NEW ZEALAND'S PERSONAL COMPUTER MAGAZINE

BITS & BYTES

September 1983: $1.25

Two new colour computers reviewed: Dick Smith's low priced VZ 200 and the powerful Colour Genie

Customising the System 80 plus new graphics card

Multiplan spreadsheet program reviewed

Telecommunications for the Micro user — tap into OASIS

BIRTHDAY ISSUE

Colour Genie

VZ200

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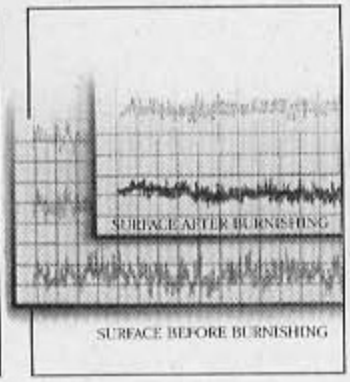

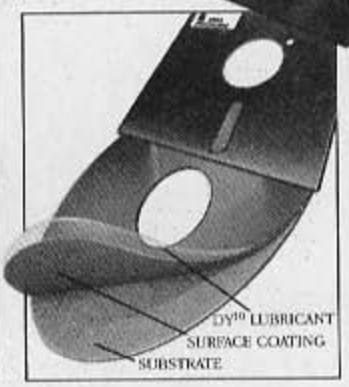

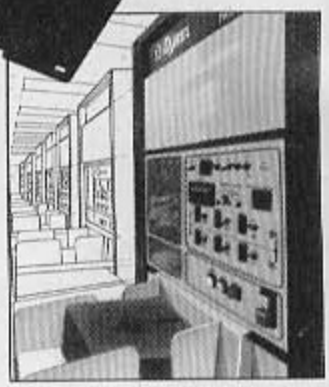

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BITS & BYTES

September, 1983 Vol.2, No.1 ISSN 0111-9826

FEATURES

Communications: 11 to 17
The worlds of communications and computers are merging, and access to the data banks of the world promises to enrichen the lives of micro owners. Pat Churchill, Rob Fullerton, and Selwyn Arrow look at what the Post Office is doing in telecommunications, at access to overseas databases, at OASIS, and at this country's new micro database, the New Zealand beginning.

Education: A bonus issue. 27
Paul Vincent and Allan Clark's paper offering a plan for compatibility in software in New Zealand schools. Ken Ryba, of Massey University, reports on a North American visit and computer literacy in schools. Mike Wall has news of a videotape about LOGO, that's available for use by schools and others.

Hardware Reviews:

Colour Genie 21
Jay Mann tests the Colour Genie — the colour System80 as it were — and likes it, especially since there's a way to tap into some of those black-and-white TRS-80 programs.

VZ200 18
The Dick Smith VZ200, the lowest priced colour computer on the market, is given the once over by Rob Fullerton, and he finds it good value.

System 80/TRS-80: A bumper issue. 40 to 44
Wouldn't colour, graphics and sound be nice on your System 80/TRS-80? Gordon Findlay reviews a Christchurch made card that makes all this possible. 40
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Software Review: Multiplan Spreadsheet program 24
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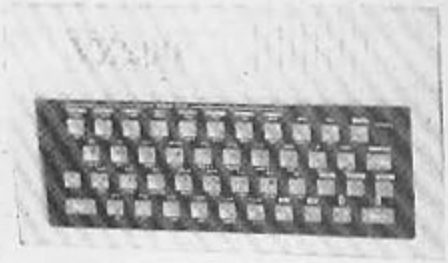
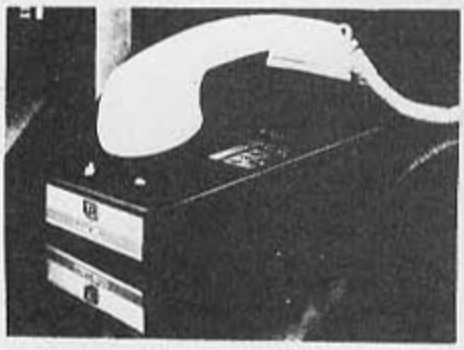


VZ200 18

Colour Genie 21



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EDITORIAL

Bigger, better, and a little dearer: we're on the march

Two changes have occured to "Bits & Bytes" this month. The first is a price rise. The magazine now costs $1.25 in shops, and subscriptions have increased from $8 to $10 a year for adults, and from $6 to $8 a year for school pupils (these increases will be applied as subscriptions fall due for renewal).

The second change is to the format. The pages are bigger, we're using more expensive, glossy paper, and we'll be including more colour pages.

The price rise s not caused by the change of format. The Department of Trade and Industry approved the rise on the basis of accounts for the then existing format of the magazine.

We, the publishers, are sorry to raise the price. The truth is, that when setting up the magazine our inexperience caused us to underprice it.

At its new level, $1.25, BITS & BYTES is still not expensive, compared with imported computer magazines, and since it went on sale last October (the first issue was free), the size of this magazine has increased 50 per cent. We are also striving to make each issue better than the last.

We look forward to the day, in a year or two, when the magazine is making enough money :o pay adequately those who spend hours at their word processors writing articles, sharing their computer experience with the thousands of other New Zealanders who read BITS & BYTES.

In the meantime, we will work to increase readership and advertising so that we can keep the magazine growing in size, in quality, and in its usefulness to computer users and to the country. If you regularly read a copy that someone else buys you can help by taking out a subscription. If you already buy BITS & BYTES, stick with us: the game has just begun.

— Neill Birss

The 64 on display

By PAT CHURCHILL

Clearly the woman in the little black cocktail number had gone to the wrong reception room in the James Cook Hotel when Commodore held their Wellington demo day for the Commodore 64.

"Gum-chewing, button-pushing kids," she said to her companion after a quick spin round the display.

Others who came to watch the machine go through its paces were considerably more enthusiastic and dealers are reporting follow-up calls from those who had their interest aroused.

The chaired demonstration programs which put the 64 through its paces had a continuing captive audience, the games kept the young (and not so young) waiting for hands-on thrills, and the word-processing demo's attracted considerable interest.

Commodore reps were kept busy fielding a wide range of questions and the table of peripherals provoked many queries.

While U.S. prices for the 64 have tumbled to around a $400 low and prices in New Zealand will inevitably fall, according to one Commodore man, even at $1295 the interest was high.

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Customs inquiry at end of stage one

The Customs Department investigation of duty and sales tax on computers and software has reached the end of its first stage.

At the request of the Minister of Customs, M· Allen, a team from Customs headquarters has been making a review. After hearing submissions, many of them from "Bits & Bytes" readers, the team has made its first report. This will now go back to all who made submissions so that they may make final comments. The team will then deliberate again and a final report will go to the Minister, who will make a decision.

In its initial report, the team makes no recommendation on the computer hardware tax of 40 per cent, on the ground that this is being considered with the report/review of the Industrial Development Commission on the electronics industry. (The IDC came out against the high level of tax.)

The first report makes four recommendations:

1. That the computer tariff structure should be separated from that for the various other goods with which it is now lumped.
2. That the rates of duty on computer software should be consistent with New Zealand's international obligations. This means, in effect, that software should be duty free from all sources.
3. That the tariff should be discussed with Canada and Australia with a view to having a completely free structure.
4. That the valuation of software be consistent with the valuation code of the General Agreement on Trade and Tariffs (G.A.T.T.).

This fourth point would mean that the value assessment would take into account the cost of the medium, the cost of the information on the medium, and the cost of putting the information on to the medium. (The present assessment takes the cost of the medium, the cost of putting the information on to the medium and adds 100 per cent.)

What this means for micro users is that there's a lot of fighting left to do.

The second and final report of the Customs Department team will be released to the public only at the discretion of the Minister.

Now micro users should begin bringing to politicians' notice how they feel about the duty on software, and should also let the politicians know that they are right behind the IDC in opposition to the iniquitous hardware tax. Put the local M.P. in the picture; put the Minister in the picture; and clubs might consider making joint policy statements on the matter to local newspapers. Members should discuss the matter with as many non-users as possible. We must convince the country of the importance of this issue.

Osborne hard disk

Sirius Systems, Ltd, has completed arrangements for the supply of hard disk drives for the Osborne 1 microcomputers. The Trantor range of hard disks will be available in three sizes: 5 Mb at $5,146; 10 Mb at $6,006; and 15.0 Mb at $7,615, including an interface. Deliveries have already started. Other interfaces for brands such as Apple, are being evaluated for the New Zealand market.

CED machines

CED Distributors, Ltd, the national agent for Apple is branching out into other brands. It will distribute the Spectra Video, a 43K machine made in Hong Kong and retailing in New Zealand at $899 ($719 to schools).

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MICRO NEWS

Cheap printers

Home-computer users will shortly have a choice of two new low-cost printers to choose from, reports Shayne Doyle. The first is the STAR STX-80 thermal printer made by Star Micronics in the United States. It features 80-column print at 60 c.p.s. with true descenders, foreign language characters and special symbols. It also offers both fine detail dot graphics and block graphics. The Star STX-80 is handled here by Access Data and costs $NZ462. The second printer is also from the U.S., the Mannesmann Tally Spirit. This is a conventional dot matrix printer loaded with facilities for its low price. Printing 80 cps, it offers 40, 71, 80, and 140 characters per line; upper/lower case alphanumeric; bit image and block graphics; four type styles including italic; and more. Although the exact price is not known yet, the agent, Anderson Digital, expects it to retail for around $900. Also coming from Tally will be a new MicroPlotter three-colour plotter. Watch for reviews on these units, coming up soon.

French videotex

Readers of the articles on telecommunications in this issue of *Bits & Bytes* will be interested to learn that Videotex Systems, Ltd, has picked French Teletel software to provide its proposed videotex service for New Zealand. Videotex Systems is a subsidiary of Computer Consultants, Ltd, and Fourth Estate Holdings. CCL has concluded an agreement with a leading French software house, Telesystems, to develop a new software package based on the more advanced French software. Videotex Systems originally planned to offer services using British Prestel software, but a spokesman for the company says that the French software is much more advanced; in particular, in its ability to access databases, public or private, stored on third-party remote computer systems.

American prices

The following prices are from advertisements in the "New York Times" of June 19, and show how badly New Zealand is affected by the computer tax: Apple III 128K's for $US1795 ($NZ2800) when bought with some software packages; Apple IIe's (64K) for $US859 ($NZ1340) with packages; Osborne's $US999 ($NZ1558).

Bundling

The same issue of the "New York Times" says that micro manufacturers are tending increasingly to market bundled systems, with software, printer and data storage combined, rather than competing for price on the basic unit. The newspaper cites the Coleco Adam which will sell for $US600 ($NZ936) and include a daisy-wheel printer, tape-storage, joysticks, and a word-processing package. The paper predicts that more versatile micros such as the Commodore 64 will drop so much in price that they will crowd out the VIC-20's, just as the latter have crowded out games-only machines. It predicts that the IBM Peanut, to be released this northern autumn, a 16-bit machine selling for under $US1000 will accelerate this trend. The paper lists the Commodore 64's June wholesale price in America as $US200 ($NZ312).

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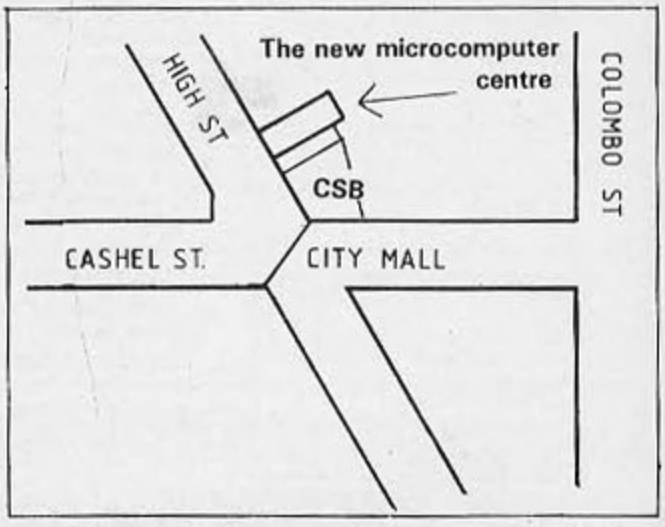

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MICRO NEWS

Bee sale

Newlands College, Wellington, has recently bought 5 MicroBee IC's. Keith Irvine, computer studies tutor at the college, reports that they will shortly link them as a network, and they are interested to contact other schools using MicroBees. Wellington seems to becoming Bee country, just as the BBC is staking out Christchurch, and the Polys are well entrenched in Rotorua. Shayne Doyle reports that the South Wellington Intermediate School, is about to purchase a set of 10 MicroBee computers. These machines will extend the school's computing power from its original couple of ZX81's. It is intended to network the machines later this year.

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Oric release

The Oric-1 computer, a rival for the Spectrum, is due to be released here next month by the New Zealand agent, Barson Computers. More details then.

But Barson's, also New Zealand agent for the BBC, says the down-market version of the BBC, the Electron, is unlikely to reach these shores this year. In fact, after much delay the Electron was expected to be released in the United Kingdom only this month.

Help! Bump! Help!

An Auckland sports club appeals to readers of *Bits & Bytes* for help.

The Auckland Offroad Racing Club, which promotes and organises races for four-wheel-drive vehicles, requires a portable system for collating, tabulating, and printing out race results. These need to show elapsed time, class, places, over-all positions, etc, all at present manually calculated.

The club will provide transport and "logistics" support, of course, and offers trips to unaccessible parts of the country for the helpers (two-way trips if the system works).

Anyone interested in helping should contact Brian Hartley, Box 85-015, Sunnynook, Auckland.

Copyright

The public have a chance to make their views known on copyright, and there should be plenty of micro users, programmers, and software buyers and sellers with something to say. The Industrial Property Advisory Committee was set up by the Minister of Justice in 1981 to advise him on all aspects of industrial property (paterts, trademarks, and designs) and laws and practices. The committee's brief also covers many copyright matters. Right now the committee is preparing to examine the question of protection for computer software — whether it exists in New Zealand now, if not, whether such protection should exist, and how it might most appropriately be provided.

The committee will liaise with the Law Reform Division of the Justice Department, which looks after "pure" copyright matters, as necessary.

Very few submissions have been made to the committee, and there are no indications that more are forthcoming. However, it is keen to hear from any interested companies, associations, or individuals.

If you have a submission to make please advise Mr R.W. Jackson, the secretary, as soon as possible. Submissions should be sent to:

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Bizarre bazaar

Mike Wall writes that some amazing stories have been circulating about "special prices" to schools for major computer purchases. If your school is thinking of buying a dozen or so be prepared to ask for a very generous discount on the list price, he suggests. Some distributors of machines new to the market are offering prices which just can't be ignored, he says.

Science package

Software Arts, of Michigan, has introduced a TK!SolverPack for introductory science, retailing in America for $US100. This is the third in a series of application packages designed for use with the TK!Solver program, for solving problems in business, science, engineering, and education.

The introductory science TK! SolverPack includes 12 models, each of which contains equations, values, and tables for solving problems in physics, chemistry and biology.

The TK!Solver program is available for the IBM Personal Computer and will also run on the Digital Professional 350 personal computer, the Digital Rainbow 100 personal computer and the Wang Professional Computer. Versions for other major brands of personal computers will follow.

It is of interest that the McGraw-Hill Book Company has signed an agreement with Software Arts. Under this, the publishing firm will produce and market special TK!SolverPacks to accompany the Software Arts programs.

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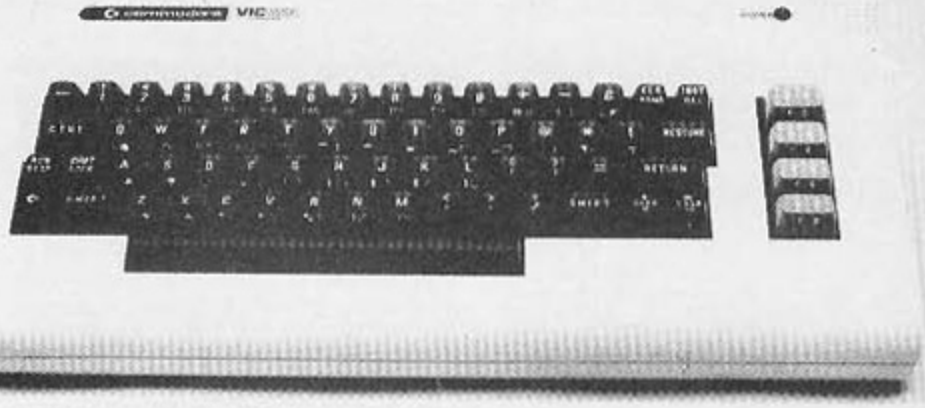

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Controlling irrigation

By CHRIS McLEOD

In earlier articles I have pointed out that if a computer is going to be used on the farm, it must be used more than just to do financial work. There is nothing wrong with using a computer for financial work on the farm, in fact they are very useful. The problem is that a computer is an expensive option when compared with farm consultants, etc. To justify a computer on economic grounds, you must have some other task or tasks which it can be used for, which will either save you money, or make you money.

In this article, we will look at one system, which in the right circumstances, would allow you to make considerable savings. Irrigation scheduling is where an optimal irrigation plan is prepared given climatic conditions, soil type, and irrigation applications. A program is being developed which takes these factors into consideration, and determines the best time to irrigate specific crops on the farm with the appropriate amount of water. A computer can carry out this procedure much more efficiently than could be done by hand, mainly because of the complex relationships between water availability and crop response for different crops.

By using the program, water use can be tailored much more exactly to provide each crop with the correct amount of water at the right time to reduce water stress to a minimum. This results in much more efficient use of the irrigation water and irrigation equipment. Consequently, better yields for the crops can be achieved with the same amount of time and water being used.

Another use for this program is to use it to get an indication of what the irrigation requirements will be for a given mix of crops before you have sown the crops. By doing this several times, changing crop types and areas, you will be able to decide on the best mix of crops, and the area for each of these crops before they are planted. This will only be an indication because climatic effects cannot be predicted with certainty, but it is much better than anything available at present.

Because of the cost of irrigation, and the differing responses to water application at different stages of growth, this system could easily be justified on many irrigated cropping farms, and on some irrigated pastoral farms as well.

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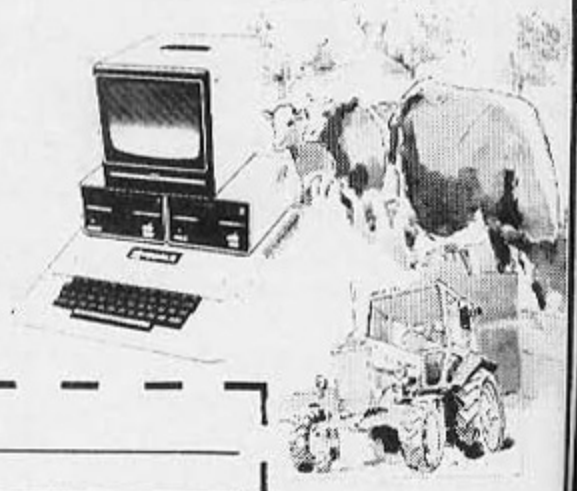

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Hooking up to the wired society

By PAT CHURCHILL

Once you've mastered your machine's version of Space Invaders, spent your tax refund on a memory upgrade, and had a garage sale to raise funds for a printer, you probably feel you're really into computing.

You've computerised your home accounting, your cheque-book balance has started agreeing with your bank statement, you've catalogued your library and your record collection, learnt how to play chess, and written to all your relatives.

What other tricks can you and your computer get up to?

If you've spent too many hours alone burning the midnight oil while you debug programs, or try to get the space rocket to move up the screen, you might be moved by the urge to start communicating with the outside world again. But can you bear to leave your precious machine?

No need to. You can move beyond your four walls without having to leave your beloved hardware. It is all just a telephone call away.

While home computing is still in its infancy in New Zealand, more machines are being sold every week and more and more people are getting hooked. Although we don't yet have our own equivalent of America's Source or the Australian Beginning which offer home computerists the power and services of a large computer, that day will surely come and present upgrading work being done by the New Zealand Post Office in telecommunications will ultimately benefit hobby computerists.

The Post Office operates several telecommunications networks capable of carrying data traffic, the public-telephone network being the best known.

Many businesses subscribe to the Datel service, a service which provides for the transmission of data over the telephone network.

As the Post Office's Director of Telecommunication Services, Dave Richards, explains it: "Datel started off in the very early days of data communication because the only network that was available was the telephone network, so people developed ways of transmitting data over the telephone system.

"When someone is speaking normally, they produce a wave pattern, an alternating-current speech pattern, and that is what a telephone is designed to handle.

"Now data, when it comes out of a terminal such as a teleprinter terminal or a computer comes out as noughts and ones, or marks and spaces and it's coming out as pulses of electricity. It might go negative, positive, negative, positive. Feed that into a telephone line and it won't go anywhere."

This is where a modem — a modulator-demodulator — comes into play. The signal is fed into a modem, which takes the signal and converts it into tones. In this form it can be transmitted down the telephone line into a second modem, where it is converted back into pulses to go into another computer.

At present, our telephone network is what is called an analogue system: speech is transmitted down the line in an almost exact representation of speech frequencies.

But, says Mr Richards, we are switching to a digital system where speech is monitored and then converted into digital signals. "That is, it's all in bits, just like a data

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transmission, and it's re-assembled at the other end."

While some countries have digital signalling on their transmission lines, they are still using the old analogue type exchanges, whereas New Zealand will eventually have a system that is completely digital — transmission and exchanges.

One of the benefits of this will be a better performance where transmission of data is concerned. There will be fewer errors, Mr Richards says.

Another benefit, when we have a fully digital network, will be that a much simpler and cheaper interface unit will be able to replace the present relatively expensive modems.

An alternative to the modem, which is electrically connected, and has to be wired up, is the acoustic coupler. This has a microphone in one end and a loudspeaker in the other. A telephone handset fits into the coupler and the microphone receives the tones from the telephone line and converts them into pulses for connection to the computer.

"We can't stop people from using them — we wouldn't even try," said Mr Richards. But the Post Office gives warning that acoustic couplers are not as reliable as electrically connected modems.

"That doesn't matter for communicating within New Zealand, or certainly not within the same town because the telephone system is of pretty good quality. There's no great loss of signal strength, so the acoustic coupled modem works pretty well."

But when people get on to international circuits, they can run into trouble, he says.

"It only needs someone to bang a door or knock a table and that can create a noise in the box that will get through into the computer and cause trouble such as mutilation of data."

Another Post Office development includes a new range of telephones, and these could provide a problem for acoustic couplers. Although the ear and mouthpieces are the same distance apart, the handset may not fit some couplers. Coupler users may have to stick with their old phones.

Old or new, push-button or otherwise, the telephone can provide you and your computer with a link to the outside world.

If its micro news in Auckland — telephone AK 491 012

The link with DIALOG

By ROB FULLERTON

Information communicated over the telephone lines is the wave of the future – the very near future – and the owner of a microcomputer system has a significant head start. With the provision of a modem and some software the personal or business computer owner has direct access to a storehouse of information which even the richest library could not provide.

In New Zealand access to these databases is usually made via the Post Office CASIS service. This service provides the telephone connection between the elected host computer system and the user and covers access to Australia and the United States. Access is also available through the system to British databases.

To connect your computer to any of these remote databases you will need a serial interface and a telephone modem. The serial interface converts the parallel data in your computer to a data stream of single bits which are then fed to the modem which connects to the telephone line.

Most business microcomputers have an internal serial interface available as an RS-232C output port requiring only connection to a modem. Personal computers may have a serial interface for connection to a disk drive which could be pressed into use but most will only have a Centronics-type parallel output, usually used for a printer. Several parallel-to-serial converters are available either as commercial units or as hobbyist kits which can provide the necessary interface.

There are basically two methods of connecting a modem to the telephone line: modems and acoustic couplers (see article in this issue of "Bits & Bytes" by Pat Churchill).

One point that should be noted is the OASIS service is full-duplex and some acoustic couplers as described in popular electronics magazines which require manual switching between transmit and receive modes will not work in this application.

The connection to a modem requires that your computer be programmed to act like a terminal with some special characteristics. The OASIS service operates at 300 baud in a full-duplex mode and the software must input and ouput data at this rate. Package programs enabling computers to act as intelligent terminals are available for most systems and popular computer brands. An excellent article in *"Microcomputing" October, 1983,* by Geoffrey Sinclair, covers many of the desirable features for terminal emulators and lists 27 available packages.

DIALOG

DIALOG is a subsidiary of the Lockheed Missile and Space Co. Inc, and had its beginnings as a specialised database produced for NASA in the early 60's. Since then DATALOG has "gone public" and increased the number of databases and subject coverage.

