NEW ZEALAND'S PERSONAL COMPUTER MAGAZINE

BITS & BYTES

November 1984: $2.00

Computers under $2000

Comprehensive guide and comparison

Symphony reviewed — music to the ears?

Bigger memory at a smaller price — the Kaypro hard disk computer

Columns on
BBC
TRS 80/System 80
Atari
Spectrum
Commodore 64
VIC 20
Sega
Spectravideo
Apple
IBM PC

Hewlett Packard 110 — the Rolls Royce of the portables?

FRAMEWORK

Framework™ is the first of a new generation of products that goes beyond today's integrated spreadsheets. It is an order of magnitude better than the original integrated products and windows.

The heart of Framework is a unique "frames" technology. Frames are actually self-contained, inter-related displays that can be nested, resized and relocated anywhere on the screen. Frames bring new flexibility to the way information is created and managed with a PC. With this truly three-dimensional design, the user can create infinite logical hierarchies of information, leading to as deep a level of complexity as needed for the task at hand. There is no limit to the number of frames that are active in the system. Framework's user interface is one of the most elegant designs yet conceived.

Word Processing

Framework's word processor is dynamite! It gives users the choice of frame or fullscreen viewing of documents, multiple margins within a single file, automatic justification and repagination, header/footers, page numbers and more. The streamlined menu system helps new users get started in a hurry and "shorthand" commands help veterans work even faster.

Outlining

The innovative and very powerful outline processor can be used as a standalone organizer or as a companion to the word processor. Using this outline mode, single ideas can be quickly captured and then expanded into fuller concepts and solutions. Any outline-frame or subheading within an outline can be instantly expanded to include text, spreadsheets, graphs or databases. Finally, with Framework, your PC is truly a thinking machine.

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Framework's database system can be learned quickly and put through its paces effortlessly because most commands are common throughout the entire program. Framework itself will handle most of your analytical information management needs, and if very large data handling is required, Framework is fully compatible with dBASE II™.

ASHTON·TATE

FRAMEWORK™

Spreadsheet

Spreadsheets are simple to create, use traditional row/column or English-language cell addresses, can be linked to automatically update other files based on cell data and have an exclusive international numerics feature that will change entries to accurately reflect changes in currency denominations including the placement of commas and decimal points.

Graphics

The graphics portion of Framework has been designed to produce exceptional charts and graphs on standard monochrome monitors. Six of the most frequently used business graphs are built-in and can be automatically drawn and updated from data in spreadsheets and database files.

DOS Access

The new DOS access capability allows any user to actually run other PCDOS software inside Framework. This allows users to gather data from other programs without quitting Framework. It will be of great help to people who frequently shuttle between programs and to businesses who perform frequent interchange of programs or data with larger systems.

Custom Applications

Framework comes complete with its own programming language. Users can begin writing their own custom packages or use software developers right away. In addition, dealers will continue to receive the excellent support that has helped make Ashton-Tate the front-runner in the software industry with dBASE II and FRIDAY!

Hardware

Framework will run on the IBM PC, PC XT and all compatibles. It requires just 256K RAM and dual 360Kb floppy disk drives with monochrome display.

Availability

Framework is available in New Zealand now. Contact your dealer for more details or write to the Master Distributor : Arcom Pacific, Freepost No 87, (no stamp required), P.O. Box 852, Hamilton.

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BITS & BYTES

November, 1984 Vol. 3, No. 2 ISSN 0111-9826

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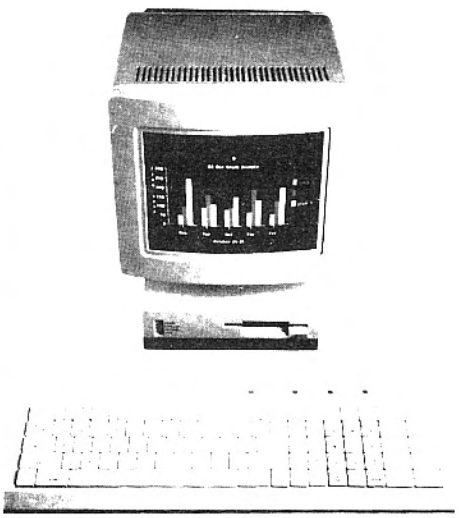


New Apricots 12

Kaypro 10 42

"If you can buy any other new electronic Daisywheel typewriter with all these features at a lower price, we'll give you double the difference!"

George Bright
General Manager Audio Action Ltd

The Juki 2200, described internationally as "the first Electronic Daisywheel Typewriter to smash the price barrier" is now available in New Zealand for the first time.

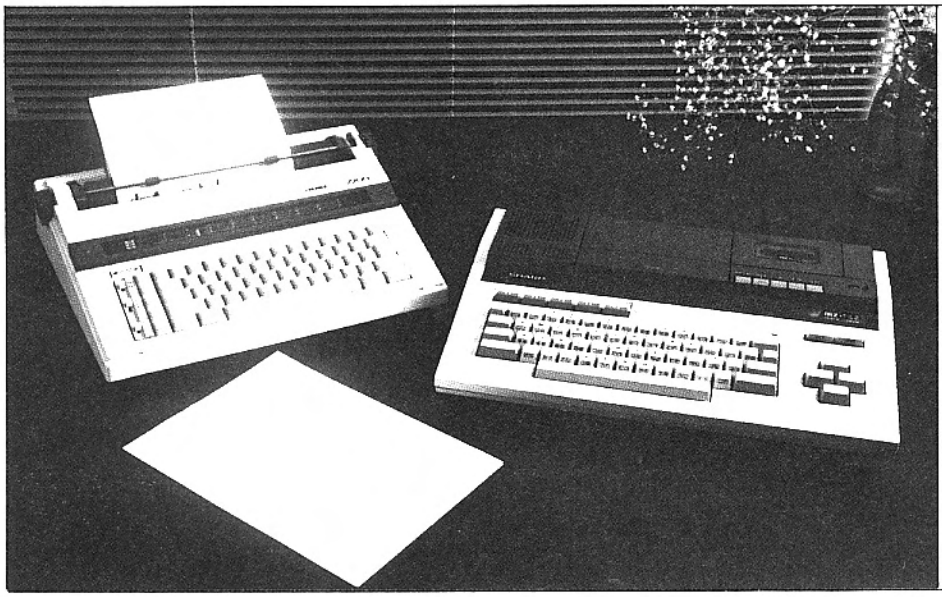
Feature for feature no other electronic typewriter in its class can match it — especially at this "Once-Only" Introductory Offer Price: $895!

JUKI WORLDWIDE SALES EXCEED $630 MILLION A YEAR!

In the highly-competitive world of Japanese electronic technology, Juki was recently awarded the coveted 'Deming Prize' for quality control.

New to New Zealand, but certainly not to the world, Juki has been internationally recognised for the quality of its products for over 40 years.

Juki — Creating Technology for a New Age.



Also a Daisywheel Printer

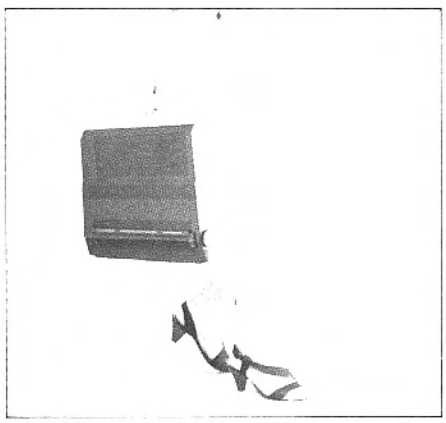
The Juki 2200 comes complete with a "built-in" interface (Parallel or Serial RS232) to connect to your home or small business computer. This turns the Juki 2200 into a true bi-directional "letter quality" Daisywheel Printer. With other machines you can pay nearly as much as the Juki 2200 for an optional interface attachment alone!!

Normally you'd pay up to $2,000 for a machine that can boast all the features of the Juki 2200!

If all this sounds too good to be true, take up our challenge.

Shop around.

If you can buy another new Electronic Daisywheel Typewriter with all these features at a lower price, we'll double the difference — in cash!



Feature Chart

Take it shopping with you and prove our offer.
"No other machine can match it . ."

- ☐ Daisywheel — 100 characters
- ☐ Printing Speed — 10 CPS
- ☐ Printing Pitch — 10, 12, 15
- ☐ Paper Width — 12 inches
- ☐ Printing Width — 9 inches
- ☐ Interline Space — 1, 1.5, 2
- ☐ Keybuffer Memory — 12 characters
- ☐ Correction Memory — 20 characters
- ☐ Impression Control — 8 steps
- ☐ Number of Copy — 1 + 3
- ☐ Shift & Shift Lock Key
- ☐ Tabulation
- ☐ Carriage Return
- ☐ Space
- ☐ Back Space
- ☐ Correction Key
- ☐ Half Space
- ☐ Express Back Space
- ☐ Right Margin
- ☐ Left Margin
- ☐ Margin Release
- ☐ Page end indicator
- ☐ Tab Set Tab Clear
- ☐ Repeat Key (all keys) Index Key
- ☐ Relocate
- ☐ Scientific signs and symbols Superscript and Subscript
- ☐ High Yield Ribbon Saver operation
- ☐ Reverse Index
- ☐ Paragraph Indent
- ☐ Decimal Tab
- ☐ Automatic Carriage Return
- ☐ Automatic Under Line
- ☐ Automatic Centering
- ☐ Second Key Board
- ☐ Built-in Interface — Parallel or Serial
- ☐ Print Buffer — 2K
- ☐ Bi-directional
- ☐ Weight — 6.1kg (6.8kg with hood)

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Andas Action Line is backed by New Zealand's largest and best-known customer service network — Andas Engineering — 200 engineers in 17 key locations — NATIONWIDE!

Andas delivers direct to your home, business or club *within two weeks of banking your order!*

All machines carry a 12 month guarantee and the Andas 'Customer Satisfaction' card.

All supplies for the Juki 2200 are available through the Andas Action Line at special low prices.

Send now for the Juki 2200 14 day "Money back" trial.

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Inquiries 264 266 Cuba Street or Phone 844-074 Wgtn. Please send me the new Juki 2200 Electronic Daisywheel Typewriter for just $[illegible]

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I understand that I may return the typewriter/s within 14 days if I am not fully satisfied, and my payment will be refunded in full.

Please find enclosed my cheque or ☐ Bankcard ☐ Amex

money order for $ _____ or ☐ Visa ☐ Diners

CARD NUMBER _____

EXPIRY DATE _____ SIGNATURE _____

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Opportunity in software

The New Zealand software industry is alive and growing, and the opportunities for New Zealand to develop a strong export market with locally generated software look very promising.

Annual sales of New Zealand written software are around $15 million in New Zealand and up to $7 million overseas, according to an initial report from Martin Kaiser, of the DSIR's physics and engineering laboratory. Mr Kaiser has been conducting a survey of the New Zealand software industry.

Most companies responding to the survey said they expected sales here and overseas would increase substantially over the next two years. But extra trained staff would be needed to develop this growth.

More than 120 New Zealand based organisations are writing software for sale, employing up to 400 people, with a further 200 employed making updates and modifications.

The low wage rate — compared with international rates — innovative skills and good use of computer resources are major strengths for the New Zealand industry, according to survey respondents.

However, lack of capital, poor marketing and a shortage of experienced staff — the factors which hindered the development of the electronics industry here — are still pinpointed as weaknesses hindering the software industry's growth in New Zealand.

Respondents to the survey suggested reduced sales tax for equipment, improved marketing and better targeted software would help the industry develop. And most firms called for better distribution and co-ordinated marketing overseas.

Mr Kaiser

Survey results indicated the major programming language used in BASIC, followed closely by COBOL, RPG, program generators and software tools.

A DSIR discussion paper — similar to that which provided a basis for a comprehensive study of the electronics industry, its basis and potential — is expected to be completed by the end of this year or early next year.

Typewriter/printer

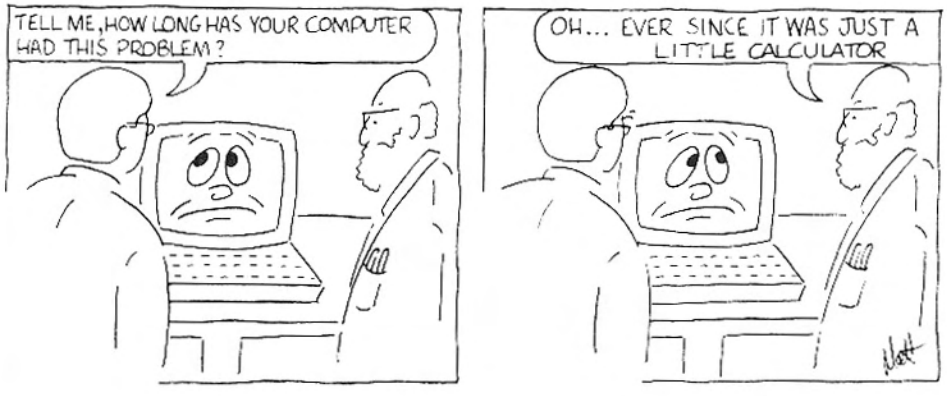
A typewriter/printer will be released in New Zealand this month by ANDAS. (Private Bag, Wellington).

The Juki 2200 is a fully fledged typewriter with a parallel or serial interface built in, enabling it to be connected to a computer and used as a daisy wheel printer (printing at 10 characters per second).

When being used as a printer, the carriage motion changes to bi-directional.

With a price tage of $895, the Juki 2200 probably ranks as the lowest priced letter quality printer available in New Zealand.

MICRO MOMENTS — BY MATT KILLIP



IT'S A SMALL MIRACLE HOW HEWLETT-PACKARD PUT 656K OF MEMORY, LOTUS 1-2-3, WORD PROCESSING, AND COMPLETE IBM CONNECTABILITY INTO
A 9-POUND COMPUTER.

THE PORTABLE.

For years business people had to choose between the power of a desktop computer and the limited capabilities of the first portables. That problem was solved when Hewlett-Packard introduced The Portable.

The Portable is designed with more total memory than most leading desktop personal computers...656K in fact. That includes 272K of user memory. So, The Portable's built in business software can work with enormous amounts of data.

1-2-3™ from Lotus,® America's most popular spreadsheet, file management and business graphics program, is permanently built into The Portable. So is Hewlett Packard's word processing program, MemoMaker. Just press the key and you're ready to work.

If you use a Hewlett Packard Touchscreen PC, IBM PC, XT or an IBM compatible you'll be glad to know that your desktop and The Portable can talk to each other with the simple addition of the Hewlett-Packard Portable Desktop Link.

The Portable's rechargeable battery gives you 16 hours of continuous usage on every charge.

Finally, you can work comfortably on a full size keyboard and an easy-to-read 16-line by 80 column screen. And it all folds shut to turn The Portable into a simple nine pound box.

The Portable. A small miracle...perhaps. But then consider where it came from.

See The Portable and the entire family of personal computers, software and peripherals at your authorized Hewlett-Packard dealer.
In Auckland call 687-159, Wellington call 877-199 for the dealer nearest you.

Setting You Free

HEWLETT PACKARD

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Charter Series — Version 7

By Gaie Ellis

A comprehensive revision of The Charter Series culminated the launch of Revision 7 in Auckland last month.

Presented in upmarket packaging with a totally re-written manual, the new product includes CP/M ad MSDOS versions of the debtors' package and an MS-DOS version of the inventory control and Order Processing systems.

At the launch the managing director of Interactive Applications, Ltd, Phil Norman, said the revision had taken a year to develop and had been a much more ambitious project than initially considered. Systems were completely re-written in some cases.

During the development stages, his company had succumbed to pressure to release products early, particularly to users who wanted extra facilities they knew would be in Revision 7, he said.

"Inevitably, this software was not robust and was often installed in environments where it was being tested to its fullest extent. As a result, these 'new' products gained a reputation for being tender and our image suffered."

However, this problem needed to be kept in context, he said. Today there are 3000 users sites throughout Australasia, with no more than 50 problem sites during the last six to nine months. All the difficulties had been remedied.

Over the past six months, IAL has revamped its quality control department for checking software before release and a number of selected sites are used for off-site testing with "live data".

Kerry Moore (left) from Business World, Hamilton, Clyde Maddock (centre) marketing manager for IAL, and Brent Wilkinson of IDAPS Computer Scene (NZ) Ltd, test the new software.

Integrated Framework

Framework, an integrated software package encompassing word processing, spreadsheets, business graphics and database management in one program has been released in New Zealand.

Developed for the IBM PC or compatible machines, this program allows the user to move between applications quickly, with a minimum of commands.

It uses an outline as the underlying structure for the program whether the user is working on multiple projects, organising files or jumping from spreadsheet to word processor.

The user can develop windows to classify and sort different pieces of information and it is possible to see a number of frames at any one time for sorting on the VDU.

The word processing mode can be used with a couple of keystrokes to make notes or write a chapter of a business plan; the operator simply closes the frame to leave, highlights another heading from the outline, opens it and starts a new operation. Commands are common to all frames.

Written in C, Framework requires 256K, has up to 32,000 cells limited only by RAM and retails here for $1450 from Arcom Pacific (NZ), and $1447 from The Computer Store which is also an Ashton-Tate agent.

See us for all your quality computer needs

Better value than an Apple II!

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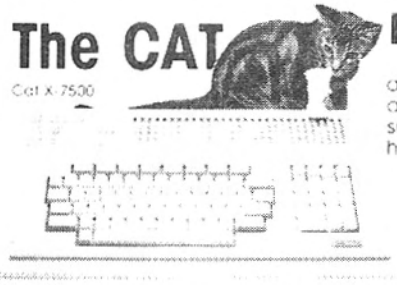
Cat X-7500



Powerful . . .

because it has 64K memory as standard and is fully expandable to suit your needs. It also offers a large range of peripherals such as, disk drives, colour monitor and high quality printers.

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because it's compatible with most software written for the Apple II computer. That means that you have access to thousands of programs; programs for education, business or leisure.

Versatile . . .

because the CAT is the one computer you will need for business, education and home entertainment.

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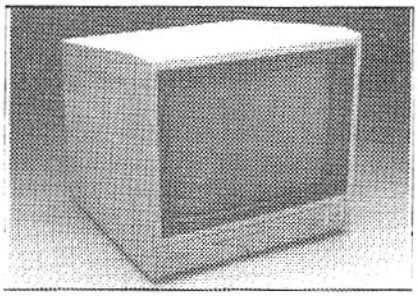
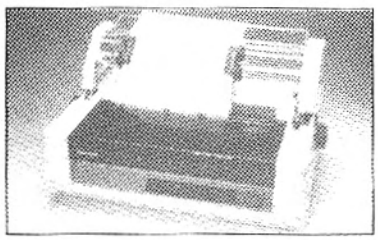


High Resolution Green Monitor

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 band width, giving a bright, sharp display, even on 80-column text and hi-res graphics!

Cat X-1220

VALUE! **$449.95**



Budget Daisywheel Printer

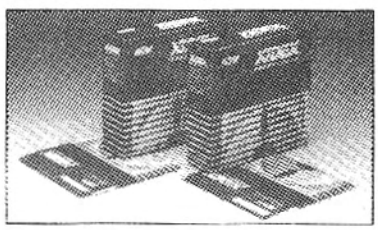
If you're using your computer for word processing, this daisywheel printer will give you top quality printing at a budget price. Prints at 18 cps. Offers a choice of 3 pitches (10, 12, 15 cpi) plus proportional. Takes standard 96-character print wheels and ribbon cartridges (Diablo, Qume compatible), 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



Xidex Quality Diskettes

The new Xidex range of precision disks offer a level of quality and reliability previously unknown. Better disk substrate, finer particles in the coating, ultra smooth polishing, tighter tolerances and an extra 18 critical tests ensure that all disks easily exceed the ANSI specs for 96 TPI high density recording.

Single sided, double density soft sector
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Box of 10 Single Sided, d density soft sector
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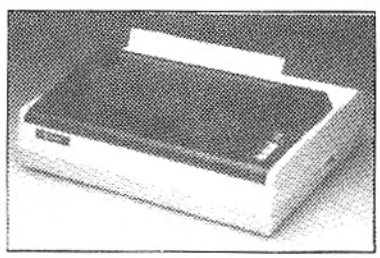

BX-80 Dot Matrix Printer

The BX-80 offers high quality, speedy dot-matrix printing at a price far lower than comparable printers. Bi-directional, prints the full upper and lower case (with true descenders). ASCII character set at 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

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Ribbon cartridge for X-3268 printer
Cat X-3269 $19.95

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NZ 120

Computing code of ethics

A Massey University researcher wants to know what computer users and New Zealand Computer Society members think about a code of ethics.

Nick Park, of the university's management and administration department, is researching a project on "Ethical Constraints and Computer Use in New Zealand".

He is particularly keen for opinion on codes of ethics and practice, the demands for ethical standards, and what those standards are, what they can be and what they should be.

"Last year, NZCS members rejected the proposed code of practice and I can imagine many good reasons for this but would prefer to have first hand accounts rather than to settle for guesswork," he said.

Mr Park is also canvassing views on the role computer people should take in wider social issues – to what extent should they pressure and what stands should they take on such matters as employment issues (personally and in the country generally), legislation on privacy; control of communication technology, and microelectronics in weaponry.

Communications should be sent to: Nick Park, Department of Management and Administration, Massey University, Private Bag, Palmerston North.

Confidentiality will be maintained in all cases.

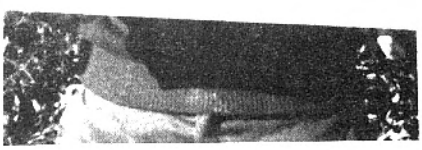
Right connections

New Zealand's first major seminar on connector technology will be held in Auckland and Wellington this month.

Organised jointly by the National Electronics Development Association and the DSIR, Connector Tech is aimed at electrical and electronic design engineers, suppliers, users, specifiers and purchasers of equipment such as computers and peripherals or any devices relying on interconnecting cables or electrical contacts.

Three keynote speakers from overseas will cover topics including an update on modern connector technology from overseas, cable/socket connectors, selection and application of connectors, commercial design and future developments.

Paul's CATch



Paul Famularo, of Chanel College in Masterton, with the CAT computer he won in the recent competition run by Dick Smith Electronics Ltd and *Bits & Bytes*.

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The Disk cartridge is 33% thicker which helps eliminate contaminants and damage from extensive handling. Each disk is quality controlled on 18 exacting tests and each and every 5¼" and 8" disk carries a "10 YEAR WARRANTY". BEAT THAT. Also, every time you buy 10 5¼" disks we give you a free unique library file. Every disk is guaranteed 100% error free so if you want the very best and you want to do it right Xidex it "today".

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Telephone 843-788.

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School computer study

A research and development programme on the use of computers in schools will begin next year, the Minister of Education (Mr Marshall) told the Educational Administration Society in Wellington.

The aim, he said, was to ensure computers were used as effectively as possible. The study will cover the use of available hardware and software, teacher training and the linking of the primary, intermediate and secondary school systems.

Teachers would be asked for their ideas on computer studies, teaching material would be sought and equipment evaluated. Computer courses would be developed at teachers colleges.

Mr Marshall said the government was committed to ensuring every secondary school was provided with adequate computer facilities. A 1983 survey had shown 96 per cent of secondary schools now had computers — 1683 machines in all.

The Education Department was conducting a survey to find out how many primary schools had computers.

Meanwhile Wellington Teachers College principal, Miss Margaret Malcolm has told the college council she believes the college could become a centre for computer education for teachers. The council is to pass the proposal on to the board of studies for consideration.

Lotus 1, 2, 3 courses

Argos Data Systems (offices in Auckland, Hamilton, Wellington, Christchurch and Dunedin) is offering courses on using Lotus 1, 2, 3.

The two-day courses are designed to give participants practical "hands-on" experience of using Lotus 1, 2, 3 and show how the package can help management.

Restricted to a maximum of 12 participants, the courses cost $385 and are conducted either on-site (for large companies wanting a number of personnel to take part) or at Argos offices.

CAD package

Autocad, an American designed computer aided design package, has been released in New Zealand by Chase Computers. (P.O. Box 6389, Auckland).

Running on an NEC APC computer, the total package (computer, peripherals and software) costs around $25,000 which compares very favourably with many other existing CAD systems.

The package is aimed at anyone working in draughting and design.

DATA PROCESSING TUTOR

A Data Processing Tutor is required to teach NZ Certificate in Data Processing subjects and to assist with the development of a range of computer courses.

Applicants must have knowledge of programming in COBOL and, at least a working knowledge of another language.

The successful applicant will have had experience in data processing and is expected to assume responsibility for a full-time NZ Certificate in Data Processing course.

Experience in a commercial environment would be an advantage.

Salary will be within the range of $15,580 to $28,257 or for an exceptional appointee, $27,521 to $30,316 plus cost of living adjustment.

Applications for this position at the Manawatu Polytechnic close with the Principal, Private Bag, Palmerston North at 9.00 a.m. on 29 November, 1984. Applications must be made on form E25/1 obtainable from Polytechnics and Technical Institutes. Further information is obtainable from the Manawatu Polytechnic. Phone Palmerston North 67-104.

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P1617

Brits and pieces

The networking abilities of the BBC micro look set to expand further. The Polytechnic of Central London now offers a plug-in ROM which allows the user to flip the BBC into VT-100 terminal emulation for use as a mainframe workstation. Meanwhile Acorn has bought into Torus Systems Ltd, also of Cambridge. Torus specialises in graphics-controlled local area networks and has just released its first product for the IBM-PC, under the name ICON.

The British company, ACT, which produces both the Sirius and Apricot micros, has released two major new initiatives on the British business market. The first is a considerable expansion of its Apricot range. This is now expanded downwards (to an outstanding portable and a low cost entry system) and upwards to the Apricot XI with a transportable, built-in 10 megabyte drive along with a double-sided 3½in floppy. All have the standard Apricot features but also feature an optional mouse, speech recognition and colour graphics.

These products are scheduled for release in New Zealand soon but pricing is not yet available. Technical aspects apart, someone should institute an industry award for the computer as art. Unlike some PC manufacturers who seem to enjoy retired architects from Stalin's Russia to design the outside of their machines, ACT seems to have found a stunner.

The second ACT initiative is a cheap facility for pipelining data and programs between Apple's IBM-PCs, Apricots and Sirius. Apart from the Apple, these machines are highly software-compatible, with the ACT machines generally offering better and (non-compatible) disk facilities to the IBM.

The product is aimed at providing painless, low cost facilities for sharing software and data between machine types rather than full networking.

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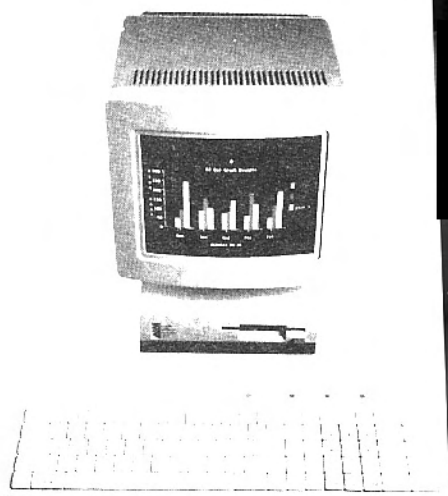

The Apricot F1/E

New Apricots

Two new Apricot models will be officially released in New Zealand this month at the Christchurch Computer Show by Barson Computers, (P.O. Box 36 045, Auckland).

