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BITS & BYTES

November, 1983 Vol.2, No.3 ISSN 0111-982E

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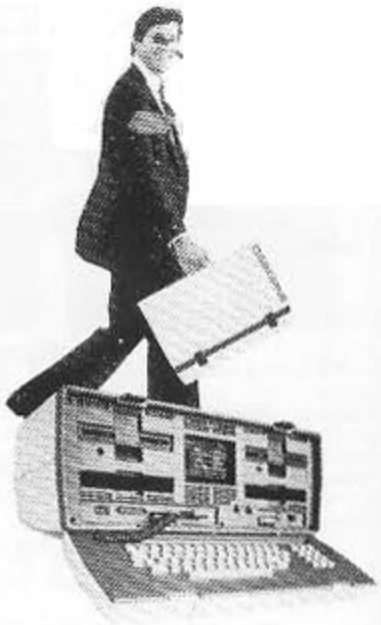
Win a hand-held!

Help us, and perhaps win a prize.

The middle four pages of this issue contain a questiornaire. If you take a few minutes to fill it in and return it you'll help us improve *Bits & Bytes,* and your name will be put in a draw to decide the winner of a $311 Hewlett-Packard financial calculator.



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Tax crumbs from the Government

The changes to the computer sales tax, announced on the eve of this edition of *Bits & Bytes* going to press, are, or the face of it, disappointing for microcomputer users.

Farmers wil now get their machines with a tax of 10 per cent rather than 40 per cent. Others to benefit include businesses in manufacturing, fishing, building, transport, communications, and research and scientific institutues.

Because the sales tax is applied at wholesale level, the effect is hard to predict, but one distributor has said that a system selling for $6500 might now sell to a farmer for $5300.

The change does show that Mr Hugh Templeton, the Minister of Trade Industry, has at least wrenched one concession out of a Cabinet that is said to have told him there would be no reduction in the computer tax unless he came up with an alternative, acceptable way of raising the foregone revenue.

The bright spot for *Bits & Bytes* readers who do not fit into the new low-tax categories is that the classifications are fuzzy at the edges and wil provide many headaches for the administering Customs Department. There will be increased pressure for an over-all reduction in the 40 per cent tax.

What happens when a firm making wooden letter boxes decides to run its business package on a low-tax microcomputer? Should the letter-box maker pay less tax on the micro that runs his spreadsheet program than his accountant does for a machine to run the same program? Should the letter-box maker's children get a cheaper machine than the employee's children next door?

Users, enthusiasts, parents, and everyone who sees how imperative it is to have a broad computer literacy in the country, must keep battering away, with Mr Templeton, against the mental wall of old politicians who are holding the nation back.

– The editor

Osborne's problem

Sirius Systems, the New Zealand distributor of the Osborne, is undertaking to provide on-going service and support for Osborne users, with news of Osborne's financial problems in America.

Auckland sources suggest that Osborne has taken an American option of filing a petition for bankruptcy but still hoping to trade its way out of trouble. There are also suggestions that the Osborne may be made under licence in another country.

Meanwhile, Sirius Systems emphasises that support in New Zealand will not be affected.

Sega from Japan

Grandstand Leisure, previously mainly in the arcade-games business, seems set to become a force in microcomputer distribution in New Zealand.

As well as Texas Instruments, it is handling the Sega, from Japan.

Sega is the brand name of a Japanese firm big in world arcade games, and one of the main sales points for the Sega soon going on sale is that many of the parent firms' arcade games have been or will be transcribed for it.

The basic machine has good colour graphics and will be a competitor in the VIC-20 and VZ-200 range. The Sega's New Zealand selling price is $399. The machine is Z80-based.

Franklin

The New Zealand distributor, Hitech Micro, disputes the report (Micronews, *Bits & Bytes*, October) that Apple has nearly won an injuction against Franklin. In fact, the position is that the United States Federal Appeal Court has required a lower court to again review certain points of law, Franklin has told its distributors in a telex message.

Franklin says its business has not been affected in any way. It says it had record sales in September.

Franklin now employs more than 500 people and has more than 1000 dealers throughout the United States.

Sinclair printers

The moist days of an English summer have brought to light one particular shortcoming of the cheap Sinclair printer . . . its paper is highly sensitive to humidity. High humidity fades the printout. Sinclair's advice: photo-copy anything important.

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International chain still coming to N.Z.

The big international computer chain, Computerland, still intends to open three stores in New Zealand early next year, reports Paul Crooks after a recent visit to Australia.

The managing director of Computerland Australia, Mr Darryl Rudolph confirmed that the stores would "definitely" be established before the middle of next year, probably in Auckland, Wellington and Christchurch.

The long-term plan is to open six stores, concentrating on selling business computers, including such well-known brands as IBM, Digital and Apple.

With more than 500 stores world-wide, including 18 in Australia, Computerland has considerable purchasing power, and Mr Rudolph indicated that the computers it will sell in New Zealand will be "competitively priced"

The entry of Computerland to the New Zealand market seems certain to shake-up existing business computer dealers.

Mr Rudolph reported a number of inquiries from New Zealanders wishing to acquire a franchise (all Computerland stores are independently owned, and a franchise is reported to cost $35,000, plus 8 per cent of profits).

But home-computer dealers may also be affected later as Computerland last year began opening home-computer stores called Computerland Satellites in the United States.

VZ200 price reduction

The retail price for the Dick Smith VZ200 has been officially lowered to $299 (previously $349) from this month, although this has been the ruling price in Christchurch at least for several weeks.

The Texas Instruments TI-99

TI agent

Texas Instruments Australia has appointed Grandstand Leisure (P.O. Box 2353, Auckland) to distribute the TI-99/4A home computer in New Zealand.

It will be available from this month and cost $895

Probably the most intriguing aspect of the TI-99 is its 16-bit processor (Texas Instruments' own chip). It was originally introduced in late 1979 – although it has undergone several changes since then.

However, the most significant aspect of the TI-99 is that, unlike most other computers now appearing in New Zealand, a large range of software is already available for it.

More than 2000 programs are on cartridge, cassette or disk. Some games cartridges (cartridges plug into a slot next to the keyboard) will not be available in New Zealand, at least initially because of customs regulations.

Also included in the base unit are cassette (plus cables) and video ports, 16K of full user RAM and 26K of ROM containing TI BASIC and interpreter, etc.

Expansion is by way of a peripheral expansion box which can house up to seven peripheral cards including memory expansion card (adds 32K of RAM), RS 232 interface card for a printer or modem, and a disk controller card which can run three disk drives (room for one is included in the expansion box).

Microdrives

Further details of the microdrive for the Sinclair Spectrum are to hand. While most reviewers rate them good value for money one shortcoming to emerge is the limited life of a drive. The quoted life for the 'floppy-tape component is 5000 access cycles. That may be fine for saving time in loading your favourite game, but any activity that saves and accesses data frequently (like word-processing, spreadsheets, or advanced adventure games) will run through that quite quickly. Maybe potential buyers should wait.

Shugarrt has announced that it will be demonstrating (note demonstrating . . . not producing, or selling) a laser-disk prototype at the start of 1984 with virtually unlimited platter life and a capacity of 1.5 Gigabytes. A Gigabyte is a thousand Megabytes. The cost is expected to be somewhat in excess of the Sinclair device.

Hitachi is also in the race aiming for April, 1984, production and a 250 milliseconds access speed. If 1.5 Gb is too small try its proposed multi-disk cluster: 32 disks accessible totalling more than 41,000,000,000 bytes.

System 80

A new System 80 computer is now almost impossible to obtain in Australia and a similar situation is likely to apply in New Zealand soon, as Dick Smith Electronics has stopped importing them.

Dick Smith himself no longer owns Dick Smith Electronics, and the new owner, Woolworths, concentrated on mass-market computers such as the Wizzard and VZ200. Nevertheless, the word from Australia is that more computer models are in the pipeline.

System 80 owners in New Zealand should be able to pick up some attractively priced software in the next few months as Dick Smith Electronics clears stock.

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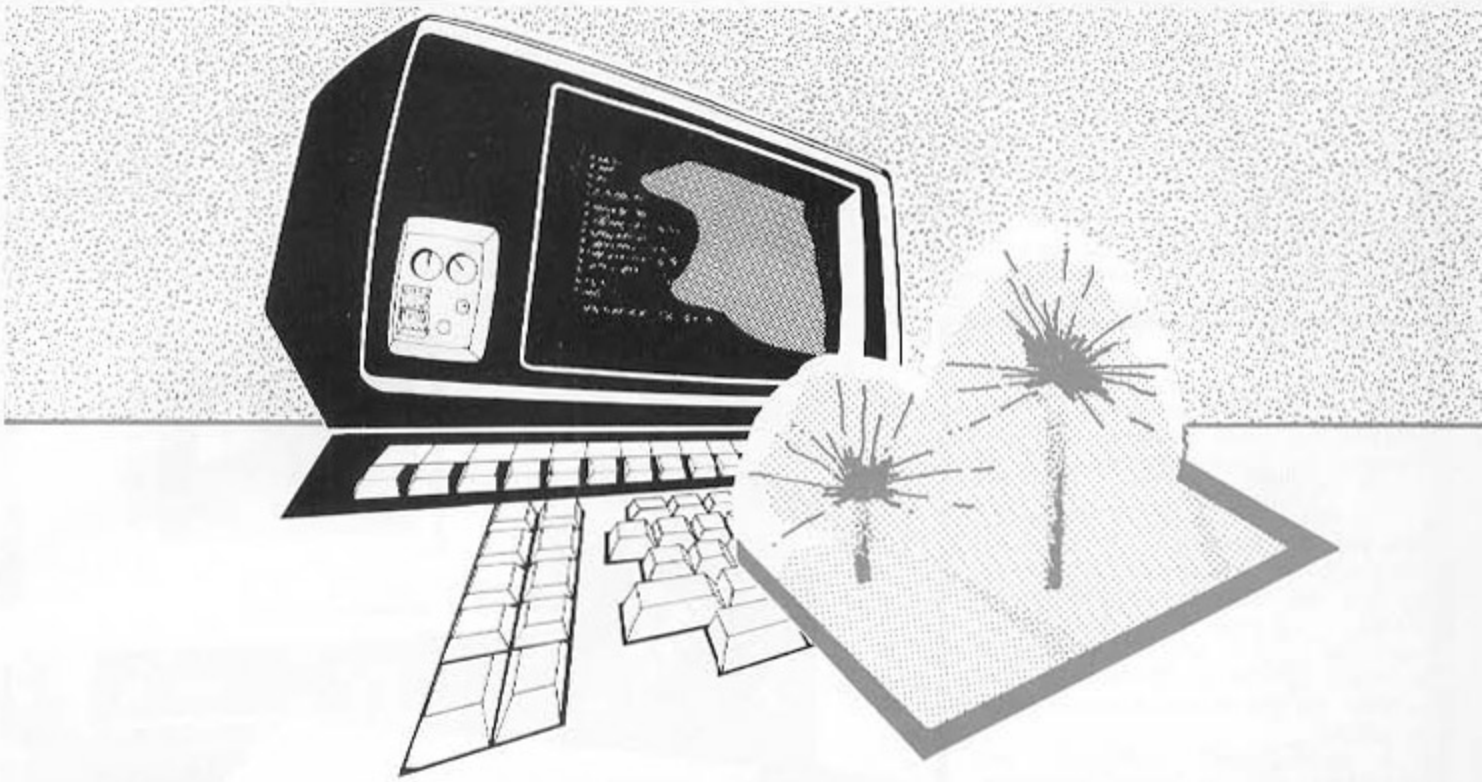

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Voice-response business micro

A computer to watch for in New Zealand next year is the Texas Instruments Professional Computer, reports Paul Crooks after seeing a demonstration in Australia recently.

This 16-bit machine has all the capabilities that have come to be expected from the latest 16-bit offerings: 128K RAM (expandable to 256K), built-in floppy-disk drive (with room for another drive or for a hard disk), detachable keyboard, high-resolution colour graphics, network communications, and support for operating systems (MS/DOS, CP/M 86, Concurrent CP/M 86, and UCSD p-system). With the addition of a card it can also run CP/M 80 software.

But the two features that set this computer apart and point the way to the future are voice management and natural language, as Texas Instruments call them.

The voice-management system combines the functions typically found in a "smart telephone", dictating machine, and a telephone-answering machine in a single unit that fits inside the Professional Computer. For example, the system provides telephone answering, speed-dialling of commonly used telephone numbers, recording of voice messages to be delivered to other Professional Computers in a network or to a central database, and recognition response to spoken commands. The latter, according to TI, means programs such as Multiplan (spreadsheet) and Easywriter (word processor) will respond to spoken commands and inputs.

The natural language capability is a user interface, derived from TI's research in artificial intelligence that allows the user to construct easily a valid English language query or command that the computer understands.New Zealand agents are Southern Business Machines, Box 3323, Auckland.

ZX81 rival

A competitor for the Sinclair ZX81 at the bottom end of the computer market has been released in New Zealand by David Wells Ltd (Box 2823, Christchurch).

The Polybrain, with 2K of RAM, will sell here for $199.50 (plus $20 for the power supply) and according to the distributors will run most ZX81 programs (programs containing PEEKs and POKEs require simple modifications. Sixty programs written for the Polybrain are already available.

A monochrome computer, the Polybrain has a more spacious keyboard than the ZX81, with 42 rubber keys. It is expandable to 16K or 32K with plug-in memory cartridges and displays 24 rows by 32 characters, using either a home television or monitor, with a resolution of 64 x 44 pixels.

Video, cassette, printer, and joystick interfaces are included in the standard unit.

U.K. hardware charts

At the end of August the long reign of the ACT Sirius as top British 16-bit computer was rudely broken by the IBM PC taking top slot. The triumph was short-lived, however. By early September Sirius was back in its accustomed position at No. 1 with the price-slashed Apple III coming up to challenge for second slot. In the eight-bit league only the Commodore 64 made any significant gain on the top three regulars: Spectrum, BBC and Dragon

Apricot

The Sirius manufacturer, ACT, has announced details of its new semi-portable, the Apricot. The machine will be based on an 8086 processor and feature useful enhancements such as a battery-powered LED clock in the keyboard (which also doubles as a system clock), LEDs on the special-function keys (so you can display custom-made functions directly on the keys under program control) and 3½ in, high-density mini-floppies. The machine will be software compatible with the Sirius and support the same 400 by 800 graphics.

The machine is small and portable . . . apart from the screen. The concept is that most users will have two screens, maybe one at work and one at home, or struggle a bit.

At a price some 20 per cent below present Sirius prices the Apricot looks very impressive. The release of its specifications almost certainly implies that the Sirius specifications will be enhanced to keep it up-market of its new sibling.