Today, DIALOG is one of the largest public information retrieval systems with a staggering volume of literature referenced in over 160 databases. Every major field of information is covered, from business and economics through to medicine and biosciences. There is even a complete electronic yellow pages compiled from all the 4,800 United States telephone books.

Two databases of particular interest to computer buffs are the *Initial Software Database* and the *Microcomputer Index*.

The software database provides a comprehensive collection of information about more than 10,000 computer programs specifically designed for use with micros and minicomputers. Each record in the database includes basic data on where to secure the item as well as an abstract about the intended purpose of the software package. Items indexed include compatible computer type (IBM-PC, VIC-20 APPLE etc.), operating system, language, minimum memory and distribution medium.

Microcomputer Index is a subject and abstract guide to microcomputer articles from 40 periodical sources such as 'Byte', 'Info World', 'Personal Computing' etc. Included are general articles about the microcomputer world, book reviews, software reviews, discussions and descriptions of new computer products. The file covers articles from 1981 onwards and contains about 15,000 records at present.

Access

Assuming you have your computer and modem set up the next step is to apply for access passwords to

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AMOUNT ENCLOSED: .....

BB

DIALOG. The first set of passwords required is for OASIS and these are obtained by writing to the Telecommunications Division of the Post Office in Wellington. The OASIS service can link you to DIALOG via two telecommunications networks in the U.S.A. so you should request passwords for both the TYMNET and TELENET systems. This gives the security of an alternative network access should one system not be available.

The DIALOG password is obtained free of charge by writing to:

DIALOG Information Services Inc.
3460 Hillview Avenue,
Palo Alto CA 94304,
U.S.A.

While there is no charge for the password, it may be cancelled if it is not used within six months.

To understand the operation of the system and the commands necessary for searching it is advisable to invest in the "Guide to Searching" literature obtainable for DIALOG. This consists of a large ring binder which contains an explanatory text on the format and function of each command and a separate sheet for each database, giving details of the subject coverage.

The present cost of this literature is $US35 via surface mail. DIALOG also publishes a monthly news booklet giving details of any changes or new features on the system. This is posted free to each registered user.

Searching

Since DIALOG is most likely to be used by people with little or no computing knowledge the format of an information search is structured in simple English commands. Every word within each reference is indexed by the computer so that it can be searched for independently.

A search consists of searching for single words or groups of words which convey the meaning of the search topic. You can search title and abstract words, names of authors or corporations, dates, codes, journal names or any other special portion of the record.

After completing each search the system returns the number of references which satisfy the search words and gives a unique set number to each. By entering further searches a whole group of sets, each containing the reference to different topic concepts, can be accumulated. These sets are then logically combined using the Boolean operators 'AND', 'OR' and 'NOT'.

The result is a further set containing the references which satisfy the logical expression. These references can then be displayed on your terminal if you wish or the set can be combined with other sets to create a complex search strategy. The searching technique is considerably easier to accomplish in practice than it is to describe.

For example, suppose you wished to retrieve references from the *Micro-computer Index* on applications of the Votrax speech synthesiser chip for the Apple II computer. The first search, for the word, Votrax, would retrieve all references to that word and place them in set 1. The second search, for Apple II, would produce set 2. These two sets would then be combined with a logical AND to produce a third set which would contain only references to both words. These would then be displayed on the terminal or printed off-line at DIALOG for later mailing.

The search would look like this (computer response in italics)

	Set	Items	Description
Select Votrax	*1*	*6*	*Votrax*
Select Apple II	*2*	*125*	*Apple II*
Combine 1 and 2	*3*	*5*	*1 and 2*
Type 3/5/1-5			

This last command displays set 3 in format 5 on the terminal. There are further powerful commands which allow multiple concept searching and transference of searches from one database to another without re-entering, etc.

While DIALOG in its present form must really be considered primarily a research tool for libraries, businesses. and academic institutions rather than a service for home computer owners, the potential market in this area is expanding.

To move into this area DIALOG has launched its Knowledge Index service. This provides low-cost access to 12 selected databases covering a broad range of subjects. The service is available to U.S. users during evenings and weekends, and provides all of the DIALOG features at a flat rate of $US24 per hour, including telecommunications charges. It is interesting to note that billing is exclusively through credit cards.

Changed your address?

Please return your complete subscription label with the new address marked on it.

Viewdata and the micro

By PAT CHURCHILL

A database designed for the hobby computerist could be a spin-off from the Viewdata system when it is introduced in New Zealand, according to Dave Richards, Director of Telecommunications Services for the New Zealand Post Office.

This has happened in the United Kingdom, where the British equivalent, Prestel, now offers a service for hobby users, Micronet 800.

A subscriber, using his computer keyboard and an acoustic modem, can call Micronet 800, enter his identification number and then be on-line to one of the world's largest databases.

He can browse, learn, send messages, watch demonstrations, choose games and load free software straight from the system into his own computer.

In addition, Micronet 800 offers more than quarter of a million pages of Prestel information, giving fast access to news, travel, holiday, and entertainment information, including an electronic booking service, plus City and commodity prices which are regularly updated.

Among the first micros which currently access the system are the BBC Micro, Commodore, TRS-80 models I and III, Apple II, RML, and Spectrum. All the leads, hardware, and software needed, have been offered at special introductory prices starting at around £49.00. The average subscription will be £13.00 a quarter, covering both Micronet 800 and Prestel, plus the cost of a local phone call to connect subscribers to the system.

Games programs are changed often and subscribers can choose from about 100 compatible with their kind of micro to load and use when they like. There are also on-screen games to play, plus big-prize games and quizzes.

Other offerings include educational programs, armchair shopping facilities and electronic banking, and a mailbox service.

And this, says Mr Richards, "is the sort of development we can expect to see in New Zealand now that Viewdata has been approved and one or two companies have started setting up Viewdata services".

It shouldn't prove too difficult to provide a home computerists' facility, he says. "They need the programs, but Britain is finding a lot of people are happy to write the programs and make them available free of charge just for the thrill of having a program they've written passed on to other people."

The Post Office's involvement in Viewdata is confined to transmission, Mr Richards says.

"We'll be providing a Viewdata access switch so that people can access the Viewdata services. Our part of it is more like a special exchange designed to separate the data traffic away from the telephone network so we can carry it more efficiently and reduce the chances of causing congestion on the telephone network."

Mr Richards says there will be a charge for the use of the Post Office access switch, or rather the use of the telephone network. This will be 10 cents a minute for calls within the local telephone area, and 17 cents a minute for calls elsewhere in the country.

He sees the major consumer of Viewdata initially as the business community, but he envisages the home computerists will eventually be catered for.

And he feels the personal computer will be widely used as a Viewdata terminal.

"It seems to me a much more attractive proposition to buy a home computer with a Viewdata package on it for $2000 or whatever they cost than to pay out $600 or $700 just for a Viewdata adaptor."

Another advantage is computers, being software programmable, can be made to emulate either a Prestel or Teletel terminal, overcoming all the standards problems.

While the technical specification for Viewdata terminals hasn't been finalised, Mr Richards says, it will include a requirement for an electrically coupled modem so a good, reliable service will be available without too much interference.

He says the Post Office will be ready for Viewdata services around the beginning of 1984.

Home computerists will be keeping their fingers crossed for a development such as Micronet 800.

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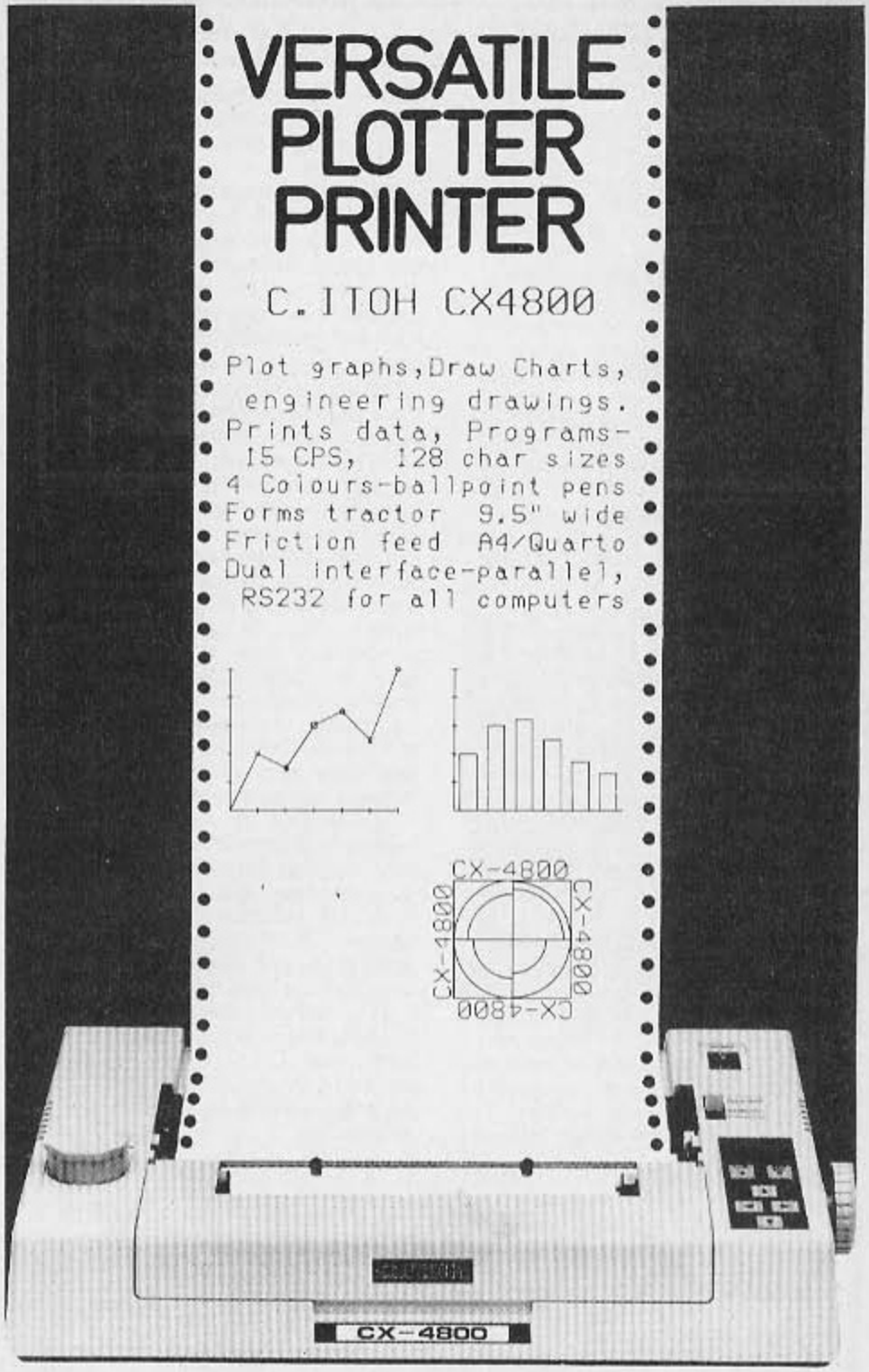

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Beginning about to start

By SELWYN ARROW

The New Zealand Beginning, a dial-up database beginning this term, will be able to provide schools with information and more than 1500 Apple public domain educational and general use programs, plus a large quantity of Australian written programs available here under licence.

Installed in a Data General MV6000 mainframe computer at IDAPS Computer Service, Auckland, this database is the first of its type in New Zealand.

Mr Brian Eardley-Wilmot, the director of CED Distributors Ltd, the N.Z. licensee of the system says, "The New Zealand Beginning may well expand into other sectors in time but initially it's for education, and the opportunities for schools are immense."

This national database provides a means to transfer programs and information between any school and the database using an ordinary telephone and an Apple computer.

Eight dial-in lines will be available initially. The majority of users will be in the Auckland area initially, but with the packet-switched network soon to be available from the Post Office, other schools will be able to gain access without having to make a toll call.

To provide access to this system CED will soon be announcing an introductory package designed for the Apple computer (II Plus or //e). This will consist of an acoustic coupler, an interface card and a founder's subscription for one year's use.

Getting on-line to the database will then require booting up the Apple, dialling the telephone number, placing the telephone handset into the acoustic ccupler and then keying in a password and an ID number when requested.

Information and programs are then selected and dumped onto disk so that they can then be reviewed at leisure. This is advisable as the connection time cost is $15 per hour, pro rata. With an average call lasting about five minutes it is necessary to use that $1.25 efficiently. Even so this adds up to providing low cost programs and information on demand.

The use of an identification code means that orly those who know it can transfer confidential data. This transfer may be from person to person or school to school. Another option will allow anybody to leave 'Bulletin Board' information for those who care to look it up.

This dial-up database will be 'user driven'. The users will decide what is in it, not CED. Programs can be added to the database at will so that all may benefit from each donor's efforts.

OASIS: a pool of information

By PAT CHURCHILL

Need to know something about aquatic sciences, education, electricity, mining, lighting, chemical engineering, horsebreeding, cold and tropical regions . . . anything?

Through OASIS — Overseas Access Service for Information Systems — subscribers can access a wide range of computer databases in Australia and the United States. And your home computer could be used as a terminal to retrieve information through this data communication service.

OASIS can be accessed by the use of a standard Post Office Datel installation (modem and business telephone) to which a terminal can be connected.

Terminals used must be capable of operating at 300 bits per second (30 characters per second) using ITA No 5 code (ASCII code) with V.24 (RS232) data interface.

As an alternative to using a Datel installation, OASIS can be accessed by using acoustically coupled terminals with the above characteristics.

Once you have the necessary equipment you make arrangements with the overseas host computer operator.

The Director-General at the Telecommunications Division (Data

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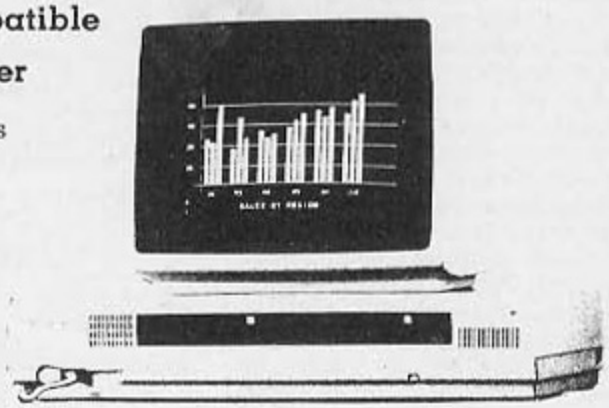

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and Leased Services) at Post Office headquarters in Wellington can provide Tymnet and Telenet directors which list data accessible via those networks, and information about Australian databases.

You must also register with the Post Office as an OASIS user. This can be done at your nearest telephone services branch. You'll be issued with an OASIS user-name and password for each database system involved and detailed OASIS operating procedures.

Dave Richards, Director of Telecommunication Services for the Post Office, says OASIS is working quite well and around 200 subscribers have signed up in New Zealand.

"The communication charge is not dear."

Calls to Australia are 80 cents a minute, with calls to the United States 60 cents per 1000 characters exchanged, plus 20 cents per connect minute. These charges are included in the caller's telephone account. Charges for the use of the database service are settled directly between the computer operator and customer.

"The database charges can be quite expensive," Mr Richards said. They could be up to $100 an hour. "But if you're doing research, you might be able to get the information you need via OASIS in half an hour at a fee of perhaps $20, compared with three days' work via your usual channels." In terms of your time, it could prove a lot cheaper.

The Post Office is disappointed that OASIS is so far a one way thing, no New Zealand databases operating, Mr Richards says.

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Trade-ins: bytes for bucks

By PAT CHURCHILL

As the home-computing virus creeps steadily through the country, so the second-hand market grows.

Sometimes a person setting out on hobby computing isn't willing to invest a whole lot of money in case this proves to be an interest that doesn't last. He buys a low-cost machine that will enable him to get started but soon finds he's hooked, has outgrown his little machine, and wants to move up.

Eighteen months ago few micros appeared in the classified ad columns of New Zealand newspapers. Today, it's a different story.

Some people choose to sell their old equipment themselves, others trade up at their dealers.

At Data Link in Wellington, for instance, sales of second-hand equipment are steady, according to John Pitchforth.

Home computerists changing from one brand to another will often trade in everything – machine, printer, software.

Others stay with the same brand of computer, but trade in for a later model. They are likely to stay with their peripherals and software. Data Link has been advertising secondhand Apple systems lately as people move from their Apple IIs to the Apple IIE.

Whereas a new Apple small system will cost $4765, the second-hand ones have been selling for $2700.

With a second-hand car wear and tear is usually evident – you can see the balding tyres and rust holes for yourself if they're there. With a second-hand computer are you likely to be buying a pig in a poke?

Mr Pitchforth says computers last a very long time. "The mechnical parts would wear out rather than the electronic components."

Data Link has its own workshop, and, says Mr Pitchforth, local components are usually used when repairs are done. Experience has taught which parts are likely to go, too.

When it comes to bytes for bucks, second-hand equipment can provide the way for a person to afford the kind of micro he wants.

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Dick Smith VZ200: good value

By ROB FULLERTON

Dick Smith Electronics has released another personal computer on the market to follow closely on the heels of the Wizzard computer. The VZ200 uses a Z80A processor running at 3.58MHz, which must be the fastest clock of all the low-priced personal computers to date.

The computer is quite small, being only nominally larger than the keyboard and 50mm thick. It comes in an attractive white plastic case with the keyboard built into a sloping matte black surround.

A power-indicator LED is the only other feature on the front of the case. An on/off switch is located on the right-hand side. Across the back of the computer there are four sockets for 9v DC power, cassette tape, video monitor, and TV output. There are two edge connectors covered by protective metal plates for the add-on memory expansion and peripheral interface. Power comes from a separate large plug pack rated at 12v 1A. It has a generous length of lead.

Also incluced with the computer is a lead for connection of a standard audio cassette for program storage and a lead for connection to a monitor or TV. This TV lead is, unfortunately, only long enough to reach to a set placed on the same table as the computer. Other items included in the package are a BASIC reference manual, a book of application programs and a demonstration cassette.

Keyboard

The keyboard is the same used in the Wizzard computer, which is not surprising, since both computers are made by Video Technology, Ltd, of Hong Kong. The moulded-rubber keys are set in a QWERTY arrangement with the standard ASCII character set. Each key performs up to four functions, including the ASCII character screen printed on the keytop, the single key Microsoft BASIC commands, the cursor control, and the on-screen editing.

The alternative functions are accessible by use of the CTRL key in the same manner one would use the SHIFT key. The single-word BASIC commands are printed on the computer above and below each key. All keys except CTRL have an auto repeat facility if held down for more than one second. This is very useful for cursor movement.

Comments I made about the keyboard of the Dick Smith Wizzard computer *(Bits & Bytes, June)*, also apply to the VZ200. The longevity of the screen-printed characters on the keys and the long-term contact reliability of the key switches remain to be proven.

Video display

The VZ200 can use either a colour TV set or a colour monitor for display as both RF and video outputs are provided. The internal RF modulator is tuned to channel 1, Australia, but the picture in N.Z. will come up on channel 2 because of TV channel allocation differences between the two countries. Some re-tuning will be necessary to get the best picture.

The display area for the computer occupies a rectangle covering about two-thirds of the screen. In the text mode there are 32 characters per line with 16 lines displayed. Even with this smaller active display area the characters are sharp and easy to read. The stability of the picture was a little disappointing, however, with persistent diagonal ripples visible on both the TV and monitor displays. The upper-case ASCII character set is displayed and can also be set to inverse video.

Editing

An excellent feature of the VZ200 is the on-screen editing capability. The cursor control keys allow you to position the cursor over any mistake in a line and then, by pressing INSERT or RUBOUT, change the required characters. This saves having to re-type the whole line again as with some computers. The auto-repeat function is very useful here as continued pressing of the RUBOUT will erase as many characters as required. These editing functions rank as one of the most desirable features of this computer, especially for the beginner.

Graphics

Two display modes are available, text mode and graphics mode. In the text mode, the ASCII character set is displayed as well as the 16 chunky graphics shapes. These characters may be displayed in eight different colours with a choice of two

background colours. For graphics mode the screen is divided into 128 x 64 pixels, each individually addresssable. Each pixel may be programmed on or off with the SET and RESET commands. The pixels may be any of four colours with two background colours. The 8192 pixels displayed in the graphics mode produce quite acceptable resolution for games and data displays.

Sound

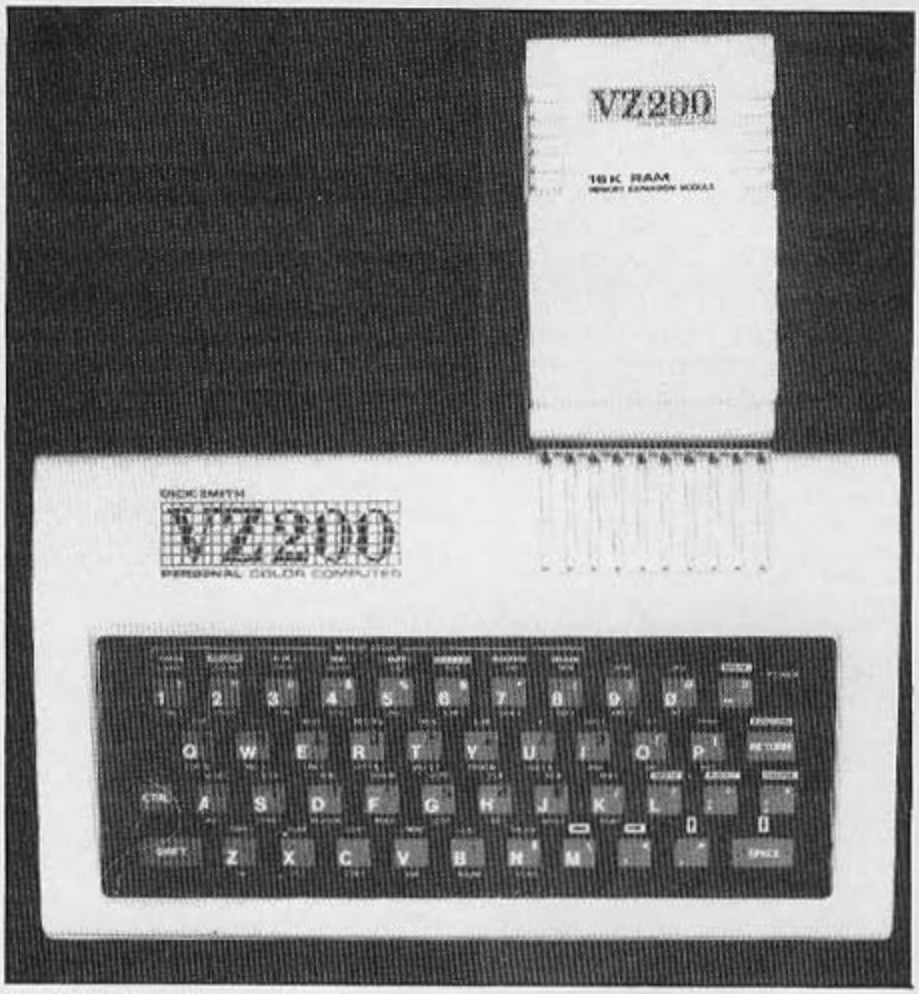
It is possible to generate sounds on the VZ200 through the internal piezo speaker. Control of the tone frequency and duration is by the SOUND command. Programmable music notes covering 2½ octaves with nine different note durations are available. The sound is very tinny, and with only one channel it can hardly be considered suitable for "serious music programming" as claimed in the advertising leaflets. It is adequate for games only.

Cassette data storage

For program and data storage the VZ200 provides a connection to an audio cassette recorder. An interconnection lead is supplied with two miniature jack plugs on one end and a stereo plug on the other. The stereo plug goes into the computer socket marked tape and the others plug into the ear and mic sockets on the recorder. A demonstration tape comes with the computer which shows off the colour and graphics capabilities.

I found some difficulty in loading this tape as the volume setting for the recorder playback appears quite critical for a successful load. There is no provision fo· cassette motor control. The di·ficulty is cured, however, by putting a 15-Ohm resistor in parallel with the earphone connection, i.e. soldering it between the two wires.

Five BASIC commands handle storage and retrieval of data from the



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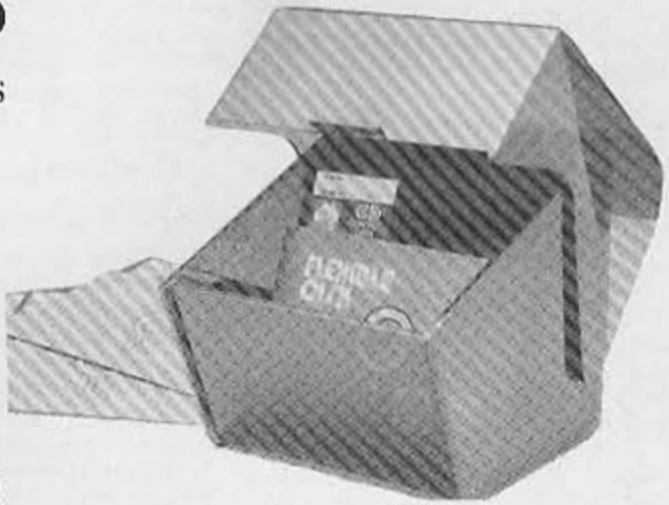


cassette. In addition to the usual CLOAD and CSAVE commands there is a CRUN command which works like CLOAD+RUN.