The FIE with an Intel 8086 processor (a true 16-bit processor), 128K of RAM, one 3.5in single side disk (giving 315K of storage) and a cordless infrared keyboard (shades of the IBM PC junior) will retail for about $3900 (40 per cent tax paid).

This price includes a range of software including the operating systems CP/M 86, concurrent CP/M 86 and MS-DOS, the applications packages, Super-Calc, Superplanner, Superwriter and three others from ACT (the UK manufacturer of the Apricot range) plus a number of utilities.

An FI version will also be available for about $5000. It has 256K RAM and a 740K capacity disk drive as standard.

The other model to be released is, you guessed it, a portable version of the Apricot.

This has similar specifications to the FI but with the addition of a 80 by 25 character LCD screen display and speech control of software. The latter sounds interesting but we have no more details at this stage.

At around $8700 for the standard portable version, the API (all these model names certainly get confusing), the Apricot portable is not cheap but at less than 6kg (or about half the weight of an Osborne), it will at least be easier on your arms than most portables.

Full reviews of these new Apricots will appear in the near future.

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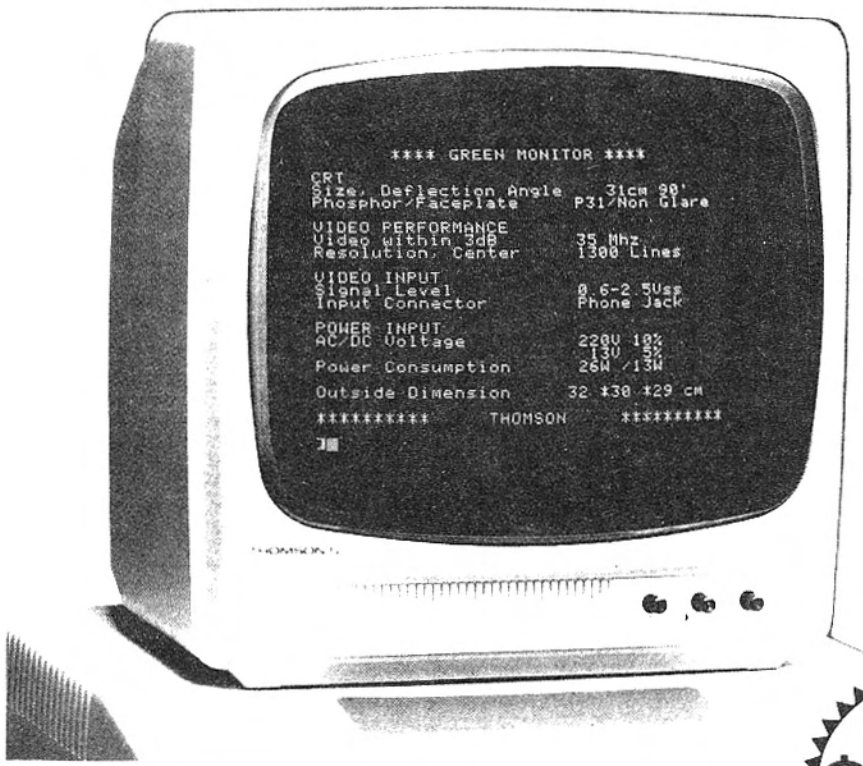

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Bits & Bytes buyer's guide

— Part 1: up to $2000.

Compiled by Gordon Findlay

In the 11 months since the first *Bits & Bytes* buyer's guide was published, the computer market has continued its frenetic pace. Keeping up with the comings and goings of the various brands is a difficult job, and quite impossible for the novice. There have been several significant arrivals on the scene, ranging from the Acorn Electron to the AT&T machines. "User friendliness" has become the catch cry, and we have seen de-emphasis of the keyboard through the touch screen and the mouse. These recent arrivals seem destined to be a major influence on the future of computer design. While there have been significant departures, the long awaited "shake out" could scarcely be said to have started yet.

As last year, the aim of this buyer's guide is to give the consumer some help, by summarising the details of as many machines as possible. This first part of the guide will cover machines costing (retail) up to about $2000. The second part, in the December issue, will cover machines costing between $2000 and $7000 in typical configurations. The February issue will have a run-down of some of the machines in the $7000 to $14,000 range.

A cautionary note

Naturally I have had to start collecting and updating information for this guide some months ago. Two factors have affected the prices of computers in the meantime — devaluation, which has had effects hard to predict in advance, and the extension of the price freeze. Many distributors are unable to say what the price will be for the next shipment from overseas until it arrives. Most New Zealand distributors carry only a small number of computers in stock, which makes them particularly vulnerable to changes from week to week in the foreign exchange markets.

For these reasons, some distributors have not been able to give a price some weeks in advance. So treat all prices quoted as a guide only!

How to buy a home computer

The first-time computer buyer is faced with a wide choice. The first essential thing to do is to decide what the computer is actually for. Is it primarily for use as a games machine? For learning programming? For the children to learn about computers? For record keeping? After considering the uses the computer will be put to, consider these questions:

- Is colour necessary, desirable, or a frill?
- What software is needed, and available? If you want to play games, rest assured that no beginner can write arcade quality games! If word processing is your thing, you don't want to start by writing a text editor. On the other hand, if learning to program is the main interest, you may not need much commercial software at all.
- Tape or disk? This is always a difficult decision, because of the two counteracting tendencies: to save money, or time. Is a cassette tape going to be bearable, or is a drive needed? Are microdrives, or one of the versions of digital high speed tape cartridges produced for the machine in which you are interested? Some machines use ROM cartridges as well! If you ever intend using your computer to store a lot of data (facts and figures, as opposed to programs), be sure not to opt for tape without seeing it in action first.
- How good is the version of BASIC on the machine in which you are interested? Ask somebody knowledgeable about this. I regularly program in BASIC on a number of different machines, and it is astonishing how much difference there is. If other languages are possible, so much the better.
- Always consider carefully how much expansion you may need. There are two ways of looking at this. One is to buy with an eye on the future — if you might want dual disk drives in a year or two (or five), buy a computer which will allow this upgrading. The other outlook is to say, "Well, by the time I want to expand, there will be new computers out, so the first one can be sold and a second one bought from scratch". The second outlook means, of course, running the risk that all your software becomes useless when you change machines. But on the other hand, it does mean you will keep up with technological change.
- Most important, consider support. Support is an all-encompassing term, but it certainly includes the support of the dealer you buy from, written material in general magazines and specialist publications, published programs, user groups, and just the general availability of advice and help.
- Ask about service arrangements, guarantees and so on. Insist on knowing where your machine can be serviced, and about the availability of spare parts should anything happen.
- Consider the price. Of course!

Don't be put off by the jargon when buying. Try to learn a little bit about what you are interested in before you start asking sales people questions. Don't expect the sales person to always know the answers either! Even the best informed cannot know all about every machine. Of course, some don't know much at all.

It isn't hard to learn the fundamentals. To start with, read the glossary in each issue of *Bits and Bytes*

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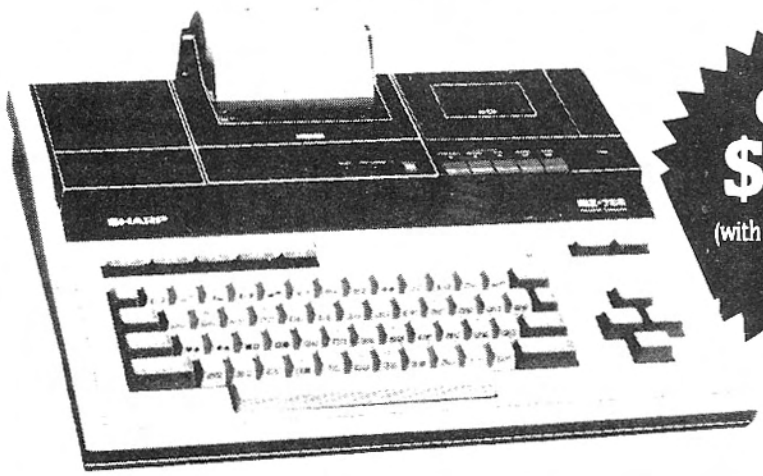

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Guide to our buyer's guide

Most of the information in this guide was obtained from distributors of the various machines. Other information came from our files, and from retailers. *Bits & Bytes* would like to thank the distributors and retailers who have helped.

We started with the aim of including all machines available. That ideal soon faded. We were unable to get information on a number of them. Machines are appearing and disappearing all the time. Where information about soon-to-be released machines is available, it has been included.

Prices

Even in the restricted price range covered this month, there is a very wide spectrum of computing power ranging from extended calculations to small business machines.

But what is the price of a computer anyway? Should the price of a monitor be included? What about a cassette recorder or disk? Generally, any price given here is for a typical, entry-level "bundle". Almost nobody buys an Apple without a disk drive and monitor, so the Apple price includes them. On the other hand, almost nobody buys a ZX-81 with a monitor, so that bundle does not include a monitor.

Be careful when reading prices of computers to check exactly what is included in the price. Prices do change, and discounts are not unknown! Prices quoted are what we were given by the distributor or a retailer. They should only be used as a guide of course.

A recent, extremely encouraging development in the range covered this month has been the appearance of special offers, reduced prices for a short time, clearance sales, and so on. The computer really has become an appliance.

Availability

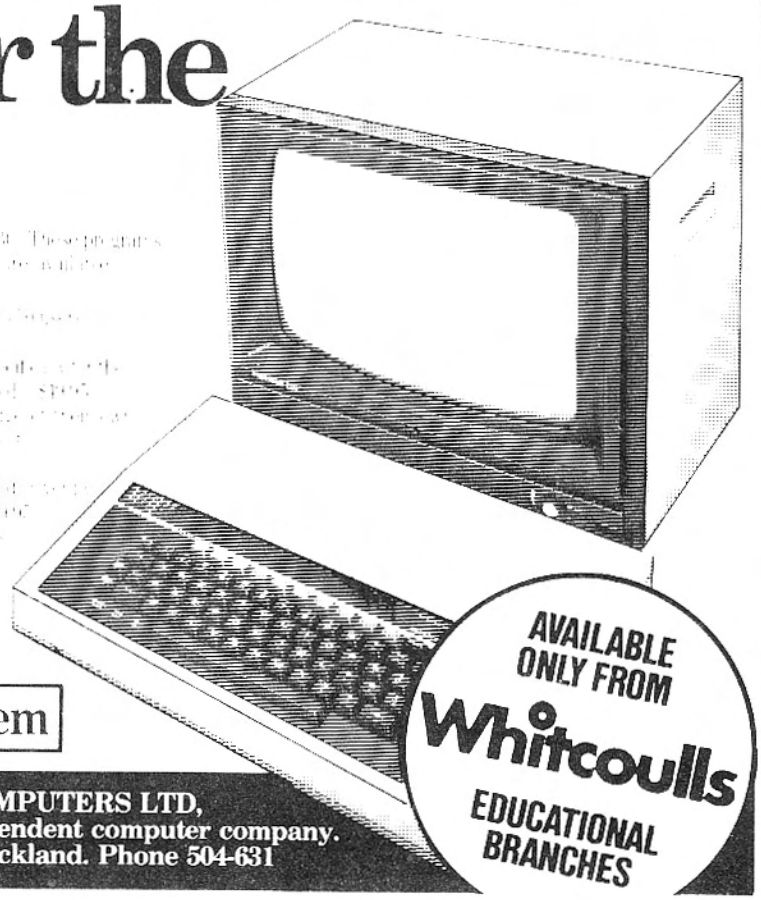
Most machines are widely available, but a few are specially imported by a particular retailer or group. Check the adverts in *Bits & Bytes* and your local newspaper.

How to read this guide

There are really two types of information in the guide. The routine information is displayed in tabular form. This includes type of processor, keyboard, RAM and ROM size, and so on. In the tables, a blank space indicates "not known". Some, especially smaller machines, use specialised processing chips rather than a general microprocessor.

Other information, specific to each machine, is presented in text form. Naturally, in a guide this big we cannot include everything about a computer!

New Zealand Educational Software for the BBC Micro



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The second round-up

Hand-helds

A few years ago, programmable calculators were programmed in machine code, and had only a few program steps and memories. The hand-helds are the descendants of these: programmable in BASIC, with 2K to 16K of memory. The chief use of the hand-helds is as a powerful calculator. Casio, Sharp, Texas Instruments and Hewlett Packard all make them, and have various models, which differ in the amount of memory, built-in functions (as a calculator), provision for programming by mini-cassettes, magnetic cards or whatever and so on. It would be hopeless to try to detail all the models here — get hold of a catalogue and compare what's offered with your needs.

Acorn Electron

A little brother to the BBC? Yes, but more than that. The Acorn is pretty much a stripped down BBC, without some of the interfaces and some of the expansion options. It uses the same extended BASIC, even to the extent of accepting (but ignoring) statements relating to hardware which isn't supported, such as the analog to digital converter. All the BBC graphics modes are present, with definable characters. The assembler is included too.

The keyboard is exceptionally good for a machine of this price, and includes 10 user definable keys, and 29 pre-defined keys enable BASIC keywords to be entered in a single stroke. An elapsed time clock, loudspeaker, standard TV, video monitor and RGB signals are all provided.

Expansion is mostly through the "Electron Plus 1" expansion unit which has provision for ROM cartridges, joysticks and a printer. There are two cartridge slots, which are also used for some further optional interfaces.

Most important the Electron has good documentation for the beginner, and is widely supported in magazine, books, software and user groups.

Reviewed in *Bits & Bytes,* April 1984. Price: $877; Plus 1 expansion unit (optional) $299.

Atari 400

Still available in New Zealand, but updated in the USA. The small amount of stock left does seem to be going at a reasonable price. The 400 has 16K of RAM and 10K of ROM. The 400 can be programmed with plug-in cartridges. Atari has provided a serial input/output port for major peripherals, and four jacks for joysticks and paddles. Both TV and monitor outputs are provided too.

Atari is a little unusual in that it has no language interpreter in main ROM, providing BASIC in a plug-in cartridge. Other cartridges allow for PILOT, and assembly language. Full screen editing, with cursor keys, and graphics characters accessible from the keyboard are other features.

The main claim to fame of the Atari family has always been graphics capability. The 400 provides nine graphic modes, with varying resolutions, number of colours, and number of luminances (intensities of colour). These are not independent — increasing the resolution decreases the number of colours and intensities you have. Player-missile graphics is a concept rather similar to sprites, and obviously intended for games. Indeed, Atari is noted for its games cartridges. Four independent sound synthesisers, each covering four octaves, with variable volume and tone are also provided, to drive the internal speaker.

Price: (16K, no recorder) $399.

Consolidation

Tony Paranthoiene has been appointed a consultant with the Paxus Information Services group in a move to consolidate its management and acquisition team in Australia.

He was previously managing director of David Hartley Computers.

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Nov Issue 3	Review of BBC computer and Microprofessor 1, start of series on selecting a micro for a small business, feature on microcomputers for accountants.
Feb Issue 5	Hand-held computer feature, review of Sirus 1 and Epson HX-20, start of farming and education columns.
April Issue 7	Review of IBM PC NEC PC 8000 and New Zealand made disk drives for System 80. New Sord column.
May Issue 8	Computers in business feature. Review of Commodore 64.
June Issue 9	Guide to farm software, reviews of Olivetti M20, Dick Smith Wizzard, Vis calc.
July Issue 10	Reviews of Spectrum, BMC 800, Supercalc, Compute Mate printer. Start of Microbee column.
August Issue 11	Reviews of Sord M5, Franklin Ace, Mannesmann printer, Calcstar, Word-processing feature. Start of Commodore 64 column.
September Vol. 2 No.1	Reviews of V2200, Colour Genie, Multiplan Communications feature.
October Vol. 2 No.2	Reviews of NEC APC, Epson QX-10, Casio FP-1000 and JR-100, 16 Bit feature.
November Vol. 2 No.3	Reviews of Casio PB-100, Proteus, Cromemco C-10.
Feb Vol 2 No 5	Summary of all computers $5-10,000 in N.Z. Reviews of Sega, TI99, Franklin Ace 1200 and Epson FX-80 printer.
March Vol 2 No 6	Reviews of Macintosh, HP150, Z100, daisy wheel printers. Program special.
April Vol 2 No 7	Communications feature. Reviews of the Electron, DEC Rainbow, Pencil II, Amust.
May Vol 2 No 8	Colour plotters. Reviews of Sanyo 16 bit, Apricot, Televideo portable, Casio lap computer and Sharp MZ-700.
June Vol 2 No 9	Printers on the market. Reviews of Dick Smith Challenger, Sord lap computer, Atari 600 and 800 XL.
July Vol 2 No 10	Reviews of Dick Smith CAT, NEC and Tandy lap computers. Financial spreadsheets.
August Vol 2 No 11	Reviews of Tandy 2000, TI Professional, and Eagle Wordprocessing feature.
September Vol 3 No 1	Reviews of Epson PX 8, Super 5 and Pinwriter printers Lotus 1, 2, 3.
October Vol 3 No 2	Reviews of Memotech, IBM PC and Tandy portables. Visi-On.

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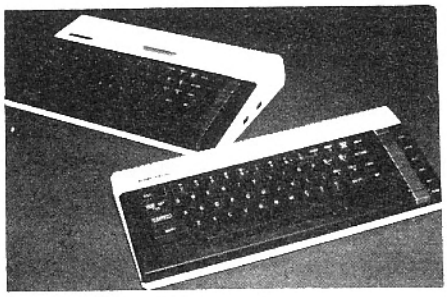
The second round-up



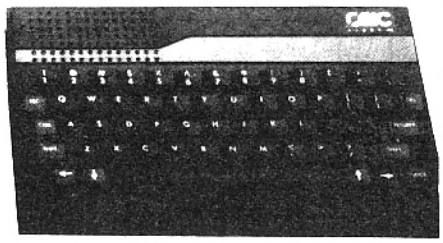
Atari XL series

The Atari 600XL and 800XL differ only in the amount of built-in memory, so can be written up as one. The 600XL can be expanded to 800XL size. These are updates of the earlier range in a light, modern style, and real keyboards rather than membranes. Software compatability with the earlier 400 and 800 models has been maintained fairly well, so many of the remarks on the 400 model will be pertinent.

However, perhaps the major difference is that BASIC is now in ROM in the main unit rather than a cartridge. This BASIC has a few useful additions, such as the use of variables as targets in GOTO and GOSUB statements. The machine is often advertised as having 256 colours — well, 16 colours at 16 intensities each does make 256 somethings!

Numerous interfaces are standard, including parallel and serial ports, joystick ports, and a peripheral port for the addition of any of a very wide range of peripherals including numeric pad, touch tablet, disk drive, joystick, paddles, trak-ball, modem and so on.

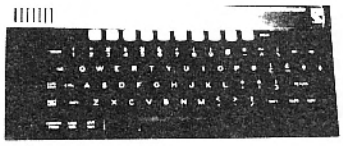
Reviewed in *Bits & Bytes*, June 1984. Prices: 600XL (16K RAM) $599; 800XL (64K) $899; cassette recorder $199.



Atmos

The Atmos is an upgraded version of the Oric-1. The essential differences are a full size keyboard rather than the calculator style, and a newer version of the ROM. Read the entry on the Oric for further details.

Price: $995.

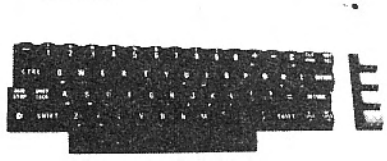


BBC

The BBC has attracted a lot of interest since its release. In outline, its specification is common enough: high resolution colour graphics, 6502 processor, 32K of RAM and so on. The special features of the "Beeb" are a little different. The 32K of ROM includes a very powerful version of BASIC, and other ROMs may be plugged in to give access to Pascal and other software. LOGO is also available in a rather non-standard implementation, as well as several other languages.

There are eight different display modes, including one for Teletext. The higher the resolution of graphics required, the more RAM must be devoted to it. This BASIC includes potent "structured" commands, and the ability to include assembly language. Interfaces include cassette, serial, parallel printer, TV, video monitor, analog channels and an extension bus. Expansion options are wide ranging, including disk drives, networking, a second processor, printers, etc. A Z80 as second processor gives operation under the CP/M operating system.

Reviewed in *Bits & Bytes*, Nov 1982. Price: cassette based, $1913; disk interface $398; disk drives from around $900 up.



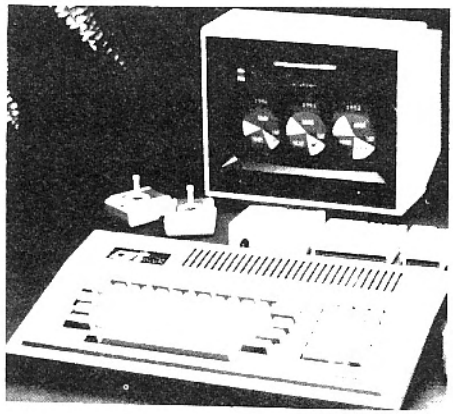
Commodore 64

Not just a big brother to the VIC 20, the C-64 is a home computer with some very interesting features. A very large body of software is available for it and the machine is expandable in hardware to handle single or dual disk drives, parallel printers, and a second processor, as well as the more usual tape recorder, TV or monitor, and so on. The second processor cartridge, containing a Z-80 enables the 64 to run CP/M. The USCD p-system is also available. Compatability with the VIC and earlier PET machines isn't perfect, but pretty close, at least in BASIC.

The processor, a 6510, is roughly a version of the ubiquitous 6502 with extra I/O facilities. Graphics facilities include sprite graphics which open up a whole lot of possibilities. Most graphics programming needs to be POKEd and PEEKed from BASIC. But useful utilities, such as sprite editors, extensions to the language and other packages, are coming out in the magazines all the time. Music is well catered for as well.

The machine includes 64K RAM, not all of which is available under BASIC (39K). Disk drives are "intelligent" — they have their own micros to control them — and the operating system is in ROM within the drive. The drives communicate in serial form, rather than the usual parallel transmission. An 80-column card may be added for serious uses such as word processing.

Reviewed in *Bits & Bytes*, May 1983. Price: $975; datasette tape recorder $127; single disk drive $1080.



Dick Smith CAT

This recent newcomer from the Dick Smith stable is an interesting approach to Apple "compatibility", In its own right, the CAT is a nice

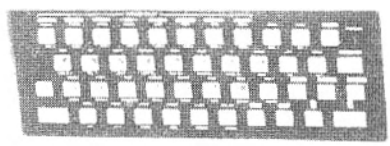
The second round-up

small computer, with an extended, 24K BASIC, a numeric keypad and eight programmable function keys which may have up to three functions each, presumably in combination with SHIFT and CONTROL. It has an 80 column display as standard — no plug-in board — but can operate in 40-column mode as well. An RGB colour output is provided for use with a monitor, as well as the standard composite video for a TV set. A parallel printer interface and four sound channels are built in as well.

The CAT on its own is compatible with a lot of Apple software, although not hardware apparently. A lot of Apple programs will run directly, and an emulator cartridge may be added (at a price) to further increase the range of compatibility. There still isn't total agreement with the Apple, but most programs seem to run. A list of programs known to be OK is provided by the agents.

The CAT has available most of the sort of peripherals we have come to expect, including disk drive (virtually essential to get into the Apple software world) and a Z80 card, allowing use of CP/M.

Reviewed in *Bits & Bytes*, July 1984. Prices: $1295 for the basic computer; disk drive and controller around $645.



Dick Smith VZ200

The VZ200 is a colour computer with many standard features and a few novelties. The price has fallen markedly since this time last year, which may be a good or bad sign depending on how you read it. It has a fairly usual rubber keyboard, each key having multiple functions. It comes almost ready to run — add a cassette recorder and a TV set or monitor and it's all on. The other standard interfaces are an expansion bus, and an expansion connector for input and output. A RAM pack may be added, and a printer interface is available to allow the use of a parallel printer. But a printer will cost far more than the unit itself!

The VZ200 has two graphics modes — 63 x 32 in eight colours, or 128 x 32 with just four colours. The video display requires 2K of the inbuilt RAM, leaving 6K for programs. There is a sound effects or music channel, on-screen editing and inverse video.

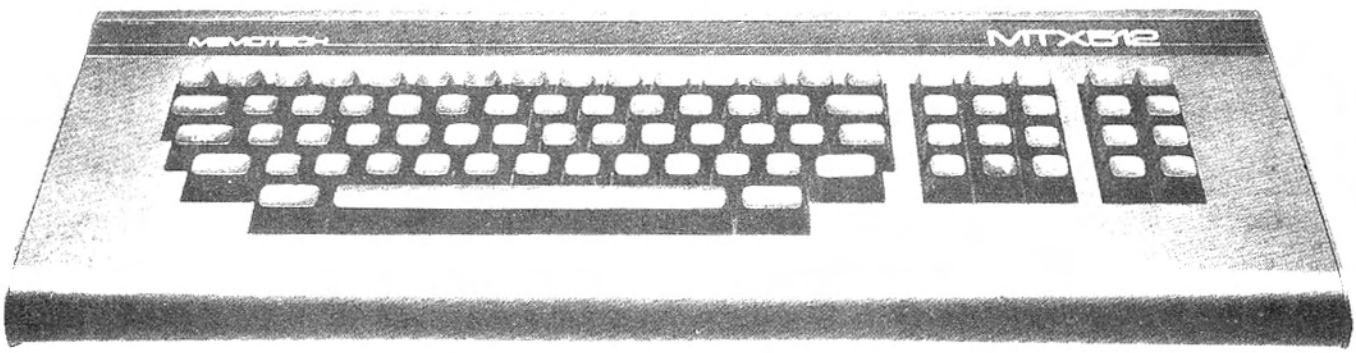
Reviewed in *Bits & Bytes*, September 1983. Price for basic unit: $199.

New appointments

Marin Lobb, who has worked in the computer industry in the USA and Britain, has been appointed company secretary for Interactive Applications Ltd.

Grant Forsyth has been named product specialist for the company.

TAKE A MEMO



CPU	Z80A
Clock	4 MHz
ROM	24K
RAM	32K, expandable
Video RAM	16K
Languages	MTX-BASIC (including MTX graphics), NODDY, Z80 Assembler
Keyboard	79 keys, including keypad and eight function keys
Display	24 lines of 40 characters on TV or monitor. Up to 16 colours. Up to 32 sprites. Eight user-definable virtual screens
I/O	Cassette port (up to 2400 baud), Parallel I/O port, Joystick ports (2), Hi-fi, Monitor, TV, Cartridge, Printer (Centronics)
Options	Communications board (two RS232 interfaces), ROMs for FORTH, PASCAL, Colour 80 column board, Memory boards (32K, 64K, 128K, 256K, 512K), Disc systems, Silicon disk (256K)

Cost	**Model**	**Suggested Retail**
	MTX 500	$995
	MTX 512	$1395
	FDX Single Drive & Interface	$1995

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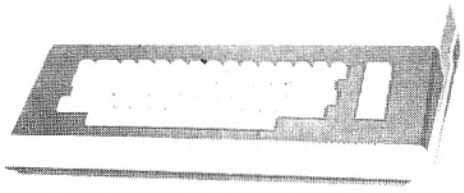
JOHN GILBERT ELECTRONICS

Parnell Rise, P.O. Box 37-245, Auckland. Phone 30-839.