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A full size screen is a good idea, costs $425. leave it in your office and take the computer to your home or even to your car, boat, caravan or tractor (the 12V battery option will cost $135) then just plug it into your cigarette lighter. If you haven't got a printer then you can select from the wide range of AMUST, PACESETTER, CWL, CITOH, EPSON printers we have in stock from $685 or Daisywheel printers from $2000.

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Portables

A round-up of the current offering

By JOHN WIGLEY

This is a review of five portable machines. Looking at them or trying them has been quite an experience. Let me start off by saying that this is not a "which portable is better" article, but a review of the features of each.

The granddaddy of the portables is the Osborne. It is the original and the standard that everyone tries to beat. For those that don't know the Osborne, it looks like the case of a portable sewing machine. Open it up and the base detaches to form the keyboard; the rest houses two disk drives, an RS-232 interface, an IEEE 488 interface, a couple of storage areas, and a small screen. The keyboard can be used to support the main part and this tilts the screen up at an easy angle for viewing.

The keyboard is connected by a coiled cable plugging into the front, and there is also a monitor interface connector, just to the side of the screen controls. The RESET button is on the front. The case is grey plastic and the weight is 12kg. The Osborne or Osborne 1 as it's now called, stores about 94 K on each double-density disk drive. This double-density option is available for owners of the earlier single-density version.

A Z80A is the CPU and it has 64K of RAM (60K available). It runs CP/M 2.2. You read this on a five-inch (125mm) (measured diagonally) screen.

The display is 52 characters of 24 rows in a window on a 128 character line, and the machine has automatic horizontal scrolling.

I found that seated directly in front of the screen the characters were readable. Certainly it would be all right for short sessions, but the optional 250mm monitor is needed for extended viewing.

The character set used is sometimes difficult to read. The specifications are not very exciting, but then Adam Osborne set out to prove that being first on the market was more important than having exotic specifications, the concept of the true portable being exotic enough.

This is the machine that set the market on its ear only two years ago.

Obviously, the hardware, while different, was not enough. What Osborne did was to price the hardware very competitively: $US1700 and then include about $US2000 of software without any extra charge. This did the trick. Any competitor has to do the same. The same sort of package of software and hardware in a normal size machine sold for $US3000 to $4000. Americans rushed to buy them and due to the aggressive pricing policy here so have Kiwis.

The software is quite a package: CP/M2.2, CBASIC, and MBASIC, WordStar, including Mailmerge and Supercalc. For those who are not familiar with this software, CP/M is the operating system, now an industry standard. The rest comprises programs that run on CP/M, with CBASIC the compiled BASIC and MBASIC the interpretive basic. WordStar is a word processor (Mailmerge lets you produce form letters, etc.) and Supercalc is a spreadsheet program.

As these computers are generally bought for business purposes, most users would use WordStar for correspondence. The letter is typed in and then spelling mistakes corrected. The layout is set up and then the letter printed. If you want to alter anything it's just a matter of calling up the file, making alterations using the special WordStar editing facility and then printing again. Once you get used to it, it is a real time and effort saver.

Supercalc is used for anything involving calculations. It is ideal for creating those interminable reports that large organisations thrive on. Imagine a large sheet of paper with lettered columns along the top and numbered rows down the side. Each row/column is called a cell. Into each cell you can put numbers (data), or text. Each cell can be referenced by any other, as can rows and columns.

Anything from a balance sheet to an audit report, to Mum's favourite recipe can be constructed. Learning all the features can take quite a while, but models are available to assist the beginner.

By having CP/M as its operating system a wide variety of programs is available off the shelf.

Osborne has chosen to include BASIC as the language for this

Kaypro 2

Osborne

Access

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3. A complete range of business software including word processing, information handling, financial modelling, accounting and many more specific application packages.

4. Other computer languages such as LOGO, UCSD PASCAL, COMAL and ASSEMBLER are being developed. Existing VIC and 40 column PET BASIC programs can be easily converted.

5. The powerful sound chip gives 3 totally independent voices each with a range of 9 octaves. User control over music envelope, pitch and pulse shapes provides the ability to make your Commodore 64 sound like a variety of musical instruments, solo or in harmony.

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.®

HOW THE COMMODORE 64 LINES UP

FEATURES	
Base Price	$995
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Maximum 5¼" floppy disk capacity per drive	170 K.B. to 1 M.B.
AUDIO FEATURES	
Sound Generator	YES
Music Synthesizer	YES
H-Fi Output	YES
VIDEO OUTPUT	
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ADDITIONAL SOFTWARE FEATURES	
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Five portable computers compared

	Osborne	Access	Attache	Kaypro2	Pied Piper
Z80A CPU	*	*	*	*	*
User RAM	60K	62K	56K	60K	56K
Disk capacity	102Kx2	184Kx2	320Kx2	195Kx2	800Kx1
High res graphics	—	*	*	—	—
Printer interface	Serial	Parallel	Serial	Parallel	Parallel
Weight in kg	12	15	9	13	N/A
*Agent or distributor	Sirius Systems Ltd	Access Data Corp	Century 21	Microsystems Research Ltd	Archive Computers
CP/M	*	*	*	*	*
BASIC	M+C	M+C	BASIC-80	S	—
Word processor	WordStar	Perfect Writer	WordStar-plus	Perfect Writer	Perfect Writer
Calc sheet	Supercalc	Perfect Calc	—	Perfect Calc	Perfect Calc
Prices ($)	3815	5800	5800	4377	3750 (excludes monitor)
Special features	5MB Hard disk extra $4920	Printer and modem included	16 bit IBM PC compatible	10 MB Hard disk complete $7640	Second 800K available at $1199

machine. Different languages are available under CP/M.

Operating the Osborne is a breeze. Set it up, plug it in, turn it on and follow the instructions on the screen. It really is that easy.

Sirius Systems, Ltd., the distributor, gives each customer a run through on "how to do it" and then follows up as needed. It seems really keen to help and make sure you are not left floundering. It has 14 dealers.

Servicing is taken care of easily, thanks to the modular construction. Send the machine by courier, and it is fixed and sent back the next day. Owners say they find it reliable and are happy with their purchase.

The Osborne has been covered in detail to give you the picture of what a typical portable is. Now we look at another variation on the theme, the Kaypro.

The Kaypro

The Kaypro has a metal case and looks like a piece of amateur radio gear. It feels substantial, but weighs only a kilogram more than the Osborne 1. The corners are square and it is an attractive blue. The keyboard detaches and props up the front. It has a 225mm green screen which is on the left of the front panel. Two disk drives, one above the other, are on the right. The display is 80 characters, 40 lines and very readable.

Once again it is very easy to get going. CP/M is the operating system with the Perfect suite of software. There is Perfect Writer similar to WordStar, Perfectcalc similar so Supercalc, Perfect Speller to correct your spelling, Perfect Filer, a small filing system that really does work, (ideal for the club), and Profit Plan, a pre-defined calc sheet.

The great thing about the Perfect range is that data can be swapped between programs in the range. This is a feature that you have to use to appreciate.

Microsystems Research, Ltd., supplied the review model and it offers excellent installation and servicing.

The Attache

For a complete change we look at the Otrona Attache. This is the neatest. The case has squared off corners and is an attractive grey with brown highlighting. It weighs a scant 9kg. The keyboard detaches and a small plastic covered wire plugs in to join it up. The handle folds underneath to support the machine at a convenient viewing angle. Two angles are available. On the left is the 235mm green screen and the two drives are on the right. There is a built-in clock for date/time. This can be called up anytime. Every computer should have one. Programs are BASIC-80, Wordstar-Plus, Charton, and Valet. The operating system is CP/M.

The style of Attache is tremendous. Every executive should have one on his desk just for the visual effect.

The Attache has graphics capabilities. A demonstration of a map of the world with local time zones is most impressive, but the screen is hard to read. It is acceptable for short checking, but this is one computer you need a monitor with. The keyboard has the commands for WordStar-Plus and the set-up mode marked on the top of the keyboard. This is another good idea and makes learning so much easier.

Basic-80 is another BASIC with the extension of graphics. I spent some time playing with these. It is quite unusual to find graphics on a CP/M machine. They were easy to use and could be worth while. A large range of programs is available as an extra.

The Access

The Access is a large box. The side drops down to form the keyboard, well laid out and nice to use. The keyboard is connected by a long cable. The amber, 178mm screen is to the left of the two vertical disk drives, each of 184K capacity. CBASIC and MBASIC and the PERFECT suite of software are included. You also get two other important programs, Fancy Font, which allows changing the size and style of type and communications support.

There is a built-in printer (Epson) and a built in modem. The printer is a 80 characters-per second, dot-matrix type. The modem is to be to CCIT (NZ) standards.

The disk controller will support 8-inch drives.

As I sit surrounded by computer, monitor, printer and cables I would like one very much to write this review on. The Access is another easy machine to use, and having a built-in printer makes it easy to keep hard copies of work. An adjustable support allows tilting for best viewing.

Pied Piper

The Pied Piper is a new machine on the market. It is portable in a different way. No screen is included, but one disk drive is in the package. This is a high-density drive, 800K capacity.

Put a lot of files on the disk, check the remaining capacity, and you find you have 250K left, more than the empty capacity of other machines. It will drive a TV, as well as a monitor so you can take it home and use your TV set in an emergency. The power supply will run another drive and for business applications it is needed.

CP/M is the operating system and the Perfect suite goes with this machine. Because of the single disk some special programs are included to allow disk copying using the one drive.

The machine starts and operates with no problem, except that the density of the disk means it can be difficult to format disks. There is no using 40 track single-density disks on this machine. Use high quality, 80 track double-density disks.

Summary

I would be happy to have any of these machines.

The Attache scores for its incredible size and portability.

The Access is a complete machine. Although heavier, you have one self-contained package.

The Kaypro has a very readable screen, was very easy to use, and for under $7900 comes with a 10M hard disk.

Since this article was prepared the Osborne company in America has filed for bankruptcy. But there are suggestions this will not be the end of this popular brand of portable computer. See Micro News item.

The Osborne is the original, is proven, and is the cheapest. It has the biggest range of accessories.

The Pied Piper has terrific disk storage making it economical.

The chart sets out what each machine offers.

My advice is to try them out AFTER sitting down and deciding what you need.

Before ending this, reluctantly I have to mention the instruction manuals. The computers set up all right and then the fun began. Terse comments, sometimes no examples, no index or an incomplete one, error messages that were not explained. A first-time user could run into all sorts of problems. Fortunately all the dealers seemed keen to give a purchaser some instruction and assistance to get them going.

Reviewer's note: The Osborne is given more space in this article because it was the machine that started it all. Most of the features mentioned about it also occur in the other machines.

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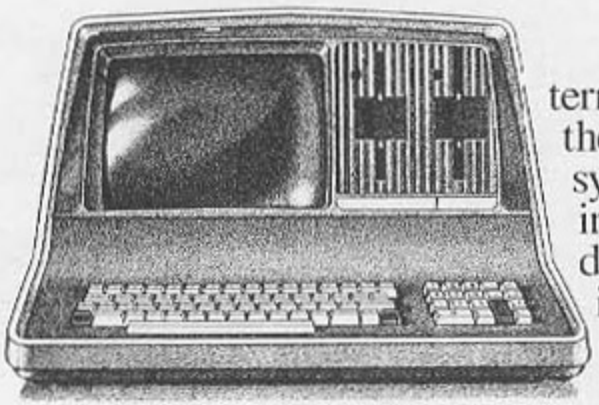

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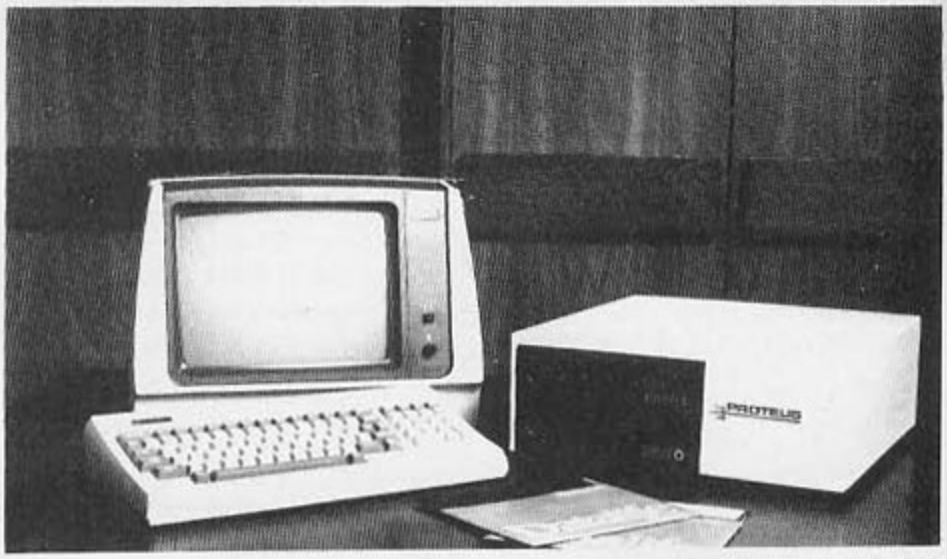
Polycorp's Proteus:

A good machine, but why another?

By BEVAN CLARKE



The Progeni/Polycorp Proteus

What's this? Another "made-in-N.Z." computer!

Why would anyone offer yet another new machine to New Zealand's small market for desktop office-or-laboratory micros? Why a system with two CPU's — a Z80 and a 6809? And why with three operating systems: standard CP/M for the Z80, standard (but not so well known) FLEX for the 6809, and something called POLYSYS?

Why? Because the vendor and manufacturer is Polycorp NZ, Ltd, and at the helm is Progeni Systems, Ltd. Both Polycorp and Progeni are renowned for their ability to innovate and to design and sell quality products. So this Proteus will surely not be yet another "plain vanilla" desk-top micro.

We shall try the standard test, beloved of both reviewers and users. This is called, "Switch on and see how far we can get without reading the manual".

Power on . . . aha! Two switches! One behind the neat flat-pack computer itself and one — fumble, stretch, fumble — behind the terminal. Now why don't they plug the terminal into a switched outlet on the back of the processor?

Still, they are both tidy units, finished in a matching rich cream textured surface. I would like to put the computer out of sight under the desk but then it would be harder to insert the 8in floppies into the two front slots. And — let's try it — the computer is too high at 400mm to use as a base for the terminal. So it takes up a lot of desk. How noisy the fan is.

Disk into Drive A. Wow! This computer loads CP/M fast! The screen is showing the familiar prompt under a sign-on banner which reveals that the BIOS (the machine-dependent part of CP/M; the "Basic Input Output System") reads 512 byte sectors off the disk. With 512 bytes per read instead of 128 bytes all disk operations should hurtle along.

The VDU's type-face is attractive and the green colour is easy on the eyes but something seems to be wrong! I can sense what I can only call "a 50-cycle" shimmer to the characters. Worse, there is a voltage-fluctuation type of roll and wobble to the screen. It must be our Educational Department power supply! I realise that it is a fixable fault, and it will only be a fault of this particular machine, but it is a fault nonetheless.