The VERIFY command checks the data on the tape against the RAM data after a CSAVE. This is particularly useful, as the RAM contents are not overwritten and another CSAVE can be given if the first load was erroneous. Files on the cassette are given a 16 character file name, so several files can be stored on a single cassette and the required file loaded by including it's file name with the CLOAD command.

As well as commands to store programs on tape there are two commands, INPUT # "filename" and PRINT # "filename", which allow storage and retrieval of variables and data from within a program that is already executing. The data on the tape is assigned to the variable list given in the INPUT # command. Similarly, the variable list after the PRINT # command is written to the tape. This feature makes a very flexible tape storage system and with a little programming ingenuity multiple mailing list programs and the like should be possible.

BASIC

The VZ200 comes with an 8K version of Microsoft BASIC with 8K enhancements in ROM. This is an excellent version of BASIC for such a low-priced computer and contains many of the features only found on more expensive machines. For example, enhancements such as IF ... THEN ... ELSE and PRINT USING are included as well as the USER function for machine code programs.

The BASIC Reference Manual guides the new user through the fundamentals of the language and explains the use of each command with examples. It cannot, however, be considered a serious guide to Microsoft BASIC and a user would have to consult one of the many texts available to obtain the details of the language.

For instance, the published specifications for the ROM BASIC quote single-precision, floating-point maths functions with nine-digit internal precision and eight digits displayed. I found, however, that double precision was available using the D format (eg. 1.2345D+3) instead of the usual E format (eg. 1.2345E+3) and that results can be calculated and printed with 16 significant digits. This suggests there may be other enhancements in the ROM which are undocumented.

Microcomputer summary

Processor:	Z80A running at 3.58MHz.
Memory:	ROM 16K with BASIC interpreter and operating system. RAM 8K (2K screen-6K for user programs). Expandable to 24K, with optional plug in module. Price $149.
BASIC:	16K Microsoft BASIC.
Keyboard:	45 keys in modified typewriter format. Keys auto-repeat after 1 sec. Single key BASIC command entry.
Screen:	Text Mode — 32 char. x 16 lines. Upper case ASCII plus 16 graphics characters for 64 x 32 graphics. Inverse video. 8 colours with 2 background colours. Graphics mode — 128 x 64 pixels individually addressible. 4 colours with 2 background colours.
RF output:	RF modulated signal on VHF channel 2. Cable supplied.
Video:	Composite video 1.4v P-P. PAL compatible. 75 Ohms impedance.
Sound:	Inbuilt piezo speaker. Music notes covering 2½ octaves with 9 note durations. Speaker "beeps" for keyboard entry.
Cassette:	Interface connects to standard audio cassette tape recorder. Data rate 600 baud. Cable supplied.
Power supply:	Plug pack. Output 10v DC at 800mA.
Manuals:	User manual, BASIC Reference Manual, book of sample programs.

Memory addresses for the video portion of RAM are given for text and graphics modes. This enables PEEK and POKE to be used for direct screen addressing in graphics and games programs. The INKEY$ command, which polls the keyboard and returns the key value if pressed or a null string if no key is pressed, is a further feature which enhances games software. It is unfortunate that a complete memory map is not included.

The greatest feature of a computer with Microsoft BASIC is the enormous range of software written in this "industry standard" language. There are many books of programs written for Microsoft BASIC including those for the TRS-80 and the System 80. These should provide the VZ200 owner with an extensive software library to adapt to his computer.

Memory expansion

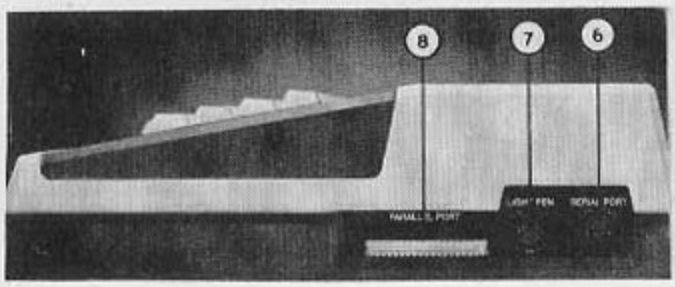
The memory of the VZ200 can be expanded from its internal 8K RAM to 24K with the addition of the 16K expansion module. This plugs into the rear of the computer in the appropriately marked socket. It is a rather bulky package which relies only on the edge connector for physical attachment. If the computer is to be lifted it would seem wise to unplug the module before moving to prevent undue strain on the connector.

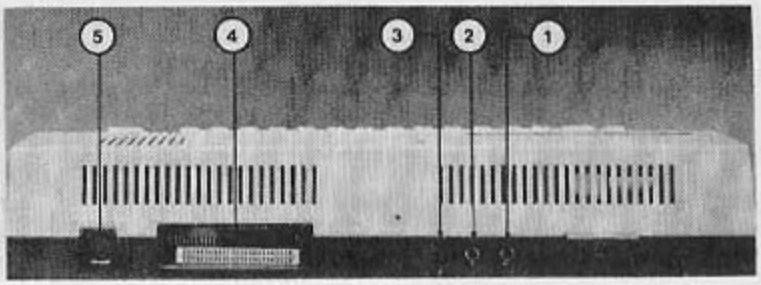
The other connection at the rear of the computer is available to accept an interface for a Centronics-type printer. This interface, with printer cable attached, is obtainable from Dick Smith for $99. The Microsoft BASIC provides good software interface for a printer as the LPRINT command can be used with the USING command to give formatted printing. As well as the LLIST command is a COPY function which allows the screen contents to be dumped to the printer.

The expansion of the VZ200 is not limited to a printer only. The product leaflet quotes joysticks, games cartridges, larger expansion memories and serial and floppy disk interfaces as "coming soon".

Summary

For the first-time computer purchaser the VZ200 offers excellent value for money at $349 for a complete up and running system. The 16K Microsoft BASIC interpreter has many enhancements not found on other personal computers in the same price range. The single key BASIC commands and on-screen editing make it an ideal machine for learning to program. The memory expansion to 24K and a printer interface make the VZ200 a powerful performer. The keyboard is definitely a disappointing feature, however, this should not prevent the prospective first time computer purchaser from giving the VZ200 very serious consideration.





The Colour Genie

By JAY D. MANN

Most users of the TRS-80/System-80 computers would agree that their chunky black-and-white graphics are not very appealing. On the other hand, these machines share an enormous base of matured software that covers a large range from business to games.

It must have seemed a clever idea for EACA (the Hong Kong manufacturers of the System-80/Genie/PMC) to build a colour computer that was like a System-80 with high resolution and colour-graphics enhancements. They have succeeded in producing a very attractive machine.

The Colour Genie has a 64-key board with full directional keys, another key to change from letters to graphics characters, and four programmable keys. Lower-case is built-in, but the normal output is upper-case and SHIFT brings lower-case. Since this bug also occurs with the original TRS-80/System-80 computers, a software "fix" should be possible.

I did not like the firm springing of the keys, and was annoyed the keyboard bounce occurred on several keys. On the other hand, key layout seemed reasonably logical, while the separate REPEAT and CONTROL keys were handy.

Sixty-four graphics characters are accessible from the keyboard. These comprise a well-chosen set of half-circles, horizontal or vertical bars, hollow squares, checkerboards, and fine-line graphics. They can be printed in any of eight colours.

My son was delighted with the tanks, UFOs, screwdrivers, and dinosaurs that he could draw with these ready-made graphics. You can program your own special 8 by 8 matrix characters — 128 of them in addition to the 64 standard ones. The colours are not stored with the characters. That is, they will show up on the screen in the colour determined by previous colour command.

On the low graphics page, located at 4400H, you can intermix both normal letters and these 192 additional characters. This display has 24 rows of 40 characters each. (The SET and RESET commands of TRS-80 computers are not applicable here because the old 3x2 block graphics characters are not standard.)

1. Video output ┐ Colour monitor
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An additional full graphics page is also available, and can be software-toggled back and forth with the low page. On the full page, resolution is 160 across and 96 down. New commands, CIRCLE and PLOT, are available. PLOT will draw lines from multiple pairs of x,y locations. NPLOT erases lines.

Four background colours (including black) are controlled by FILL, while BGRD reverts to pink. PAINT is supposed to fill outlines with any of these four colours, the edges being independently coloured. I had some trouble with it until I discovered that the edge colour must match the foreground colour.

A completely different kind of SHAPE table is used in the full graphics page. By building up a byte table that includes both colour and directions, you tell the computer what colour stylus to use and which way to move it. Only one shape can be defined at any time (at least from BASIC) but it can be plotted anywhere on the screen and scaled to various sizes. XSHAPE can be used to toggle these shapes to any of four colours. This approach to graphics is like that used by the Apple computer.

Gun shots and sirens for the kids

Sound effects are generated using the same unbiquitous General Instruments chip that is to be heard on, say, the VIC. The three musical channels are controlled from BASIC using a PLAY (channel, octave, note, volume) command. This PLAY command is a nice convenience, since it provides automatic computation of frequencies.

Dedicated noise fans can drive the GI chip directly using "SOUND register, data" commands; that technique provides for the realistic gunshots, sirens, wolf-whistles, and screaming bombs without which no household is complete. The sound effects are modulated on to the video signal and are normally heard from your TV set. A direct sound output for a separate amplifier is available at the back of the computer.

Similarly, those with colour monitors will find a composite video signal available on the back panel. The video modular box contained four integrated circuits plus one or two transistors, a nice change from the usual cheap-and-nasty, one-transistor circuit.

One of the games tapes provided a good demonstration of the machine-code capabilities of the Colour Genie. Waves of rabid moths circled, dropped smart bombs both straight down and diagonally, and finally resorted to kamikaze dive-bombing tactics. Each wave had its own colour. Their angry humming blended with the rat-a-tat-tat of the defender's weapon, plus the loud bang each time an insect exploded.

There is no doubt that the hardware of this computer can be used for some very effective and enjoyable games. The available 32K of RAM lets game designers exercise their imaginations without having to fit into a limited memory space. But where will these game designers come from?

The internal hardware of the Colour Computer seems to be well designed. There is a separate power supply with good heat-sinking, alongside the single through-plated solder-masked circuit board. Most of the numerous integrated circuits are standard LS types with three 40-pin chips: the Z80 microprocessor, a 6845 video controller chip, and the GI AY-3-8910 sound-effects chip that also provides two 8-bit parallel ports. One of the latter ports is used for the optional joysticks, or for a parallel printer. A piggy-back board carries several EPROMS.

The optional joysticks, incidentally, are well balanced and worthy of use on a variety of computer systems. A short ribbon cable connects the joystick "motherbox" to the computer; two joystick boxes rest on this box, or else can be hand held, since they have coiled cables.

Each unit has 12 buttons (10 digits plus two unlabelled) and the analog joystick itself.

A new BASIC command, LET A1=JOY2X, is used to read in a joystick value. Similarly, the pushbuttons are available with LET N1-KEYPAD1. Note that the joysticks will not automatically work

Microcomputer summary

Name:	EG2000 Colour Genie
Manufacturer:	EACA International, Hong Kong
Microprocessor:	Z80
Clock speed:	2.2 MHz
RAM:	32K
ROM:	16K
Input/output:	Parallel port (non-standard connector); one RS-232 port; one cassette port; one composite video output; one direct audio output port; one modulated sound/video port (channels 2 or 3); one light pen port; one expansion port.
Keyboard:	Typewriter style, 64 keys
Display:	Text/lower graphics page 40 characters x 24 lines; upper and lower case.
Languages:	Microsoft BASIC (full TRS-80 standard plus hexadecimal or octal numbers, renumbering, graphics and sound commands); ZEN assembler cassette available.
Graphics:	8x8 dot matrix graphics in eight colours on lower graphics page; 160 x 96 pixels in four colours on upper graphics page.
Sound:	3-channels of tone, 1-channel of noise, output either to external amplifier or via TV set.
Cost:	$795.
Options:	Centronics Printer Interface with cable ($155); dual joystick controllers with digital keypads ($189.50); light pen; cassette recorder ($119.50); plug-in software cartridges; disk drives 150K (one including expander $985, two $1595, three $2270); software/hardware manual; dot matrix graphics printer 30 c.p.s. $612.50, 50 c.p.s. $733.50.
Other features:	Repeat key; mechanical shift lock; eight strings can be programmed into function keys for convenient use.
Reviewer's ratings:	Documentation 3, ease of use 4, language 4-1/2, value for money, 4 as hardware, 2 as software, Support, six months guarantee. Repairs in Auckland.

Review unit from Rekon Computers, P.O. Box 9308, Auckland.

COLOUR GENIE

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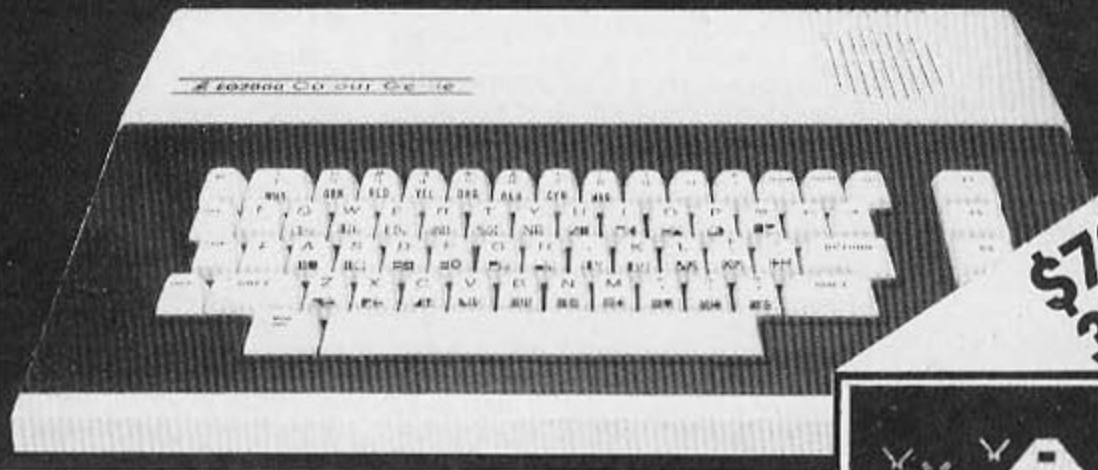

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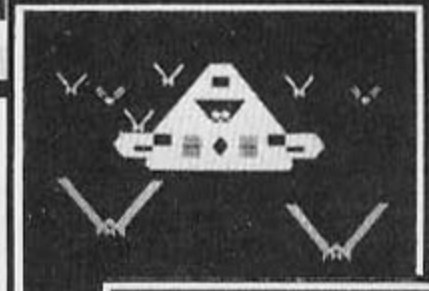

Colour Genie is now available in New Zealand offering the home/business user a sophisticated computer with Z80 CPU and full size type-writer style keyboard, a system of immense power and flexibility at a low affordable cost $795.00

Colour Genie has as standard a massive 32K RAM–normaly a very expensive extra for most home computers.

Colour Genie has considerable software already available and supports the equipment to translate the vast library of TRS 80 programmes onto the Colour Genie system.

Colour Genie comes with full colour and extensive graphics; 28 pre-defined, 128 user-definable, a total of 256 graphics set. The high speed cassette interface runs at 1200 baud which allows 15K to be saved in 100 seconds.

Colour Genie can take three disc-drives, a master with expander and 8K boot-up ROM included and two add-on drives. Each drive will be single density, 40 track with 150K Bytes formatted–a total of 450K on disc and 32K RAM on board!

Colour Genie has superb sound which connects directly to television or any Hi Fi system. The custom chip alows four arguments; channel (1-3), octave (1-8), note (0-12) and amplitude (1-15); in addition, there is also a noise "special effects" channel.

Specifications

Processor Z80. **Clock Speed** 2.2 M-z. **RAM** 32K. **ROM** 16K.

Language Extended Microsoft BASIC. **Baud Rate,** 1200. **Standard Accessories** 2 Users Manuals, 1 Demonstration Tape, 1 Cassette Recorder Connector Cable.

Video Video output or RF with sound modulated output. **Text Mode** Flashing cursor, upper and lower case.

Display 40 characters by 24 lines. **Resolution** 160 x 96 pixels.

Keyboard Type-writers style ASCII 58-key keyboard with repeat key and cursor control keys. 4 Programmable Function Keys allowing 8 dedicated or programmable functions.

I/O Ports One parallel port, one RS-232C port, one cassette port, one Video output port, one Audio output port, one RF + sound modulated output port, one light pen port, one expanson port.

Optional Accessories:

EG 2012	Centronics Printer Interface with cable	$155.00
EG 2013	Joystick Controllers (pair) – 6 bit analogue	$189.50
EG 2014	Light Pen	
EG 2016	Cassette Recorder	$119.50
EG 2300	Master drive, 150K	$985.00
EG 2300D	Master drive and 1 add-on drive in same case, 300K	$1595.00
EG 2310	Add-on drive, 150K	$675
EG 3018	Daisy-chain cable	$144.50
EG 2330	Software/Hardware Manual	
EG 602	Dot matrix Graphics Printer	$612.50

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The Colour Video (continued)

with any game program unless that program specifically checks for joystick input.

The tape recording format has been changed. Tapes SAVE and LOAD at 1200 baud. Both the EACA tape recorder supplied (not very impressive, with an inoperative latch and an invisible tape counter) and my 12-year-old portable tape recorder loaded without a hitch. Contrast this with the worried, prayerful attitude of a typical TRS-80/System-80 owner as he tries once again to load his favourite game without incurring a "C" error.

Hitch in using TRS-80 software

Now the bad news. Because of technical limitations with colour TV sets, and because of the improved graphics, most of the machine-code games for the TRS-80 will not run on the Colour Genie without significant modification.

Purely word and number-handling BASIC programs will work with little or no changes. This ought to ensure that Colour Genie owners will never run out of programs. It is not possible to read a "standard" 500 baud tape with the Colour Genie in its present form, but the New Zealand agent, Rakon Computers, now has available a utility program (priced at $44.94) which will allow the Colour Genie to do this. It will allow some compatability between the Colour Genie and System-80/TRS-80 software. In addition Rakon Computers says it has 50 plus programs already available for the Colour Genie.

There is not really enough documentation for the Colour Genie at present. Two manuals were provided with the machine. The first, a Beginner's manual, was top-notch, and got a new user into operation immediately.

The second manual is a reasonable reference guide to BASIC and to the Colour Genie enhancements. Unfortunately there is neither a table of contents nor an index, so its utility is limited.

Eighty-two pages are devoted to a rehashing of the Microsoft BASIC, which is common to the older S-80 computers. It might have been wiser to include one of the better TRS-80 user manuals so that the Colour Genie manual could have concentrated on changes and enhancements. Instead, only 33 pages are devoted to the graphics and sound commands.

The manual descriptions themselves are very good, with numerous examples. I found myself stumped for quite a while with the SHAPE programs on pages 101-103 until I realised that the expanded memory on machines imported to New Zealand means the Shape Table has to be poked into BF00H (-16639) instead of into 32 512 as per the manual. That sort of error has no business in a book meant for novices!

A third manual, with technical information, is promised, and I would strongly urge prospective purchasers to insist on having it before parting with their money.

I have very mixed feelings about the Colour Computer. The hardware is excellent, the graphics characters are varied, and the full graphics page could perhaps give Apple a run for its money. But the engineers made it awkward for the computer to access a wealth of TRS-80 software. Someone could adapt the older software base to this new machine. In the meantime, prospective purchasers ought to look carefully at the software actually available. Those who are anxious to write their own programs will find in the Colour Genie a well designed computer with both interesting graphics and a fine BASIC language.

Christchurch BBC's

In the last several months several Christchurch schools have swung sharply towards BBC micros, Wall reports. (This includes the country's biggest secondary school, Burnside High.) "Although the general mood is one of caution, and Apples still have the widest market penetration it is significant that those schools which have decided to invest in a major installation have all decided on the BBC.

"Once one or two more major purchases have occurred, BBC's will approach 'critical mass'. So many schools will be using them and pouring energy into making them effective teaching tools, that other schools in the Christchurch area would be foolish to buy a large system of anything else."

Microsoft's Multiplan: powerful and useful

BY PETER BROWN

Microsoft Corporation, of the United States, is well known for its BASICs, versions of which are found on many popular microcomputers. With the advent of Multiplan they have launched a major attack on the applications software market.

Multiplan is an electronic spreadsheet designed to assist those engaged in producing mathematical models that need to be powerful and sophisticated to be any good at all.

Like all such worksheets, Multiplan presents the user with a large work area marked off into squares (or "cells") that are identified by column-row references. The computer is used to replace paper, pencil, eraser, and calculator.

Each cell may contain either a value (which can be text or numbers) or a formula which manipulates such values. The spreadsheet may be formatted in a number of ways for reports, etc, and can be used to examine various outcomes of financial, engineering, scientific, or statistical problems.

Once you have loaded your spreadsheet software into the machine, you can design almost any sort of model your imagination can come up with.

Usually, you will start by labelling various rows and columns (e.g. by calendar month, or by expense, or revenue item), and then constructing formulas that relate the items to each other and to other data you will input. This is the hardest part and it is well worth taking great care to prevent problems arising later.

Then you can enter your data and watch as the machine calculates the consequences of each entry.

When you have entered all the basic information, you can change values, or formulas, and the spreadsheet will automatically re-calculate the effects of your changes. You can do this over and over, until you have results that are satisfactory.

With the calculating power of the computer to help, this work can be done in minutes — rather than days (or weeks) with a paper spreadsheet.

Multiplan is the latest in a long line

of electronic spreadsheets — a line that began with VisiCalc.

Like all spreadsheets, Multiplan provides basic formatting and arithmetic functions that cover most routine tasks. And, like most, it has trigonometric functions, as well as the ability to apply logical tests to select outcomes from alternative events.

With Multiplan, however, a number of additional features are available, including a standard deviation function, some strong manipulation facilities, a sorting command, and one or two quite advanced mathematical functions for the specialist user.

In fact, Multiplan's whole setup seems to be aimed at highly skilled and professional users. Despite claims to the contrary, it is not suitable for those with limited experience of this sort of package.

One of the most interesting features is its ability to link related worksheets so that material from one can be used automatically by others.

With this you can, for example, build regional reports on separate worksheets and combine their totals into another, national, worksheet for monthly or annual reports.

Another useful feature is the sorting capability. With this you can sort rows or columns into ascending or descending order, regardless of whether they contain text, numbers, or a mixture.

This can be an extremely powerful tool in the right hands (as can many of the other features), but great care must be taken since the formulas underlying the spreadsheet are sorted, too, and some editing may be necessary to ensure the logic of your model hasn't been sorted as well!

As far as the user is concerned, Multiplan provides a number of helpful facilities to make life easier.

These include prompts in ordinary English; protected cells (so you don't accidently overwrite something vital); a 50-page on-line (i.e., in the computer) "Help" menu to get you our of most problems with commands and functions; the ability to name cells, either individually or in groups — thus letting you use meaningful references in your formulas instead of the usual unintelligible gibberish (e.g. "gross profit" instead of R21C13); and excellent control over printed output.

VisiCalc fans are especially catered for by Multiplan. There is a provision for VisiCalc files to be read directly by Multiplan, although, of course, VisiCalc files cannot be *written* direct from Multiplan.

There is also a symbolic link (SYLK) file format which allows data interchange with other application programs. Multiplan files may also be written to disk in such a way that they can be accessed by, for instance, a word-processor.

Getting started, however, is not easy with Multiplan. While no great knowledge of computing is necessary, some background will be

Software summary

Program:	Multiplan
Made By:	Microsoft Inc., U.S.A.
NZ Agent:	Armstrong and Springhall, Wellington.
Hardware required:	Apple II, Olivetti M20, or any machine with CP/M. Also available for MS-DOS.
Uses:	Budgeting, financial planning, statistical applications, project evaluations, etc.
Price:	$400
Documentation:	Not good. Most things are covered but not always as clearly, or as thoroughly, as is desirable. Tutorial section of the manual is too primitive to be much use.
Ease of use:	Gets better with practice, of course, but use of ordinary English and extensive on-line "Help" menu are very helpful.
Facilities and functions:	Very wide range of functions available.
Value for money:	Very good.
Other comments:	Extremely useful piece of software for those who already have the skills to use it to maximum advantage.

