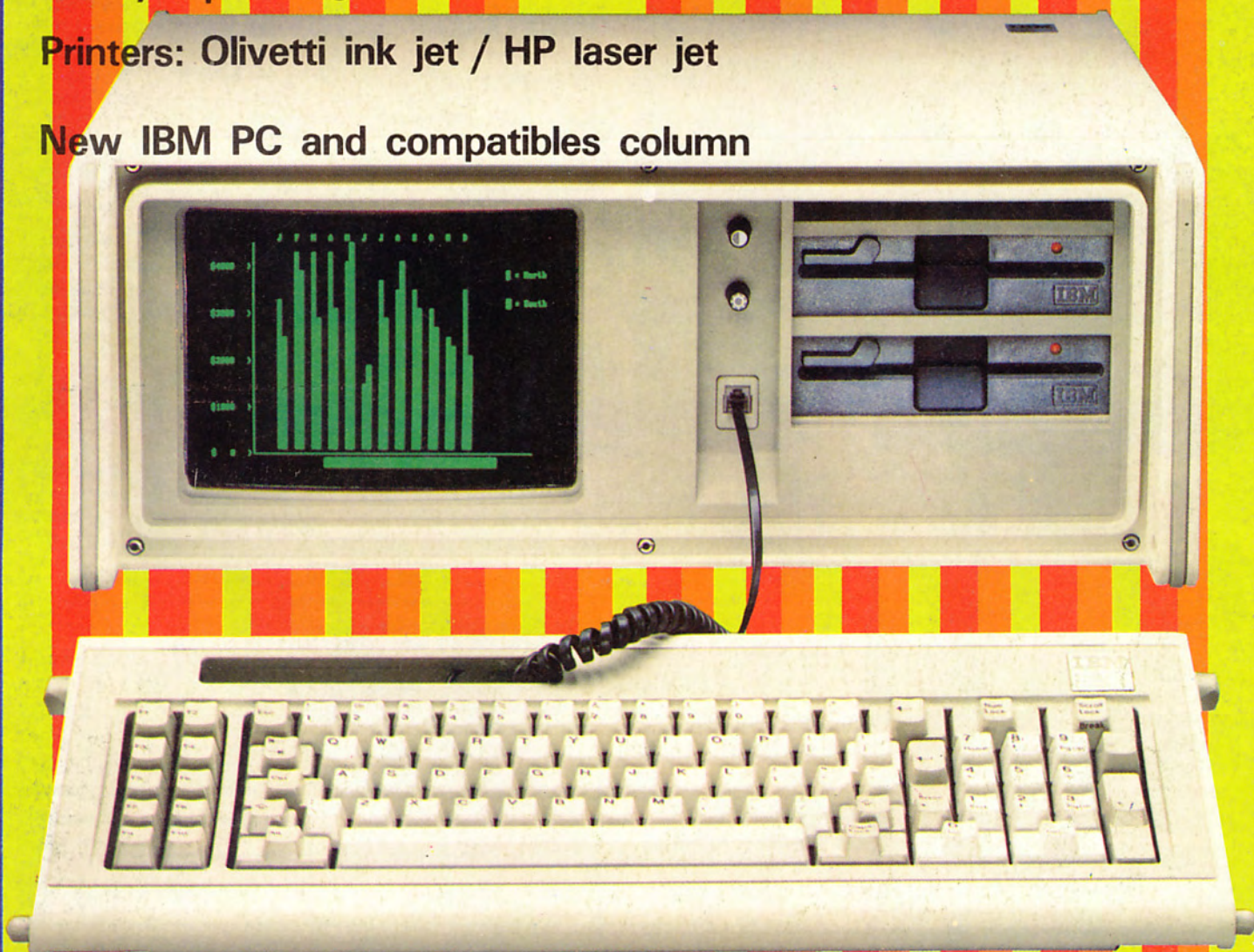
Visi-On reviewed

Big British computer seller Memotech arrives

Tandy's portable

Printers: Olivetti ink jet / HP laser jet

New IBM PC and compatibles column

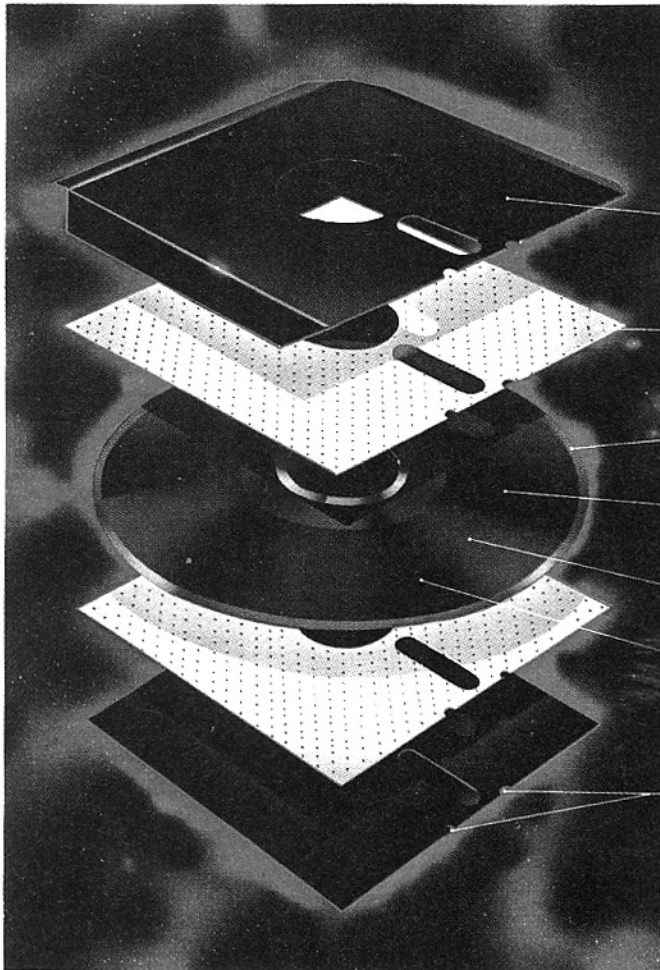


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Results BM 1

BITS & BYTES

October, 1984 Vol. 3, No. 2

ISSN 0111-9826

FEATURES

Integrated packages

John Vargo looks in the "window" – the latest in software design for microcomputers. And he goes through Visi On, the first of these integrated windowing environments entered in the Lisa look-a-like stakes.

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Hardware reviews

The Sinclair QL has been the subject of widespread speculation and conjecture as New Zealand has awaited its arrival. Gary Parker managed to get his hands on one of the first machines to arrive. He reports.

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Rodney Lincoln puts it to the test.

Memotech's MTX-500, which comes complete with many of the extras you normally have to pay for, impressed Peter Ensor.

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He explains why.

A portable clone with a difference – it was announced by IBM. That's how Dennis Lowe sums up the IBM Portable PC.

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A sound, efficient CP/M unit. John Slane comes up with this assessment of Multitech's MIC-504. Find out why.

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Printer review

Shayne Doyle gets into "dry ink" printer technology and comes out impressed – and with his hands clean.

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Business

Pat Churchill reports on how a computer has helped a one-man business band – and saved time and money.

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A home-based banking trial has begun in Wellington.

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Pat Churchill has the details.

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Memory is one of the most important components of a computer system. Gordon Findlay recalls memory and fights his way through the jargon.

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The New Zealand Personal Computer Exhibition Overseas Terminal Auckland 9-10-11 May 1985

The logo above should become a familiar sight over the next six to eight months as we count down to New Zealand's first Personal Computer Exhibition.

As outlined in our September issue, the event will be more than just an exhibition with a series of seminars, a dinner and the presentation of the first New Zealand Microcomputer Industry Software Awards also taking place.

The response from companies in the microcomputer industry has been extremely favourable so far and several are endeavouring to arrange leading figures to speak at the seminars.

In the near future Bits & Bytes will call for nominations for the software awards.

Most computer companies should now have received detailed information about the exhibition and surrounding events but anyone else can write to the PC 85 office, P.O. Box 9870, Auckland or telephone 549-028 or 549-658 and ask for Rod Prater, Gaie Ellis or Paul O'Donoghue.

If you live outside Auckland and want to attend PC 85 we suggest now is the time to start making travel and accommodation plans.

Devaluation Bites

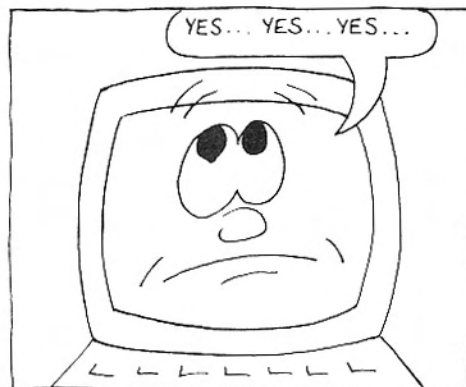
Ouch!, that hurts. With the New Zealand devaluation and the world wide shortage of fine papers, our printer recently informed us of an impending 55 per cent increase in the printing costs for Bits & Bytes.

We have decided to hold our subscription rates costs until early next year but the cover price of Bits & Bytes will increase to \$2.00 from the November issue.

While we regret the necessity for any price increase it is due to circumstances out of our control.

MICRO MOMENTS

BY MATT KILLIP



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Competition for Macintosh?

Is Commodore International Ltd about to do to Apple Macintosh what it did to the Apple II series with the Commodore 64? Reports from the USA suggest Commodore will soon release a "Macintosh-type" computer for considerably less than half Mac's price tag.

Commodore has bought Amiga Corp, a small company which had

developed a 32-bit, Motorola 68000-based computer aimed at the Macintosh market. A week before the purchase announcement, Commodore's president and chief executive officer, Marshall F. Smith, said his company would soon introduce a Macintosh-like product for "well under \$US1000". Macintosh sells in the USA for around \$US2,500.

The Amiga computer, unveiled at a consumer electronics show in June, attracted rave reviews for its

graphics capabilities — including full colour capability. (Macintosh has no colour.)

Commenting on the Amiga purchase, Commodore's treasurer, Donald Greenbaum said it gave his company "...quick entry with a 32-bit machine, their engineering group and their management. We have better resources than anyone else to do something significant with this product."

PLATO



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Computer World Ltd, Cnr Lorne & Victoria Sts, Auckland. Tel: 31-394

Wellington Area Dealer:

Office Requisites (Microshop) Ltd, Cnr Waring Taylor & Featherston Sts, Wellington. Tel: 721-902

Christchurch Area Dealer:

Computer Corp, 78 Riccarton Rd, Christchurch. Tel: 488-300

In All Other Areas:

Contact: D.R. Britton Ltd, 3 Sydney St, P.O. Box 38400, Petone, Wellington. Tel: (04) 688-066. Attention: Mark Britton

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PLATO



Changing How The World Learns

New languages for the BBC...

In a series of new software releases, Acorn has announced a spreadsheet (Viewsheet), a Logo turtle graphics emulator and two new twin language ROMs — Pascal and full Logo.

... and a video interface

An interface pioneered in Christchurch by the Polytechnic allows the creation of tutorial and training modules on the BBC micro. The modules include passages of illustrative video from a video tape recorder. Called the CAVII system, the interface and its software allow the identification of a series of videotape scenes and a related set of question and answer topics.

The microcomputer delivers the instructional text and video and provides a suitable response to the student by offering congratulations, suggestions or refresher material as appropriate. The unit runs with a single CRT using 1/2 in VHS videotape connected to an industrial standard videotape recorder.

IBM PC-AT released

The new IBM personal computer, the AT (advanced technology) micro, is for immediate world-wide release. Still based on the Intel chip set, this one uses the 80286 descendant of the 8088. Unlike the IBM/PC which lost much ground overseas by its tardy arrival, this one was announced in New Zealand within days of US release. Unseen at the time of writing, it looks to be a conservative step forward — accepted rather than advanced technology. IBM still seems slow to capitalise on its 68000 experience with its scientific lab micro, a surprise to some observers.

Dead on arrival

Day 1: Receive the April issue of *Byte* (which lugged its cumbersome bulk through the post some three weeks ago). Read an appetising review of the innovative new 80186 based Mindset computer. *Byte* rated it highly and the specs and architecture looked a treat. Make a mental note to get a look at one sometime if it reaches New Zealand.

Day 8: Returning friend from Britain brings old June *Practical Computing* issue back with him. Gossip column reveals that news of Mindset has reached Britain and has been well received. Desire to see an example increased.

Day 10: September copy of *Time* has review of US micro industry and reveals that some Silicon Valley firms have run into trouble. Named example includes Mindset... launch problems have caused withdrawal of model and cut-price sale of machines still on shelves. Make a mental note that the pace of change is hotting up.

Remote communications

Minder Systems has successfully used telephone modem communications to control its system from a remote point. A personal computer at Mt Roskill, Auckland dialled Minder, installed on a North Shore site and performed all functions normally by telephone.

Subsequent transmissions over lengthy periods have demonstrated Minder's ability to detext NZPO problems and overcome them by retransmission. This capability, the developers report, opens Minder's market up to a wide range of applications where installations need to be accessed from remote locations.

Wellington computer show



A constant flow of people visited the show, as witnessed by the crowd checking out the Data Link stand.

It was definitely a hands on computer show that *Bits & Bytes* staged in Wellington in early September as many of the visitors put a wide range of hardware through its paces.

The 32 exhibitors showed their wares to more than 11,000 people during the three-day show.

The trade day on the Friday was the busiest day as the Wellington business community grasped the opportunity to make a closer inspection of the different brands of computers.

But the Saturday and Sunday were also very busy, with the general public, including many computer "novices", investigating what computers had to offer.

Exhibitors pronounced the show very worthwhile and plans are already underway for a bigger and better event next year.

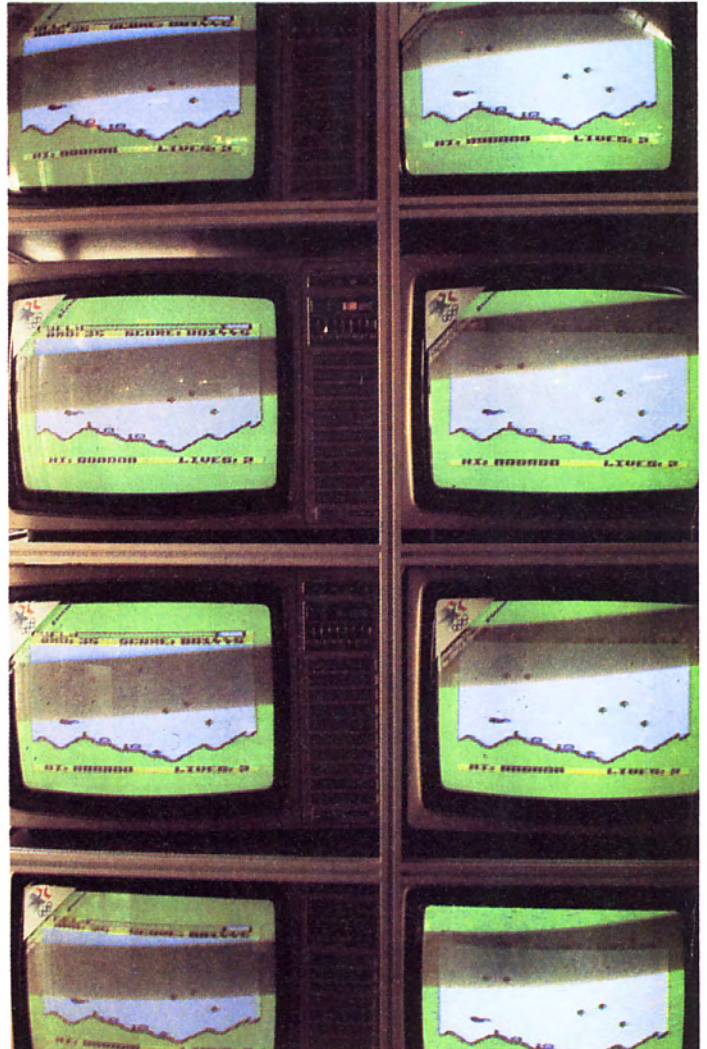


A youngster catches up on her education using a Radio Shack computer on the AVM Electronics stand.



ABOVE: Pensive looks as some serious computing goes on.

BELOW: One of the stacks of television sets, displaying the latest computer game for Commodore computers, which marked the impressive Fountain Marketing stand.



Geophysicists turn to Plato

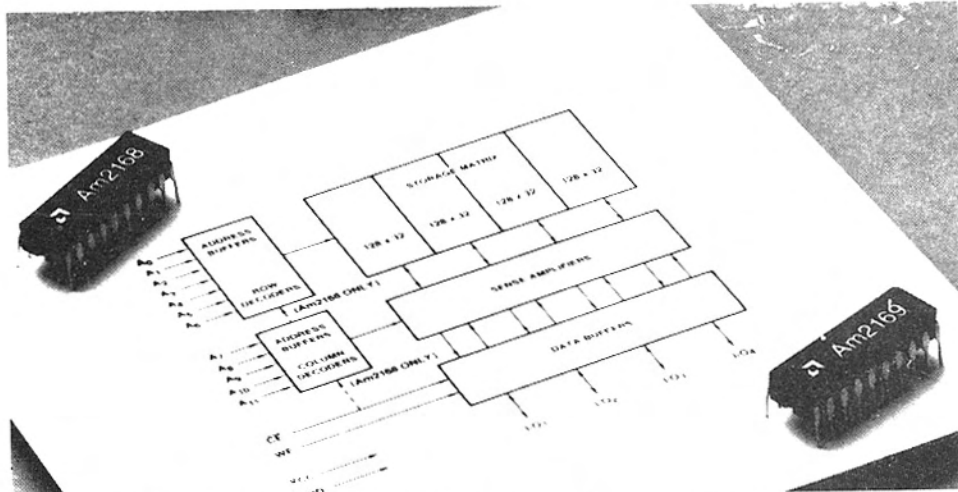
Computer-based instruction programs for geophysicists are among the latest additions to Control Data's PLATO system.

Basic Exploration Geophysics was developed by CD for the Chevron Geosciences Co which served as operator for a consortium of 14 leading exploration companies that contributed to the content.

According to CD's New Zealand manager of computer based training, Liz Dengate, this combination of computer and exploration expertise has provided comprehensive instruction materials geared to the industry's needs.

"Diskette delivery of the instruction is specially suited to district exploration offices and even offshore drilling rigs and platforms where leisure activities are limited and off hours can be used for training," she said.

The lessons include the fundamentals of geophysical exploration, the acquisition, processing and interpreting of seismic data, linear systems and non-seismic geophysical exploration.



The Am2168 and Am2169 RAMs in the flesh and in diagrammatic form

High-speed RAMs

Production of two high-speed static RAMs, organised as 4096 x 4 bits, is planned for October by Advanced Micro Devices. The Am2168 and Am2169 high performance N-channel devices, with access times as fast as 45ns and 40ns, respectively, are pin-for-

pin replacements for the industry-standard Inmos 1420/1421.

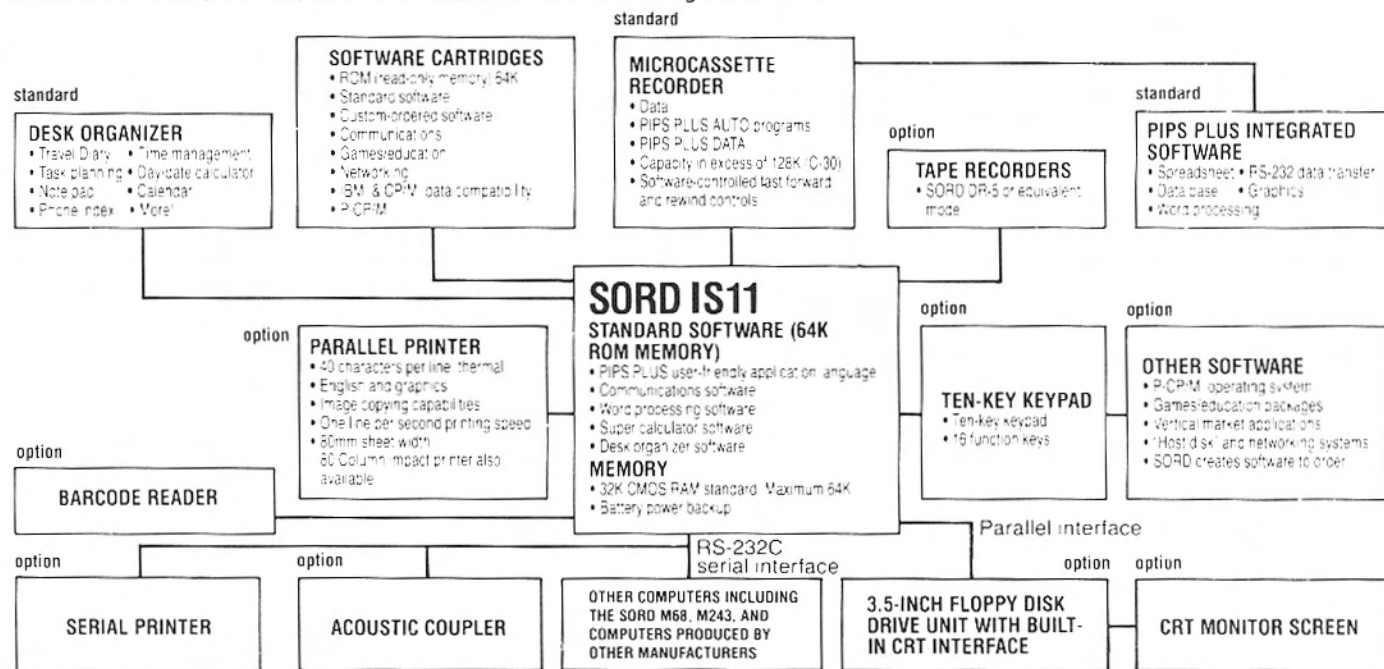
The Am2168 has a power down mode that reduces power dissipation by 75 per cent when the device is deselected, so lowering system power use. Further information: G.T.S. Engineering Ltd, P.O. Box 9613, Newmarket, Auckland or P.O. Box 27-357, Wellington.

Face it. Many potential computer users are turned off by the idea of turning their desks into computer centres. Standard desktops are too much computer for the casual user. The SORD IS11 provides a wealth of software and hardware functions in a desktop package that's so compact it can be put away in a drawer when not in use or taken home at night. It's powerful, yet easy to use, and is specially aimed at a new generation of computer buyers.

- Word processing ■ Spreadsheet ■ Data base ■ Desk organizer
- Communications ■ SORD makes software to order for OEMs.
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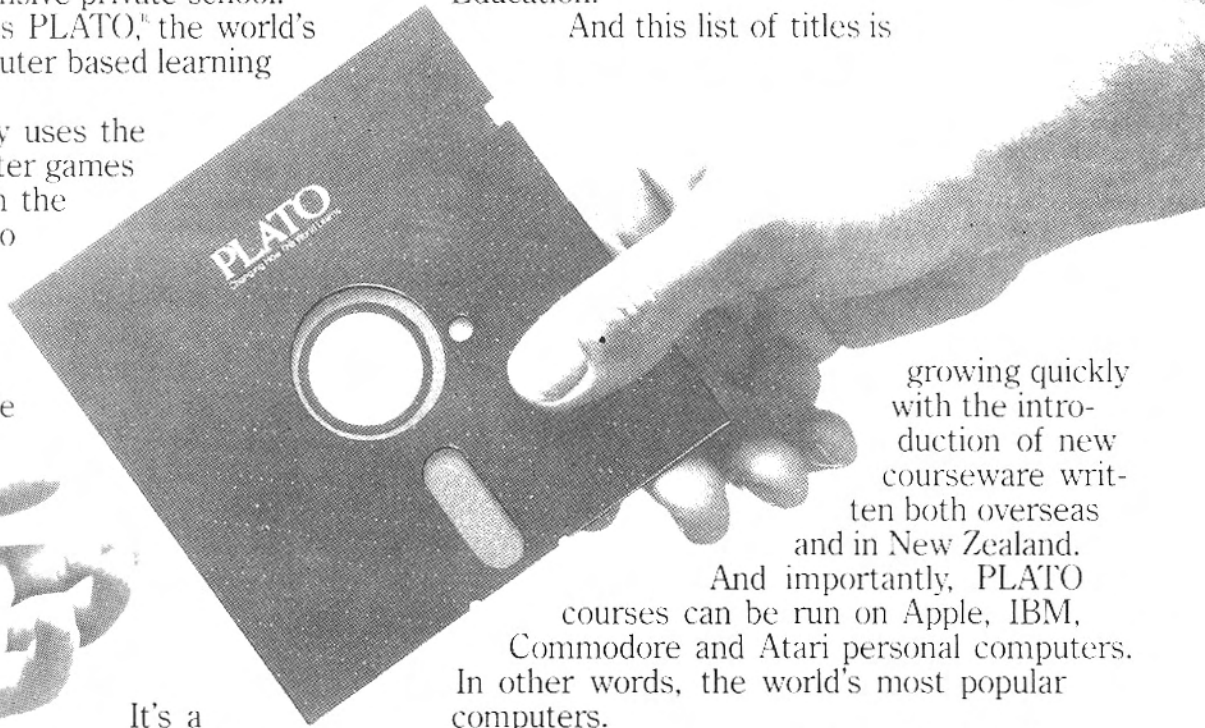
Take heart. It's not as difficult as you might think.

And it won't necessarily mean sending your child to an expensive private school.

All you need is PLATO,[®] the world's most advanced computer based learning system.

PLATO simply uses the technology of computer games and combines it with the information needed to succeed in today's world.

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Extensive trials in America, Australia and New Zealand have shown that students on PLATO learn at greatly increased rates. But perhaps even more importantly, they learn with greatly increased knowledge retention.

As well as PLATO courseware, we bring you a broad selection from some of the world's most respected names in computer based learning. Names like the Minnesota Educational Computing Consortium (MECC), Thoughtware, Krell and Cosine.

The courses range from primary to tertiary

levels and include Fine Arts, Science, Social Studies, Mathematics, Languages, Health, Computer Literacy and Business Education.

And this list of titles is

growing quickly with the introduction of new courseware written both overseas and in New Zealand.

And importantly, PLATO courses can be run on Apple, IBM, Commodore and Atari personal computers. In other words, the world's most popular computers.

Now you can give your children the education you want them to have.

And perhaps learn a thing or two yourself.

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Or telephone Mark Britton on
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GD CONTROL DATA PUBLISHING

Bitronics Ltd. is a subsidiary of GD 1984 001

Fast, quiet quality

By Pat Churchill

It's eight times faster than a typical daisywheel printer, has letter quality output and is quiet in operation. It's the new Hewlett-Packard laser printer.

The LaserJet printer will operate with such personal computers as the HP 150 Touchscreen, IBM PC and IBM PC compatibles.

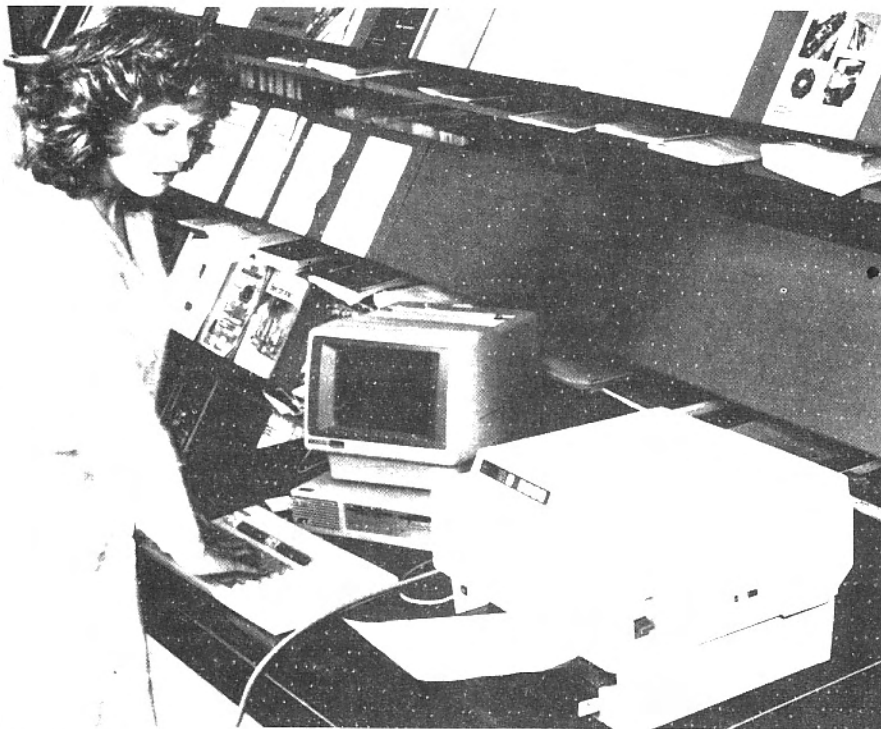
H-P's sales manager, computer systems, Bob Cattell, said the new printer would be priced between \$7,500 and \$8,000. It is aimed at the small business and office market and is said to be so quiet it won't interrupt the telephone conversations of those nearby while printing. In fact, at work it registers a noise level of less than 55 decibels.

The LaserJet is compatible with such software packages as Lotus 1-2-3, Multimate, Wordstar, PFS write and BPI Accounting. It can print horizontally for correspondence and reports, vertically for spreadsheets using a condensed font.

Other fonts include a standard Courier 10 font plus cartridges for Courier bold and italics and proportional fonts in bold and italics. Further font cartridges are under development.

Letter quality output is achieved by a 300 by 300 dots per inch resolution.

H-P says the LaserJet printer has built in raster graphics capabilities and is compatible with screen copy graphics on the HP 150 touchscreen computer. Graphics printing can also be done under program control from



The HP Laser Jet printer

the HP 150 or the IBM PC. Software allowing screen copy on the IBM PC will be available later in the year.