The second round-up



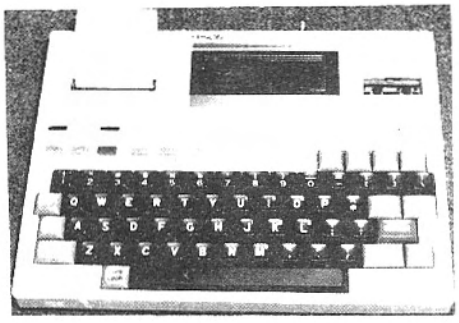
Eaca Colour Genie

Made by the same people who brought the very successful System 80/Video Genie/C micro, this is a desktop machine, with a full size keyboard, high resolution graphics, colour, sound, a good version of BASIC, and a lot of room for expansion. Under a bit of a cloud as the original manufacturer has folded, but there are lots of rumours about who will take over manufacture of what is quite a machine for the price — which has dropped considerably! Locally produced add-ons are starting to appear too, as they did for the System 80.

As well as pixel graphics (plotting points, lines, circles and so on), the Colour Genie has both predefined and programmable graphics characters. The predefined characters are accessed by pressing combinations of keys. There are eight function keys which may be programmed as you wish. As well as the usual built in interfaces, the Genie includes an audio output to supplement the in-built speaker, parallel and serial ports, a light pen port, and an expansion port for software cartridges. Joysticks are also available and are built in to a numeric keypad.

The version of BASIC in ROM is very complete with a lot of commands, rather similar to the earlier model, but with the addition of sound, joystick and graphics functions. The same powerful BASIC line editor as found in the earlier machine is also provided in ROM.

Reviewed in *Bits & Bytes*, Sept 1983. Price: (32K, excluding monitor) $599.



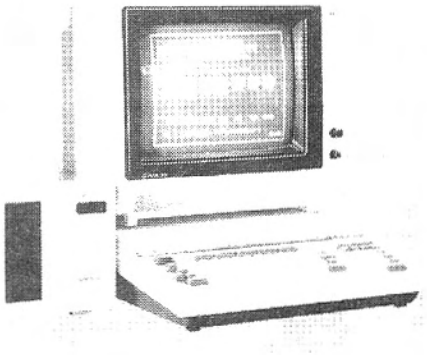
Epson HX-20

If the Epson is a representative of the "briefcase portables" class — a small package, battery powered, and just the size (in area) of a copy of *Bits & Bytes*. The liquid crystal display, like most digital watches, is a four-line window on a much larger "virtual" screen. A small printer is even built in! A "real" keyboard, typewriter style, has five programmable function keys. Graphics characters are there too.

It is programmed in a very powerful dialect of BASIC, with more commands than many, much bigger computers. Interfaces are provided for cassette, a serial interface for printer or modem. It has a bar-code reader, ROM cartridges, and the ability to connect to a standard TV set. Expansion options listed include a full size printer and a floppy disk, but it won't all fit in your briefcase then (not with room for your lunch anyway!) An acoustic coupler is intended to allow communication to others, and to bigger computers, when New Zealand gets into the communications act properly. Graphics capability: four lines of 32 characters in four colours on a TV, or 32 by 120 dots on the liquid crystal display.

The HX20 also includes a sound generator, and a clock for the time and date.

Reviewed in *Bits & Bytes*, February 1983. Price: $1929.55; microcassette, additional $326.61; 16K RAM in expansion unit, $357.57.



Hitachi MB-6890

The Hitachi "Peach", as it is known in Australia, is under $2000 in basic configuration, but over this limit with disk drives. Few machines are being used without drives, but it's here anyway! A middle-of-the-road machine in every way — probably aimed at the small business or professional market, but with other possible areas of application. The keyboard includes the CPU and interface for colour and black and white video, parallel printer, cassette, light-pen and serial (RS-232) interfaces. Notice, no TV; a modulator would need to be used. Most machines are sold with a green screen or colour monitor.

Internally, the machine boasts six edge connectors for expansion, and two memory sockets, which may each have 16K of RAM fitted. There are a number of video modes, the highest resolution requiring 16K of user RAM for the screen. Extended BASIC is in ROM to support the graphics. The Hitachi is well supported with business software utilities and games. The BASIC language is not particularly fast; machine code is accessible through an assembler.

The keyboard has a numeric pad, and function keys which are initially programmed with common BASIC instructions. These may be changed

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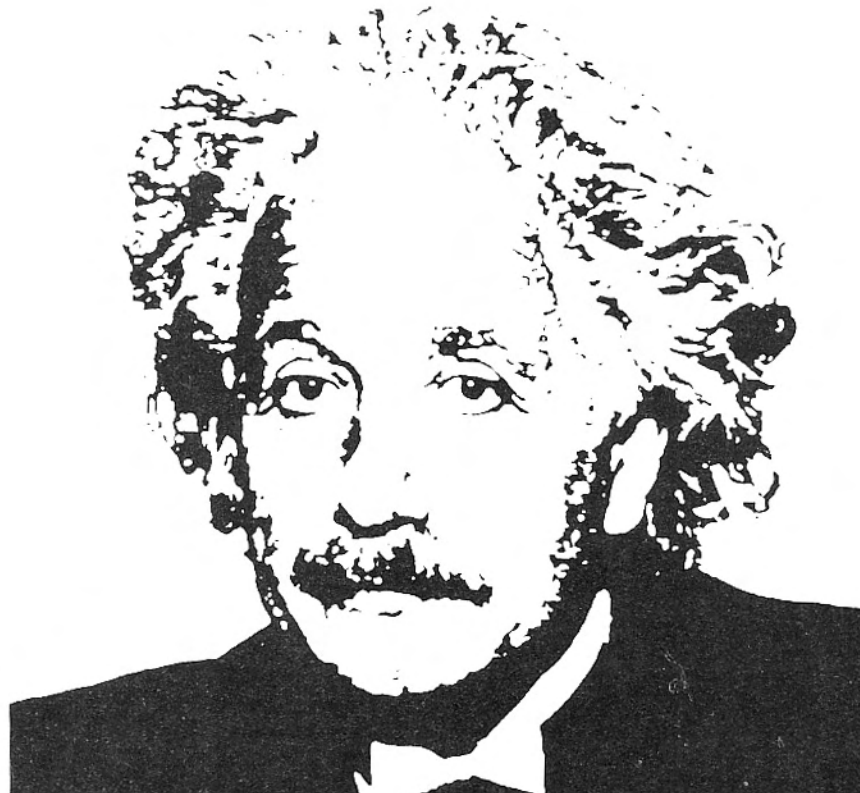


Einstein's theories on choosing a micro computer

C[illegible]

THE PIT-FALLS.

Don't buy a games machine.

[illegible]

Software.

[illegible]

Check the quality of the product.

[illegible]

Don't let the add-ons add up.

[illegible]

KEY POINTS TO LOOK FOR.

Computer language.

[illegible]

Expansion.

[illegible]

Software.

[illegible]

High resolution colour.

[illegible]

Keyboard.

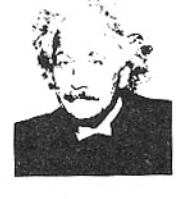
[illegible]

RAM (Random Access Memory).

[illegible]

[illegible]

Einstein



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at will. A CP/M card will be available, and disk drives, both 8in and 5.25in, are available. The dual mini-disk drive holds 640K (formatted) data; the 8in dual unit has two megabytes in total. A light pen is also for sale ($520 approx).

Reviewed in *Bits & Bytes*, March 1983. Prices: keyboard unit only $1775; green monitor $338-524; dual mini-floppy drives: $3031; 16K RAM card: $225 (required with disks); dual 8in disk drives $5724.

Memotech

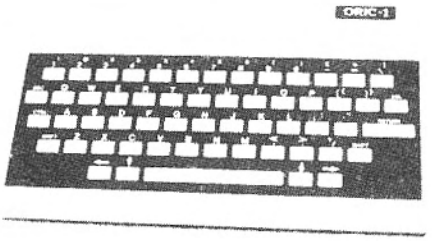
A recent, very stylish import from Britain, the Memotech series is one of the few British computers to get rave reviews in the USA. The styling immediately stands out; it is finished in matt black metal in a low, long case. Inputs and outputs are via sockets at the back, and include serial and parallel, joysticks and audio, as well as an expansion bus. The Memotech range uses a video processor which gives true sprite graphics as well as a reasonably high resolution. The cassette interface is quite quick at 2400 baud; disk drives are available and even allow the use of CP/M.

Screen layouts are novel, with a prompt line at the bottom, below four lines for entry and editing. Plenty of graphics commands enhance a relatively standard BASIC; sounds are also well catered for. In-line machine code can be used where necessary. A certain amount of windowing is possible from BASIC. Pascal and Forth are options; another language, with the unfortunate name, NODDY, is supplied and might be useful for simple text manipulation. Other peripherals include disks, an 80-column card, and so on.

Reviewed in *Bits & Bytes*, October 1984. Prices: MTX 500 (32K RAM) $995; MTX 512 (64K RAM, expandable to 512K) $1395; floppy disk system $1995.

Buy books this month

The second round-up

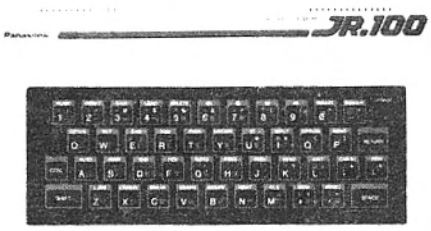


Oric

The Oric -1 is a small colour computer which has attracted quite a following overseas, and was named Home Computer of the Year in France (I'm not sure who by). It has a calculator-style keyboard, with a standard layout rather than the multiple functions found on some. The BASIC is fairly standard Microsoft-style, with the addition of several statements to control graphics, sound effects and music. Foreground and background screen colours are set using the familiar PAPER and INK commands; and characters may be made double height, or flashing. The cassette interface has two speeds — 300 or 2400 baud — and has a name for reliability. Graphics dislays are 200 by 240 pixels, leaving three lines of text at the bottom.

The Oric has a wide range of peripherals listed in the catalogue, although some may not be available in New Zealand. These include a 3in disk drive. A parallel printer port is standard.

Reviewed in *Bits & Bytes*, December 1983. Price: (64K RAM) $755.

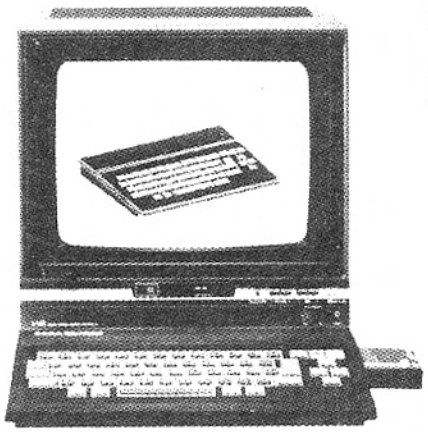


Panasonic JR100

The JR100 is a black and white display only computer, with BASIC keywords obtained from the keyboard using a control key. The BASIC is in ROM, and it has 16K of RAM, 64 graphics symbols and 32 user-defined characters, standard interfaces to cassette, TV and monitor. Each graphics character may be displayed in inverse video.

The processor is equivalent to a 6802. Each key has a number of functions: a letter, a keyword (such as PRINT), a graphics character, and often a special symbol. Entry of programs is aided by the screen editor.

Reviewed in *Bits & Bytes*, October 1983. Price: (no monitor cassette) $140.



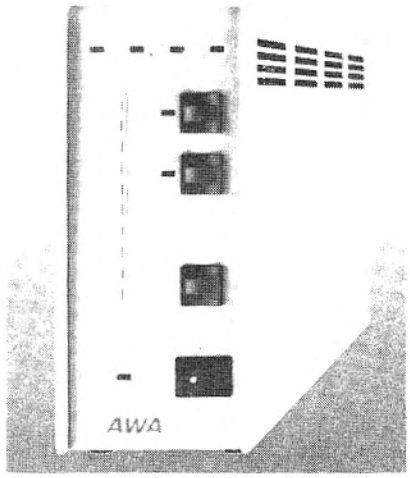
Sega 3000H

A recent (September) upgrade has seen the rubber keyboard version of this popular machine replaced with an update having a full stroke keyboard. Clearly designed with games one of the intended applications, the Sega has 16K of separate memory for use by the display. High resolution graphics in 16 colours (225 hues), and use of 32 independent sprites are naturally being used to produce arcade style games.

The Sega also boasts more serious applications. Sega BASIC is quite extended, and comes in various levels of complexity. Quite a wide range of expansion components is available, including a disk drive due for release in November. The distributors have been working quite hard to assist users, helping with the formation of a magazine, national users' group and other forms of support. Alternative languages such as Pascal, Logo and Forth will be available soon, as will an assembler. The quality of the implementations remains to be seen of course.

Reviewed in *Bits & Bytes*, February 1984. Price: the advanced pack (32K ROM, 26K user RAM, level IIIB cartridge and power supply)

Three on One



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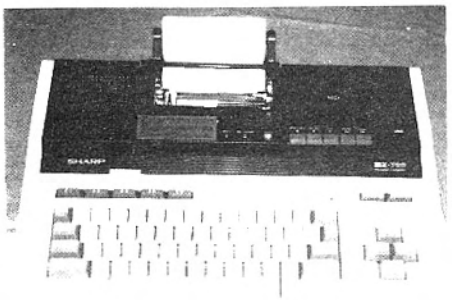
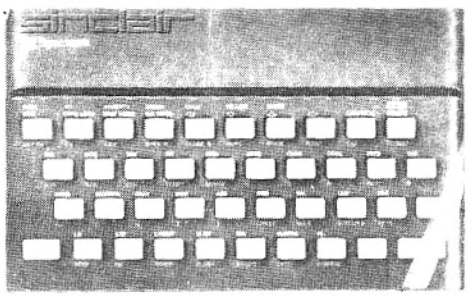


Sharp MZ-721

The Sharp MZ-721 is advertised as a "family" computer. In appearance it resembles a large calculator with some accessories attaching at the rear, such as a small colour plotter/printer. The computer has a large amount of RAM — 64K and very little ROM — just 4K. There is also 4K of RAM for video. This means, of course, that BASIC must be loaded from tape at 1200 baud, which takes about three minutes. Once BASIC is loaded, the user has 36.4K bytes of RAM free. The BASIC supplied is fairly standard, the main novelty being an included machine code monitor. Alternatives are said to include Assembler, and Pascal.

There are two graphics characters associated with each key in an 8 x 8 dot matrix, but apparently no dot addressable graphics as such, other than a very low resolution 80 by 50 system accessed by SET/RESET commands. The large number of graphics characters does allow complex designs to be built up, but with difficulty. On-screen editing is supported by editing keys; there are also five definable keys. Other facilities include a built-in clock (no battery backup) and loudspeaker. The screen foreground and background colours can be assigned separately.

Reviewed in *Bits & Bytes*, May 1984. Price: $995.



Sinclair ZX Spectrum

The Spectrum is much more than just the colour version of the ZX-81. It has a low profile, plastic box, with a rubber keyboard. The keys have a positive "click" to help in data ent
Each key has a multiplicity
functions associated with it: 1
functions for 40 keys. The compu
will sometimes automatically sel
the appropriate meaning; at ot
times control keys must be used
conjunction with letter keys.

Sockets at the rear provide f
power supply, cassette and T
connection, and for expansi
peripherals, including t
microdrives. The screen is divide
into "paper" and "border" area
which may have separate colou
specified. Each character can b
printed in any colour "ink", and i
brightness can also be controlled, s
quite a variety of display is possibl

Sixteen graphics characters, and
further 21 user-defined character
are provided. The display can also b
treated as a grid of 256 x 192 dots
BASIC contains commands fo
drawing lines, circles, and so on.

In the high resolution mode, 9K o
RAM is left to the user in a 16K
machine. Sound is also supported
The machine has two versions, with
16K or 48K or RAM. Other
expansion options include a thermal
printer and the "microdrives", high
speed digital tape cartridges, acting
like a normal disk drive. Software,
both on tape and published, is
common. Forth may be used as an
alternative to Basic, and assembly
language programming is supported.

Reviewed in *Bits & Bytes*, July 1983. Price: 16K $499; 48K $699.

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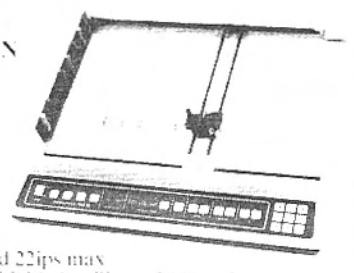

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The second round-up

Sinclair ZX-81

It's probably the smallest, just about the cheapest, and almost certainly the largest selling computer in the world. Something like a million and a half have been sold in the States (under the Timex/Sinclair label). But this doesn't mean the ZX-81 is not a powerful computer. It has a BASIC which is as powerful as most; any limitations arise because of its size.

The ZX-81 is small, and there isn't room for a real keyboard. Instead, a membrane keyboard is provided, with each key having a number of functions. Basic programs are entered as a series of keywords — there is a key labelled "PRINT" for example, and you cannot type the five letters individually. The computer itself keeps track of which function is meant when a key is pressed.

The display has 24 rows by 32 columns, the bottom two lines reserved for program input and error reports. A black and white machine only, the ZX-81 has a number of graphics characters accessible from the keyboard, giving low resolution graphic facilities.

An alternative language (Forth) is available. Storage of programs is cassette tape only, the original 1K o RAM can be expanded with a 16 package attached to the rear of th computer. A small thermal printer using aluminised paper, can also b added. Software, mainly games, i common, and the ZX-81 gets good magazine coverage.

The ZX-81 may be getting a bit dated now after all, you can get a colour computer for the same price. But it's still worth a look if that's all you need.

Price: (1K RAM) normally $199, often available at less.

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Micro Worx, Inc., Hurst Lubbock, Texas

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Sord M5

The Sord M5 is a compact home computer, with colour graphics and sound, a rubber keyboard with keywords and graphics characters on the keys, and provision for the most important interfaces. RF, video and sound outputs, cassette and parallel printer, and an expansion bus are standard. The expansion bus is intended to service RS-232 output, and a 3.5in microfloppy drive, expected to be available soon. The basic machine has only 4K of RAM, and a simple version of BASIC. BASIC-I (introductory). Two other versions, one for graphics support, the other with floating point (decimal) numbers, are obtainable in ROM cartridges. The M5 has sprite graphics in up to 32 priority levels. Memory can be expanded to 32K with plug-in packs.

$650; family pack (12K user RAM, 16K ROM, level IIIA cartridge and power supply) $599; peripherals include joysticks $29.95; datasette recorder $125; games cartridge $39.95; colour plotter/printer $470; disk drive $995. A keyboard conversion kit will be available for earlier models.

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The Electron has been designed as a development of the original BBC technology (a very important consideration as more and more schools are changing to BBC Basic computer language). It has a total memory of 64K and can store up to 32K (32,000 characters).

High quality, high definition graphics are also part of the Electron appeal.

Choose from one of the biggest ranges of software in New Zealand — from simple games to educational packages to small business aids. And it's growing all the time.

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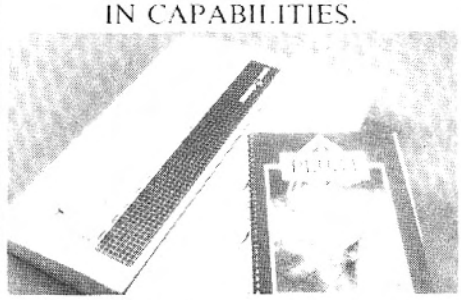
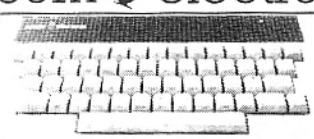


With the add-on capability of the Electron Plus 1, the sky's the limit.

The joystick input creates new game possibilities, while the printer output opens up more serious uses (word processing, financial calculations, etc).

Plus 1's cartridge slot also extends the Electron's software capabilities.

acorn electron



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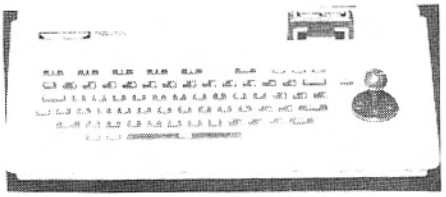
860-780

The second round-up

Reviewed in *Bits & Bytes*, August 1983. Price: (4K) $495; BASIC F or G cartridge $107; expansion unit $269.



Spectravideo SV-318

This is an interesting machine — the first result of an agreement between software and hardware manufacturers on the specifications for low-end eight bit computers. This specification, known as MSX, details the input/output and graphics conventions to be used, without binding the designer as to how they are to be met. The most noticeable feature of the machine is the built-in joystick which is part of the cursor movement pad.

A full range of inputs and outputs is provided: additional joysticks, software cartridges, video and TV signals, a cassette port, and access to an expansion bus for the addition of the very large number of peripherals. These include a special recorder, floppy disk drives, modem, printers and so on.

The BASIC supplied in ROM is an extended version of Microsoft BASIC, and has a very long list of commands, many to support the extensive graphics capabilities of the hardware. Sprite graphics are fully implemented with 32 sprites and multiple screens, and it will be interesting to see what software becomes available utilising the hardware.

The manufacturer is no newcomer and has been producing games and other software for the Atari range of computers and games consoles for a long time. Sound is supported too, and there are special purpose keys on the keyboard for many common operations. These function keys are redefinable at will.

Reviewed in *Bits & Bytes*, December 1983. Price: 32K of RAM, power supply, cassette recorder and modulator for connection to a TV $795.

Spectravideo 328

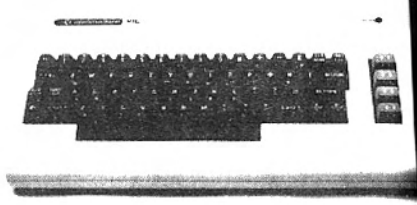
The 328 is much the same machine as the 318, but with real keyboard, and some special "word processing" keys. There isn't a built in joystick, which isn't too surprising really. You can always plug one in the back if you feel like swapping WordStar for Pacman!

Price $1095 (with cassette recorder). Many peripherals are to be had: 64K RAM expansion $295; single drive expander $1795; 80-column card $295 (these are also compatible with the 318).

Tandy model 1000

The 8K version of the Tandy Model 100 portable, or lap, computer is priced at $1995, so it falls just within the price range of this part of the guide. But we'll include it with the 24K version, next month.

If it's micro news in Wellington — Phone Pat Churchill 797-193



VIC-20

The VIC-20, by Commodore, is one of the more widespread machines. Commodore was, of course, one of the very first companies in the "personal computer" business. The VIC has a full size keyboard, programmable keys, sound, music, colour graphics. Plenty of expansion is allowed for, including increasing the initially small amount of memory, the addition of disks, a modem, a printer and so on.

Colour programming cannot be readily summarised, but fundamentally there are eight colours available for characters, eight for borders, giving 16 for the screen, in various combinations. Colours are selected from the keyboard. PET-type graphics characters are provided, along with a programmable character generator.

The VIC requires a modified tape recorder. VIC BASIC is broadly compatible with other machines, such as the PET. It includes a full complement of commands and functions. Sound is catered for with three independent generators, each covering three octaves. Beyond a certain stage, it becomes necessary to add an expansion chassis to provide extra plug-in slots.

Reviewed in *Bits & Bytes*, November 1982. Price: officially $465, but available at around $399; datasette tape recorder $137; disk drives from $1080; RAM expansion (16K) $129.95.

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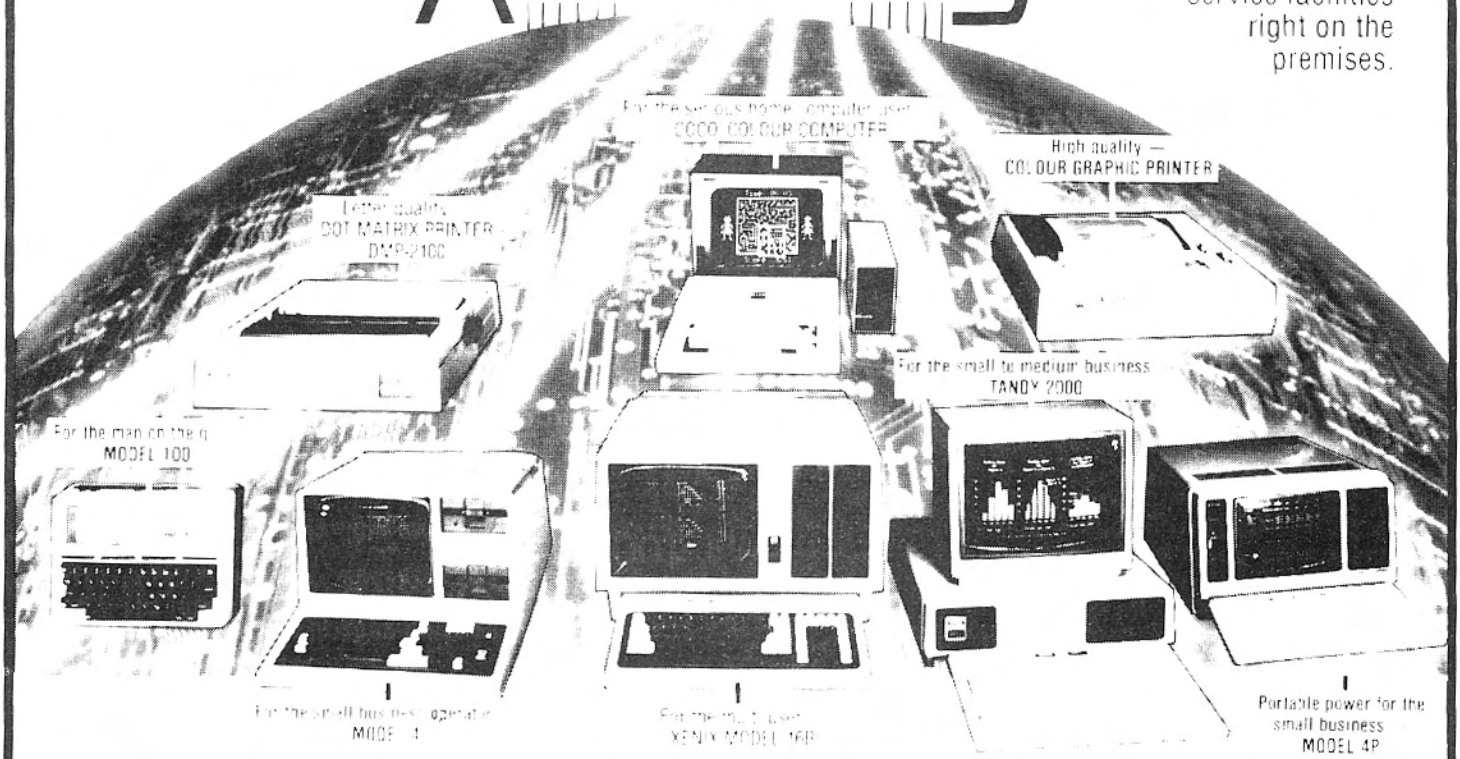

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Computer round-up — under $2000

NAME	Acorn Electron	Atari 400	Atari XL	Atmos	BBC	Commodore 64
Processor	6502	6502	6502	6502	6502	6510
RAM (K)	32	16	16 64	16-64	32	64
ROM (K)	32	10	12	16	32	20
Keyboard	typewriter	membrane	typewriter	typewriter	typewriter	typewriter
No. of keys	56	57	62	57	73	66
TV interface?	yes	yes	yes	yes	yes	yes
Monitor interface?	yes	no	yes	yes	yes	yes
Colours	16	9	16	8	16	16
Text display (lines x characters)	25 x 40 25 x 80	24 x 40	24 x 40	28 x 40	25 x 40 25 x 80	25 x 40
Maximum graphics resolution	640 x 256	320 x 192	320 x 192	240 x 200	640 x 250	320 x 220
Lower case?	yes	yes	yes	yes	yes	yes
Graphics characters	yes definable	29 & 256 definable			definable	

NAME	Dick Smith CAT	Dick Smith VZ200	Colour Genie	Epson HX20	Hitachi 6809	Oric
Processor	6502	Z80	Z80	2 x 6301	6809	6502
RAM (K)	64-192	8-24	32	16-32	32 64	16-64
ROM (K)	24	16	16	32-64	24	16
Keyboard	typewriter	rubber	typewriter	typewriter	typewriter	calculator
No. of keys	81	45	58	68	87	57
TV interface?	yes	yes	yes	yes	yes	yes
Monitor interface?	yes	yes	yes	yes	yes	yes
Colours	8	8	8	see text	7	8
Text display (lines x characters)	24 x 40 24 x 80	24 x 32	24 x 40	see text	25 x 80 25 x 40	28 x 40
Maximum graphics resolution	560 x 192	128 x 64	160 x 96	see text	640 x 200	200 x 240
Lower case?	yes	no	yes	yes	yes	yes
Graphics characters	no	16	128 & 128 definable	see text		

Blank means "not known".