Progeni's service was prompt and friendly. Twice during the review period they sold my machine out from under me. Once I came back to find a computer which just would not boot. What was impressive was the speed with which Progeni got that machine working again!

I'll try a DIRectory command. What's on this disk? The usual CP/M utilities; STAT, DDT, SUBMIT — they're all there. ASM, the entry-level Digital Research absolute 8080 Assembler and ED, the world's very worst editor.

By now, I've broken the reviewer's oath and dipped into the manuals! I find that Polycorp agrees with me. It advises users to edit with a real editor like WordStar.

And WordStar is on the disk! Bliss! Away we go! Ah yes. This is dear old reliable standard WordStar. The

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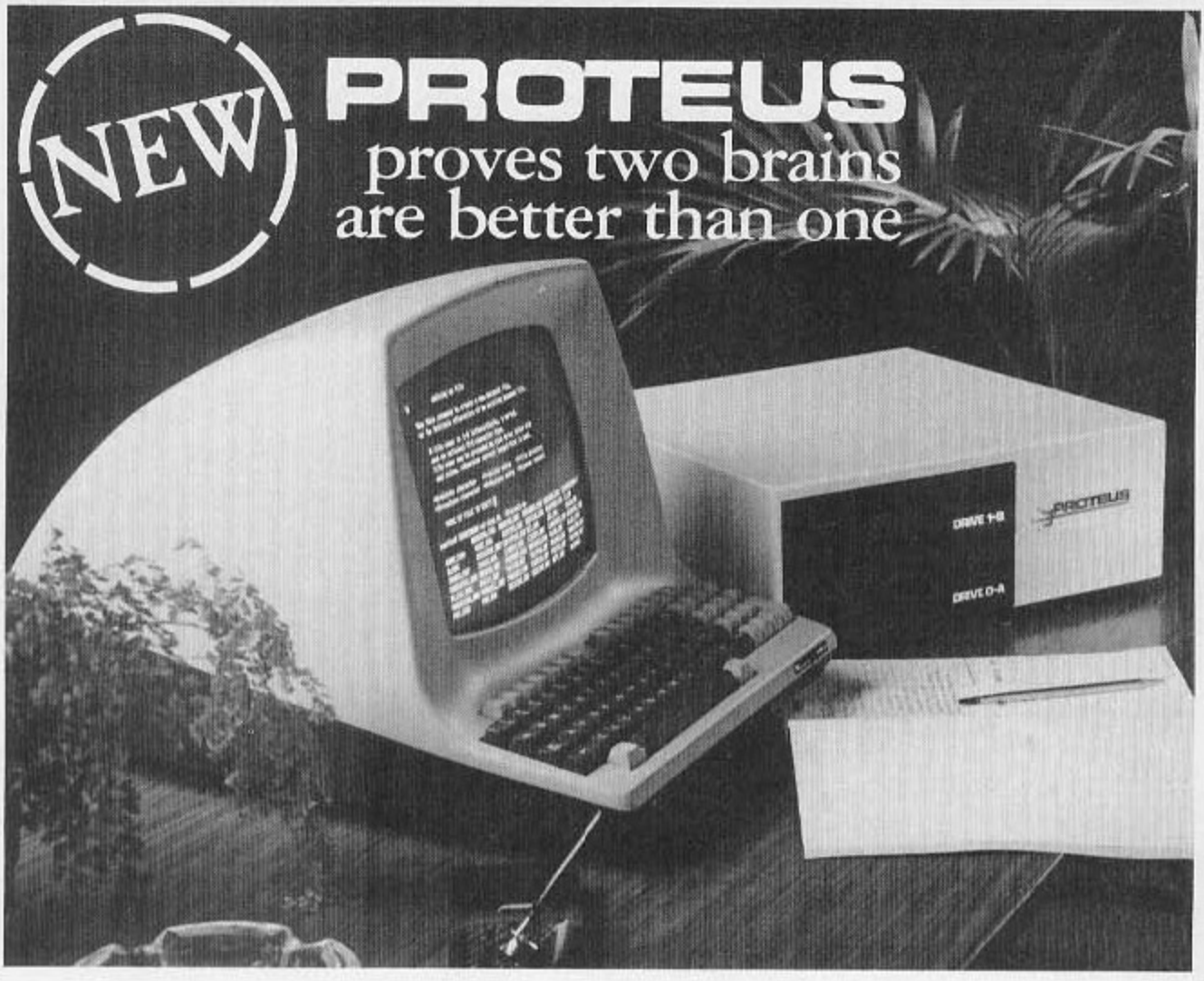

PROTEUS incorporates two processors — Z80A and 6809 — as standard. It **automatically** recognises whether the control program on any disk you insert is CP/M or FLEX and loads and executes the program using the appropriate processor. The result — a greatly increased range of off-the-shelf application programs can be run on the one machine at high speed, substantially lowering the system cost.

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LANGUAGES: PROTEUS successfully handles various BASICS, COBOL, PASCAL, FORTRAN, PL1.

BUILT-IN DISK DRIVES: One or two 8" slimline floppy drives. Capacity: CP/M 630 Kbytes, FLEX 580 Kbytes per disk.

TERMINAL: Lear Siegler ADM23. 30.5 cm non-glare, green phosphor screen. 87 keys, numeric keypad, cursor controls, function and edit keys.

For full information contact:

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WRM32355

Proteus review (continued)

Proteus screen is pleasantly fast, too. The keyboard has a good type-ahead buffer. Yech! The arrow cursor keys on the ADM 23 terminal are set in an error-causing straight line, not an ergonomically sensible diamond.

Help! Suddenly I'm stuck in a software/hardware lock! I was just re-setting WordStar's HELP level and WS/PROTEUS will not accept my "2", nor any other keystroke, for that matter.

Later: Re-booting was the only cure. (The RESET button is safely out of the way at the back, yet reachable.) Fortunately, I could not make Proteus repeat the fault, no matter what I tried. In fact it performed very well on my hardest WordStar speed test. (This is to "block copy" a panel, repeatedly doubling it until disk noise tells me that RAM is full, then re-format and search from the beginning for a string which happens to be right at the end.) I have tried this test on many machines and in the comparison the Proteus stands out as a most acceptable word processor.

Great range of software

Compatibility and access to a wide range of software is the main reason for buying a CP/M system. How does the Proteus score? In a word: perfectly. I could not find an 8in CP/M disk it could not both read and run. The CRTL-C warm re-start command causes the disk controller to shift to single density thus giving access to the industry-compatible SS/SD disks.

The summary box quotes the manual's list of runnable programs. To this list I can add: Nevada Pilot, SuperCalc and a bi-lingual Adventure game.

A disk was provided with a FLEX OS on it together with a quite adequate accounts-receivable package. No documentation was provided for FLEX and only one page for the package, which was written by university students and "massaged" by the vendor and an accountant into a useful product. Since without a printer connected many of the menu selections cause the package to hang up I could not really give this lonely FLEX product a fair work out.

What about FLEX itself as an operating system? The accounts receivable disk was an "auto-boot" disk which leapt straight from boot-up into the running of the package. I have been assured (by a would-be vendor) that there is a significant supply of business software for FLEX and the 6809 processor. (I must read all the wrong journals.) Alas several phone calls to my FLEXible friends failed to make contact so I can report nothing more to you on this score.

And POLYSYS? This, too, was not able to be tested since it is the operating system for networking Proteus to several of those lovely Polycorp computers. Talking to the company about this, however,

Microcomputer summary

Name	Progeni/Polycorp PROTEUS
Processors:	Two: Zilog Z80A and Motorola 6809, both 4MHz.
RAM:	64 Kb all available to the user.
ROM:	4 Kb system ROM.
Operating Systems:	CP/M using the Z80A, FLEX and POLYSYS, using the 6809. The boot ROM detects which OS is on the disk and passes control from the default processor, the 6809, to the Z80.
I/O:	Two DS/SD 8in slimline floppy disk drives (can be used as SS/SD drives) offering 630 Kb per disk under CP/M or 580 Kb per disk under FLEX and POLYSYS. Up to six ports are provided: • Terminal, modem (up to 9600 baud) and serial printer (RS-232). • Parallel (Centronics) printer, and network. This is a 5-pin socket provided for connection to the Polycorp Poly network. • A connector labelled 'extension disk'.
Keyboard:	The terminal provided is a Lear Siegler ADM 23 green-screen terminal with logic and memory for self-testing and customisation. The keyboard of the ADM 23 supplied was not detachable.
Languages and packages:	The range of operating systems says it all! Under CP/M the following have been tested: MBASIC, Macro-80 Assembler and Link, ZSID (symbolic debugger), WordStar and WordMaster, Multiplan and dBase II.
Terminal:	31cm green screen ADM 23 terminal, 80 x 24, with half intensity, inverse video, blinking underlining and protected fields. The keyboard's 87 keys are in a conventional layout, with numeric keypad.
Sourd:	Presumably just a beep.
Options:	Having three operating systems and six I/O ports surely reduces the demand for options. Proteus comes with two 8in drives. It is available with just one disk drive, or (through the extension port) it can address two more 8in floppies, drives C and D. It can interface to joystick/paddles, AD converter and scientific instruments. Software has been used to connect the Proteus directly to both Prime and Burroughs mainframes and can probably be readily adapted to other computers.
Character set:	128 standard ASCII characters.
Price:	For the Proteus CPU with twin drives, $5710. For the ADM23 terminal, $1947. A total of $7657 including 40 per cent sales tax. Extension disk drives cost $4125.
Reviewer's ratirgs:	(on a scale of 1 to 5) Documentation 3; ease of use 4; language 5; expansion 2; value for money 3.

revealed a little of the genesis of the machine. Polycorp's dolphin-streamlined teaching computers use the 6809 processor.

The Proteus has a dual function as a CP/M office machine and as a file server for a network of Polys. Since FLEX was already the de facto standard for business software on the 6809 it made splendid sense to design Proteus to provide FLEX as an extra service. The marginal cost of an extra processor and operating system is very low. Hence the three operating systems. If you think you can live happily ever after with CP/M alone you can simply ignore FLEX and POLYSYS. But they are there if you can use them.

Manuals provided are: Proteus user's manual, technical manual, and a comprehensive manual for the VDU. Although the Proteus manuals are not fat they are quite complete, and are clearly printed in clear language.

Although clear, I would not call the manuals friendly. A computer buff would not even notice that they are solid EDP jargon from stem to stern. But a first-time user, unpacking the shining Proteus, would soon be seeking help.

For example, the user manual contains one of the world's shortest CP/M manuals. It occupies six pages. Almost everything essential is there — but would the rank beginner assimilate it when presented in such concise form? There is neither a FLEX Manual nor a Polysys manual.

The technical manual is also the maintenance manual. Thus the user who wants to climb into such reasonable "smart user" issues as, say port addresses (which are nearly tabulated) is also faced with notes for the real experts on issues such as disk head alignment and test equipment settings.

A look at what's missing

What the Proteus does it does well. But are we entitled to expect more of a desk-top business micro in 1983? Several goodies which the machines of the 80's have led us to expect are not provided:

- There is no option for colour.
- Because the Proteus is designed to mate with any standard terminal there are no function keys, nor provisions for assigning strings to any keys.
- There is no 25th line.
- There is no frequency controllable sound generator.
- There are no graphics, but for $200 you can add chunky character graphics.
- There is no standard bus, nor any slots for add-in boards (though there are the disk extension and Polynet connectors on the back panel).

Over all then, what do we have? Well-made New Zealand and well-made Polycorp? The Proteus is a nice piece of engineering, which capitalises sensibly on the Polycorp experience. It is neat, clean-looking and robust. It offers the novelty of two processors and three operating systems, of which CP/M opens the world's largest software box. How nice a Z-80/8088 (CPM/MS-DOS) combination would have been!

If you have no need for FLEX and POLYSYS then you will rate the Proteus on the scale of Z-80, CP/M desktop micros. And this is a crowded market into which the Proteus seems to bring good value for money but nothing new.

Bevan Clarke is a professor of accountancy at the University of Canterbury.

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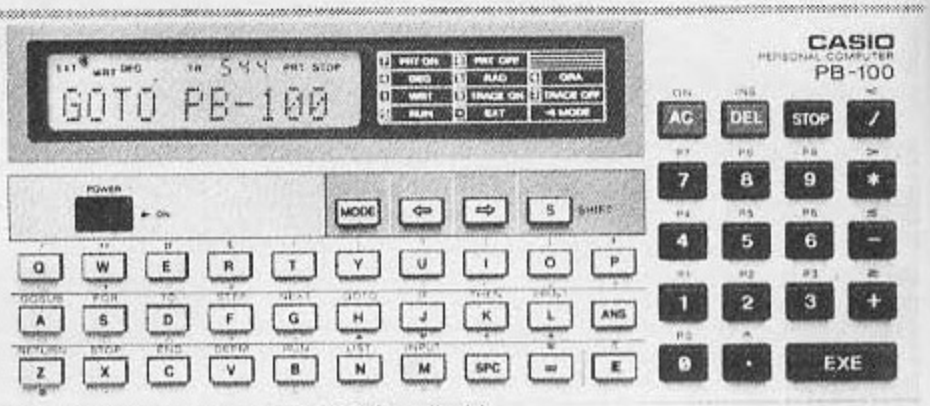
The PB/100 hand-held

By Ron van Lindt



The keyboard of the PB/100 handheld

The Casio PB 100 should not really be regarded as a pocket computer alone. Having got that off my chest, I shall attempt to elaborate.

When I first saw this unit, I thought, "Oh, yeah another glorified programmable calculator." But now I feel a lot more positive about this little gem.

With the BASIC tutorial book and operating manual, the PB 100 makes a very affordable way of getting into computing. The manual is written in a very friendly, understandable manner, something not always found in the bigger-league computing manual.

It didn't take very long to come to grips with the operation of the unit, which goes to prove how easy it is to operate. Admittedly only the very basic functions were present. Notably missing were keywords like AND and OR, but on the whole this did not present any problems.

The keys are typical calculator keys, which have up to three functions, not counting upper and lower case characters, which are available.

The PB 100 is the only pocket computer in the Casio line that incorporates an extended graphics set, suitable for use in games, for instance. This is something I hope to demonstrate in a subsequent article. At present it is not really practicable to incorporate as a feature a user definable graphics set, as the memory size is only 554 bytes (unexpanded).

A memory pack is available for a small price. This, fitting inside the computer, upgrades the machine to 1.5K RAM. A cassette interface and a printer are now also available through the normal outlets.

An interesting feature is the 10 totally separate program memories that are accessible through the numeric keys. These programs can be used as each other's sub-routines. (The PB 100 will not permit sub-routines beyond 8 levels or FOR-NEXT loops beyond 4 levels.)

Without memory expansion, only 26 variable names are allowed. Of these you are only permitted to use the name once i.e. A*A$ is not possible, A*B$ is. But anyone buying this unit is not likely to demand the performance of a Commodore, a Tandy, or an Atari from it.