The printer has a built-in sheet feeder which can handle 100 sheets of paper at a time. A disposable electro-photographic cartridge replaces the conventional printer's ribbon cartridge and lasts for about 3000 pages of printing. When the cartridge is changed, the key imaging components, including the drum, are replaced each time.

SEAMS update

An update of the SEAMS software system has been released by IAL this month to be used with videotex technology to reduce ordering times and improve communications internationally in the clothing industry.

SEAMS was developed by IAL two years ago to record orders, plan production, control despatching and invoice clients in the clothing industry.

The package has been installed in more than 50 sites in Australia and New Zealand, and has also been purchased by Farah, the largest men's clothing manufacturer in the USA.

Using videotex, garment company representatives can enter orders from anywhere in the world and provide two-way traffic between the company and its representatives.

Digitisers, buffers, modems and video display

Graphics enthusiasts should watch out for a K-150 bit pad digitiser from Warburton Franki.

A new hand-held terminal, AT-301 should find many applications in warehouse and factory environments.

The LDB series print buffers should solve many print backlog problems. The 64K byte LDB-100 will sell for \$700, while the top of the range LDB-104 comes with up to 256K bytes of memory, parallel in, parallel and serial out facility, and multicopy feature.

A K741 optical modem set will offer up to 100 metres range via synthetic fibre optic cable. A link, complete with modem at each end, will cost less than the equivalent run of standard RS232 cable, but with the advantage of immunity to interference problems.

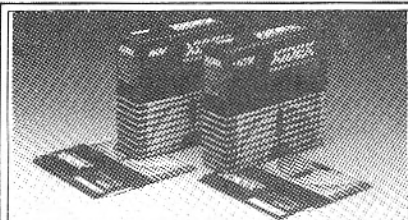
Also coming is the Z-29 video display terminal, giving DEC VT52, Lear Siegler ADM3A and Hazeltine 1500 emulation. The terminal has advanced on-screen configuration facilities, 33 special graphics characters, and integral 24-hour clock.

We specialise in the conversion of overseas computer & video tape recorders to N.Z.T.V. channels. (Any quantity from individual units to large production runs.)

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Cat X-3518 \$6.95

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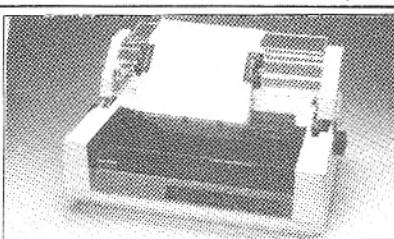
Even at our low prices you should still treat your disks with care - especially if your company's financial records are on them! This disk library holds and protects up to 10 diskettes in their jackets in an upright position for easy use. Can be closed for storage. A cheap investment.

Cat X-3515 **\$9⁹⁵**

Keep it on Cassette! Data Cassette Tape

Yes we're now stocking the famous Microcassette computer verified cassette tape. Five minutes per side gives over 40K capacity per side.

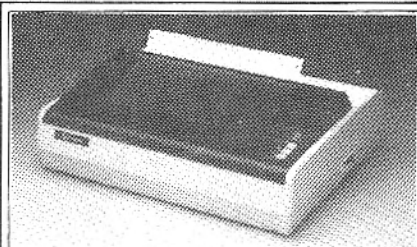
Cat X-3502 **\$4⁵⁰**



Budget Daisywheel Printer

If you're using your computer for word processing, this daisywheel printer will give you top quality printing at a budget price. Prints at 18 cps. Offers a choice of 3 pitches (10, 12, 15 cpi) plus proportional. Takes standard 96-character print wheels and ribbon cartridges (Diablo, Qume compatible), paper up to 330mm wide. Very quiet too - only 58dBA. Standard Centronics-type interface suits most popular computers.

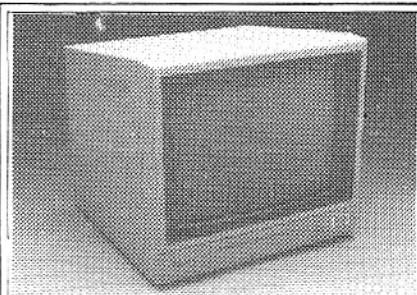
Cat X-3270 **\$1135**
Ribbon cartridge for X-3270 Printer
Cat X-3271 \$19.95
Tractor feed attachment as shown above
Cat X-3273 \$195.00



BX-80 Dot Matrix Printer

The BX-80 offers high quality, speedy dot-matrix printing at a price for lower than comparable printers. Bi-directional prints the full upper and lower case (with true descenders) ASCII, character set of 80 cps, with four character widths, 80 columns, 254mm wide either single sheet (friction feed) or fan-fold (sprocket feed). Prints bit-image graphics (640 dots line), responds to ESC code sequences for software control. Standard Centronics type interface suits most popular computers.

Cat X-3268 **\$795⁰⁰**
Ribbon cartridge for X-3268 printer
Cat X-3269 \$19.95



High Resolution Green Monitor

Even with a colour computer, you may prefer to use a green screen monitor instead of a colour monitor - especially if you're using it for business. This high-resolution green monitor has a 30cm screen and 18 MHz bandwidth, giving a bright, sharp display, even on 80-column text and hi-res graphics!

Cat X-1220 **\$449⁹⁵**

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	\$ 40.01 - \$ 60.00	\$ 4.00
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NZ113/LL

28 at a time

Hewlett-Packard's new HP 3000 Series 37 "workgroup computer" can support up to 28 users and communicate with larger central computers or smaller personal computers.

It has the same features set as the largest HP 3000 and runs identical software, but is small enough to fit next to a desk or under a table, and is much quieter than a typewriter.

The Series 37 can be installed by the customer in configurations with up to 110Mb of disk storage. Starting at \$45,000 (before tax), a Series 37 office system has 512K of main memory and 55Mb disk, cartridge tape backup, systems console, image database and office cabinet.

With standard upgrades, the user can expand through three other models, the largest with as many as 400 terminals. By networking, interconnection is possible to many more.

Applications could include branch offices or departmental uses.

Apricot tops survey

The Apricot microcomputer, distributed by Barson Computers (NZ), Ltd, has rated first on a quarterly price and performance survey of small computers in New Zealand and overseas in the second quarter of 1984. It was also first in the first quarter survey of computers in the \$5000 to \$7000 category.

Second was the Zenith Z100, third the Epson QX10, and fourth the Apple Macintosh.

The Report is compiled and researched on a quarterly basis by Eckford Enterprises Ltd.

A new plant

Hartley Computers has opened a new computer production plant in Brisbane which its New Zealand general manager, Dean Wotherspoon, says will allow the company to expand further into the design and production of high technology components. The move is a clear commitment by Hartley to the company's involvement in software.

The new factory will produce 200 units a month, supplying the Australian market as well as New Zealand, the UK and South Africa - markets which account for 30 per cent of the company's annual \$8 million hardware production. The Brisbane plant assembles the



The HP 3000 Series business computer system.

recently released 3902 Hartley PC, other Hartley single and multi-terminal systems and a large minicomputer.

Interactive Macintosh

Apple Computer is introducing a data communications package which allows the Macintosh to interact with mainframe and minicomputers as well as commercial electronic information services.

The MacTerminal has just been released in the USA and is likely to be available here within the next month, providing Macintosh users with access to information stored on large computers by businesses and universities. It is compatible with a variety of protocols.

CED, New Zealand distributor of Apple, says the package offers the most popular and useful features found on other data communications products and also enables users to exchange information with other Macintosh software by automatically converting data to a compatible format.

MacTerminal can also run on Lisa 2, 2/5 or 2/10 computers using MacWorks, the Macintosh operating system for the Lisa 2 family. It has a visual user interface, integration between applications, a mouse and the ability to view multiple objects on screen.

It is integrated with MacWrite and Microsoft's Multiplan spreadsheet, allowing users to copy and paste between applications.

This package also has a file transfer facility which allows the transfer of text and graphics to Macintoshes or Lisas in different locations.

Updated Multiplan

An updated version of Microsoft Multiplan is now available in New Zealand.

Interactive Applications Ltd, the New Zealand agent, says the amended program offers three major enhancements over Multiplan 1.10. An expanded financial function provides a more refined method of calculating financial returns on investments, based on the modified rate of return which allows the user to specify re-investment rate of interim cash flows of an investment.

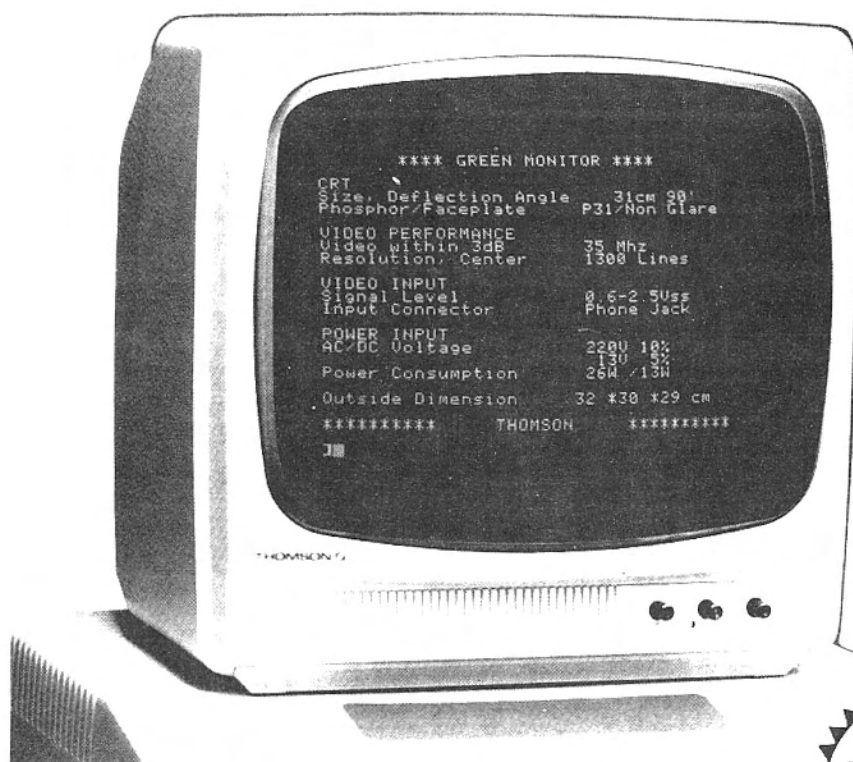
Other upgrades include the ability to run colour on the IBM PC and the PC Junior - a choice of 16 foreground, background and border colours is provided for each window with colour selected via the "window paint" command.

The new version provides the ability to select a \$ format and to specify the number of decimal places preferred. Microsoft dealers will arrange to update the Multiplan 1.06 or 1.10 packages with the new programs for a \$50 fee. MS-DOS Multiplan 1.2 is now available at \$595.

No Tandy gap

Last month we reported how Computer Advances was establishing in Auckland's Silicon Alley... and how the co-directors, Grainger and Smith, had picked up the Radio Shack agency when it was relinquished in New Zealand. That agency was relinquished some time back but Tandy machines have been sold here by Porterfields in Auckland and Christchurch-based AVM Electronics.

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Modems – at last?

By the time you read this issue of *Bits & Bytes* the Post Office should finally have released the specifications for direct connect modems and begun type approving such modems.

Until now the only modems legal to use with microcomputers have been acoustic coupled modems (where the handset of the telephone sits in the modem) which are not generally reliable.

As their name implies connect modems are directly connected to the telephone via a jackpoint and are much more reliable.

But while such modems are freely in use overseas it wasn't until June this year that the New Zealand Post Office announced it was going to type approve them for use in New Zealand.

This prompted a number of companies in New Zealand, anticipating a ready market for direct connect modems, to start planning for manufacture or importing of them.

But first they needed the specifications which the Post Office would use to decide whether a modem should be type approved or not (it is illegal to use any modem apart from acoustic coupled ones not type approved). These didn't appear however, although most companies assumed they would simply be the internationally recognised CCITT specifications used in many other countries.

As this issue of *Bits & Bytes* went to press Mr D. Richards, Director of Telecommunications Marketing for the Post Office, told us he expected the specifications to be released in the "next week or so" and that they would be the CCITT standard.

If this is so, and type approvals quickly follow, then microcomputer owners can expect to be able to choose from a number of different modems in the next few months. Most of these will be switch selectable between different baud rates including the 1200/75 rate necessary for accessing the different Videotext services now beginning.

However, the modems won't be cheap with most expected to retail in the \$400-\$500 range and on top of that software will be required for your computer to drive the modem and most existing telephones won't have the required jackpoint. To

arrange for this you will have to contact your local Post Office telephone services section although the cost, if any, is not known yet.



The Zenith Z-160 Portable PC

Two more from Zenith

New Zenith products are on the way of Warburton Franki.

Following in the footsteps of the highly successful Z-100 computer will be the new Z-150 Personal Computer – a totally IBM compatible computer featuring direct ROM emulation of the IBM PC, but at the same time offering its own advanced specifications and features.

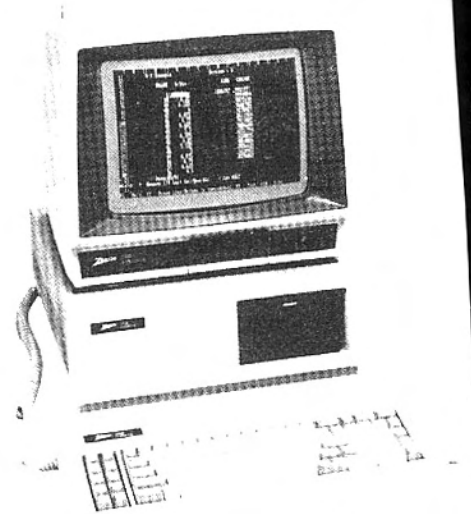
The portable version of this computer is the Z-160, with its pop-up top containing the two slimline 360K minifloppy disk drives.

VIB – Very Intelligent Building

Construction has started on a futuristic high rise office building in Auckland, billed to be the most intelligent building in Australasia.

The new Shortland Centre incorporates a sophisticated electronic communications network and automated building operation system. Future tenants will be able to access the 18-storey building's "brain" – an integrated system which provides access to word processing and laser printing, data processing, video, teletext, overseas data bases, telex, telephones, paging and video camera security.

An automated document carrier will complement the centre's \$65 million electronic system; its electronically controlled carriages will travel vertically or horizontally on aluminium rails from the building's nerve centre to stations on each floor



The Zenith Z-150 PC

of the twin towered block.

The carrier will allow incoming mail, documents and material produced by laser printer to be conveyed between offices and a sixth floor service centre.

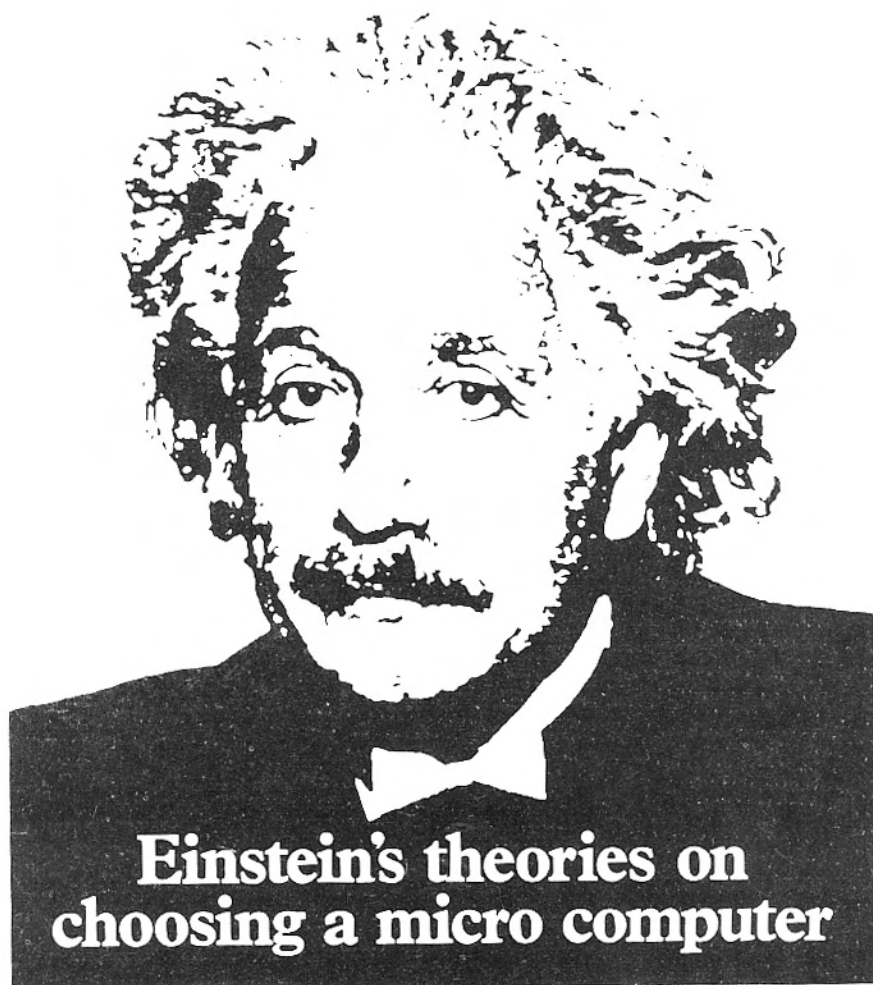
C64 word processing

A simple word processing package has been released for the C64; the WORD/NAME MACHINE is a low level word processor that acts like a typewriter.

Suited to young children, the program allows users to write, save, edit and print documents or letters in a format decided by the writer. It offers three printing formats – formal, informal or draft. It also allows the C64 to be used as an electronic telephone book, a source of mailing labels and a tool for generating a batch mailing list.

Poly growth

There are now around 350 Poly and Proteus computers installed in educational institutes. Among the new Poly courseware is a geography package written by Dr P.C. Forer, of Canterbury University's geography department. The urban land-use package explores the concepts of mobility/growth, urban structure, retail competition, and zoning and growth. The suite of four programs makes full use of Poly graphics and sells for \$50.



Einstein's theories on choosing a micro computer

Choosing a micro is a daunting task for the novice and with an ever increasing number of micro's emerging on the New Zealand market. Even upgrading from a ZX81 can be a risky and expensive exercise with the wrong decisions made. At first you should be so below 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 facilities 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 you to keep with its rapid pace 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 PCB's. 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, but remember 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 no 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 bases, some being very different from the rest. Adequate standard in the computer industry is Microsoft BASIC. Learn this and you will be able to programme in the majority of computer bases. Such an important point of 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, plot, stack, 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 for details. Check on the vertical and horizontal resolution in graphics 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, as 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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and command structures of the various application programs (even though they would be run on the same screen under the control of the windowing program). Microsoft Windows is a similar package which allows the use of existing software. Microsoft, however, has developed specialised software for its integrated environment, allowing users to take full advantage of the benefits of integration if they choose — without requiring the replacement of an entire library.

On the other hand, there is the integrated environment which requires the use of specially designed application programs and naturally derives all the benefits of such complete integration. This category will be the focus of our attention over the next few months. Among these systems are Visi On, by VisiCorp, the marketer of the original electronic spreadsheet, VisiCalc.

Other examples of this approach include Symphony, by Lotus Development Corp. (marketer of Lotus 1-2-3), and Open Access, by Software Products International. These two products will be the focus of further articles in this series.

Hardware requirements

Keep in mind that one of the primary purposes for the introduction of the windowing software is to improve the man-machine interface. This improvement usually means making the machine smarter so that the users of the systems don't have to be so highly trained. If the systems are easier to use and less daunting, more people will be able and willing to use the systems, so increasing white collar productivity.

To maintain an acceptable level of performance (reasonably short waiting times), smarter systems will require more powerful hardware. As was noted by many reviewers when the Apple Lisa was first introduced, here was a machine with a 32-bit processor, hard-disk drive and half-a-megabyte of memory devoted to a single work station. In years past, this would have sounded like a mainframe configuration for a multi-user environment. And even with the Lisa, there were times when you wish it would hurry up!

Now we see arriving all the windowing packages attempting to do with software alone what Lisa used dedicated hardware and

software to accomplish. Can they do it? This question is a bit misleading. All the windowing environments announced so far require hardware upgrades and therefore are using hardware enhancements, along with new software, to accomplish the job. In most cases, the hardware upgrade includes extra memory and colour graphics.

Typically, these systems require from 256K bytes of RAM up to 512K

Visi On — the first

By John J. Vargo

Visi On was the first of the integrated windowing environments announced into the Lisa-lookalike sweepstakes. There was much speculation before its release about Visi On's ability to do all the things Lisa was doing and still deliver acceptable performance. The equipment requirements for the Visi On system include minimum 512K bytes of RAM, a 5-megabyte hard-disk drive, graphics adaptor card, an optical mouse supplied (at extra cost) by VisiCorp, and the necessary communication interface (RS-232) for the mouse.

Visi On falls into the specially designed software category, requiring the purchaser to replace existing applications programs with ones specifically designed for the Visi On system. An interesting commentary on the development and marketing of complex microcomputer software in a fast moving market is noted in the following quotes:

"Many of the electronic desktop functions that make Lisa so attractive are also found in VisiCorp's Visi On, which was announced in November 1982 but not shipped until nearly a year later." — Popular Computing, December 1983. (It is somehow reassuring to know we are not the only ones who underestimate the time required to develop new programs.)

"VisiCorp — which is in the midst of launching its ambitious integrated windowing package, Visi On — finds itself in crazy times:

— It has dropped the price of the Visi On Application Manager, which is necessary to run any of the applications packages, such as Visi On Calc from \$495 to \$95;

— Software Arts, the developer of the original VisiCalc, is going to court to get back the rights to the latest version of VisiCalc and the VisiCalc trademark. Software Arts says VisiCorp has not used its best efforts

bytes, and in some cases a minimum of 5 megabytes of hard-disk storage as well. On top of this there is often the need for a mouse and communications interface. This often means a major upgrade costing thousands of dollars on top of the current system. In most cases, these windowing packages are initially being released only for the IBM-PC and direct compatibles.

to market VisiCalc, but is steering customers toward Visi On Calc.

— Lotus Development Corporation announced its Symphony product about 10 days later, but Flystra (chairman of VisiCorp) said he didn't know of the coming Lotus product. There was, however, a "crazy Wall Street reaction" which hurt VisiCorp's stock, but that was due to "misunderstandings" because Visi On was being compared to Lotus' 1-2-3, he added." (PC Magazine, April 3, 1984.)

As can be seen from these comments new product releases can severely affect the sale of earlier products. High powered marketing and an extremely competitive environment often produce promises that are never fulfilled.

Product overview

Visi On is a tightly integrated system using an application manager to act as a higher level operating system. The applications manager performs all interface between the user and computer including loading particular application programs, saving and retrieving files, listing and loading files, as well as other features usually performed by the operating system. Available as applications are: Visi On Calc, Visi On Word, and Visi On Graph. Each application may be purchased separately to suit your particular requirements.

Visi On uses eight simple commands. Help displays a help menu; Open, Close, Full, and Frame provide for manipulation of the windows; Stop terminates the current command; Transfer allows you to move data from one window to another in a cut-and-paste operation; and Options produces a particular functional menu for the application that is in the active window. Although a number of

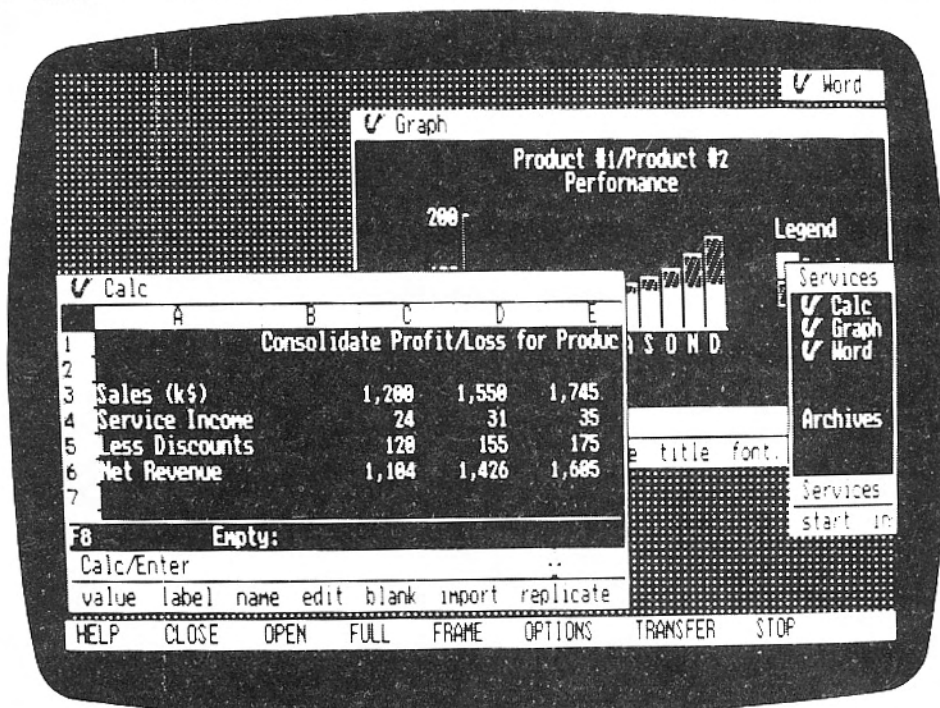
INTEGRATED PACKAGES

windows (as many as 16) may be present on the screen, the computer is in fact running only one application at a time. You must switch from one window to another before you can begin to work with a new application.

Working with Visi On

The creators of Visi On chose an optical mouse for their product, unlike the mechanical mouse used with the Lisa and Macintosh computers from Apple. The optical mouse used with Visi On moves very smoothly and you get calibrated to its motion quite quickly. The choice of a two-button mouse for Visi On rather than the one-button mouse of Lisa/Macintosh is another distinguishing feature.

The left button on the Visi On mouse selects the action to be performed by pointing at the appropriate command, formula operators (+, -, *, sum(), etc.), and active cell selection and clicking the left button. The right button causes the window in which you are working to scroll in the direction in



The view through the Visi On window which you move the mouse. The further you move the mouse, the more quickly the scrolling takes place — a very slick feature.

The one unfortunate thing about the design of Visi On is that the option to use the mouse is not left up to the user. The mouse is required in working with the product, and this can be a real drawback, especially if your mouse goes out of order — as mine did twice!

With the mouse being a potential failure point in the system, it would be a good idea to have the use of the mouse switch selectable and allow use of the cursor control keys instead.

Another immediately noticeable feature of the product is the speed at which it handles file access, window changes, and data transfer. It is slow, probably unacceptably so for many applications. This is not totally unexpected since even the Lisa with its dedicated 32-bit processor was at times a bit slow. Unfortunately, Visi On is much slower and this severely hampers the otherwise excellent features of the product.

The graphics presentation of Visi On uses a bit-mapped system, producing very sharp, high resolution graphics. This system uses quite a bit of memory, and consequently the creators have not added colour to the features of the package nor the use of icons (small pictures depicting the function of particular commands, used in the Lisa/Macintosh).

Regarding the particular application packages, Visi On Word is a full featured word processor giving a "what you see is what you get" screen display. The result is that

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Visi On — the first

special features like bold, italic, underlined, superscript, subscript and other combinations of these are actually seen on the screen rather than as special characters, which is often the case with other word-processing packages.

The program includes most of the standard features including search and replace, block move, and centring. The program also has an interesting additional feature called "synopsis" which is a special history sheet maintained automatically in conjunction with each document created.

This synopsis form provides the dates the document was created, last modified, and last printed, and the number of pages and lines in the document. Optionally, you can add the author of the document, the name of any document you would like to chain to the end of the current document for printing, and a comment line of up to 45 characters.

Visi On Calc has all the features of typical spreadsheet packages, working within the Visi On environment. Features such as formula replication, use of special mathematical functions (sum, min, max, avg and so forth), copying or moving ranges of cells with automatic formula adjustment are all included.

There are also a number of less usual functions including the random number generator, internal rate of return and annuity payment functions. Plus a full range of calendar functions to perform date arithmetic for such computations as the accrued interest on a certificate of deposit.

As with all Visi On applications, to transfer data between worksheets or other applications you simply select the transfer command from the main menu line which is always visible at the bottom of the screen. It is

necessary to have the documents, worksheets etc. on screen in separate windows before starting the transfer process. You are then prompted to point (with the mouse) at the window from which you would like to transfer, the data to be transferred, the window to transfer to, and the place in the receiving window. The program does the rest.

Visi On Graph creates graphs based on series of data either specially created within the graph program by the user — or transferred in from the calc program. The process of transferring data to the graph program again follows the standard Visi On transfer process. Options for graphic display include line, bar and pie graphs. As well as these standard graphs, the graph program provides for X-Y, area (filled in line graphs) and high-low-close graphs (for stock market data display). Naturally, the program

provides for annotating labels, titles, and other explanatory text to the graphs.

Visi On is an easy-to-use integrated system working with an optical mouse for command selection. The program has provided most of the features a business user could ask for in the application programs — and does so in a very consistent fashion. The manuals provided by the vendor include an easy-to-follow, quick-start course and good indexing.

Unfortunately, the product suffers from hardware that is not quite up to the requirements of the software, so producing slow performance. I am sure that as time progresses, this problem will be overcome with refinement of the program code and more powerful hardware. Meanwhile, we will look at Visi On's competitors in the integrated windowing market next month.

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Help for 'one-man band'

By Pat Churchill

Just over a year ago, Iain Morrison quit his job with the New Zealand Wool Board and started Freelance Publications Ltd. Recently, he decided to computerise his public relations and publishing business.