BUYER'S GUIDE

NAME	Panasonic JR100	Sega 3000H	Sharp MZ721	Sinclair Spectrum	Sinclair ZX81	Sord M5
Processor	MN1800A	Z80	Z80	Z80	Z80	Z80
RAM (K)	16	up to 48	64	16, 48	1 16	20 (4 K user)
ROM (K)	8	up to 32	4	16	8	8
Keyboard	rubber	typewriter	typewriter	rubber	membrane	calculator
No. of keys	45	66	69	40	40	53
TV interface?	yes	yes	yes	yes	yes	yes
Monitor interface?	yes	yes	yes	no	no	yes
Colours	no	16	8	8	no	16
Text display (lines x characters)	24 x 32	24 x 38	25 x 40	24 x 32	24 x 32	
Maximum graphics resolution	64 x 48	256 x 192	see text	256 x 192	64 x 44	256 x 192
Lower case?		yes	yes	yes	no	yes
Graphics characters						

NAME	Spectravideo SV318	Spectravideo SV328	VIC 20	Memotech MTX
Processor	Z80	Z80	6502	Z80
RAM (K)	32 144	80 144	5 29	16 512 plus 16K video
ROM (K)	32	32	8	24
Keyboard	calculator	typewriter	typewriter	typewriter
No. of keys	67	89	67	69
TV interface?	yes	yes	yes	yes
Monitor interface?			yes	yes
Colours	16	16	8	14
Text display (lines x characters)	24 x 40	24 x 40	23 x 22	24 x 32
Maximum graphics resolution	256 x 192	256 x 192	176 x 158	256 x 192
Lower case?	yes	yes	yes	yes
Graphics characters	52	52	64 & 256 definable	

Blank means "not known".

QL delayed

While demonstration models of the Sinclair QL seem to be freely available in New Zealand (judging by the number of people who say they have seen a QL in action), the New Zealand Sinclair agent, David Reid Electronics, won't now be releasing the QL for sale until early next year.

The projected retail price is $2495 which will put it out of the reach of many home users and into the small business category.

A recent survey of British industry comments suggests there is still good news and bad news about Sinclair's new QL beast. The good news remains largely its price and the 68000 chip. Reports suggest the bad news is the bugs in almost every aspect of the initial systems released.

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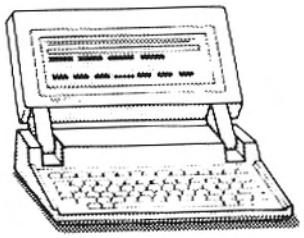

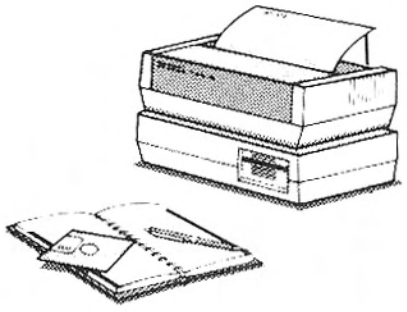

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HP110

A portable in the HP tradition

By Shayne Doyle

Hewlett-Packard has long been recognised as a manufacturer of quality electronics and laboratory equipment, and in recent years, as a manufacturer of high quality computer gear. The new HP110 portable maintains that tradition.

On opening the case, the first impression is of a well made product. The computer is fairly compact (13in x 10in x 3in) and quite heavy at 8.5lbs. Moulded in a high impact, off-white plastic, it comes complete with a very stylish padded carry case, with shoulder strap or briefcase style handle. For the well heeled, a leather carry case is available as an alternative.

The top two-thirds hinges up and contains the 16 x 80 LCD display. This section is about an inch thick and is held at the desired viewing angle by an excellent pair of friction hinges — no sag at all.

The 61-key keyboard has grey keys with wine coloured lettering; above these are eight shiftable grey function keys, four white cursor keys, and three special function keys. CAPS and CTRL are reversed to the usual and DEL/ESC is where the left Shift key usually is - I kept hitting it by mistake.

The case has two slots at either side to allow customised function key overlays to be used. The bottom right key controls the LCD display contrast. The keyboard feels good to use, solid and fairly quiet, with not too much "return clack". I feel this is an important factor in evaluating a keyboard, as keys which emit a loud "clack" noise when released, can quickly alienate people around you. This is especially important with a portable intended for use on public transport and in meetings.

Rear connections are provided for HP-IL interface input and output, battery recharger, nine-pin RS232 connector, and telephone connection for the in-built modem.

The display comes to life

On opening the lid and pressing any key, the display comes to life and the personal applications manager (PAM) menu screen appears. The display is OK to read in bright light conditions, but I found it difficult in low ambient artificial light and had to use full contrast all the time.

Unfortunately, in common with most other lap portables, no provision is made to output video to an external monitor. The top line lets you know how much space is free on RAM disk A. The HP110 has two mass storage mediums — up to eight single or four dual external drives can be connected, and there are two electronic disks in memory (RAM disks A and B).

RAM disk A is read/write and may be used to store programs and data files. RAM disk B is read only and contains MS-DOS, Lotus 1-2-3, Memomaker, and Terminal Emulator. Line four of the display gives a percentage of battery charge reading and the currently set system date. Below this is a row of five blocks labelled with the names of the four resident software packages, and one block labelled "Diagnostics". An arrow is moved with the cursor keys to point to the desired application and RETURN pressed to load it. As you may expect, loading software from RAM disk is very quick — Lotus 1-2-3 loads in 2.5 seconds, Memomaker 1.5 seconds.

Delving into the Diagnostics program reveals a very complete set of self test routines for all components of the system. Of particular interest is the LCD display test which shows well what the display can do and proves it is capable of very fast response indeed. Along the bottom of the menu are eight blocks corresponding to the eight function keys.

"File Manager" is for printing and deleting files or directories, creating and looking at directories, initialising new disks, copying and renaming files. "Clock Config" sets system date and time, maintained by a quartz crystal. "Datacomm Config" configures both the RS232 serial interface and the HP-IL loop interface. "System Config" allows

A user's view of the HP110

the user to tailor several system parameters, including the mix of system memory/RAM disk size, some printer characteristics, alternative display character sets, and disk write verify mode.

Versatile word processor

Memomaker is a simple word processor, ideal for producing brief documents. Should a fully featured word processor be required, then WordStar/MailMerge/CorrectStar may be used in addition. Files from each system are fully compatible and may be edited by the other software

One of Memomaker's uses is to create an alarm schedule file, either personal message alarms or program run (execution) alarms. Up to eight of these can be entered in the file. Memomaker is still a versatile word processor, having all the block manipulation, cut and pasting, formatting, file handling etc associated with any useful word processor program.

Terminal Emulator enables the HP110 to communicate with other computers with either the built-in modem, serial interface, or HP-IL interface. Rather than manually perform the log-on procedure when establishing a link with another computer, the log-on information may be stored together with a phone number in a terminal configuration file.

This file will then be automatically executed by the HP110. It not only has the ability to place calls to other computers, but it can answer calls as well. An auto-answer file is created containing the answering instructions. External modems may be used in place of the built-in direct-connect modem, and may be either direct-connect or acoustic modems. Files may be transferred to and from other computers.

MS-DOS version 2.11 is resident in the machine, but I did not have the disk drive to experiment and will refrain from commenting, other than to say I thought the documentation quite good.

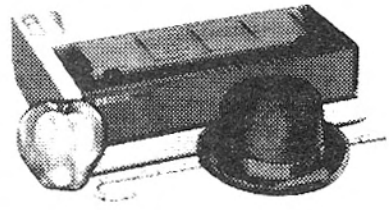
Lotus 1-2 3 rates an article on its own, and I refer you to John Vargo's review in *Bits & Bytes* (September 1984). It is such a comprehensive

Microcomputer summary

Name:	Hewlett-Packard HP110 Portable.
CPU:	8086 16-bit, 5.33 Mhz clock speed.
Memory:	384K bytes CMOS ROM; 272K bytes CMOS RAM; up to 256K bytes user memory; up to 176K bytes RAM disk.
Display:	16 x 80 column flip-up LCD display; 128 x 480 pixel bit-mapped graphics; keyboard contrast control.
Input/Output:	Hewlett-Packard interface loop (HP-IL); RS232c v.24/v.28 serial interface; 300-baud modem.
ROM language:	Microsoft BASIC.
ROM software:	MS-DOS version 2.11; PAM (Personal Applications Manager); Lotus 1-2-3; Memomaker word processor; Terminal Emulator.
Cost:	$NZ7409.
Options:	Portable 3.5in single microfloppy disk drive $1951; battery pack for disk drive $141; box of 10 3.5in disks $124; HP150 Extended I/O interface (includes Centronics parallel) $366; HP-IL interface to IBM PC & IBM XT $259; portable Thinkjet printer (HP-IL interface) $1212; serial daisywheel printer $4117; RS232 printer cable $158; RS232 modem cable $112; Centronics cable $147; leather carrying case $158.
Ratings (5 highest):	Documentation 5; ease of use 5; language 3; expansion 4; value for money 3; support 5.

(Review unit supplied by Hewlett Packard NZ Ltd)

Apple and IBM Owners Join the Jet Set



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spreadsheet-business graphics-data management system that the range of data manipulation commands and facilities becomes overwhelming once you start following the command tree structures around to see just what can be done. I do not intend to elaborate on the capabilities of Lotus 1-2-3, but suffice it to say it is a good choice.

Other software is of course available: Multiplan, WordStar, dBASE II, Microsoft Series 100/BASIC, GW-BASIC, Pascal, Microsoft Chart for presentation graphics, the great adventure games Zork I-III, and many more. Under the MS-DOS directory, I found an MS-DOS BASIC Version 5.28, and while I have no love for Microsoft's BASIC, I did have a bit of a tinker with it, in spite of not having the BASIC manual.

As I could not find a way of returning from BASIC to PAM, I investigated a removable panel on the rear of the machine and discovered a minute system reset switch which does the trick admirably! Why it has to be hidden away I don't know – obviously HP is fully confident the average user will never need to use it.

Using the HP110 is delightfully easy. Navigating around the software can be done by pressing function keys -- each new access layer redefines those keys and displays their new functions, defaul first. This is a very necessar software refinement for anything pretending to be "user friendly" these days.

Additional software may be "installed" quickly and easily by the user, and will then appear as part of the PAM menu screen. Very comprehensive "help" facilities are provided; every major command has an associated help screen explaining all the sub-commands – just like having a built-in reference manual.

I found the LCD display very fast -- a couple of other lap machines I have used were dreadfully slow to output a screen, and made using a spreadsheet a frustrating process. Whether the problem was a software or hardware failing, I could not say. However, no such delay exists with the HP-110 – it is almost as fast as using a normal monitor.

The only criticism I have of the display - and it is probably as much the fault of the program – is that when graphing Lotus 1-2-3 data, pie charts are compressed too much vertically, and if labels are included on the display, chaos ensues when more than a few data fields are graphed.

In common with most other lap portables, the display switches off after a present interval – in the HP's case, the delay is user-changeable from the system configuration option. Touch any key and the display switches on again. Battery use seems to be extremely miserly – up to two weeks' normal use off a charge, and at 20 per cent charge, you are reminded on the PAM display to recharge it. At five per cent charge, the system locks you out, but you are given several weeks to recharge before data loss starts to occur.

Inter-computer communication is well provided for, either by the in-built 300 baud direct connect modem, or via the RS232 interface to your own modem. While I did not try the modem, I did connect the HP to my Microbee via the RS232 port and not having the HP "Thinkjet" printer, "printed" through the Microbee onto my own monitor screen. Provision is made to link directly with the HP150 Touchscreen computer and the IBM PC, using the optional interface converters.

The companion printer and disk drives are quite remarkable; both are designed to run off batteries, making the whole system truly portable. The

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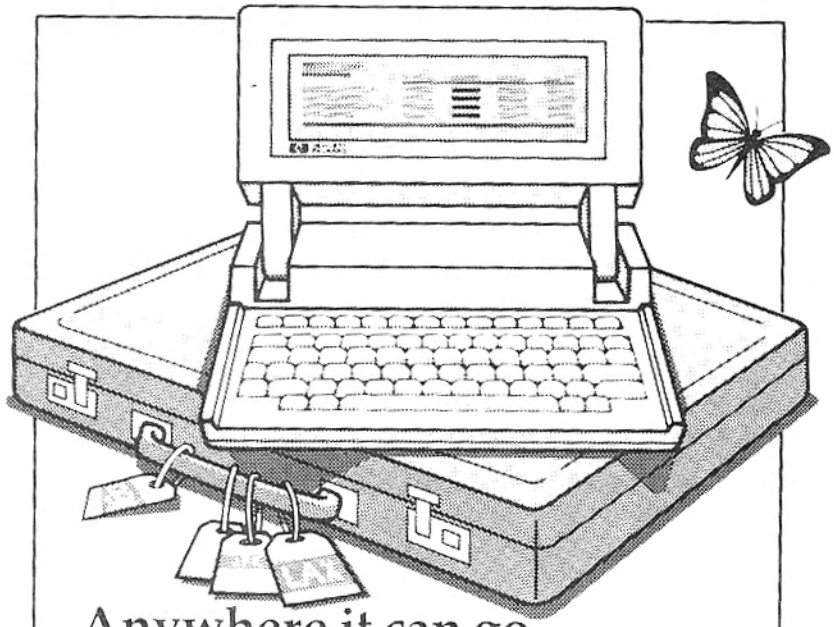

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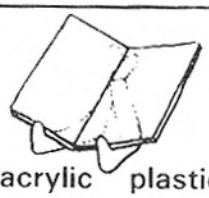

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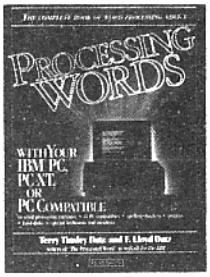

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KAYPRO 10

An eight-bit total package

By John Slane

The Kaypro 10 is a transportable, hard disk, Z-80A, 64K computer. Other Kaypro models have been described previously in *Bits and Bytes*. What makes the Kaypro interesting to look at again is the offering of the total package – computer plus an enormous selection of software.

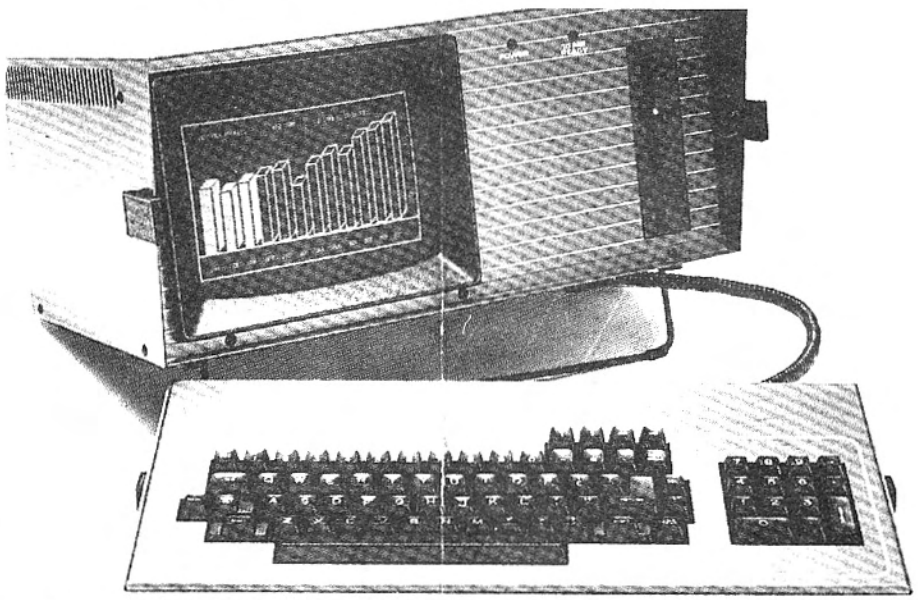
Anyone contemplating spending several thousand dollars on a computer will clearly have specific purposes and needs in mind – any one or a combination of business accounting, management, inventory and stock control, data storage and processing, financial modelling, word processing, number-crunching, communications, education, problem solving and other tasks. The potential buyer will also have an idea of the storage capacity and speed of the system and whether future expansion is likely.

With all the publicity and interest in the 16-bit machines (and perhaps the prospect of owning an IBM) maybe the solid eight-bit CP/M workhorses are losing the attention they might still deserve. Certainly, some of the manufacturers and suppliers seem to think there is a chance they will have their eight-bit products ignored.

It's not from a sense of altruism that "free" software is offered with their computers – it's to entice you to buy. And who wins from the war of the software hampers? For once, I'm pleased to report, it's the customer!

A catch for the unwary

However, there is a catch for the unwary. It's not as simple as looking at the computer's price tag and counting the number of software programs offered. It will be well worth the trouble to find out what the programs are like and to try to judge whether each one in the bundle will really be useful to you.



The Kaypro 10

An impressively large software bundle may, in fact, contain programs which are poorly designed, hard to use and of limited application (in spite of a fancy-sounding title). Manufacturers/distributors will be tempted to buy rights as cheaply as they can – and when this is the case, some of the cheap stuff will be cheap because it is basically valueless.

These comments apply equally to software offerings with 16-bit machines, as the software packages in that area are also designed to attract buyers to one IBM clone rather than a competitor.

As a rule-of-thumb to start, look for well-known software names. If they are well known because they have good reputations, you can be reasonably confident. However, be careful of the "sound-alikes". They may be great. Or they may be very inferior versions of a respectable original.

Remember that CP/M is showing its age badly. Raw CP/M has never heard of humans so humans have to think and behave like machines to operate it. A substantial amount of CP/M software shares this fault – it is mindlessly mechanical, linear, unnecessarily recursive and basically just stupid. Good CP/M software insulates the user from the operating system and provides economical efficient processing oriented to the real needs of the user. (Some of the 16 bit software is starting to achieve this very impressively.)

Another serious problem is that software may not be customised to the particular machine with which it is bundled. The purchaser may be paying a premium for a special keyboard, say one with cursor keys but then finds the software still thinks cursors have to be moved with the E, S, D, X, keys! The software manual may have the computer's name on the cover, but that doesn't necessarily mean the two have been matched.

It was with these matters in mind that I was interested in looking at what the Kaypro 10 had to offer.

First, the machine itself.

Competitor for the Osborne

Kaypro was the first serious competitor to the revolutionary Osborne, the first cheap portable to be offered with bundled software. Kaypro mimicked the Osborne format but decided it would be worth having a bigger case to offer a larger VDU.

I had not used the Kaypro before and was pleased to find the 9in screen, coupled with text produced by an outstandingly clear and attractive character generator, was

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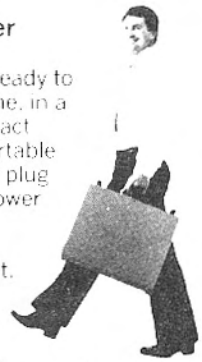
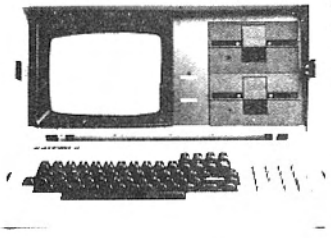


The Kaypro II is ready to go anywhere, anytime, in a single, rugged compact carry case, easily portable at only 11.8 kg. Just plug into any standard power socket for instant computing power whenever you need it.

Big Keyboard Built-in Monitor.

With the Kaypro II, you get a key pad that is normally found only on much more expensive word processing equipment. The keys are sculptured for your handling convenience and the numerical pad includes 14 keys with its own return. Dedicated cursor control keys give you quick access to any part of your display data or text.



And what a display! The large 9" diagonal built-in monitor features green phosphor characters in an 80 column by 24 row display for comfortable viewing.

The Kaypro II is a complete computer in itself. No extras are needed.

Hard to beat Software.

The Kaypro II System represents sensational value, with a FREE package of software included. An instruction disc and training manuals are provided and the CP/M® program provides a disc operating system which supports Perfect Writer and allows access to a world of software that is standard in today's market.

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legible without any strain. However, the green phosphor has a slow decay and I found the ghosting annoying. Surely there must be a happy medium?

Graphics capability is available on this model through pixel addressing. But unless you are a very enthusiastic and competent programmer, you would probably find the graphics process too complicated to really be useful.

All switches, controls and ports are on the rear of the case — inconvenient for reset, power on/off, and plugging in keyboard. However, it's probably very convenient for the manufacturer. The front of the unit is consequently very bare and unattractive; the case and clip-on keyboard are robustly sheathed in metal. Total carrying weight is reasonable and it is a genuine transportable.

The keyboard is well designed and well constructed except that all the keys squeak. This was driving me slowly mad until I discovered in an obscure part of one of the 21 manuals that the squeak was a "beep" and could be turned off from BASIC. I did. After that, just about any I/O or reset turned the darn thing back on again! A zap would fix this — ask your dealer. It would be nice if the dealer could also quieten the roar of the fan, but I wouldn't be too optimistic.

I found the Kaypro 10 hard disk and single floppy reliable and efficient. A variety of tests showed the Kaypro 10 benchmark times compared favourably with 16-bit machines I have tried (and reported on in *Bits and Bytes*), except that I could not store records in a random file if they were longer than the default value of 128 bytes. (The reason for this had not been resolved at the time of writing.)

In summary, the machine itself performed well. A "hard" reset meant you could always access the power-down routine to park the hard disk heads for secure transport before turning off the power.

Apart from CP/M 2.2 and BASIC-80, 10 major software programs and a suite of games are included in the Kaypro 10 post-devaluation price of $7255. On a head count, that's impressive! The machine comes with all these installed on the hard disk, although inexplicably scattered through nine user areas. (The consequence of this is that if you are in a user area which does not include the program you want, the computer is too dumb to go and look for it — you have to look for it yourself. See what I mean about CP/M.)

A separate package encloses 21 supporting manuals plus five quick reference command cards. A six month (renewable) subscription to the company's user magazine, *Profiles*, is also provided.

The first thing that really impressed me was the final result of the auto start-up routine. A selected menu was provided, but this had very little in common with conventional menu presentations. A cursor-driven highlight moves down a single column of choices. As each choice is highlighted, a full description of what that program is about appears on the far right-hand side of the screen.

A choice selected by the right-arrow moves out of its original column, rises to the top, then unfolds a sub-menu. A new description for each of these choices appears on the right as you move down the new column. "RETURN" actions the choice. Left-arrow folds up the sub-menu and parks everything back in the original slot in the left column.

The last time I saw such an elegant process was when using the new Visi On software (for 16-bit and 500K RAM!).

But the best part is that by using a text editor, you can customise this dynamic menu presentation for your own selection of programs and your verbal descriptions of them. It can only be described as brilliant.

Word processing, data management, calc sheet and mailing lists/labels are generally the selected essentials in bundled software, and all these are represented in the Kaypro 10 package and listed in the data box.

WordStar is a very well known and generally held to be a good example of a processing program that will do just about everything. But it is complicated to use. Users tend to be polarised — they either love it or hate it. However, the spelling checker program, The Word Plus, which works in WordStar, is outstanding and vastly superior to any other spelling checker I have used.

The author, Wayne Holder, earns my utmost respect and admiration for an excellent manual and a meticulously developed program. Spelling correction, look-up, find, anagram, hyphenation, homonyms, etc, are all fast, efficient and accurate. Solving crossword puzzles will never be the same again if you've got access to The Word Plus

Two other programs are worth special mention. The first is dBASE II. This is really an industry standard in program generators for data management and although complicated and requiring a great deal of study to use fully, it is a very significant program to be included as part of a "bundle".

The second is Superterm, a terminal emulation program for communication such as through a modem. This is logically very appropriate for a transportable computer.

The other software I found just

Microcomputer summary

Name:	Kaypro 10.
Manufacturer:	Kaypro Corp. California.
Microprocessor:	Z-80A 8-bit.
Clock speed:	4.0 MHz.
RAM:	64K.
User RAM:	About 30K in Basic.
Input/Output:	Parallel Centronics for printer, 2 RS-232C serial for serial printer and modem.
Keyboard:	Detached unit. 72 keys, typewriter style; the 14 key numeric pad can be redefined into user programmable keys.
Display:	25 x 80 on a 9in screen.
Languages:	Everything that is available for CP/M 2.2; comes provided with Basic-80, C-Basic, S-Basic.
Graphics:	100 x 160 pixel resolution.
Sound:	Inbuilt speaker; beep only.
Cost:	Kaypro 10 with everything included: $7255.
Software:	The Word Plus (spelling), Microplan (spreadsheet), Superterm (to use modem or feed into another terminal), WordStar (word processing), Mailmerge (file merge with WordStar), Infostar (data base management), Calcstar (spreadsheet), dBase II (data base management).
Reviewer's ratings (5 of the highest):	Ease of use 3; documentation 4; languages 5; support 5; expansion 5; value for money 5.