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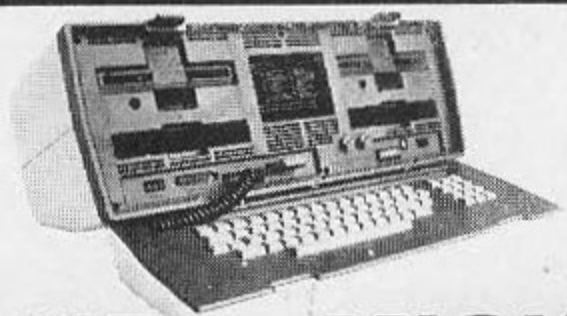

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SINCLAIR

A byte calculator

Here's a ZX81 program that will tell you how many bytes are used by a line of program, and also allow the comparison of an alternative statement. It was written by Ken Allan, of Wellington, and his son, Nicolas, on a ZX81 with 16K RAM, but it works equally well on 1K. It can be modified provided no changes are made before line 100, and lines 2, 6, and 8 are entered exactly as shown.

```
3       RANDOMIZE
4       LET A = 1
5       PRINT CLEAR
10      LET X = INT(RND(1)*79+1)
15      LET Y = INT(RND(1)*23+1)
17      LET A = A+1
20      IF A = 1 THEN
    :     PRINT CHR$(27) ; "[32m"
22      IF A = 40 THEN
    :     PRINT CHR$(27) ; "[31m"
23      IF A = 80 THEN
    :     PRINT CHR$(27) ; "[33m"
24      IF A = 120 THEN
    :     PRINT CHR$(27) ; "[34m"
25      IF A = 160 THEN
    :     PRINT CHR$(27) ; "[35m"
26      IF A = 200 THEN
    :     PRINT CHR$(27) ; "[36m"
27      IF A = 240 THEN
    :     PRINT CHR$(27) ; "[37m"
28      IF A = 280 THEN
    :     LET A = 0
30      PRINT CURSOR(X,Y) ; CHR$(154) ; CHR$(155) ; CHR$(7)
40      GOTO  10
50      END
```

BUSINESS

useful. You will need an intimate understanding of your problem and it will help if you are familiar with some of the more advanced functions, and their uses, or you will not be able to use the spreadsheet to its greatest advantage.

For a beginner, the manual provides no real assistance. There is a tutorial section but it is very primitive, and I doubt whether it will instil the confidence needed to successfully tackle, unaided, the more advanced features which are found in the reference section. This is unfortunate since these are what make Multiplan worthwhile.

Apart from this, and a number of minor niggles — such as having the columns labelled numerically instead of alphabetically (as is usual) — I found Multiplan a powerful, sophisticated, and useful tool for professional users. It's the type of program you graduate to after you have "cut your teeth" on something less sophisticated, but easier to learn and use.

There are versions of Multiplan for most machines, particularly those with CP/M. There are also versions adapted to specific hardware, such as the one reviewed, which was for the Olivetti M20. Depending on your luck, however, you could have difficulty tracking down a suitable package. It does not seem to be as widely available as might be expected.

Prices vary but about $400 is usual, depending on your machine.

The review copy was supplied by Paul Messervy, of Armstrong & Springhall, Private Bag, Wellington.

This is the last in the series of spreadsheet reviews by Peter Brown. He'll soon be back with more business computing articles.

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VISA

This paper was written jointly by Paul Vincent and Allan Clarke. Paul Vincent is head of mathematics at Wanganui Girls' College, but is spending 1983 at Waikato University as visiting teaching fellow in computers in education. Allan Clarke was in charge of the academic school at the Royal New Zealand Navy's training establishment, HMNZS Tamaki, before being awarded a Defence Fellowship to develop a computer-based teaching scheme for the Defence Department.

Towards compatability in school software

In January of this year, the Department of Education announced its decision giving tacit recommendation of the five following microcomputer systems: Apple II, BBC Micro, BMC 800, NEC PC 8001, Poly 1.

Some secondary schools have subsequently purchased one of the systems after conducting their own evaluation of their perceived needs. It can thus be seen that for the next few years at least, these microcomputers will co-exist in New Zealand secondary schools and eventually will be used in other schools. Virtually the only feature common to all machines is the use of the BASIC computer language, but even this exists in a different dialect for each machine.

At present there is no way by which a program written for one machine may be used directly on any of the other microcomputers. In the Performance Specifications (1982) it was stated that courseware (educational software and associated written material) would originate within the Department but until this happens and is proven, schools are limited to any commercial courseware or software (computer programs) available for their particular model and to programs written by teachers.

It is widely expected that the microcomputer will become one of the most powerful teaching aids yet devised. This destiny has yet to be fulfilled, however, and Moursund (1979) succinctly summarised the barriers to their wider acceptance and fuller utilisation as:

A. Lack of sufficient and adequate hardware.
B. Lack of appropriate software.
C. Lack of appropriate courseware.
D. Lack of adequately trained teachers.
E. Lack of adequate support from school boards, parents and taxpayers.

While the indications are that the first barrier is being breached, the others more or less remain intact four years later and the microcomputer now occupies the position which, 12 years ago, was held by electronic hand-held calculators, namely that of a fascinating if somewhat expensive electronic tool. A comprehensive survey of the literature reveals that there has been little or no progress in computer-based teaching in the last five years.

It can be even said that there has been no significant contribution to this field since the advent of the microcomputer eight years ago. In the current times of economic difficulties, any proposal to overcome more of the above factors must of necessity not impose a continuing drain on precious school funds or on the State education vote. This paper proposes a solution that will only incur nomina expenditure while greatly increasing the range of courseware available to all schools regardless of the brand of computer used or in the size of the school.

To be efficient as a teaching tool, computers must have a continuous supply of educationally sound courseware. Commercial courseware suffers from the following disadvantages:

A. It is expensive.
B. Frequently written for other-than-N.Z. schools.
C. Often educationally unsound; e.g. do not reteach when a student error is detected.
D. Mostly available only for one of the approved machines.
E. Unable to be edited if compiled (translated by the machine into machine language) or on protected disks (unable to be listed or copied).

Steinberg (1983) stated that persons who have taught the target population in an interactive dialogue mode are the ones best qualified to judge the suitability of courseware for that group. A corollary of this is that persons who have so taught the target population are best qualified to write courseware for them. However, it is observed that relatively few teachers are actively engaged in writing computer software.

They have first to know how to program efficiently and second know the special features of their particular microcomputer. Currently the programming process is extremely time-consuming (10-50 hours or more for a half-hour program) and the final product is invariably machine specific. Thus, contrary to other computer applications where processes are made easier, more efficient and much faster, computer teaching program preparation is a much more tedious and difficult task. A satisfactory system for providing courseware for school needs therefore would meet the following criteria:

A. Be inexpensive.
B. Follow N.Z. curricula.
C. Be written by teachers (preferably).
D. Be able to be written quickly; ideally in no more time than it would take to prepare an ordinary lesson.
E. Evaluated for educational soundness.
F. Be portable (able to be transferred to and run on any approved system).
G. Be free from copyright constraints.

The following proposed system satisfies all bar one of the above criteria. Requirements for evaluation and portability dictate that there needs to be some form of central clearing agency for courseware.

It is also necessary that one of each of the five microcomputers named by the Department is held by this agency. The four stages of courseware handling would be:

A. Evaluation by an expert panel of courseware/software submitted by teachers.
B. Transfer of software from the machine for which it was written to the other four machines.
C. Editing of software to suit each particular system.
D. Distribution to schools on request.

Software compatability

(continued)

Programs would be evaluated by an expert panel of teachers convened from schools in the vicinity of the central agency and, if necessary, returned to the author for program editing. On acceptance, the software would be transferred to each of the other microcomputers by means of a procedure developed using a VAX-11/VMS mainframe-type installation as a host computer for the transfer. A member of the unit responsible for this system (at the University of Waikato, say) would then edit the program as necessary to make it work well on the particular microcomputer(s) with which he/she is familiar. The courseware would then be available at a nominal fee (price of a disk or cassette plus a handling charge) to schools on request.

It has been suggested that the author of a teaching program should receive a small fee when the program is accepted. If only ten per cent of secondary schools in N.Z. were able to submit two good programs each year, this would make at least 70 new programs available annually to all schools under this scheme.

The factors that prevent a computer-based lesson from being prepared speedily are currently under investigation. A substantial improvement in the time taken to write computer lessons is nevertheless expected if the software procedures described below are followed.

Other fields in which computers have the promise of doing more educationally than is possible at present are continuing education, second chance education, retraining, correspondence schooling and education of the handicapped. However, a successful scheme of computer based education for the physically handicapped in particular would depend upon a freely available supply of up to date software such as that expected to be created for ordinary schools.

Software aspect

Software portability may be accomplished in one of three ways. These methods are presented in order of desirability, although the nature of the program being converted will determine which method is best.

1. **By using an authoring language.** Existing authoring languages may be regarded as simplified methods of programming which require the use of only a limited number of elementary commands. Their intended purpose is to enable teachers to produce professional-looking software without necessarily having any expertise in normal programming. These authoring languages have the limitation of being essentially textual in nature, only offering simple graphics facilities and often unable to fully utilise the mathematical functions available in the computer.

However, they can normally provide multiple-choice answering facilities and are often able to maintain records of students' answers.

A considerable amount of software can be produced by means of such an authoring language, e.g. PROFORMA (created by Dr John Collett, of the University of Waikato) or PILOT. It would be necessary to find or create a suitable educational authoring language and produce a version of it for each of the five recommended microcomputers.

Software produced in this way involves the creation of a text or data disk file which would be entirely in machine-independent code (the words and symbols used in programming). Versions of these text or data files produced by the mainframe transfer process (mentioned above) would operate without requiring any sort of modification. The author language master program is simply loaded into the computer; it will then operate upon the required text or data file to produce the desired result.

2. **By using a standardised coding format.** This concept involves writing as much machine-independent code as possible, to reduce the work of conversion to a minimum. The resident language in each of the five recommended microcomputers is BASIC, but there are a number of differences in each version which tend to thwart compatability. However, it is hoped that a standard version of BASIC will emerge within the next five years and be universally implemented.

At present about two-thirds of a program could be written in machine-independent code, which would form the first part of the program. When a disk or cassette is produced for a particular machine (using the mainframe transfer process), this portion would normally remain untouched (except for minor changes to cater for Poly 1 and Apple II). The remaining portion of the program would require conversion, but much of this work would involve the substitution of standard routines which could simply be "merged" into the program. The major task would involve the rewriting of any graphics routines which are used.

3. **By recording a non-standardised program.** This would be extremely time-consuming, particularly if the original program is poorly coded, but may be the only practical way at present to transfer some types of programs, especially in the mathematics and science areas. Generally, complete recoding would be required for each program, but one benefit of this method is that it becomes possible to take full advantage of each machine's unique strengths and to avoid any of its weaknesses. However, it is difficult to imagine the effective implementation of this option unless suitable persons are specifically seconded for the task, and it would seem that the amount of software requiring this sort of conversion would be relatively small.

Recommendation

That a microcomputer central clearing agency be established to:

- Receive and evaluate non-copyright educational software and courseware.
- Transfer software to each of the other four approved microcomputers and edit as required.
- Distribute courseware/software to schools on request.

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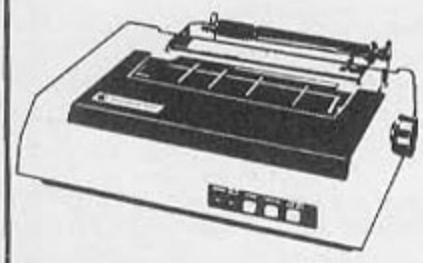

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Promoting computer literacy in schools

By KEN RYBA

Perhaps the most important impact computers will make on education is to show us how little we really know about learning and teaching.

Fortunately, there is a growing shift away from the limited view of computers as advanced teaching machines towards more powerful ideas concerning the role of computers as instruments of personal learning.

Computer assisted instruction (CAI) in particular has done much to highlight the probable limits of programmed instruction approaches and the tendency educators have to oversimplify the learning process.

It is reassuring to note the recent view that learning is more likely to be effective when children are put in control of computers rather than being controlled by computers. The main theme is that children should be able to use computers in some meaningful way to explore and extend their own learning. This changing trend has resulted in a great deal of attention being given to computer-literacy programmes in schools.

Recently, I visited a large number of computer-education projects in Canada and the United States. Everywhere I went it was evident that a major revolution was underway to develop computer-literacy as a core subject area in all school grades from kindergarten through high school.

I feel compelled to use the term revolution when describing these developments as many important and rapid changes were occurring. Many school boards are investing heavily in computer-literacy training for teachers with recognition that teachers will require the skills, attitudes, and resources to develop their own school-based programmes.

Typical of the many developments which are occurring across North America, the San Mateo County Office of Education in Redwood City, California, has established a Microcomputer Resource Centre for teachers. There, a variety of microcomputers are made available for use by teachers in evaluating and previewing various types of software. Teachers are free to try different types of computers and to gain experience through courses which the centre offers on programming, computer literacy, and teaching with computers. Public domain software which has been donated by firms and schools is available for teachers to copy free of charge for use in their classrooms.

Such a comprehensive service as this helps to ensure that computers will be integrated into schools as rapidly as possible. There has been rapid growth in the private sector with the establishment of many computer-education consulting firms (usually ex-teachers) who typically offer such services as computer-literacy training, advice on selection of hardware and software, and discount deals on computer systems. The rush is on, schools eagerly seeking to become involved in the computer revolution.

Universities are getting in on the action as well by launching computer-education courses and degree programmes for teachers. Interestingly, the universities were not particularly well equipped to meet these new demands for courses so have seconded many school teachers with computer-education experience to teach.

At the University of Calgary, for example, the Continuing Education Department offered a basic computer-literacy course 20 times per week along with many other specialst courses for administrators, special educators, primary school teachers, and so on. Generally, it seems that anyone with computer-education experience is in demand at the moment, having a near-endless stream of opportunities to engage in contract work. Many school boards in Canada and the United States have created new positions for microcomputer specialists to guide the introduction of computers into schools.

The rapid and widespread attention given to computer-literacy in education became particularly apparent to me through a conference I attended in Hartford, Connecticut. The conference, sponsored by the Council for Exceptional Children, was concerned with uses of microcomputers in special education. Originally estimating that 1000 delegates would attend, the final number of participants swelled to 2500 special educators, all eager to extend their own skills and knowledge.

Events such as these underline the enormous impact computers are having on all areas of education. I talked to many people who at their own expense were seeking to improve their own level of computer-literacy, viewing computers as a vital new part of education.

The above comments are not meant to impress or bewilder but to underline the enormous importance attached to the integration of computers into education. School boards overseas are moving rapidly as possible to develop computer-literacy programmes on the basis that this kind of literacy is vital for equipping children with the skills, knowledge, and attitudes they will need to meaningfully participate in a technologically advanced society. It is worrying that New Zealand has not made this commitment to computer-literacy and that the overall impact of computers on education has been much less evident here than in many other developed countries.

Our Department of Education has been slow to respond to the rapid developments with computers in education, but has nonetheless recognised the importance of doing something.

The Minister of Education, Mr Wellington, set up a Consultative Committee on Computers In Education during late 1981 to

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consider some possible courses of action. This generated lots of ideas on the subject but in practice very little has happened. A few other reports have been released by the department offering general advice on the use of computers in schools.

I find it worrying, however, that many senior education officials themselves lack computer-literacy skills and are not really in a position to offer advice that can lead to action decisions. I'm not intentionally putting these people down but simply suggesting that they are often out of touch with developments.

Computer-literacy is an intellectual and affective process. Putting it more simply, people need to learn how to operate and use computers (intellectual) and to feel in control of computers so that they can use them in some personally meaningful way (affective). The interactive nature of modern technology makes it imperative that we develop computer-literacy skills and attitudes by placing people in control of computers.

It concerns me that the Department of Education continues to put so much emphasis on intellectual tidbits such as computer awareness while placing less importance on the need to put children in control of computers. "Hands-on" computer-literacy programmes are needed to help ensure that children can use computing power for themselves. The question that remains to be answered then is how we go about creating the kind of computer-literacy programmes we urgently need.

Best come from the 'front line'

Overseas experiences have clearly shown that the best and most effective computer-literacy programmes are developed in the "front line" by computer-using educators. It makes little sense to have policy decisions passed down by head office when in fact we haven't even done the homework needed to translate these policies into practice.

Progress towards computer-literacy is most likely to occur as a result of efforts by keen, knowledgeable, and motivated teachers. I believe that we need to identify and employ these people now to prepare curricula, to organise and provide in-service training, to consult schools, and generally to assist with improving the over-all level of computer-literacy in schools.

This will require a positive response by the Department of Education in providing the facilities, release time, and other arrangements needed to get these programmes underway. We stand to benefit as well from the direct advice and guidance of overseas people who have the demonstrated expertise in the design of computer-literacy programmes. Direct links need to be established with organisations such as the International Council For Computers In Education, which, under the direction of Professor David Moursund, at the University of Oregon, offer resources and services to promote computer-literacy in schools.

Within the Department of Education at Massey University we are attempting to bridge the gap through offering both internal and extramural courses on computers in education. Recently we held an extension course on computer-literacy training for primary school teachers which was oversubscribed. Plans are underway to extend these courses to intermediate and high school teachers, tertiary educators, and administrators. Other universities are getting in on the action as well. Mention should be made of Dr Pip Forer, at the University of Canterbury, and Dr Larry Nelson, at the University of Otago, who both have made significant contributions to computer-literacy in New Zealand education.

Perhaps more than any other technical innovations, the computer revolution has the potential to increase the distance between developed and undeveloped nations. There is little doubt that New Zealand will have to follow overseas trends rapidly or run the danger of being left behind. Our ability to take part in the electronic revolution will be a function of the type of computer education that we provide for all people – but more importantly our children.

(Dr Ken Ryba is a lecturer in education at Massey University.)

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If you want to apply your TRS-80 to more than just standard peripherals, you need to know the internally generated signals and how each can be used under BASIC language program control. A book for the reader with a good understanding of commands in level II BASIC, and midway between the beginner and the advanced programmer/hardware designer.

Sams — **Our normal price $19.80**

Making the Most of Your TRS-80 Color Computer — **Peter Vernon**

Will help you create eye-catching visual displays, informative graphs and exciting games. And you can enhance them with sound and music from the computer. You can also explore program packs and a variety of other programs which transform the TRS-80 into a word processor, financial planner, typing instructor, games machine.

Prentice-Hall — **Our normal price $22.30**

TRS-80 Models I, III, & Color Computer Interfacing Projects — **William Barden Jnr**

Contains practical and easy-to-build construction projects which demonstrate how to interface the three machines to "real world" devices with a minimum of time and expense. Detailed instructions on building projects, and descriptive material on internal design of the computers.

Sams — **Our normal price $29.80.**

Using the Z-80 in the TRS-80 — **Elmer Poe**

Explains programming the Z-80 in TRS-80 machine language, leading you step by step through Z-80 architecture and instruction set in the the TRS-80. Guides you in devising machine language techniques and developing them slowly and progressively. Suitable for self study or introductory course. Covers both TRS-80 Models 1 and III.

Sams — **Our normal price $27.90**

Top-Down BASIC for the TRS-80 Color Computer — **Ken Skier**

Learn how to design BASIC programs from the top down. Covers user interface for games, animations and educational programs; breaking down a large project into subroutines; making programs user-friendly; writing programs in a readable manner.

Osborne/McGraw Hill — **Our normal price $29.80**

How to Write a Computer Program: Vol 1. TRS-80 Ed — **Ed Faulk**

Sets out some simple techniques for program development. Faulk offers no guarantee he will turn you into a "super programmer" but does claim he will make you a better programmer if you apply his methods diligently. Discusses planning, preparation for coding, coding, testing, documentation.

Prentice-Hall — **Our normal price $26.30.**

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Books for the beginner

Introductory

Basic Computing
A Complete Course — **Tim Crawford**

Provides a broad-based introduction to computer science and data processing suitable for a variety of levels in high schools, universities or industry. Begins with questions such as What is a Computer? Where Did Computers Come From? Gives detailed coverage of computer languages, programming, program structure, logic, testing, documentation and program maintenance.

Osborne/McGraw-Hill — **Our price $26.10. Save $1.40 and earn 2 bonus points.**

Mastering Computers — **G.G.L. Wright**

A good introduction for the initiated, or for use as a text in a computer-appreciation course. Covers the field from the basis of mainframes, through such everyday applications as bar coding to the possibilities of videotex and an electronic money system. Well written, concise, and well illustrated.

MacMillan Master Series — **Our price $9.45. Save 50c and earn 1 bonus point.**

Microcomputers in Plain English for New Zealanders. — **Brian Strong**

The first computer book for New Zealanders, and the book for the first-time computer users. Clear, precise and often humorous introduction to the world of the microcomputer for business people, those at home, farmers and teachers, industrial technicians and sports administrators. Assuming no previous knowledge of computers, the author explains the different uses of microcomputer, the way it works, the jargon of the industry, and the various equipment and programs available.

Reeds — **Our price $7.50. Save 45c and earn 1 bonus point.**

Hardware

Don't, or How to Care for your Computer — **Rodney Zaks**

An easy, entertaining guide to computer and peripheral preservation. Specific advice for the computer, floppy discs, hard discs, the CRT terminal, the printer, tape units, the computer room, software, and documentation. In the words of "Popular Computing" this book is "... cheap insurance".

Sybex — **Our price $22.75. Save $1.20 and earn 2 bonus points.**

From Chips to Systems: An Introduction to Microcomputers — **Rodney Zaks**

A superb, fast-paced journey through the history of microprocessors, the microprocessor chip itself, its support components, and the design of an actual microcomputer system. You'll find out that microprocessors were developed by accident rather than design, that early structural errors have become today's features and, most importantly, how easy it is to understand microcomputers.

Sybex — **Our price $37.95. Save $2 and earn 3 bonus points.**

Microcomputer Design and Troubleshooting — **Eugene M. Zumchak**

Considers every aspect of microcomputer design from the idea to the working system. Controller functions, the development system, read/write timing, good hardware design, the computer system, hardware testing and troubleshooting and the three basics of software design: documentation, philosophy, and technique.

Sams — **Our price $30.75. Save $3.35 and earn 3 bonus points.**

Keyboarding

Quick Keyboarding — **Vonnie Alexander**

Sub-titled "Competent Keyboarding in 6 Hours", this book by New Zealand Vonnie Alexander has a unique method for teach-yourself competent keyboarding. A wall chart of finger positions is included.

Methuen — **Our price $6.50. Save 45c. and earn 1 bonus point.**

Keyboarding for Information Processing — **Robert Hanson**

Enables a person to develop basic touch keyboarding skill in a minimum time. The person who completes the book will be able to key in alphabetic, numeric and symbol information; input numbers on a seperate 10-key pad; keyboard information quickly and accurately; understand some of the basic vocabulary used in keyboarding. Can be used for classroom or individual, self-instruction.

Osborne/McGraw-Hill — **Our price $8.95. Save 57c and earn 1 bonus point.**

NOTE: The Bits & Bytes Book Club order form is on the card in the centre of the magazine. Just fill it in as normal and return.

Language/programming

Applesoft BASIC.
A Teach Yourself Introduction — **Barrie M. Peake**

A manual for New Zealanders ... of learning BASIC with the Apple, instead of picking information from two or three. It has model answers. Inquires regarding terms for class sets welcomed.

John McIndoe — **Our price $9.45. Save 50c and earn 1 bonus point.**

Basic BASIC – English Dictionary — **Larry Noonan**

Specifically for users of the Apple, PET, and TRS-80 who have found programs in magazines or books that were exactly what they wanted, but were written for some other computer.

dilithium Press — **Our price $20.80. Save $1.15 and earn 2 bonus points.**

Beginning Basic — **P.E. Gosling**

An introduction to the language for first-time users. Also has lots of interesting digressions about such devices as tape readers.

Macmillan — **Our price $11.35. Save 60c and earn 1 bonus point.**

Discover FORTH: Learning and Programming the FORTH Language — **Thom Hogan**

Whether you are a beginner seeking information on this multifaceted programming language or a serious programmer already using FORTH this book is a reference that should not be overlooked. Describe FORTH syntax, specifically applicable to both FORTH 79 and FIGFORTH.

Osborne/McGraw-Hill — **Our price $29.90. Save $1.60 and earn 2 bonus points.**

Learning LOGO in the Apple II — **McDougall, et al**

LOGO's a Piaget-based way into computing. A multi-purpose language. Non-technical, learning by doing.