Iain does a limited amount of public relations work and is on contract to the New Zealand Chambers of Commerce as editor of the monthly publication, *Business Today*, on a profit-sharing basis.

Working as a "one-man band", he found it logical to invest in a computer to improve the efficiency of his operation.

While at the Wool Board, he produced the in-house 35,000 circulation, *Wool World*. There, he gained experience of computerised publishing using a Wang word processor and producing pre-coded copy on disk that could be fed into the typesetter's computer system without the need for re-setting.

When he started his own business, Iain discovered that typesetter Richard Hook, of Comset, had computerised typesetting equipment which could handle many types of computer disk.

"I thought it was time to start taking tentative steps into computerising my operation," said Iain.

Two long term benefits

He could see two long term benefits. One was saving time, the other was saving money.

The Chamber of Commerce had purchased an Apple IIe and he wanted something compatible.

A secondhand Apple II+ with colour monitor and disk drive became available at a good price. Iain snapped it up.

To get copy set in the right type and column sizes, it must be marked with coded setting instructions. By entering the coding himself and providing copy on disk ready for setting without further keyboarding, Iain can save on costs.

"When I'm sitting here at 11 at night writing an article, I'm actually typesetting. This is knocking about a third of the cost off typesetting and comping."

These savings will help pay for his computer system.

Future plans include a modem hookup so that Iain can download his copy from his computer into the Comset system. And this is where Iain sees a real timesaving benefit occurring.

"I'll be able to work on a story at night, for instance, then send it through to the Comset system say at

six the next morning. Then I'll be able to get the bromides of the set type later in the day."

Savings in time

This will save Iain time otherwise spent finding carparks and running errands, or money spent on couriers.

A thorough checking of his own input will ensure the end product is already proofread — a further bonus.

Iain uses Apple Writer software for word processing. He says he is now able to think easily in the copy marking code, visualising what the end product will look like.

Like so many computer users, he is well aware how utterly logical these machines can be.

"Unforgiving," is his word for it. "If, for example, I put in the code to indent paragraphs, and then I forget to cancel the command, everything thereafter will be indented."

Iain says the Apple seems able to do all the functions he requires: "It will help teach me. Next time round I will know what machine I need."

His next step

His next step will be to establish his own office and have a computerised filing system for his work, records and accounts.

"I'm not interested in programming. I just want to be more efficient."

While Iain's Apple is a piece of business equipment, it is also a big hit with his family.

"We're in the computer age, like it or not. I think it is important for children to learn about computers."

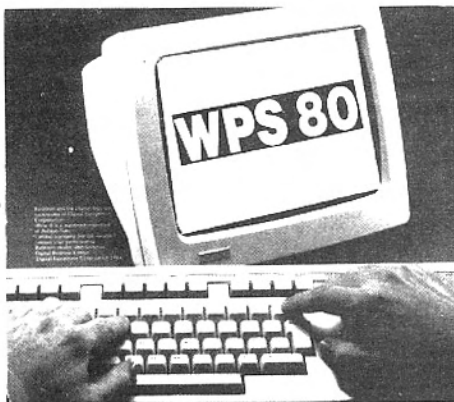
His 12-year-old son, Matthew, is a fast learner. He and a friend managed to unpack the machine and get it hooked up and running programs in not too many minutes — and without the benefit of a manual to tell them how.

"It would have taken me a lot longer," Iain admits.

Anyone who has been itching to get computer literate and can come up only with "? syntax error" will know the feeling...

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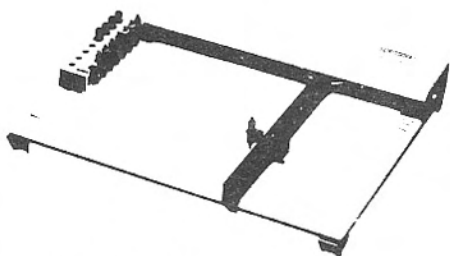
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By Pat Churchill

Powercorp Group, Ltd's, public issue of 4.8 million ordinary shares opened and closed on October 4. The ordinary shares, of 25 cents each, are to be issued at 60 cents a share.

Powercorp, a Wellington computer retail chain, software house and office equipment dealer, has bought a chain of IBM and Wang computer retail outlets from its parent company, Andas Group, Ltd. In return, Andas will hold 51 per cent of Powercorp capital.

Powercorp will deal in IBM personal computers, word processors and typewriters, Wang word processors and typewriters, Toshiba photocopiers, office furniture, Sharp calculators and Casio calculators and cash registers.

Powercorp has also purchased the Auckland-based IBM computer retailing group, the Martin Spencer Group, which has a sizeable software development and marketing arm.

In its financial projections, Powercorp has based its figures on a 20 per cent growth in the market for micro-computers and related software and services, and expects to earn a \$541,000 profit after tax for the June 1985 financial year, and \$1 million the following year.

Andas' chairman, Ken Fraser, is the new company's chairman.

Kiwis in good shape

New Zealand is in a good competitive position when it comes to writing software for overseas clients, according to the managing director of Powercorp Systems, Ltd, Martin Spencer.

As an instance, he said the \$40 per hour fee charged here for writing software translated to \$US20 an hour.

"Compare that with the \$50 an hour charged in say Chicago," he told *Bits & Bytes*.

The new Powercorp Group, Ltd, intends to get into software development and marketing activities and has acquired the Martin Spencer Group which already has a considerable involvement in these areas.

'84 was a good year

By Pat Churchill

The Andas Group has achieved an after tax net trading profit of \$961,000 for the year ended June 30, 1984 compared with \$69,000 for the previous year. Net profit, after extraordinary including \$84,000 goodwill written off and \$99,000 prior year tax adjustment, was \$723,000.

The profit was achieved on sales of \$31 million — 29.8 per cent ahead of the same period last year.

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MAGNABIZ

QL: Serious and professional

Gary Parker has been able to get his hands on a new Sinclair QL, one of the first in the country. He reports on the experience...

It was difficult to believe this was the same computer reviewed in British magazines. Where were the faults? Sinclair seems to have corrected all of them in this latest version, and what I had before me was an exceptionally powerful, professional business system.

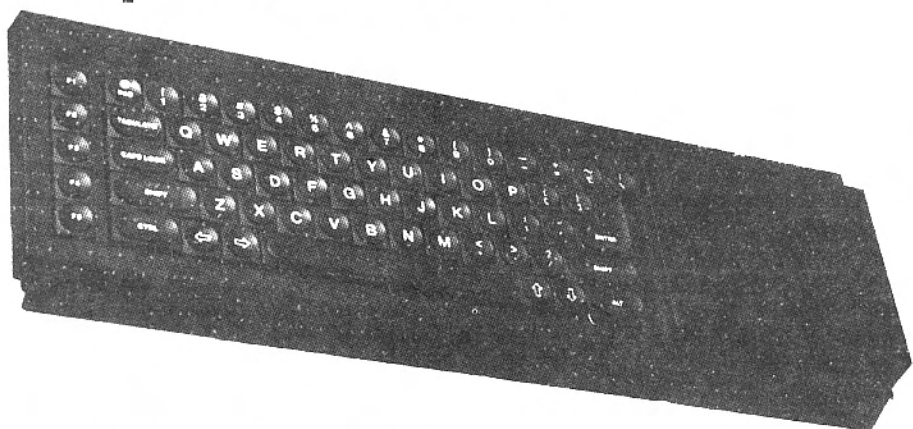
The QL has too many features to mention here, and I was only able to skim the surface during my session with it. The only hint I could find of any of the criticisms was that some keys occasionally stuck down. Apart from that, the ROM on this model was internal (all 48K), the twin built-in microdrives handled data at disk-drive speeds, and the operating system gave an impeccable performance.

The SUPERBASIC really does live up to its name. It seems very PASCAL-like with its huge number of commands. When writing programs on my Spectrum, I can never decide whether to use BASIC or PASCAL, since they both have advantages. BASIC allows the programmer considerable freedom, and being interpreted, is easy to edit, while PASCAL has clear structure, allows powerful definitions, and, being compiled, is fast-running. SUPERBASIC seems to have combined the best features of both.

Other languages are also forthcoming; PASCAL, C, 68000 ASSEMBLER, APL and BCBL are promised in the QLUB (QL Users Bureau) newsletter.

To fully appreciate the QL's graphics capabilities, an RGB monitor is required. On power-up, the QL asks you to press F1 if you have a monitor, or F2 if you have a television. With a monitor, the column width is doubled to 80 characters per line, and the screen divided into two halves; the left for the program listing, the right for the program's output.

Of course, the program can make use of the whole screen if desired, and extensive window commands are implemented. The ROM also contains turtle graphics. The twin-screen system makes debugging a pleasure, since you can read the program while you are observing its output.



The QL offers a maximum resolution of 512 x 256 pixels with four colours, or 256 x 256 with eight colours. Four stipple patterns are available to produce various intermediate hues, and a short demonstration program which I typed in produced an impressive Atari-like rainbow display. 32K of the QL's 128K of RAM is reserved as screen memory.

The four business programs must have also been considerably improved since early reviews; I experimented with Quill (the word processor) and Easel (the business

graphics package) and found them to be exceptionally powerful and user-friendly.

In short, the QL makes home computers look like... well, home computers. But while its capabilities and price may attract games enthusiasts, I very much doubt whether the QL will ever match the Spectrum in terms of the thousands of games available. The QL is a serious computer.

The QL will be reviewed in detail in our November issue.

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HARDWARE REVIEW

TRS-80 MODEL 4P

Get-up-and-go appeal

By Rodney Lincoln

One of the most impressive qualities of the new TRS-80 Model 4P computer is its functional shape and size. Unlike some computers, it fits in easily with any decor while maintaining a very businesslike appearance. The Model 4P is the latest brainchild of the Tandy Corporation which describes it as a "transportable".

The Model 4P Transportable has a very interesting background. In 1980, Tandy brought out its Z80-based Model III desktop computer, and in 1983, introduced a more powerful version of the Model III with 64K of RAM and a very similar shape. Now Tandy is introducing the Model 4P in a smaller, transportable package. The 4P has the same amount of RAM as the Model 4 and has two inbuilt disk drives. It can use any of the large library of software developed for the Model III and Model 4 computers.

The Model 4P is a compact disk-based computer with a difference. It is perfect for busy managers on the move. It is also perfect for the small business person, student or professional person. As well as being able to run previous Model III and 4 software, it has the option of running the CP/M-plus operating system, giving it a powerful software base.

This computer is similar in its design approach to the Osborne 1 and Access portables which were not so successful, partly because of their tiny 7in screens. The Model 4P uses a quite acceptable 9in screen which is easy on the eye even after long periods of use.

Because of the computer's construction, the screen sits about 3in above desktop level. It is angled backwards at about 15 degrees and viewing is further enhanced by the simple adjustments of contrast and brightness controls.

Comfortable viewing

I found the Model 4P very good for comfortable viewing and was impressed with its compactness and ease of setting up. Setting up is a matter of taking off the cover, connecting the power cord and switching on the power. After a second or two, the system is booted and the computer tells you to insert a disk.



The standard software is a 5¼in floppy disk which contains the useful TRS DOS 6 operating system and the popular M BASIC. For those needing more power, the 4P can be expanded to take Tandy's hard disk system.

The Model 4P comes in an off white, high impact ABS plastic case, measuring 30cm x 25cm x 40cm and weighs 26lbs. The front of the computer has three areas shaded in black — the first, on the left, has the brightness, contrast, power and reset buttons; the second area surrounds the screen; and to the right are the two floppy disk slots. An excellent detached keyboard has 70 keys, a numeric pad on the right with three function keys, and capitals, shift and control keys. The cursor keys are a little unconventional, with the verticals on the left hand of the keyboard and the horizontals on the right.

After use, the keyboard slips very neatly into a slot at the bottom of the machine. The front cover can then be snapped on and the cords removed to make the machine ready to be transported. At the rear of the

machine is a neat snap-open cover which reveals an RS232 port, an I/O bus for use with an optional modem and a parallel centronics printer port. The rear of the case also has a very solid carrying handle. The whole unit is well constructed and looks professional.

The Model 4P has a Z80A cpu with a clock running at 4MHz (2MHz in Model III mode). It comes with 64K of inbuilt RAM as standard and this can be expanded up to 128K. When the RAM has been expanded, unused RAM can be used as a disk emulator or a superfast disk. This disk emulation is set up in blocks of 16K from the DOS. The disk operating system, TRS DOS 6, uses around 20K of RAM. If BASIC is loaded into the RAM as well as the DOS, about 30K of user RAM is still available on the standard 64K machine.

Useful commands

The TRS DOS 6 has some useful programs and commands:

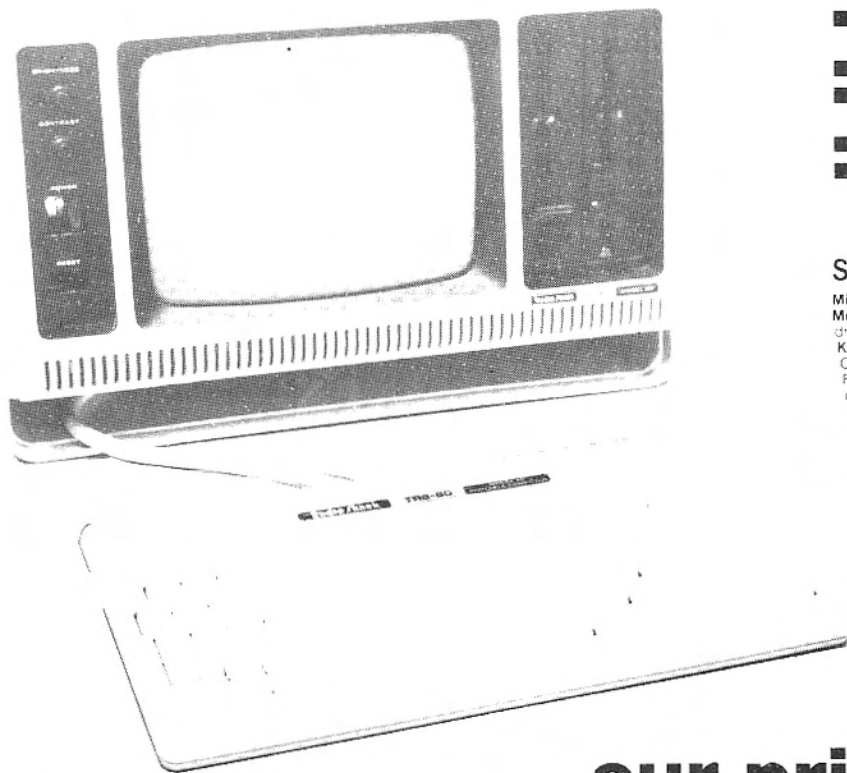
- MEMDISK lets you store information in memory in the same



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SPECIFICATIONS:

Microprocessor: 4 MHz Z-80A (2 MHz in Model III mode)
Memory: 64K RAM, expandable to 128K. Provides for disk drive emulation in RAM, only 64K addressable from BASIC
Keyboard: 70-key typewriter-style with datapad, plus CONTROL, CAPS and 3 programmable function keys (F1, F2, F3)
Video Display: 80x24 (Model 4 mode), 64x16 (Model III mode), or double-width 40 or 32 characters per line. Upper and lower case, Reverse video (Model 4 mode), 96 teletype graphics and 96 special characters
Language: Microsoft 5.0
Sound: Obtainable from BASIC. Triggered "keyclick"
Disk Drives: Two built-in double-density 184K 5 1/4" drives
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HARDWARE REVIEW

way you store information in a disk file. This is the command used for the disk emulation.

- CONV. moves information from a diskette formatted by TRS DOS 1 (the Model III operating system) to a diskette formatted by TRS DOS 6 (the model 4P operating system).

- COMM lets you connect your Model 4P to another computer and use its hardware and software; eg, the TRS-80 Model 100 (see *Bits & Bytes*, July 1984).

- KSM/FLT lets you save TRS DOS and basic instructions that you use most often and quickly recall them from the keyboard; eg, you can reprogram the B key to represent the DIR:1 or directory command.

- SET/FILTER. If you are an assembly language programmer this lets you change the programs which control each part of the hardware.

The TRS-80 Model 4P supports a powerful form of Microsoft MBASIC. It is easy to edit, has a real time clock and does maths in single or double precision. It can run other languages on diskette as well. Tandy offers other compilers for other languages such as BASIC, PILOT, COBOL and FORTRAN. Assembly language is

supported for the advanced programmer. The Model 4P is compatible with the CP/M plus operating system and can therefore run programs such as VisiCalc (business spread sheets), Multiplan (an advanced form of VisiCalc), WordStar (word processor), Scripsit (powerful word processor), and various spelling and grammar checkers.

With the Model 4P running on TRS DOS 6.0, the 80 by 24 screen does not use any of the computer's 64Kb of RAM. Instead, a specially addressed bank of 2Kb of RAM handles the screen memory. All functions work well with this display and it is easy to shift to 40 characters display if you require. A standard Model 4P has two 40-track double density disk drives which can each format a disk with 18 sectors on 40 tracks. TRS DOS 6.0 can create two types of disks system disks, which hold the DOS and various other utilities, and data disks which contain programs and other files.

The 4P has an 80 character by 24 lines display. Unfortunately, the 4P must be upgraded to produce its optional, 640 x 240 pixels, high

resolution graphics. The high resolution graphics allow you to draw shapes not already defined in the low resolution graphics set. Programs are available to help you do this. In low resolution graphics, there are 64 predefined graphics characters and 96 special characters available to the user.

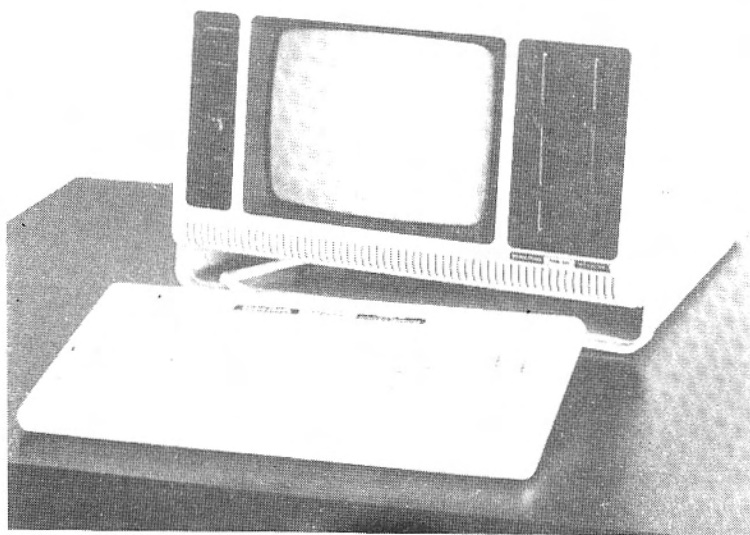
The documentation

I found the 4P's documentation very complete and of high quality. The main manual is the *Model 4 Disk System Owners Manual* in a high quality ring binder. Also available with the machine is the *Model 4 Quick Reference Guide and Introduction to your Disk System*. The last two are quick reference guides for everyday use. For those wanting to know more about the Model 4P a small book, *Things to do with your TRS-80 Model 4 Computer* is available.

For more technical information, there is another ring binder manual which sells for \$68. This *Technical Reference Manual* provides a much more in depth knowledge.

These manuals are excellent for those who already have at least a little hands-on experience. However,

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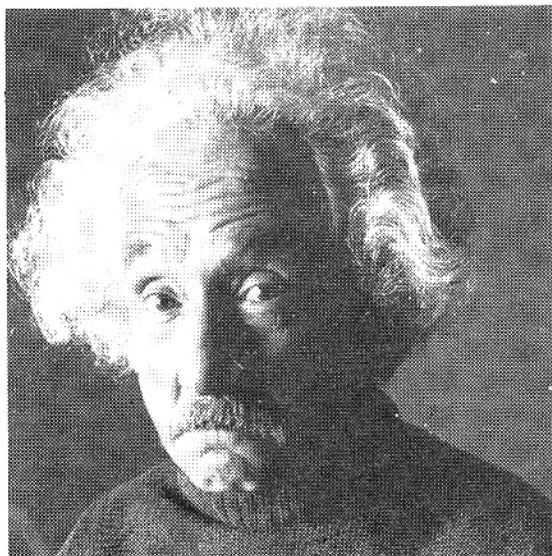
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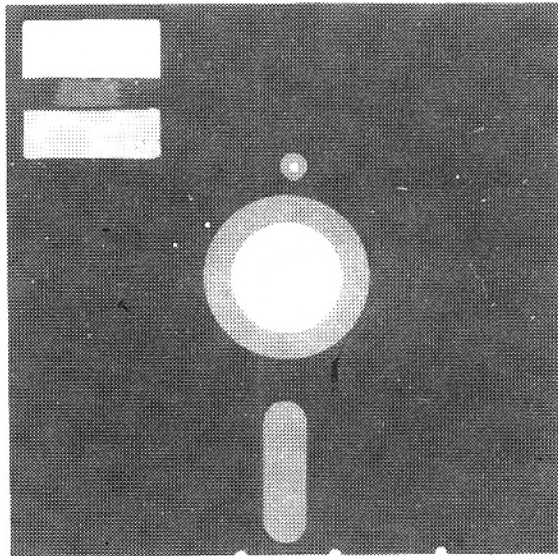
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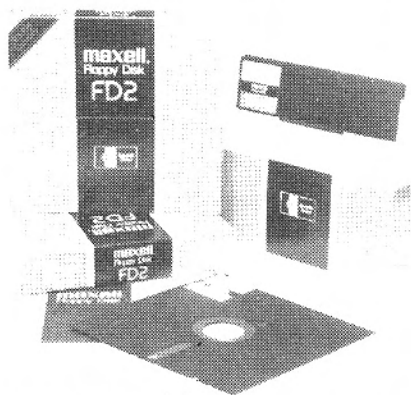
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HARDWARE REVIEW

they could be daunting for the first time user who, I would suggest, should obtain one of the many excellent elementary programming books available.

As the Model 4P offers similar facilities to the Apple IIe, a comparison may be of interest. The basic Apple IIe arrives with 64K of RAM, a monochrome monitor, a single disk drive and a disk drive card. To upgrade the Apple IIe to be closer to the Model 4P, you would need to add another disk drive and a centronics printer port. The Apple IIe is not as expandable in this form as the Model 4P because if you want to add further drives to the IIe, you have to buy another disk drive card. If you want to add additional disk drives to the Model 4P, these need only be connected and you are in business.

To balance the coin, however, the IIe may be expanded to display excellent colour graphics. A large number of programs have been written for Apple graphics.

The software

I was assured there was no difficulty with supply of hardware and most software for the Model 4P. Servicing is handled through two Auckland companies.

I was told that the price of \$NZ4995 for the standard 4P will not increase in the immediate future.

The standard software with the Model 4P, is: Model 4/4P TRS DOS 6 and basic interpreter; Data Disks 0 and 1. "Accounts for small business" a package which runs stock control (up to 1000 items), invoice entry, payments/journal entries, and debtors from the main menu.

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Microcomputer summary

Name:	TRS 80 Model 4P.
Manufacturer:	Tandy Corporation.
C.P.U.:	Z80 A @ 4MHz.
RAM:	64K expandable to 128K.
Keyboard:	70 Key, typewriter style with Datapad.
Video display:	80 x 24. Upper, Lower case, Reverse video. 64 graphics and 96 special characters. 640 x 240 dot graphics Single channel piezo device.
Sound:	TRS DOS 6. CP/M plus with expansion.
Operating system:	Large range available.
Software:	Two built in double density 184K 5¼ drives.
Disk drives:	Disk emulation available in expanded model. Buffered I/O Bus.
Special features:	Documentation 4; ease of use 4; support 4; expansion 3; value 3.
Reviewer's ratings (5 of the highest):	Basic 4P, 64K two disk drives, software \$4995.
Price:	(Review machine supplied by Porterfield Computers, Ltd, Dominion Rd, Auckland.)

The Model 4P has two built-in double density, 184K 5¼in, single sided disk drives. Reliable and reasonably quiet, they should give about 50 typed pages of information per disk.

Good definition

The 4P computer uses a 9in monochrome screen (green screen models will be available in about three months). The advantage of the green screen is the response time of the phosphors used. Green phosphors cause less flicker and hence, less eye strain. However, I found the monochrome screen very good and was impressed with its good definition.

As the Model 4P is a great performer around the home, games are really important. While the 4P can give you plenty of fun playing games, it cannot compete with the quality of arcade games. It can produce graphics but without a colour display, it cannot compare with computers such as Atari for games.

More and more programs are becoming available for home finance, loan management, tax computations and home records. There is also a range of software to help manage nutrition and of course, quite a large amount of educational software is available.

Computer communications is becoming increasingly important, and the Model 4P has an optional modem board available — although this is not yet type-approved by the New Zealand Post Office because it is direct-connect. However, approval is expected soon.

Tandy Corporation has achieved its aim of providing a very useful

computer with an extremely practical layout. I was very impressed with the obvious planning that has gone into producing a computer with real get-up-and-go appeal. The Model 4P slots in nicely with Tandy's existing range of hardware and can make use of a large range of software, utilities and support.

PX-8 review at issue

Microprocessor Developments, Ltd, the distributor of the Epson PX-8, takes issue with the review of the machine in the September issue of *Bits & Bytes*.

MDL's software manager, Hans Remiens, says that although it has much of the power of a desktop micro, the PX-8 is not a desktop and should not be evaluated as such. "Rather the PX-8 is a unique battery powered portable — not 'luggable' with significant extensions to CP/M."

He says the reviewer's description of the keyboard layout is incorrect, claiming there is no such thing as a "standard" keyboard layout. "It is certainly not again 'standard' for the HOME key to be in the centre of the cursor control keys. The PX-8 has four special purpose keys and five function keys, shiftable to 10. These function keys may be user-defined and the function key prompt may be optionally displayed on the last line of the screen."

(Our reviewer did not describe the PX-8 as a luggable; he wrote that it could receive competition from existing "luggables". The review thoroughly described the size and weight of the machine. — Editor).

MTX-500

A lot in a metal case

By Peter Ensor

Computers are like cars — they go through fads in design. Just as front-wheel drive cars have become the norm, computers are invariably produced in cream coloured plastic cases. The first thing you notice about the MTX-500 computer, from Memotech, is that it is made in an ancient material called metal.

The metal provides not only a robust covering but is also used for radio frequency interference suppression and as a heatsink.

The black case is a broad wedge shape similar to the Commodore 64 but much wider. The keyboard, which is sloped on the top of the case, contains (as well as the standard QWERTY keyboard) 12 keys shaped as a numeric keypad with a further eight function keys to the far right.

The numeric keyboard is predominantly used for cursor control and special functions, with the shift key pressed to use the numerics.

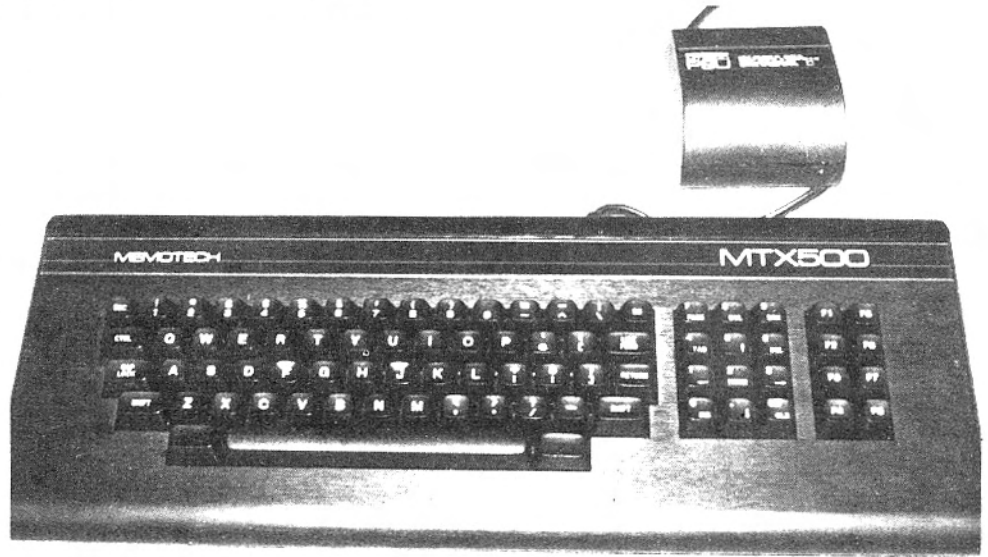
On the back of the case are the input/output sockets . . . for two joysticks, the cassette, Centronics printer as well as the TV, monitor and audio outputs. There are two serial RS-232C ports for the serial option. The full Z80 expansion bus is provided on the left hand side of the case.

Tried and true Z80

The machine is steamed by the tried and true Z80 running at 4MHz. This enables the system to run CP/M which is supplied as standard with the dual disk drive option.

The review unit contained 32K of memory but there is another model, the MTX-512, which contains 64K. This unit is capable of being expanded to 512K without the need for extra expansion boxes. In addition, both models contain 16K of separate memory for the video processor.

The TMS 9929 video processor provides 32 sprites as well as a 256 x 192 graphics resolution. The normal text display is 40 columns by 24 lines. All information can be presented in 14 different colours with the 15th "colour" being a transparent mode for the sprites.



The Memotech MTX-500 keyboard

The sound generator can produce three tones as well as a pink noise generator. (Pink noise is louder in the low frequencies than white noise which has an equal volume of all frequencies.)

The unit supplied was a cassette-based machine . . . again, going back to the old-fashioned method of using a standard audio tape recorder. However, to make things better and brighter, the data transfer rate has been increased to 2400 baud. Programs loaded in quickly and without error, with the TV speaker used to confirm operation of the tape recorder.

A demonstration program, some business programs and a reasonable game called Toado were supplied with the unit. A head cleaner tape and a blank cassette were also included. These little additions make you feel as if Memotech wants to make sure you can use the machine as soon as you buy it. Nice.