The display is LCD, which can show up to 12 characters. I thought that this would prove annoying, but you learn to live with it.

When listing any programs, the listing speed is quite good.

The operating system comes with nine error codes, which, by consulting the operating manual, tell you where you went wrong and what to do about it.

This machine is a worth while investment, especially if you are just starting out in computing and do not have the money for a bigger system. Even for the more experienced programmer it provides a lot of fun.

A complete system, including cassette interface, memory pack and printer need not cost more than $350, pretty good value.

Hand-held summary

Name:	PB100
Manufacturer:	Casio
RAM:	544 Bytes unexpanded expandable to 1.5K
Keyboard:	Calculator type
Display:	Liquid Crystal Display 12 characters
Language:	BASIC
Graphics:	Custom graphics set
Cost:	$119
Options:	I/O port for cassette interface and printer. Internal socket for 1K RAM pack
Peripherals:	Cassette interface $50, Printer . . . . . $150 RAM pack $50
Reviewer's ratings:	(from 1 to 5): Documentation, 5 ease of use, 4; language, 3; value for money, 4; expansion, 4; support, 3.

Review unit supplied by Computer Centre, Christchurch.

Smalltalk gossip

Xerox is low-key in the computer world but has one fabled, and as yet largely unreleased product: Smalltalk. Smalltalk is a language designed to be user-friendly. It is credited with inspiring the Lisa operating system but until recently needed a costly Xerox work station to operate it. Smalltalk now looks set to emerge from its long hibernation. A sub-set of Smalltalk is now available for the Apple II (if it has RAM cards to bring its memory to 256K) under the trade name Smalltalk-80. Although authored outside Xerox it is reported to have close links with the original.

Meanwhile, Xerox is reported to be licensing Smalltalk to companies and universities. Apple, DEC, and Hewlett-Packard are rumoured to be among the first interested parties. It has been reported several times that a version of Smalltalk is already prototyping on the Lisa.

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HANGMAN, KRYPTOGRAM, DICE, BEETLE, GRAND NATIONAL AND MUSIC — (BBC) MODEL A AND B
MUTANT INVADERS, BREAKOUT (BBC) MODEL A AND B
BEEP-BEEP (BBC) MODEL B (OR A + 32K)
BEEBMUNCH (BBC) MODEL B (OR A + 32K)
SUPER HANGMAN (BBC) MODEL B (OR A + 32K)
3D MAZE (BBC) MODEL B (OR A + 32K)
FLAGS (BBC) MODEL B (OR A + 32K)
HYPERDRIVE (BBC) MODEL B (OR A + 32K)
INVADERS (BBC) MODEL B (OR A + 32K)
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Cromemco
C–10

Good small business machine

By Peter Fearnley

The Cromenco C-10

A microcomputer, among other things, is a small computer. Compared with the monsters of yesteryear today's micro is often more capable than its huge predecessors.

The Cromemco C-10 is a compact business computer. The three component configuration — keyboard, monitor and disk drive — is light and reasonably portable.

The high speed Z-80A microprocessor and the 12in, high-resolution screen are housed in a small moulded plastic case, which is designed to sit on top of a fully adjustable swivel stand for comfortable viewing.

The compact, ergonomically designed, 61-key, keyboard has all the usual control and character keys but no numeric key pad. The keyboard is attached to the back of the cathode-ray-tube cabinet with a plug-in cable.

The single double-density disk drive has 390K storage capacity and hooks up through a stacking connector which allows for up to three additional drives to be added with ease.

There are two additional ports, one for a modem or another computer, and the other is a DB-25, which can be configured for connection of a printer, plotter, or another peripheral.

The CRT displays 25 lines with a full 80 characters on each line and is clear and easy to read. It features inverse video, half intensity and underlining. There are also special symbols and box and line graphics.

The CPU has a 4MHz clock and as there is no bus the 64K of on-board RAM memory is not expandable. There is 24K of ROM, 4K of which is used for four character sets including graphics.

Switch-on and the C-10 goes

Microcomputer summary

Name:	Cromemco C-10
Microprocessor:	Z80A
Clock speed:	4 MHz
RAM:	64K bytes
ROM:	24K bytes
Input/output:	1 parallel, 1 serial port
Keyboard:	Sculpted QWERTY, cursor, function, soft touch
Display:	80 x 25, green phosphor, high resolution
Language:	Cromemco Structured BASIC, CP/M
Graphics:	Chunky and line graphics
Disk operating system:	Cromemco CDOS
Disk capacity:	390K bytes
Peripherals:	Printer, modem, C-net
Extras included:	WriteMaster, PlanMaster, structured BASIC
Price:	$4855.00

Reviewer's ratings (out of 5): documentation, 4; ease of use, 5; language, 4; expansion, 3; support, 4; value for money, 4.

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through a diagnostic routine before booting off disk the operating system, Cromemco's own CDOS which is an upswept modified version of CP/M 1.4. This user friendly system immediately brings up a menu program which invites the operator to select the next step.

Applications software supplied with the C-10 package includes Plan Master, WriteMaster, and Structured BASIC.

Plan Master, like Visicalc, is an electronic spreadsheet, with some significant differences. The spreadsheet is not as large: there are 10 pages, each with 30 rows of 12 columns, with row and column totals. Rows and columns may be labelled, labels appearing in formulae.

Equations are not specified on the spreadsheet proper, but on its associated "define page". This operates similarly to a programming language and includes IF, ENDIF and ELSE statements.

WriteMaster is an impressive and easy to use word processor. A good feature is that the top row of keys can be used as function keys and they are referenced from the top of the keyboard. This facility aids the learning process and saves referring to the manual as often as is usual. I found it easier to use than WordStar.

Cromemco's structured BASIC is the programming language supplied with the C-10. It is supported by excellent documentation and should present few problems, even for the beginner.

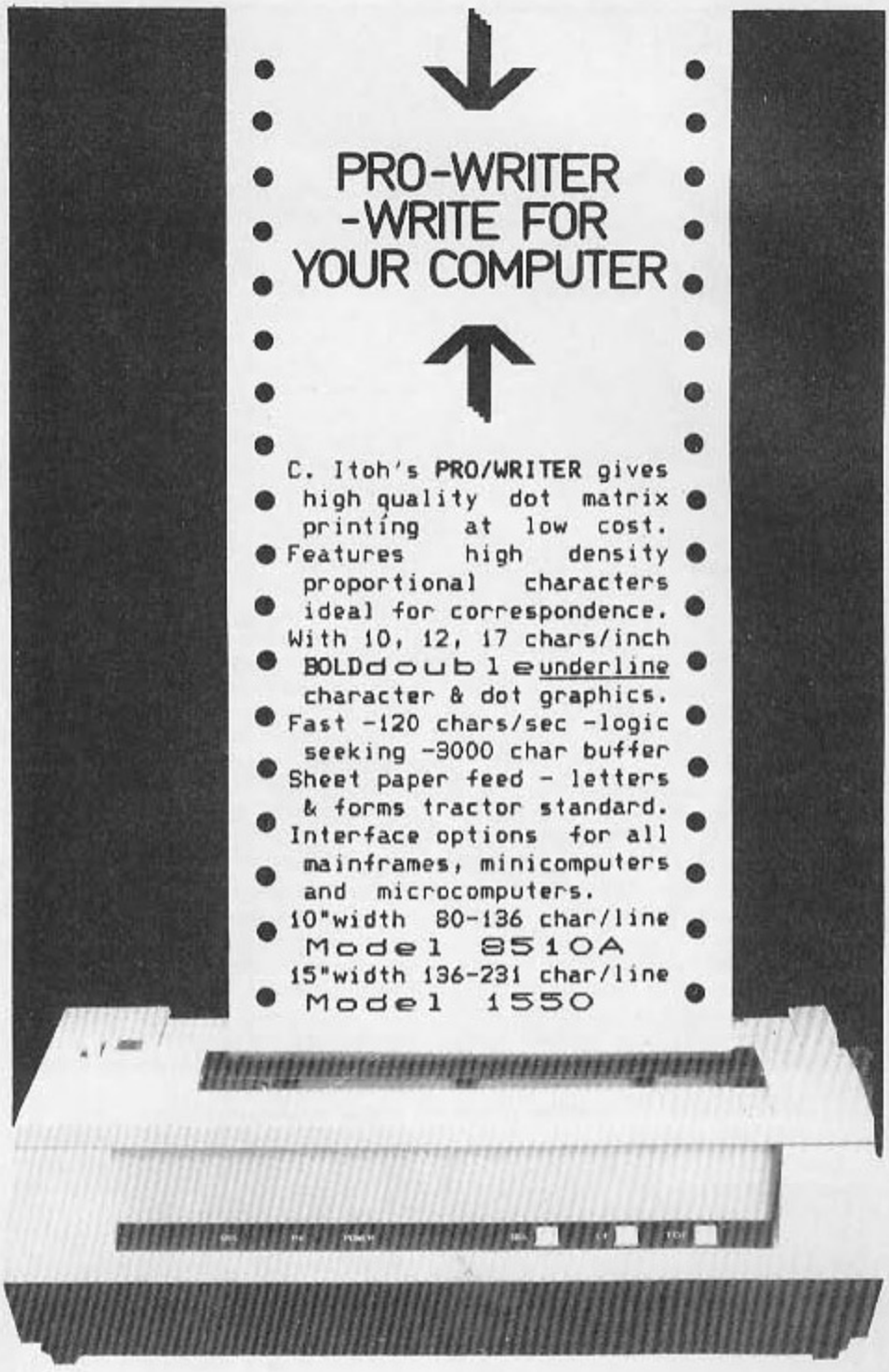
Being used to an Apple II plus, I found the C-10 system a little claustrophobic. One feels locked into the menu. It is not a hobbyist's computer, but is ideal for the small business owner or for the professional person.

Advantages: Compact, robust and reliable. Good screen clarity. Good disk capacity. Excellent documentation. Wide range of business software supported. User friendly.

Disadvantages: CDOS limits transportability of CP/M.

Comments: Cromemco is one of the longest-established micro-computer companies in the United States and has a reputation for keeping up with the state of the art. The C-10 represents good value for money.

Typical User: The C-10 would appeal to the small businessman or professional person who requires a database, financial modeller and word processor.



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TWA 1996B

Literacy versus awareness

By LARRY R. NELSON, of the education department, University of Otago

In September an article appeared in *Bits & Bytes* wherein my good friend and colleague, Ken Ryba, of Massey University, made favourable reference to some of the work we have been undertaking at the University of Otago. However, he referred to it as an effort to contribute to computer literacy in New Zealand.

I have never been convinced of the need to mount courses, seminars, and workshops specifically designed to promote computer literacy. Those who argue for them cite a perceived need to prepare students for a microprocessor-dominated future. That we (or our children) will have such a future is certainly of little doubt. The problem, as I see it, is to assume that this means that we should rush about exposing as many students as possible, as quickly as possible, to present day microcomputer hardware and software.

Last year I attended a special meeting of the New Zealand Computer Society. It led to the formation of a new interest group for encouraging and co-ordinating computer applications in education. The guest speaker was from the big town a few hours up the main road north. In stressing the need for the formation of such a group, he used the old washing-machine argument. If you haven't heard it before, it is this: even washing machines now have microprocessors! That's it. The "argument" itself is often followed by a bit of an explanation, just in case the implication is at first not apparent to the listener. That is, if washing machines are becoming computerised, what won't? If we don't teach our kids about this new technology, where will we end up?

Not with dirty clothes. Those computerised washing machines are chip transparent; one can use them without even having to know that a microprocessor lurks just behind the front control panel. That is how it should be. In fact, one might wonder if sales would increase or decrease if more people were aware of the number of chips going into washing-machine control circuitry.

The washing-machine argument doesn't hold water. Sure we will see chips all over – thank God they're now being used to control the heat cycle on some new toaster. But we will not need crash courses on elementary programming and software running to prepare us to use them.

How many readers feel that knowing how an internal combustion engine works is an essential prerequisite for operating a motor-vehicle?

Now, we could certainly make the distinction between a chip-dominated and a computer-dominated future. If we tighten the view of the future somewhat, by agreeing that the washing machines and toasters need not concern us unduly, should we still be bothered with worrying about getting us ready for a true computer in every room and office?

If we have to go by the standards of today's hardware and software, yes. It does indeed take at least a small amount of intensive preparation to use them. The point is, though, that what we see today just can't last. If we are talking about machines which will be used by everyone, not just those with infinite patience and IQs greater than 115, we have got to expect better design. We might expect, for example, touch-sensitive screens, obviating the need for hunt-and-peck keying, and circumventing the problems inherent in light pens. We should certainly expect easier to use, more reliable software.

We should, in other words, have reason to think what we have today will not necessarily bear close resemblance to the absolutely polite, easy-to-use machines of the very near future.

Some readers will say that we should still be getting a head start, that even though we might be working with tomorrow's relics, learning the new stuff will be easier if we have endured a 1983 class or two on computer literacy. Does that mean that our Otago students now doing data preparation on menu-driven, key-to-disk software, would pick it up easier if years back they had learned to punch cards on an 026 or 029 card holder?

Quantity is not necessarily the same as quality

These thoughts sum up my personal feelings on computer literacy. I find it quite difficult indeed to support efforts to put as many computers into as many places as we can, thinking that we will be falling behind the rest of the developed world if we do not. Of course, if we don't we *will* be falling further behind North America in terms of number of computers situated in seemingly relevant places. What I want to say is that falling behind in a quantitative sense is not the same as coming last in the qualitative dimension.

Rest assured that I have few illusions as to the effect of my words regarding computer literacy. It is now a tremendous bandwagon with an awful lot of steam in its boilers. So much steam is seeping from this behemoth that even John and Jane

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Doe, as they say in North America, are sweating a bit from the apprehension generally induced in people who see the bandwagon but have not yet jumped onto it.

Perhaps by now you have sensed that computer literacy, per se, is not our primary interest at Otago. This is not to say that we are not into computers. We most definitely are. We have been for more than two years.

Next year we will offer three papers in the area. Instructional Uses of Computers I and II, and Research and Administrative Applications of Computers. In the first course we do in fact pass the initial term immersed in CAL (or CAI) literacy. Students have a fair go at drill and practice programs, at instructional games, tutorials, and simulations. They see some of the best and worst of each area. We start them out with the best, see the gleam in their eyes (confirmed by heavy bookings on our machines), and then wean them into reality by getting out the average stuff now available. We bring in local elementary and secondary teachers who have been using small computers in classrooms, and we have a good time. By the end of Term I, however, initial enthusiasm has generally tempered considerably. Almost all students are still keen, but I think it accurate to say that they have seen that CAL is not the pie in the sky for every subject area.