Prentice-Hall — **Our price $18.05. Save $1 and earn 1 bonus points.**

Program Your Microcomputer in BASIC — **Peter Gosling**

No previous knowledge of computing is assumed. The author says this book is designed to cut in just where the manuals have allowed you to get your new micro up and running. Instructions or groups of instructions are dealt with in activities, giving a complete course in the elements of BASIC.

Macmillan — **Our price $13.25. Save 70c and earn 1 bonus point.**

Mastering Computer Programming — **P.E. Gosling**

A complete, self-contained course from Britain for self study at home, or for use in the classroom. In one book, the essential information to learn programming. The language taught is BASIC. The author, a former lecturer in computing, runs a computer services company.

MacMillan Master Series — **Our price $9.45. Save 50c and earn 1 bonus point**

Inside Basic Games — **Richard Mateosian**

A fun introduction for anyone beginning programming. The author has chosen the medium of games to teach readers how to design error-free, interactive BASIC programs. Computer games are described in detail, then explained and analysed to illustrate how the games were developed. Rules, algorithms, and coding differences from the TRS-80, Apple II, and PET are also included.

Sybex — **Our price $25.15. Save $1.35 and earn 2 bonus points.**

Word processing

The Tenderfoot's Guide to Word Processing — **Barbara Chirlain**

Can I use a word processor in my profession or small business? What do I need in the way of equipment? Will a word processor be of use to me? These are just a few of the questions this book will answer.

dilithium Press — **Our price $18.95. Save $1. and earn 1 bonus point.**

Introduction to Word Processing — **Hal Glatzer**

What a word processor is. What is does. How to use one. How to choose one. A Word Processor is not se likely to generate cash flow, as it is to save time, trim labour, improve efficiency, and productivity, says the author. The "Bits & Bytes" reviewer described it thus: "An ideal introduction to word processing for the home-computer initiate".

Sybex — **Our price $21.80. Save $1. and earn 2 bonus points.**

Wordstar Made Easy — **Walter Ettlin**

In 14 easy lessons, this handbook demonstrates all the powerful features of the MicroPro Wordstar system. Lessons cover everything from loading, using the unique printing, text manipulation, and formatting functions. Spiral bound, it is ideal to use while working at the terminal.

Osborne/McGraw-Hill — **Our price $23.85. Save $1.25 and earn 2 bonus points.**

Atari

Some Common BASIC Programs: Atari Edition — **Lon Poole et al**

Seventy-six short programs to key into your Atari 400 or 800, giving you a powerful collection of financial, statistical, and maths programs. Each program is complete with source listing, documentation, and sample execution.

Osborne/McGraw-Hill — **Our price $29.90. Save $1.60 and earn 2 bonus points.**

BASIC Exercises for the Atari — **J.P. Lamoitier**

A practical and entertaining way to learn programming with Atari BASIC. Through step-by-step examples you learn the fine points of the language and how to write your own programs. This is what "Interface Age" said: "this excellent book ... teaches BASIC without talking down to the reader." The exercises run on the Atari 400, Atari 800, and the new 1200XL.

Sybex — **Our price $29.90. save $1.60 and earn 2 bonus points.**

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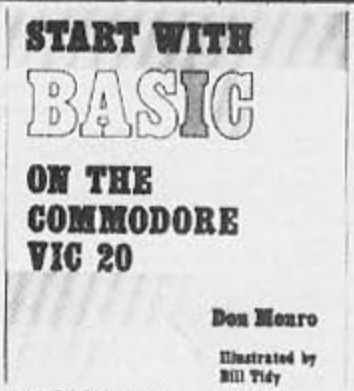

Start with BASIC on the Commodore VIC 20 — **Don Monro**

Don Monro is one of the snappiest, most humorous, and easiest to follow writers on beginning computing. This book with its illustrations by Bill Tidy, is an excellent guide for VIC 20 owners. The helpful exercises and line drawings make learning a snap.

Reston — **Our price $19.25. Save $1.05 and earn 2 bonus points.**

Computer books to read and use

Our new selection

Data Base Management Systems: A Guide to Microcomputer Software — **David Kruglinski**

Helps set benchmarks among the variety of data base packages — defines the capabilities of file, relational and network/hierarchical categories of data base management systems; provides criteria for evaluating data base software; examines several packages, some of which run under the CP/M system; discusses future products and trends.

Osborne/McGraw Hill — **Our price $33.80. Save $1.80 and earn 3 bonus points.**

Pascal for the Apple (book disk) — **Iain MacCallum**

Provides an introduction to Pascal as a first computer language. Use your Apple to help you learn programming Pascal. Uses graphics extensively — to entertain, provide experiments and programs, and teach the serious principles of program construction. Written as a self-teaching guide for those working alone and for students. No previous experience assumed.

Prentice-Hall — **Our price $53.35. Save $2.80 and earn 5 bonus points**

Two Dozen Exciting Programs for your 1K ZX81 — **B.W. Hempseed & G.R. Parker**

The authors, both members of the Christchurch Sinclair User Group, show what can be done with a 1K machine and offer plenty of hints and tips. Includes logic games, moving graphics, fun programs, and some more serious and useful programs. Listing can be studied to see how programs achieve their objective and the techniques applied to your own programs.

B.W. Hempseed — **Our price $9.45. Save 50c and earn 1 bonus point.**

Commodore 64 User's Guide

Helps you get started in computing, even if you've never used a computer before. Clear, step by step instructions provide an insight into the BASIC language and how you can put the machine to a myriad of uses. For those already familiar with micros, advanced programming sections and appendices explain the 64's enhanced features and how to get the most from these expanded capabilities.

Sams — **Our price $23.45. Save $1.20 and earn 2 bonus points.**

Boolean Algebra for Computer Logic — **Harold E. Ennes**

Knowledge of Boolean algebra is a must for anyone wanting to understand the design of digital computer logic circuits. This book provides that understanding without the reader having to know higher mathematics or advanced electronics. Many line drawings and worked examples. Exercises allow self-testing (answers included).

Sams — **Our price $12.55. Save 65c and earn 1 bonus point.**

Businessman's Guide to Microcomputers

Deloitte Haskins & Sells, a firm of chartered accountants, has developed this guide to help businessmen choose and use microcomputers in their business. Contains information on products available in Australia and New Zealand; concentrates on financial modelling database, word processing and general accounting; comments on specific computers and software; includes checklists, summary charts and information you need when buying.

Prentice-Hall — **Our price $27.95. Save $1.40 and earn 2 bonus points.**

Real-time control with the TRS-80 — **Russel Genet**

Helps plan and develop a real-time date logging or control system that will avoid major pitfalls and save you time and money. Shows you how to communicate with the computer by remote keypad and video monitor, discusses steeper motors and explains how to eliminate reading of strip charts, writing down data and keying in data. Detailed case study of real-time control systems.

Sams — **Our Price $27. Save $1.45 and earn 2 bonus points.**

Introduction to Electronic Speech Synthesis — **Neil Sclater**

Helps you understand how a human "voice" is electronically created by three current digital synthesis technologies. Explains what you can expect in speech quality as it relates to data rate and cost of memory devices. Technical introduction to the subject written in non-technical terms. Ideal if you know something about electronics but don't have a background in computers, programming or speech physiology.

Sams — **Our price $17.85. Save 95c and earn 1 bonus point.**

Vic 20 User Guide — **John Heilborn & Ran Talbott**

Designed to help you enjoy your computer time whether for entertainment or practical applications. Shows how to operate the VIC 20 and all its peripherals, program in VIC BASIC, use the machine's full range of colour graphics and sound capabilities, build a custom character set, and learn advanced mathematical programming.

Osborne/McGraw Hill — **Our price $29.80. Save $1.60 and earn 2 bonus points.**

Forth Programming — **Leo J. Scanlon**

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

Sams — **Our price $33.80. Save $1.80 and earn 3 bonus points.**

Microcomputer Math — **William Barden Jnr**

Step by step introduction to arithmetic operations on all types of micros. Covers binary, octal and hexadecimal numbering systems. Gives many practical examples and self-testing exercises.

Sams — **Our price $21.60. Save $1.15 and earn 2 bonus points.**

Assembly Language Programming for the BBC Microcomputer — **Ian Birnbaum**

A guide on how to get the most from your BBC. Covers addition and subtraction, decision making and loop structure in assembly language, indexed addressing, multiplication and division, the stack, subroutines and interrupts. Offers some utility programs and provides answers to exercises.

MacMillan — **Our price $33.20. Save $1.75 and earn 3 bonus points.**

The 68000: Principles and Programming — **Leo J. Scanlon**

An introduction and full description of the highly complex and powerful 6800, 16-bit microprocessor, and how to program it. Starts with fundamental material and gradually introduces more involved topics in an orderly manner.

Sams — **Our price $22.75. Save $1.20 and earn 2 bonus points.**

Buy now

Books for the buff

PET

The Alien, Numbereater and other Programs for Personal Computers With Notes on How They Were Written — John Race

Dr Race has devised some interesting and unusual programs for the Commodore PET 2001 8K. He has listed the programs, but, more important, has detailed the way the programs were developed, pointed out the techniques and pitfalls, and generally provided a sound basis for the reader to design and write games and other programs for himself. A book for the enthusiast rather than the beginner. Programs suitable for Commodore 64.

Macmillan — **Our price $12.32. Save 65c and earn 1 bonus point.**

PET Fun and Games — Jeffries and Fisher

Selected Cursor Programs

More than 30 games and puzzles, selected from more than three years issues of "Cursor" magazine. Will run on any model Commodore PET or CBM. The games include Zap, Shark, Demon, Maze, Dungeon, Yahtzee, Mad. The puzzles include Hanoi, Box, and Mind.

Osborne/McGraw Hill — **Our price $23.85. Save $1.25 and earn 2 bonus points.**

Business

Inventory Management for Small Computers — Chuck Atkinson

A detailed inventory-management system, written in C BASIC and running under CP/M. Minimum hardware required: 32K RAM, and two disk drives. John Vargo said of this book in a "Bits & Bytes" review: A good introduction to inventory management for a retail business, as well as a practical computerised solution to many of the problems presented in controlling this asset in a competitive environment.

Sybex — **Our price $24.65. Save $1.30 and earn 2 bonus points.**

Mastering VisiCalc — Douglas Hergert

Written both for newcomers to the spreadsheet program and for those who are already using it. Shows how to set up VisiCalc spreadsheets for finance, business and numerical applications; how to change the parameters; how to create the formulas; how to use the DIF file function. A complete guide.

Sybex — **Our price $19.90. Save $1.05 and earn 2 bonus points.**

Doing Business with Pascal — Richard and Douglas Hergert

Gives the building blocks for writing complete business programs in Pascal. Learn how to use UCSD Pascal and its extensions, modular programming, and file management techniques to design efficient, interactive programs for your business tasks. Includes listings for programs such as vendor performance analysis, accounts receivable ageing analysis, financial ratios, sales analysis.

Sybex — **Our price $37.95. Save $2 and earn 3 bonus points.**

IBM

Using Your IBM Personal Computer — Lon Poole

A practical thorough guide. Part One helps you get started with off-the-shelf programs, and shows you how to use the PC's system unit, keyboard, display screen, disk drives, and printer. Part Two teaches you to program in PC BASIC, with scores of examples to help you learn quickly. Full explanations on all commonly used PC BASIC commands, including those for graphics, music, sounds effects, and more.

Sams — **Our price $33.75. Save $2.00 and earn 2 bonus points.**

Sinclair

Your Timex Sinclair 1000 and ZX81 — Douglas Hergert

For Sinclair users. Takes you from the very beginning and explains in simple, everyday language how to use your ZX81 to its fullest capabilities. A good book for the new user.

Sybex — **Our price $15.15. Save 80c and earn 1 bonus point**

Z80 Assembly Language Programming — L.A. Leventhal

Comprehensive coverage of the Z80 microprocessor assembly language. Examples illustrate software development concepts and actual assembly language usage. Assemblers and assembler directives are explained. Includes more than 80 sample programming problems. All problems solutions in source code and object code. Each Z80 instruction fully explained.

Osborne/McGraw-Hill — **Our price $33.95. Save $1.78 and earn 3 bonus points.**

The Sinclair ZX80 Programming for Real Applications — Randle Hurley

Aims to develop in the reader an interest in pushing the ZX81 further that anyone expected it to go when it was first launched. The programs show how to store more numbers than there are memory bytes in the 16K ZX81 and then access this idea in many different ways afterwards. Large, "off the peg" programs, but you can also use these as working examples to illustrate the programming ideas at the beginning of the book. Financial, banking and educational programs, and a lot more.

Macmillan — **Our price $27.50. Save $1.45 and earn 2 bonus points.**

More Real Applications for the ZX81 and the ZX Spectrum — Randle Hurley

Provides ZX81 and ZX Spectrum owners with "off the peg" programs doing real computing work in a wide range of applications: file handling, batting and bowling statistics for cricket, the production of frames for animated sequence. Requires 16K for the ZX81.

Macmillan — **Our price $27.50. Save $1.45 and earn 2 bonus points.**

Software tapes available

Advanced Programming for the 16K ZX81 — Mike Costello

Written for those who have had time to get used to their ZX81 and are now looking for more information in order to exploit it to the full. Investigation of the ZX81's operating system, discussion of BASIC subroutines and techniques used in a wide range of programs, including business applications and games. Also the use of assembly language programming techniques and mixing BASIC with machine code.

Macmillan — **Our price $25.60. Save $1.35 and earn 2 bonus points.**

BBC

Basic Programming on the BBC — Neil and Pat Cryer

You've seen the machine on television, and this is the book prepared to go with programme. It's designed for the new BBC. Teaches how to write programs, draw and animate pictures and graphics in full colour, design sound effects and program games. Detailed glossery.

Prentice-Hall — **Our price $19.25. Save $1.05 and earn 2 bonus points.**

SPECIAL

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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.
Dec/Jan Issue 4	Review of TRS80 Colour Computer, feature on farm computing, adventure computer games.
Feb Issue 5	Hand-held computer feature, review of Sirius 1 and Epson HX-20, start of farming and education columns.
March Issue 6	Reviews of Microbee, Hitachi Peach and Apple III.
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. Wordprocessing feature. Start of Commodore 64 column.

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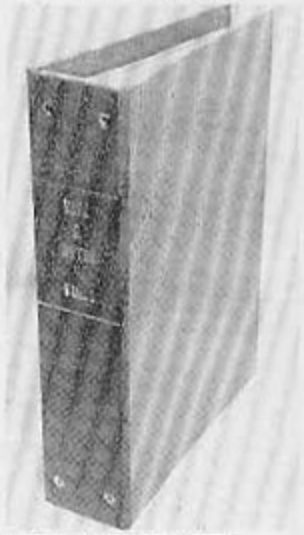

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Video-tape on LOGO available

By MIKE WALL

Christchurch Teachers' College has produced a video-tape about the use of the LOGO computer language.

The first 35 minutes is divided into five episodes, each dealing with a group of elementary graphics statements. No computer knowledge is assumed, and each episode finishes with a simple exercise for the viewer to do.

Once a teacher (or pupil) has viewed the tape and done the exercises, he or she should be able to define and edit simple procedures using the graphics commands for moving forwards, backwards, turning through an angle, and travelling through arcs and circles.

Nested procedures and procedures involving repetition are dealt with, but the tape does not introduce the use of variables, and makes no mention of the statements for manipulating text.

Once the vocabulary section of the tape is completed, it is followed by a separate program which explores some ways in which LOGO can be taught to a class. Starting with a simple target — shooting exercise to familiarise pupils with angles and the size of the screen, the construction of a "turtle-typewriter" is demonstrated and discussed.

In this typewriter project, pupils define procedures for all the letters of the alphabet, starting with the "level 1" letters like H, I and T. They proceed to harder ones like K and then on to ones involving arcs like R, U and B.

The most difficulty is encountered in letters such as Q and G and a split arc method is demonstrated for them. Once all the procedures are entered, it is possible to use them for typing enlarged text on the screen. The finished product could be used for doing television titles.

The Teachers' College designed the program to be a training resource for teachers, but it has also been used quite effectively with pupils.

CED Distributors has offered to subsidise the copying of the tape for schools. If you would like to get a copy, send a VHS video cassette with space for an hour program, with a school order form to:

LOGO Tape,
Television Department,
Christchurch Teachers' College,
P.O. Box 31-065,
Christchurch.

The normal fee for copying a program of this length is $15, but with the subsidy from CED, schools will be charged $10, including postage.

The copying offer does not apply only to schools: if you have your own VHS video recorder, please feel free to send a cassette. The copying fee for private users will be $15.

Evaluation unit

The surprise announcement in July by the Minister of Education that a Computer Development and Evaluation Unit is to be established in Wellington should be warmly welcomed by all teachers involved in computing.

The unit will be staffed by two full time officers and extra teachers with special expertise in different subject areas will be called in where appropriate.

Its purpose is, initially, to evaluate software for school use and provide guidance in computer-related curriculum areas. Finance has been made available for the purchase of computer equipment and software. Users of the less common computers will be pleased to know that there is enough loot in the kitty to buy one of each of the five recommended machines. However, what the department is hoping is that the distributors will lease their machines out at highly user-friendly rental and so allow more money to be allocated for purchasing or developing software.

This is the sort of high-level support which has been badly needed, and although the proposal is far from lavish in financial terms, mighty oaks from little acorns grow.

Because no official funding has ever been made available to schools for the purchase of computers, some rather unfortunate side-effects have occurred. The one that bothers me the most is that schools have got used to the idea of software being free. As long as this attitude prevails, distributors of software are going to be wary of investing much time and money in projects that teachers are only willing to look at.

Throwing a bit of money into the pot is bound to lubricate things considerably and the fact that the money comes from the Education Department and not from the PTAs of New Zealand will please everyone involved.

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Southland school shows the way

Dear Sir,

It is apparent from an article in your "July" issue that there is a general lack of awareness as to the present use of computers in primary schools. Perhaps the following will interest you.

Children at the Colac Bay School, Southland, have had extensive experience with computers for two and a half years. In fact, each child has some daily contact with at least one machine.

Each pupil from new entrant to standard four has a personal disk with Apple programs one side and BBC the other. These contain a variety of learning programs, many of which are automatically updated as improvement occurs. Even five-year-olds can work independently as they only have to insert their disk and switch on — although small group work is the norm. Their attention span is far greater than for any other area of schoolwork, and does not decrease over a long period.

It is now possible for small children to interact with a computer without using the keyboard. The keyboard has obvious disadvantages —

1. Small children are not at all familiar with the capital letters which are on the keycaps.
2. The letters are arranged differently to the order in which they learn them (i.e. alphabetically).
3. The children are so slow at in-putting their responses as to frequently lose their train of thought.

I do not believe that the present generation of primary school-children will neec keyboard skills — note the Apple Lisa Mouse concept and the rapid progress in voice recognition technology — and to this end I am writing and re-writing programs which use —

1. A voice synthesiser to give verbal instructions and ask questions.
2. A light pen for in-putting responses.

These are very easy to use with the BBC and these facilities together with its large coloured letters mean that small children can use computer aided learning without touching a keyboard.

Yours faithfully
Lyndon McEntee,
Principal,
Colac Bay School,
R.D. 1,
Riverton.

SORD MS review

Dear Sir,

In his otherwise excellent review of the SORD M5, your reviewer, Chris O'Donoghue, apparently became so engrossed in BASIC-G that he made several factual errors concerning other features of the system. For the benefit of your readers, I would like to correct those now.

The cassette speed of the M5 is not 1200 bits/second but 2000 bits/second. Despite being faster than any other home computer, the M5 does not require a "special" tape recorder to be used.

The BASIC-G, BASIC-F and FALC cartridges all have additional RAM memory as well as 16K (not 8K as stated) of ROM. Your reviewer complains that the FALC table size is only 60 lines by 8 columns. In fact, FALC tables can be up to 200 characters across or as many as 99 lines long. Furthermore, FALC can handle two of these tables in memory at any one time.

In his comments on documentation, the reviewer mentioned that it was basically in tutorial form with a statement summary at the back of each manual. He went on to request a syntax and usage reference for experienced programmers, which is precisely what the "statement summary" supplies.

Finally, although SORD's 80-Column graphics printer will be available, the M5 standard interface will support any parallel printer without further upgrade items being required.

Apart from these few blemishes, Chris's review was a good example of the professional standards which are sadly lacking in some other reviews I have seen.

Yours faithfully,
Peter J.M. Hyde
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Applying logic to the facts

By PAUL BIELESKI

These tools (see panel) do not on their own account tell you what the error in programming is, but they help confirm (or deny) any theory that needs testing. More important than the use of the tools, is the use of pure logic. Bugs can be winkled out by pure reason from the facts.

To apply logic to the facts, you must establish what the facts are, even to the point of actually writing them down. Note what is both **correct** and what is **incorrect.** Note what is present in the output, and what is not present. All this information tells you something about what the program is actually doing.

To track down the bug site you can use two approaches, one from the front and one from the rear. In the frontal attack, the old standard technique of hand-simulating the computer action is required. You must be careful to follow the computer instructions rather than write down what you planned to happen.

Information collected on what has happened, and what has not, should confirm what you work out by hand. If it does not, you are coming close to the bug. What you calculate to happen and what actually happens should match. The fact that this is different from what you planned and expected to happen identifies the bug. Often this approach will only take you so far with a lack of useful output.

Rear Attack

The alternative approach is from the rear. In this case, you work from the wrong position you got to, and reason out how you must have got there.

Perhaps only one or two logical conditions direct you to where you know the program reached from the external evidence. Then each condition that could send you to this point must be examined by logic to establish furthe· conditions.

No doubt these conditions were not expected in a correct run so that you must continue to reason back through the program as far as possible. If you get back to a point where you have external evidence contradicting the logical deductions you must have traversed the bug. Remember to use the negative evidence as well as the positive. Sherlock Holmes was a master at this.

If a reasonable amount of effort working in the two directions does not reveal the actual bug, then at some point you need to invoke one of our tools to gather further information. In your examination of the program in both directions there must be some information you lack in order to know exactly what happened.

An appropriate trace or spy should be used to confirm logic paths and variable values. The skill comes in knowing just how far to go with hand simulation and logical analysis before it becomes more efficient to do more runs with your debugging tools in place.

Practice will help, but don't expect to be able to make the right decision all the time.

Do expect to always track down the bug. Often it is the only way you really learn what each language construct really does.

Tools for the de-bugger

Last month in "Bits & Bytes", Paul Bieleski described some of the tools used in debugging. These included:

- *The trap, the triggering of an invalid operation, such as division by zero.*
- *The dump, the listing of memory on the printer.*
- *The trace.*
- *The spy, code that sends out information from within a program.*

This month the subject is debugging strategy.

Eureka! And you've loused it up

It is really quite satisfying to track down a difficult bug by this methodical approach, rather than become desperate by experimenting with variations in the program in the hope that the bug will go away.

There is a danger in catching the "Eureka Syndrome", in which the analysis brings you to the sudden realisation of the bug's cause and rush into a quick change. The error that gave you the bug should be checked against the evidence to make sure it is the actual cause of the problem. In finding *a* bug you may have missed *the* bug.

It is also important to examine the whole of the program particularly in parts you have not reached for other cases of the bug. If you make a quick change only to arrive at another case of the same bug it is so annoying. Debugging takes time, so it is always worth that little bit of extra effort to

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get it all right.

Avoidance is the obvious cure, but how do you do that? As programming skill increases, the size of program you can write bug-free increases. It is helped by knowing the language really well so that you are never in doubt as to what it will do in any circumstance. Experience makes you familiar with ever-increasing blocks of reliable code for information manipulation. However, for everyone there seems to exist a size of program where bugs will usually occur. The trick is to make that very large.

Structured programming is a technique that is designed to make it easy to write correct programs as a matter of course. It also makes it easier to analyse a program for a bug. This is especially true of the backwards analysis from a trapped bug.

Given you know the language, and use structured program units in the correct way (only one entry and one exit from a structured code block) it is advisable to program conservatively when approaching your critical size of program, by building in aids such as traces, spies, and end-of-job dumps to your programs as a matter of course.

It wouldn't be a bad idea if every serious programmer kept a log book, much like the pilot who keeps a log book of his flying hours and experience gained in different conditions.

A note of errors made and the experience of bugs caught could be a help in avoiding a repetition of such mistakes.

Making your micro talk

By SHAYNE DOYLE

Having recently had the opportunity to compare directly two different speech synthesis units, both using the Votrax SC-01 phoneme synthesiser chip, the following observations may be of use to those contemplating getting into this area of micros.

One unit was the "Electronics Australia" Compuvoice, featured as a do-it-yourself project in the October and November 1982 issues, and also available in kit form from local Dick Smith retailers for $NZ150.

The second unit was the Microvox synthesiser, originally designed by Steve Giarcia for "Byte" September and October, 1982. The kit is available from MicroMint in the States for $US215. By the time it arrives in your eager hands, it will cost about $NZ400-450. In terms of facilities and use of the SC-01 chip, these two units represent the top and bottom ends of the do-it-yourself speech-synthesiser scene (for Votrax SC-01 devices only).