(Review machine supplied by Hitec Micro, Ltd, Customs St, Auckland.)

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mediocre to adequate. When I find I have done something I need to back out of, I am not very impressed by being required to type in: "CTRL J, CTRL C, CTRL C, A, Y, CTRL C" to recover. One of the routines in Infostar required me to do that!

Very impressed overall

Overall, I was very favourably impressed with the hardware and software in the Kaypro 10 package and consider it good value for money — remembering that for what you pay, the Kaypro 10 is up and going without buying anything additional (VDU is included, for example).

The same software is offered on the next model down, the Kaypro 4, which runs two 400K floppies for about $2000 less. I prefer the hard disk version simply because we are working with only an eight-bit processor and 64K.

Because of the limitations of memory, large programs and large amounts of data have to be broken into manageable chunks and loaded in and out of disk storage. As hard disk access is many times faster than for floppies, the speed factor is an important compensation for the small RAM available.

This is where the 16-bitters have got it all over the eight-bit processors. With more generous addressable RAM, spreadsheets can be larger, documents larger and still within immediate access, discards can be temporarily held in case a change of mind wants to bring them back, sub-programs can be tucked in RAM for instantaneous access, large in-memory sorts can be done, spooling implemented, and so on.

Most of these facilities can be approximated through moving information in and out of permanent storage — less likely to be annoyingly slow when the permanent storage is hard disk.

It finally comes down to what a user wants to do and how he/she wants it done. Yes, it is worth more than a glance at the eight-bits before rushing up to 16. But a demonstration of your application is probably essential before finally deciding.

HP on the up

The Hewlett-Packard Company has reported a 47 percent increase in net earnings and a 35 percent increase in net sales for the third quarter of the company's 1984 year, ending July 31.

Learning 'breakthrough' claimed

By Pat Churchill

Progeni has launched its new computer-based learning system, Poly 2 and its new Fourth Generation learning software, Forge.

Forge will allow users to apply the concepts of Fourth Generation learning without becoming programmers or technicians, says Progeni's managing director, Perce Harpham.

"Forge is a breakthrough that will change, indeed it will virtually create, the learning industry," he said at the Poly 2/Forge launch in Wellington in September.

"The Forge product is an integrated set of five modular units dealing with instruction design, authoring, delivery, management and sequencing.

While authoring languages on micros are appearing with increasing frequency, and programs have also become available to help teachers manage instruction, Progeni says Forge has distinguishing factors:

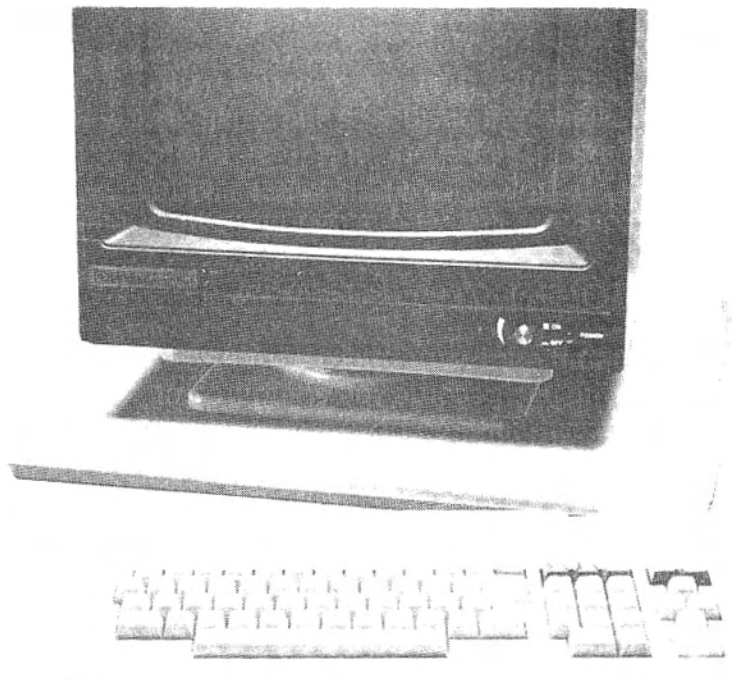
- There is no comparable system offering an instructional design editor.
- No comparable system offers Forge's modularity or the capability of the system as a whole to provide a capacity for interactive optimisation of instruction.
- The instructional sequence editor is the integrating factor. It also makes it possible for the teacher to use any kind of instructional methodology.

These innovations have significance, according to Progeni. With a mounting demand for training in the new technologies, those employed as trainers might not have the skills. Those with the skills might not be trainers and might be in such demand they could not be spared for training.

Time taken to prepare computer based training is immense – perhaps 100 hours to develop an hour of instruction, even with authoring languages. Forge's authoring editors enable a person with good typing skills to author at the rate of 20:1 or better.

According to Dr John Tiffin, an instructional technologist recruited by Progeni, the Forge authoring editors mean there is no more to putting the content into computer-based training than there is to using a word processor.

"But it's not just a question of writing text," he said. "There is a graphics editor and a music and sound editor. You can call up a template for setting a test and arrange for it to be marked and the marks collated. You can introduce other media and edit how they are to be used."



The Poly 2 learning system

Dr Tiffin said a learner's progress could be charted by the management module. This could point up the student who was not doing well. It might also show everyone was having trouble learning a particular thing. This could point out the fault was not with the learners but with the instructional design.

"The management module allows us to see when a failure in learning is the student's fault and when it is the fault of the instruction. Moreover, since we have a precise design, we can see precisely where the instruction is wrong."

He described this as a process of interactive optimisation.

The name, Forge, comes from Forth Generation learning approaches.

Dick Greenbank, who is in charge of the Poly 2 project, said that while all Poly 1 courseware and developments would run on the new system, Poly 2 was built to serve a broader market.

Mr Greenbank said the most advanced electronic and learning technologies had been integrated in the Poly 2 system.

Up to 32 units can share disk memory and peripherals. Each Poly 2 features 128K of memory, with a portion of this arranged as Ramdisk to provide almost instantaneous response to user requirements for courseware, graphics, data and files.

Poly 2 can also incorporate other media including video tape, laser video disk, speech synthesis and computer managed audio and slides to provide more explicit simulation.

With the dual operating system capability of Progeni's Proteus computer, the Poly 2 also provides access to commercial and business software for use with the CP/M operating system.

The new system has a detachable keyboard, full QWERTY with upper and lower case, 32 keys, function programmable. There are six special function keys – four cursor control and two dual function editing. There are a further six learning support keys and a control key.

The price is $2900 for processor, keyboard and monitor. An optional high resolution monitor is available.

Symphony – successor to Lotus 1-2-3

By John J. Vargo

This is the third in a series of articles on integrated software involving the use of Windows. Last month, the Visi On package was reviewed; this month, it's Symphony. A review of Open Access and Framework will follow next month.

Symphony, by Lotus Development Corporation, is a fully integrated package incorporating spreadsheet, graphics, word-processing, database management, and communications applications. Integration in this package involves both the operating environment as well as the individual applications, all of which are included in the purchase price.

This program is the successor (or upgrade) to Lotus 1-2-3, one of the most successful spreadsheet programs integrating graphics and some database functions. This new offering by Lotus is a major upgrade to the previous product with the addition of a large number of new features.

Symphony's features are truly impressive, allowing a flexibility in the development of specific applications that would be hard to match with most standalone packages. Of course, all this flexibility has its price in terms of complexity, and unfortunately this will mean a longer learning curve for the new user.

When starting Symphony, you are placed in the spreadsheet environment. In fact, Symphony does all of its applications on the "canvas" of a large background worksheet. The maximum size of the worksheet is 256 columns by 8192 rows. Although this is the theoretical maximum, the real limit is far smaller, bound by the amount of memory available.

Symphony follows the Lotus 1-2-3 tradition of requiring all of a worksheet to be resident in RAM at the same time. This makes for a very fast working environment, but it also causes unnecessary limitations in the size of applications that can be developed.

For a fairly simple data base with name, address, city, country and phone number, you probably cannot expect to have more than 2000 records on a 512K RAM IBM-PC. Naturally, if you are going to add a few form letters, spreadsheet analysis, graphics and communications applications to the database in this integrated environment the maximum size of the database will shrink accordingly.

It is possible to change the working environment from the initial spreadsheet by selecting from a menu presented when the TYPE key (alt-F10) is hit. The menu appears this way:

Using the cursor movement keys (or the initial letter of your selection) you make your choice, and on hitting the (RTN) key, you are in a new environment. The environment in which you are working determines which commands are available to you.

Two types of main menus are used in Symphony. When the F9 key is hit, you

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enter the SERVICES menu which allows you access to a common pool of commands for file access, printing, reconfiguration, and window manipulation. If on the other hand, you hit the F10 key, this brings up the main menu for the environment in which you are currently working, with appropriate commands for spreadsheet, word processing, graphics, etc.

Symphony uses environment, and more than one portion of a document - increasing flexibility in viewing and manipulating data.

Because of the complexity of this package, the use of the windows is not totally intuitive, and new users are recommended to acquaint themselves thoroughly with the individual working environments before starting to use the windows. Great care is also required in "mapping" out the application you would like to create, limiting each working environment to a particular portion of the background worksheet, otherwise confusion and damage to your data may occur in the most unexpected ways when moving around in the windows and different environments.

The SHEET environment is very similar to Lotus 1 2 3 and most experienced 1-2-3 users will adjust very quickly. This spreadsheet supports all the usual functions including variable column widths, replication of cell contents, moving contents, special scientific and business functions including internal rate of return and statistical functions like average, mean, and standard deviation.

The command menu is quite easy to work from and allows direct access into the graphics mode, so it is not necessary to change environments to generate graphs. In addition, Symphony adds some new and welcome features. Among the most notable are:

- PASSWORD controlled access to worksheets and hidden cells which increases the security of the worksheet, both globally and within portions of the worksheet.
- STRING handling functions largely lacking in 1 2 3.
- MACRO LEARN which allows the creation of macro command files in an automatic mode. If you are in the learn mode, the package will automatically store every key stroke as you issue commands to format, copy, place telephone calls, extract and analyse data, etc. This is a great improvement over working through a problem you would like to automate, furiously writing down the necessary key strokes, then going back and typing in the macro in laborious detail. A great way to creat some automation in your spreadsheets!
- TIME ARITHMETIC functions which should allow the automatic execution of macros based on the time of day, for example auto dial the main office and transmit the day's transactions.

In total, the Symphony spreadsheet is one of the most powerful and comprehensive I have seen and although it runs a bit more slowly than Lotus 1-2-3, it is faster than much of the competition.

Good word processing

The DOC working environment provides good word processing capabilities. The usual functions for moving, inserting, and finding text are supported and the ability to assign a NAME to a particular format line allows easy change of format. Special print characters are supported including bold, underline, italics, subscript, superscript, and combinations of these.

These are all supported in a fashion similar to WordStar. First, you press (Ctrl) B for beginning point of special affects, then you press another key to specify the particular feature or combination of features that you would like. These characters appear on screen indicating which special features are active, then you press (Ctrl) E to end the special effects.

Since the underlying principle of all Symphony applications is a spreadsheet, word processing is really the manipulation of a series of long labels occupying one row each. However, this peculiarity of the package fades into the background quickly after using it for a short while.

If you would like to incorporate some data into your document, a few key strokes will move you to the SHEET environment and then you can insert formulas or copy data from the underlying worksheet. These inserted numbers will automatically be updated whenever any data is changed in the related spreadsheet or database. A few more key strokes and you are back in the DOC mode and you can carry on with word processing. The ability to include spreadsheet data in a document with automatic updating is a real plus for many applications.

Another useful feature is Symphony's ability to name store and retrieve boilerplate text from both the current worksheet as well as from separate files. In addition, it is possible to assign a keyboard macro to often-used phrases and retrieve the text with a few key strokes.

The special function keys include those for centring text (Alt) F4, for taking an active window and blowing it up to full screen size (the zoom key (Alt) F6), and others which are used in the five different working environments. In total, there are 20 special function key assignments, incorporating F1 to F10 and (Alt) F1 to (Alt) F10. This could prove a bit confusing except for the fact that Symphony comes with a key template which fits over the special function keys, clearly describing the functions they perform.

The editing features work very well, allowing speed highlighting of a range of text to be moved, deleted and so forth. When in edit mode, you may use either the cursor control keys or simply type the last character you would like to include in the range and the highlight automatically jumps to the next occurence of that character. For example, if you would like to delete a sentence when in delete mode, just type a period and the highlight jumps to the end of the sentence.

Among the weaknesses of the word processor is the fact reformatting of sections of text does not happen automatically but must be specifically commanded. I found the best bet if you were editing a large document was to make all your editorial changes, then reformat the entire document. This can be done all at once. Although you may have to wait a moment while reformatting of the document takes place, it does save the frustration of finding you have not reformatted a portion after the "final" print-out has been run!!

Two new graphs

The Graph working environment basically allows access to an expanded version of Lotus 1 2 3 graphics. In addition to the pie chart line graph, bar chart, stacked bar and X-Y graphs the high-low-close open graph for use with stock market prices, and the pie chart with exploded wedges and colour.

One of the Lotus 1-2-3 features which took a bit of getting used to was the fact that to produce a hard copy of a graph, it was necessary to save the graph to a special print file. You then exit 1-2-3 and go to the printgraph program, specify details of plotter/printer type, type face and colours required etc, then print your graph.

Unfortunately Symphony continues with this approach. Given the size and complexity of the existing program, this fault can be forgiven. In addition, Symphony does not provide for mixing hard copy documents or spreadsheet reports with graphics. This drawback is offset by Symphony's outstanding graphs produced on a wide range of printers and plotters.

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Database management

One of the most interesting and useful features of Symphony is the database management provided in the FORM environment. Using a simple process of database definition involving typing of labels (field names) down a row together with the field type and the field width, Symphony sets up a database, an input form, and a basic report format.

The database is managed using the input form to add, delete, retrieve, and modify individual records, allowing searches using "query by example". When you select the search mode, you are presented with a blank input form. You fill in any field with your search criteria, and Symphony quickly retrieves matching records. It is possible to output selected records to a specified range and print them out in a flexible report format.

Matching criteria include wild card characters such as "*" to specify all of a similar type, and "?" to indicate any character would be acceptable at that location in the search criteria.

As with Lotus 1 2 3, the statistical functions are very good and you will have to go some distance to find a stand-alone database system with as extensive calculation capabilities.

It must be admitted that use of the FORM environment can be deceiving in its apparent simplicity of use. Underlying the surface simplicity is a rather complex system that can be cause for a great deal of frustration if you do something wrong.

I inadvertantly deleted part of a report range for headings of a database report and this was not discovered until I ran a copy of the report on the printer. Not only was there no heading but the format of the report was set to a default of nine character wide fields. This made mincemeat of my report, rendering it almost unreadable (since many of the fields were 15 characters wide). It took me an hour with the manual to figure out what I had done wrong, and correct my mistake.

Too much for the new user

This brings up an interesting point about integrated software. A major impetus for these new integrated windowing packages is ostensibly to make it easier for users to access a wider range of application packages without the problems of different menu structures, command types etc, etc. But in some cases, this process of integration has spawned software so comprehensive and flexible the complexity of the program is more than the typical new user can handle.

It would seem to make sense to release these complex programs in a preconfigured state that would not allow new users to make the most common mistakes, but would rather teach them new features only as they require them. This would provide a truly interactive tutorial and help function, superior to the typical rote tutorial, and help files.

This is, of course, a level of software sophistication one step beyond where we are now. But it seems to be a necessary next step if software is to continue to become more comprehensive without becoming mindboggling.

Symphony's COMM environment provides for very comprehensive asynchronous communications, accomplishing this function as well as most standalone packages. Data may be sent or received automatically using the autodial and autoanswer functions, with data capable of being captured directly into a worksheet.

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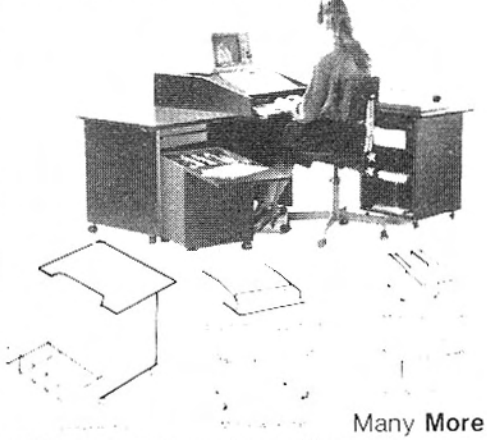

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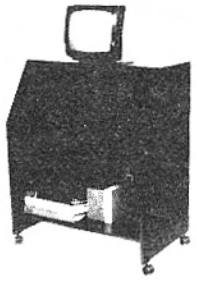

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As with all of Symphony's environments settings, sheets are used to modify the working environment to suit a particular application. Elements which are variable are indicated in the main settings sheet and menu below:

Speed and type of transmission

Interface	Phone	Terminal	Send	Break	Handshaking	Capture	Login	Name	MENU Quit
Interface			Terminal			Send			
Baud:		110	Screen:		Window	EOL:			/013
Parity:		None	Echo:		No	Delay			0
Length:		7	Linefeed:		No	Response:			
Stop bits:		1	Backspace:		Backspace	Break:			60
Phone			Wrap:		Yes	Handshaking			
Type:		Pulse	Delay:		0	Inbound:			Yes
Dial:		60	Translation:			Outbound:			Yes
Answer:		15	(none)			Capture:			
Number:						Range:			No
						Printer:			No

Communications Settings: C:/INITIAL.CCF

Settings sheets may be created for each particular application, and even multiple settings sheets if it were necessary to communicate with a number of different remote sites with different configurations. Terminal emulation for many standard terminals are supported such as the DEC VT 100.

Switching with windows

Symphony uses windows to allow switching from one working environment, or section of the underlying worksheet, to another with speed and ease. The process for accomplishing this involves creating a series of windows for each new application. For example, you might create:

1. a FORM window in which to enter and retrieve data from a data base;
2. a SHEET window in which to capture and analyse data retrieved from the data base;
3. a DOC window in which to prepare a standard letter with extracted data from the analysed data;
4. and a COMM window to send the letter to a remote site for distribution.

The size and placement of each window on the CRT screen is entirely at the discretion of the user. Windows may each be full size (taking up the entire screen), or smaller, allowing overlapping and viewing of more than one window at a time.

Individual windows are treated like sheets of paper on a desktop, and when you press the "window" key, the next "piece of paper" on the stack is moved to the top of the pile. If that window happens to be fullsize, all the underlying windows disappear. At first, this is a bit disorientating, but adjustment comes fairly quickly.

You can move to a new window by either cycling through the stack until you find the one you are looking for (like shuffling through a stack of paper on your desktop), or move straight to a particular window with the Window Use command.

With the use of the special macro functions, it is possible to create programs, including specialised menus for the execution of desired functions. I suspect many such special applications will become available, developed by the diligent Symphony officiado for the less diligently inclined. The special commands within the macro language allow: loops; subprograms; ring the bell; testing of success of communication exchange with other computer; menu selection and execution; automatic placement of phone calls; and automatic execution of all regular Symphony commands.

Symphony comes in a hard plastic case with two compartments, one for the disk storage container (a separate hinged hard plastic container capable of holding eight floppy discs, function key template, and quick reference guide), and the other to hold the three manuals which come with the package.

The manuals include: an introduction, and installation guide, a how-to manual, and a reference manual.

Each manual is very professionally presented, as one would expect from Lotus Development Corporation, with an index and three-colour illustrations liberally sprinkled throughout. The manuals have been developed primarily with the new user in mind. Generally good indexing makes them easy to use and helpful to novices as well as the more experienced.

Symphony is an extremely comprehensive and complex integrated program. There is no quesion about its potential to deliver tremendous problem-solving power into the hands of users. The only real question is whether users will be diligent enough to uncover the potential among the complexity.

Computer marathon

Wang Computers has established a community foundation through which the company intends sponsoring a number of cultural and sports activities.

Its first move is the underwriting of the Wang NZ marathon (previously the City of Auckland marathon) for the next three years.

Sandy's best yet

By Carol Miles

Officially, it's a best buy! Sandys word processor has evolved over the years — and the latest program is the best yet. I first used it as Version 1.8, dated 19/6/80, then (oddly enough) as Version 1.7.7, dated 1/1/83. Version 1.8 2e 80, dated 9/12/83, has the latest pedigree, and is by far the best.

The Education Department has confirmed in a recent report that this version is the best value for money of a number of tested word processors for the Apple IIe.

This new word/test processor fits the "new" Apple like a glove, using all of its keys. Some keys seemed to have no function with earlier software. The TAB key, the Delete key, underline, tilde, etc. now all function.

With the introduction of the new Apple IIc, 12VDC portable machine with an 80-column, 24-line liquid crystal display, Sandys version 1.8 can be extended unchanged to the new hardware. (The IIc has the same keyboard as the IIe.)

Those with Apple workalikes can stick with Version 1.7.7, and still have an excellent wordprocessor. Since Sandys is a single-load program, computer users with only

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one disk drive are not disadvantaged.

Perhaps the first thing the experienced user notices is that the DELETE or key now works more like a typewriter's TAB key. The cursor positively zooms through text. SAVE and LOAD are delightfully quick, as is shifting from the start to the end of the file.

The GRAB function, used to shift blocks of text, once could handle only one RAM page (256 bytes). Now it can handle two text pages (4096 bytes), and has become a very "powerful" feature when composing text at the keyboard.

Stretches as needed

A "Softspace", which will stretch as needed, is a clever new feature found on few other word processors. Deletion can now be done whole paragraphs at a time.

A glossary, or "macro" facility has been added too so that blocks of often used text such as "Dear Sir or Madam" can be entered with two keystrokes.

Sandys could always handle Applesoft text and binary files easily, but now has some new special features such as a PRINT TO DISK which lets you prepare and store preformatted files. These files can interface with (for example) Gutenberg, another word processor.

It is unusual indeed to find any program which provides special features so that another similar program will be able to work with it. (The Gutenberg program is a much more expensive word processor with advanced formatting features.)

Sandys is now much faster than before. James Donald, the author of SANDYS, also wrote FastDOS, a high-speed replacement for DOS 3.3. His concern for speed shows, for he has introduced many speed-up techniques. The cursor is fast to start, and speeds up the longer you hold down an arrow key. Vertical scrolling is smoother as well as faster. Many embedded commands, which used to require two keystrokes, now require only one.

The Open Apple and Closed Apple keys are used extensively, and perform many of the functions previously lumbered upon an overworked CTRL key. In some cases, perhaps because of my current unfamiliarity with this latest version, I find the cursor movements just a mite too fast.

Turn to page 64

Lower cost networking

Interested in an IBM PC for half price? Well if you are also interested in local area networks Skellerup Microsystems can offer you the next best thing to an IBM PC at approximately half the price.

It's called a PC Terminal, a microcomputer that fully emulates the feature, speed and power of the IBM PC when linked to it using a local area to network called PCnet (which not surprisingly Skellerup Microsystems also sell).

PCnet is a popular and relatively inexpensive bus-structured network that links PCs with one another and any number of peripherals. Printers, modems, floppy and hard disks, and even internal memory can be shared among the networked PCs. Adding a PC to PCnet involves buying a network interface board, plugging it into the PC, and turning on the power. The network is compatible with all IBM software – a further convenience and money saver. (IBM's own local area network is expected to take at least another year to reach New Zealand).

So why PC Terminals? The answer is now, instead of buying another IBM PC, costing around $9000 when you want to add another station to your network, you can buy a PC Terminal at $5580 (40 per cent tax) or only $3542 for educational institutions.

You still have to have at least one IBM PC of XT in your network but up to 16 PC Terminals can be linked to one IBM PC.

What the price of a PC Terminal buys you is a network interface board (a $1498 value that would have to be added to the price of an IBM PC if you wanted to use that PC in a PCnet network) and a bare-bones computer that is PC compatible. The terminal consists of two pieces: a detachable IBM style keyboard and a CPU with a 12-inch monochrome monitor secured above on a tiltable pedestal. The CPU is a standard 8088 microprocessor; the unit also has space for Intel's high-speed number-crunching 8087 co-processor. Internal memory is 64K, expandable to 256K, and an RS-232C serial port and parallel printer port are built into the unit as well.

In keeping with its low-cost profile, the PC Terminal eschews peripheral boards or floppy disk drives. The monitor interface, for example, is built into the motherboard. If you must have floppy storage, the power supply is capable of supporting a single half-height disk drive, which fits neatly into the side of the monitor.

Part of the PC Terminal's compatibility lies in its bus – the connectors and associated wiring that allow the computer to accept plug-in circuit boards designed for the IBM PC. The PC Terminal has four IBM PC compatible interface slots. One slot is used for the network interface card; the rest can be used for additional memory, a color graphics board, or other devices. The potential for expansion is always here.

The PC Terminal

In a network environment you may never use the expansion potential of the PC Terminal, since existing resources in the network can always be tapped. As it is, the PC Terminal can be placed on a desk, hooked up to the network with a standard 70 ohm coaxial cable, and used immediately.

The PC Terminal is powerful but not very intelligent. It does have its own BIOS ROM (which, among other things, allows it to function with the network) and the requisite 8088 chip for processing; however, to be fully operational it must find its brains, namely DOS, somewhere in the network.

At power on, the PC Terminal reaches across the network and searches for a PC that has already loaded DOS into memory. The PC Terminal then copies the DOS from the other PC's memory. At this time the PC Terminal becomes a member of the network.

The important point to remember is that there must be a PC running DOS in the network from which the PC Terminal can boot. The PC in this case acts as a server, providing the PC Terminal not only the where-withal to operate but the resources as well. While the PC Terminal can process data on its own, it also supports a remote execution mode, taking control of the server PC's processors, memory, and peripherals.

Zidex for Zidex

California's Zidex has been represented here by Zidex (NZ) Ltd (P.O. Box 6501, Wellington) since July. Previously, its products were represented by Challenge Computers. The company is involved in a range of products including micrographics, microfiche readers and printers and microfilm. It also has a complete range of disks – 3½ in, 5¼ in and 8in.

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

Sorting out data

By Gordon Findlay

What is data? How is it stored in a computer? How can a computer handle names and addresses as opposed to numbers?

Most people are fairly comfortable with the idea of a computer handling numbers. After all, that's what computers were invented for. But a lot of the time computers seem to be dealing with items of information which aren't numbers at all. I have just received a letter from the tax department's computer. Lots of numbers on it, sure but there's my name, and my address. And there's a date "7 Feb 1985" — not a number although it does appear to contain numbers.

Any sort of information is called data. There are basically two types: numeric data, consisting of numbers such as measurements, prices, quantities and amounts; and non-numeric such as names, addresses, dates, part numbers, and so on.

Confusion can arise with some "numbers" which are classified as non-numeric. The address "12 Main St" includes a number; my computer has the product number, "3003", on it. But no good could come of adding, multiplying or subtracting those numbers. Nor does it make sense to "add" part number 12345 to part number 23456. These part numbers are just identifying strings of symbols.