In Term II, students team up and begin the creation of a CAL module, due by the middle of the last term. They pick their subject area. We provide examples of the amount of work we're looking for. They use a very swept-up version of Pilot, one with a superbly complete operating system, to do their programming. We provide solid CAL modules on Pilot which are locally-made, and others which have been imported.

About 85 per cent of the students have had no previous computer experience. Yet no-one fails to complete their module, and some of the modules turn out to be quite good. They are not supposed to be programs of immediate use to schools; our focus is on a short, single-purpose module with a sound pedagogic base, reflective of the concerns for good CAL developed during the first term.

I like to think that students come out of our first course computer wise. Aware of both the capabilities and limitations of present day hardware and CAL software, knowing what to look for should they have need for a machine in the future, cogn sant of the time needed to develop instructional software, and decided as to whether or not they should delve further into computers.

Our second paper on instructional uses is, of course, for those who want to paddle into the deep end of the pool. Approximately half these students have had quite a bit of prior computing experience. Some of them get into areas beyond the experience of our own staff. We have, for example, a couple of students trying to merge graphics support routines written in machine code with standard Pascal and Pilot authoring tools. A co-opted colleague has developed an easier-to-use Logo system. One student is putting Forth-based tools into a standard suitable for CAL authoring. This work takes time, but already it looks very promising.

Our paper on research and administrative applications is a chance for students to learn how to use pre-developed software for data analysis, word processing, and data management. In these areas there is some excellent, mature software already available. The paper will be offered for the first time next year. Upon completing it, students will be able to use a small computer for grading, processing tests and surveys, initiating and maintaining a data bank of student-class records, and word processing.

If asked to put a concise label on what we are about at Otago, the term computer comprehension would be infinitely better than computer literacy. With regard, again, to the literacy issue, my comment would be that we have got the telescope turned backwards. The literacy effort, if we are to have one, should be to make computer software, and hardware too, much more people literate, rather than the other way around. When it becomes so we will not have to worry about students and teachers taking to it – that will be a natural outcome, if it is worth its salt. Shake much of the stuff around now; if anything at all emerges it is most probable that is something quite different to salt.

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Working with children

Dear Sir,

I was interested in the comments made by Lyndon McEntee in a letter in the September issue of *Bits & Bytes*. While I feel that it is admirable that Mr McEntee's school is offering young children access to computers as part of their daily routine, I cannot agree that the keyboard does not have an important place in introducing young children to computers.

I am working on a master's thesis at Waikato University whereby I am using a Compucolor II to provide pre-school children with games involving concept learning, problem solving, and memory skills. I have designed the games specifically for pre-schoolers, on the basis of games and puzzles they are likely to encounter at kindergarten.

Because the games stress the use of thinking-problem solving skills rather than manipulative skills, speed of input into the computer is not a crucial factor in either the operation or successful completion of the game. Children control the games in much the same way as many "traditional" computer games are controlled, that is, by pressing specified keys to obtain specified results. In some cases the identification of keys is aided by small pieces of coloured tape, but this is not always necessary, as even pre-school children it seems are quick to learn which keys have which effect.

Although there has been some variability in the speed of learning control sequences all the children I have worked w th to date (about 20) have learnt to control the games through the keyboard input system. Most have developed considerable sophistication in this area and can work rapidly; keying in becomes secondary to the main task at hand. Also, even at this age, some of the children have learnt to control the computer input system and disk drive and can select games they wish to play. These children have been able to find their way about the "QWERTY" system, have been able to find letters when asked to type in simple words, and have not been confused by upper and lower case letters.

Generally then, my observations suggest that much can be done within the realm of conventional hardware and programming techniques to provide useful and workable computer-based material for young children to work with.

I would be willing to provide more details of the programs I am developing tc anyone who is interested. I would also be interested to hear from anyone else who is interested in writing programs for pre-school children.

D. Yeo,
R.D. 3
Cambridge

Pilot in schools

Dear Sir,

After a year's research we have completed a term using Atari Pilot with a group of primary school children in a week-end hobby class. It's been exciting!

Our resources have been Conlan & Deliman's *Atari Pilot for Beginners*, David Thornburg's *Picture This!* (available in New Zealand for a year: the importers wondered why nobody was buying it), *The Computing Teacher* from the University of Oregon (tremendous value for all computer education, especially Pilot and Logo), and the Young People's Logo Association material including their program exchange.

Is there any network of people using Atari Pilot with younger children in New Zealand? Or of people using Pilot and Logo at primary schoo level? If not, who would like to share experiences and swap programs? And particularly, who could help organise? Because with two jobs and a family I'm kept pretty busy.

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A watch on the Big Brothers

By Shayne Doyle

Each year the New Zealand Computer Society annual conference and computer exhibition provides a venue for suppliers to show their hot new hardware and software offerings for the year. At this year's exhibition (in Wellington from September 13 to 16) I thought the most noticeable areas were computer assisted design (CAD) and computer assisted instruction (CAI), with videotext systems also very high profile.

CDC showed the sophisticated PLATO CAI system, using touch sensitive screens and very high-resolution, printed screen dumps. Progeni was there with the Poly of course, a circular tower of Polys making all sorts of noise and running many different demonstration programs.

Some very high-tech CAD hardware and software was being demonstrated, particularly on the large, warren-like Prime stand, and also on Walker Scientific's stand. Colour VDU's were everywhere, showing off very high-resolution displays from all the new 16-bit machines with their appropriately large video RAM areas. I had great difficulty deciding whether a display I saw on a DEC micro was a TV image or a computer display — I'm still not sure.

Plenty of neat compact Sony videotext terminals were around, and I spent a half hour paging through Databank Systems demonstration system. I must admit that after a short while I got fed up with the slow screen display time and low resolution graphics.

Honeywell was showing a micro system sporting the most amazing multi-function keyboard I have seen. Beautifully designed, and a dream to the touch, Clive Sinclair would go green to see how many functions are on this one .

IBM had ts interesting looking 3290 Plasma Display on display. I'm not quite sure what one would use it for — perhaps classroom demonstrations? Burroughs had only its B20 series micros on the stand; there was no sign of the new ET1100 terminals, although since then I have had the opportunity of using an evaluation unit at work.

Those strangely shaped Televideo terminals were on show, and I must say I quite like the look of them after the initial feeling that they look lopsided. The local Apple retailer, Microshop, had Lisa there, of course, and also a Mitsubishi RM101 robot arm waving around all over the place. Speaking of robots, the "robot" fronting Prime's advertising campaigns, Albert Einprime, was there charming the girls. Perhaps I should call him a biologically activated exoskeleton to be quite correct?

The personal computing market was not really represented, and this is probably fair enough, as this exhibition seems to be aimed primarily at the business user. A few Hewlett-packard ultra-programmables, Apple IIe, and one newcomer to the New Zealand market, the Pencil — a product of ColecoVision of Hong Kong. This appears to be a quite sophisticated product offering a lot of features for a very realistic price. The demonstration cartridges I saw running featured very high quality graphics animation and resolution.

I expect to be able to present a review of this machine early next year.

One new printer of interest to home-computer users: AWA is handling the Amust-80DT, 80 column dot-matrix printer. This has been available in Australia for some time and is again similar to a number of other printers coming on to our market; it will sell for about $840.

To sum up, this show is not for the personal computing enthusiast, rather for the big brothers of computing.

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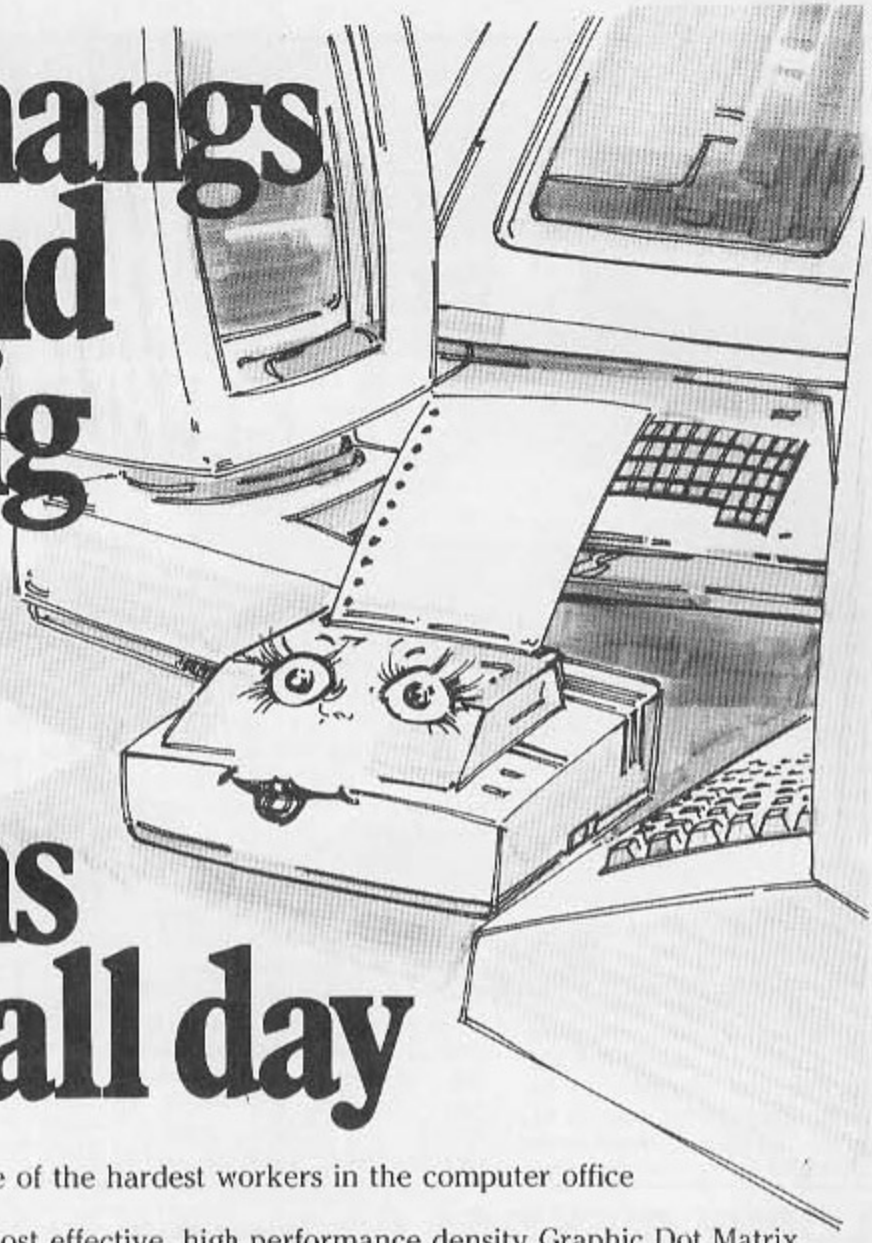

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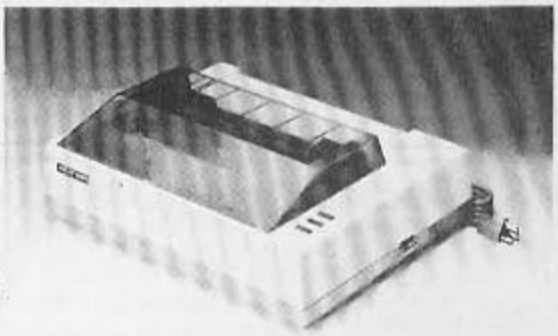

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Towards computer literacy

By PAT CHURCHILL

We need to be literate to go about our daily lives. There are those who say we will also need to be computer literate to get by in the future.

Computer literacy was the topic of one of the more general interest papers presented at the recent 8th New Zealand Computer Conference in Wellington.

Dr John F. Barrett, lecturer in education at Macquarie University's School of Education in North Ryde, Australia, took the need for computer literacy in society as a basic assumption and discussed the development of a curriculum to meet the need.

While Dr Barrett's paper was aimed more at the development of computer literacy programs in formal education at school level, the general model suggested was applicable to school courses, courses in teacher education, and training programs in business, industry, Government departments, and the armed forces.

He said the first obstacle to be avoided was centring the course on hardware. While equipment, composition and functions might be valid at the introductory level, "there is very little to be gained by giving detailed descripton of ROM and RAM to raw beginners."

Presentation laden with jargon would only help reinforce the notion that only those possessing special magic (and who could converse about peeks and pokes) "would be the rightful and chosen ones to enter the kingdom of the computer literates," Dr Barrett warned.

While terminology had its importance, the ability to match terms and definitions did not necessarily make one computer literate.

Dr Barrett said the approach that put correct learning before practical experience had to be questioned.

"Well structured learning experiences are unquestionably important, but this should not exclude the integration of the theoretical and the practical."

Research indicated people liked using computers. "It is ludicrous to frustrate this initial motivation."

Also, he said, the "why not try it" approach to learning could encourage problem solving skills of hypothesis construction, analysis, testing and verification.

While a minimal level of manipulative skills associated with the keyboard were valuable, the need for this skill might diminish within a few years with developments such as direct input through voice recognition, menu driven programs or devices such as the Apple Lisa.

Touching on the psychological process of modelling or imitation, Dr Barrett said strong influences on a student's attitudes, values, and knowledge could well occur through observation of teachers' behaviours and of computer applications within schools. If teachers were uncomfortable with computers and had little access to or use of computers, the impact of the literacy program would be greatly diminished. And how could a student begin to believe computers were useful when timetabling was done with coloured pins and bits of card? Dr Barrett asked.

He also mentioned the use of experience in computer based learning programs in adding to a user's awareness of computers.

Generally, he said, computer literacy curricula included these topic areas:

- History of calculators and computers
- Application of computers in society
- Hardware
- Problem solving techniques
- Software
- Programming
- Computers and society

Dr Barrett said criticism of many current courses could be made on the ground there was no over-all sense of purpose or coherence.

"We are now at a point where an attempt should be made to integrate and organise the main ideas upon which a computer literacy curriculum should be based."

He presented a concept map showing the ideas considered to be appropriate in learners becoming computer literate.

Among the subjects were information, communications, control, technology, society, hardware, man/machine interface, software, data, artificial intelligence, industrial and business processes, applications, education and training, data bases, information systems, electronic mail, careers.

These covered the computer application dimension, the functional dimension, including the individual use of computers for one's own purposes (e.g. use of a home computer for word processing or exploring information bases) and development of a level of competence from complete lack of competence through the "get-by" or survival level and reactional levels to the productive or creative level.