The screen layout is white characters on a blue background spread over the full width of the screen. The character fonts were easy to read and used true descenders. The screen is divided into three areas. The bottom line is a prompt line while the four lines above this are the entry and editing lines. The rest of the screen is used as a normal scrolling screen.

One annoying point in using these three divisions is that when a program finishes, the last three lines can be blanked out by the editing

area. A bit of very simple programming overcomes this problem.

The BASIC appears to be a special version. The old LET statement is mandatory but offset against this are some very good sound and graphics commands. The language does not allow a variable to be used on the righthand side of an equation until it has been defined — this avoids wasted time debugging a program. Any error found is placed in the edit window for alteration. The error messages themselves, however, are cryptic and a copy of the explanations is required.

The graphics commands were quick and plentiful.

The sprite commands make use of the interrupts the CPU receives to update the real time clock to move the sprites. When any of the 32 sprites are defined, there are options to set it moving in a chosen direction at a chosen speed.

Likewise, the sound commands have options to not only vary the volume to produce attack and decay effects but also to produce glide tones.

Unusual feature of BASIC

One unusual feature of the BASIC language is the inclusion of eight user definable windows. These allow portions of the screen to be used as small screens within the full screen. It also allows virtual screen

A lot in a metal case

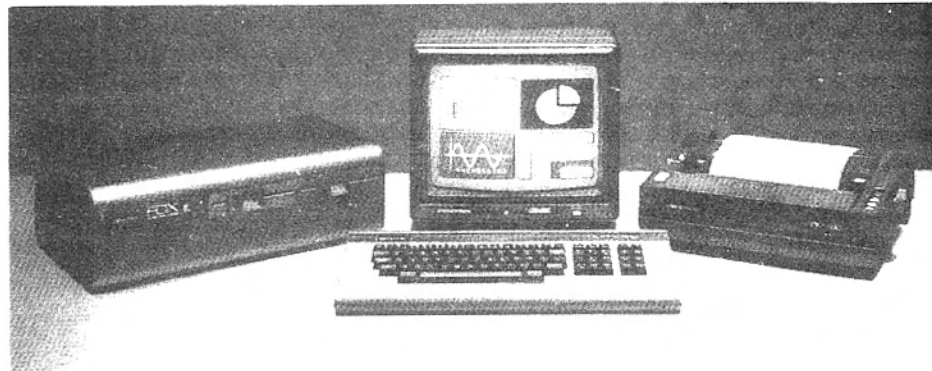
addressing to be used. When a new window is selected, the previous windows are not destroyed. This can be used to advantage to stop text from corrupting a graphics presentation.

One of the commands of the BASIC is to change to a language called NODDY. This is a simple language that would be most useful for displaying text. The pages which form the program form part of the BASIC code and are saved with the BASIC program.

The computer comes standard with a Z80 assembler/disassembler used to insert inline machine code in BASIC programs. Complementing this is a debugger that displays the memory, registers and disassembled code. This machine code is also incorporated into the BASIC program.

When listing a BASIC program, any machine language is also disassembled, complete with the symbol table as it occurs in the program.

A text editor, called NewWord, was also supplied for review. This is very similar to the old favourite, WordStar, but without some of the bloc operations and some of the print functions. It was supplied as a plug-



in ROM card which fitted inside the main case. The only disappointing thing about having such a good editor available was that it had to be used with a cassette based system.

Connection for ring system

With the addition of the RS232 board, the computer may be connected to other MTX computers to form a ring system. The cost of such a system is a low \$US20 per computer to set up. This would make it very attractive to schools and other institutions as up to 255 units can be connected per ring. The software for this node system is known as the Oxford Ring.

Other peripherals which will be available in New Zealand are a floppy or Winchester disk system that comes with CP/M 2.2 operating system, 80 column RGB video

generator and NewWord and SuperCalc software.

The ability of 512K of memory, plus a maximum of 32 megabytes of RAM disk plus Winchester and floppy disk storage to a total of 160 megabytes, shows that Memotech means business with this machine.

As the full bus is available to the disk controller, the disk should live up to the speed of the main unit. This is evident by the fact Memotech is making RAM disks available. For those looking for a straight business machine, this system should stand up to scrutiny.

An 80-column board is available for use with CP/M. This produces a RGB video signal to produce good clarity. The graphics mode for this board is 160 x 96 which is surprisingly less than for the standard display board. There is full cursor control as well as vector plot and point plot commands of the standard video generator.

The 80-column board also has a light pen input and Teletext compatibility. The quoted speed to this board is 25,000 baud and there is a choice of two 96-element, character sets.

Documentation supplied with the unit is good. There were only one or two places where things were a bit hard to understand and it was all there. Of special interest to users could be the very full technical section which had in-depth chapters on using the video generator for example.

The machine is one of the first to combine the ability to draw colour graphics/play games with the power of being able to do decent work using the CP/M operating system, at a price suitable for the hobbyist or the home.

The unit is not plagued by hidden costs or extras you have to buy. With all the extras supplied with the basic computer and the performance of the unit, this system is worth investigating.

Microcomputer summary

Name:	MTX 500.
Manufacturer:	Memotech Limited, England.
Microprocessor:	Z80.
Clock speed:	4MHz.
RAM:	32K; 64K on MTX 512 expandable to 512K; 16K extra for video processor.
ROM:	24K.
Input/output	Joysticks, cassette, centronics printer, TV, hi-fi, monitor.
Keyboard:	QWERTY plus special function/numeric plus eight special function keys.
Display:	15 colour 40 x 24 text; 256 x 192 graphics; 32 sprites; eight user definable windows.
Sound:	3 voice plus pink noise.
Languages:	BASIC, NODDY, Z80 assembler/dissassembler.
Cost:	\$1200; MTX-500, \$1600.
Options:	Extra RAM per 32K; two RS232 ports; Oxford ring; MTX PASCAL ROM; MTX NewWord ROM; FDX Floppy disk system \$1895; HDX Winchester disk system; 80-column card; silicon (RAM) disk boards.
Ratings (5 the highest):	Documentation 4; ease of use 5; language 4; expansion 5; value for money 4; support 4.

(Review unit supplied by John Gilbert Electronics, Auckland.)

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MTX 500	\$995
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IBM PORTABLE PC

The dinkum article

By Dennis Lowe

Had enough of uncabing and repacking your office IBM PC each weekend? Now there is a new portable PC clone with a difference — it was announced by IBM! This difference should excite all those PC users who waited until the world's largest computer manufacturer legitimised the micro market back in 1981 with the introduction of the IBM PC.

The review machine was presented in its very attractive blue canvas carry bag. This, with its hefty shoulder strap, is a necessity for transporting the machine more than a few metres. The computer tipped my bathroom scales at 33 pounds.

The carrybag unzips to reveal a stylish lightweight grey casing, with a sturdy carrying handle positioned over the rear cover which conceals the cable connectors and power switch. A small switch controls the international power setting of 120 or 220 volts. Make sure this is set correctly!

At the other end, the keyboard is latched over the screen and disk drives. Releasing the top latches allows the keyboard to fold out for use while still attached at the bottom of the machine.

A simple one-finger release then separates the keyboard completely for lap operation. This catch



mechanism is simple and effective and much better than the terrible catches on some other portables. The machine is unpacked, cabled up, power on and ready to work in seconds, very easily.

Much criticised keyboard

The keyboard itself has been much criticised by touchtypists for some unfortunate layout positions, notably the shift and backlash keys. I do not like the double use of the numeric keypad as cursor controls either. The typing action is generally excellent although on the review machine, the END key would sometimes not register without a heavier touch than usual.

The cooling fan starts up when the power is switched on. The background hubbub of a busy office helps subdue the drone of a fan which may be very irritating in a small quiet room at home. I used the PPC for continuous lengthy periods in such a small quiet room and although the fan is very definitely audible, I was never bothered by it.

The display screen is the first obvious component difference from the normal PC. It is a 9in amber unit made by Zenith. The PPC comes with a colour graphics card as standard and an external colour monitor may be connected to a socket at the back. The amber screen shows colours as a "grey" scale. The high quality screen never shows a sign of flickering during disk accesses, which also shows the adequacy of the power supply —

again in contrast to some other portables.

Because the screen is always in graphics mode, no underline mode is available. Text in graphics mode is quite acceptable although not as sharp as for text mode display. Some programs that optionally use colour may be better run in monochrome because of the appearance of the "grey" scale colours.

The graphics capabilities of the colour card are its justification for use in this machine. The longtime best selling PC program, Lotus 1-2-3 can be used without the need to add expansion cards.

Screen causes neckache

Although the screen is rock steady and of reasonable resolution, it does have one fault — it causes neckache! The screen is about 12 inches below eye level pointing at your chest when you are sitting normally with the machine on the desk. IBM should have provided some means of tilting the screen or the whole machine upwards. The solution is easy enough — rest the front edge of the computer on a couple of hefty books.

As with the PC, the portable has ROM resident BASIC as its only base price software. The latest version PC-DOS 2.1 is \$166. The computer is provided with 256Kb of memory as standard, and this can be expanded to 512Kb. Given the reducing relative cost of memory, I think IBM may as well have provided 512Kb immediately, with the capability to use the extra for print

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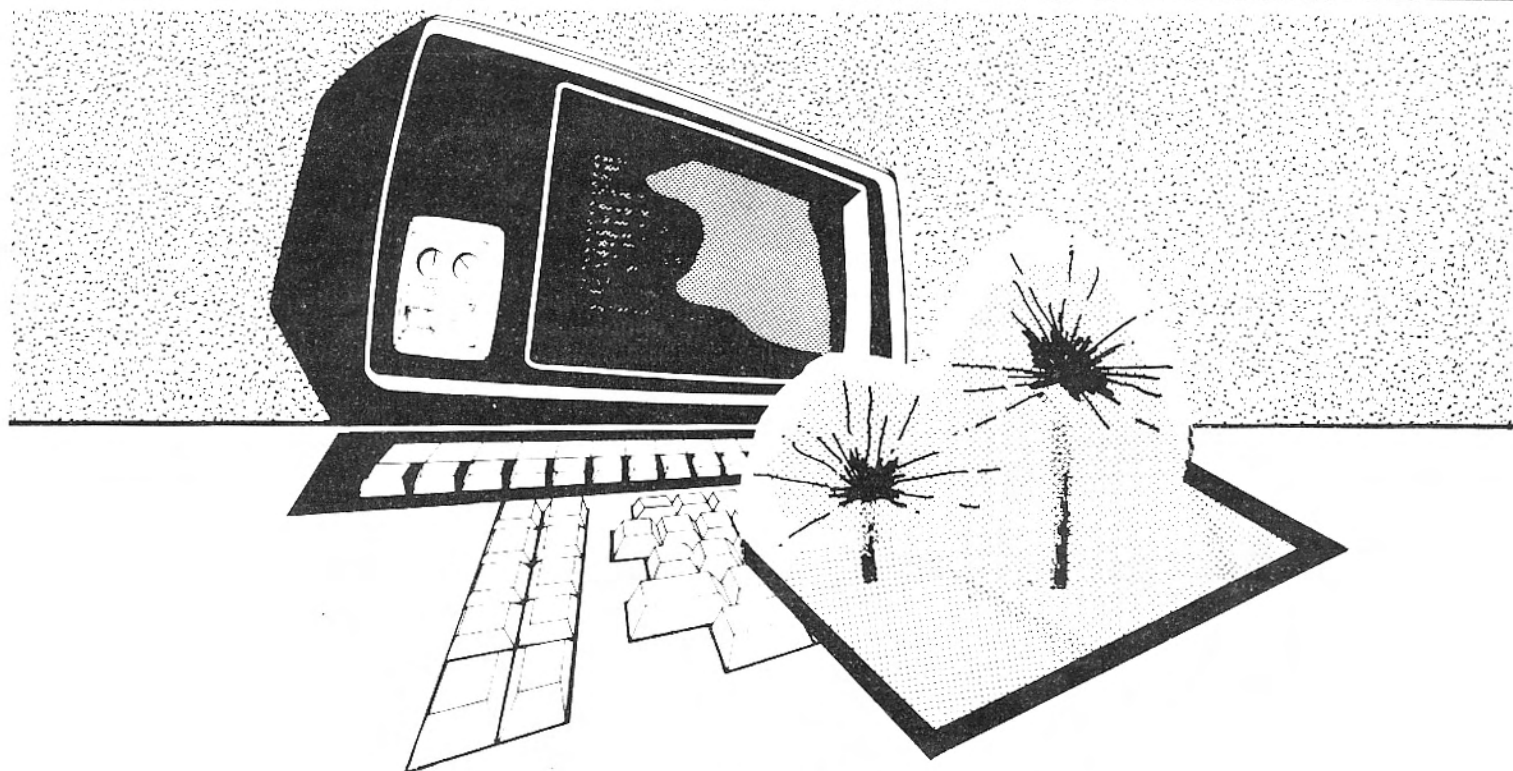
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HARDWARE REVIEW

spooling and as a pseudo disk. However, the big blue might just have the edge over me in marketing expertise, so I bow to its decision.

The disk drives are the same half height slightly noisy Qume drives used by the PC Jr. They are of course, compatible with IBM PC disks. They portable has the same system board as the PC-XT, giving rise to speculation that a hard drive may be added. IBM makes no mention of this in its announcement.

It is possible to acquire expansion cards for your IBM PC to upgrade its capabilities or capacity enormously. Five expansion slots are provided in the portable but with the more restricted physical space, these slots are half-sized. No doubt the add-on card manufacturers will respond to this limitation, but bear it in mind if you need immediate expansion facilities.

IBM's portable has been mischievously described as "Compaq-like" and no doubt, IBM American marketing people expect their machine to head off the impact Compaq (and others) have had in the IBM PC marketplace.

The PPC is a robustly constructed stylish computer with a dependable

performance. The price of the base model (with only one diskette drive) is \$8586. The review machine, with two drives and a printer adaptor card, added up to just over \$10,000 — a hefty price tag compared with

competitors' products with similar specifications. But as has happened many times before, expect a long queue of customers willing to pay the premium to buy the genuine article.

Microcomputer summary

Name:	IBM Portable PC (model 5155/68).
Manufacturer:	International Business Machines Ltd.
Microprocessor:	Intel 8088 16 bit.
Clock speed:	4.77 MHz.
RAM:	256Kb, expandable to 512Kb.
User RAM:	62Kb under BASICA.
Disk storage:	2 x 5.25in drives, each 360Kb (one drive std).
Input/output:	No ports standard, 5 expansion slots available.
Keyboard:	83 keys, including 10 function keys, numerous special.
Display:	9in amber graphics screen (Zenith) 25 lines x 40/80cols
Languages:	BASIC, BASICA with PC-DOS.
Graphics:	320 x 200 or 640 x 200, colour maps to "gray" scale.
Sound:	Speaker responds to sound commands.
Cost:	\$8586.00 for base model (one drive).
Software:	As for IBM PC.
Options:	External colour monitor, 2nd drive, 8087 coprocessor.
Reviewer ratings (five the highest):	Documentation 5 (usual IBM detail); Ease of use 4 (keyboard & PC-DOS limitations); Value for money 3 (cheaper competitors, no extras); Language 3 (only BASIC included); Support 5 (IBM reputation); Expansion 3 (half-size expansion slots).

(Review machine supplied by the IBM Product Centre, Wellington.)

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MULTITECH MIC-504

Sound, efficient CP/M unit

By John Slane

The first and most obvious feature of the Multitech MIC-504, a Z80 CP/M unit, is its neat appearance. Two slimline disk drives are set horizontally side by side, in front of a robust metal case with a modest footprint of 40cm x 35cm. At the back are sockets for VDU/keyboard, parallel printer, RS232C. The power switch is at the rear, as is the moderately quiet cooling fan, with the reset button at the front.

The advertising blurb optimistically describes the 504 as having "2 Megs of on-line storage" with two double-density, double-sided, 80-track drives. However, a formatted data disk has just 695K bytes available. Still quite impressive, of course, and probably the main reason you might be interested in this model if the starting price of \$3763 (with some basic utility software) sounds reasonable.

As illustrated, and as supplied by Rakon Computers for review, a Teko, Model VA2000 VDU is set up with the MIC-504. It also carries the Multitech label. This is a high quality, intelligent terminal costing \$1512. The review model had poor linearity in the top three or four lines which became less noticeable when the unit reached maximum operating temperature (a couple of hours). The character font is everything you would wish for — high definition, pleasing style and outstandingly legible.

The keyboard is excellent — function keys, separate cursors, dedicated keys such as insert, delete, home, etc. "Control", in line with and immediately to the left of the space bar, is somewhat unconventional.

As I always do as I'm told, I did not operate the computer/VDU in the obvious (and pictured) mode. A slip enclosed with the manual strictly warns the user that since there could be data loss problems "due to electromagnetic interference from the VA-2000 terminal power supply, do NOT place the terminal on top of your processor cabinet". The terminal carries the Multitech logo label and one would have thought the terminal and processor unit would be a harmonious match. But it's not to be so.



The Multitech MIC-504

It's also not so when running the Multitech bundled software. Not the slightest attempt has been made to customise the software to the terminal and its keyboard.

Take the WORD RIGHT (word processing) program, for example. Although the keyboard has cursor keys, the program doesn't recognise them. The programmable function keys have no discernible, logical functions. The insert/delete/home, etc. keys don't work as labelled.

I'm afraid I would have to say the word processing package and the other programs provided are very old-fashioned software — they are characterised by being user-unfriendly and require quite sophisticated computer literacy to be at all usable. If they weren't free, you

probably wouldn't want them.

For the record, the software provided is:

WORD RIGHT: as described.

Qsort: Just a sorting program of the kind already found as a utility routine on good DOS systems.

NAD: Name-address mailing system. Very limited conditional enquiries. This, and Magic Worksheet, do access into WORD RIGHT which is sensible and useful.

Analyst: An elementary database manager. As for NAD, it is limited by lack of search parameters and by poor report formatting techniques (no dynamic screen formatting), the user is recommended to plot first on graph paper! One might well ask, why spend thousands of dollars on a computer, and still have to do some

MIC-504: a sound efficient CP/M unit

planning on graph paper?
Magic Worksheet: A very inferior
copy of VisiCalc and its clones.

Getting into the processor

Standard CP/M literature is provided, some copied under licence is extremely well presented. The unit-specific literature is written in Asian-English but the message is understandable. Rather more disconcerting is the appearance of statements like: "Now is checking!!!" and "Diskette is no problem!!!" on the screen. I'm sure this sort of non-standard stuff could be cleaned up before release in New Zealand.

Formatting of a new disk takes two minutes 10 seconds. DCHECK takes a similar time and on the review unit, a disk classed as OK on one occasion was described as having as many as 20 faulty sectors on another. I experienced a number of read errors while carrying out tests including DCOPY, which suggests that on this particular machine there was a fault either in the drives or in the controller. However, one software program ("Accounts") ran without problems. The PC "Prime Number Test" to 50 ran in 43.3 seconds, which compares favourably with many of the 16-bit machines. It also found all the primes in that range. The version of MBASIC used was less successful in finding integer square roots of the numbers between one and 2500. Time taken was two minutes 7.6 seconds, and the MIC-504 missed 23 of them — it was only 54 percent accurate on that task.

The writing to disk of 1000 records of 132 characters took two minutes seven seconds.

Some additional error messages have been added to standard CP/M. They are nothing to get excited about, and meaningless unless you

are binary-literate!

The promotion material describes the MIC-504, and its lesser brother the MIC-501 (about 400K on two drives), as business solutions. These Taiwanese units appear well constructed with little evidence of innovation in design or operation, and seem to be aimed at potential business users who have identified CP/M software that suits their needs.

By the time you've bought the processor and the Multitech terminal you are well over \$5275. For that money, a user would want high quality software to match the size of the hardware investment. I was pleased Rakon provided a copy of SL Microsystems' "Small Business Series — Accounts" program (\$500) with the review unit. This was a good, workmanlike program and showed the Multitech to good advantage.

Rakon also supplied a serial/parallel dot matrix printer retailing at a whisker under \$1000 — the NSA WP-1000, also made in Taiwan. Under some assigned uses, the fact it has only a one-line buffer makes it perform significantly under its claimed 160 cps, but the pleasing

quality and range of text presentations is commendable.

With additional memory and somewhat better organised software commands, this would be an excellent value printer and passably acceptable as "letter quality". The proportional mode texts are outstandingly legible, but calculation of word-wrap in this style requires a more sophisticated management program in the printer.

Summary

The total package I had the opportunity to try — processor unit, VDU, printer and software — was soundly constructed and generally efficient in operation. No customising or optimising was evident — the bits were just hung together and shared only basic CP/M. Since there are better, more integrated systems around, I suspect the Multitech MIC-500 series will have particular interest to those people already familiar and comfortable with CP/M.

Of the CP/M units presently available, the clean design and high storage capacity of the 504 would make it a computer well worth consideration.

Microcomputer summary

Name:	Multitech MIC-504.
Manufacturer:	Multitech Industrial Corp., Taiwan.
Microprocessor:	Z-80A 8-bit.
Clock speed:	4MHz.
RAM:	64K.
ROM:	4K EPROM for bootstrapping and firmware debugging.
Input/Output:	2 x RS-232C ports (one for VDU/keyboard console), Centronics parallel. Baud rates software variable from 110 to 19.2K.
Keyboard:	Detached unit. Typewriter style, numeric pad, separate cursor keys, dedicated and programmable function keys.
Display:	25 x 80.
Languages:	CBASIC provided on system disk. Will run any others adapted for CP/M.
Graphics:	No data provided and no graphics illustrated in brochures. Green on black monitor.
Sound:	Beep.
Cost:	MIC-504 \$3763.62 (MIC-501 \$2755.62). Price includes bundled software (see below). VDU terminal and keyboard: \$1512. Printer (WP-1000) \$998.
Software:	CP/M, WORD RIGHT, QSort, NAD, Analyst, Magic Worksheet (see text for details).
Reviewers Ratings (up to five, the highest):	Documentation, 4; ease of use, 2; ("5" if you think CP/M is the best operating system ever invented); value for money, 3; language(s), 5.

PRINTER REVIEW

OLIVETTI PR2300

Dry ink and a lot of spark

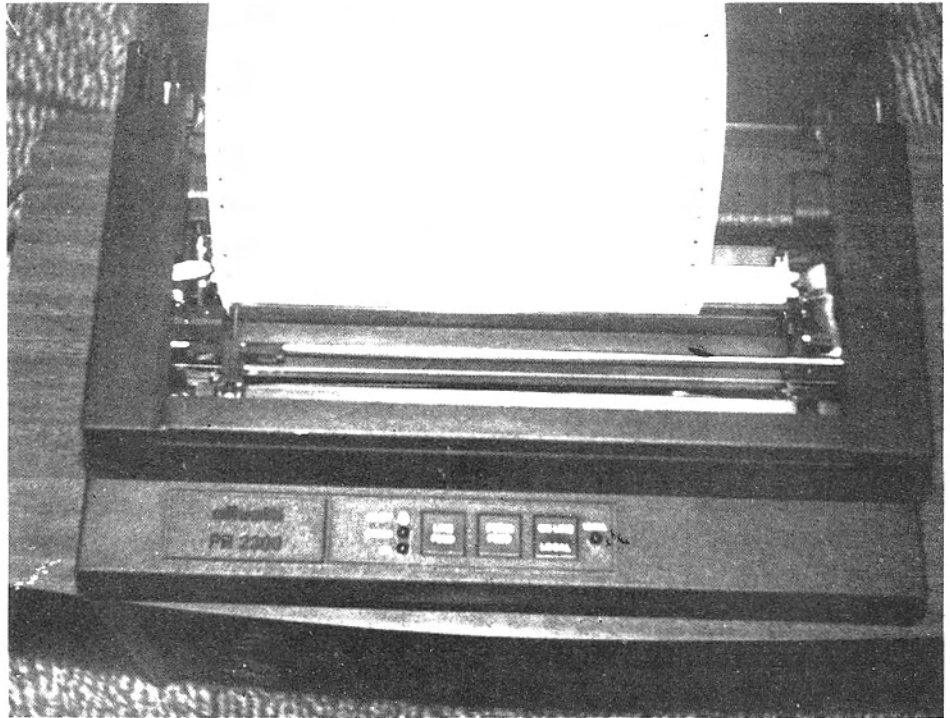
By Shayne Doyle

I approached this machine with considerable interest, having read many references to ink jet technology over the years, but never actually getting my hands on one. It has not been a common method of getting hard copy from personal computers, and some of what I had read claimed it was a messy business and something to keep well away from.

Well, this recent machine from Olivetti is quite the reverse. It uses "dry ink" technology, and quite successfully too. The print head is actually a fine glass tube packed with carbon grains in a binding agent, and there is no ink, as such, at all.

The carbon is projected onto the paper by a fascinating process — an electric spark is generated by the potential difference between the carbon rod and a metal strip immediately below it, producing voltage peaks up to 4.5 kv. This spark enters the tip of the glass rod and literally blasts a minute speck of carbon material out onto the paper. Each pass of the head can print only one line of dots; so for the seven vertical rows in a character, it requires seven passes of the print head, or eight passes if underlining.

As you can imagine, the extremely light head assembly absolutely whizzes back and forth across the page. Looking down onto the head as it prints, one can see the blue spark and there is a very strong ozone smell as the spark ionizes the air in its vicinity. It is quite a sight in a



The Olivetti PR2300 printer.

dark room with the lights off. When in full swing, the printer emits quite a loud whistling or whining sound, making more noise than I expected from a non-impact print mechanism.

Not like the traditional

Basically, the PR2300 does not bear much resemblance to a traditional printer — no doubt because of its Italian origins. It is an angular black box shape with a front protruding platform on which the

user controls are mounted. These comprise line feed, form feed, and online/local pushbuttons. There are also four LEDs indicating power on, local mode, end of paper or cover open alarm, and an ink low warning.

The printer notifies the user when the print head is almost empty by a very elegant method — a Hall Effect sensor is mounted to the left of the print head travel, and this detects the approaching end of the ink rod. When the sensor is activated, it starts a hardware counter over the next 10,000 characters. The ink low LED comes on and a five-second acoustic signal is given. The user can continue at this point and the printer will print 6 x 2000 character cycles, sounding the buzzer between each cycle. After the sixth cycle, the print head must be replaced.

On the rear is the power switch, and a thumbwheel control which adjusts the printing density. Interface connectors are also rear mounted. Paper is pin-fed with the right pin wheel adjustable. Roll paper can also be used, and this is friction fed by three rubber rings mounted on the pin feed shaft. The paper feed knobs are serrated sections at either end of the platen and do not come outside the case.

A paper release lever raises the pin wheel carrier shaft to allow fanfold paper to be inserted under the pin

Printer summary

Name:	Olivetti PR2300.
Type:	Non-impact dry ink jet dot matrix. Bidirectional print with optimised head travel.
Matrix:	7 x 7 dot character matrix.
Chars/line:	80.
Graphics:	Videotex and TRS-80 block graphics characters. Bit map graphics — 110 dots per inch horizontally; 216 dots per inch vertically. Zoom mode doubles the pixel size.
Speed:	50 x 80 character lines per minute.
Paper:	Continuous fanfold, pinfeed with movable right tractor. 3.5in diameter paper rolls. Maximum paper width 9in.
Interface:	Centronics parallel standard, RS232C serial and 20mA current loop optional.
Buffer:	1 Kbyte line buffer.
Price:	\$1134.

(Review unit supplied by Andas Wholesale; Wellington.)

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PRINTER REVIEW

wheels. I found it difficult and fiddly to load paper even with the platen raised.

Easy to read

With a character matrix of 7 x 7, print quality is obviously not letter standard, but as can be seen from the sample, the characters are quite well formed and easily legible, although there may be some smudging if the text is handled immediately after being printed. Not quite as easy to read is the compressed 18 cpi mode, but try the double height/double width mode for legibility! It's a perfect printer for the computer user with bad eyesight!

Various underlining options are available and vertical spacing options are provided. Graphics modes comprise simple semi-graphic characters of the TRS-80 six-pixel character format and high resolution

bit image graphics with a horizontal density of 110 dots per inch, vertical density 216 dpi. Two unusual features are the "zoom" facility whereby each dot may be doubled in size, and a "reverse" mode where the graphics data is printed inverted (negative).