The "EA" kit offers a cheap way of experimenting with computer speech generation, and is controlled through a Centronics-type parallel interface. It includes an amplifier to drive a speaker, but does not make use of the inflection control signals of the SC-01. The clock frequency can be varied, however, and this gives some degree of manual control over the pitch of the speech.

Generating fixed speech from a program is simply a matter of LPRINTing the appropriate string of phoneme codes to the parallel port. To experiment with text to speech translation, it is necessary to write your own program to perform a synthesis by rule analysis of the character strings typed in.

Microvox, on the other hand, is a stand-alone microcomputer dedicated to speech synthesis. It is in effect a general purpose 6502 micro with a speech synthesiser attached as a memory mapped I/O port, and with a 6K byte text to phoneme translator program residing in Eprom. It has both parallel and serial interfaces, the latter having an adjustable baud rate from 75-9600 baud. It can operate in four different modes: text to speech, text to spelled speech, phoneme codes, and sound effects/music. The user can simply switch between modes at any time by sending the appropriate control codes, and they can be mixed in a single statement.

Operational parameters directly controllable by the user are:

- Synchronisation of speech with what is being displayed on the host computer's VDU.
- Phrase termination — it will not translate into speech until designated phrase-terminating characters are received.
- Intonation (or inflection) — a special intonation algorithm is included and you may select flat

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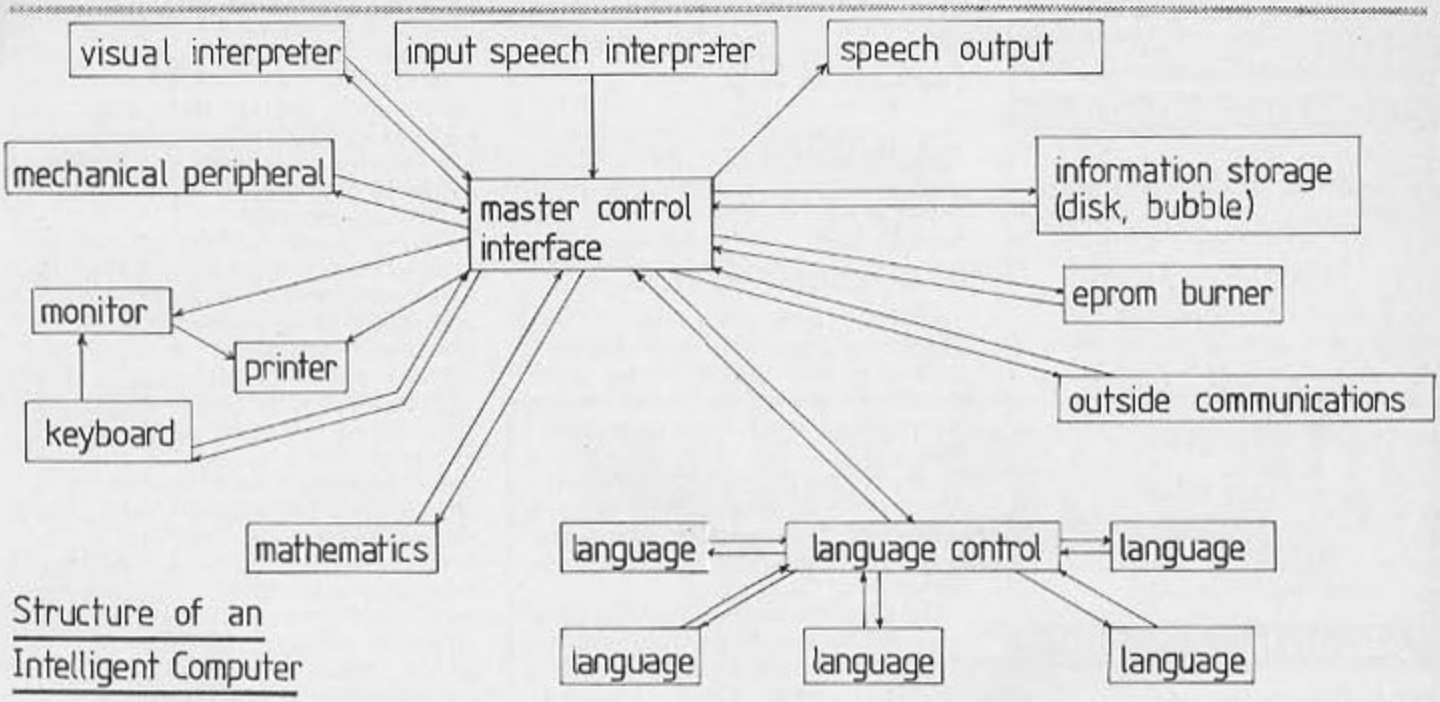

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(no intonation), automatic intonation by the algorithm, or specified intonation by setting the base pitch (four levels) and/or the clock rate (16 levels).

- Punctuation modes — select from pronounce all punctuation, pronounce all except CR LF & SP, or pronounce only unusual punctuation.
- On line/Off line — allows it to be attached in parallel with another device such as a printer, but not speak everything sent to the parallel port.

I found the speech quality from both units very much dependent on the spelling of the word typed in. That is, as far as text-to-speech is concerned, the user should converse with the machine in a phonetic language. It is quite often necessary to experiment with different phonetic spellings of a word to obtain an acceptable auditory result. This also applies when encoding pre-set speech into a program.

The Microvox produced better more easily understood speech, no doubt as a result of the flexible control over the SC-01 chip, and the built-in text translator program.

In my opinion, the microcomputer user who wishes to effectively use speech output as an adjunct to normal computer/user communication, would be advised to obtain a unit similar to the Microvox — the extra money is worth it. On the other hand, the dedicated experimenter who wishes to explore the text-to-speech translation area would probably be happier with the Compuvoice unit.

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Colour, sound card

By GORDON FINDLAY

Wouldn't colour be nice on your TRS80 or System 80? Wouldn't high-resolution graphics be nice? Wouldn't a sophisticated sound generator be nice? There have been a few add-ons like this, and now a locally (Christchurch) produced add-on, offering all these things, is being marketed. This s the Graphcard, designed and manufactured by Jenson and Parr.

Because this card is likely to be of interest to a very large number of my illustrious readers, I felt that a review was worth while. Let me hasten to point out that I have absolutely no connection with the designers, and that if I decide to get a card, I'm going to have to buy one, just like you. I do like it — very much. It's a remarkable product.

The Graphcard functions as a colour graphics terminal. Your regular monitor is used for programming, and running programs, in the usual way. Colour output is produced on a colour screen, which may be a television, a PAL monitor, or an RGB monitor, as you wish. This separates instructions such as RUN from the output being produced, game being played or whatever.

The Graphcard allows eight colours, at any point of the screen. There are three possible resolutions, or size of the graphics blocks ("pixels"):

- 92 x 64, with 8 pages;
- 184 x 128, with 2 pages;
- 184 x 256, with 1 page.

In the first two modes, the pixels are square, in the third they are rectangular, twice as wide as they are high. All eight colours are available at any point on the screen, in all three modes.

The reference to "pages" may be new to you. The effect is that in the first mode there are eight screens, of which only one is displayed at a time. But any of them can be drawn on, without the result being seen until that particular screen is displayed. This allows the program to display one page, while writing on another. Rapid switching between pages is possible, to produce the effect of motion just as a cartoon does. The demonstration program I saw used this page swapping to produce a very rapid journey through a maze. This was programmed in BASIC, of which more later, but certainly looked as fast as machine code does normally.

Text may be written on the graphics screen, in a wide variety of sizes and in any colour.

As well as the eight colours provided, many more may be obtained by mixing them. This mixing seemed to be virtually unlimited.

The Graphcard is a single printed circuit board, which is attached to the host computer by a 16-conductor ribbon cable. In the version I saw, the cable was soldered to IC pins in the computer. Production versions, it is to be hoped, will use clip leads, to avoid soldering.

The Graphcard has a speaker, but no enclosure or power supply. The power supply needed is 12V at 500 milliamps, and this must be well regulated to get good colour. You can buy a suitable power adaptor for about $40, or build one if you like (a

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circuit diagram is provided) for less than $20.

Graphcard will work with any computer, as only a few general purpose signals are required to be provided — the data bus, three address lines, and address-decode signal, memory write, and zero volts. No power is drawn from the computer itself. It is readily programmed in machine code, but for the TRS/System 80 machines, comes with a very clever extended BASIC. This comes on a system tape, at no extra charge, and gives the following additional BASIC instructions:

GSZE — sets the size of the graphics dots ("resolution").

GDSP — selects the page which is to be displayed.

GWRT — selects the page which is to be drawn on.

GCLR — clears the page to any colour.

GPNT — plots one or several points, in any colour.

GLNE — draws any number of lines, from point to point.
This can be used to draw open shapes in one statement.

GPLY — draws, and fills in, a polygon with any number of sides.

GTXT — prints text, anywhere on the screen, any colours, any size.

GSHP — used to change the shape of the letters used to write on the screen! You can change the shape of the letter "E" if you like.

GSND — makes a sound. This statement has parameters for the channel, the period of the tone and/or noise, the envelope and the volume.

These statements each have parameters. For example, to plot three points in yellow, you might use the statement, GPNT 3; 7,12; 25,35; 89,67. The "3" selects the colour; the other pairs select the point(s) to plot. The parameters for each statement, and the punctuation, all look reasonably consistent.

I didn't have time to try much programming of the board, but read the demonstration program carefully. The new statements become part of the BASIC interpreter, and can be used just like any other commands. This part of the implementation has been done very well — much better than the many other BASIC extensions I have seen — and the author (Ian Jenson) is to be congratulated on this software.

As well as graphics and colour, the board has a programmable sound generator chip on board. This gives three tone channels, a noise channel,

Growth area

By far the biggest growth area in business computers is in micros, according to a national survey conducted in May by the Wellington management consultants, Arthur Hoby and Associates. The survey covered 1000 organisations employing at least 10 people or with a turnover of $200,000 a year.

In the new business micro market, excluding "home" computers, the leaders are listed by the survey as Commodore, Apple, Canon, Sord, and the TRS-80.

The survey found that while Auckland, Wellington, Christchurch, and Dunedin accounted for 87 per cent of mainframe installations, they accounted for only 43 per cent of micro locations.

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and envelope control. The sound generator covers eight octaves, and can also be used to produce very realistic explosions, gunshots and so on.

The sound facilities are standard for the AY-3-8912 chip, and fairly difficult to describe in detail — experiment is the answer here!

The BASIC extensions must be loaded, from tape or disk, before using the card. Even from tape, this didn't take long, and they don't use much RAM space — in a 16K machine, the memory size is set to 30719, so only 2048 bytes are required. When you consider the power of the software, this is a remarkable feat.

'Best display I've seen on a TV'

Nothing is perfect, and the Graphcard has one limitation — there is no way of reading the colour from the screen. This is a significant limitation, in that it forces a particular style of programming, but it can always be programmed around.

Physically, the card looks to be extremely well engineered. The printed circuit board lay-out is most impressive. A lot of components are on the board, including its own 24K of RAM, so the colour graphics do not require any RAM, as do the BBC and Apple machines. Using graphics need not restrict the size of programs!

The manual which comes with the card has detailed installation instructions for the System 80, TRS 80, and general instructions in case you want to use it in another computer, or in an OEM application. The manual explains fully the use and programming of the Graphcard. It is complete, carefully written, and a lot better than most computer-related documentation, but probably isn't suited to the complete beginner — get some help at first. Many more examples would help. I recommend a revision.

And the results — most impressive. Using an ordinary domestic 19 inch TV, fed through the aerial socket, the Graphcard produced the best display that I have ever seen on a TV. The display was much better than can normally be obtained on a monitor, never mind a television. The designers have aimed to get good colour, and they certainly succeeded! The requirements of good colour forced them to design their own modulator, and to include many of the components that other people leave out.

The colour that I saw was bright, saturated and vivid, covering the whole screen, without any of the annoying bars which so often spoil other displays. The TV this was displayed on had just been delivered to my house in a pick-up and plugged straight in. Animation is possible, and can be made relatively fast, using Graphcard Extended BASIC.

The cost — just under $400. Uses — almost anything, particularly games and education, I imagine, but not necessarily restricted to these. If you are interested in more information, write to the manufacturers — Jenson and Parr, Box 31-007, Christchurch. This is another excellent local product. It seems that New Zealand designers have a lot of ability in producing add-ons for the '80.

I did intend to do a round-up of the clubs this month, but time has caught up on me, and this article is being written before the clubs that I wrote to have had a chance to reply, so I'll leave it a month.

Systems 80 customising

By PAUL BRIGGS

Readers of my last report, "Infectious diseases in Microcomputer Clubs" *(Bits & Bytes No. 1, p. 21)* will be pleased to know that because of the miracle of modern medical science (forced viewing of six straight hours of "The Young Doctors"), I have now been cleared from quarantine and can safely approach a microcomputer once again. The last piece of prose also stimulated a number of inquiries concerning what is available and where for Systems 80 hardware, hence the rest of this article.

The awkward thing about System 80's is that they simulate a microcomputer that was never originally designed to do that which it wound up doing, namely a TRS-80 with 48K RAM and disk drives. When Tandy released the TRS-80 model 1 in 1978 through its Radio Shack chain of stores, it was intended to be an up-market experimenter's device to explore the new world of microcomputers which were starting to appear on the electronics scene.

For this reason it contained only 4K RAM and a limited BASIC. Wherever possible cost-saving shortcuts were applied to circuitry as the device was not expected to sell in large numbers. This policy led to a video display that was marginal in

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6. 62 predefined graphic characters plus full alpha numerics with upper and lower case letters, all available directly from the keyboard and displayable in normal or reverse video in any of 16 colours.

7. 40 column by 25 lines colour display. In high resolution graphics mode, a bit mapped screen gives 320 x 200 individually addressable pixels.

8. The dedicated video chip allows the use of high resolution multi-coloured "Sprites" (moveable object blocks). Sprites can be moved pixel by pixel, independently of anything else in the screen.

9. Sprites can also be set up in 8 "layers" giving full 3 dimensional effects with, if required, automatic collision detection between sprites and any other screen object.

10. Machine bus port will accept ROM cartridges for many applications, including business, educational, home and leisure software.

11. A second processor option using the Z80 gives the Commodore 64 the ability to support CP/M.®

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quality and an unreliable cassette format. However, sales rocketed soon after release and this popularity combined with requests from owners for more capability soon gave rise to on board modifications to carry the larger Level 2 BASIC and an expansion unit for extra memory, disk drive controllers, and a parallel port.

High power marketing of the TRS-80 in the United States and its relatively low cost has made it the most popular microcomputer in that country in the earlier years, and this has given rise to its biggest selling point: the huge range of cheap software available for it. This in it's turn promoted more sales (software range forms over 60 percent of the REAL value of any microcomputer) and so the TRS-80 range is still a major seller.

For some reason Tandy was very slow in exploiting the export market for TRS-80s and this lack of vigour combined with fairly high costs of the landed machine in New Zealand, (courtesy of the exchange rate and our taxation system) allowed the establishment of a TRS-80 clone in this country, namely the Video Genie from EACA International, Ltd., of Hong Kong, also marketed under the labels of Systems 80 and C/Micro

Present owners of these systems still enjoy the benefits of a large software base, but it's hardware inheritance leaves something to be desired in this fast improving field: the cost of expanding to full memory and disk drives is still high, no colour, no CP/M capability, and a number of annoying incompatibilities with programs written for the TRS-80 model 1. As I mentioned in the previous article, a small group of electronic enthusiasts have developed a series of modifications to rectify some of the above and are rapidly mastering the rest.

Because it is not practical for a group of private individuals to offer these upgrades to the general public, John Gilbert & Co. * now performs the installation and servicing of these on a 30 day guarantee on all work. The modifications are aimed at three areas:

1. Reducing the cost of full configuration (disk drives, full memory etc) by eliminating the need for an expansion unit.
2. Improving obsolete circuit design to aid reliab lity.
3. Adding late generation features available on other micros (e.g. colour).

The current range includes CP/M (using standard 5¼ inch disks), colour video display with 8 fully selectable colours, 48K user RAM fitted inside the case, TRSDOS/NEWDOS compatible floppy disk controller — again fitted internally, parallel printer interface patch that allows the printer to respond to TRS-80 type programs (the TRS-80 printer is memory mapped rather than part-configured as in the System 80), lower case characters, CPU clock speed up to double the operating speed, and a switch to allow older systems without an internal amplifier and speaker to get sound effects via the external cassette socket.

Future customising includes joysticks, a really good machine code monitor, an RS-232 serial port, a voice synthesiser, a parallel port, and a multiple channel music synthesiser.

Taking into account their purchase price, the above upgrading and the plethora of software it is obvious to me that these microcomputers still give the most for the least.

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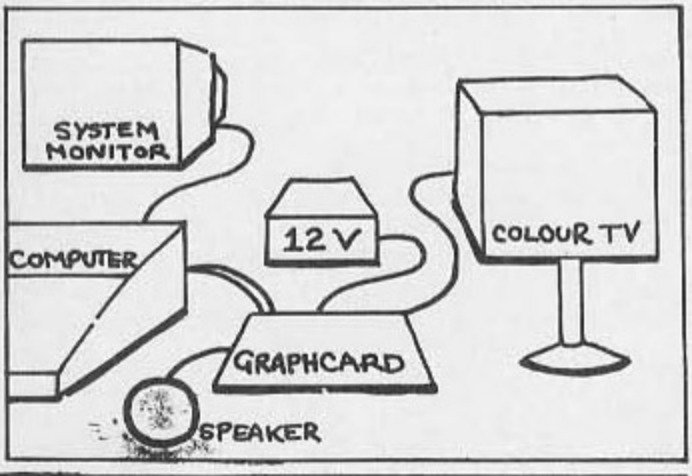

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The National Computer Conference, at Anaheim, 30 miles south of Los Angeles, earlier this year is the subject of this report by Craig Honey, of Auckland.

New products at the National Computer Conference at Anaheim included: Slim-line disk drives which are now being incorporated into systems such as the Visual 1050, a Z80 based machine with up to 128K bytes of programmable memory.

TEAC, the well-known Japanese maker of tape-recorders and stereo equipment, was strongly promoting its range of 41mm high, floppy-disk drives to manufacturers, and although prices are at present higher, slim-drives will soon be as common as 3¼in high drives.

Also from TEAC and from HITACHI were 3in floppy disk drives with the media sealed in a rigid plastic case. Using 100 tracks per inch, the same recording format, data transfer and disk rotation speeds, these drives are plug compatible replacements for standard 5¼in drives.

HITACHI offered both single and double density in either single or double-sided drives, and TEAC's drive allowed flipping the disk in either single or double density. Capacity unformatted in 250K bytes (single density) or 500K bytes (double density) using both sides.

Already at least two computer makers are incorporating Sony 3in drives in their portables and with Hewlett-Packard using these in their new disk-top computer, their acceptance is almost certain.

Weighing less than half the weight of the normal 5¼in drives and having more compact dimensions, they are bound to appear shortly in the flock of portables now appearing.

At least eight new portables were shown, among them the MCS-100 from Microdyne featuring two Z80A processors (one for the CRT), built-in modem four expansion slots, S-100 bus and 256K bytes of user accessible RAM.

Commodore had its DX64 "Executive 64" on display which is Commodore 64 compatible and has a 5in colour display monitor, one or two disk drives, and 6502 processor.

Jonos Corporation offered several models of Z80 based machines using the STD bus and having five expansion slots and two Sony 3½in micro floppy disk drives, each with 322K bytes formatted capacity. This portable machine has a sophisticated display using an 8085 processor to control the 9in green monitor. Additional options even include a built-in printer. For $US3195, including CP/M, BASIC, Multiplan, Spellbinder and Spellcheck, this utilitarian-looking portable is good value.

Other IBM PC compatible portable computers included the Anderson-Jacobson PC/530 (also known as the Dynalogic Hyperion), Columbia VP Portable, Osborne Executive II, and Compaq.

The Compaq features a 9in green-phosphor, high-resolution monitor with very legible characters, 320K byte disk drive and three expansion slots for IBM PC compatible cards. Selling at around $US3000 in standard configuration, this machine has proved very popular and the company states that it has such difficulty meeting domestic demand that it at present has no export plans.

The new Osborne Executive with amber 7in display and 128K of bank-switched RAM was shown but the IBM compatible Executive II has yet to become available. Osborne now has a lot of competitors, most at competitive prices and with larger (and clearer) displays. For example, the Columbia VP portable comes with 9in monitor with graphics, 128K RAM, two 320K byte disk drives, 8088 processor and $US3000 worth of Software — all for $US2995!

Sixteen-bit computers, many claiming at least some IBM PC compatibility, are becoming the norm, and software is now widely available with the number of programs written under MS-DOS or CPM-86 growing at an astounding rate.

The Japanese were showing a number of 16-bit machines and indicating quite attractive prices for complete machines with, in most cases, very impressive colour monitors. Toshiba, Hitachi, Sord, and Sony all offer MS-DOS as the operating system and have very impressive colour graphics. The new Sord M343 is interesting in that it has an 8086 processor, up to 768K bytes of main memory and expansion slots on the S-100 bus.

Texas Instruments has also joined the competition with its Professional Computer with 8088 processor and reluctantly admits that some IBM programs will run on the machine. TI also offers MS-DOS, CPM-86 and the UCSD P-System operating systems with a variety of options in hardware. But the machine at present lacks adequate software.

Voice control from TI

A most impressive demonstation of TI's Professional Computer showed its capabilities in telephone answering (and recording messages on diskette) and voice recognition and control.

For professional people who cannot touch-type, voice command and input is a fast way of using the computer with a minimum of training. The software had not yet been released but plans are to have it on sale by the end of the year.

Also innovative and becoming more popular at reasonable prices are colour printers (most of which are also capable of high resolution graphics). Multi-coloured ribbons seem to have given way to the "drop-on-demand", ink-jet system of printing which is slower (typically 40 cps) and requires suitable paper but produces excellent images.

As usual with printers, the Japanese had some excellent examples, Canon's A-1210 giving an excellent rendition of a high-resolution CRT colour display. Printacolour also showed a similar printer and claimed 4913 shades of colour available with built-in "dithering". These printers and similar plotters are slow.

Polaroid showed its system, with other companies having similar systems to reproduce a screen image onto 35mm slides or overhead transparencies. These systems are expensive and would have limited application.

Despite the numerous displays of hardware, software was conspicuous by its absence: only about 75 exhibitors were listed under software and many of these were showing only software related to their hardware on display.

The Japanese seem to have seen the light and are utilising software from the United States and more manufacturers are bundling common software such as spreadsheet, word-processing and data-base programs with their machines.

Of 'Zork' and word processors

By STEVEN DARNOLD

"Zork" is a very popular adventure game available for a wide variety of computers. The Commodore 64 version is fairly standard. The computer scrolls its output on the screen and takes the user's responses as ordinary input statements. A status line at the top of the screen shows the adventurer's progress. Most of the data is stored on disk and it is accessed very, very often. This slows down the game a bit on a 1541 drive, but I expect a much faster response time when I get the IEEE interface for my 2031 drive.

"Zork" does not change the screen colours, so you can set the colours before you run it. I like pink letters on a brown background. If you want to save a game in progress, "Zork" has this feature, but you will need a fresh disk. I tried to save a game on a partially filled disk, and "Zork" obliterated some of the programs.

"Zork" is an excellent adventure. It has a very large vocabulary, and its descriptions are rich and varied. The plot is cleverly intertwined with puzzles, laughs, and surprises. I highly recommend it. However, "Zork" is not for novices; it is far too demanding. There are no hints, and the maze is the most vicious I have ever encountered. Inexperienced adventurers will just be frustrated.

If you are interested in adventures, but don't know much about them, I suggest you start with "Atlantis Adventure". It is in the public domain and your local Commodore dealer should have a copy.

"Easy Script" is one of the many word processors available for the Commodore 64. Last time I counted, there were eight, but I suppose there are even more to come. This plethora of word processors should not be surprising — word processors are jolly useful. Letters, reports, articles, homework assignments, etc., are produced faster and look neater when done on a word processor.

Two years ago, I got a word processor for my Commodore PET. Now the old typewriter is covered in cobwebs, and my wife and I use the word processor nearly every day. It's just as well we now have two computers. Several times already we have ended up shoulder to shoulder, she on the PET and I on the 64.