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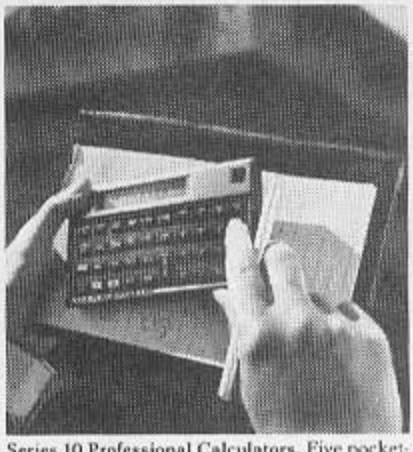

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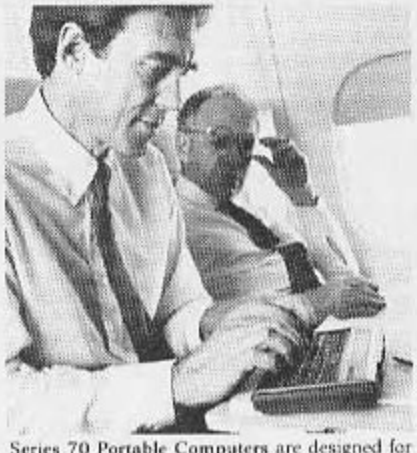

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- ☐ Adapt or write my own programs in languages such as BASIC.
- ☐ Use packaged software purchased off the shelf with little or no attempt to do my own program writing.
- ☐ Adapt or write my own programs in machine code.
- ☐ Read computer magazines but do not yet get much hands-on experience with the computer.
- ☐ Other, please indicate:

_____

2. **Indicate the PRIMARY type of access you have to a computer: (Please tick ONLY ONE)**

- ☐ Have my own
- ☐ Use my friend's computer.
- ☐ Use the computer at School, Polytechnic, University, etc.
- ☐ Use the one at my place of work.
- ☐ Don't have much access to a computer.
- ☐ Don't know enough to use one.
- ☐ Other, please indicate:

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3. **If you do use computers, indicate the brand of computer that you access predominantly:**

Name of Brand: _____ Don't use ☐

4. **If you do not own a computer do you intend to purchase one:**

- ☐ Within three months.
- ☐ Within six months.
- ☐ Within one year.

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- ☐ Hobby.
- ☐ Small business application.
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- ☐ Professional.
- ☐ Educational. (teacher, lecturer, etc)
- ☐ Other: _____

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- ☐ From a friend.
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- ☐ Saw in a computer/hobby shop.
- ☐ Received a complimentary copy.
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- ☐ Saw in a library.
- ☐ Other, please indicate: _____

7. **How do you obtain your copy now?**

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- ☐ Library.
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- ☐ Other, please indicate: _____

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- ☐ Every issue.
- ☐ Every other issue.
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10. **What do you do with your copy of BITS & BYTES after you have finished reading it?**

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11. Approximately how many individuals, other than yourself, read your copy of BITS & BYTES? _____

12. Please indicate how useful you find EACH of the following types of articles by placing a tick under the heading that best describes your view:

	Don't know	Very Useful	Useful	So-so	Not Useful	Not Useful at all
(a) Computer Programs	☐	☐	☐	☐	☐	☐
(b) Book reviews	☐	☐	☐	☐	☐	☐
(c) Farming topics	☐	☐	☐	☐	☐	☐
(d) Glossary	☐	☐	☐	☐	☐	☐
(e) Hardware reviews	☐	☐	☐	☐	☐	☐
(f) Micro news	☐	☐	☐	☐	☐	☐
(g) Classified adverts	☐	☐	☐	☐	☐	☐
(h) Display adverts	☐	☐	☐	☐	☐	☐
(i) Club contacts	☐	☐	☐	☐	☐	☐
(j) Software reviews	☐	☐	☐	☐	☐	☐
(k) Feature articles such as "Word Processing"	☐	☐	☐	☐	☐	☐
(l) Education topics	☐	☐	☐	☐	☐	☐
(m) Articles on business/professions	☐	☐	☐	☐	☐	☐
(n) "Beginners" articles	☐	☐	☐	☐	☐	☐

13. How many times have you sought additional information DIRECTLY from any advertiser in BITS & BYTES?

- ☐ None
- ☐ Once or twice.
- ☐ Three or four times
- ☐ Five times or more.

14. (a) Now much have you spent on computer books during the past twelve months?

- ☐ None
- ☐ Up to $9.99
- ☐ $10 to $19.99
- ☐ $20 to $29.99
- ☐ $30 to $49.99
- ☐ $50 to $99.99
- ☐ $100 or more

(b) Some of these were bought from BITS & BYTES book club?

☐ Yes ☐ No

15. How much have you spent on computer software during the past twelve months?

- ☐ None
- ☐ Up to $20
- ☐ $20 to $49.99
- ☐ $50 to $99.99
- ☐ $100 to $149.99
- ☐ $150 or more

16 For each of the statements below, please indicate the degree of your agreement by placing a tick under the appropriate column:

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
(a) I would seek more information from advertisers if a detachable reader inquiry card were available.	☐	☐	☐	☐	☐
(b) I intend to purchase books from BITS & BYTES BOOK CLUB during the next 12 months.	☐	☐	☐	☐	☐
(c) I would be interested in mail order software similar to mail order books now offered by BITS & BYTES.	☐	☐	☐	☐	☐
(d) I would like to see increased coverage of "general news on micro computers" rather than specific machines or brands.	☐	☐	☐	☐	☐
(e) Adverts in BITS & BYTES have prompted me to seek additional information regarding these products.	☐	☐	☐	☐	☐
(f) I like the present style of writing in BITS & BYTES.	☐	☐	☐	☐	☐
(g) I like the existing page format of BITS & BYTES.	☐	☐	☐	☐	☐

17. **For which of the brands listed below would you like to see more coverage of computer programs and/or programming hints? You may tick more than ONE.**

- ☐ ZX81
- ☐ BBC
- ☐ Apple
- ☐ VIC20
- ☐ Sord
- ☐ Hand-held
- ☐ Spectrum
- ☐ HX20
- ☐ IBM PC
- ☐ TRS80 – Sys80
- ☐ Micro Bee
- ☐ Commodore 64
- ☐ Osborne
- ☐ Other: _____

If you ticked more than ONE, which is the MOST important to you?

_____

18. **Has the purchase of a computer product or service been influenced by an advert you have seen during the past 12 months?**

☐ Yes ☐ No ☐ Haven't purchased anything during the past 12 months

19. **For each of the products listed, please indicate whether or not you own one by ticking the appropriate box:**

(a) Disk drive ☐ Own ☐ Do not own ☐ Intend to buy within a year

(b) Printer ☐ Own ☐ Do not own ☐ Intend to buy within a year

(c) Colour monitor ☐ Own ☐ Do not own ☐ Intend to buy within a year

(d) Other, specify: _____ ☐ Own ☐ Do not own ☐ Intend to buy within a year

_____

20. **Please list the names of any other computer magazines or journals you read regularly:**

☐ Don't read others regularly.
☐ Name of magazine(s): _____

_____

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- ☐ Less than Secondary School
- ☐ Secondary School Qualification
- ☐ Tertiary Qualification or higher
- ☐ Trade Qualification
- ☐ Other, specify: _____

Level of personal income:

- ☐ Under $4999
- ☐ $5000 to $9999
- ☐ $10,000 to $14,999
- ☐ $15,000 to $19,999
- ☐ $20,000 to $24,999
- ☐ $25,000 to $29,999
- ☐ More than $30,000

Space for general comments or statements(e.g. style of writing, page format etc):

_____

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A-mazing: Challenge to micromice

By Pat Churchill

The Wellington Micro Computer Society is on the look out for mice—micromice.

The society is hoping to stage the first New Zealand micromice contest in Wellington next year.

A micromouse isn't of much interest to the domestic cat. It is, in fact, a miniature self-contained robot, usually controlled by a microprocessor. The robotic rodent is designed to find the quickest path through a specially constructed maze from the bottom left hand corner to the centre.

For the contest, consideration is also being given to a second class of micromouse to be controlled remotely by pre-programmed personal computers.

While micromousing is new to New Zealand, readers of overseas computer magazines will be familiar with micromouse maze contests held abroad. Typically, the maze consists of 16 by 16 squares. The starting square is at the bottom left with the target post at the centre. Each mouse is allowed a maximum total of 15 minutes to perform although if the mouse becomes boring or demonstrates erratic behaviour which could endanger the state of the maze, the judges can request an early retirement of the mouse.

If a mouse gets to the centre of the maze it can be restarted so it can profit from any learning ability in making a second run. Within the time limitation it can make a number of runs and be credited with the shortest successful run.

Within reason, battery changes and minor repairs can be undertaken, though the clock is left running.

With a New Zealand contest in mind, the Wellington Micro Computer Society is inviting companies, other organisations and individuals to register their interest in:

Sponsorship, particularly regarding prizes and publicity.

- Micromouse kit design, manufacture and/or marketing.
- Design, manufacture and/or marketing of a mouse/personal computer interface.
- The inclusion of a micromouse competition in a wider exhibition or other public occasion, preferably one involving relatec technologies.
- Being added to the society's mailing list for future 'competition news.
- Entering a team, or themselves, in the contest.

Interested parties can contact the society at P.O. Box 1581, Wellington.

Ross's nous for mouse

There is at least one mouse interested in the New Zealand Micromouse Contest. It is the work of Ross Parkes, a senior engineer with Wang in Wellington.

Ross's micromouse, although still with a few bugs (fleas?), went through some of its paces on the Wellington Micro Computer Society's stand at the recent computer confe·ence in Wellington.

The mouse took a couple of month's construction, plus about $100.

"The mechanics weren't a big deal," according to Ross, although he said it was difficult for people in New Zealand to get parts. He was fortunate in being able to get a bit of scrap equipment from work, although he thought with the number of radio-controlled model cars around, parts are probably there somewhere.

He said the only information he had to work on was from the *British Practical Computing* magazine plus a sample program. He adopted the technique and rewrote the program (it had bugs in it). The gadgets and electronics were his own work.

Ross used his Texas Instruments computer to do a maze on screen and used the same logic for his micromouse. The mouse's program is written in Z80 assembler. Ross used just over 2K of the mouse's 4K of Eprom. There is also 1K of static RAM to keep track of where the mouse is. The unit is totally self contained and has two six volt batteries.

Ross's mouse weights each square with the value of times it has been there. It stows away valid squares as it progresses towards the centre, flagging culs-de-sac as not to be entered. It saves and reads information for a second run.

Ross is still working on his mouse.

Will it be a robot in mouse's clothing when complete? Ross isn't anxious to weigh his micromouse down with sartorial elegance although he has toyed with the idea of a Mickey Mouse hat.

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Where NEC rules the roost

"When you get to Japan", the man from *Bits & Bytes* said, "try to get on a few mailing lists from the leading companies – that way you get up-to-date information on new products . . ." which is all very well but first I have to get an idea who the "leading companies" are. So, what better way to start a series of articles on the Japanese computer market than by reporting on the latest survey on market shares held by the various computer manufacturers? There are a few surprises, I promise you!

The survey I found was taken by the prestigious "Japan Economic Journal" and was reported early this year. The results are shown in Table One. It is worth while now to analyse why the best companies have achieved such sales (remember, the Japanese computer market is worth more than $700 million every year, and is still growing).

The best place to go to learn about the computer market in Japan is the Akihabara district of Tokyo – a veritable Mecca for computer and electronics fanatics. In Akihabara there are blocks followed by blocks of shops all stocking a huge range of computers, calculators, radios, stereos, VCRs, television sets and innumerable other electronic gadgets. So, to Akihabara I went, notebook and wallet in hand!

NEC models can be found in almost every store which stocks computers. It is a very large company with a long-standing good reputation for producing electrical and electronic products of almost every kind imaginable. It has very good distribution because most shops already stocked large quantities of NEC goods before the computers were introduced. NEC also has many of its own stores, called "Bit Inns". These are large walk-in showrooms crammed with the latest models, lined with books and software and, logically, packed with people.

A wide range of computers is offered by NEC compared with those of American or British manufacturers (eg: Apple, Sinclair). This is a very common phenomenon: Japanese companies do not restrict themselves to one market. Although NEC does export its computers, it tends to concentrate its efforts on the home market, both in service and product design. This probably accounts for most of its popularity in Japan.

The SORD Computer Corporation is a relatively small and new company among the giants in this survey. Despite this, it has held second ranking for two years, and is well known as the fastest-growing company in Japan over the last six years. It has a reputation for high-technology products with innovative software. Much of their success has been due to PIPS (Personal Information Processing System) – powerful but simple software which makes it possible for a novice to use computers without programming. SORD is concentrating on networking its computers, using a low-cost system known as S-Net.

"Bits & Bytes" now has a reporter in Japan. Peter Hyde, who has written Sord articles for the magazine, (pictured), has taken up a position with Sord Computers in Tokyo. But his reports will not be confined to the latest Sord releases. He will keep readers up to date with all the latest developments and releases from Japanese manufacturers. This is his first article.

SORD also has a large range of computers, from a 32-bit desktop under development to the new M5 – SORD's first home computer, which can be found on sale in every Akihabara shop. Apart from the electronics stores, SORD has a network of dealers and PIPS-Inns – display and training centres where customers can review the new models and be trained in the use of PIPS. These are very effective for business users. It is also notable that SORD has the highest brand-loyalty (ie: percentage of existing customers who return for additional machines) – 58 per cent as against 32 per cent for its nearest rival, NEC.

Fujitsu is a large company well known for its production of mainframe and mini-computers (eg the FACOM M and V series), which run IBM software while costing much less than the United States counterparts. Fujitsu's entry into

JAPAN REPORT

microcomputer market has been most successful with both 8-bit and 16-bit models on offer. Its next model is likely to be a 32-bit machine rather than a home computer.

Okidata is better known in New Zealand for its printers (eg: the Microline 80). However, it has business computers on sale in Tokyo with very good software. I could not find any English manuals or brochures for the Okidata models so I could not gauge how well they would do on the New Zealand market.

TABLE 1
Table of market shares held by leading brands in Japan

Manufacturer	Percentage of total market
NEC	35.1
SORD	13.1
Fujitsu	12.5
Okidata	7.5
Sharp	5.2
Hewlitt Packard	3.8
Hitachi	3.1
Apple	3.0
Tandy	1.6
Commodore	1.5
Others	13.5

Sharp's market share has fallen dramatically with the surge in competition from models such as Fujitsu and Okidata. It is likely that is will need to concentrate more on software and new technology to improve its standing in future.

It is most interesting to note that Hewlitt Packard, the most popular overseas model, is only sixth in ranking with a very low market share. H.P. probably defeated the other United States contenders because its products have a reputation as specialist scientific and engineering tools, and thus displace some Japanese brands in these markets.

The remaining United States brands no longer do well in Japan (Commodore used to hold nearly 80 per cent of the market!) since they do not cater for specific Japanese needs such as Katakana characters or operating systems.

In future articles, I will take a closer look at some of the most popular new models available in Japan, and discuss their chances in overseas and New Zealand markets. Concurrent with the survey of hardware sales, the "Japan Economic Journal" did a survey of sales of user-friendly information processing spreadsheet software. I will deal with the results of this survey in my next article. Until then, sayonara . . .

IBM

The PC in New Zealand

By Shayne Doyle

At the recent Computer Society conference in Wellington, IBM (NZ), Ltd, held a press seminar as a statement of current and future progress with the Personal Computer in New Zealand.