Comprehensive interfacing options are provided, with Centronics parallel interface as standard, RS232 serial and 20mA current loop interfaces as options. The serial interface can communicate using ETX/ACK protocol as well. I'm not entirely sure where the market is for this printer; it is more expensive than a low cost impact dot matrix unit, and does not offer half the facilities. Obviously, it is a lot quieter — which may be important enough to some users to warrant choosing it over conventional printers.

```
OLIVETTI PR2300 DRY INK JET PRINTER
STANDARD MODE PRINTING
OLIVETTI PR2300 DRY INK JET PRINTER
DOUBLE HEIGHT MODE PRINTING
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OLIVETTI PR2300 DRY INK JET PRINTER
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18 CPI SPACING MODE PRINTING
OLIVETTI PR2300 DRY INK JET PRINTER
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18 CPI DOUBLE HEIGHT MODE PRINTING
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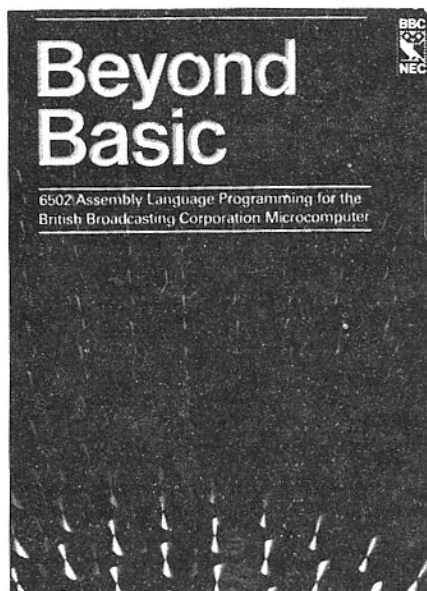
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RELEASE=R4.2
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FORM=101
PARALLEL INTERFACE
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RSTUVWXYZ0123456789:;= 176ABC
DEF0GHIJKLMNOPQRSTUVWXYZ0123456789:;= 176ABC
UVWXYZ0123456789:;= 176ABC
GHIJKLMNOPQRSTUVWXYZ0123456789:;= 176ABC
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Print samples from the Olivetti PR2300 printer.

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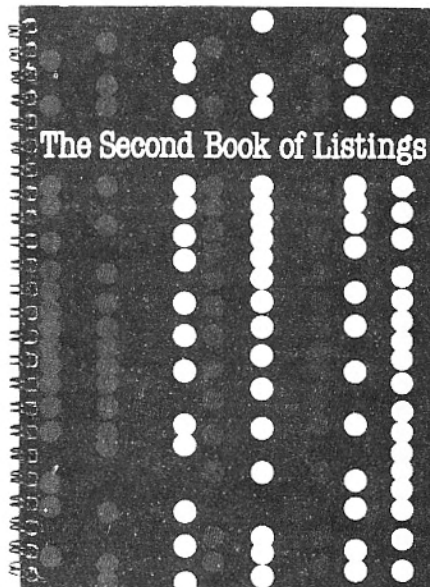
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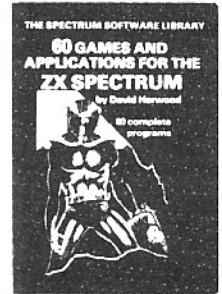
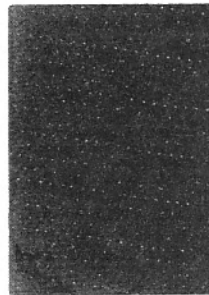
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A national umbrella organisation for regional computer education societies was formed on July 28 in Wellington. The New Zealand Computer Education Society was established to represent and promote the development of computers in education. In this article, the president of the new society, Gerrit Bahlman, gives an overview of the development of computers in education.

Education societies plug the gap

The appearance of computer technology in the classrooms of New Zealand can be traced back to the 1960s. Fortunate schools were able to boast access to larger computer systems through a variety of schemes that depended on the luck of location. A very few schools actually possessed small mini-computers, donated or acquired in some entirely fortunate fashion. Most schools were unable to provide access to the burgeoning new technology.

The advent of the micro, with its inbuilt scale of production economies, gave a new lease of life to educational computer applications. Schools could see that possession of the technology was within their financial sights. Pressure built within schools. A rollercoaster of enthusiasm was on its way.

Little practical advice was available. What could be done with machines in schools? Which ones were most suitable? How were they best employed, situated, exposed to pupils? Should programming be taught? If so, in what language? What was computer aided

instruction, computer aided learning, computer managed learning, computer managed instruction? How important are the various hardware components in the available machines?

Hundreds of questions had to be asked and answered. The expertise simply did not exist to help teachers make the right choices. Inevitably, mistakes were made but there was also a growing awareness that costly duplication of effort could be avoided by bringing people together to allow the cross-fertilisation of experiences.

The format of regional computer education societies was a direct consequence of the confusion and lack of leadership available. Eight societies were formed over the last five years in Auckland, Northland, Hawke's Bay, Waikato, Central Districts, Canterbury, Otago and Southland.

These organisations have provided a variety of services to teachers interested in the role of computers in schools. Regular meetings have allowed a wide variety of information to be disseminated about every aspect of educational computing. Hardware, software, peripherals, all manner of relevant subject matter, has been presented and discussed.

The societies have also tried to meet the teacher training requirements of the new technology. Courses introducing languages such as Logo and Pascal have been run. Word processing skills related to teacher administration have been introduced. The use of database management packages applied to administration and to multi-choice question banks has been examined. The distribution of educational public domain software and the publication of software available to teachers has been another area of vital activity.

The societies have met a need well recognised overseas. Inevitably, the Department of Education has received criticism for its apparent

lack of leadership in the area of computers in education. The hoped for nationwide distribution of hardware to schools and then the expectation that the department would be involved in the provision of software to schools, has inevitably led to the criticism.

The first positive step

The setting up of a Courseware Curriculum Development Unit is the first positive step officially taken by the department to promote and organise computer education. Unofficially, the department has been involved at regional level with the societies. Special in-service courses and the development of courseware materials for computer awareness programmes has been one substantial area of departmental activity.

Interestingly, computer education societies are not in evidence overseas. While in Australia, I made a determined effort to contact equivalent teacher-based organisations. The role the societies have carved out for themselves in New Zealand has been met by well funded state government programmes in Australia.

The formation of the New Zealand Computer Education Society is a natural consequence of the activity of the regional societies. The national society is an umbrella organisation which will provide a co-ordinated voice for the regional societies and provide a national profile for concerns related to computers in education.

As the economies of scale continue to increase the power of computer technology to schools, the variety of applications will quickly expand. The main surge of interest in New Zealand secondary schools has left virtually every high school in the country owning at least one computer, with many owning classroom sets. Primary schools are now rapidly moving into the arena so the need and function of the computer education societies will continue to grow.

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Memories are made of this

By Gordon Findlay

Memory is one of the most important components of a computer system. No memory — no computer. Let's look at computer memory, and try to fight our way through the jargon.

At a really fundamental level, there are two sorts of memory: main and backing stores.

Main store — sometimes called core store, main memory or whatever — is the memory the computer system can get at or access directly. It is built into the computer's main unit.

Backing storage is not directly accessible. It consists mainly of tapes and disks. Any information or instructions in this sort of memory must be read into main memory before it can be used.

Why "core" storage? The earliest computers, from the mid-1940s on experimented with many types of storage. Williams tapes (just like a TV tube) and containers of mercury with circulating electrical pulses were two of the chief contenders, until stores formed by stringing together little rings ("cores") of magnetic material were built. These proved most successful, and this was the origin of the term. All core store is now made from semi-conductor chips, but the name lives on.

From here on, we will be concerned only with main memory. In small computers, this also comes in two main types — the infamous ROM and RAM. No two "words" strike more fear into the computer tyro.

Permanent memory

Some memory is permanent and never loses its contents. This is ROM (Read Only Memory). Even when the computer is turned off the contents of ROM are preserved. This is ideally suited to the most important instructions and data the computer needs always — the operating system and languages (see the article on operating systems in the August *Bits & Bytes*. Without ROM, we would have to load BASIC into our machines every time we turned them on. From tape that might take four to 20 minutes. One bug, and we might have to reload! So ROM is typically used to store the BASIC language, operating system and such important features. The name? This type of memory can be read only, not written into.

ROM is "programmed" or filled in its manufacturing process, unlike most other forms of memory which are filled by (or with) a program as it runs.

The other main sort of memory is called RAM (Random Access Memory). This really is a stupid name — ROM is "random access" too. Which just means that any particular location in memory can be read independently without reaching all those before it. A move was made to call RAM "Read/Write"

memory, but it seems to have petered out.

RAM can be written too. This means the program can store things in RAM, as well as reading them from it. This sort of memory is used to store a program and the data it is working on. If you are using a program to store and look up telephone numbers, you will have stored in a few RAM locations names (say *Bits and Bytes*) and in other locations the corresponding phone numbers ((03) 66566) and so on. Other locations will keep the program instructions themselves.

Machines differ in the amounts of ROM and RAM they include. Roughly speaking, the bigger machines use little or no ROM; the smaller ones more.

Static & dynamic

There are several other types of memory you will hear about. RAM can be either static or dynamic. This refers to the way the chips behave electrically, and makes no difference to the way they are used. PROM is programmable ROM — ROM which can be loaded with data or information after it has been made. This involves melting ("fusing" or "blowing") small links in a chip, and is done with a piece of hardware called a PROM "blower". EPROM is Erasable PROM — programmable ROM which can be wiped clean and reused. The erasing is done by ultraviolet light, unless the PROM is also EEPROM (electrically erasable PROM). Erasing is then done with a similar, or the same, piece of hardware.

Uses of PROMS? Sometimes it is desirable to change some of the really low level information in a system. I have had the character set of my computer (the actual shades of the letters which appear on the screen) changed. This was done by loading the shapes I wanted, suitably coded, into an EPROM, and replacing one of the ROM chips which came with the computer originally.

Memory is divided into bytes — more or less the amount of memory which the computer uses at one time. The number

of bytes is limited by the design of the processor and the rest of the system. The amount of memory is measured in "K". A larger personal computer will contain 64K of memory, some ROM and some RAM. 1K is 1024 bytes, so 64K is 65536 bytes which, just to add to the confusion, will be numbered 0 to 65535. The abbreviation, "K" is sometimes taken to mean 1000, rather than 1024, so the 64K might be written as 65K. The moral of this confusing mish-mash is that the exact numbers are not important.

Computers specify their memory sizes in different ways. For example, a 48K TRS-80 machine has 64K of memory in all. The 48K refers to the amount of user memory — memory (RAM, in fact) available for use by programs. This doesn't include memory used by the operating system, or ROM. On the other hand, the Commodore 64 has the same amount of memory in total, but only roughly 38K is available for programs. The total amount of memory in a system will be divided into four parts — ROM, System RAM, video RAM (used to contain the screen display) and user RAM. Make sure you are comparing like figures — the figure for user RAM is the important one.

How much memory is enough? The early machines had very small main memories. In 1950, 512 bytes (0.5k) was regarded as a lot. Computers are available with as little as 1K, and as much as 512K. The amount you need is determined by the sort of programs which you want to run. To run the CP/M operating system, you'll need 64K. The famous program, Lotus 1-2-3, requires 192K from memory. On the other hand, the ZX-81 has shown that games and simple programming at least are possible in just 1K.

Another common phrase is "virtual memory". In this set-up, a machine pretends to have a very large or infinite memory by using disk as if it were a large block of RAM. This is done by the operating system, and is most common in large machines.

All this memory and I still can't remember my kid's birthdays!

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Apples work with AppleWorks

By Alex & Fred Wong

Another leaf has fallen from the II branch of the Apple tree! This latest offering from the hard working orchardists in Silicon Valley presents an integrated software package for the IIe and IIc featuring a word processor, spreadsheet and database named AppleWorks.

AppleWorks comes impressively packaged in a well cushioned box in IIc colours with a tutorial and a reference manual, three disks (two of them double sided) and a plastic coated reference card.

All this attractive, high quality material requires a IIc or an 80 column IIe, preferably with 128K RAM, to work and uses Pro DOS for an operating environment.

AppleWorks, as Fred tells me, is integrated. This means all three applications within AppleWorks create files that can be merged with any other file so that addresses entered for the database can be used to head a form letter written with the word processor for instance.

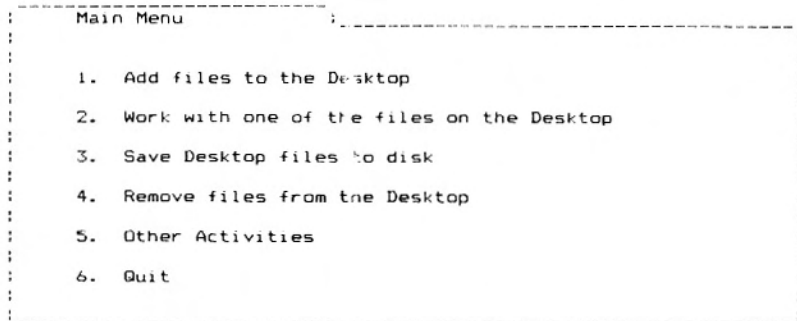
Besides this, although AppleWorks is not multi-tasking (does more than one thing at a time), all three applications are on the same disk and data files from them may all be sorted on one data disk, eliminating tedious disk changes and long booting-up times between uses.

Basically, AppleWorks is a superset of three well known and respected members of the software community — QuickFile II, AppleWriter II and VisiCalc — modified to use the same keywords for the same functions, accessed through a command shell overlay called the desktop manager.

After we worked our way through the excellent tutorial disk (which is a simulation in Pascal!), we dived in. We wrote this review with the word processor; Fred pushed some stock assignments through the spreadsheet and I entered my record collection into the database.

Disk: Drive 2

MAIN MENU



Type number, or use arrows, then press Return

@-? for Help

The main menu...the heart of AppleWorks and what the desktop manager presents.

The database

Formatting one is easy — just type the wanted categories down the formatting page and it's done. Additional categories may be defined even after data has been entered.

Entering information is fun (unlike those torrid tax forms) and the features to facilitate this are breathtaking. As well as the traditional single record format, (with a touch of a key) there is a novel, multiple record layout (fully formattable) by which data may be viewed, entered or deleted. Fields may be set to contain certain information through different records, they may be dittoed from a previous entry, or copied entirely.

Sorting information is lightning fast. The entire file is memory resident, although this does lead to the file being restricted to about 300 files for a 64K or 1000 for a 128K machine. Ways to get around this would be to split files along convenient axes. It may be sorted by words or numbers in either ascending or descending direction. Specific records may be found by comparison with

present criteria, giving 12 options for a relational search.

Creating a report for printing may be done in two ways — a tables style report to show comparative lists or a labels style report for such things as mailing labels or index cards. Both are fully formattable and very easy to create.

The spreadsheet

The spreadsheet, while very similar in many ways to VisiCalc, contains many extra features found in other popular programs. Labels that are too long may spill over on to the next cell if it is empty, and right or left justified or centred. Specified cells that may contain important formulas can also be protected from accidental erasure. Values may be specified to be monetary or have certain decimal placings, and commas in thousands are placed automatically.

Calculating a spreadsheet may be done every time a value is changed, or only on order. Another very coveted feature is the ability to sort columns by letters or numbers.



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- ★ All menu/prompt-line driven using key-letters.
- ★ Recognises shiftkey mod. & enhanced keyboards.
- ★ Type-ahead buffer/Preview/Mailer/Calculator!
- ★ Clear 95-page manual plus 80-col supplement.
- ★ Gives simple control of your printer, allowing insertion of control sequences in the text.
- ★ Advanced formatting options: page numbering, page heading, indents, justify, definitions.
- ★ Simple to learn; powerful to use.

Printer options are very comprehensive, giving control over all the margins and page lengths and such. But like other spreadsheet programs, the width of the report has to be manually checked against the capabilities of the printer.

The word processor

This program puts many other word processors to shame. Formatting a document is done with an option menu which appears on the screen with a single command to give more than 30 choices to control the text or the printer. Among them are commands to control justification, underlining, margins, spacing and pagination, as well as boldface, superscript and subscript.

Since basically what you see is what you get and word wraparound is automatic, text entry is a breeze. An interesting exception to this is justification, which shows only when a document is printed. Justification, as well as most of the embedded format commands (which may be viewed with the zoom command), may be switched on and off by placing the cursor at the desired location and choosing the appropriate option.

As in the other applications, the full screen cursor has two modes — overstrike, which types over anything in its path, and insert, which pushes text

Disk: Drive '2

APPLEWORKS FILES

Escape: Main Menu

Main Menu					
Add Files					
AppleWorks Disk volume Name	Desktop Index			Date	Time
=====	1.	AppleWorks B	WP		=====
AppleWorks	2.	Moms Bulletin	WP	8/26/84	
AppleWorks	3.	Record Catalog	DB	8/26/84	
DAVE	4.	Organic Growth	SS	8/19/84	
Moms Bullet	5.	USL	SS	8/26/84	
Rec.Cat1				8/01/84	
Record Cata				8/26/84	
Organic Growth		Spreadsheet	3K	8/26/84	
Our Budget		Spreadsheet	5K	8/26/84	
USL		Spreadsheet	6K	3/20/84	

Type number, or use arrows, then press Return

25K Avail.

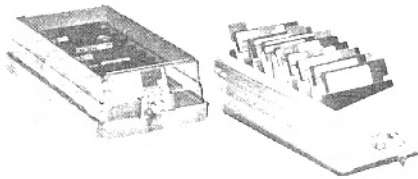
AppleWorks Files shows the screen, after a few keystrokes, listing a disk catalogue and inside that, a window to what's on the desktop.

over as it types. This is actually (far from my expectations!) an excellent system and the modes may be switched over with a command. Editing becomes child's play when the cursor is used with the highlighting capability to, for instance, (in addition to the key for that purpose) define all the text to be deleted.

As formatting is done primarily with the option menu, printing is succinct and efficient, and does not need much preliminary.

Desktop & clipboard

The desktop manager is the heart of AppleWorks; as well as application access, it is responsible for file management, printer specification and all DOS housekeeping duties. Its menu appears first on the screen and all choices appear on "index cards" traceable back to that point. The desktop also asks the date and updates the files accordingly, and before quitting will



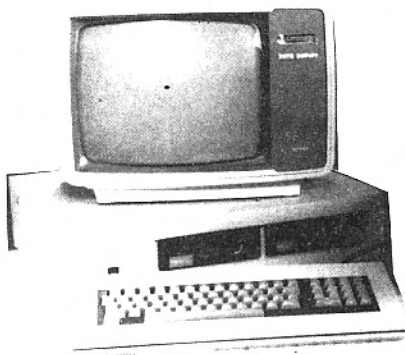
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Apples work for AppleWorks

examine all files to see if any changes have been made to them. If so, it will prompt you to save them first. When it saves a file to disk, a very friendly "CAREFULLY SAVING THIS FILE" message appears.

Another useful feature is that as well as normal print, AppleWorks can do direct screen dumps that include everything. Although we could not obtain a hard copy using an Epson interface card, this problem did not surface when Fred plugged in his Apple parallel interface card.

The clipboard is actually invisible (probably why we mentioned it last) but is responsible for all the file merging between applications. It may be accessed from any of the applications and the pertinent file (or part of it) moved or copied on to it, to be inserted into any other file (including itself) to be viewed, manipulated or printed. However, it does not mention whether or not it has anything on it before another file is placed there. The first item is irretrievably lost in such a case. Apart from this, it is very easy to use and operates very quickly, enabling immediate feedback before printing.

Documentation

The AppleWorks tutorial manual is written in clear concise terms which allow even the first-time user to get

File: Record Catalog

REVIEW/ADD/CHANGE

Escape: Main Menu

Selection: All records

Singer	Record	Catalog	Remarks
Dylan, Bob	Pat Garrett & Billy The K	34	1973 movie soundtrack
Dylan, Bob	Bob Dylan & The Band	35	1974 live
Dylan, Bob	Desire	36	1976
Dylan, Bob	Hard Rain	37	1976
Dylan, Bob	Masterpieces	38	1978 compilation
Dylan, Bob	Streetlegal	39	1978
Dylan, Bob	Bob Dylan At Budokan	40	1978 live
Dylan, Bob	Saved	41	1981
Dylan, Bob	Shot Of Love	42	1983
Dylan, Bob	Infidels	142	1984
Eagles	Hotel California	43	-
Easton, Sheena	Madness, Money & Music	128	uh-huh
England, Natasha	Captured	127	-
Eurythmics	Touch	153	dates quickly
Faithful, Marianne	The World Of Marianne Fai	44	best of her pre-70's

Type entry or use @ commands

@-? for Help

A dump of the database, showing the multiple record layout where you can still add or change entries.

started right away. It works in closely with the sample data files supplied on disk to give, with many screen dumps and diagrams, an interesting, interactive and painless introduction to the features of AppleWorks.

Once the basics are learnt though, many users would abandon the tutorial for the very comprehensive reference manual which provides the same information and much more, although in less easy terms. It covers everything, from booting up to using the profile hard disk, sending AppleWorks files via a modem and interlacing DIF, ASCII, QuickFile and VisiCalc files into AppleWorks.

There is also an informative reference card which contain all the open-Apple commands used for fairly similar functions throughout AppleWorks, as well as the entire option menu from the word processor and all the spreadsheet functions. These are available at all times from the on-screen help tables but the reference card is still greatly appreciated and used.

Both the tutorial and the reference

manuals are ringbound in the Ilc colours and presented beautifully. The reference card (unlike some others), if treated with just a fraction of the respect it deserves, should continue to be useful for many years to come.

Summary

The value of these separate applications, not to mention them as an integrated whole, would be enough incentive for purchase. Although there are limits imposed by available RAM and a few other oddities (like the clumsy four-step GOTO command in the spreadsheet), the integration capabilities of AppleWorks far exceed its liabilities, especially for small to medium businesses and personal use, and it is indeed very impressive.

At a price of \$499, it beats other packages hands down for value and it brings many features formerly available only to more costly machines in the Apple II family. Apples not only work with AppleWorks — they enjoy it too!

Eight more stations

Yates Corporation Ltd is adding eight Convergent Technologies NGEN work stations to its computer mainframe. The modular desktop systems will be deployed in Auckland, Palmerston North and Christchurch.

The contract, worth more than \$100,000, has been announced by Sigma Data NZ, Ltd — the first since it was formed in June to market the CT range in New Zealand.

According to Yates' general manager, administration, Mr John Tait, the company will add up to a dozen more NGENs at branches throughout the country if the initial order performs up to expectations.

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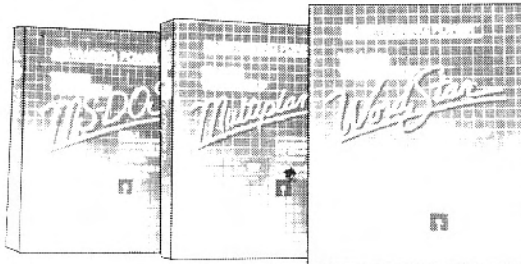
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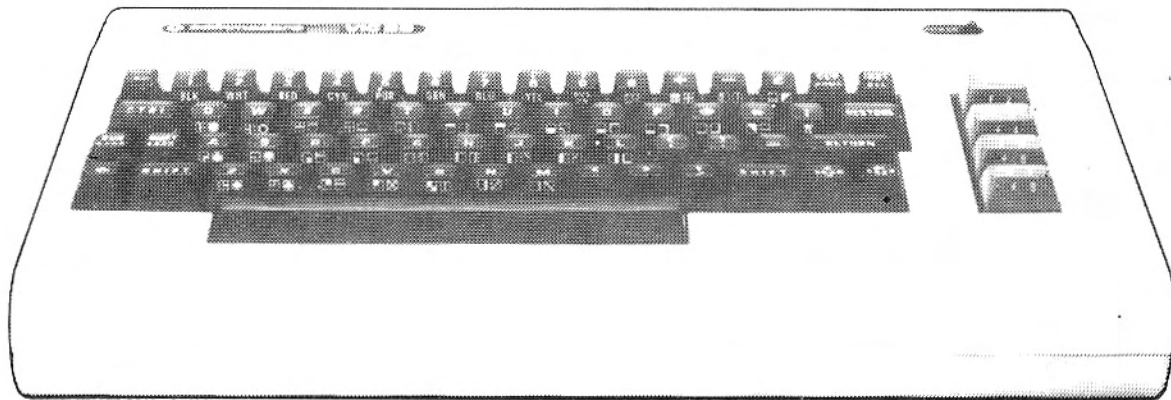
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Atari games on the C64

By Steven Darnold

Since the beginning of this year, Atari has been converting its range of arcade games to the Commodore 64. Recently, three of these games — Pole Position, Dig Dug, and Donkey Kong — have come into my possession.

The best of these games is unquestionably Pole Position. The



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graphics are the best I have seen on a game of this type. As you steer your car down the race track, you experience a realistic sense of motion as the lines on the road speed toward you. Cars and billboards appear on the horizon and grow progressively larger as you approach. The illusion of motion is very strong.

Pole Position also makes good use of sound effects. There's a realistic whine from the engine when you need to change gears; there's a squealing sound when your tyres skid; there's a nice explosion when you hit something. Sounds are well co-ordinated with the graphics, and the overall effect is very good indeed.

Unlike some other Atari games, Pole Position responds well to the controls. This is very important because it links the sound and graphics to the joystick and fosters the illusion you are in the car steering and accelerating. Full marks to Atari — the game works well. My only criticism is that this type of game is inherently repetitious — driving round and round and round.

Dig Dug is not nearly as well executed. The graphics and sound are interesting, but not exciting, and the game, as a whole, lacks the vividness of Pole Position. In addition, the controls are not as responsive as they should be, and there are occasional minor hang-ups.

Nevertheless, Dig Dug is an appealing game. In fact, in some respects it is more fun to play than Pole Position. It requires an element of planning which is totally lacking in Pole Position, and has more variety.

Donkey Kong is a disappointment. The main problem is that the controls are frustratingly unresponsive. Often, the little man refuses to go where you want him to, and this can be deadly. Moreover, the little man sometimes falls inexplicably when making a quite simple jump. This lack of control is so annoying the game hardly seems worth playing.

I have seen two other versions of Donkey Kong, and this one is potentially the best. It is the most faithful copy of the arcade original, and it would be a



Fourteen-year-old Richard Murphy, who won the Commodore 64 competition at the Wellington computer show, is a fourth former at Glenfield College in Auckland. Here, he is congratulated by Fountain's marketing manager for Commodore, Mr Tony Butler. Richard's only computer experience to date has been on Apple IIe during computer classes at high school where the emphasis has been on writing adventure games.

good game if it were easier to control. It's a pity Atari didn't spend a bit more time on it and get the joystick routines right. While at it, the sound, which is pretty poor, could be improved.

The most noticeable thing about these Atari games is the huge contrast between Donkey Kong and Pole Position. Everything that's wrong with Donkey Kong is absolutely right with Pole Position. It's hard to believe the programs come from the same producer. Clearly they must have different programmers. I also suspect Atari was in a bit of a rush to release its first batch of conversions for the Commodore 64, and didn't spend as much time as it should have.

This would explain why Donkey Kong and, to a lesser degree, Dig Dug aren't integrated into the 64 as well as they should be. Both games were in the first batch of conversions released by Atari. Pole Position, on the other hand, is a much more recent release and shows definite signs of a clearer understanding of the 64.

I'm glad Atari is converting its most popular programs for the Commodore 64. These are sound programs with proven appeal. Atari, however, must be careful to tailor the programs for smooth operation on the 64 — otherwise, it is wasting its time.

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The value of a computer

By Steven Darnold

When people first find out I have a computer, they often ask: "What do you do with it?" Most people realise computers are extremely useful, for businesses, but they don't understand what a computer can do in the home.

A very big role for the computer in the home is entertainment. Most people already spend many hours each day watching television, listening to music and playing various sports and games. Similarly, some people use a home computer for entertainment. Many children and adults enjoy playing games on the computer. These range from arcade games which test the reflexes to thinking games which test the brain.

Another big role for the computer in the home is word processing. Anybody who uses a typewriter will benefit from a computer running a word processing program. Whether you're a student preparing an essay for school or a parent writing letters to relatives, a word processor will make it easier and faster to produce attractive output.

I find computer games so entertaining and word processing so useful that these two functions alone are enough to justify the purchase of a computer. However, it has many more potential uses.

Because computers are programmable, they are capable of performing a wide variety of useful functions. For example, if you have inflation bonds, you can write a short program to compute the daily value. If you are trying to learn the lines for a play, you can program the computer to give you your cues. If you are doing the handicapping for your sports club, you can write a program to do the arithmetic. None of these tasks is very difficult, but they are all much simpler with a computer.

As an example, I am including a short program which I wrote about a year ago to calculate what combination of

postage stamps to use on a letter. The program itself is no earth-shattering achievement, but it's a useful program which I use several times each month.

Normally, I keep several denominations of postage stamps in the house: 24 cents (regular mail), 35 cents (letter rate for cassettes and disks) and 58 cents (air mail to USA). I also keep some one-cent and three-cent stamps to make up odd amounts. Normally, it's not too difficult to work out which stamps to use on an envelope: domestic air mail = 24+3+3; air mail to Britain = 35+35. However, sometimes I get values which need a bit more thought. How do I get \$1.15 or \$1.79 or \$2.08 using the least number of stamps?

"Postage Finder" makes selecting the stamps easy. I simply input the postage I need and the computer determines the least number of stamps. If I get some new stamps with different denominations, I need only change the values in line 10, and resave the program.

I'm not suggesting everyone will find this program useful. Rather, it's just an example of one way my computer makes life a little bit easier for me. I have many such programs. I may use each program only once a month or once a year, but taken together they represent a worthwhile function of the computer.

```

1 REM **** POSTAGE FINDER ****
5 PRINT"<cr>"
8 :
9 REM STAMP DENOMINATIONS
10 N1=58:N2=35:N3=24:N4=3:N5=1
11 :
15 INPUT"POSTAGE (IN CENTS)";T
20 CC=99
25 FOR I1=0 TO T/N1:T1=I1*N1
30 FOR I2=0 TO (T-T1)/N2:I2=I2*N2+T1
35 IF T1>T THEN 95
40 FOR I3=0 TO (T-T1-T2)/N3:I3=I3*N3+T2
45 IF T1+T2>T THEN 90
50 IF I3>T THEN 90
    
```

The winner of August's competition was Murray Wu, of Wellington. Murray has been sent a copy of "Alice in Videoland" (donated by Viscount Electronics).

The prize for this month's competition is a cassette tape of "Moon Buggy" (donated by Alpine Computing). Entries close on October 25. The winner will be selected randomly from among the correct entries. Only one entry per person.

Your task is to depict on the screen a spider suspended by a single strand. When you push the joystick up, the spider goes up; when you pull the joystick down, the spider goes down. Send your program with your name and address to: Moon Buggy Contest, P.O. Box 546, Blenheim.