If you can afford it, get a printer and turn your 64 into a word processor. Perhaps you don't use a typewriter much now, but once you have a word processor you'll find it much easier to put together an article for *Bits & Bytes* or to write a letter to the *Listener*. Be careful, though, when you buy that printer. If you are going to get full use from your word processor, you will need good quality printing. Daisy-wheel printers are the best, but they are unneccessarily expensive. A good quality dot-matrix printer with real descenders is just fine. The Commodore 1526 printer is suitable for word processing. The Commodore 1525, however, is not recommended.

"Easy Script" is the best word processor I have used. It is slightly better than "Wordpro 3" and much, much better than "Papermate". In many ways "Easy Sript" appears to be a copy of "Wordpro". The screen has a similar layout and many of the formatting commands are the same. However, "Easy Script" offers several improvements over "Wordpro". The main text area is twice as big, there are more editing options, and up to 240 columns can be viewed using the screen as a

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Commands for making sound

BY PIP FORER

I have a working (and totally indefensible) definition of BASIC commands into those for layman and those for heavy hobbyists. In the latter category reside BBC unique verbs such as FX, OSBYTE and USR as well as knowledge of concepts such as Fred and Sheila (not to mention Jim). I haven't made my mind up about VDU yet.

In the layman's category are the normal, healthy BASIC commands. To me, the most complicated of these commands are those for sound. Maybe it is the association with hi-fi's (and anyone can use them), or maybe just that sound differs from maths and strings and logic, and I really feel it should be easier to program than the rest. Yet in practice it is not and since this month's column comes in reponse to reader requests I seem to be not alone in this dilemma.

One reason for initial difficulty is that the BBC offers some very sophisticated sound commands over four sound channels. However, to access these is not a matter of requesting a ZAP, POW or ZONK as on the playful Oric computer. Rather it is a process of getting a feel for what the commands (and their parameters) entail. Once you have that worked out you can get to work on some interesting effects. This article is an overview rather than a detailed technical note but the New Zealand user's group newsletter is a good source of further ideas and effects. Here we just look at some strategic Questions.

What are the BBC sound facilities? (this question is for non-BBC owners only).

BBC sound comes in four channels numbered 0 through 3. While three of these channels give musical notes the other one (channel zero) is a "noise" channel for special effects. You have slightly less control over this channel than the other three and it is certainly less musical.

Commands

Sound is ccntrolled by either a SOUND command or a SOUND and ENVELOPE command used together. The simplest use, which even I feel totally at home with, is using SOUND on its own. The SOUND command has the following syntax: SOUND C,A,P,D. The letters C,A,P and D represent the channel number (C), the amplitude (or loudness = A), the pitch (or freqency or actual note = P) and the duration (or length = D). In a program you can use numbers or variables for these values. The permitted ranges of these values and special comments are given in the table.

Parameter	Function	Range	Notes
C	Channel Number	0 to 4	0 is noise
A	Loudness or Envelope Selector	-15 to 4	-15 is loud 0 is silent 0 refers to envelope
P	Pitch of Note	0 to 255	53 is mid C 48 covers an octave
D	Duration	0 to 254	In units of 1/20th Second.

Is that all there is to sound? No. That gets rid of simple sound. But most sounds require a changing quality as they are created. The amplitude of the sound may vary as the note is played and so too may its pitch. Any lifelike sound, and many special effects, depend on this greater control of sound.

This control is achieved by the ENVELOPE command which carries with it no less than 14 parameters to define. I want to look at the envelope more at a later date but let me outline what it does. Its main function is to let you access differing qualities of sound by using any one of four envelopes. The envelope you are using is defined by a positive value to the A parameter in SOUND. It does not have to be that of the channel number accessed.

The ENVELOPE has two functions in controlling SOUND. First, it allows you to control the volume of the note over time as the note is played, through six parameters. Second, it allows control over pitch (through another six parameters). Between them these two functions allow the production of almost limitless tailored sounds. However, the production of the sort of sound you actually want demands some thought on the definition of envelopes and the relationship between envelope definition and sound parameters, particularly duration.

The use of ENVELOPE requires much practice. In the second part of this topic we will give a short listing to experiment with ENVELOPE. Since the envelope really requires a lot more explanation I will return to it in November after a review of BBC disks next month.

View drivers

Further to last month's column it appears that the printer driver for View allows two sets of printer control codes to be defined at any one time. By default, these are codes for underlining and emphasis but they can be set to other effects, for instance character size. However, it appears that two sets are the maximum permitted in any one application.

Apart from this a spreadsheet package to complement View is rumoured to be in preparation and the Wordwise people have also announced a £45 spreadsheet ROM.

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Simple sound is achieved by using a loudness factor of zero or less. In this case a note of equal loundness is generated for the given time period of the note. The larger the negative value of A the louder the note. Unless you use channel zero the result is an unexciting but musical sound.

For instance SOUND 1,89,-12,20 would produce a computer-like A above middle C for one second at quite high volume. The note comes on, plays and then dies abruptly. While paying it does not vary in pitch or loudness. Sound on channel zero is offered through a "pitch" of between 0 and 7 but these "pitches" in fact represent different sorts of special sound effects such as white noise (see p349 of the *User's Guide*). Only values three and seven offer further control over pitch.

Essentially, channels of sound are independent unless you want to make them connected in some way. Each channel can play its own note, alone or simultaneously with others. The mechanism is that the sound requests go to the SN76489 chip and for each channel can be queued, with up to four requests for each queue being held at any one time.

The queues are independent so that several notes may be processed through one queue while a single note plays on another. No new note can be played on a channel until the former note has been played.

If the queue fills right up, the program you are running may suddenly slow down since statement execution will continue only after a SOUND command has lodged its request in a queue.

The main involuntary exception to the independence of channels are options three and seven of channel zero mentioned above. Here the pitch of the special effect is on zero controlled by the pitch of channel 1. The main voluntary exception is that you can control channels to play together. In this way channels 1 to 3 can be synchronised to play chords if wished. In fact this facility is part of a more general form of C (for channel) in SOUND.

General form

You can replace channel (C) by a hexadecimal number. For instance the value, & 1103, could be used. The & denotes a hexadecimal number and each integer is in fact one of four parameters that can be passed to SOUND. In the manual these are referred to as HSFC and the last one, C, is our friend the channel number.

Of the rest, H and F are easy. H is a parameter that determines when a note ends. It can be zero or 1. If 1 then the last note played on channel 1 continues until a new note appears (D is over-ridden). This allows a smoother merging of sounds. F, a queue-flushing parameter, can also be either 1 or 0. If the value is 1 the current note playing on the given channel, plus the entire queue, are flushed out of the system. This lets you avoid infinite sounds or queueing problems.

S is the key parameter for chords. It gives the value of extra notes to be played simultaneously. If zero there is no effect on normal operation but a one indicates that one other note (on a different channel) should play simultaneously with the new one. A two means that three notes total are needed. In this case nothing will be

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Turning the tables

(GORDON FINDLAY continues his series on BASIC for beginners.)

Last month I left you with a problem, which was to write a program to test the multiplication tables. This was the detailed "specification":

1. Clear the screen, and print a welcoming message.
2. Ask for the multiplication table to be tested.
3. Ask 12 questions, from "one times" to "12 times". Each question is to be printed on the third line of the screen, replacing the previous.
4. After each question is presented, get the user's answer. If it is correct, print, "Well done". If it isn't, print, "Sorry, the answer is", and the correct answer. Wait two seconds between each question.
5. Once the questions have all been asked and answered, the screen is cleared, and the number of correct answers displayed in the form: "You answered — questions correctly".

The variables that the program was to operate on were:

TB — the multiplication table being asked;
X — the other number in the question "TB x X";
CT — the correct answer;
AN — the user's answer;
SC — the score — the number of questions answered correctly.

This is how I went about it. You could very well have come up with different, even better, ways of writing this program.

Steps one and two are straight forward:

```
15 CLS
20 PRINT
25 PRINT
30 PRINT "HI! WELCOME TO TABCHECK"
35 PRINT
40 PRINT
45 PRINT "WHICH TABLE DO YOU WANT TO TRY?"
50 INPUT TB
```

Remember that line 15 may be different for your machine, and that lines 45 and 50 could be combined in most cases.

The blank PRINT statements (35, 40, etc.) are to spread the message out on the screen. There are other ways of doing this too — depending on your machine again.

Before we start in at step three, let's remember that the "player's" score needs to be kept as the program runs, so we need to start the score off — at zero obviously:

```
55 SC=0
```

Don't forget the LET in this statement, and others, if your machine requires it.

Step three is best tackled a bit at a time. To ask each question, we must first clear the screen, then print the question:

```
70 CLS : REM CHANGE TO WHATEVER YOUR MACHINE WANTS
75 PRINT
80 PRINT
85 PRINT TB; " x "; X;" = ";
```

Notice the semicolon at the end of statement 85, to keep the user's input on the same line. Now we need both the user's answer, and the correct answer!

```
90 INPUT AN
95 CT = TB * X
```

Now compare them. There are two possible actions, and we need to skip around the one not selected each time:

```
100 IF CT = AN THEN GOTO 115
105 PRINT "SORRY, THE ANSWER IS";CT
110 GOTO 125
115 PRINT "WELL DONE"
120 SC = SC + 1
125 FOR I=1 TO 2000
130 NEXT
```


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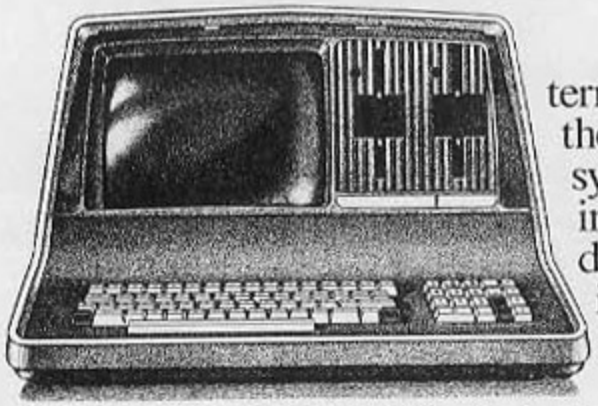

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The pair of lines 120–125 do absolutely nothing, but they take about two seconds (on my machine anyway) to do it — it's as if the machine were idling. This gives you a chance to read the screen. Check carefully the jumping around: if the answer was correct, the path is 100–115–120–125–130; if wrong, the path is 100–105–110–125–130.

Line 120 of course increases the user's score — see how that is in the part of the program which is only reached when a correct answer is given?

Lines 70 to 130 complete the handling of one question — the question "X times whatever". We need 12 of these. The best way of repeating some sequence when we know the required number of times is a FOR-loop. The loop is simple, but watch line numbers if you're typing it in:

```
60 FOR X = 1 to 12
135 NEXT X
```

All that's left is step 5 — telling the user how he or she got on. Better clear the screen first:

```
140 CLS
145 PRINT
150 PRINT
155 PRINT "YOU ANSWERED ";SC;" QUESTIONS CORRECTLY"
160 END
```

This output also appears on line three of the screen — in the same place as the questions did. Most often this is a good idea.

Now you are probably thinking that this is terribly long-winded discussion of a relatively boring program. I agree! But look at the division into small tasks which we have carried out. And look at the careful thought that I put in before writing. Hopefully you can learn a few more skills, and broaden your experience, by this sort of exercise.

Now for the interesting bit! Add all the graphical and sound effects that you can to this program to make it into a real whoop-de-do game.

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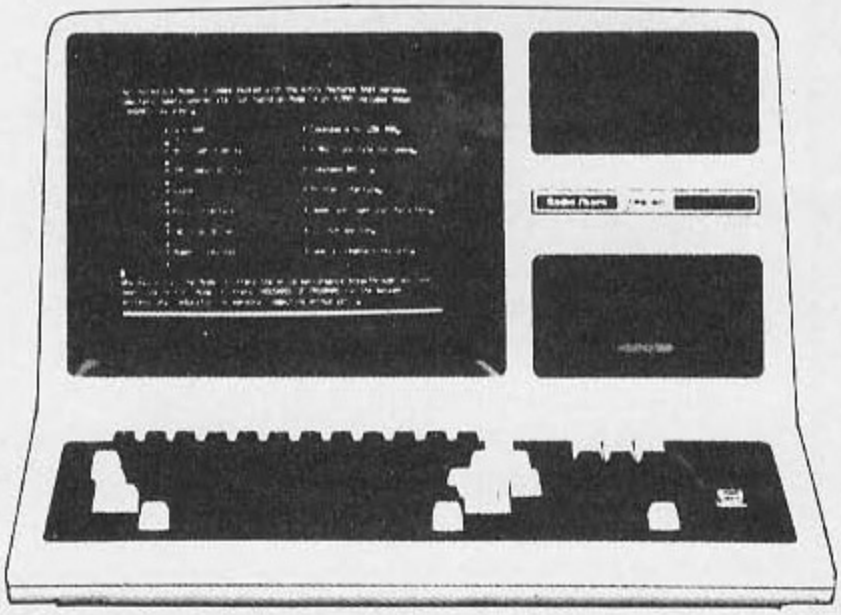

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A beginner's look at CP/M 80

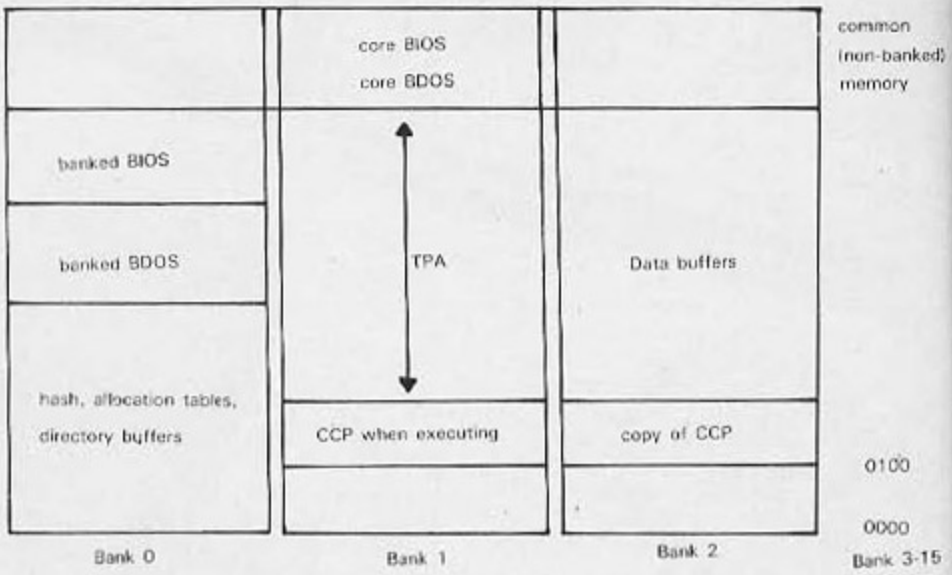
By JOHN WIGLEY

This month we leap into CP/M 80. If you are new to CP/M read the introduction to CP/M from last month, or at least keep it handy for reference.

CP/M is an operating system. Like all systems it tends to "grow" as new and better features are added. The problem is that this growing reduces the memory available to run programs, or TPA, in CP/M parlance. To add a new feature means making a choice between the benefits of the feature and the loss of available memory space.

CP/M 2.2 occupied a large amount of memory and any improvement is bound to occupy more. CP/M version 3, or CP/M 80, as it's now called, occupies quite a lot of memory, but in the right sort of system can leave 61K of TPA,

How is this paradox resolved? Digital Research has taken advantage of "bank switching" of memory (scmetimes called "extended addressing"). Quite simply the Z80 808X type family can address 64K of memory (16 addressed lines).



We can switch this memory by plugging in say another 64K memory board. The CPU will happily go on addressing up to 64K. All we have to do is keep track of the boards as we switch them. We do, however, have a problem. As we have used all 64K we have no common omen to link the boards and nowhere in memory to store it! If we use the top, say, 8K of memory and make it common to all banks of memory we can load BIOS and BDOS into this and use it to transfer programs/information in memory from one bank to the other. What's more we can use the operating system, CP/M 80, to keep track of the switches.

Problem solved? Well, not quite. We must use memory boards that are built for bank switching, in the case above, our own 64K memory boards would be bank selected in 8K chunks or banks. The size of the chunk can vary from 4K to 16K, depending on the board manufacturer.

The diagram shows how this works. It has been simplified to make it easy to read. Note that the TPA extends into the non-banked memory for program transfer. Only three banks are shown, but up to 16 can be used. The net result of all this has been to give a lot more effective space. As well, the BIOS and DDOS are bigger but occupy less space in the system when it is executing.

Since these extras are stored in memory we do not need to access the disk to use them thus cutting down on disk wear, and no slowing down for disk reads occurs.

On top of this, Digital Research has chosen to implement data and directory buffers. Directory buffers go into bank O and data buffers into banks 2-15. Cache buffering is used so that if information needs to be re-read it is read from the buffer, not from another disk read. Up to 255 buffers may be allocated to data and directory.

Obviously this is going to use memory, so don't get too carried away. To cut down on superfluous buffers, Least Recently Used section is used. As new information is called up, Old Least Used is dropped. The directory tables are also "hashed", which means the directory entry can be accessed directly. All this adds up to speedier running programs and less disk drive and diskette wear.

Another feature, and not before time, is a "help" program. Instead of cryptic messages, error messages are expanded and a help facility can be called up to explain and assist. This feature will be worth its weight in gold.

How does CP/M 80 stack up against CP/M2? To decide this a deeper look into some of the new features is needed but if you do not have a "bank" facility available then stick with CP/M2.

Next time CP/M86, Concurrent CP/M, and deeper into CP/M 80.

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BOOKS

Excellent for some

"Mastering Computers" by G.G.L. Wright. Published by MacMillan Education, in its Master series 1982. 227 pages. $9.95. Reviewed by Gerrit Bahlman.

Computer awareness is the "in" phrase in most high schools in New Zealand today. In computer awareness courses students are introduced to the why's, what's and wherefore's of computers without necessarily being introduced to formal programming. Such courses endeavour to make students familiar with the technology and jargon without giving them any formal training in it. While successful computer awareness courses spell their own doom and critics of such courses ask the question, "Did anyone need telephone awareness courses?", it is accepted by most people that there is an abysmal ignorance of both the technology's capabilities and the state of the art today.

"Mastering Computers" is a commercially oriented computer awareness text designed to introduce adults to the vagaries of the technology and its arcane vocabulary. It is up-to-date and comprehensive. It is at the brink of the micro explosion with a photograph of the ZX80 micro as an example of the "bottom" of the home-computer market. It discusses computing in schools and the various activities in education and explores some of the social implications of the technology in its "future" section.

If the text pushes any barrow it is in the detailed description and analysis of systems development, commercial computer acquisition principles, software development procedures, and the organisation and administration of large mainframe computer departments. This bias makes it very clear that the text is aimed at the businessman who is concerned with the acquisition of commercial computer literacy.

The commercial approach is not over-stressed, however, and a solid overview of computer architecture, primary storage, peripherals, and the mechanics of how a computer operates is provided.

If any serious criticism is to be aimed at the text it must be at the attempted depth of treatment. For a computer-literate person the book has surprising depth yet clearly fails to extend. However, for the computer illiterate it will appear daunting. So the question of the level at which the book is aimed is the one which gives concern. I believe it is an appropriate text for anyone who has a working understanding of the industry, but has yet not achieved exposure to the detailed understanding that formal training would provide. In this case the book would be an excellent extension and can be readily recommended.

Database in Pascal

"Microbook: Database Management for the Apple II". By Ted Lewis. dilithium Press. 307pp. $39.95. Reviewed by Brian Strong.

Microbook is a data-management system and program development tool presented in an English-like language that, for anyone with a minimal knowledge of computers, makes it easy to use. This Pascal-based system is explained stage by stage with the various elements presented as diagrams or actual screen displays.

Microbook is extremely versatile and can be easily modified for such uses as

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accounts receivable and educational tests through to stockmarket histories, sports statistics, lists, or whatever your special requirements may be. At least half the book carries an easy to read program listing, making it a must for Pascal programmers faced with producing customised database packages for user-friendly situations. Instructions for obtaining Microbook on disk are also enclosed.

This book gives a good insight into structuring database systems, but experience in Pascal programming will be needed.

Interfacing TRS-80 III

Interface Projects for the TRS-80 Model III. Richard C. Hallgren (Prentice-Hall, 1982. PP, paperback $24.60. Reviewed by Jay D. Mann.)

Your personal computer can control the outside world, as well as perform calculations. Three elements have to be added to the basic computer: a means of sensing and measuring external events; a way to control or modify the outside world; and suitable software to tie everything together. This book by Richard C. Hallgren provides essentially complete answers to all three needs. It is intended as a practical guide to the reader who is familiar with digital circuits and with design of circuit boards.

This is definitely not a beginner's book. There are no tutorials on Boolean logic or soldering techniques. Instead, you are given a series of "cookbook" answers that will fulfil 95 percent of your interfacing requirements. Because the hardware is presented in detailed circuit drawings with I.C. pinouts numbered, and the logical gate operations of each I.C. are drawn out in full, you could build each circuit without having to look up anything in the manufacturers' specification sheets. Conceivably, you could build each of these projects by following the wiring connections without understanding the logic, but when troubles arise all needed information will be found. The emphasis on labelling all pinouts continues in the appendices where the in/earth/out connections for both positive and negative 3-terminal voltage regulators are covered. How often do authors omit this small but vital point?

What sort of circuits are presented? To begin with, you could start with a simple analog-to-digital unit that employs 555 timer to convert voltage or resistance into a computer-readable value. For faster response time, you can then choose between either an 8-bit analog-to-digital circuit or (for nit-pickers) a 10-bit circuit. As to what you measure, suggestions are made for a thermistor probe or air or skin temperature, wind velocity, joysticks, or fluid levels. Ultimately, these measurements have to be translated into something else. You will find programs for plotting results on the VDU screen, possibly after a remarkable fast Fourier transform written in BASIC! Circuits for switching external circuits, or for outputting a digitally controlled voltage or current are presented.

Hardware alone is not suficient. Software is even more important, and it is not omitted. Dr Hallgren uses machine code for speed in controlling the interface hardware, plus BASIC for ease in manipulating results. Although the assembly language versions of the machine-code routines are given, in practice with BASIC programs poke the machine-code into memory.

The programs and hardware are specifically designed to mount on to the signal bus of the Model III machine (and typically a useful listing of signals on this bus is given). One of the key aspects of the Model III is that you can jam information on to the computer's data bus by pulling an external line low; other computers will need different approaches. Full advantage is taken of this feature of the Model III, but most people who are capable of utilising this

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CLUB CONTACTS

BBC MICROCOMPUTER USERS GROUP OF NZ, P.O. Box 9592, Wellington. Local meetings:— Auckland: 2nd Wednesday of the month at VHF Clubrooms, Hazel Ave, Mt Roskill. Ph: Dave Fielder 770-630 ext 518 (b). Wellington: 4th Thursday of the month at the Correspondence School staffroom, 1st floor, Portland Cres, Thorndon, 7.30pm. Ph: Anton, 286-289.

SERADO & HART APPLE COMPUTER CLUB, Kerikeri High School, Kerikeri. Lessons, 12:15 to 1:15 weekly. Contact: S. Shearman 79-882 (Kerikeri) or Fairway Drive, Kerikeri.

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

NZ MICROCOMPUTER CLUB INC: P.O. Box 6210, Auckland. The monthly Meeting is held on the first Wednesday of each month at the OSNZ Hall, 107 Hillsborough Rd, Mt Roskill, from 7.30pm. Visitors are also welcome to the computer workshop in the hall, 10am–5pm, on the Saturday following the above meeting.

The following user groups are part of the club. All meetings shown start 7.30pm at the VHF Clubroom, Hazel Ave, Mt Roskill. Other active user groups within the club are:

APPLE, CP/M, DREAM 6800, SMALL BUSINESS, KIM, LNW, SORCERER, 1802 and 2650. They can all be contacted at club meetings or via NZ microcomputer Club, P.O. Box 6210, Auckland.

APPLE USERS' GROUP: Don Hagen, 70 Hapua Street, Remuera; 546-748 (h) 547-180 (w). Meetings, first Tuesday each month.

ATARI MICROCOMPUTER USERS GROUP: Brian or Dean Yakas. Phone 8363 060 (h). Meetings: Second Tuesday.

BBC USERS' GROUP: Dave Fielder. Phone 770-630 ext 518 (w). Meetings, second Wednesday of month.

BIG BOARD USER GROUP: Steve Van Veen, Flat 5, 111 Melrose Rd, Mt Roskill, Auckland 4. Phone (09) 659-991 (h).

BUSINESS USERS' GROUP: John Hawthorn, 11 Seaview Rd, Remuera. Phone 542-714 (h), 876-189 (w). Meetings monthly.

COMMODORE USERS' GROUP: John Walker, 833-9589 (day), Box 5233 Auckland. Meetings 3rd Wednesday, Remuera Primary School Hall, Dromorne Road.