Mr Noel Cohen, marketing staff manager, IBM Product Development Centre, presented some significant figures from overseas that point to an increasing share of the market for the PC. Introduced in August 1981, the PC has grabbed 26 per cent of sales, dislodging Apple from the number one spot. The PC was voted 1982 Product of the Year by "Infoworld", "Time", and the "Wall Street Journal". It is the official computer for the 1984 Olympics. These accolades, with IBM's name and mainframe dominance have combined to make the IBM PC the industry's standard.

According to one industry analyst, about 2700 software programs exist for the PC or the PC XT, these comprising three categories of program — IBM Logoed programs that after stringent testing to standard are acquired and marketed by IBM.

More than 100 products are in this category as compared with 14 two years ago.

Vendor Logo products are externally written and may be marketed by IBM provided they meet the standards.

The third category is non-IBM software and you take your chances with that. IBM PC users now have a choice of six independently published magazines centrec almost solely on the PC.

Of total microcomputer market revenue, in New Zealand, small-business users represent 53 per cent, large users 32 per cent. Distribution in New Zealand is largely a three-pronged thrust, authorised dealers handling 70 per cent of sales, the Product Distribution Centre 15 per cent, and representatives another 10 per cent.

Mr Noel Cheer, Market Support Manager, presented a summary of software availability and structure. Elaborating on the three tiered progam supply structure, Mr Cheer mentioned that several products in the Vendor Logo category are currently under evaluation in New Zealand. These products are still owned and supported by the vendors. One of the most useful references for the PC user is a copy of The List — a summary of all known software and hardware products for the PC. The copy made available at the seminar contained 14 pages of references, and copies may be had by contacting the Product Centre.

The IBM PC is backed up three-fold by the Hotline, Problem Determination Database, and the Customer Support System. Mr Roger Souden, Dealer Service Manager, outlined the sophisticated customer support system from its development in Boca Raton, to 1000 installed in United States dealers' systems.

With a further 30 to 40 installed in Canada, the system has not had one crash to date.

The CSS provides a hard disk based database of recent announcements, demonstrations, product directory information, PC configurations, warranty claims history, electronic mail between dealers or between IBM and dealers, technical support for problem solving by program or hardware unit, hotline facility and up to date diagnostic techniques. The diskette version is here now, and the hard disk version was to be available in October.

IBM NZ is evaluating the online version of the CSS for an early 1984 decision. IBM at present uses the VNET system hookup to Boca Raton, Florida, for 24 hour turnaround on problems unsolvable locally.

Summing up, Mr Cohen emphasised that IBM was "getting its act together" and was definitely "on plan for its targets" as far as the IBM Personal Computer was concerned.

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Exploring the envelope

By Pip Forer

In September, we started a short review of sound on the BBC and covered the SOUND command. This month's column deals with the counterpart of that command: ENVELOPE. With 14 parameters attached to it this command is not among the friendliest. The terminology used by the writers of documentation is also rather confusing. All of which makes ENVELOPE rather imposing to the first-time user, albeit better than the POKEs and PEEKs required by some other machines.

The earliest of the 14 parameters appear simple. The first is the envelope number (called by SOUND), and the second parameter is the base time period on which all the other parameters should operate. This is in 1/100ths of a second . . . not 1/20ths as in the note duration defined in SOUND. The top bit has a special significance described later.

The remaining parameters are more confusing. This is because the ENVELOPE command is in fact defining two envelopes, one related to the amplitude of the sound (how its loudness will vary over time) and one related to its frequency (how the pitch of the note varies from the base level established in the counterpart SOUND command). It may be best to sort these two out separately.

Envelope parameters

ENVELOPE E, T, P1, P2, P3, D1, D2, D3, AA, AD, AS, AR, L1, L2.

Number	Time Step	Pitch Envelope	Amplitude Envelope

The AMPLITUDE envelope defines the changing loudness of the note. It requires six parameters to set it. These relate to four distinct phases in the note. As a user you need to define the actual level of sound at two points in the note. We could call these level 1 and level 2. (L1 and L2 in the parameter list.) You also need to define the rate of change in volume getting to these levels and dropping down again after they have been reached. In fact four rates of change are needed: the Attack, Decay, Sustain and Release (AA, AD, AS, and AR).

In the history of any note these rates have a simple function. Attack says how quickly the note will rise from silence to Level 1 loudness. Clearly the slower the rate and the higher Level 1 the longer in time terms will be the attack phase. Its duration is defined by these two parameters, not directly. The second rate controls the movement towards Level 2. It is called Decay phase, which is very misleading to the less musically knowledgeable since in fact a decay phase can mean a rise in amplitude if Level 2 sound is louder than Level 1. This is why both Attack and Decay rate can have positive or negative values. After Level 2 has been reached Sustain comes in. This is more of a decay in loudness since it must be either 0 (the Sound does not die away) or negative. Sustain continues until the sound dies away or the duration of sound defined in the SOUND command has been reached. If the sound is still audible at this point Release simply describes the rate at which it drops away to zero.

You can see that the combination of these six parameters and information from the SOUND command together allow the amplitude to be controlled with some accuracy throughout the note. Notes which die away rapidly (like a snare drum) or resonate (like an organ) can be produced by a suitable choice of parameters.

The remaining six parameters control the PITCH ENVELOPE for the note. The initial pitch is set by SOUND so what ENVELOPE requires is another set of rates of change. In this case, however, the amount of change is controlled by a duration parameter, not by defining some desired end state as with amplitude. The BBC offers three phases of pitch change in any one note. These are totally unrelated to the sections controlled by the amplitude commands. You can, of course, co-ordinate the two in some way but that is is the user's responsibility. In the actual ENVELOPE

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SOUND	ENVELOPE	
1,1,140,45	1,1, -6,6,0,10,10,0,	125,0,0,-125,125,125
1,1,0,40	1,1, 1,0,0,190,0,0,	125,0,0,-125,125,125
1,1,160,100	1,1, 36,-36,0,20,20,0,	125,0,0,-125,120,120
1,1,90,20	1,4, 80,-13,-13,10,20,20,	126,0,0,-126,126,126
1,1,100,200	1,1, 70,6,0,31,10,0,	125,0,0,-125,125,125
1,1,200,100	1,4, -1,1,0,20,20,0,	125,0,0,-125,125,125

command the three rates of change come first (P1, P2 and P3), then the three respective duration parameters (D1, D2 and D3). These define the duration in terms of the units set by parameter 2 of ENVELOPE (T in centiseconds).

From this you can see that any sound you produce is defined by the interplay of a variety of parameters and the possible combinations are almost endless. The relationships between the duration of the note and each of the two envelopes is clearly central to what sound is produced and has many variations. The program listing below offers a way to experiment with different aspects of the ENVELOPE statement to see how different settings interact. There is one point you should note before trying this, however.

The second parameter (duration) has a range 1–127. For value between 129 and 255 the duration acts as the value minus 128. The difference is that the ENVELOPE will not auto-repeat. You can see that an envelope can have one duration (defined by the sum of the durations of each amplitude phase before the sound dies) and the SOUND command another. Normally the SOUND duration takes precedence and the envelope will repeat itself as many times as needed to complete the SOUND's duration. This is how warbling effects can be created. The higher values of parameter 2 do not auto-repeat and in effect the note's duration is controlled by ENVELOPE and not SOUND.

The listing below may prove helpful in experimenting. It allows you to define a SOUND with a standard envelope set up and then modify aspects of the amplitude and frequency envelopes. In the meantime, or for those with less time, try the sound effects in Task 1.

As for the program there is nothing of any originality in it, but it does provide an easy way to experimenting and tinkering with the ENVELOPE command. It prompts the user to establish a standard set of SOUND and ENVELOPE parameters. The note defined by these is then played. The user can then replay the note or access procedures to modify either the amplitude or pitch envelopes or the time units used. This provides easier experimentation than just keying in direct commands and listening. Inevitably the program is mainly prompts and print statements although the VDU 28 (text window) statement is used to control the screen layout. What it needs is a little graph of the envelopes in the bottom right of the screen. Over to you.

```
  10 MODE 0:VDU 31,20,1:PRINT"))))))
))) ENVELOPE SOUND EXPERIMENT ((((((((
(((("
  12 VDU 31,9,18
  20 INPUT " ENTER Channel,Envelope
Number,Pitch and Duration";C%,A%,P%,D%
  25 IF A%<0 OR A%>3 THEN 20
  26 IF C%<0 OR C%>3 THEN 20
  28COLOUR 0:COLOUR 129
  30 MODE 0:VDU 31,20,1:PRINT"))))))
))) ENVELOPE SOUND EXPERIMENT ((((((((
((((":VDU 20,2,8,35,2
  34COLOUR 1 :COLOUR 128
  35 CLS:PRINT
  40 PRINT"CURRENT EXPERIMENT on Cha
nnel ";C%
  50 PRINT:PRINT "ENVELOPE = ";A%

  60 PRINT"Pitch          = ";P%
  70 PRINT "Duration      = ";D%/20;"
 Secs"
  95 PROCDEFINE
 100PLOT 4,0,400:PLOT 6,1280,400
 101 PROCDISPLAY
 104 PROCEDITCHOICE
 105 IF A$="T"THEN CLS:INPUT" WHAT N
EW TIME PERIOD? ";STPLEN%
 110 IF A$="A"THEN PROCAMPLITUDE
 115 IF A$="P"THEN PROCPITCH
 120 IF A$="Q"THEN MODE 4:END
 121 IF A$="N" THEN SOUND C%,A%,P%,D
%
 124 GOTO 101
```

```
 125 DEF PROCPITCH
 126 INPUT" PITCH CHANGE IN SECTION
1 (-128-127) ";PI1%
 127INPUT "NUMBER OF STEPS IN SECTIO
N 1 (0 - 255)";NSTP1%
 130 INPUT" PITCH CHANGE IN SECTION
2 (-128-127) ";PI2%
 135 INPUT"NUMBER OF STEPS IN SECTIO
N 2 (0 - 255)";NSTP2%
 140 INPUT" PITCH CHANGE IN SECTION
3 (-128-127) ";PI3%
 145INPUT "NUMBER OF STEPS IN SECTIO
N 3 (0 - 255)";NSTP3%
 150 ENDPROC
 1000 DEF PROCDEFINE
 1005 VDU 28,2,30,78,12:CLS
 1010 COLOUR 0:COLOUR 129:PRINT" NOW
DEFINE YOUR ENVELOPE":COLOUR 1:COLOUR
128:PRINT
 1015INPUT" WHAT NEW TIME PERIOD? ";S
TPLEN%
 1025 PROCPITCH
 1030PROCAMPLITUDE
 1040 COLOUR 1:COLOUR 128:CLS
 1070 ENDPROC
 2000 DEF PROCDISPLAY
 2020 VDU 28,40,16,78,3:COLOUR 1:COLO
UR 128:CLS
 2025 PRINT"  ))))) CURRENT ENVELOPE
STATUS (((((("
 2030 PRINT "PARAMETERS....ENVELOPE "
;A%;" STEPLENGTH ";STPLEN%
 2040 PRINT:PRINT"AMPLITUDE ENVELOPE"
:PRINT"Level 1 = ";ALA%;"  level 2 = "
;ALD%
 2050 PRINT"Attack Rate ";ATTCH%;TAB(
20);" Decay Rate  ";DECCH%
 2060 PRINT"Sustain Rate ";SUSTCH%;TA
B(20);"Release Rate ";RELCH%
 2070PRINT:PRINT"FREQUENCY ENVELOPE"
 2080 PRINT "Period";TAB(12);"1";TAB(
24);"2";TAB(36);"3"
 2090PRINT "Change Rate";TAB(12);PI1%
;TAB(24);PI2%;TAB(36);PI3%
 2100PRINT "Length ";TAB(12);NSTP1%;T
AB(24);NSTP2%;TAB(36);NSTP3%
 2103 ENVELOPE A%,STPLEN%,PI1%,PI2%,P
I3%,NSTP1%,NSTP2%,NSTP3%,ATTCH%,DECCH
%,SUSTCH%,RELCH%,ALA%,ALD%
 2105 SOUND C%,A%,P%,D%
 2110 ENDPROC
 3000DEF PROCEDITCHOICE
 3010 VDU 28,10,28,78,22:COLOUR 0:CO
LOUR 129:CLS
 3014 VDU28,30,28,78,22
 3016 PRINT
 3020 PRINT"ENTER P to edit PITCH"
 3030 PRINT"ENTER A to edit AMPLITU
```

Turn to page 59

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POKEing around

By Tony and Paul Graham

Budding computer enthusiasts are usually confused by the POKE instruction. Hopefully the following short programs will help you to understand what happens. POKE is probably best described as a BASIC command for a non-BASIC function. It allows the programmer to escape from the restrictions of BASIC, but in doing so BASIC's error-trapping routines are also eluded.

In other words, a wrong POKE may lock up your computer, leaving no alternative but to switch off and start again; or it may remain hidden for hours just to trip you up when you try and save your program. It all depends on where you POKEd. Don't be scared of POKE's; just be careful.

Initially we will only POKE to the screen which on a standard VIC (no expansion memory), occupies memory addresses from 7680 to 8135, and the colour memory, which occupies from 38400 to 38905. By doing so we cannot cause problems and we can see what we are doing.

Type in and run the program "Alphabet Soup", see what happens? The screen should become filled up with changing characters and colours.

```
1 REM ALPHABET SOUP
10 PRINT"□"
20 A=INT(RND(1)*506)
30 X=INT(RND(1)*256)
40 C=INT(RND(1)*8)
50 POKE 7680+A,X
60 POKE 38400+A,C
70 GOTO20
```

How the program works: Line 20 sets A, with a random value between 0 and 505. Line 30 gives X a value between 0 and 255 to provide us with random characters to POKE to the screen. Line 40 gives a random colour for the character. In line 50 the POKEing begins. A when added to 7680 gives an address somewhere on the screen, which we poke with X, "some character". Line 60 POKEs the corresponding colour memory with C, "some colour". And of course line 70 sends the program back to repeat the whole process.

```
1 REM DRAW BORDER
10 POKE36879,59
20 PRINT"□"
30 X=42
40 FOR A=0TO22
50 POKE 7680+A,X
60 POKE 7680+(A*22),X
70 POKE 7701+(A*22),X
80 POKE 8164+A,X
90 NEXT
100 GOTO100
```

The BORDER program simply draws a border around the screen. X is the character which makes up the border. Look up screen character codes on page 141 of your VIC 20 manual, choose a new character and make X= the code of that character. The POKE in line 10 of the program sets the colour of the screen, or we would have white characters on a white background. It would be possible to POKE in a colour for your character. Remember that the colour memory starts at 38400 and must be kept in step with the screen memory. The colour is determined by a number between 0 and 7.