```

55 FOR I4=0 TO (T-T1-T2)/N4:I4=I4*N4+T3
60 FOR I5=0 TO N4-1
65 IF T4+I5*N5<=T THEN 85
70 C=I1+I2+I3+I4+I5:IF C>CC THEN 85
75 CC=C
80 F1=I1:F2=I2:F3=I3:F4=I4:F5=I5
85 NEXT I5
90 NEXT I4
95 NEXT I3
100 PRINT:PRINT I1;"--"F1
105 PRINT:PRINT I2;"--"F2
110 PRINT:PRINT I3;"--"F3
115 PRINT:PRINT I4;"--"F4
120 PRINT:PRINT I5;"--"F5
    
```

READY.

Staff laid off

Visicorp, in the USA, has recently laid off 55 staff members, a move which may reflect a reportedly generally slow market with some of its more recent software packages.

The Vision package, which came onto the New Zealand market in June, has been fairly slow to catch on here although users seem happy where it has been installed.

Public domain 'scandal'

By Steven Darnold

Public domain programs are supposed to be free. They are donated by the authors and are not meant to be sold.

I am deeply disturbed that distributors are charging high prices for public domain programs in New Zealand. Disks of public domain programs usually sell for \$30-\$50. This is a scandal.

Distributors claim the price represents merely the cost of the disk plus a reasonable copying charge. Nonsense. A good quality disk can be bought for \$7, and copying takes less than three minutes on a dual drive. Is \$300 per hour a reasonable copying charge?

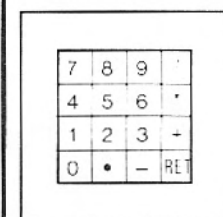
I am disgusted. I spend hundreds of hours working on programs which I donate to the public domain. I do not expect \$300 per hour for my work. I do not expect even one cent. How is it that

some businessman thinks he can spend a couple of minutes copying a disk of my programs and pocket \$18?

To add insult to injury, some clever person in USA has copyrighted the term, "public domain", and is selling public domain programs under his copyright, with threats of legal action against anyone breaking the copyright. Some of my programs appear in his collection and I am appalled that he has copyrighted them. The "Public Domain, Inc." disks are being sold in New Zealand for \$30 each. I urge readers not to buy them.

Do not buy public domain programs. Public domain means free. Do not pay ridiculous copying charges. The programs were donated to you by myself and other programmers. They are readily available from user groups in New Zealand, there is no need to pay.

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Selective input routines

By Tony Graham

When writing programs, we often want to arrange for the computer to respond to a single keyboard character. This limited form of selection is not hard to achieve and is usually found in similar form to:

```
10 GET X$:IF X$="" THEN10
20 IF X$="Y" THEN50
30 END
50 REM NEXT LINE
```

These few lines use the GET statement to check the keyboard for input. If no key is pressed, the computer keeps running line 10 in a continuous loop. As soon as a key is pressed, the program drops through to line 20 which checks to see if the key pressed was Y. Any other key will cause the program to run line 30 and end. If Y was the key pressed, the program will jump to line 50 and continue.

What happens when we want a response to several keys? If, for example, a game requires different keys for up, down, left and right? The chances are it will be easier to use four lines of program each with its own IF-THEN statement to select the path the programmer wishes.

If, however, we want the input to be selective to a group of characters, and we do not require a branch in different directions, ideas change.

Let us assume we want the computer to respond only to numeric input, the numbers 1 to 9. We could use +10 IF-THEN statements. It would work but would also be inefficient.

A better way to achieve our aim is to check the ASCII value of the character received from the keyboard and accept only those characters which fall between an upper and lower limit.

First, what is ASCII? A look at pages 145 to 147 of your VIC manual or pages 135 to 137 of your C64 manual reveals a table of codes. This table shows which character is PRINTed by a given code number. It is this number we will check. Enter and RUN these lines:

```
10 GET X$:IF X$="" THEN 10
20 PRINT ASC(X$):GOTO 10
```

Your computer will PRINT a number on the screen as you press a key. The number will change with each key; you can check the results against the table in the manual and see the effect of the shift and Commodore keys.

Note that for the keys 0 to 9, the ASCII codes are 48 through to 57, so if we want only numeric input, we can include a line of program to select only between 48 and 57. Here is what we need:

```
10 GET X$:IF X$="" THEN 10
30 IFASC(X$) < 48 OR ASC(X$) > 57 THEN10
90 PRINT X$:GOTO10
```

We now have an input which accepts only numbers, but we can't get out of it without using the STOP key. What we need is a line to sort out when RETURN is pressed. This will work:

```
20 IF ASC(X$)=13 THEN100
100 REM Next line.
or if you could use:
20 IF X$=CHR$(13) THEN100
```

As you may have guessed, 13 is the coded value of the RETURN key which allows us to jump out of the loop, but we could choose another key if we wished. If we changed the 13 in line 20 to 19, we would be using the CLR/HOME key to escape from the loop.

So far, our numeric input routine does not allow for plus or minus signs. We might need those, so we had better change line 30 to allow codes 43 and 45 to pass. To do this we'll try:

```
30 IF ASC(X$)<43 and ASC(X$)> 45 AND ASC(X$)<48 or ASC(X$)>57 THEN10
```

Well it works, but we still can't use a decimal point. That's ASCII 46. We could add AND ASC(X\$) ^ 46 to line 30 if it will fit. If we re-think the problem, what we really want is all characters from ASCII 43 through to 57 with the exception of 44 the comma and 47 the slash. Let's write it that way.

```
30 IF ASC(X$)< 48 OR ASC(X$)>57 THEN10
40 IF ASC(X$)=44 OR ASC(X$)=47 THEN10
```

That's tidier. We let the comma and slash sneak through line 30 and throw them out at line 40.

All we have done with our input routine so far is to PRINT out each character as it was entered from the keyboard. By now, you may have realised the delete key can't function to erase those characters, and there is not much profit in only PRINTing them.

Let's add line 50 so that as well as PRINTing a character we collect our GET X\$ in a new string called Y\$. Enter:

```
50 Y$=Y$+X$
```

We will also need to change line 90 to PRINT Y\$ and not X\$, but if we are not careful, there will be a trail of partly completed Y\$'s down the screen. To avoid this add line 80 to PRINT 20 or so spaces which will overwrite the last PRINT of Y\$, and end with a cursor up control character. PRINT Y\$ by changing line 90 so that X\$ becomes Y\$ and change the semi-colon to a cursor up control.

Bringing the DELETE key back into operation is the next problem. It's easy to read the key but what response do we require? As the character we wish to delete will be contained in Y\$, we can alter the length of Y\$ if the DELETE key is pressed. Y\$ can be shortened by one character.

First, we add a line to test for the DELETE key and direct the program to the line to shorten Y\$

```
20 IF ASC(X$)=20 THEN 60
Next add the lines which remove the last character entered.
60 L=LEN(X$)-1:IF L 0 THEN L=0
70 Y$=LEFT$(Y$,L)
```

Line 60 finds the length of Y\$, subtracts 1 and checks to make sure we do not try and delete more characters than we entered. Line 70 makes Y\$ the new length.

Apart from adding GOTO80 on the end of line 50, this jumps the last lines we added, the routine is ready to use.

A listing of the complete routine is provided in case you got lost somewhere along the way. Try changing the routine so that it will only accept alpha characters or possibly alpha and numeric but no graphics, but don't forget to allow for the space bar.

```
10 GETX$IFX$="" THEN10
20 IFASC(X$)=13THEN100
25 IFASC(X$)=20THEN60
30 IFASC(X$) 43ORASC(X$) 57THEN10
40 IFASC(X$)=44ORASC(X$)=47THEN10
50 Y$=Y$+X$:GOTO80
60 L=LEN(Y$)-1:IFL 0THENL=0
70 Y$=LEFT$(Y$,L)
80 PRINT"
90 PRINTY$""":GOTO10
100 PRINT"YOUR INPUT WAS ""Y$"
```

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Control that cursor

By Peter Archer

One of the things about the VIC-20 that gets beginners tied up in knots is the way Commodore computers control the movement of the cursor, and the so-called "quote mode".

Both the VIC and the Commodore 64 share the same keyboard, including the cursor movement keys. There are two only cursor keys conveniently located at the bottom right of the keyboard. One of these controls up-down cursor movement, and the other left-right.

Pressing the "up-down" key moves the cursor down the screen. You must also hold down the shift key (or the shift-lock key) to move the cursor up the screen. Similarly, the "left-right" key moves the cursor to the right, unless the shift is also pressed to change the movement to the left.

Although beginners take a while to learn this, use of these keys becomes automatic after a while. I no longer have to think about these keys at all: they have almost become an extension of my hands.

Strange symbol on your screen

This is all very well if that was all there was to it. But of course, it is not. If you press a cursor key after opening up a quote mark on the screen, the cursor does not move; instead, a strange looking symbol appears on the screen! If you now put another quote mark on the screen, the cursor will again move in response to the cursor keys.

This is Commodore's method of positioning the cursor from within a

program. Different computer manufacturers use varying methods to achieve this. Apple, for example, uses vertical and horizontal TABs, others use "PRINT AT" statements, etc.

I prefer the Commodore system, probably because I am used to it. Used intelligently, the Commodore cursor movement system is an elegant way of moving around the screen under program control. Perhaps a few examples will illustrate this.

Suppose you want to print several lines of text on the screen with (say) a gap of three lines between each text line. Many versions of BASIC would do it this way:

```
100 PRINT "THIS IS THE FIRST LINE"
200 PRINT:PRINT:PRINT
300 PRINT "THIS IS THE SECOND LINE"
400 PRINT:PRINT:PRINT
500 PRINT "THIS IS THE THIRD LINE"
etc.
```

This will work fine on any Commodore computer, but there is a more elegant way:

```
100 PRINT "THIS IS THE FIRST LINE"
200 PRINT:PRINT:PRINT
300 PRINT "THIS IS THE SECOND LINE"
400 PRINT:PRINT:PRINT
500 PRINT "THIS IS THE THIRD LINE" etc.
```

This will work fine on any Commodore computer, but there is a more elegant way:

```
100 PRINT "THIS IS THE FIRST LINE"
300 PRINT "{Down} {Down} {Down} THIS IS
THE SECOND LINE"
400 PRINT "{Down} {Down} {Down} THIS IS
THE THIRD LINE"
```

In the second example, the (Down) represents one press of the cursor down key while in "quote mode". This would show on the screen as a inverse Q. You use one of these cursor down symbols for every line you want to move down.

The other three directions have different symbols. If you are not familiar with them, try them. There are, however, two problems to watch out for.

Sometimes, you may be in what is known as "quote mode" (you have typed a quotation mark) and after entering some text, you decide to change something you have already typed. So you press a cursor key to (say) move back along the line.

But the cursor does not obey you! Instead, you get the symbol for "cursor left" for each key press. This can be very disconcerting for the beginner who wonders what on earth is happening.

Worse still, there is another more subtle way to enter "quote mode". Another example will illustrate. You have entered this program line:

```
100 PRINT "THE BOY JUMPED OVER THE
GATE"
```

You then decide you want to change this to: "The boy jumped over the large gate". So you use your cursor keys to move the cursor over the top of the letter, G, in gate, and you use the insert key to open up a gap to make room for the extra word.

You type the letters LA, but then decide that "high" would be a much better word than "large". So you press the cursor left key to go back and type over the "LA" with a "HI". But what happens. The cursor does not move left. Instead you get the symbol for "cursor left" appearing!

This happens because when you open up a gap inside quote marks, the computer automatically enters "quote mode" - for a very good reason. If it did not do this, it would be difficult to enter cursor movement symbols when editing existing program lines.

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Two ways around the problem

There are two ways around this problem. The "insert/delete" key is not affected by quote mode: it still works as normal. So if you make a mistake while in quote mode, you can use the delete key to back-up to make a correction. You will, of course, have to re-type everything from the mistake onwards. Or you can simply press the "return" key and exit from the line. The "return" key always cancels quote mode, and you can then re-enter the line and make the desired changes.

The other problem arises from the difference between the computer's "graphic" and "text" modes. All Commodore users will be familiar with pressing the shift and "Commodore logo" keys together to change between these two modes. What you may not realise is that this changing between graphic and text modes is achieved by the computer using a completely different character set stored in a different part of the character ROM.

Whoever designed the Commodore character set (which is much the same on all Commodore computers) decided to use the inverse of some of the keyboard characters as cursor movement symbols. The inverse of the letter, "Q", is used to symbolise cursor-down. Thus, when in graphics mode, this appears as a capital and when in text mode, as a lower case inverse "q".

This is only slightly confusing; what is much worse is that the "cursor up" symbol is the inverse of the shifted Q. Therefore when in graphics mode, this appears as an inverse round (which is the inverse of the graphics symbol appearing on the "Q" key), but in text mode it changes to an inverse "Q"! So the "cursor-up" symbol in text mode is the same as the "cursor-down" symbol in graphics mode, although they actually mean the opposite!

The reason for this lies in the way the computer obtains these inverse symbols from the character ROM; it is not a practical joke by the computer designer.

Three tape games reviewed

By Peter Archer

Many inexpensive games are now available in New Zealand on tape for the VIC-20. These generally fall into two distinct categories - those which will work on a VIC without any memory expansion, and those requiring extra memory.

Any developer of software for the VIC is faced with a choice.

Create the best possible product regardless of memory usage (but knowing the potential market is limited to VIC owners who possess the extra memory required); or tailor the program to fit into the standard unexpanded VIC and open up a much larger potential market (but probably having to severely prune the program by leaving out many desirable features).

I believe "Skramble", for the unexpanded VIC by Terminal Software (England), distributed in New Zealand by Alpine Computing and priced at \$24.95, shows signs of pruning. However, it is still a very nice product.

Many of you will be familiar with the arcade classic "scramble" and this is a reasonable imitation considering the memory limitations. The game is exciting to play, the graphics are realistic, the action is fast.

The programmer has done a commendable job. The program uses every last byte of the VIC's memory: not one byte is wasted.

But the compromises do show. The scenery is somewhat repetitive because of memory limitations which lead to a multiple use of the same limited number of scenery generating routines over and over. The sound is well done although

the opening music gets on my nerves after a few times.

The worst feature though is that you get only one life and if you lose this, you have to start again right at the beginning. After deducting two points for these defects, I will award this one a generous eight out of 10.

The other two games are both by another English firm, Romik Software, and also distributed by Alpine Computing and selling for \$24.95 each.

"Space Attack" (yawn) is an "invaders" type game, and while I must admit I have seen much worse, it does not impress me much. Alpine's catalogue states that "Romik promises a minimum of one new game every month!" Well, if this is typical, that shouldn't be too hard to achieve.

Although the action is fast, the graphics are uninspiring, and I tired of it very quickly. I'll be generous and give it five out of 10 - but only because I've seen much worse.

Romik's other offering, "Shark Attack", has a more original theme - you are using an "atomic net" (whatever that is!) to trap hungry sharks. To make life more interesting, you also have some "deadly octopi" to keep clear of.

The graphics are once again disappointing, although I played this for longer than "Space Attack" before tiring of it. Because of this and its more original theme, I will score it at six out of 10.

I am left with the impression that the author of "Skramble" laboured for a long time to create as good a work of art as possible within the limitations of the unexpanded VIC. But "Space Attack" and "Shark Attack" show signs of having been thrown together in a hurry.

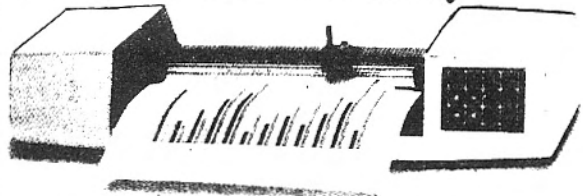
There is not much you can do about these little quirks built into your machine other than to be fully aware of them so as not to be caught out.

There is one other related thing about inverse symbols. Examine closely the

symbols which appear when you press the function keys while in "quote mode". Then change from graphics to text mode and work out the relationship between the different symbols.

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Stopper for debugging

By Gordon Findlay

Most readers of the TRS-80 column run Model I machines, or System 80s. A few run Model 3s. All these machines are, technically, obsolete. This shouldn't unduly worry anyone, but it does raise the issue of software availability. You have probably already noticed that American magazines advertise less and less Model I software. Even the pirates seem to be finding new software harder to find!

Many TRS-80 users want sophisticated software packages, rather than simple-minded programs. They expect a lot and know that their machines, despite the age of the design, are capable of a lot of work.

There has always been a fair bit of software brought in privately from the USA — particularly games, and "business" software such as word processors and data base packages. However, this is no longer cheap, with the New Zealand dollar buying something like 48 cents in American currency, with freight to be paid (also in American dollars!) and a discussion to be had with the Customs Department.

There is one company in New Zealand, Molymerx, Ltd, of Auckland, which sells

software mail order for the TRS-80. It has a very large catalogue, featuring all sorts of software, from games to business software to programming languages. Almost all of it is duplicated in New Zealand, under distributor's licences, and packaged by Molymerx.

The catalogue is well worth reading just to see the range of programs available (it isn't free but it is worth the \$4.50 charge which is said to include updates). Molymerx also has a colour computer catalogue, and sells a little hardware from time to time. Prices may seem high, but remember the costs involved when comparing.

Remarkable machine code program

The company sent me (for review) a remarkable machine code program to use while programming in BASIC, it is "Stopper", by one of the biggest names in TRS-80-land, Roxton Baker, the author of "Trakcess".

"Stopper" allows you to breakpoint a BASIC program for debugging purposes, to trace it in many ways, to single-step through a program, and much more, to

aid in the search for the elusive bug.

It comes on tape or disk. The tape version loads using the "SYSTEM" command; the disk version is a "/CMD" file which is run from DOS, then BASIC entered, and activated, again with the "SYSTEM" command. The breakpointer relocates itself to the top of available memory, leaving any special high-memory routines undisturbed.

But wait — what is a breakpoint? It is a point in a program at which the program is interrupted — just as if the BREAK key were pressed — but with the options of quitting, or carrying on. Using the "Stopper", a breakpoint may be set at a given line, or for a given value of some variable.

A line breakpoint is entered (from BASIC READY) with a command like (1000,

This sets a breakpoint at line 1000 — as soon as the program reaches the start of that line, it stops. A very useful extension (1000,8 will stop the program the tenth time it reaches line 1000. This gives the capacity to run right through a loop, but stop just before the end.

A value breakpoint is set by the command (1% = 10.

This interrupts the program as soon as the variable 1% reaches 10.

Once a breakpoint is reached, the program halts, indicating where. From here on, the program may be stepped through, one statement at a time, using the "+" key, or one line at a time, using the ")" key. This allows you to run the program at normal speed (nearly) until a breakpoint is reached, then single-step through the difficult section.

There are also commands to carry on, quit, and special versions of the single-step commands to make it less awkward single-stepping through loops such as keyboard scans with INKEY\$

During the running of a program, the CLEAR key can be used to freeze the action, and restart it. Holding the key down allows the program to continue at a slower speed — about three statements per second.

"Stopper" adds significantly to the TRON/TROFF commands used for tracing programs. Rather than having line numbers appear all over the screen, probably concealing whatever the program is doing, the numbers all appear in the bottom right corner, or on the printer in one or eight columns.

As well as tracing line numbers, the value of one specified variable — the "variable of interest" — may be constantly displayed and updated on the bottom line of the screen. If such a "variable of interest" is defined but isn't being traced, its value can be found at any time when the program is running by pressing the "?" key.

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The user may specify the degree of tolerance allowed in making comparisons with real numbers, either single or double precision. This can save trouble when you are using a value breakpoint. As well as all these, there are quite a few other convenience commands for resetting or editing breakpoints and so on.

This is a complex program, interacting in the most intimate way with the operation of the BASIC interpreter. It isn't long, occupying about 3.1K of RAM. It slows programs a little, depending on what breakpoints are set, but that isn't a problem as the "Stopper" will be used only for debugging, not when the problem is actually running.

"Stopper" is claimed to be compatible with all DOSes, and virtually all the disk basic enhancements. The only conflict recorded is with traced single-stepping under DOSPLUS. But "Stopper" gives you that anyway.

Documentation is essential with complex programs. The documentation for "Stopper" is 10 pages long, reproduced from a dot-matrix printer. It is complete, as far as I could tell, and intelligible to the likely users, programmers. A copy of the documentation was on the disk, as a word processor file - a real convenience.

There is a big place for this sort of utility. Programmers who write long programs will find it of greatest benefit. The price: on disk, \$79.95; no price listed for the tape version. The last price I saw in US magazines was \$30 quite a while ago. Allowing for the exchange rate, post and packaging and sales tax, that's comparable.

I have had a number of suggestions for columns recently. Feel free to add your questions or ideas. I will write it up or get somebody else to. Write to me, *c/- Bits and Bytes*.

Sprite movement: part one

By Barbara Bridger

The next step after creating some sprites with interesting shapes is to get them moving. There are various ways of achieving this to satisfy different requirements.

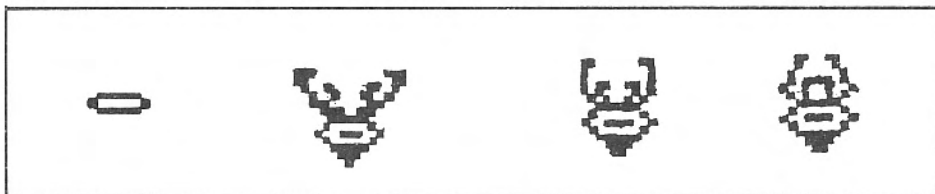
You may want to give the impression of movement within an otherwise stationary figure, to move a sprite around the screen in a set pattern under the control of program statements or to control sprite movement in response to joystick movement or keyboard input.

The visual effect of movement within a stationary sprite can be achieved by designing a number of separate sprites with the same basic shape but having the moving part or parts displaced slightly. These sprites are then placed successively at the same location and on the same sprite plane. Flashing areas may be produced by having similar

numbers can be used to fix sprite positions or decision statements can determine alternative sprite placements. Sprites can also be moved according to some mathematical formula which calculates the row and column position of the sprite.

Watch out for the movement of sprites off the screen. If the row position of a sprite is increased until it moves off the bottom of the screen and increase of the row position is continued, the sprite will eventually appear back at the top of the screen. But this "off screen" movement will cause a flickering or temporary disappearance of those sprites still "on screen".

This can be avoided by having program statements to check whether sprites have reached the perimeter of the screen and if so to take appropriate action, for



sprites with complementary areas; the pixels of this area are switched on for one sprite and off for the other. The sprites are then put alternately on the same sprite plane.

There are several possibilities for using program statements to control sprite movement around the screen. Random

example:

```
X=X+1 : Y=Y+1
IF Y > 192 THEN Y=0
IF X > 255 THEN X=0
PUT SPRITE 1,(X,Y),10,1
```

Sprites may be placed on one of the 32 sprite planes, numbered 0 to 31, but there can not be more than four visible sprites on one row. If two sprites are

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placed at the same position, the one on the lower-numbered plane appears as if it is on top of the other one. Sprites on any plane appear above printing or shapes formed with such graphic commands as PAINT, CIRCLE etc.

Making a screen change during a program, such as SCREEN 1,2 to SCREEN 1,3, will cause the record of sprites formed previously to be lost. If you want to use the same sprites with different screen sizes, you will have to read the data into individual strings when initially forming the sprites and use the information in these strings to recreate the sprite after the screen change.

The Spider Shoot program illustrates some of these points. Lines 50-240 form the sprites; lines 270-290 and 370-380 are instructions for playing the game and may be left out if you want to save typing effort; lines 300-350 produce movement and flashing within a stationary sprite; lines 500 and 560 use random numbers to fix the initial position of the spider sprite; lines 790, 810, 820, 870, 880, 890 determine the path of the missile sprite.

The equation used is the path of an artillery shell in a frictionless atmosphere and a gravitational field: $y = x \tan A - g/2V^2 \cos^2 A \cos A$. A is the angle of elevation of firing, g the gravitational constant and V the gun muzzle velocity of the shell. V would be determined by the weight of the shell and the size of the explosive charge. In this game, g and V are incorporated into a constant with some scaling to keep the missile on the screen.

If you are interested in the program and don't want to type it in, send \$2 plus a tape and self addressed envelope with 30 cent stamp to: Moving Sprites, 11 Mawson St, Lower Hutt.

SPIDER SHOOT

```
10 CLS
20 SCREEN 1,2
30 COLOR 15,1,1
40 LOCATE 85,95:PRINT"SPIDER SHOOT"
50 REM NOW TO FORM SPRITES
60 FOR I = 1 TO 6
70 U$=""
80 IF I=4 THEN RESTORE 170
90 IF I=5 THEN RESTORE 230
100 IF I=6 THEN RESTORE 210
110 FOR J=1 TO 32
120 READ A
130 U$=U$+CHR$(A)
140 NEXT J
150 SPRITES(I)=U$
160 NEXT I
170 DATA 0,0,0,1,3,7,8,19,8,7,10,20,22,16,16,24
180 DATA 0,0,0,128,192,224,16,200,16,224,80,40,
104,8,8,24
190 DATA 0,0,0,1,3,7,8,19,8,7,10,18,11,8,4,6
200 DATA 0,0,0,128,192,224,16,200,16,224,80,72,
208,16,32,96
210 DATA 0,0,0,0,0,0,7,12,7,0,0,0,0,0,0
220 DATA 0,0,0,0,0,0,224,48,224,0,0,0,0,0,0
230 DATA 0,0,0,1,3,7,8,19,8,7,10,20,40,68,128,1
92
240 DATA 0,0,0,128,192,224,16,200,16,224,80,40,
20,34,1,3
250 REM NOW TO PUT SPRITES ON SCREEN
260 LINE (0,0)-(255,190),1,BF
270 LOCATE 10,0:PRINT"YOU MUST TRY TO HIT THE S
```

Challenge for the expert

SASA Reviewed by Barbara Bridger

Here is a really challenging machine language game for the enthusiastic games expert. It requires patience, strategy and quick reflexes as well as total concentration and a joystick in top condition.

The game can be played at three levels — practice, normal and arcade — and there are four different scenes to guide SASA through, each with quite different objectives.

Controlled movement is by recoil from firing bullets and there are numerous dangers to be avoided: helicopters with missiles, an electric barrier, octopi and their ink spots, astro-beetles and astro-monsters.

The graphics are impressive and imaginative throughout, with lots of attention to detail. The sound is also excellent with great variety in the sound effects for each scene. I particularly liked the flying saucer sound in the second scene and the rhythmic sound effects for the fourth and oh, so elusive final stage!

The instructions are detailed and even include some hints on successful strategies. SV318 owners need at least a 16K RAM expansion to run SASA. At \$18 for the tape version, this game would make a good Christmas present for your favourite Spectravideo owner, but don't expect to get any dinners cooked or lawns mown for at least a week. This game is very addictive.