Computers are able to handle numbers. But how can they handle names? Ultimately, all data is encoded numerically. The most common such code, at least in the world of micros, is called ASCII American Standard Code for Information Interchange. In this code, A is represented as the number 65, B as 66, and so on. Every symbol, including punctuation marks, upper and lower case letters, and even sometimes graphical symbols such as the hearts, spades and so on of a card pack, has its own number. There is room for 256 different symbols to be given a number, so we won't run out.

In this system, "Gordon" is represented internally as "71 79 82 68 79 78". I'm ignoring the fact these numbers will be stored in binary that would make the discussion too complex. Somewhere in the computer's internal instructions, there will be a mechanism for displaying characters on the screen, and this mechanism (the "character generator") knows that when a 65 is sent to it, the dots on the screen should be arranged in the shape of an A.

Even though the ASCII code is supposedly a standard, no two machines use exactly the same version of the code. For example, most machines use the codes from 0 to 127 only. The TRS80 uses higher codes, from 128 up, to represent some graphic displays. Under some circumstances, the Apple uses the codes from 128 to 255, in others the codes from 0 to 127. There are disagreements about the ordering within the code too — which should come first, upper or lower case letters? Machines differ.

Every one's a bit different

Once the information or data is encoded, the computer is able to handle it, just as any other set of numbers. But of course, it must not be allowed to try to take the square root of my name. Programming languages help by forcing programmers to decide whether a variable being manipulated is a true number, or a string. This is done in BASIC for example by putting a dollar sign at the end of a variable name which is to be a string. In Pascal, the declaration will contain the word STRING or CHAR. Any attempt to multiply strings will then result in an error being reported. The report usually is "TYPE MISMATCH ERROR" or similar.

Strings are indicated in programs by using quote marks around them. "3003" is a string, 3003 without the quotes is a number, and these two are quite different. In machine code, where the programmer doesn't have the protection of a programming language to check on what he is doing, it is all too easy to confuse the two and get the wrong answer.

Data often has its own structure. Here are four pieces of data:
"Gordon Findlay",
"Bits and Bytes",
"P.O. Box 827",
"Christchurch."

Obviously they are not unrelated. Taken separately, we have four items of information here four strings. Taken together, we have one piece of information, a name and address.

Records, fields and files

A group of items such as these form a record. Each record is one item. Within each record there are, in this case, four parts, called fields. Each field may be manipulated separately, or the whole record taken as one.

Records may also be grouped together, into files. As an example, let's take a telephone directory.

The directory is a file. Not only that, it is a sorted file, in that the records are in a particular order, designed to help find any individual one.

Each record relates to one person or firm. The record has four fields, the name, the address, the exchange and the number:

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first	second	3rd	4th	fields one record.

In more complex sets of data, fields may be nested within each other. In some bridge tournaments, each game in a round will have the same hands dealt at every table. We need to be able to store the complete details of a deal:

ONE COMPLETE DEAL

East	West	North	South	<— a record <— each hand is a field.
Spades AKJ82				
Hearts 10632	each hand has a field for each suit,			
Clubs 74	which contains the details of the cards			
Diamonds J5				

Here, each record has four fields, each of which has four sub-fields, containing the actual information.

Describing such a data structure can be very easy or very difficult, depending on the programming language used. In many of the most sophisticated languages such as Pascal, C and so on, a deal can be handled and manipulated just as one item, in the sort of language used ordinarily. In BASIC and many other of the less sophisticated languages, a deal must be represented as an array (or list) of numbers, which increases the difficulty of writing, understanding, and debugging the program immensely.

Appointment

Dr Geoffrey Smith has been appointed chief technical officer for Computer Sciences NZ Ltd. He has 18 years' experience in the data processing industry and formerly worked for Databank Systems Ltd and Philips Data Systems in the Netherlands.

User groups: a dealer's friend

By Steven Darnold

When I arrived in Blenheim recently, one of the first things I did was attend a meeting of the Marlborough Commodore Users Group. I was pleased to see a good turnout of about 30 members. Following the reading of the minutes and other formal business, there was a very useful demonstration of how to maintain datasettes and disk drives. The VIC-20 and C-64 users then split into two groups to discuss matters specific to their machines.

I was very impressed by the meeting and my only regret was that such get-togethers occur only once a month. I would prefer weekly meetings. However, it's probably wise for the group to start off slowly and increase its activities as finances and membership permit. The Marlborough group has taken the sensible step of affiliating with the Christchurch group. This enables it to receive the Christchurch newsletter and share in the Christchurch public domain library. I recommend this course to the smaller Commodore user groups.

If a town as small as Blenheim can support a healthy Commodore user group, there should be enough support in all New Zealand cities for such groups. The latest *Bits & Bytes* lists Commodore groups in Auckland, Tauranga, Hamilton, Hastings, Wanganui, Wellington, Lower Hutt, Nelson, Christchurch, Dunedin and Invercargill. This is only about half of the cities in New Zealand, and I'm astonished such places as Palmerston North and Timaru do not have local Commodore groups.

If you live in a city without a Commodore user group, I suggest you start one yourself. Hire a small hall; put up notices at all the Commodore dealers; put a small advertisement in the local newspaper and on the local radio station. You'll probably be surprised at the number of people who show up. A lot of Commodore computers have been sold in the last year, and many owners are desperate for assistance. Few dealers have the time or knowledge to help their customers overcome their difficulties. User groups have a very important role to play in helping novices come to grips with their computers. Every city of 20,000 or more people needs a Commodore user group.

Why not start your own?

Unfortunately, many dealers dislike user groups. They complain that the groups pirate commercial programs and pass them around the members, ruining the market for the dealers. This is incorrect on two counts.

First, to my knowledge, no user group in New Zealand permits the copying of commercial software at meetings. User groups often have large libraries of public domain programs – which are available to members, but they are careful to keep commercial programs out of the libraries.

Second, the market for commercial programs is so limited that few dealers will make much money out of this side of their business. The main problem is that commercial software is so ludicrously expensive in New Zealand that most Commodore users will buy only a handful of programs. No dealer is going to get rich selling programs.

It pays to encourage

The best way for dealers to make money is to encourage their customers to get deeper and deeper into computing. A keen computer user will soon be looking to buy a disk drive, printer, modem or other piece of hardware. Moreover, he or she will spend hundreds of dollars each year on magazines, blank disks and printer paper. A wise dealer will do everything he can to help customers use their computers. Every novice has problems and a little assistance can keep the computer from ending up gathering dust in the closet.

An important way for dealers to help customers is by encouraging the development of a local user group. The group will help beginners get started and allow them to share their experience and understanding. I urge dealers to look on user groups as allies, not enemies.

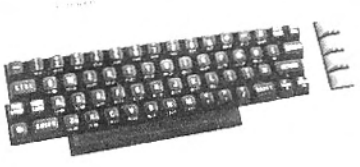
Competition

The prize for this month's competition is a tape of Dicky's Diamonds (donated by Alpine Computing). The winner will be randomly selected from among the correct entries – only one entry per person.

Your task this month is to write a program which inputs the user's date of birth and then tells him his or her age and star sign.

Send a listing of your program with your name and address to: Dicky's Contest, P.O. Box 546, Blenheim. Entries close on November 25.

HOME COMPUTER SPECIALISTS



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Requiem for the VIC-20

By Steven Darnold

The VIC 20 has been withdrawn in Britain and its replacement, the C-16, looks like being a big success in the pre-Christmas market. Although the C-16 is selling for exactly the same price as the VIC, it is a vast improvement in every way.

It has 16K of RAM, instead of the VIC's 5K. It has 40 columns instead of the VIC's 22. It has a lovely expanded BASIC and machine language monitor instead of the VIC's ancient PET BASIC.

In addition, Commodore has made an effort to get all the little things right on the C 16. The TV modulator is built into the computer; it is not a clunky external box as on the VIC. There is a built in reset button and a special HELP key. All the function keys are pre programmed and are very easy to alter. Commodore has answered nearly every criticism levelled at the VIC. The C-16 looks set to become the king of the cheap computers.

At the other end of the range, Commodore is poised to produce a 68000 computer to compete with the Apple Macintosh and the Sinclair QL. The new computer will be based on the Amiga, a computer which independent analysts say is better than the Macintosh. The Commodore Amiga is expected to sell for half the price of the Macintosh, and is bound to cause problems for both Apple and IBM.

It's good to see Commodore taking the initiative again after seemingly drifting for the last few years. The VIC-20 was long overdue for replacement, and the old Commodore business computers were simply no longer competitive. Except for the C-64, Commodore was selling yesterday's computers. Now with the C-16 and the Amiga, Commodore is making a strong bid for overall market leadership.

However, C-64 owners have nothing to fear. The C 64 has just entered its golden age and has plenty of life left. This is guaranteed by the mountain of software now available for it.

In addition, its sound and graphics capabilities are still superior to any other home computer, including the C 16. This combination of software support and technical superiority will keep the C-64 alive for many years to come.

That vital pit stop

By Steven Darnold

Car race games are popular on microcomputers. Most brands have at least one such game available; the C 64 has several. In recent issues of *Bits & Bytes*, I have reviewed Motor Mania and Pole Position. This month, I'm taking a look at Pit Stop.

Initially Pit Stop is a bit of a disappointment. The racetrack graphics and sound are pretty ordinary and compare unfavourably with the high standard set by Pole Position. Even Motor Mania has a more interesting racetrack.

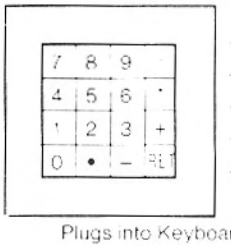
But Pit Stop is more than just a racetrack game. It introduces a whole new dimension by focussing on the pitstop. You don't just drive the car round and round the track; you also have to change the tyres and top up the petrol tank.

The pit stop part of the game is very nicely done. As your car leaves the racetrack, the perspective changes to a close up view of the pit. Your car is surrounded by four men whom you manoeuvre around the car by using the joystick. If you are running short of fuel, you manoeuvre the man holding the petrol hose so that the nozzle goes into the car's tank. If one of your tyres is dangerously worn, you manoeuvre one of the men to remove it and replace it. You'll have to hurry, though, because every second counts.

The pit stop makes the game quite interesting. Since you are striving to finish the race in the least possible time, you can't afford to make pit stops too often. Even when you've got a badly worn tyre on a nearly empty petrol tank, there's a big incentive to squeeze in an extra lap before stopping. If you are too careful, you will get a low score. If you are too optimistic, you will run out of petrol or blow a tyre. This dilemma adds spice to the game.

Overall, Pit Stop is an interesting game which requires more thinking than either Pole Position or Motor Mania. Nevertheless, the superior graphics and sound of Pole Position maintains its number one position among car race games.

COMMODORE 64 NUMERIC KEYPAD



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More selective input routines

By Tony Graham

Last month, we looked at how to create an input routine which would accept only numeric input. This month, we will expand the use of the ASC function to create other useful input routines by re-defining keys and later, the use of the ON GOTO statement.

Type in and RUN our test program.

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

Press the A key; your computer will return a value 65. Now press SHIFT and A; the answer will be 193. Try the same test with a few other keys. It becomes clear that the SHIFT key increases the answer by 128. This leads to interesting possibilities as it means we can include a line in an input routine which will change SHIFTed characters to unSHIFTed or vice versa.

Here is a line that, when added to our test program, will change SHIFTed characters to their unSHIFTed counterpart.

```
15 IF ASC(X$)>127 THEN
X$=CHR$(ASC(X$)-128)
```

In this line, the ASC value of X$ is checked to see if the value is more than 127. If it is greater, 128 is subtracted from the ASC value obtained and X$ is revalued by the use of the CHR$ function.

We can change unSHIFTed characters to their shifted counterpart by re writing the line to read:

```
15 IF ASC(X$)<128 THEN
X$=CHR$(ASC(X$)-128)
```

While many other changes are possible, we must be sure our program never attempts an ASC or CHR$ value outside the range of 0 to 255 or we will crash with an illegal quantity error.

Note that the CHR$ is the converse of the ASC function.

We will now move on to the VIC and C64 function keys which, for some reason, seem to mystify budding programmers as their sole purpose is to provide extra keys. While there are several ways to read these keys, we will keep to the ASC(X$) method.

If we RUN our test program, we will find the F1 key returns a value of 133. F2 is 134, and so on up to F8 which is 140. Because these keys return consecutive numbers, they are ideal for use with the ON-GOTO statement, as with only a few lines we can decode all function keys.

Try this routine to read only the function keys and provide eight options for the program path:

```
10 GETX$:IF X$="" THEN 10
20 A=ASC(X$)
30 IF A<133 or A>140 THEN 10
40 ON A-132 GOTO 100, 200, 300, 400,
500, 600, 700, 800
```

Line 10 is the familiar loop waiting for a key to be pressed. Line 20 gives the variable A the ASC value of X$. Line 30 checks to see if it was one of the function keys. Line 40 uses the ON-GOTO statement to select the desired program path. By subtracting 132 from the value returned by a function key, we are left with a value between 1 and 8 which selects the line we GOTO.

Lines 100, 200, 300 etc, or your own alternatives, must exist or your program will crash.

If we wish to read only five or six function keys, it is a simple matter to alter our trap in line 30 to reject the unwanted keys and reduce the GOTO options in 40.

This is probably an opportune time to mention alternative methods of selecting input.

On both the VIC and C64, a check for which key is pressed can be made by PEEK(197). If no key is pressed when the PEEK is made, the PEEK will be 64.

The value returned by each key can be found by using this program:

```
10 A=PEEK(197):IF A=64 THEN 10
20 PRINT A,CHR$(A)
30 GOTO 10
```

Note that the values returned by the PEEK are not standard ASCII or CHR$ codes.

I prefer not to use this type of keyboard decoding as it is not compatible with other Commodore models. The PET uses PEEK(151) with versions 2 & 4 BASIC but there are variations in the values returned. If however, we do use this system we can still use the IF THEN statement to accept or reject a single key or group of keys by checking the value of the PEEK.

The CHR$ function is another useful method we can use to select a given key. This can be used in a similar way to the ASC function.

Here is a routine which responds only to the RETURN key:

```
10 GET X$:IF X$=CHR$(13) THEN 90
20 GOTO 10
90 END
```

We can use the CHR$ function to detect other unprintable characters such as delete, cursor left or right, or cursor home. The purpose for which we use this or any function may well be determined by how we wish to use the information entered via the keyboard.

There is no right or wrong way to select input. Some input routines are definitely tidier than others. So if your routine works, can be easily followed and is economical in terms of memory usage, it's OK.

Missing links

We dropped a couple of symbols off the routine at the end of Tony Graham's article on "Selective Input Routines" last month. Here is the correct version.

We also missed a greater than and less than, in the paragraph beginning: "Well it works, but we still can't use a decimal point. . .

Here is the corect paragraph:

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$)< 43 OR ASC(X$)>57
THEN10
40 IF ASC(X$)=44 OR ASC(X$)=47
THEN10
```

New Macro Assembler

A new version of the Macro Assembler computer language development system for 8 and 16-bit microcomputers has been released here.

The new 1.27 version, from Microsoft, offers fast and powerful facilities usually found in higher-level languages, increasing programming efficiency and relocatable object code. It has the ability to recognise memory greater than 512K.

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Read all about them . . . the magazines

By Peter Archer

There are several types of computer magazine. These include those aimed at business users and those slanted more towards the hobbyist. Those for the hobbyist break down into two main divisions: those which specialise in one or several machines only (or in specific aspects of computing), and those that try to "cover the field".

Obviously, if a computer magazine tries to capture as wide a readership as possible by covering all types of machine, it can give only (relatively) thin coverage to each aspect of computing. Most of the English and Australian computer magazines on sale in New Zealand suffer from this "cover all bases" policy.

A couple of years ago when there was a sudden appearance of many computer magazines on our bookshop shelves, I used to buy most of these imported magzines. But now I am very discriminating; there are many magazines I never even bother to glance through any more as I know they will not contain anything of interest to me.

I honestly believe the best value for money "general" computer magazine is our own *Bits & Bytes*. It gives good coverage to Commodore machines (at least five or six pages), is relatively cheap, and its general features and articles are mainly of a high standard.

For several years now, the best American computer magazine has been *COMPUTE!* It started in the early days of microcomputing and has specialised in computers using the 6502 processor family, especially Commodore and Atari. The famous Jim Butterfield, of Toronto, has been a regular contributor and the Commodore content has always been of an excellent standard.

As the VIC-20 and then the Commodore-64 became popular, *COMPUTE!* went from strength to strength. 1983 was a real vintage year as circulation climbed from just over 100,000 to 400,000. Quality also kept climbing — the December '83 issue had almost 400 pages of top grade features (even the advertisements were interesting with new products appearing monthly).

The magazine moved into larger premises for the fifth time in five years, and at the end of 1983, appeared poised to pass *Byte* as the largest selling computer magazine in the world.

A hard act to follow

But 1983 proved a hard act to follow. Higher circulation means higher advertising rates, and as the (already high or by our standards) rates soared, advertisers dropped out. The June '84 issue had only 160 pages, but still of a very high quality and still very good value.

The other reason for the shrinkage of *COMPUTE!* was its launching of a new Commodore only magazine, *"COMPUTE's Gazette"*. This first appeared in July '83 and covers the VIC-20 and Commodore 64 only. The standard is extremely high, and it is streets ahead of all its opposition. Many of the Commodore advertisers have switched from *COMPUTE* to the *Gazette*, and circulation is now near 400,000.

I recommend *"Compute's Gazette"* as the first magazine you should buy each month followed by *COMPUTE!* It is interesting to note that the publishers of *COMPUTE!* tried to jump on the IBM bandwaggon and introduced another magazine specialising in the IBM PC and PC Jr. This has recently folded, mainly because of the dismal sales of the PC Jr.

During the past year or so many new specialist Commodore only magazines have been launched in North America and Europe. Some of these are available in New Zealand but none I have seen come up to the standard of *Compute's Gazette*. The nearest would be the English publication, *Commodore User*, which first appeared in the early VIC days under the title, *VIC Computing*, initially as a two-monthly.

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VIC

Commodore User usually contains some good meaty articles for the more advanced Commodore user. There are always plenty of software reviews, some of which are hard-hitting. I always suspect the good intentions of a publication which prints only favourable reviews; it makes me wonder is this for real or are they just avoiding upsetting their advertisers by not rubbishing any of their products? So be suspicious of magazines which publish only favourable reviews!

The next best US Commodore magazine I have seen would be *Commander* which is very heavy on reviews with an adequate amount of programs, etc. I obtained several issues direct from the USA, but have not seen it here yet. If anyone knows of it being available here, I would like to know.

Another reasonable quality US publication is *Run* which has been on sale in New Zealand for some months now. While not anywhere as good as *Compute's Gazette*, it is still reasonable value and I get the impression the publishers are really trying hard.

Closer to home, there is a magazine distributed to Commodore dealers by the New Zealand Commodore distributors. *Commodore Magazine* has been produced by (or for) Commodore Australia, but has not been popular in New Zealand because of its poor quality and excessive price.

I heard from one of my Australian user group contacts that it was to be revamped under new editorship, and the other day I received a copy of the first effort direct from the new publisher. I am quite impressed. The format is much the same, but the quality of the content is much improved.

. . . and the books

There are many books aimed at the VIC user, but the quality (and price) varies greatly.

Commodore (NZ) distributes about a dozen VIC titles to its dealers, and there are many others available from bookstores. Two of the oldest titles however, remain very good value.

Commodore's own *Programmers Reference Guide* is an essential addition to any serious VIC user's library. It is a straight reference work, not a tutorial, but contains a wealth of information. At $32, it is not cheap, but to gain the equivalent information from alternative sources would mean buying several separate titles.

If you are a beginner wanting to learn all about programming your VIC in BASIC, you still cannot do better than Commodore's *Introduction to BASIC, Part 1*. Along with part 2 which covers the more advanced aspects of BASIC, this has been around since the very early days of the VIC. But it is still the definitive tutorial on BASIC for VIC users. At a list price of $43.50, it is rather expensive, but for this you get 150 large (A4 size) pages presented in an attractive sensible format with lay-flat type spiral binding.

There are plenty of easy-to-follow, worked examples, with liberal use of flow charts. Two cassette tapes, containing 17 programs to load into your VIC, are also included. These include both demo programs and quizzes on the subject matter covered in many of the chapters. *Introduction to BASIC*, written by a professor at a Scottish university, has sold well over 100,000 copies throughout the world.

Many of the numerous computer books now on the shelves of local bookshops show signs of having been hastily produced with the main object of both the author and publisher being to cash in on this computing craze. Especially prone to this are books written by an author who produces titles for many different brands of machine. These often show signs of a "jack of all trades, master of none", with much of the content superficial and most programming examples written in "standard BASIC", and only slight coverage of each particular machine's specialised character.

Stands up to inspection

At first glance, I was afraid that *Get More From the VIC-20*, by Owen Bishop, published by Granada, fell into this category. Granada produces a whole lot of computer books in the same type of cover style and binding, etc.

But on close inspection, I found that Mr Bishop has done a good job. He has obviously taken the time to really come to grips with the VIC. Some of his examples are really well presented. I especially like the diagrams which explain the poking of screen characters and colours; this would be the best explanation of this that I have seen. Priced at $19.95, this one is good value.

Among the best value VIC books are those produced by the publishers of *COMPUTE!* and *Compute's Gazette* magazines. They are all in lay-flat type spiral binding which other publishers could do well to copy.

The content quality is always first rate and the authors are really expert. In some of the books, they take the very best from past issues of the magazine and re-present it in one volume, along with some fresh material. In others, they present mainly fresh material.

If you missed the earlier issues of *COMPUTE!* and *Compute's Gazette* magazines, it would be well worth looking at the set of books, *COMUTE's First Book of VIC*, *COMPUTE's Second Book of VIC* and *COMPUTE's Third Book of VIC*. These are a real gold-mine of useful information, with plenty of useful program listings for those who enjoy typing in programs. Topics covered in considerable depth include graphics, games, utilities, machine language, sound, and the VIC memory map.

BC's seven-screen test

By Michael Fletcher

Three months ago, I sent away for a program about which I had heard so much I just had to get it. "BC's Quest for Tires" eventually arrived in my postbox neatly wrapped in a plain brown Huntington's computing envelope. Hurriedly, I rushed in, turned on the computer and the disk drive, and in about 30 seconds, the words, "BC's Quest for Tires" flashed on the screen. Soon the action started and I must say I have never been so impressed before by a home computer game.

The graphics are, to say the least, truly incredible. On screen, you are portrayed as the lovable comic character, BC, and it is your task, as the heroic character, to rescue the beautiful cave lady, Tires, from her kidnapper, the Cave Hag. Sound complicated? Believe me it is.

The scene is set in the Cromagnon era and BC is a primitive caveman. It is your job, with the aid of a spinning rock wheel which BC uses to move around, to find Tires and her pet, the evil cave Brontosaurous.

The action is totally original. In the first stage, for example, it involves you, as BC, to jump and duck while moving on your rock wheel, logs, tree branches, rocks, ditches and numerous other objects. This may all sound old hat but not when you see this game in action on screen. How many of you have heard of a hairy caveman with moose lips, balancing on a wheel turning at 10 mph, while ducking under a mangrove branch?

The game shows off the Atari's graphics and colour capabilities. It is available only on disk and is 48K. Though not available in New Zealand retail shops, it can be obtained from large mail order computer software firms in the USA.

Apart from the difficulty in getting hold of it, BC is a very exciting and a graphically remarkable program.

One of its big plus points is its essentially non-violent aspect. This makes the game ideally suited for very young children and the 100 per cent machine code action means it is also playable for older Atari owners.

The game is divided into seven action screens. Each is different and most are graphically excellent.

Screen 1

The action starts furiously. As on all screens, the joystick is used to move forwards, backwards, or jumping and ducking obstacles. In this introductory screen, the object is to roll along on your wheel trying to avoid many different dangerous objects, including low branches, pot holes and rolling stones. The screen ends when you come to a screaming halt at a lake.

Screen 2

Perhaps the most humorous screen of the game, it involves you, as BC, a lake with bobbing turtles, and the evil cave hag swinging a club up and down while chanting "jump, sucker".

The object s to jump from turtle to turtle to the other side of the screen, without the cave hag hitting you on the head. This is extremely hard to achieve and it took me a good 30 tries to get past the cave hag's swinging club.

When you are knocked off a turtle, you fall into the lake, a nasty smirk embraces your face and you slowly disappear to the bottom of the lake. On screen, this is very funny. Once mastered, this screen is relatively easy to complete.

Screen 3

This is almost the same as screen one,

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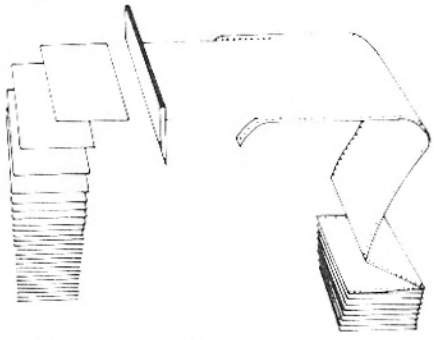

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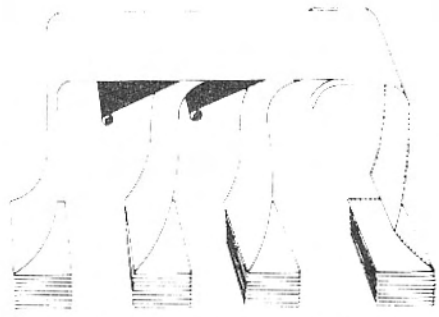

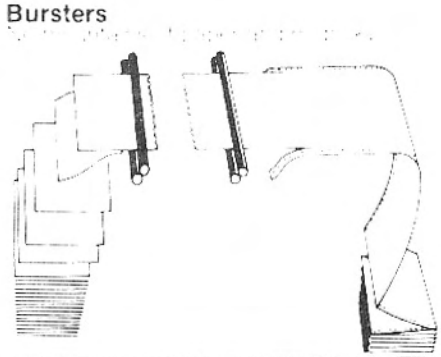

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but this time you are travelling uphill and you must jump to avoid boulders rolling down the hill. A good tip is to always jump at an angle. This way, you can avoid two objects at once. The screen ends when you reach the top of the summit.

Screen 4

This involves jumping over boulders and ditches. From about halfway through, a funny looking bird flies along the top of the screen. Very soon, you approach a huge pit. If you manage the right jumping action, you can cross the pit by grabbing the bird's legs. The bird will fly you safely across the tar-filled pit, then drop you while giving a huge smile.

Commodore's record year

Commodore International has had another record year, with sales topping $1.25 billion.

Commodore's Australian managing director, Nigel Shepherd, said the performance during 1983/84 almost doubled the turnover for the previous financial year of $681 million.

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However, if you don't jump the pit, BC's legs will be helplessly stretched down into the tar and his unhappy face will soon follow. This screen ends just after completion of the jump.

Screen 5

After stage four, BC starts rolling down the hill, again having to avoid ditches and rocks. This screen gets really difficult at the end when BC has to jump over a tar pit to get to the next level. To do this, BC must push the action button and move the joystick to the right. This increases BC's speed and allows him to jump the pit safely.

After completing the tar pit, rocks start falling out of the sky and you have to maneouvre BC to avoid them. This is very difficult as you are still travelling at the speed you used to jump the ramp. The best thing to do is push the action button and move the joystick to your left (this slows you down) and hope for the best. The screen ends when you come to another row of bobbing turtles.

Screen 6

This is almost identical to screen two (bobbing turtles) except the cave hag is exchanged with her pet brontosaurus which keeps sticking its head in and out of its cave. The turtles also dive a lot faster, making it harder to jump from turtle to turtle. Once this task is completed, BC finds himself in the brontosaurus' lair and up against two forms of obstacle, stalagmites and stalagtites, which BC must jump and duck.

Though one of the longest screens in the game, this is fairly easy to complete. It ends when you reach the place where Tires is being held captive.

Screen 7

In the final screen, you as the player control nothing on screen. Instead, everything is controlled by the computer. The screen involves you, as BC, and the lovely cavewoman, Tires. This is all I'm going to tell you as I don't want to ruin the surprise. But the interaction is well worth seeing.

Good news on games

By Michael Fletcher

One of the more exciting pieces of news about the new software boom for Atari products is that Monaco Industries seems to be importing Activison software as well as Atari material for both Atari systems (2600 and Atari computers).

The name, Activison, should be familiar to any Atari owner who has picked up an American computer magazine recently. Activison made its name in the software field two years ago as the first independent computer company to make a cartridge for the Atari 2600 TV game. Its success in this field induced the company to produce titles for the Atari range of computers.

This is good news for New Zealand Atari owners as Activison has well over 35 original games for the Atari VCS, which it plans to convert to Atari computers. These titles range from the award-winning Pitfall to the brilliant audio on Kaboom which will be reviewed in *Bits & Bytes* next month.

Using BASIC: a tutorial

By Ron McMullen

It usually pays to begin a program with a GRAPHICS command. Use GRAPHICS 0 where you have a lot of text to display and multiple colours are not needed. Use GRAPHICS 1 or GRAPHICS 2 if you do not have a lot of text to display. The increased size and number of colours make text more readable and attractive.

GRAPHICS 3 to 7 are multicolour mapping modes, useful for pictures, bar charts etc. GRAPHICS 8 is a single colour mode for plotting graphs and hi-res pictures.

Note that GRAPHICS 0 provides a major advantage over modes 1 and 2 for INPUTing data from the keyboard. In mode 0, the screen and keyboard are tied together to form the so called "editor device".

Example:

```
10 GRAPHICS 0: REM Setup mode 0 and clear screen
20 PRINT "HOW MANY PEOPLE";:REM print the prompt
30 INPUT PPL:REM Print a "?" and wait for a number to be typed on the keyboard.
40REM as you type the number it is printed on the screen. The backspace key can be used to erase mistakes.
50 REM continue the program once RETURN is pressed.
```

This screen/keyboard interaction is not available in modes 1 and 2. Quite a different programming technique is needed to achieve the same thing.

Want some simple code which increases a number if the joystick is up and decreases if the stick is down? Try this:

```
10 X=X+(STICK(0)=14)-(STICK(0)=13)
```

(STICK(0)=14) is true (and therefore equals 1) if the stick is up and false (0) if the stick is down.

Ever wanted a number to wrap around from 255 to 0 when you add 1, or from 0 to 255 when you subtract 1? Here's a simple way to do it:

```
10 X=ASC(CHR$(X+256))
```

Put this line after the addition/subtraction and it does the wraparound for you.

Graphics extravaganza

By Pip Forer

This month we look briefly at three, newly released graphics accessories to the BBC. Two of them are relatively expensive (about $1200), one is a New Zealand initiative and one is a cheap boon to all Acorn users wanting to dabble with LOGO.

Price of place should go to CAVII, a product developed by Barson Computers in collaboration with Christchurch Polytechnic. CAVII, an interface which controls an industrial standard video tape recorder (VTR), is designed to allow a teacher or training school to set up teaching modules composed of sequences of text and questions interspersed with video imagery.

In many cases, teaching a topic requires a visual demonstration of something, whether fitting a plug in electronics or the architecture of a Khmer temple in a geography unit on Man and landscape. Often it is useful to ask questions on material presented in this way.

CAVII controls a VTR so that clearly defined sequences of film can be presented to the user. It also uses software which is able to provide the student with multiple choice or open response questions. The response to the questions controls the video that is presented. A student who knows the topic may simply progress through a series of questions and short video sequences. Someone having trouble with the ideas may be routed by the program to look at a remedial film and be asked different and more basic questions.

BBC joins a select bunch

In having such an interface, the BBC joins a fairly select bunch of machines offering this facility for individualised learning. Although a complex product, it is simplicity itself to the student user.

Equally impressive is its extreme ease of use for the person producing the teaching or training sequences. Once the required video is available and the learning sequence designed, it offers high productivity in producing material. The user creating a lesson has available an editor which allows them to define film "scenes" in terms of position on the tape. Having done that, the user creates a session by defining a sequence, text pages, questions and branches.

The last of these allows different responses by the user to trigger different learning paths. You can even bring in a BASIC program halfway through a session and then resume the video based exercise. Just to top it off, student records and progress are automatically documented on disk.

The product looks robust and its only current drawback — speed of videotape searching — is not of its own making. Even so, this is not a crucial drawback for most uses and as a starter on the route to similar video-disk based technology, it is a worthy beginning.

Next up is the BBC version of the Robocom Bitstik, originally produced as a CAD (computer assisted design) workstation for the Apple II. This is getting back to standard computer graphics from the world of video. The Bitstik is a sophisticated joystick with three special buttons and a rotating joystick providing a third channel of adjustable control.

It works via a ROM and software to allow the user to create complex designs using commands from the screen menu. These allow considerable flexiblity in choosing colour, particular shape drawing options, zooming (magnifying), panning (moving across a larger image than the screen) and lettering. The most important option is that any drawing created on the screen can be saved to a library of drawings. New and more complex drawings can then be produced by combining these library pictures at any new scale or rotation. It should be noted though, that drawings are strictly two-dimensional.

As a simple CAD device, it draws gasps of admiration and has enormous potential as a low-cost two dimensional CAD terminal. It is easy to learn, suitably fast and a pleasure to use.

However, right now it also has some flaws. It is quite demanding on the purse and equipment since it is configured for a twin disk drive, second processor machine. It also requires a ROM slot. Whether the ROM is set up to save memory in the second processor or just as a hardware "dongle" is hard to tell, but it reduces portability a lot.

The need for two disks is unnecessary and seems to have been built around the assumption that two-sided drives would be rare. In particular, communications with the outside world are a bit limited. At present, it lacks a digitiser interface (for capturing printed material), a plotter driver and any range of printer dump routines. The plotter omission is the most severe and is I gather, being rectified. Watch for this product to mature fully. It has been heavily promoted in Britain and has considerable potential.

'Turtlegraphics' package

Lastly, Acornsoft's "turtlegraphics" package which I managed to sight at a high school. This is the first entirely satisfactory version of turtle graphics I have seen on the BBC/Electron range and it has been worth the wait.

Essentially, the package allows the user to work in the LOGO graphics environment pioneered in Papert. It does not embrace the structure and list handling of LOGO but it does allow the creation of new, named procedures exactly in the manner of classic LOGO. In fact, the statement syntax is identical to LOGO and it has presumably been designed to allow easy user-progression on to a full LOGO where desired.

Turn to page 70

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Moving sprites: part 2

by Barbara Bridger

Many game programs require virtually continuous player input. For one-player games, it is usual to accept input from the inbuilt joystick for movement, with the space bar used as a firing button, if necessary.

However, if a lot of shooting games are being played on your machine it is worthwhile investing in an external joystick to avoid weakening the space bar return spring (SV318). Two player games can use the two joystick ports or the keyboard for one player, and the inbuilt joystick or cursor keys (for the SV328) for the other.

When programming these games, it is necessary to use the STRIG and STICK and probably the ON SPRITE function. The STICK command assigns a value to a variable depending on which direction the joystick is being pushed. This value is then used to determine the direction in which the sprite is to be moved. It takes the form X = STICK(n) where X is the variable and n is the joystick number (0 = keyboard joystick, 1 = joystick port 1, 2 = joystick port 2). If X = 1, then upward motion results; if X = 3, 5 or 7, movement is right, down or left respectively. The missing even numbers give the diagonal directions, in clockwise order.

Accepting firing input is accomplished using the STRIG commands. There are two options; both use the STRIG(n)ON statement to look for input from the keyboard trigger (space bar) or joystick trigger. Note there must be no spaces in the STRIG(n)ON command to avoid a syntax error. Then you can use the statement ON STRIG GOSUB X,Y,Z to transfer program execution to a subroutine beginning at line X, Y, or Z when trigger button 0, 1, or 2 has been depressed (space bar, port 1 firing button or port 2 firing button, respectively).

An alternative statement

Alternatively, the statement X = STRIG(n) can be used. When the appropriate trigger has been pressed, X = −1, and you can then use the statement

IF X = −1 THEN GOSUB y

to transfer program execution to a suitable subroutine.

The essential difference between these alternatives is that the first may transfer control to a subroutine from any point in the program, whereas the second transfers control from a specific point in the program.

STRIG(n)OFF stops the recording of trigger input and STRIG(n)STOP means that the depression of a trigger will be recorded but no action will be taken until STRIG(n)ON is encountered.

The ON SPRITE function is relatively straight-forward. The statement, SPRITE ON, enables sprite collisions to be detected and the statement

ON SPRITE GOSUB Y

directs the program sequence to a suitable subroutine when two sprites collide. SPRITE STOP records sprite collision without action being taken until SPRITE ON is encountered again, and SPRITE OFF stops the recording of sprite collisions.

Some care needs to be taken with the positioning of these statements. For example, when control is transferred to a subroutine by ON SPRITE GOSUB Y, then while the subroutine is being executed, SPRITE STOP is in effect and the current collision will be registered. When the subroutine is finished, the program will immediately re-enter the subroutine. This is avoided by putting the statement, SPRITE OFF, at the beginning of the subroutine and if required SPRITE ON at the end.

Another way to move

Some SV users will have noticed another way to move sprites in the Auckland SV club newsletter. PUTSPRITE p, STEP(dx,dy),c,n. can be a useful command for moving one sprite faster than the methods discussed in this article. The p,c & n are the standard PUT SPRITE attributes with dx and dy the increment values to be applied to the last x and y position of the sprite.

However, on our machine, at least, we could not have more than one sprite on the screen at any one time if any sprite used the undocumented STEP variation of PUTSPRITE. We would welcome any reader's comments or findings in this area. Just write to: "Moving Sprites", 11 Mawson St, Lower Hutt.

The following program is intended to illustrate the above description of STRIG, STICK and SPRITE functions. Use joystick no 1 to move the cross hairs and shoot at the enemy plane.

If you would like a copy of this and the previous two Spectravideo programs rather than typing them in, please send $5 plus a tape or disk to the above address.

SOFTWARE REVIEW

From page 53

Especially friendly is the continuity of text handling. My earliest files, prepared on the old 40-column Sandys, work quite well with the latest version. Even their special embedded commands are displayed in the latest manner. New commands and features just add quality, and never seem to upset older files.

Sandys commands are relatively few, logical in designation for the most part, yet very flexible. Since they can be used together, you have the equivalent of an extensive formatting language, but with minimal memory work.

The manual has been completely reworked. It is well indexed, quite readable, and is significantly improved. I can most warmly recommend this entire software-cum-bookware package as a program especially good for direct composing at the Apple IIe keyboard.

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SPECTRAVIDEO

Space shoot

```
10 CLS : COLOR 15,1,1:SCREEN
 1,2
20 CIRCLE(50,50),5,3:PAINT(5
0,50),3
30 CIRCLE(90,90),9,3:PAINT(9
0,90),3
40 CIRCLE(50,50),4,2,3,0
50 CIRCLE(90,90),8,2,3,0
60 CIRCLE(90,90),7,2,3,0
70 CIRCLE(50,50),3,2,3,0
80 CIRCLE(30,150),5,6:PAINT(
30,150),6
90 CIRCLE(30,150),4,8
100 CIRCLE(30,150),3,8
110 SC=0:CO=2
120 GOTO 210
130 Y=Y-C1:RETURN
140 X=X+C2:Y=Y-C1:RETURN
150 X=X+C2:RETURN
160 X=X+C2:Y=Y+C1:RETURN
170 Y=Y+C1:RETURN
180 X=X-C2:Y=Y+C1:RETURN
190 X=X-C2:RETURN
200 X=X-C2:Y=Y-C1:RETURN
210 FOR J= 1 TO 3
220 U$=""
230 FOR I= 1 TO 8
240 READ A
250 U$=U$+CHR$(A)
260 NEXT I
270 SPRITE$(J)=U$
280 NEXT J
290 DATA 0,16,16,16,254,16,1
6,16
300 DATA 24,124,126,29,29,12
6,124,24
310 DATA 0,24,24,60,60,24,24
,0
320 C2=4:C1=4:C3=2:C4=.1:RN=
RND(-TIME)
330 X=200:Y=150
340 FOR L= 1 TO 20
350 Z1=-5:C5=INT(RND(1)*140)
360 FOR I = 1 TO 100
370 STRIG(1)ON
380 ON STRIG GOSUB ,530,
390 Z1=Z1+C4:W=(.8*Z1^3)+C5
400 Z=(Z1+5)*25.5
410 PUT SPRITE 5,(Z,W),CO,2
420 DI=STICK(1)
430 ON DI GOSUB 130,140,150,
160,170,180,190,200
440 PUT SPRITE 1,(X,Y),11,1
450 NEXT:NEXT
460 COLOR 1,11,2
470 CLS:COLOR 1,11,2
480 LOCATE 80,80:PRINT "GAME
 OVER"
490 LOCATE 40,100:PRINT"You
scored ";SC;"  points but yo
u"
500 LOCATE 40,120 :PRINT"let
 20 enemy planes through"
510 FOR H= 1 TO 5000:NEXT H
520 END
530 STRIG(1)OFF
540 SOUND 6,10:SOUND 7,19:PL
AY"s11v518c"
550 SPRITE ON
560 ON SPRITE GOSUB 600
570 PUT SPRITE 1,(X,Y),6,3:F
OR K= 1 TO 20:NEXT K
580 SPRITE OFF
590 RETURN
600 SPRITE OFF
610 IF X<Z+2 AND X>Z-2 AND Y
<W+2 AND Y>W-2 THEN SC=SC+50
 ELSE SC=SC+10
620 LINE(225,0)-(255,15),4,B
F:LOCATE 230,5:PRINT SC
630 SB=WMOD256:SB=192-SB
640 FOR K= 1 TO SB:W=W+1:PUT
 SPRITE 5,(Z,W),CO,2
650 NEXT K:SOUND6,15:SOUND7,
19:PLAY"s11v913c":CO=CO+1:IF
 CO>15 THEN CO=2
660 Z1=-5:C5=C5+50:I=1
670 RETURN
```

Swingman swings

By Barbara Bridger

This is an interesting version of the popular hangman game where you guess a word letter by letter. Correct letters provide jungle ropes for Swingman and if the word is not guessed within the allotted number of chances, Swingman crashes to the ground.

The screen layout and graphics are generally excellent, although I feel there is over-use of flashing printing for instructions and progress information. Instructions are easy to follow with words up to nine letters long randomly selected from an extensive list. (While sugar is incorrectly spelt, colour has the New Zealand rather than American spelling. A few words are duplicated).

The game is challenging for adults since not too many guesses are allowed. (Altering line 2121 to TR=14 gives young children a more realistic chance.)

The sight of a Tarzan-like figure swinging across the screen after getting a word correct is greatly enjoyed by youngsters; so too is the sight of him not making it when the word is not guessed. Having the words in capitals only rather than lower case increases the difficulty for younger children.

The program is written in BASIC which allows you to determine how the various graphic and sound effects are achieved. Changing words in the list is easily done. Swingman requires the miniexpander and 16K RAM expansion for SV318 users. This can be avoided if the list of words is reduced by about 15.

Overall, this tape program is a worthwhile acquisition for $18. However, there is room for minor improvements which can easily be made by the purchaser. This, in turn, will increase understanding of Spectravideo BASIC.

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Beta is better

By Gary Parker

Although many excellent programs are available for the Spectrum, it isn't very often that a program appears which dramatically improves its usefulness. Of all the programs I have, I would include only Tasman's "Tasword" word processor and Hisoft's Pascal in this category – although I'm sure other Spectrum owners would include many other titles.

But I have found a new program to add to the list. "Beta Basic", by Betasoft, is an amazing program which extends the Spectrum's BASIC language more than twofold, producing a language that puts the BASIC implementation of most micros to shame.

"Beta Basic" provides more than 50 new commands and functions for the 48K Spectrum. (A simpler version for both 16K and 48K Spectrums may be available soon). I have seen some BASIC extensions advertised which rely on the user entering the new commands in REM lines, or with USR calls. Not so with "Beta Basic". All commands are entered just like normal keywords, except using graphics instead of extended mode. While this does raise a slight problem of having to remember the keys used to obtain all those keywords, at least Betasoft has assigned the keys logically. For example, LOOP is on the L key, and CLOCK on the C key.

While "Beta Basic" has too many features to cover in detail, here is a summary of the commands which most impress me.

ALTER allows direct manipulation of the colour attributes. Many different forms of this command are possible, for example:

```
ALTER INK 3, PAPER 6 TO INK 7, PAPER 0, FLASH 1
```

which alters all magenta-and-yellow squares on the screen to black-and-white flashing ones. This command would be very useful for writing games programs.

AUTO line numbering is a great boon for typing in long programs. Rather than having to type in each line number, the computer puts them on the screen so that you only have to type the statements.

BREAK has been improved so that it will even stop machine code programs (or at least, those that don't alter the interrupt status). This is very handy for machine code programmers.

The CLOCK command allows the Spectrum to tell the time although of course this is lost when the computer is turned off. A very powerful feature is the ability to call a subroutine after a specified time.

DEF PROC allows named procedures to be created, just as with BBC BASIC. So if you had a procedure (subroutine) beginning at line 1000 with

```
DEF PROC Check Answer
```

then you could call this procedure with

```
PROC Check Answer
```

instead of GO SUB 1000, improving the structure and readability of the program.

The only looping stucture which BASIC normally provides is

```
FOR . . . NEXT
```

"Beta Basic" adds

```
DO . . . LOOP
```

which can take several forms such as

```
DO WHILE  DO UNTIL  LOOP UNTIL
```

Another useful command, sorely missed in BASIC, is ELSE:

```
If answer = 1 THEN PRINT "correct": ELSE PRINT "wrong"
```

Editing has been much improved. Moving the cursor rapidly through long lines is easy, since it can be moved up and down as well as left and right. JOIN and SPLIT can be used to combine two lines into one, or separate a line into two.

ON ERROR allows a subroutine to be accessed if an error occurs. For example, it BREAK is pressed, you could send the processor into a simulated NEW routine, just to scare the user, and then resume normal running!

Entire strings can be POKEd. So you could move the bottom third of the screen to the top third in a flash with

```
POKE 16384, MEMORY$(0)(20480 TO 22527)
```

SCROLL can move any rectangle of the screen, in any direction, any number of pixels at a time. ROLL acts similarly, except with wrap around. These commands produce windows not unlike those of the Sinclair QL.

USING allows numbers to be formatted when PRINTed. So for example, numbers could be automatically output with a leading dollar sign, and two decimal places.

The method of entering functions with "Beta Basic" is a little more unusual than entering commands. You type in the keyword FN followed by a letter and a $ or (. As soon as either of these last two characters is typed, the FN is replaced with the proper name of the function. For example, if you type:

```
PRINT FN M(
```

you get

```
PRINT MEM
```

More than 20 new functions are implemented. There are faster versions of RND, COS, and SIN (called RNDM, COSE, and SINE). The AND, OR, and XOR commands, normally only available to machine code programmers, are present. DPEEK and DPOKE allow easy manipulation of two-byte numbers. SCRN$ works like SCREEN$, except that user-defined characters are also recognised.

Other "Beta Basic" commands and functions include cursor control codes, DEF KEY, block DELETE, EXIT IF, FILL, GET, KEYIN, improved LIST and LLIST, GO TO ON, GO SUB ON, improved PLOT, POP, RENUM, SORT, TRACE, BIN$, CHAR$, FILL, FILLED, HEX to DEC and vice versa, INSTRING, MEMORY$, and MOD. It takes a 60-page manual to explain all the new features of "Beta Basic".

"Beta Basic" controls the new commands by using the interrupts, and so when it is in memory, everything is slowed down slightly. I timed a simple FOR NEXT loop, and found it about 10 percent slower than normal.

However, "Beta Basic" also speeds up certain operations. GO TOs, GO SUBs, and RETURNs are much faster, because the normal situation where the processor starts at the first line of the program, and checks each line until it finds the one it is meant to jump to, has been changed so that the processor goes straight to the correct line. This can speed up long programs considerably. Combined with the fast versions of RND and suchlike,

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Winners & a new contest

The winner of August's "Gnasher" contest was Michael Monti, of Wellington. Michael's entry produced results which were as good as any other entry, and his program was the shortest.

The winner of September's "Wheelie" contest was C.P. Rhodes, of Napier, whose program used a clever combination of block graphics and plotting to produce large, accurate lettering.

I have received some contest entries with up to 72c postage on them. Cassettes cost only 30c to post in New Zealand (with or without the case). Nor is it worth sending entries by airmail. It saves only a day at the most, and I'm not that strict about the closing date.

This month, a copy of Anthony Camacho's excellent book, *Drive Your Spectrum*, will be awarded to the person who sends in the best entry to this contest: write a program which will draw a clock face on the screen, and keep the time by moving the hands.

Send your entries, preferably on cassette, to:

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Connecting new keyboards

By Steven Cragg

The keyboard is one of the most criticised parts of the ZX Spectrum, so it is no real surprise that a "proper keyboard" is one of the most popular additions.

Many purpose-built keyboards are available overseas but generally cost $150 $200 which is outside the price range of most home computerists. So, unless they are going to soldier on using the original keyboard, most people must design and build their own keyboard.

There are two main ways to approach this job. The first method is to completely build your own keyboard by buying the keyswitches; the second is to buy some of the surplus keyboards frequently advertised here and overseas, and modify them to work on the Spectrum.

For both methods, you will need to refer to diagram 1 which shows how the Spectrum keyboard is divided into an 8 x 5 grid called a matrix. Each of the keys is a switch which when pressed, connects the perpendicular lines of the grid together at the point where the key is located. When you press a key or keys, the computer can, by looking at the various rows and columns, decide what keys are being pressed and take the appropriate action.

So the way to build a keyboard for the Spectrum is to buy 40 keyswitches and wire them into the matrix the Spectrum uses. The actual wiring is the easy part — the hardest part is getting the keys properly spaced and all level.

This method of construction has the disadvantage of being very expensive. The keyswitches and keytops are difficult to get hold of and are expensive when you do find them. If you do opt for this method decide on a few things (for example, do you want a full-sized space bar or a large enter key?) before you rush in and buy all the parts. Remember you are going to build yourself a keyboard only once, so make sure it includes all the options you want (within reason). A few decisions at the beginning can save expensive mistakes.

The second method is slightly cheaper and has completely different problems of construction. It involves buying a ready-built surplus keyboard and modifying it to conform to the Spectrum matrix.

Modification involves cutting all the tracks on the printed circuit board on which keyboards are mounted. This is often difficult as most of these boards are double-sided; but with a little perseverence it should not prove impossible.

The next step is to wire, as before, onto the back of the keyswitches to produce the desired matrix. This rather drastic modification is necessary because no commercial keyboards use the same keyboard matrix as the Spectrum. With this method, you do not have to use expensive electronics to achieve the desired result — a working Spectrum keyboard.

The other advantage of using a ready-built keyboard is that all the keys are level and have the same spacing. When buying a keyboard, make sure it is unencoded. ASCII-encoded keyboards are generally more expensive and it is pointless to pay more than you have to.

It is easy enough to connect a new keyboard to the Spectrum as long as you wire it properly. All that's left to do is connect the new keyboard to the computer. If you have ever opened up a Spectrum, you will know the keyboard is connected to the circuit board via two flat cables, one of five-way and one of eight-way. These cables correspond to the rows and columns of diagram 1.

When connecting a new keyboard, you first disconnect the original cables by sliding them out of their connectors and replacing them with small pieces of filed-down veroboard which should have the lines from the new keyboard soldered onto them.

I cannot tell you which way the lines go as there are so many different Spectrum versions with just about all possible ways of connecting the keyboard. However, it shouldn't be too difficult, with a small amount of experimentation, to get the new keyboard working.

These are only some of the methods available to you. For example, I am at the moment adding a computer-controlled keyboard to my Spectrum. So don't think these two methods are the only ones. Happy keyboarding!

CAPS SHIFT	Z	X	C	V
A	S	D	F	G
Q	W	E	R	T
1	2	3	4	5
0	9	8	7	6
P	O	I	U	Y
ENTER	L	K	J	H
B	N	M	SYMBOL SHIFT	SPACE

Diagram 1

Displayed on Stand 1 Bits & Bytes Show

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SEE YOU AT THE SHOW

ENBase: impressive sophistication

By Gordon Findlay

Several readers have written recently with questions or comments on various DOSes. We intend to have a number of reviews and background articles on them coming up but what do you think? Write in and let me know. What operating system do you use? Why? What is wrong with it? What are its good points? Would you like to change if a better one came along? Let's get a real discussion going about this.

Computers are often used for storing and retrieving information. Programs have been written to store information (on disk usually) in various ways, and to link information together to form a database. A number of programs are available for the '80, but none so sophisticated as a product from Southern Software (UK) called ENBase. This is a truly relational database, unlike all the others I know of, which are non-relational.

I assume you know what records and fields are — if not, there is a brief explanation in the beginners' column this month. Most file managers will input, store, sort, display and update records with a mixed field structure, and indexed on one or perhaps a few important fields. Sales records might be indexed on customer name, medical records by patient's name, or whatever. The field on which the program indexes the data is called a key field, and typically it is possible to sort or access data on only one or a very few key fields which, most importantly, must be nominated in advance.

ENBase is a relational data base. I have found this concept very difficult to explain — and my guess is that the textbook writers have too because the literature on relational databases is pretty hard going. The basic idea is this (the language used is mine, not from the manual):

Values collected into sets

All the values of each field are collected into sets. For a medical database, there will be a set containing all the patients' names, another containing all drugs prescribed, perhaps another containing surgery performed. These sets are made up of as many fields as there is available disk space, on up to four drives.Each set is ordered and maintained separately from all the others, so a change in one value is easily made. If, for example, a drug is renamed, just one element in the drug set must be renamed.

Links between the sets describe individual records in the conventional sense. There might be a link from Mrs Smith (in the patient set) to penicillin in the drug set. As many links as you like can be established. Mrs Smith can be linked to as many other drugs as needed, and many patients can be linked to penicillin.

This structure has a number of advantages. It is very easy to alter the structure of a database, say by adding a new field in each record. This can be a real problem with other programs. A change (like the change of name) can be made just in one set; the links between them are not disturbed, so all the affected records are automatically "updated". I am using words like "field" and "record" in their usual meanings to relate ENBase to more familiar material.

These links between sets can be exploited in all sorts of ways. Suppose we were interested in all patients who had taken a particular drug. This means picking out an element of the drug set, and finding all the patients linked to it. The patients, of course, are linked to other sets, so it would be easy to see if a particular drug was often associated with a particular surgical procedure, or even if users of penicillin were slow to pay their bills.

This system obviates the need to store many pieces of information repeatedly. Of course, the links must be stored somehow, so the relational system may require more disk space.

Records in ENBase are not of a fixed length. This means no waste space is required to allow, say for the longest name you might want to use. In a conventional database, each record will be a fixed length, and they may be blocked together in one of a number of ways. Because this is not required with ENBase, much greater flexibility is possible.

It is also possible to pre-edit the information to be found in some sets, say always numeric, always upper case, or what have-you. It is also possible to close sets, not allowing additional values to be added. Why? Well for one thing, to limit the range of options is to limit the possibility of typing errors.

The amount of data handled is limited only by disk space, not memory space.A database can span up to four drives, but all the disks must be mounted at once. A hard disk is supported through the usual DOS interface.

Above trivia and the trivial

ENBase is not a trivial program, and will not be used for trivial tasks. The first step must be to analyse the data to be manipulated. The more carefully the data is analysed, the easier it will be to use ENBase. While it is possible to manipulate data in a startling number of ways, this analysis will ensure the task goes as smoothly as possible. Thereafter, ENBase is entirely menu driven.

Sensible prompts are used, and it is usually possible to get some explanation of what each entails from the program. Entry of an ambiguous response will generate a submenu. There are menus for starting a new database, adding data, deleting, editing and renaming data, and producing reports. Reports may be

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Report formats are regarded as simply another part of the database, able to be edited and changed in the same ways. Reports may be written to disk as well, for loading into a word processor. Data to be reported on may be selected in a number of ways, such as these examples (some taken from the manual):

- all employees with a particular salary;
- all employees with a salary greater than $10,000;
- all employees with a salary between $10,000 and $20,000;
- all employees with a salary greater than their managers.

Conditions may be combined: all employees with salaries greater than $20,000 or whose manager's salary is less than twice their's. Any expression you could write in a BASIC IF statement is allowed as a selection option.

Data may also be selected using "wildcards" so that all names starting with "Ga" or all cheques written in December 1983 are selected and printed out.

Output from ENBase may be converted using a supplied utility program into a format which can be used with VisiCalc.

ENBase consists of two parts – a machine code access manager which takes care of all disk input and output, and a menu manager which is the main program and surprisingly, is written in BASIC. Surprising because it is so fast. The BASIC program accesses the disk only through the access manager located in high memory. All input and output is buffered, and the system will use as much memory as you have to maximise the size of the buffers, thereby minimising disk accesses.

Whenever I am using a program which stores information, I worry about how much I will need to retype when something breaks, the power fails, or I make a silly mistake. ENBase has a concept of a "comitt point" – usually one step up the nested ladder of menus – where the disk is updated and the data saved against errors.

Because ENBase is written partly in BASIC, it is possible to customise it and there is an extensive discussion of this in the manual. It is also possible to use the machine code portion alone, and to write special programs in BASIC to operate on databases in ways which aren't part of ENBase. This is done in an interesting manner, using many of the Disk BASIC keywords with different meanings, so allowing the BASIC interpreter full access to the databases without venturing into machine code.

Documentation is important in a product like this. ENBase has two sorts of documentation. The first is a well presented, relatively readable manual of about 150 pages. This is clear, and once the underlying concepts are understood, very good. A number of tutorials – which consist of demonstration runs of ENBase, with a commentary, covering the main points of everyday use of ENBase – are also supplied.

I can't escape the feeling that at some point someone who knows quite a bit about computers is going to have to set the system up if it is to be used by non-computerists. I had to alter the tutorials before I could see anything just because of the different ways the various DOSes use to enter BASIC with zero files, and reserving high memory.

There is a lot more to be said, but not the space to say it. I have tried to give the flavour of ENBase in terms more commonly used than its own technical terms. ENBase is compatible with the Model 1 and Model 3, and the System 80, of course, under TRDOS, NEWDOS, LDOS and DOSPLUS and probably any others you have. It comes on two disks for the Model 1, one disk for the Model 3, with a utility for copying with just one drive in case your DOS can't do that. There is also a utility to relocate the machine code part to handle different memory sizes, the tutorial scripts, a sample database and some sample BASIC programs to illustrate programming using the access manager.

Altogether, this is a most impressive package. Typical users will be business users with relatively unstructured data or unsuited to fixed length fields. Examples given include farming records, medical and dental records, sales, customer files, purchasing, real estate records, schools and colleges, and household accounts. Expense alone would rule out the last; but the others seem feasible and there are many other feasible uses.

(Review copy supplied by Molymerx Auckland)

From page 63

Where it scores over many full LOGO implementations, and certainly the current Apple one in schools, is that it will work in any mode (although not in the 20K modes for unadjusted disk-based machines), has an easy on-screen text command and a simplified editor uses the standard BBC operating system editing procedures. It also allows full access to all "*" OS commands and VDU calls.

This makes for a very good introductory environment, at the cost of the loss of the processing capabilities of full LOGO. For many classrooms, that may not be significant.

A final good point is that the special function keys are left free for the user to dedicate. Hence you can enter the simplest commands into these for a beginner (and give a graphic template over each SF key), put the longer commands in for an experienced user to save typing, or even redefine the keys as you go to have procedure names in them.

"Turtlegraphics" is an excellent and apparently cheap product. However, it is only a portion of full LOGO. Coincidentally, a full ROM-based LOGO and PASCAL have just been released for the BBC and next month, these will be put under the spotlight.

VZ200 correction

In the VZ200 column in September issue of *Bits & Bytes*, the function auto in the how to use should have been POKE 31469 not 31479.

Four logical operators

By Brian Gibbs

The four logical operators – which are given only a brief mention in the Sega manual – are NOT, AND, OR and XOR. These four commands work in binary – decimal numbers are converted to their binary equivalents, calculated, and then converted back to decimal.

The NOT operation works on single numbers. The bits of the binary number are inverted to obtain the result. An example is NOT 9:
9 = 1001 binary
results = 0110 binary
the answer is 6 in decimal

The AND operation states that if both bits are a 1, the result is 1. Otherwise, the result is 0. An example is 10 AND 6:
10 = 1010 binary
6 = 0110 binary
result = 0010 binary which equals 2 in decimal.

The OR operation states that where any bit is a 1, then a 1 is put in the result column. For example 10 OR 6:
10 = 1010 binary
6 = 0110 binary
result = 1110 binary which is decimal 12.

The exclusive OR or XOR operation is a little more difficult. The rule is that if both bits in a column are 1, the result is 0. But if only one 1 of the bits is a 1, the result is a 0. For example, 10 XOR 6:
10 = 1010 binary
6 = 0110 binary
result = 1100 binary or 12 decimal.

You can check the operations by typing PRINT 10 XOR 6, for example, on your computer. When you enter the command by touching the CR key, the result, 12, will be displayed.

The main uses of these commands are in machine code programming and for performing such functions as sprite collision detection. They will also be used more often when the disk drive is used.

Grandstand Leisure has started a Sega user's group which, for a $39.95 fee, entitles you to six issues of a two-monthly magazine and two free programs on cassette.

Six for Elks, three for Beebs

By Pip Forer

Of the nine new books reviewed here for Acorn computers, six are for the Electron (for some reason nicknamed the Elk in Britain) and three for the BBC. On the face of it, this is a sign of the times. However, it is also noteworthy that most of the Electron books are derivatives of existing titles for the BBC. The alterations needed to cope with the Electron (most significantly no Teletext and slower speed) are such that converting a BBC book to the Electron is a small matter.

This adaptation may not be a bad thing. The best of the bunch is in fact *"Advanced Programming Techniques for the Electron"* (McGregor and Watt/Addison Wesley), an adaptation from their outstanding BBC book of (almost) the same name. At $37, it is not cheap but for the more experienced user it is highly recommended.

"The Electron Programmer" (Gee and James/Granada) is aimed more at the novice. It is an adequate book in what is a crowded market. It runs in quite a way ahead of the lamentable *"Getting Started on your BBC Micro"* (Hartner and Gollner/Futura) but behind the beautifully produced and well written *"Acorn Guide to the Electron"* (Cryer and Cryer/Penguin). This is a first rate introduction and rescues the Cryers from the disappointing graphics text they have produced. A very sound $14 investment that runs a new owner from Babbage through to Booleans via Basic.

Also from Penguin is *"Games and Other Programs for the Electron"* ($14). The book is a listing of listings from the British user magazine, *Beebus*. The programs look all right and some are downright impressive but who wants to hammer in someone else's unannotated and inadequately explained listings?

The same can be asked of *"40 Educational Games for the Electron"* (Apps/Granada), *"21 Games for the Electron"* (James, Gee and Ewbank/Granada) and *"36 Challenging Games for the BBC Micro"* (Rogers and Callender, Interface). At least the last two of these don't pretend to be educational!

As a genre, books such as this puzzle me considerably. I have never met anyone who has obtained pleasure or learnt much about programming by slavishly copying in someone else's listings on a variety of random topics. Most of these books offer just this experience and if that is your bag (as the argot has it), then go for it. Not for me or mine though.

The final book is *"Disk Systems for the BBC Micro"* (Sinclair/Granada). This deals with the BBC disk system and several of its early alternatives and covers the system and the art of disk file usage. There is arguably a need for a text aimed at disk use to supplement the BBC manual(s) and this book is useful for this. However, it never really gets below the surface of BBC DOS.

A lot of the information is repeated from the manuals which may be no bad thing when it is now all grouped in one place. A valid criticism though is that the text tends to spin things out to expand the book size and all in all, the additional material lacks substance. One would expect that better texts on disk use are in the offing.

All credit to the artist

Your First Apple II Program, by Rodney Zaks, illustrated by Daniel Le Noury. Sybex. $21.95. Reviewed by Carol Miles.

Let's credit the artist, Daniel Le Noury, more than the author for an interesting book. He created amusing cartoon characters to represent aspects of programming. The program snake is a series of linked boxes "executed" box by box. The mischievous bug is present too. Perhaps it is significant the programmer is represented by Dino the dinosaur — is Le Noury trying to tell us something about Zaks' exposition?

It is a visual irony that the illustration showing mill wheel buckets going around on a mechanically impossible way lies opposite the page on which Dino says, "Remember . . . be exact."

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BOOKS

This book is supposed to be about one's first Applesoft program. It seems most inappropriate to even mention machine language instructions or to discuss that there are Integer, Applesoft, as well as downloadable (and alterable) nonresident BASICs. Nor would you expect to do flowcharting on your first attempt. Yet much of the two largest chapters are on this topic.

Zaks seems to confuse Apple with less well thought out machines. For example, two pages are used to explain how to make one's program listing more readable by formatting with blanks — apparently never realising that Applesoft automatically formats LISTings, and it is totally unnecessary to do this by hand.

There are many small traps for the first user: LOAD and SAVE must have a file name when being sent to disk storage, but not to cassette; RUN, and RUN (filename) do not do the same things; Applesoft rounds off numbers, it does not truncate; illustrations of what you are supposed to see with "PRINT A,B,C" do not represent what you actually see on the monitor; why should the variable name, AB1, not be legal, but STUDENT1 be legal? On, and on . . .

If you enjoy cute illustrations of cartoon characters, you might find this book amusing. As a text from which to learn your first Applesoft program, there are cheaper, better organised books with fewer errors.

A fun way to learn

"Your First BASIC Program" by Rodnay Zaks, Sybex, 182pp, $19.95. Reviewed by Gordon Findlay.

This is a well laid out, entertaining introduction to BASIC programming. It assumes no knowledge of computers to begin with, and goes just far enough to enable independent progress subsequently.

The version of BASIC used is a relatively machine independent dialect, obviously based on the Microsoft family. Dr Zaks covers the language statement by statement, with lots of examples and demonstration output. There is also a worthwhile discussion of how to create a program, including design and debugging. I feel much more emphasis should have been placed on the use of subroutines as an aid to effective design.

Each chapter has a selection of questions and exercises, most of which have answers provided. A glossary explains commonly used jargon, and a list of the more usual reserved words is included as well.

Layout is excellent, with good use of a second colour to highlight important ideas. Some of the cartoons are real little gems.

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HARDWARE REVIEW

From page 36

"Thinkjet" printer is an ink jet unit, printing at 150 characters per second.

The 3.5in microfloppy disk unit holds up to 710 kilobytes of data, equivalent to about 175 pages of text. It weighs only 5.5 pounds and runs for eight to 12 hours on a charge. It is not cheap — almost $2000 for a single drive — but you could probably get away with one because of the HP110s RAMdisk.

The Hewlett Packard HP-110 is one of the leading "state of the art" portable computers. While expensive, it packs the power of a conventional desktop 16-bit computer into a remarkably small and flexible package. My only disappointment was the lack of a standard composite video output as well as the LCD display. I am not yet a fan of undersized hard-to-read LCD displays for computer use, although this one is certainly getting close to very good. But if I had that much spare cash lying around looking for a use, Hewlett-Packard would get it.

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Wizardry: we're under its spell

By Alex and Fred Wong

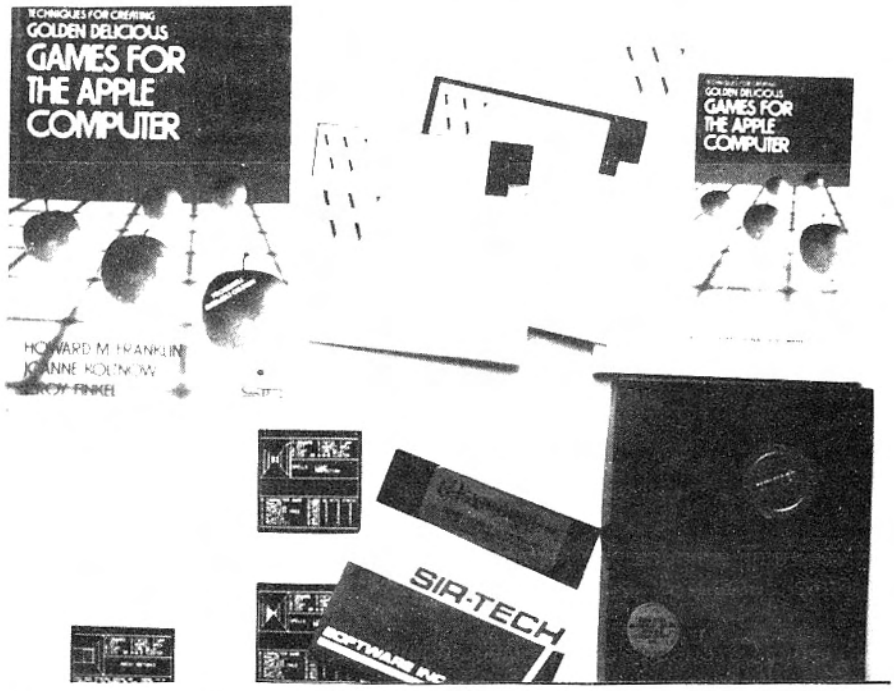
With the Christmas holidays just an office party or a school social away, we thought it might be nice to look into the lighter side of Apple life. First up, we'll compare Wizardry, that classic Apple adventure, against some other games you might like to put your holiday time into. Then a look at the Golden Delicious games that not only entertain but also educate.

Why Wizardry? Why not check out something newer like The Coveted Mirror instead, you might ask. Because Wizardry, despite its age, still sets the standard for Apple adventure games, and most people know something of it. Besides which, it's my personal favourite.

Written in Pascal, Wizardry is based on Dungeons and Dragons which is a fascinating game if there are enough willing players and no shortage of imagination. Wizardry has both players and imagination, and so benefits from a more established framework than most adventures. It is what we (Fred and me, that is) call an interactive adventure, as opposed to a graphic or a text adventure.

Interactive adventures like Wizardry, Ultima and the Temple Of Apshai are played by controlling the hero directly, usually via single key commands that attempt to simulate real reaction, while graphic and text adventures like the Coveted Mirror, Transylvania and Zork make you control characters by sentence or word prompts as if they were another person. Although sentence or word prompts may allow for more variety in response, single key commands provide more direct manipulation of the surroundings and the specific action controls allow for more martial pursuits (if you like fighting — after all, you can run!)

The main difference though, between the two types (for graphic and text adventures are basically the same — one just has no pictures) is that Wizardry and its ilk are much more flexible in object (basically the acquirement of power and its attendant, money) than Transylvania and its friends, in which the object is more often than not the achievement of a particular goal (such as rescuing a usually ungrateful princess).



A tasty mixture . . . Wizardry and Golden Delicious documentation.

Because of this, interactive adventures allow much more freedom of action in their imaginary world, while a graphic or text adventure often has one, and only one, correct way of advancing through it, sometimes stubbornly tied to the syntax of a certain phrase! After many frustrating hours traipsing through the picturesque but unyielding scenes of Transylvania, I know I'm not ready for that kind of pictorial puzzle.

Playing Wizardry

Of course, it's not only for those abstract points of supposed superiority that I favour Wizardry. It plays quite differently to anything else as well. Although none of the interactive adventure displays are quite as impressive as The Quest's dragon scene (or many of the other pictures either, come to think of it), Wizardry does come close with its three-dimensional line drawings and most interactive adventures (Temple of Apshai springs to mind) provide a lot more information on the status of the hero (or heroes, or heroines with Wizardry) such as their names, health, class (professional, not social), what spells they have and what commands are available. Wizardry, partly because it does not redraw the entire scene, is also faster than most and there isn't too much of a time lag.

Wizardry and such are more martial in nature and this is reflected in the large number of different armaments (for a price) with which they may be equipped. There are also 50 different spells available to the right character which gives Wizardry an angle that practically no other game has. Each of the six characters (most adventures feature one hero only) are individually controllable during any of the fighting and the sophistication of the opposing monsters is such that very often those controls are absolutely necessary. Let me openly admit I like these violent games as well as those specifically non-violent ones, which most graphics and text adventures are.

Aside from all this, the characters you create in Wizardry are inevitably endearing (as Fred found out when he tried to send a group of specially created kamakaze samurai to discover the length of one dark tunnel and brought them all back before they'd reached halfway).

Turn to page 76

Hands-on holiday

Just talking about all that programming makes me itch but if you actually like it, then we've got the thing for you to occupy the summer break. We would like you to write the best educational mathematics program you can and send it to us (no, it's not just to help me with my maths) by no later than the end of January. We'll judge the best entry and the winner will receive the Temple of Apshai from Epyx and Dark Forest from Sirius, and have the winning program published in *Bits & Bytes*.

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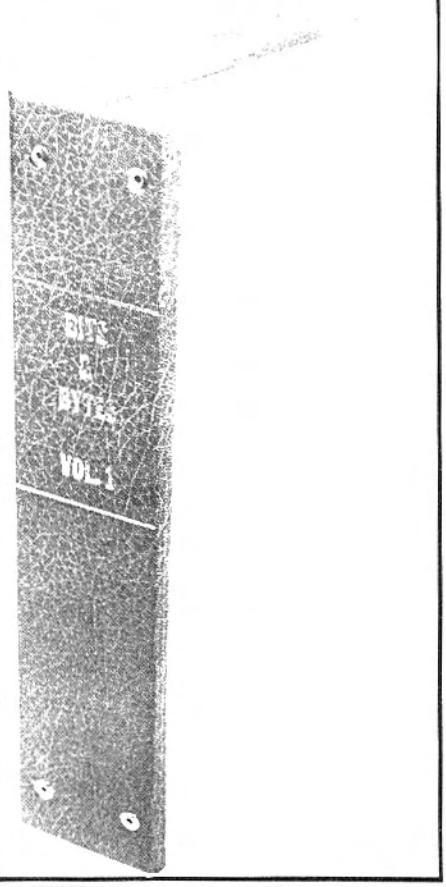

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PRINTED circuit board for acoustically coupled modem. Uses XR2211 detector, 567 tone generator, plus several opamps. RS232 or TTL input/output. Self-powered or can be driven from Commodore 5-volt supplies. Reliable with bulletin boards, mainframe links, but mixed success in acoustic-to-acoustic linkups. Board, precision resistors and capacitors, foam insulators, circuit and pinout diagrams, instructions $25. All-up cost around $110 if you have good junk box. For experienced electronics people only. Jay Mann, 330 Centaurus Road, Christchurch 2.

FOR SALE VZ-200 computer with VZ invaders, giant book of games and free membership to a games club. Only four months old. $150.00. Paul Famularo, 142 South Rd, Masterton. Ph 83-534.

APPLE

From page 74

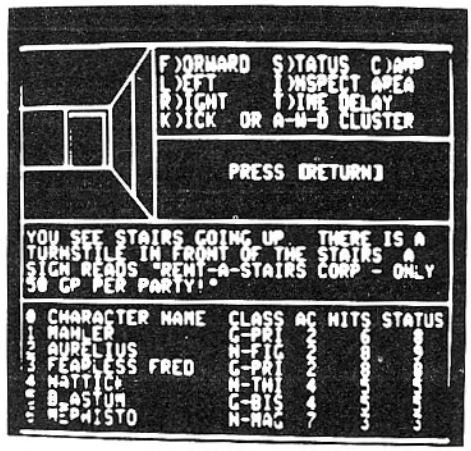
And one treats all these little alter-egos as comrades rather than just strangers.

Not for eating

Well, now that I've aired all my reasons for liking Wizardry better, let's get on to what you can do if you'd rather write your own than buy a game readymade. Do what Fred has done and pick a Golden Delicious off the shelf. Not for eating, though. The book, *Techniques For Creating Golden Delicious Games For The Apple Computer* is available with an optional two disks that contain all the programs listed if you can't be bothered typing.

The book is designed to assist the ambitious BASIC programmer write games with examples of good programming practice and many of the more useful and/or tricky subroutines included. It promotes logical, user-friendly programs which are consistent and interesting. It contains remarks, suggestions and hints every step of the way and leads you through the programs and subroutines with the maximum of clarity and the minimum of obtuse technical terms.

One of the disks is filled with subroutines 78 of them while the other disk holds the six feature games as well as some subroutines. The menu programs show how much easier it is to preach than practice. There seems to be no error trapping and any unplanned response can abort the menu. The programs (Story, Blockout, Match, Concentration, Stars and Simon Says) and the type of program postulated, are more suited to the entertainment and education of the younger person so a grown adult might not find them so



The computer screen during a game of Wizardry.

challenging (and though I enjoyed them, I'm sure some of my detractors would not list me as a grown adult!)

Indeed, Fred considers the Golden Delicious package best suited to parents or teachers of younger children who would like to expand or create customised programs suited to individual needs rather than programmers at large. However, although Fred is not a parent and has no immediate plans to become one, he has often entertained little visitors and smaller persons with the aid of his Golden Delicious games – and I'm sure will continue to do so in the future.

From page 66

most programs should run slightly faster with "Beta Basic".

Obviously, a lot of thought has gone into the preparation of "Beta Basic". It provides a myriad of new features which are both powerful and easy to use. I bought "Beta Basic" from England, where it is rather pricy compared with other Spectrum software. But now "Beta Basic" is being produced under licence in New Zealand for about $35.

On other computers, new languages and language extensions cost hundreds of dollars, so any sort of BASIC extension would be good value at this price. An extension of the quality of "Beta Basic" is remarkable value indeed. In my opinion, anyone who writes programs on their Spectrum would be crazy to do without it.

"Beta Basic" is available directly from Westbridge Computers, P.O. Box 7280, Christchurch.

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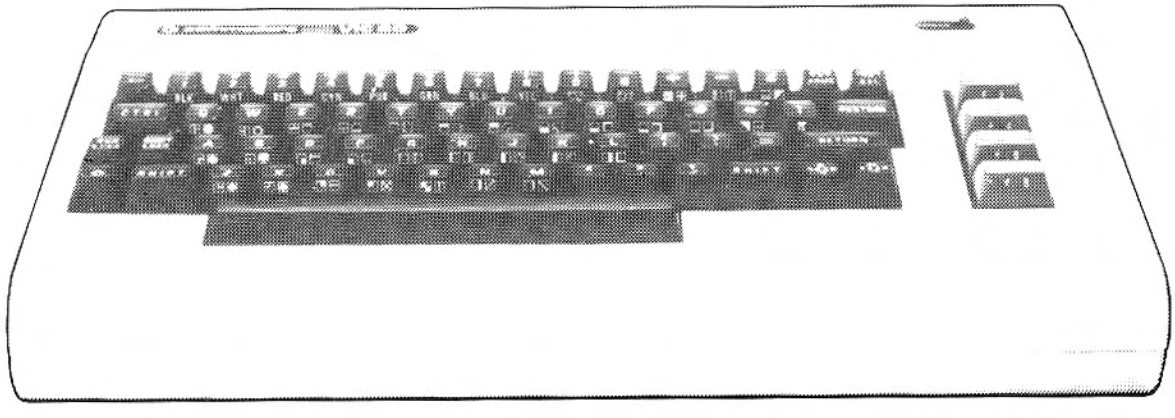

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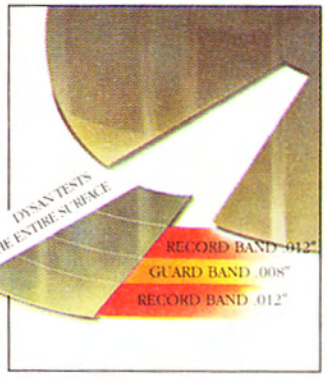

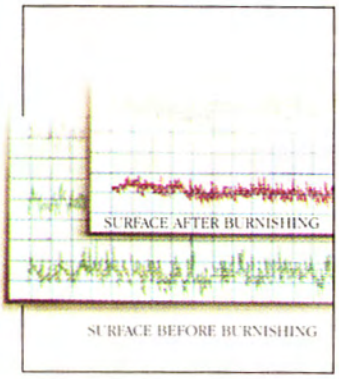

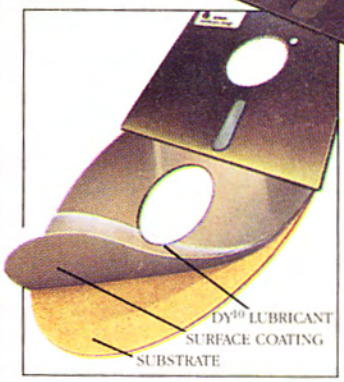

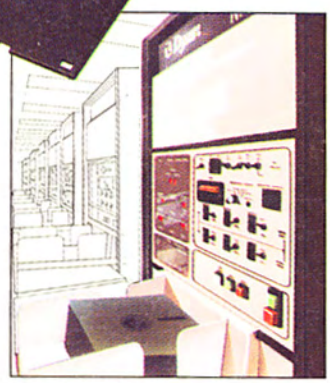

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