CP/M USERS' GROUP: Kerry Koppert, 2/870 Dominion Rd., Balmoral. Phone 69-5355 (h). Meetings: Micro workshop.

IBM PC USERS' GROUP: Terry Bowden, 452-639 (h.) 778-910 (w.), Box 6210, Auckland.

NZ OSBORNE USERS' GROUP: Brian James, 659-738 (h.) Box 6210, Auckland.

DREAM 6800 USERS: Peter Whelan, 22 Kelston St, New Lynn, Auckland. Phone (09) 875110 (h).

KIM USERS: John Hirst, 1A Northboro Rd, Takapuna. Phone (09) 497-852 (h).

LNW USERS: Ray James. Phone (09) 30-839 (w), 585-587 (h).

SINCLAIR USERS' GROUP: Doug Farmer. Phone 567-589 (h). Meetings: Fourth Wednesday.

SORCERER USERS' GROUP (NZ): Selwyn Arrow. Phone 491-012 (h). Meetings: Micro workshop.

SORD USERS' GROUP: Graeme Hall, 5 Brouder Place, Manurewa (266-8133) (h).

TI 99/4A USERS' GROUP: Ray Tucker, 568-195 CW, 63 Marriot Rd, Pakuranga.

1802 USERS' GROUP: Brian Conquer. Phone 655-984 (h).

WIZZARD USERS' GROUP: Richard McFadgen TGN8219(Ch), 784580 (w), 11 Hilling St, Titirangi.

The above contacts can usually be found at NZ Microcomputer Club Meetings, or via P.O. Box 6210, Auckland.

Other Auckland-based groups:

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

BBC Club: See entry at head of this list.

CMUG (Combined Microcomputer Users' Group): This is an association of Microcomputer Clubs, Groups, etc, formed to co-ordinate activities and to give a combined voice on topics concerning all micro users. Representation from all Clubs and Groups is welcomed to: CMUG C/- P.O. Box 6210, Auckland.

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

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

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

OSI/BBC USERS' GROUP (Ak.: Secretary: Ken Harley, 77 Boundary Road, Auckland. Meets third Tuesday, VHF Clubrooms, Hazel Ave., Mt Roskill.

SYMPOOL (NZ SYM USER GROUP): Mark Bennett, P.O. Box 651, Manurewa, Ph 541-043 (w).

A.Z.T.E.C.: Brian Mayo, Church Street, Katikati. Phone 490-326. Members use all micros.

BAY MICROCOMPUTER CLUB (Tauranga): C. Ward, Secretary, P.O. Box 6C37, Brookfield, Tauranga. Phone: 89-234.

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HAMILTON SUPER 80 USERS': Bruce White, (h) 436-878.

WAIKATO COMMODORE USERS' GROUP: Secretary, Mrs Eileen Woodhouse, 32 Kenny Crescent, Hamilton.

MORRINSVILLE COMPUTER SOCIETY: Contact: Alison Stenyer, 49 Coronation Road, Morrinsville. Phone 6695 (h). Meets 1st and 3rd Wednesdays.

GISBORNE MICROPROCESSOR USERS' GROUP: Stuart Mullett-Merrick, P.O. Box 486, Gisborne. Phone 88-828.

ELECTRIC APPLE USERS' GROUP: Noel Bridgeman, P.O. Box 3105, Fitzroy, New Plymouth, Phone 80-216.

TARANAKI MICRO COMPUTER SOCIETY: P.O. Box 7003, Bell Block, New Plymouth: Mr K. Smith, Phone 8556, Waitara.

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

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

MICRO AND PEOPLE IN SOCIETY (MAPS): Levin, meets on second and fourth Thursday of each month. D. Cole, 28 Edinburgh Street, Levin. Phone 83-904, or W. Withell, P.O. Box 405, Levin.

WAIRARAPA MICROCOMPUTER USERS' GROUP: David Carmine, 64 Herbert St, Masterton. Phone 86-175.

CENTRAL DISTRICTS COMPUTERS IN EDUCATION SOCIETY: Rory Butler, 4 John Street, Levin, (069) 84-466 or Margaret Morgan, 18 Standen Street, Karori, Wellington, (04) 767-167.

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

BBC USER GROUP: Users of other machines welcome too. Write P.O. Box 1581, Wellington, or Phone 861-213, Wellington.

BBC Club: See entry at head of this list.

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

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

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

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

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

WELLINGTON MICROCOMPUTING SOCIETY INC.: P.O. Box 1581, Wellington, or Bill Parkin (h) 725-086. Meetings are held in Wang's Building, 203-209 Willis Street, on the 2nd Tuesday each month at 7.30pm.

WELLINGTON SYSTEM 80 USERS' GROUP: Contact: M. Trickett, Phone: 724-351 (w), 662-747 (h).

NELSON MICROCOMPUTER CLUB: Dr Chris Feltham, Marsden Valley Rd, Nelson. Phone (054) 73-300 (h).

NELSON VIC USERS' GROUP: Peter Archer, P.O. Box 660, Nelson. Phone (054) 79-362 (h).

BLENHEIM COMPUTER CLUB: Club night second Wednesday of month. Ivan Meynell, Secretary, P.O. Box 668. Phone (h) 85-207 or (w) 87-834.

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DUNEDIN SORD USERS' GROUP: Terry Shand. Phone (024) 771-295 (w), 881-432 (h).

CENTRAL CITY COMPUTER INTEREST GROUP: Robert Edgeler, Eclipse Radio and Computers, Box 5270, Dunedin. Phone 778-102. Meetings every second Tuesday.

SOUTHLAND COMMODORE USER GROUP: (VIC 20 and 64s). Address: C/- Office Equipment Southland, Box 1079, Invercargill.

NOTE: Clubs would appreciate a stamped self-addressed envelope with any written inquiry to them.

NOTE: If your club or group is not listed, drop a line with the details to: Club Contacts, BITS & BITES, Box 827, Christchurch. The deadline for additions and alterations is the first weekend of the month before the next issue.

We'll win

By PAT CHURCHILL

The Poly 1 educational computer is now "beginning to do quite well in a number of areas, considering all the abuse it's had," according to Mr P.W. Harpham, chairman of the marketing company, Polycorp.

"As people become more used to the Poly and more knowledgeable about it, they get to realise why it is built the way it is," he said.

One of the biggest things the Poly has had to overcome is prejudice — "that you can't do this in New Zealand", Mr Harpham says.

"We're getting more inquiries and follow-ups than ever," Mr Harpham said. Taking firm commitments into account, about two dozen New Zealand seoondary schools have gone the Poly way.

As the number grows, so does the educational software.

Teachers and pupils are beginning to generate their own software.

Another Poly software catalogue is due for release and will be a major enhancement on the previous one, Mr Harpham says.

He says things have got "enormously screwed up and the quality of the product has got lost in all sorts of arguments. At the moment we're getting the sort of chaos the Education Department feared."

However, Mr Harpham says he is confident about the future of the Poly. "We've been able to keep up with developments and build on what we've got. I think we're going to win eventually with the Poly."

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book will be able to modify the designs for other Z-80 computers The author has also written a book of interface projects for the Apple II.

If you have sufficient hardware expertise to build the circuits presented, this book will save you a great deal of effort, particularly with its integration of hardware and software. University and industrial laboratories, in particular, ought to find the book an invaluable source of ready-to-run circuits and programs. It is not easy to find such detailed, down-to-earth information that can be applied so directly.

GLOSSARY

Algorithm: A list of instructions for carrying out some process step by step.

Applications program: A program written to carry out a specific job, for example an accounting or word processing program.

Array: A data type found in high level languages, which is stored in a contiguous block of memory. Accessed by the array name and an index making it easier to process groups of data in many situations.

BASIC: Beginners' All-purpose Symbolic Instruction Code. The most widely used, and easiest to learn, high level programming language for microcomputers.

Baud: Speed of transferring data, measured in bits per second.

Binary: The system of counting in 1's and 0's used by all digital computers. The 1's and 0's are represented in the computer by electrical pulses, either on or off.

Bit: Binary digit. Each bit represents a character in a binary number, that is either a 1 or 0. The number 2 equals 10 in binary and is two bits.

Boot: To load the operating system into the computer from a disk or tape. Usually one of the first steps in preparing the computer for use.

Buffer: An area of memory used for temporary storage while transferring data to or from a peripheral such as a printer or a disk drive.

Bug: An error in a program.

Byte: Eight bits. A letter or number is usually represented in a computer by a series of eight bits called a byte and the computer handles these as one unit or "word".

CAL: Computer Aided Learning CAL programs are written to take different actions on different student answers.

Computer language: Any group of letters, numbers, symbols and punctuation marks that enable a user to instruct or communicate with a computer. See also Programming languages and Machine language.

Courseware: Name for computer programs used in teaching applications.

Cpi: Means character per inch. A common way of describing character density, i.e., how close together characters are in printers.

CP/M: An operating system for Z80 based machines. It is by far the most widely used DOS for Z80 based machines and there is an extremely large software base for it. See also disk operating systems.

CpS: Characters per second. A common way of describing speed in printers.

Cursor: A mark on a video that indicates where the next character will be shown, or where a change can next be made.

Data: Any information used by the computer either I/O or internal information. All internal information is represented in binary.

Disk: A flat, circular magnetic surface on which the computer can store and retrieve data and programs. A flexible or floppy disk is a single 8 inch or 5¼ inch disk of flexible plastic enclosed in an envelope. A hard disk is an assembly of several discs of hard plastic material, mounted one above another on the same spindle. The hard disk holds up to hundreds of millions of bytes – while floppy disks typically hold between 140,000 and three million bytes.

Disk drive: The mechanical device which rotates the disk and positions the read/write head so information can be retrieved or sent to the disk by the computer.

Diskette: Another name for a 5¼ inch floppy disk.

Disk operating system: A set of programs that operate and control one or more disk drives. See CP/M for one example. Other examples are TRSDOS (on TRS 80) and DOS 3.3 (for Apples).

DOS: See disk operating system.

Dot matrix: A type of print head, made up of a matrix of pins, e.g. 8x8. When a character is to be printed the appropriate pins push out and strike the ribbon to paper forming the character.

Dot graphics: These graphics are individual screen pixels. Used by either turning on or off one pixel.

Double-density: Floppy drives that store twice the standard amount of data in the same space. This has been made possible by advance in the medium and the drives.

Dump: Popular term for sending data from a computer to a mass storage device such as disks or tape.

Execute: A command that tells a computer to carry out a user's instructions or program.

Fanfold: A type of paper that although a continuous sheet folds into set length sheets. This is achieved by way of a perforated line at set intervals. It also makes its easy to tear off a length of paper.

File: A continuous collection of characters (or bytes) that the user considers a unit (for example on accounts receivable file), stored on a tape or disk for later use.

Firmware: Programs fixed in a computer's ROM (Read Only Memory); as compared to software, programs held outside the computer.

Floppies: Thin plastic disks with a magnetic coating used for storing information. Called floppies because they are flexible.

Friction feed: A type of paper-feeding system for printers; normal paper in a continuous sheet is gripped between two friction rollers as on a typewriter.

Hardware: The computer itself and peripheral machines for storing, reading in and printing out information.

Hex: Abbreviation for hexadecimal notation, a base-16 numbering system convenient to use with computers.

High-level language: Any Englishlike language, such as BASIC, that provides easier use for untrained programmers. There are now many such languages and dialects of the same language (for example MicroBASIC, PolyBASIC etc).

HIMEM: Denotes the highest address that is available in a memory map.

Input: Any kind of information that one enters into a computer.

Interactive: Refers to the "conversation" or communication between a computer and the operator.

Interface: Any hardware/software system that links a microcomputer and any other device.

I/O "Input/output".

Inverse video: When the background is coloured; e.g. on a black and white screen white becomes background and characters are written in black.

K: The number 1024. Commonly refers to 1024 bytes. Main exception is capacity of individual chips, where K means 1024 bits.

KILOBYTE (or K): Represents 1024 bytes. For example 5K is 5120 bytes (5 x 1024).

Line feed: A control code character found in the ASCII character set. Its normal purpose is to move the cursor down one line (on screen) or move paper up one line (on printer). Does not return the cursor to the left-hand margin.

Machine language: The binary code language that a computer can directly "understand".

Mainframe: The very large computers that banks and other large businesses use are called mainframes. Also in microcomputers the term is sometimes used to describe the core of the machine, i.e. the CPU plus memory.

Mass storage: A place in which large amounts of information are stored, such as a cassette tape or floppy disk.

Megabyte (or Mb): Represents a million bytes.

Memory: The part of the microcomputer that stores information and instructions. Each piece of information or instruction has a unique location assigned to it within a memory. There is internal memory inside the microcomputer itself, and external memory stored on a peripheral device such as disks or tape.

Memory capacity: Amount of available storage space, in Kbytes.

Menu: List of options within a program that allows the operator to choose which part to interact with (see Interactive). The options are displayed on a screen and the operator chooses one. Menus allow user to easily and quickly set into programs without knowing any technical methods.

Microcomputer: A small computer based on a microprocessor.

Microprocessor: The central processing unit or "intelligent" part of a microcomputer. It is contained on a single chip of silicon and controls all the functions and calculations.

Modem: Modulator-demodulator. An instrument that connects a microcomputer to a telephone and allows it to communicate with another computer over the telephone lines.

Network: An interconnected group of computers or terminals linked together for specific communications.

Output: The information a computer displays, prints or transmits after it has processed the input. See input and I/O.

Parallel interface: A type of communications interface used mostly for printers. It sends a whole character of data down eight (commonly) lines, one bit down each line. The most common type of parallel interface for printers is the centronics interface.

Pascal: A high-level language that may eventually rival BASIC in popularity.

PEEK: A command that examines a specific memory location and gives the operator the value there.

Peripherals: All external input or output devices: printer, terminal, drives etc.

Pixel: Picture element. The point on a screen in graphics.

POKE: A command that inserts a value into a specific memory location.

Program: A set or collection of instructions written in a particular programming language that causes a computer to carry out or execute a given operation.

RAM: Random access memory is the very fast memory inside your computer. The access time for any piece is the same. Your program and run-time data are usually stored in RAM.

REM statement: A remark statement in BASIC. It serves as a memo to programmers, and plays no part in the running program.

Resolution: A measure of the number of points (pixels) on a computer screen.

ROM: Read only memory. Any memory in which information or instructions have been permanently fixed.

Serial interface: A type of communications interface used for a wide variety of purposes (printers, terminals, telephone correction etc.). It uses a minimum of two wires, and sends the data one bit at a time down one wire. The most common type of serial interface is RS232C.

Sheet feed: A type of paper feeding system normally used for high-quality document printers. A special device picks up a sheet of paper and feeds it into friction rollers.

Simulation: Creation of a mathematical model on computers that reflects a realistic system.

Software: Any programs used to operate a computer.

System: A collection of hardware and software where the whole is greater that the sum of the parts.

Tractor feed: A type of paper feeding system for printers. Special computer paper with holes along both sides is fed by the tractors gripping these holes.

VDU: Visual display unit. A device that shows computer output on a television screen.

Word: A group of bits that are processed together by the computer. Most microcomputers use eight or 16 bit words.

BBC

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played until three of the channels have a note ready to go. Thus the value above (&1103) meant look at channel 3, keep its note running once played, do not flush the queue and wait for a second channel to have a note ready before playing both together.

Clearly, even simple sound needs care to get the notes or effects timed and to prevent queues overflowing.

Z80 software

The details of software to be released with the Z80 second processor are beginning to leak out. They include a Microsoft Basic, a BBC BASIC for the Z80, GSX enhancements to the CP/M environment, CIS-COBOL and software for word processing, spreadsheets, and book-keeping. It is known that software will come bundled with the processor, but just what of this list would come bundled within the quoted system price of £285 is not completely clear.

CLASSIFIEDS

System 80/TRS 80: Utility Software, on cassettes. All below $15.00. Send S.A.S.E. for free catalogue, to, Software, P.O. Box 1003, Gisborne.

For Sale: Sharp PC-1251 Hand held computer 24K ROM 4.2K RAM complete with CE125 Printer-Micro cassette recorder, power supply and spare printer rolls. New, unwanted gift. Valued at $690. Sell for $500. Phone Auckland 547-347 or write to 43A Upland Road, Remuera, Auckland.

Wanted, Buy or borrow, past copies British "Your Computer" magazine. Write A. Telford, 55 Temata Road, Havelock North, Phone 775-421.

Customised ZX81 inside a 'Dean Keyboard' with hard wired 16K RAM converted to feed monitor, separate on/off switch and power socket. No more keyboard errors except yours. Cost over $500.00. I would like $380.00 o.n.o. Also BMC Green Screen Monitor 18MHZ band width $300.00 o.n.o. ZX Printer $180.00 o.n.o. B. Mycroft, 213 Westparkdale St, Tokoroa. Ph. 67-625.

For Sale: Sorcerer 48K RAM c/w B.W. Monitor/T.V., tape deck and software (mainly games). Plus Creed teletype (no interface but working). $950 o.n.o. Westport 8301 Evenings.

Information wanted on converting B & W T.V. for ZX81, also circuits for RAM expansion. Matt Killip, 11 Brookbank Place, Glenview, Hamilton.

Wanted MIKBUG 2.0 compatible BASIC or information on S.W.T.P.C. 8K BASIC V2.3. Ph. AK 403-8789 collect.

Machine Code book for ZX81. Ideal for beginners or advanced programmers. $19.95. Computer World Software, P.O. Box 2722, Christchurch.

Dick Smith Wizzard. For Sale. Joysticks cartridges, cassette interface. Worth $800. Sell $600 o.n.o. Telephone 55-909 (Tauranga), collect.

For Sale: Sharp Pocket Computer Model PC-1211, plus cassette interface and printer Model CE-121, price $399 o.n.o. (New Price $704). Write to: David Capill, 25B Carruthers Street, Christchurch, 4 or Ph. 585-619.

Information wanted on ZX81 1K programs, games etc, please contact Darin Mandy, 3 Russell Street, Foxton.

For Sale: Games for TRS-80/System-80 16K Tape-Eliminator, Air Traffic Controller, Armoured Patrol, Asylum, Scarfman, Hellfire Warrior. All $15. Chromasette Tape, Oct. 1982, for Radio Shack's Colour Computer with Extended Basic. $8. Books for ZX81 ROM Disassembly Part A and B. Mastering Machine code on your ZX81 by Toni Baker. $10 each or all 3 for $25. Peter Clare, 8 Norway Street, Kelburn, Wellington, Ph. 757-989.

New Atari 400 with power adaptor and books $650. Atari CX 2600 — 2 controllers and 3 games cartridges $450. Ph. Whitianga 65-157.

Wanted to swap ZX81 Quicksilva CHRS board software and any other ZX81 software, games etc. N. Donaghey, 56 Cambria Street, Nelson.

Cash Buyer would like to purchase micro and software for games/hobby use, anything under $1000.00 considered. Please write to 208 Charles Street, Hastings.

SHARP PC1500 Computer Machine Language Book, available from all leading Sharp Stockers. Price $33.00.

Unique offer: $260 – Pocket Casio FX702P with taperecorder/interface, soft cases instructions and program library. Contact Visser, 127 Napier Road, Ashhurst, 268-237.

Wanted to buy: Microprofessor MPF1 2K or 4K RAM. Will pay up to $200. Optional extras also considered. Write to Mr M. Relling, F/24, Ilam Flats, C/- University of Canterbury, Private Bag, Christchurch.

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window. The only aspect of "Easy Script" which is inferior to "Wordpro" is that it lacks an alternative text area.

"Easy Script", like most word processors, uses a disk drive. However, a workable word-processing system can function without a disk. I happily used my word processor for a year before I got a disk drive. The main advantage of a disk drive is that files can be stored and retrieved very quickly. This is important if you have very long documents or you want to call up standard paragraphs. Otherwise, a tape-based system will cope reasonably well. The program will take several minutes to load; but once it's ready, it will edit, format, and print just like a disk-based program.

Three tape-based word processors are available in New Zealand: "HES Writer", "Totl Text" and "Papermate". Even more are available overseas. It is interesting to note that the "Easy Script" program contains a tape option. So far, "Easy Script" is only available on disk, but I suspect that a tape version is not far away. The "Easy Script" disk is specially copy-protected; no doubt a tape version will be protected by a cartridge or dongle.

In general, I have been surprised by the amount of 64 software released on copy-protected disks. Certainly, tapes are easily copied, but I would hate to see the 64 become too disk orientated. The Commodore cassette system is quite reliable and sophisticated. There is no need for the average home user to buy a disk drive. However, if all the best software is to be available only on disk, then a prospective purchaser will face a much higher cost for an effective system.

One of the reasons why an Apple II is so expensive is that it would be unthinkable to get one without a disk drive. I hope this doesn't happen to the 64.

Coming up in October

- Reviews of the NEC APC, judged "computer of the year" in Australia, and of the Epson QXIO.
- A look at 16-bit micro's.
- Printer reviews.
- Machine columns, including an extra ration for ZX81 users, and one for Spectrum users.
- Books for computer buffs and beginners.

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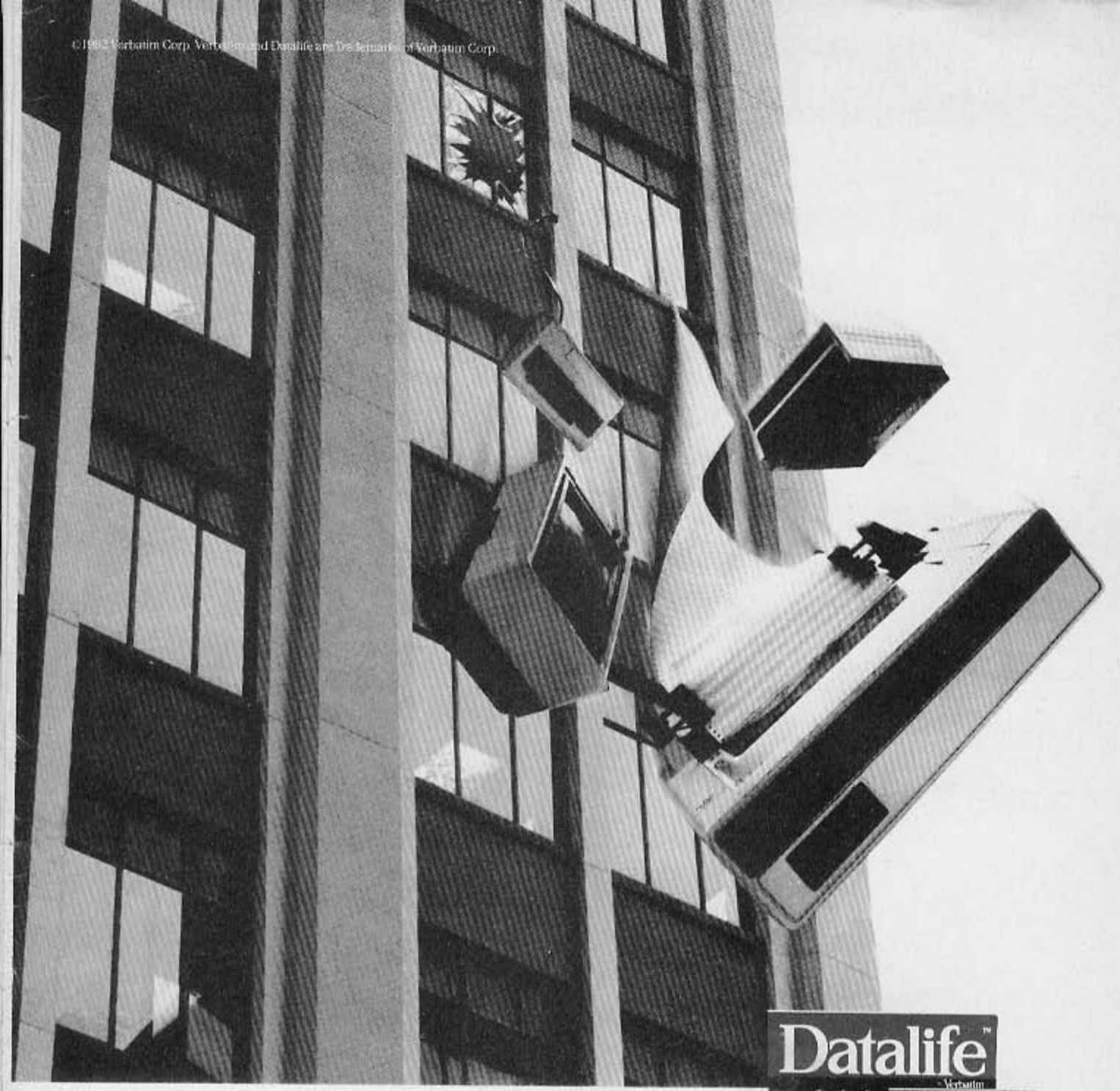

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