```
PIDER WITH YOUR":LOCATE 10,25:PRINT "MISSILE BE
FORE IT ESCAPES TO A SHELTER.":LOCATE 10,50:PRI
NT" RANGE IS CONTROLLED BY THE ANGLE OF":LOCATE
10,75:PRINT" ELEVATION OF FIRING WHICH YOU ENT
ER"
280 LOCATE10,100:PRINT" WHEN IT IS REQUESTED AT
THE TOP OF THE":LOCATE 10,125:PRINT" SCREEN."
290 LOCATE 10,150:PRINT" MAXIMUM VALUE = 83 MI
NIMUM VALUE = 25"
300 FOR I=1 TO 50
310 FOR J= 1 TO 6
320 IF J= 3 OR J=6 THEN C=6 ELSE C=4
330 PUT SPRITE 2,(127,125),C,J
340 NEXT J
350 NEXT I
360 PUT SPRITE 2,(50,50),0,6
370 LOCATE10,180:PRINT"PRESS ANY KEY TO CONTINU
E"
380 Z$=INKEY$:IF LEN(Z$)=0 THEN GOTO 380
390 LINE(0,0)-(255,190),1,BF
400 LINE(0,162)-(255,162),10
410 RESTORE 480
420 U$=""
430 FOR K= 1 TO 8
440 READ A
450 U$=U$ + CHR$(A)
460 NEXT K
470 SPRITE$(7)=U$
480 DATA 0,28,126,255,126,28,0,0
490 HI=0:M=0
500 RN=RND(-TIME)
510 LINE(0,0)-(255,161),1,BF
520 LINE(52,148)-(62,162),10,BF
530 LINE(252,148)-(255,162),10,BF
540 PUT SPRITE 7,(5,156),8,7
550 LOCATE50,175:PRINT"HITS":LOCATE190,175:PRIN
T"HISSES"
560 PS=62+INT(190*RND(1)):SPRITE OFF
570 PUT SPRITE 2,(PS,144),4,1
580 FOR K=1 TO 500:NEXT K
590 IF PS>150 THEN D=-1 ELSE D=1
600 SP=1
610 LINE(0,0)-(255,10),4,BF:FOR H=1 TO 100:NEXT
H
620 Z$=INKEY$:IF LEN(Z$)<>0 THEN GOTO 620
630 PUT SPRITE 7,(5,156),8,7
640 LOCATE 10,1:PRINT "enter the angle of eleva
tion for firing"
650 FOR H=1 TO 400-(DE*19):NEXT H
660 ANGLE$=""
670 LINE(220,11)-(240,25),4,BF:LOCATE235,10:PRI
NT"o"
680 Z$=INKEY$:SP=SP+1:IF SP>6 THEN SP=1
690 IF SP=3 OR SP=6 THEN C=B ELSE C=4
```

```
700 IF LEN(Z$)=0 THEN PS=PS+D:PUT SPRITE 2,(PS,
144),C,SP:IF PS>250 OR PS<50 THEN GOTO 1040 ELS
E GOTO 680
710 ANGLE$=ANGLE$+Z$
720 LOCATE 224,17:PRINT Z$
730 Z$=INKEY$:SP=SP+1:IF SP>6 THEN SP=1
740 IF SP=3 OR SP=6 THEN C=B ELSE C=4
750 IF LEN(Z$)=0 THEN PS=PS+D:PUT SPRITE 2,(PS,
144),C,SP:IF PS>250 OR PS<50 THEN GOTO 1050 ELS
E GOTO 730
760 LOCATE 230,17:PRINT Z$:PUT SPRITE 2,(PS,144
),4,1
770 ANGLE$=ANGLE$+Z$
780 IF VAL(ANGLE$)<25 OR VAL(ANGLE$)>83 THEN LI
NE(0,0)-(255,10),3,BF:LOCATE 10,1:COLOR 1:PRINT
"angle must be >=25 and <=83":COLOR 15:FOR K= 1
TO 2000:NEXT K:GOTO 610
790 RAD= 3.14/180*(VAL(ANGLE$))
800 SOUND6,10:SOUND7,19:PLAY"s11v518c"
810 R2=TAN(RAD):R3=COS(RAD):R3=R3*R3:R3=4E-03/R
3
820 X= 0:AM=INT(RAD*180/3.14)
830 SPRITE ON
840 FOR K= 1 TO 42
850 SOUND7,56:PLAY"s1306v111a"
860 FOR H= 1 TO 3
870 Y= X*(R2-1)*R3
880 X=X+1:Y=156-(2*X)
890 PUT SPRITE 7,(2*X,Y),8,7
900 ON SPRITE GOSUB 980
910 IF PS>250 OR PS<50 THEN GOTO 1050
920 IF Y>156 THEN GOTO 960
930 NEXT H
940 LOCATE 2*X,Y:PRINT". "
950 NEXT K
960 SOUND6,15:SOUND 7,19:PLAY"s11v614c":LINE (2
35,170)-(255,185),4,BF:M=M+1:LOCATE 236,175:PRI
NT M
970 IF M>19 THEN GOTO 1090 ELSE GOTO 610
980 SOUND6,15:SOUND 7,19:PLAY"s11v913c"
990 LINE (0,0)-(255,10),6,BF:LOCATE 10,1:PRINT
" YOU GOT HIM !!!"
1000 FOR K= 1 TO 800:NEXT K
1010 HI=HI+1:LINE(10,170)-(35,185),4,BF:LOCATE
10,175:PRINT HI
1020 DE=DE+1
1030 IF HI>19 THEN GOTO 1090 ELSE GOTO 510
1040 LINE(0,0)-(255,10),2,BF
1050 LOCATE10,1:PRINT " he GOT AWAY that time":
FOR K= 1 TO 999:NEXT K
1060 LINE(235,170)-(255,185),4,BF:M=M+1:LOCATE
236,175:PRINT M:IF M>19 THEN GOTO 1090
1070 GOTO 510
```

Turn to page 57

Thrills of 'Jungle Hunt'

By Michael Fletcher

Any Atari owner who has been inside an arcade in the last six months is bound to have heard of "Jungle Hunt", a game which when first introduced to the arcade, caused quite a sensation. The controversy was all about the main character — a long-clothed jungle man. Greystoke estate lawyers claimed the jungle man resembled Tarzan too much and therefore came within their copyright on all Tarzan products. Taito (the people who make the game) decided to change the main character to a modern adventurer and all was settled. This controversy didn't make much difference to the success of the game and its success in the arcade induced Atari to buy the home computer rights and produce the game for its own home computers.

"Jungle Hunt" is quite an original game. You play the part of a famous adventurer with the task of battling the dangers of the African jungle and rescuing your girlfriend who has been captured by the natives. The game has been divided into four screens. I will give a short description of each screen and offer a few tips on completing them.

The vine screen

The vine screen is the first and involves 10 trees, with vines swinging between them. You have to swing from vine to vine and reach the next stage. This may sound very simple but is far from it. To swing from one vine to

another takes a lot of judgement and skill. If you just jump and hope, you will end up dead at the bottom of the tree you just tried to jump to. I found the best strategy was to jump when the vine you are trying to jump onto is off the screen. This method means that when you jump, the target vine will be swinging towards you and 99 times out of 100, you will be able to safely attach yourself onto it.

Once you have completed swinging from vine to vine, you come to a river. When you push the jump button, you heroically dive into a crocodile-infested river with only a Bowie knife to protect yourself.

The river

There are two elements, time and action, to this stage. The action, is battling the numerous crocodiles that live in the river which you must swim across to rescue your girlfriend. The time is how long you can stay underwater before you have to surface to get air.

You are provided with a knife which you must use to kill the extremely hungry crocodiles which haven't eaten an adventurer for weeks.

Your knife is very useful for stabbing crocodiles and generally making life a little longer. To kill a crocodile, you must position your swimming man just below the croc's mouth and then push the action button to stab upwards. This should kill the crocodile and earn you 200 extra points.

The only tip I have is to swim at the

bottom of the screen and surface only for air. This way, you miss out on most of the crocodiles and will probably survive to go onto the next screen.

The boulders

Once you reach the bank, you are returned to the upright position and suddenly subjected to running up a hill and jumping and ducking flying boulders.

The object is to avoid the numerous boulders being rolled at you by jumping or ducking. This is done by pushing the action button and pulling the joystick up or down. This stage gets progressively harder — the longer you last, the bigger the boulders and the harder they are to avoid.

My tip is to stay near the middle of the screen and move back or forward when the need arises.

The girlfriend stage

The final stage involves a pretty gruesome looking playfield. Two spear-wielding natives move back and forth across the screen and if you touch one, he will kill you. On the other side of the screen is a pot of boiling water with your girlfriend being lowered into it. Your task is to jump over the natives, then jump up and rescue your girlfriend.

The best strategy is to wait until the closest native starts coming towards you, then jump quickly three times. With luck, this should work.

I found Jungle Hunt a very enjoyable and addictive game and recommend it for any Atari owner. A 16K cartridge costs \$79.95 and should be available at all Atari stockists.

Top value for money

By Michael Fletcher

I recently acquired a brand-new Atari 1027 letter-quality printer, a package I soon discovered was well worth its \$795 price tag. The print quality is quite amazing. It equals and sometimes surpasses the print found on expensive electric typewriters.

The reason is a small drum which has each individual letter and number characters moulded onto it. The drum acts as a daisy wheel and rotates continuously throughout the entire printing process.

To print a character, the drum stops

when it reaches the correct letter or number and hits the paper to be printed on. To make this process work at all, an ink roller has to be fitted onto the character drum (two ink rollers come with the printer but others can be bought independently).

This printer, quite an innovation from Atari, incorporates a lot of new features. One which I found extremely useful was the easy-to-use maintenance hatches at strategic positions around the computer. They allow repairs to be made and drums to be changed very easily.

Another strong point is the full 80 columns. Previously most Atari printers have been only 40 column, and, any 80-column printer cost well over \$1000. This change can only be for the best for Atari owners.

In terms of price, the 1027 is the best letter-quality printer on the market for the Atari. If you want to use your Atari for word processing or any other business-related activity, take a close look at it.

From page 56

```
1090 LINE(0,0)-(255,50),10,BF: COLOR 1:LOCATE 1
0,1:PRINT " GAME OVER":FOR K= 1 TO 200:NEXT K
1100 LOCATE 10,20:PRINT " YOU SCORED"
1110 LOCATE 10,30:PRINT HI;" HITS AND HAD ";M
;" MISSES"
1120 FOR K= 1 TO 2000:NEXT K
1130 CLS:COLOR 15,4,5
1140 END
```



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A splendid game

Lunar Jetman, by Ultimate Software for the 48K Spectrum. Retail price \$29.95. New Zealand agent; Paragon Software. Reviewed by Gary Parker.

Lunar Jetman is Ultimate's 48K follow-up to the deservedly popular 16K game, Jetpac. After escaping in the rocket he assembled in Jetpac, Jetman has landed on an alien world. Here, he must drive his lunar vehicle to alien missile installations, and destroy them before an attack on Earth is launched.

Lunar Jetman is a wonderfully complex arcade-style game. First, you must pick up a large bomb and place it on your moon rover. Then you must drive over a sideways-scrolling landscape, trying to reach an alien base. But your vehicle cannot pass over craters unless you pull a bridge out of the boot and drop it over the crater. However, doing this leaves you exposed to the various aliens

and rotating mirrors which are flying overhead.

I could not get past the first missile outpost where you must try to drop the bomb on the missile, while avoiding flak hurled at you by a little robot. If the flak doesn't get you, the heat-seeking missile will.

So Lunar Jetman involves the sort of complex mission that will keep the player engrossed for game after game. Yet it is fiendishly difficult, especially considering the number of keys which must be manipulated. If you like difficult games, and have plenty of time and determination, you'll love Lunar Jetman.

But many people will become frustrated by its difficulty, and give up without witnessing the surprises this game holds in store for them. Lunar Jetman is a splendid game, but easier difficulty levels are sadly lacking.

Simple yet absorbing

Atic Atac, by Ultimate Software for the 48K Spectrum. Retail price \$29.95. New Zealand agent; Paragon Software. Reviewed by Gary Parker.

Every Spectrum owner has heard of Ultimate games. The 16K arcade-type games are among the best available, so I was interested in Ultimate's new 48K games.

In Atic Atac, your task is to roam through a five-storey castle, find a hidden key, and escape through the main doors. This may sound like an adventure game, but Atic Atac is very much an arcade-style game. Each room is shown from above as you run through the castle, avoiding evil beings such as ghosts, witches, vampires, and jack-o-lanterns, eating food such as cans of beans and bowls of ice cream, and collecting useful objects such as potions, scrolls, and keys.

You can choose whether to be a wizard, knight or serf. Each has certain abilities. For example, the knight can throw swords and walk through grandfather clocks. Each room has several doorways, but a door can slam shut at any time, leaving you at the mercy of the bouncing monsters. Stairs lead to higher levels, but you can spend a long time climbing stairs, only to fall down a trapdoor back into the dungeons.

You can move smoothly and throw your weapon in all eight directions, using keys, or kempston or cursor joysticks. The hectic pace of Atic Atac means it is most fun with a joystick, although you'll still need to resort to the keyboard to pick up and drop objects.

The graphics are excellent, with a huge variety of monsters and objects, and a very large number of rooms to explore. The basic idea of the game is simple, yet there is enough variety to keep the player occupied for months.

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NORRIS 1925

Those useful system variables

By Gary Parker

Because the Spectrum has a reasonably extensive BASIC, direct manipulation of the system variables is not used as much as with some other computers. Yet the system variables can be very useful. Their use can lead to programs which run faster and take up less memory, and some effects can be achieved only by using them.

The system variables consist of an area of memory addresses which contain information used by the system. They are termed variables because they are

contained in RAM and can be changed. You can do this from BASIC using POKE, and can read their values with PEEK. The system variables begin at memory addresses 23552, and continue to address 23733.

Some system variables never hold a value greater than 255 which can be contained in a single byte. Others may need to hold numbers greater than 255, and so use two bytes. In such a case, the number in the second byte is multiplied by 256, and added to the number in the first byte, to give the number in decimal. Each system variable has a name made up of an abbreviated description of its purpose.

Address 23560, called LAST K, contains the code of the last key pressed. The code remains there until another key is pressed, so PEEK 23560 can be used to check if a key was pressed while the computer was doing some calculations, for example.

Controlling the repeats

REPDEL, address 23561, controls how long a key must be pressed before the autorepeat begins. POKE 23561,0 will switch off the repeat altogether. A value of 1 will make the key repeat so quickly it is very difficult to enter a single character. The normal value is 35, so a value of around 50 will lengthen the period before the repeat begins.

REPPER, address 23562, controls how often a key repeats once the delay controlled by REPDEL has passed. A value of 0 will make only one repeat occur, no matter how long the key is pressed.

PIP, address 23609, controls the length of the beep which occurs whenever a key is pressed. To make typing easier, it is worthwhile increasing the value of PIP so that a key press is easier to hear. POKE 23609,10 produces

a clear click. A value of 100 will produce a more musical note.

MODE, address 23617, can be used to control the appearance of the cursor which appears when a program asks for input. For example, a value of 238 will produce a plain flashing square for the cursor. 222 produces a question mark, which is probably a better indication of what is required of the user than the usual L or C. Other interesting values to try are 32, 70 and 80. The POKE must be in the program, because editing causes the normal cursor to reappear.

Use instead to GO TO

NEWPPC, address 23618, can be used instead of GO TO. This is a two-byte variable which holds the line number to be jumped to. Address 23620 controls which statement in the line the jump is made to. Normally, you should POKE 23620,1 after you POKE addresses 23618 and 23619 with the line number. But you can give 23620 a value other than 1, causing a jump to another statement in the line, a very useful feature which cannot be done with ordinary BASIC commands. Try this example:

```
1 POKE 23618,44: POKE
23619,1: POKE 23620,2
2 STOP
300 PRINT "1": PRINT "2"
```

Normally, you would expect the program to stop at line 2. But line 1 causes a jump to the second statement in line 300 (since $44 + 256 \times 1 = 300$), because POKE 23620,2 means the second statement in line 300 is jumped to. If you change the 2 in line 1 to a 1, a jump will occur to the first statement of line 300, so both digits 1 and 2 will be printed on the screen.

BORDCR, address 23624, controls the colour of the border. It must be POKED with eight times the number of the required colour. So for example, POKE

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23624,40 produces a cyan border.

NXTLIN, address 23637, gives the memory address of the line which follows the line which does the PEEKing. This is useful if you want to POKE machine code into a REM statement which is not the first line of the program. Try this:

```
10 LET address = PEEK 23637 + 256 * PEEK 23638 + 5
20 REM x
30 POKE address, 143
```

What happens when you RUN it? The x in line 20 is replaced by a black square. Line 10 finds the starting address of line 20, and adds 5 to it, so that the '20 REM' is skipped. Then line 30 POKEs that address with 143, the code for a black square.

DF SZ, address 23659, controls how many lines the lower portion of the screen contains. Giving this a value of zero will "protect" programs, since the computer seizes up if BREAK is pressed. However, nothing must be printed on lines 23 and 24, and no INPUT commands must be attempted.

Forms internal clock

FRAMES, addresses 23672, 23673, and 23674, is a three-byte system variable. It forms the internal clock of the Spectrum and begins counting as soon as the computer is switched on, adding 1 every fiftieth of a second. So if you want to measure a particular time period, you should POKE these three addresses with

zero to begin the count. Then to measure the time taken, in seconds:
LET time = (65536 * PEEK 23674 + 256 * PEEK 23673 + PEEK 23672)/50

DF CC, address 23684, can be used to control the screen PRINT position:

```
10 PRINT at 10,10: "1":
20 POKE 23692, PEEK 23684 33
30 PRINT "2"
```

In DF CC, each square on the screen is given a number from 1 to 704, so a square 32 squares back from another square will be straight above it on the screen. In this example, after PRINTing the "1", the PRINT position is on the square after it. Subtracting 33 from this gives the position above the "1", so the "2" appears above it rather than at the start of the next line as we would normally expect.

SCR CT, address 23692, controls how many lines are PRINTed before the computer stops and asks SCROLL? For games it can be useful to have continuous scrolling. POKE 23692,0 achieves this, and must be repeated at least every 255 lines. For example:

```
10 FOR k = 1 TO 1000
20 PRINT k
30 POKE 23692,0
40 NEXT k
```

ATTR P, address 23693, controls the permanent screen colours. The number you should POKE into it is:

```
INK colour + 8 x PAPER colour + 64 x BRIGHT + 128 x FLASH
So POKE 23693,2+8*6+64*1+128*1
followed by CLS will produce a yellow and red, bright, flashing screen.
```

ROM calls

By Steven Cragg

The ZX Spectrum's BASIC ROM (Read Only Memory) contains many useful routines that can enhance your BASIC programs. The first of these is especially useful when converting ZX81 programs. A one line scroll, the same as that produced by the ZX81 command, SCROLL, can be produced by executing the line RANDOMIZE USR 3582. If you want to make the Spectrum ask 'scroll?' as it does normally, use RANDOMIZE USR 3213 and the machine will wait for a keypress as usual.

Timing is important in some programs and is usually quite hard to accomplish. However, if all you want to do is time the time until a keypress occurs, then the line, LET T=7997-USR 7997, will cause the computer to stop and wait for up to two and a half minutes for a key to be pressed. Once a key is pressed, the variable, T, will contain the time for which the computer was stopped in 50ths of a second.

It is sometimes useful to be able to print in the bottom two lines. This can be achieved by a line such as PRINT#0; "Message". Be careful that you do not overflow the bottom two lines as the scrolling can ruin the rest of the display.

When testing for keypresses in games, rather than use INKEY\$ it is sometimes easier to use LET A\$=CHR\$ PEEK 23556. Location 23556 contains the uppercase (ASCII code) equivalent of the key pressed or 255 if no keys are pressed. The use of this means that lines such as IF A\$="A" or A\$="a" THEN as A\$ can only contain the upper case character.

Now for one of the more useless "secrets" of the Spectrum ROM. The line, RANDOMIZE USR 4757, will produce Sinclair Research Ltd. printed in the cursor's current position.

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Parallel not serial

In last month's review of the Brother HR-5 printer, I said that "most printer interfaces for the Spectrum are serial, so if you buy one of these, you will require the Centronics version of the HR-5". Centronics interfaces are, of course, parallel; so for "serial", read "parallel". — Gary Parker

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A bit (of memory) on the side

By Pip Forer

The deluge of alternative second processors for the BBC has solved any problem of memory shortage. With one of these second processors, the original Beeb hosts all the input-output/screen functions, leaving the second processor free for other work. However, not everyone may want to spend the money required for a second processor, or possibly have the desk space. An alternative is to attach extra RAM. This is possible using the sideways ROM slots on the BBC. For a lower outlay, the user gets a significant boost in available memory.

There are now several RAM boards available on the market. In some, you simply replace non-volatile ROM with

volatile RAM. This RAM can be used to store information or even duplicate code held by a ROM but, of course, loses such information or code when the machine is turned off. One use of even a small RAM of 16K is to increase flexibility.

A single ROM in a ROM slot can only ever do its one single task, whatever that may be. A RAM card in a ROM slot can be set up to function as any number of utilities at different times. It can only ever be one thing at once, of course, but could, for instance, be a spreadsheet at one time and a word processor at another. This eases the ROM slot space shortage quite a bit.

An alternative option is to use a RAM card in a sideways slot to hold the memory required for the screen. The

Aries board, the first of these on offer, gives 20K RAM available so that memory use is independent of the screen mode in which the BBC is operating.

For both uses, hardware and software are needed. Except for use for variable storage, however, the software is usually required only at the start of a session — if at all. Software may be needed to set up a sideways RAM with word-processing instructions but once set up, the word processor will run itself transparently. The Aries board simply uses normal commands in combination with an undedicated operating system call to carry the screen operations. In Mode 0, however, the user now has four or five times the memory space available.

The cost of these additions makes them economic options (in Britain, they run around 40-50 per cent of the cost of a second processor). The idea has further implications though, which have been realised by a company called Solidisk Technologies. Solidisk makes a simple, humble 16K sideways RAM. With it, you get software that can load any given ROM to disk from a ROM slot. It will also later reload the ROM instructions back into RAM. The next model is a 32K one; you can have two flexible slots.

However, I want to take time to review the 128K or 216K sideways RAM — the top-of-the-line product which offers further additional benefits. While large RAM boards are not new to personal computers, the BBC operating system and a cheap design make this option of particular value.

This component consists of a 30cm long board that fits in the rightmost ROM slot in the Beeb and contains the equivalent of eight (or more for the larger board) sideways ROMs. Straightaway, you have the equivalent of a sideways ROM extension board since the 128K model can be configured as eight additional ROM slots.

Now, however, the ROM slots can be

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configured for new uses for different sessions. Furthermore, you get software included which can set up a 16K printer spooler in one of the slots. Program listings sent to the printer simply pour into the buffer and then get sent to the printer freeing you (except for large print jobs) to get on with something else straightaway.

This is only the start of the possibilities. If you need no or few sideways ROMs loaded into RAM, part of the 128K memory area can be used as a silicon disk dedicated (by default) as drive 1. This gives you a 100K (or in the larger version 200K) silicon disk which behaves identically to a floppy, but at orders greater speed. This is useful for program development, disk copying, moving files when you have only a single drive or for working with programs that use the disk a lot (data base programs, the "edit" mode in View and so on). No whirring or delays, just ultra-fast disk access.

The silicon disk can be set up at the start of a session, necessary files can be copied to it, its work done and finally its contents copied back to floppy for permanent storage. This will work with almost any standard programs.

Quite a lot of free software is also provided to make this facility useful. This includes space for additional typing in Wordwise files and a spelling checker

that can be used with any text file. This checker comes complete with a 5000-word dictionary. Basically, it scans the text file and checks each word it finds against its dictionary. If it fails to match, the user has the option of skipping, marking or adding to the dictionary. Any new word not "skipped" or added to the dictionary is marked by a "hash" sign (#) in the document. The user then corrects it at leisure.

With a floppy disk system, such an application takes a long time because of the constant searching for words within the disk file. The fast access of the silicon disk speeds this to a point where the task can be done within a reasonable time. Up to this point, the column has 952 words. The spelling checker took 70 seconds, much of which was taken in accessing the text file of this document from floppy.

I would rate this the most significant independent upgrade currently available for the BBC model B. Its UK price (for 128K) is about 70 per cent of a second processor. But for that, you get a considerable enhancement of your disk and sideways ROM systems plus various helpful utilities. Fitting it requires a little application and New Zealand Beebug has reported two Kiwi purchasers who had initial problems with early versions. My version has posed no real problems but has added considerable power. It is

worth checking on.

A further new (and local) product designed in Christchurch is the CAVII interface. This allows the BBC to control a video tape recorder for education and training. More on this development next month.

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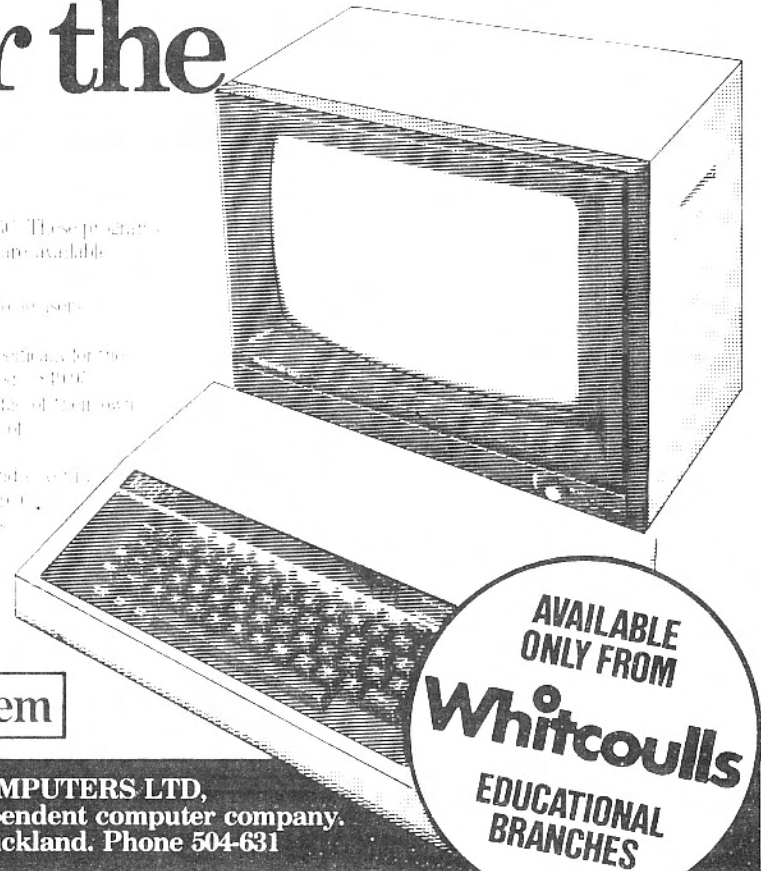
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Locking the keyboard

By Paul Cull

The IBM PC, as anyone who has used it will know, has two keys for setting the keyboard status. CAPS LOCK, logically enough, is used to lock the alphabetical keys into capitals while NUM LOCK places the numeric keypad in cursor movement or digit mode. On power-up, these keys are both off — the alphabetical keys are lower case and the keypad in cursor movement mode.

For a lot of programs, such as accounting applications, it is desirable to

have both these keys on — the keyboard producing capital letters and the keypad numeric. The program presented in this article puts the keyboard into this mode and is intended to be included in the AUTOEXEC.BAT file.

Buried in RAM, at location 1047 decimal to be exact, is a flag byte containing the keyboard status. Various bits in this byte are for various keys (see page A2 of the technical reference manual for more details).

Of interest to us is the fact that the bit 6 (counting from the right) contains the

NUM LOCK status, and bit 7 the CAPS LOCK status. By setting these two bits high we can "fool" BIOS into thinking we've pressed CAPS LOCK and NUM LOCK. Loading the status byte with 96 decimal will set these two bits high and the rest low (if we were fussy about preserving the rest of the flag we would or it with 96).

The assembler program in figure 1 simply loads 96 into the keyboard status flag. If you don't have an assembler, you could create the program using DEBUG. Type in everything underlined in figure 2,

Figure 1: assembler listing of LOCK.ASM

```
TITLE LOCK
; lock CAPS LOCK and NUM LOCK keys on
DATA SEGMENT AT 40H
    ORG 17H
    FLAG DB ?
DATA ENDS
CODE SEGMENT
ASSUME CS:CODE,DS:DATA,SS:CODE
    ORG 100H
START: SUB AX,AX ;load AX with zero
    PUSH AX ;and place on stack as return address
    MOV AX,DATA ;set up data segment
    MOV DS,AX
    MOV AL,96 ;new value of status byte
    MOV [FLAG],AL ;and store in status flag
    RET ;return to DOS
CODE ENDS
END START
```

Figure 2: using DEBUG to create LOCK.COM

```
A> DEBUG
-E 100
xxxx:0100 xx.2Bb xx.CO b xx.50b xx.B8b xx.40b xx.00b xx.8Eb
xx.D8b
xxxx:0108 xx.B0b xx.60b xx.A2b xx.17b xx.00b xx.C3d
-NLOCK.COM
-RCX
CX 0000
:OE
-W
Writing 000E bytes
-Q
A>
Note: 'b' means ' ' (space), 'd' means ENTER and 'x' means any
hex digit.
```

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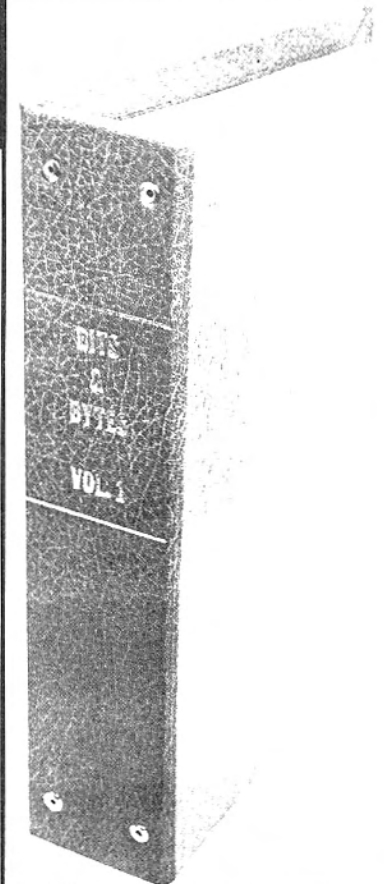
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Important on three counts

By Dennis Lowe

IBM has made a recent product announcement which is very interesting on a number of counts, and which I believe to be of enormous importance to the microcomputer marketplace.

First, IBM has now released a product range which covers the entire market from small home machine (the junior), through portable model (PPC) and single-user desktop (PC) with hard disk version (PC-XT) to multi-user high capacity business model (PC-AT). The PC-AT (for advanced technology) features a 20mb hard disk with a 1.2mb floppy, with 512kb memory expandable to 3mb, based on an Intel 80286 microprocessor, for around \$20,000.

Second, IBM has announced a personal computer network which interconnects the PPC, XT and AT models in a multi-user environment. This requires adaptors (costing \$1891 each) to be fitted to machines to permit attachment to the network. The network unit translator unit (model 5178) costs \$2061 and allows connection of up to eight (or up to 255 with other components) IBM PC stations within 200 feet (maximum of 5kms with extra kit). An IBM-supported LAN (local area network) is certain to have a big impact in the market.

Third, the new top of the PC range, the PC-AT is released with an official IBM XENIX operating system. This is derived from Bell Labs' UNIX with enhancements from Berkeley University and Microsoft Ltd. With its announcement, IBM provides a XENIX statement of direction indicating intent to migrate to AT&T UNIX system V as a future release of XENIX. It is unusual for IBM to indicate any future intentions, which emphasises the strategic importance of this move. Not coincidentally, AT & T recently released a desktop microcomputer, the 3B2/300, as a large UNIX based multi-user machine.

Locking the keyboard

From page 66

note that a space is shown as "b" and 'd' means ENTER. If you make a mistake, type Q and ENTER and start again.

When finished, you should have a program 'LOCK.COM' on the default disk. The filename, LOCK, will execute the program — this could be included in the AUTOEXEC.BAT file on your boot disk (remember to copy LOCK.COM to the disk).

Although this program is only 14 bytes long, I have found it useful in making the operator's job easier.

PC-DOS has been upgraded to version 3, supporting all PC models. Version 3.0 is required for support of the PC-AT hardware features, while version 3.1 is required for support of the network options.

Home boom coming

The world market for home computer hardware is estimated at \$US2.6 billion at 1983 retail prices. The home computer market is expected to grow strongly over the next five years to a retail value of \$US9.4 billion by 1988.

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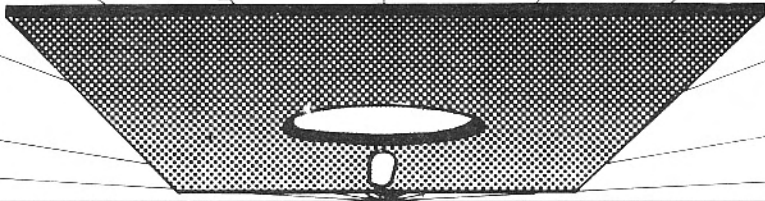
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NASHUA

Putting more speed into loops

By Jay D. Mann

Computer magazines are filled with hard-to-read, hard-to-debug programs, in which the authors have omitted useful REMarks and spaces, in an effort to save on memory space and to increase execution speed. Personally, I would be delighted to waste a few spaces in order to avoid such abominations as `FORM=ITO1000`.

Memory is cheap nowadays, whereas time taken to decipher and type in a closely spaced program listing is expensive. Even if it were vital to drop out every space in order to squeeze a program into a limited machine, I regard it as the author's duty to publish the program with as much space and structure as possible; let the reader omit the spaces if he needs to.

On the other hand, execution speed can be important. An overseas magazine recently rehashed some of the traditional methods that are supposed to speed up programs. These methods included the usual tricks of omitting spaces, no REM statements inside loops, and the like. If these tricks really increased speed, they might even be worth using (at least inside time-critical loops). But perhaps we can find better ways to speed up our code, and can thus afford to splurge on a few spaces and REMs.

One speed-up method was discussed at a meeting of the

Christchurch 80 Users Club: if you end a FOR/NEXT loop with a simple NEXT instead of a NEXT I, the computer doesn't have to spend time checking for the correct loop variable. Starting from this clue, I began experimenting with how long it takes to do other operations. The results might surprise you as much as they did me. The fundamental test was the following program:

```
10 T1$=RIGHT$(TIME$.4): REM Make
note of starting time.
100 FOR M = 1 TO 5000
300 NEXT M
400 T2$=RIGHT$(TIME$.4)
450 PRINT T2$
460 PRINT T1$
470 STOP
```

Running in a System 80 at normal clock speed, this program took 17 seconds to execute, based on subtracting T1\$ from T2\$. Leaving out the variable checking by changing line 300 to NEXT cut three seconds off the time, to 14 seconds.

Is it worth dropping the NEXT variable this way? Not all BASICs will allow you to do so. Moreover, it can help a lot in debugging a program, to be certain that you are dealing with the correct level of nesting. On the other hand, omitting the variable is only a minor sin compared with the unstructured, uncommented programs most of us write. In a very short, time-critical loop you could use a plain-vanilla NEXT, if your machine allows it, without any real chance of confusion.

For real speed, though, you should

define the loop counter as an integer! Put the statement `DEFINT M` early in your program. Running the test program, with `NEXT M`, but with `M` as an integer, cut the time to 13 sec. Finally, combining a naked NEXT with `INTeger M` cut the whole time down to only 9 sec. This was just about twice as fast as the original version.

Remember, though, that so far the FOR/NEXT loop had not done any useful work. I then tested the effects of inserting different statements in the middle of the loop. For instance, `250 GOSUB 500 plus 500 RETURN` increased the time for 5000 loops to 32 sec. So the time to jump back and forth to a subroutine far outweighed any effect of using a non-integer index counter for the FOR/NEXT loop.

Removing the GOSUB and replacing it with `250 REM` made the loop 17 seconds, slightly longer than the time for an empty loop. A long REMark:

```
250 REM THIS IS A LONG REMARK IN
WHICH I DISCOURSE ON THE NATURE OF
THE UNIVERSE, TRUTH, AND ALL
THAT, TOGETHER WITH SELECTED
RECOLLECTIONS FROM MY CHILDHOOD
```

took 52 seconds to process, much to my surprise. I thought that the computer immediately skipped on to the next line once it encountered an apostrophe or REM. Instead, it must go through every byte in the line until it reaches the end.

The extra time for a short REM does not mean you should eliminate user comments from your programs, even inside a loop. Remember that even the long REM took only 10 milliseconds per pass, while the short REM took 3 milliseconds.

Wouldn't you rather wait an extra 3 or 4 milliseconds in order to have a self-documenting program when you try to modify it six months later? Besides, you will see below that the time to process a REM line is small compared to any number-crunching.

The integers have it

Putting arithmetic operations inside the FOR/NEXT loop was very revealing. Using integer arithmetic (`DEFINT I-M`), it took 47 sec. for `250 J = K + L + M`. Simply reading in one integer variable `J = 12345` took 33 sec. Copying an integer variable `J% = K%` took 28 seconds. Copying a

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PROGRAMMING

noninteger, single-precision variable also took 28 seconds, as in

```
10 A = 123.45
250 B = A.
```

But repeatedly working out a single-precision variable inside the loop, as in `250 B = 123.45` took an incredible 104 seconds. So if you need to keep resetting a variable to a real value inside your time-critical loop, first establish a reference variable outside the loop, and then copy that value over to your reset-variable in the loop. Don't force BASIC to read and reread the same ASCII digits and work out the binary equivalent.

Array operations such as `J%(I) = I` took 42 sec, and the same thing with noninteger `A(I)=I` took 46 sec. Integer division using `J% = 6/2` took 70 sec. A simple string operation `X$ = "A"` took 27 sec.

Dropping out the spaces in a line had no discernable effect on speed. Also, it doesn't matter if a little bit of maths is needed to work out the FOR/NEXT limits at the start. `100 FOR M = 1 TO 50 * 10 * 100 / 10` took no extra time.

Note that any kind of mathematical operation takes just as long as one short REM statement. Since most loops will contain quite a

few number-crunching steps, the extra cost of a comment will be relatively small.

The motto of this little study is that the best way to speed up your loops is to use integer variables whenever possible. Integer operations will cut down the time taken for just about every mathematical operation. If you own a different brand of personal computer, try these same experiments yourself. You might find a different way to boost your program's speed.

LETTERS

Apple was the winner

Sir — As a person interested in educational computing, I have been following the articles, claims and counter-claims around the Poly/school computing debate and think that two important points have been missed:

- The real "winner", as such, from the lack of policy, lack of clear directions etc was Apple which has a fairly substantial lead over other models and makes in terms of numbers and distribution in New Zealand schools.

- No mention has been made — except recently in the June article by Nick Smythe — about software and its influence on hardware purchase. What is the educational software range available to the BMC using CP/M as its operating system? What about the cost of developing New Zealand-based software for any of the machines? What about the need to alter minor or substantial parts of the British or American-produced software for the New Zealand setting?

All in all, hardware specifications seem to me to be less important than software range, scope and quality, particularly in the educational computing field. The Department of Education made a grave mistake (another!) in not considering courseware scope and availability in conjunction with hardware specifications. — STEPHEN BRIGHT (Wellington).

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'Chockfull of meat'

"101 Projects for the Z80"
by Frank P. Tedeschi & Robert
Colon, TAB Books, 358pp
\$38.95. Reviewed by Ted
Brown.

This very thick, largish book is chock-full of meat. It is roughly divided into three sections. The first (chapter one) consists of nine projects which are circuit diagrams for various power supplies, led displays, debounce, RAM expansion and some others.

The next section (chapters two to eight) is perhaps the best part of the book for Kiwis. Long chapters cover information about the Z80 CPU, Z80 instruction set, hardware around the Z80, P10 (parallel input/output) information and programming, CTC (counter/timer circuit) and the same for the SIO (Serial Input/Output). These seven chapters are easily the best material I have seen on the Z80 chip set.

Now we come to the tricky part. Chapters nine to 13 are very largely software projects (only about seven or eight are interface circuits). The

sad fact is they are all designed (as are several projects in chapter one) to be used with an S D-Z80 trainer kit. No circuitry is shown for this and it may be difficult to obtain in New Zealand. The kit has a small monitor ROM which is sometimes CALLED from some of the software programs, so I feel these software projects lose much of their value as tutorial material.

There are about 84 software projects or exercises in the third section, covering a wide range — from complementing a number in the accumulator to random number generation, from simple addition to multiple byte addition. Other projects show how to copy memory to another area, echoing keyboard to display, to a number guessing game. There are one or two other simile games and then we get onto the more difficult teletypewriter, oscilloscope and light chaser programs.

Overall, a very useful book for those wishing to get nearer to the heart of their Z80-based computer.

'Super expander Graphics'

"VIC Graphics" by Nick
Hampshire. Hayden, 187pp,
\$27.95. Reviewed by Steven
Darnold.

This book will be of considerable interest to VIC users who have a super-expander cartridge. It contains full listings of 38 graphics programs, with a special emphasis on colour plotting, high resolution graphics, graph plotting, scaling and stretching, rotating and moving, and 3-D displays.

Before presenting the programs, several pages are spent discussing the basic concepts involved. There is also a page of discussion before each program. These sections are fairly difficult, but are useful for someone wanting to learn how to design his or her own graphics.

The book uses super-expander commands throughout, and it is useless to someone without this cartridge. To avoid confusion, it really should have been called "Super-Expander Graphics".

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Interface Titles Just Arrived

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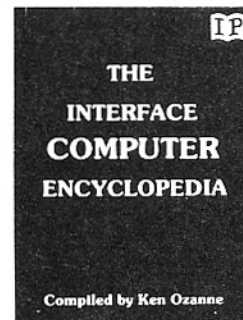
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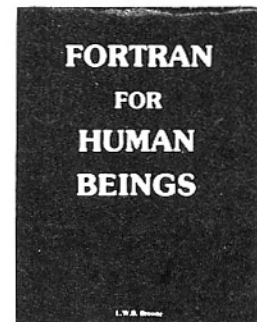
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BOOKS

Handy but a bit pricy

VIC-20 Programmer's Notebook" by Earl R. Savage. Sams, 254pp, \$31.40. Reviewed by Steven Darnold.

Written for budding programmers, this book is ideal for someone who has recently completed a book on BASIC programming and is looking for a bit more assistance. It gives good coverage to programming style and organisation, with particular reference to data management and program protection. It discusses various PEEKs and POKEs and looks at some of the more important zero-page memory locations. It also has full sections on sound, graphics and joysticks.

Although much of the material is fairly advanced, it is clearly presented. The author uses numerous short demonstration programs, and the average reader should have no trouble understanding what's going on. Beginning programmers, however,

Mathematical bent

"119 Practical Programs for the TRS-80 Pocket Computer" by John Clark Craig, TAB, 298pp, \$19.95. Reviewed by Gordon Findlay.

This is a collection of short programs for the pocket computer, and with minor modification for most of the hand-held computers. It also contains some useful programming techniques and tips, useful general information, and some advice on conversion to other versions of BASIC.

Whether the programs are practical or not depends on your application and needs. In keeping with the most likely uses of the pocket computer, most of the programs are mathematical, ranging from elementary statistics to Bessel functions and Bernoulli numbers.

There are a number of curve fitting programs, calendar and date manipulation routines, a chequebook balancing routine, a few simple games, and many others. Each program is listed, and a sample run given, with a brief explanation and worked example.

Mainly of use for those with a substantial need for, and understanding of, maths, physics or engineering.

should learn BASIC thoroughly before starting the book.

A small problem is the binding. For the book to lie down flat, the pages have been bound with a strip of plastic rings. Unfortunately, repeated opening and closing can mangle the ends of the pages and cause some to fall out. The book really should have been bound with a spiral of metal wire.

A bigger problem is the price. It costs as much as a full reference manual, but is much less useful in the long run. VIC owners on a limited budget would be better off spending their money on a reference manual.

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SHARP PC1500 USER GROUP Contact Allan Thomas, P.O. Box 155, Napier. Newsletter.

KERIKERI APPLE USER GROUP: Contact S. Shearman (Chairman), Fairway Drive, Kerikeri, or I. Harris, C-Post Office, Kerikeri.

WHANGAREI COMPUTER GROUP: Tom Allan, 3 Maunu Rd, Whangarei. Phone 83-063 (w). Meets every second Wednesday of the month at Northland Community College.

N.Z. MICROCOMPUTER CLUB, PO Box 6210, Auckland. A meeting is held on the first Wednesday of each month at the OSNZ Hall, 107 Hillsborough Rd, Mt Roskill, from 7.30 pm. Visitors are also welcome at Micro Workshop 10am - 5pm, at the same hall on the Saturday following the above meeting.

The following user groups are part of, or affiliated with, the N.Z. Micro Club: Meetings start at 7.30pm at the OSNZ Hall. Those shown (*) are held at the VHF Clubrooms, Hazel Ave, Mt Roskill.

APPLE USER GROUP: Ross Bryon, ph 761 670 (h). Meetings: 3rd Tuesday.

BBC USER GROUP: Dave Fielder, ph 770-630, Ext 518 (w). Meetings: 2nd Wednesday.

BUSINESS USER GROUP: Cathy Arrow, phone 491 012. Meetings: 4th Tuesday * even months, visits on odd months.

CP/M USER GROUP: Kerry Koppert, 2/870 Dominion Rd, Balmoral, Phone 695-355 (h). Meetings: 1st Wednesday 9pm.

IBM PC USER GROUP: Terry Bowden, ph 452 639 (h) 778 910 (w). Meetings: 3rd Thursday.

MSX SPECTRAVIDEO COMPUTER CLUB: P.O. Box 22 620, Otahuhu. Meetings: third Wednesday of month. Contact: Bill Ferguson (secretary), ph 276-1966 ext 803 (w).

NZ COMMODORE USER GROUP (AK) INC. John Walker, ph 8339 589 (h), PO Box 5223, Auckland. Meetings: 3rd Wednesday, Remuera Primary School Hall, Dromorne Rd, Remuera.

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The above contacts can usually be found at N.Z. Microcomputer Club meetings and micro workshops, or via P.O. Box 6210, Auckland.

Other Auckland-based groups:

ACES (Auckland Computer Education Society): C- Director, Computer Centre, Secondary Teachers' College, Private Bag, Symonds Street, Auckland. Meetings, third Thursday of month, at the College.

ATARI MICROCOMPUTER USER GROUP: Ian Mason, 25 Manutara Ave, Forrest Hill, ph 467-347 (h). Meets 2nd Tuesday, Western Suburbs Radio Club, Gt North Rd, New Lynn.

BBC Club: See entry at head of this list.

COLOUR GENIE USER GROUP (Auckland): Secretary: Mrs Nola Huggins, Ph 655 7518, P.O. Box 27-387, Auckland 4. Meets every fourth Monday, All Saints Church Hall, Ponsonby Rd, Auckland.

EPSON HX20 USERS' GROUP: Contact: C.W. Nighy, 231 Khyber Pass Road, Auckland, (Ansaphone, 774-268).

HP41C USERS' GROUP (Auckland): C- Calculator Centre, P.O. Box 6044, Auckland: Grant Buchanan, 790-328 (w). Meets third Wednesday, 7pm, at Centre computers, Great South Rd, Epsom.

NZ TRS-80 MICROCOMPUTER CLUB: Olaf Skarsholt, 203A Godley Rd, Titirangi, Phone 817-8698 (h). Meets first Tuesday OSNZ Hall, 107 Hillsborough Rd, Mt Roskill.

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HAWKE'S BAY MICROCOMPUTER USERS' GROUP: Bob Brady, Pirimai Pharmacy, Pirimai Plaza, Napier, Phone 439 016.

HAWKE'S BAY COMMODORE USER GROUP: Contacts: Mike Phillips, 401 Lascelles Street, Hastings (resident); Mark Hodgson, 1108 Oliphant Road, Hastings (secretary). Meetings: first Tuesday of month at H.B. Community College.

WANGANUI COMMODORE 64 USER GROUP: Contact: P. Northway, Phone (h) 42-916, 7 Broadhead Avenue, Wanganui. Meets first and third Thursdays of month at Wanganui Community College.

HBCES (Hawke's Bay Computers in Education Society): Contact - Grant Barnett, 89 King Street, Taradale, Napier, Ph 446-992.

MOTOROLA USER GROUP: Harry Wiggins, (ZL2BFR), P.O. Box 1718, Palmerston North. Phone (063) 82-527 (h).

MANAWATU MICROCOMPUTER CLUB: Contact: Richard Anger, 64-108 (W) or 63-808 (H). Meets twice a month at PDC Social Club rooms.

HOROWHENUA MICROCOMPUTER CLUB: Meets on second and fourth Thursday of month. President, Wally Witnell, P.O. Box 405, Levin; secretary, Dennis Cole, 28 Edinburgh Street, Levin, Ph (069) 83-904.

WAIARAPA MICROCOMPUTER USERS' GROUP: Geoffrey Petersen, 27 Cornwall St, Masterton, Ph (h) 87-439.

CENTRAL DISTRICTS COMPUTERS IN EDUCATION SOCIETY: Rory Butler, 4 John Street, Levin (069) 84-466 or Margaret Morgan, 18 Standen Street, Karori, Wellington, (041) 767-167.

UPPER HUTT COMPUTER CLUB: Shane Doyle, 18 Holdsworth Avenue, Upper Hutt. Phone: 278-545. An all machine club.

BBC USER GROUP: Users of other machines welcome too. See entry head of list.

MICROBEE USERS' CLUB: P.O. Box 871, Wellington, 2nd Sunday of month.

NEC COMPUTER USERS' GROUP: C- P.O. Box 3620, Wellington.

N.Z. SINCLAIR USERS' GROUP: P.E. McCarrall, 11 Miro Street, Lower Hutt.

NZ SUPER 80 USERS' GROUP: C- Peanut Computers, 5 Dundee Pl., Chartwell, Wellington 4, Phone 791-172.

OHIO USERS' GROUP: Wellington. Secretary-Treasurer: R.N. Hislop, 65B Awatea Street, Porirua.

POLY USERS GROUP: Wellington: Contact: Christine Greenbank, Computer Studies, Wellington Teachers' College, Private Bag, Karori, Wellington.

ATARI USERS' GROUP: Wellington: Eddie Nickless, Phone 731 024 (w), P.O. Box 16011. Meetings: first Wednesday of month.

WELLINGTON APPLE USERS: 56 Lonsdale Crescent, Wellington 6003. President, Bob Hamlett (h) 797-086; secretary, Grant Collison (h) 872-537.

WELLINGTON COMMODORE USERS' GROUP: P.O. Box 2828, Wellington. Contacts: Peter March (h) 86-701, Robert Kegan (h) 789 157.

WELLINGTON MICROCOMPUTING SOCIETY INC.: P.O. Box 1581, Wellington, or Bill Parkin (h) 725-086. Meetings are held in the Fellowship Room, St Johns Church, 176 Willis Street, on the 2nd Tuesday each month at 7.30pm.

SEGA OWNERS CLUB: Lower Hutt. Meets 1st Monday each month. Contact: Murray Trickett, (w) 724-356, (h) 662-747.

WELLINGTON SPECTRAVIDEO USER GROUP: Contact - Don Stanley, ph 896-379, C. Box 7057 Wellington or C. Epidemiology Unit, Wellington Hospital. Meets on one Monday a month at Staff Common Room (Level 01, Wellington Clinical School, Mein Street, Newtown).

WELLINGTON SYSTEM 80 USERS' GROUP: Contact: W.G. (Bill) Lapsley, day 286-175, evenings, 208-939; or Andrew Vincent 780-371 (evenings).

HUTT VALLEY COMMODORE USER GROUP: Contact: Ken Alexander, C- 16 Enfield St, Waiuomata or phone Waiuomata 645-830. Meetings, first and third Mondays of month at St. Bernard's College, from 7.30 pm.

NELSON COMMODORE USERS' GROUP: Peter Archer, P.O. Box 860, Nelson, Phone (054) 79-362 (h).

NELSON HOME COMPUTER CLUB: Contact: Mike Jenkins, Box 571. Ph 87-930. Meets, 7 p.m., first and third Tuesdays of the month at Nelson Intermediate.

BLenheim COMPUTER CLUB: Club night second Wednesday of month. Ivan Meynel, Secretary, P.O. Box 668. Phone (h) 95-207 or (w) 87-834.

MARLBOROUGH COMMODORE USERS' GROUP: Secretary, Robin Vercoe, 42 Rogers Street, Blenheim. Meetings, Second Thursday of month, 7.30 p.m., IHC rooms.

HOKITIKA COMPUTER USERS GROUP: Contact - Adrian Mehrens, 185 Sewell Street. Ph. 943.

CANTERBURY COMPUTER EDUCATION SOCIETY: Contact: Graeme Sauer (secretary), P.O. Box 31 065, Ilam, Christchurch 4.

CHRISTCHURCH ATARI USERS GROUP: Contact: Ron van Lindt, 10 Silverdale Place, Christchurch 6. Ph 891-374.

CHRISTCHURCH TRS-80 COLOUR USER GROUP: Meetings: last Wednesday of month. Contact: Dennis Rogers, 21 Frankleigh Street, Christchurch 2. Phone 34-731.

CHRISTCHURCH '80 USERS' GROUP: Brendan Thompson. Phone (h) 370-381. P.O. 4118, Christchurch.

OSI USERS' GROUP (CHI): Barry Long, 377 Barrington St., Spreydon, Christchurch. Phone 384-560 (h).

SINCLAIR USERS' GROUP CANTERBURY INC: Contact: Gary Parker (resident), Phone 894-820, P.O. Box 4063, Meets 7.30 p.m., last Monday of month. Phone for latest meeting place.

CHRISTCHURCH COMMODORE USERS GROUP: John Kramer, 685-533 and John Sparrow, phone 896-099.

CHRISTCHURCH BBC USERS' GROUP: Contact: Michael Hopkins (h) 582-267 or Rodney Derham (h) 893-215.

PANASONIC IJB-3000I USERS' GROUP: Contact: Prof B.J. Clarke, Dept of Accountancy, University of Canterbury, Private Bag, Christchurch 1.

CHRISTCHURCH COLOUR GENIE USERS' GROUP: Meets 2nd Wednesday, 7.00p.m., Abacus Shop, Shades Arcade. Secretary, Robert Wilson, 17 Warblington Street, Christchurch, 7. Ph: 881-456.

CHRISTCHURCH SORD MS USERS GROUP: Meets first Thursday of month, 7pm. Ph: 792-771 for details.

DICK SMITH WIZZARD COMPUTER CLUB: Christchurch: Contact: Tony Dodd, 34 Mayfield Ave. Ph: 557-327.

CHRISTCHURCH VZ 200 USERS GROUP: Meets second Tuesday of month. Contact Ian Birse, Ph 523-915, Graham Dillon, Ph 324-117, or P.O. Box 22-094, Christchurch 1.

ASHBURTON COMPUTER SOCIETY: Mr. J. Clark, 52 Brucefield Avenue.

SOUTH CANTERBURY COMPUTER GROUP: Caters for all machines from ZX81 to IBM34, Geoff McCaughan. Phone Timaru 60-756 or P.O. Box 73.

NORTH OTAGO COMPUTER CLUB: Contact: Peter George, P.O. Box 281, Oamaru. Phone 29-106 (h) 70-646 (h).

LEADING EDGE HOME COMPUTER CLUB: Elaine Orr, Leading Edge Computers, P.O. Box 2260, Dunedin. Phone 55-268 (w).

OTAGO COMMODORE 64 CLUB: Meets first Tuesday of month, 7.30pm. Contact: Geoff Gray, 41 Eglinton Road. Ph 53-986.

DUNEDIN SORD USERS' GROUP: Terry Shand, Phone (024) 771-295 (w), 881-432 (h).

CENTRAL CITY COMPUTER INTEREST GROUP: Contact: Terry Stevens, Box 5260, Dunedin. Phone 882-603. Meetings every second Tuesday.

OTAGO COMPUTER EDUCATION SOCIETY: Jim Ferguson, Arthur Street School, 26 Arthur Street, Dunedin. Ph 776-524.

ATARI USERS GROUP, Dunedin: Contact: Harvey Kong Tin, Phone 741-509. Meets every second Thursday, cater for 400-600 800.

SOUTHLAND COMMODORE USER GROUP: (VIC 20 and 64s). Address: C- Office Equipment Southland, Box 1079, Invercargill.

SOUTHLAND COMPUTER EDUCATION SOCIETY: Secretary, Bob Evans, Southland Boys' High School, Herbert Street, Invercargill. Ph (h), 73-050 or ZL4X.

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GLOSSARY

Acoustic coupler: Connects the RS232 part of a microcomputer to a telephone handpiece.

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.

Bidirectional: A printer that prints when moving left as well as when moving right.

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.

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.

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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 semi-conductor, 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. Daisywheel printing is close to traditional typing in appearance.

Data: Any information used by the computer either I/O or internal information. All internal information is represented in binary.

DC: Direct coupling (telecomputing); or direct current.

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.

Execute: A command that tells a computer to carry out a user's instructions or program.

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.

FORTH: A compact language. The programmer extends the language as he programs.

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.

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 Ki): 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.

Pinned: (also called sprocket feed). A method of paper feed in printers using sprockets.

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 run-time 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 correction 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.

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.

Programs wanted

Bits & Bytes welcomes submission of programs for inclusion in its regular program features, and in other sections of the magazine. We pay for programs used. But we don't want only games programs. We are also interested in helpful utilities or useful programs for any brand of computer from ZX81 to IBM PC, no matter how small.

Please note, however:

- If the listing is required back, enclose a stamped, self-addressed envelope.
- Programs will be stored until used. Those not used will eventually be discarded.
- Listings should be printed on white paper, and the ribbon of the printer should be in good order.
- For long programs, a tape or diskette is essential so that we can see how it works. These will be returned in due course.
- Don't forget to include full details of your address and name.
- Don't forget to say which machine your program runs on.

Address programs to:

Programs Editor
Bits & Bytes
Box 827
Christchurch

And keep them coming in...

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8 INCH FLOPPYS: Various brands, little used, \$2.00 ono. Ph (09) 793-264 or write PO Box 3470, Auckland.

INTERACT computer owners. Please write to D. Clark, 43 Charles Street, Westshore, Napier. Phone 59-517.

FOR SALE: TRS 80 colour, 16K with extended basic, manuals, joysticks, cartridges, cassette recorder and software. \$1200 or offer. Contact E. Carter, 14 Poto St, Auckland 8. Phone 836-5553.

APPLE SOFTWARE — Visicale Advanced for //e with 128k. Advanced and enhanced version of Visicale. Displays 80 columns, variable column widths, protect cells, help screen, and much more. Complete with original manual and disks. Retail \$695.00. Sell only \$375.00. Contact: Mr Neville Chun, P.O. Box 44-014, V.I.C., Lower Hutt. Phone (04) 694-830.

For Sale: Epson HX20 portable computer plus micro cassette and printer. Had little use. S. Parsons, 259 Adelaide Rd, Newtown, Wellington. Ph 897-095.

WANTED: Detailed memory map of KERNAL ROM for C64. Phone or write D. Lynch, RD4, Wellsford. Ph 5122 WFD.

SPECTRUM to printer Centronics interface with software. New \$160. RS232 Centronics interface. Can be used with Sinclair Interface 1, \$85. Contact R. Dawkes, P.O. Box 14012, Christchurch Airport. Ph 857-404.

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ADDRESSES PLEASE: Would the following please contact the editor of Bits & Bytes, Box 827, ChCh, with their addresses: John Kelleher, L. Clarke and A.R. Hill.

TR-100: Users who are interested in swapping or buying software contact A. Somerville, 72 Aberdeen Rd, Castor Bay, Auckland.

Toys to software

Blackwood Gale, a distributor company which has specialised in educational toys, has extended its product range into games software for juveniles.

Its software which will sell mainly through major booksellers, comes from four major US companies — CBS Software which has an educational range including maths programs; Epyx, with a range centred on strategy and actions games; SSI's strategy, war and leisure games; and Avalon Hill's war games, diplomacy range, stocks and bonds and sports.

Blackwood Gale considers the move into software a natural extension of its activities and intends following its American principal's philosophy of keeping a constant stream of new games in front of the market. The games will run on Commodore 64, TRS80, IBM PC and Atari 400/800/1200.

USER GROUPS

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GORE COMPUTER CLUB: Meets first and third Tuesdays of month. 7pm. Contacts: Allan Rodgers, ph 7488. Dave Clarke, ph 5836.

N.Z. SOFTWARE EXCHANGE ASSOCIATION: Non profit group for exchange of software written by programmer members. Contact: Ian Thain, Box 333, Tokoroa.

Note: Clubs would appreciate a stamped self-addressed envelope with any written inquiry to them.

If your club or group is not listed, drop a line with the details to: Club Contacts, BITS & BYTES, Box 827, Christchurch. The deadline for additions and alterations is the first weekend of the month before the next issue.

SOMETIMES, YOUR COMPUTER KNOWS BEST!

Monthly Check List

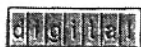
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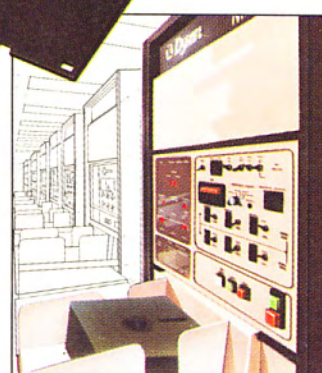
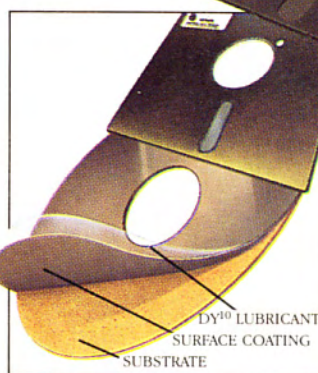
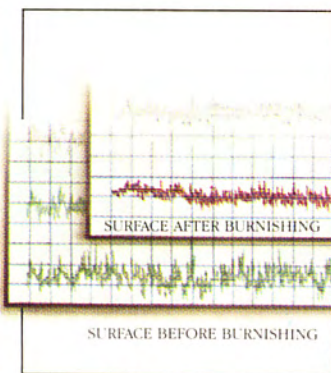
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