The wrong POKE: To show the effect of a POKE to the wrong address LIST one of the programs. Now type POKE 4100,255 then press RETURN. Again LIST the program. The first line number will now be 65290 if it was 10, or 65300 if it was 20. POKE 4100.0 to restore the program. What happened? We POKEd into the address where BASIC stores its first line number thereby corrupting the program. Try POKEing any address between 4096 and about 4150; that's the section of memory where our BASIC program is stored, with a value between 0 and 255. LIST and see the havoc you can create. It's a bit like trying to LIST all those protected programs.

Get yourself a memory map so you can learn just where to POKE.

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Riding the IEEE Express

By STEVEN DARNOLD

In the beginning, all Commodore computers used the IEEE-488 bus to attach printers, disk drives, and their peripherals. This IEEE standard is widely used on scientific instruments and on several other microcomputers, notably Hewlett Packard. While not as widely used as the RS-232 and Centronics standards, IEEE-488 is superior to both. It sends data a byte at a time — so it is much faster than RS-232, which sends data a bit at a time. Moreover, it has a two-way capability which the Centronics standard lacks.

Commodore produces six different IEEE disk drives. These range from a single disk drive, with the same specifications as the 1541, to a multi-megabyte hard disk drive. Commodore also produces four IEEE printers. In addition, many printer manufacturers supply IEEE versions as an option. An Adler IEEE daisy-wheel printer, for example, sells for $1895 in New Zealand.

With such a solid base of IEEE peripherals, it is surprising that Commodore switched to a new serial standard on the VIC-20 and 64. However, the reason is simple: the serial port is cheaper to implement than an IEEE bus. This reduces the cost of VIC and 64 peripherals by about $200.

Cheaper peripherals are nice, but there is a price to pay: the serial standard is much slower than the IEEE. An IEEE disk drive, for example, is more than twice as fast as the 1541.

To gauge the loading speeds of the disk drives, I chose a 26K program as my standard. I used the same disk in all of the drives, and I reset my 64 before each trial.

First, as a point of reference, I loaded the program on cassette. It took 488 seconds. Then I loaded it on the 1541: it took 67 seconds. This makes the 1541 about seven times faster than cassette.

Next, I put an IEEE interface into my 64 and loaded the program on a 2031 drive. This drive is the exact equivalent of the 1541 drive, the only difference being that it uses IEEE and costs $300 more. The 2031 drive loaded the program in 26 seconds. This is more than twice as fast as the 1541. Then, for my last trial, I loaded the program on a 4040 dual disk drive. This IEEE drive loaded the program in 16 seconds.

Most Commodore 64 owners will be quite happy with the loading speed of the 1541. It may not be lightning fast, but it's reasonably priced and it does the job. Some users, however, will want something faster. Business users, in particular, should consider the speed advantages of the IEEE drives. In addition, the larger IEEE drives offer considerably more storage capacity and enable backups to be made quickly and easily.

For light business use, the 1541 is all the Commodore 64 needs. It will happily perform some wordprocessing, prepare a payroll, or print out an updated price list. Back-ups are awkward to do on a single 1541, but if they don't have to be made too often, there should be no problem. However, if a business wants to use the Commodore 64 heavily, particularly if it needs to maintain a lot of records, the 4040 dual drive is better. It is four times faster than a 1541, it has twice the storage capacity, and it has a built-in backup command. Moreover, the 4040 can read and write 1541 disks.

At $2595 the 4040 costs much more than a 1541, but for some applications it will be worth it. The bigger IEEE drives are even more expensive, and they can not read 1541 disks. Nevertheless, some users may want to consider them.

Before you rush out to buy an IEEE disk drive for your Commodore 64, beware of the fish hook. Many disk programs for the 64 are especially protected from copying. Unfortunately, this protection may block the program from loading on an IEEE drive. "Easy Script", for example, will not load on some IEEE interfaces. Talk this over with your dealer. Don't buy an IEEE drive unless he will let you return any programs which don't work.

If you decide to use IEEE peripherals on your 64, you will need to plug an IEEE interface in your cartridge port. In New Zealand there are three IEEE interfaces to choose from: the C-64 LINK, the DAMS IEEE, and the MSD CIE. Commodore kindly provided me with samples of the first two; Viscount Electronics sent me a copy of the instructions for the third.

At $350 the C-64 LINK is the most expensive of the three, but it is much more than just an IEEE interface. It also provides a machine language monitor, a parallel printer driver, a terminal program, and the BASIC 4.0 disk commands. Somehow it manages to squeeze all of this into a tiny cartridge which hardly protrudes from the back of the 64.

If you want all these extras, the LINK is a nice piece of work. However, it is a bit too obtrusive for my liking. It gobbles up 8K at the top of memory, and alters the operating system in lots of little ways. One big advantage of the LINK is that it comes with a relocation program which permits you to shift the coding to ten alternate locations. The manual claims that one of these locations will load "Easy Script", but I couldn't try this out because the LINK I received was malfunctioning.

The LINK's extra features are impressive, but I was disappointed with their limitations. The machine language monitor is only a simple load-save-display monitor. The public domain monitor, 'Supermon', is far more capable. Similarly, the printer driver and terminal program are rather unsophisticated.

At $288, the MSD CIE is nearly as expensive as the C-64 LINK. However, the CIE is just an IEEE interface and it has no fancy extras. The CIE is larger than the LINK, and it includes a socket for other cartridges. It is supported by two adjustable feet.

Whereas the LINK takes over the operating system as soon as the 64 is turned on, the CIE is surprisingly shy. In fact, the CIE isn't there until a SYS is executed, and then it disappears whenever there is a RUN/STOP RESTORE. This is an undesirable feature. The interface should stay on until the user decides otherwise.

The CIE comes with program listings to relocate its code to two alternate locations and to permit it to use specified serial and IEEE devices at the same time.

At $190 the DAMS is both the cheapest and the biggest IEEE interface. It produces 15 cm out the back of the 64 and has no support feet. This is its worst feature. Not only did I have to be careful not to damage the board, I had to push my monitor back to an uncomfortable viewing distance. In the end I solved both problems by getting a plastic platform for my monitor and cutting a hole in the front side. I then pushed the 64 up to the platform so that the DAMS slid through the hole under the monitor.

The reason for the size of the DAMS IEEE is that space has been left on one end of the board to attach a socket for other cartridges, and on the other end of the board for a networking connector. I would have preferred a smaller board, but some people may find these options useful.

The DAMS has many attractive features. Unlike the other two interfaces, it uses no BASIC RAM in its normal position. Thus, it is less likely to need relocating. Furthermore, if you do want to relocate it, it is not necessary to load and run a special program: a single SYS shifts the code.

The DAMS is automatically enabled when the 64 is turned on, and it integrates itself well into the system. Unlike the other two IEEE interfaces, the DAMS polls both the serial and IEEE buses. Thus, a serial printer and an IEEE disk drive can easily be used together.

The DAMS manual claims that it will load "Easy Script". However, I was unable to do so. Perhaps the new manual, due out soon, will tell me how. "Zork" and "Deadline", on the other hand, both loaded easily.

Whichever IEEE interface you choose, you will need a PET-IEEE cable. This will cost you an extra $110. Plug the interface into the 64, plug one end of the cable into the interface, and plug the other end into the disk drive. Now you're ready to ride the IEEE Express.

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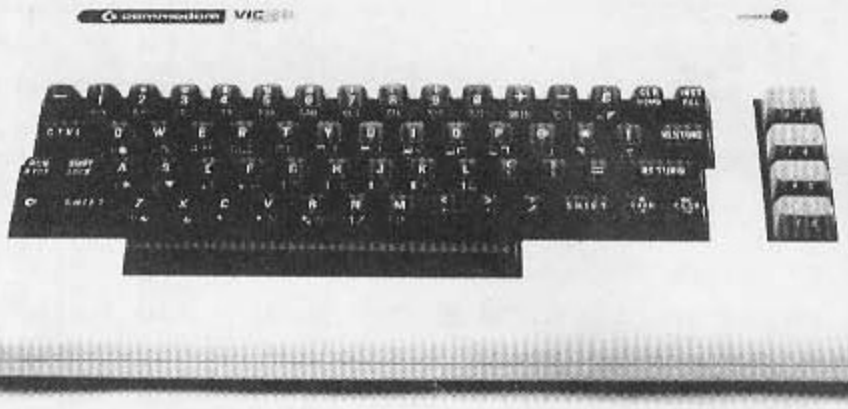

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```
  10 LET A=14
  11 LET B=8
  12 LET S=0
  20 FOR N=10 TO 11
  30 PRINT AT N,0;"[illegible]"
  40 NEXT N
  50 LET X=INT (RND*100)
  60 IF X>50 THEN LET B=B+1 AND
B<30
  70 IF X<50 THEN LET B=B-1 AND
B>0
 100 PRINT AT 10,A;"■ ■";AT 9,A;
"▀▄▀";AT 8,A;"▄▄▄"
 110 PRINT AT 10,B;"■          ■
 113 FOR X=1 TO 5
 114 NEXT X
 120 IF B=A OR A=B+9 THEN GO TO
250
 130 PRINT AT 9,A;"    ";AT 8,A;"
  "
 140 LET S=S+10
 150 LET A=A+(INKEY$="L")-(INKEY
$="A")
 160 IF B=A OR A=B+9 THEN GO TO
250
 200 GO TO 50
 250 PRINT AT 10,A;"▀▄▄▀";AT 9,A;
"▀▄▀";AT 8,A;"■ ■"
 260 PRINT AT 11,10;"SCORE= ";S
```

Note: In line 30, insert 30 graphic spaces inside the quotes. In line 100, insert one space. In line 110 insert nine spaces. In line 130 insert three spaces inside each of the pairs of quotes. In line 250, insert one space.

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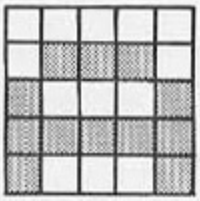
Jeep: stay on road

This game from James Gerbich, of Auckland fits 1K. The object is to stay on the road without crashing into the side of the bank.



Your man should look like this, 3 spaces wide, and 3 spaces deep.

You stay between the arrowed graphic lines. If you crash your jeep turns upside down and a score is given. Note that A = Left, and L = Right.

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Day-of-week finder

Which day of the week were you born? Here's a simple program from Keith Paintin, modified slightly by John Mitchell our new ZX81 editor, which will identify the day of a given week this century.

It fits into 1K. Note that, in line 70, the last two digits only of the year are entered.

```
  50 LET E=INT (RND*7)+3
  60 LET C=INT (RND*6)+4
  64 PRINT E;"X";C
  65 LET C=C*E
  70 LET E=INT (RND*9)+1
  80 FOR F=1 TO 9
 130 LET G=INT (RND*72)+10
 140 IF G=C THEN GO TO CODE "▙"
 150 IF F=E THEN PRINT "■";C;
 160 PRINT "■";G;
 170 NEXT F
 190 LET F=VAL "15"
 200 FOR C=15 TO 1 STEP -1
 210 PRINT AT C,F;"*"
 214 FOR Q=1 TO 30
 215 NEXT Q
 220 LET F=F+(INKEY$="8")-(INKE
$="5")
 230 NEXT C
 240 IF F=3*E-2 OR F=E*3-1 THEN
PRINT "CORRECT"
 245 FOR Q=1 TO 600
 250 NEXT Q
 260 RUN
```

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Fun with animation

By PAUL KINLEY

This program is an example of ZX81 animation. ZX81 users may like to experiment with movements or add more robots.

```
 1 LET A$="                "
 2 LET B$="                "
 3 LET C$="                "
 4 LET D$="                "
 5 LET E$="                "
 6 LET F$="                "
 7 LET G$="                "
 8 LET H$="                "
 9 LET X=0
10 IF X=0 THEN GOTO 100
20 IF X=1 THEN GOTO 130
30 IF X=2 THEN GOTO 700
40 IF X=3 THEN GOTO 810
50 IF X=4 THEN GOTO 979
60 IF X=5 THEN GOTO 740
70 IF X=6 THEN GOTO 979
80 IF X=7 THEN GOTO 100
82 IF X=8 THEN GOTO 400
85 IF X=9 THEN GOTO 500
86 IF X=10 THEN GOTO 140
90 IF X=11 THEN GOTO 1
100 LET A$="              "
110 LET B$="              "
112 LET C$="              "
120 GOTO 1000
130 LET C$="              "
132 GOTO 1000
140 LET F$="              "
390 GOTO 1000
400 LET A$="              "
420 LET B$="              "
440 LET C$="              "
444 LET E$="              "
450 LET F$="              "
500 GOTO 1000
600 LET A$="              "
610 LET B$="              "
620 LET C$="              "
630 LET D$="              "
650 LET F$="              "
690 GOTO 1000
700 LET A$="              "
702 LET B$="              "
704 LET C$="              "
708 LET D$="              "
720 GOTO 1000
740 LET A$="              "
750 LET B$="              "
760 LET C$="              "
800 GOTO 1000
810 LET A$="              "
820 LET B$="              "
830 LET C$="              "
840 LET D$="              "
900 GOTO 1000
979 LET A$="              "
980 LET B$="              "
982 LET C$="              "
984 LET D$="              "
1000 PRINT AT 5,10;A$;AT 6,10;B$
;AT 7,10;C$;AT 8,10;D$;AT 9,10;E
$;AT 10,10;F$;AT 11,10;G$;AT 12,
10;H$
1010 LET X=X+1
1100 GOTO 10
```


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Cassette system word processors

This is the first of two articles by BRIAN SULLIVAN on word processors for cassette-based TRS80/System 80 microcomputers.

Microprocessors can do a myriad of tasks; most of us know this and are hooked! But to stop short of using your micro's wordprocessing potential is like pushing a bicycle down hill.

Of course I hear you say the cost of a printer will hold you back. Lately, however, there are appearing on the market some very adequate machines for use at more reasonable prices. If you do write reports, type assignments, or just write a lot of letters then word processing is, I guarantee, going to be a delight for you. Especially if you want one more reason for having a computer around the place.

For those who require a first-class presentation of script then the ideal would be a daisy-wheel printer or an interface with an electric typewriter. For us lesser mortals the dot-matrix printer can do a more than adequate job. In fact, some printers have an enhancing capability (extra dots) for clearer resolution and darker print-out. Most printers now will have different script sizes and shapes. Make sure if you are purchasing a printer that you get all the options you can expect for your money. Shop around and find out what each model offers. Three very important necessities if you are going to use your printer for word processing are:

First, don't buy less than an 80-column printer.

Second, make sure you can feed in one sheet of paper (usually termed *friction feed*) as well as sprockets (usually termed *pin feed*). You should really have both options, the first for wordprocessing and the second for listing programs.

Third, check the printer has *true descenders* (letters such as g and p and so on that go below the line) for you may not care about such niceties until your uninitiated friends start saying, "Oh! But the g's and p's and things are up in the air!"

Enough said about the hardware, you will need to make your own choice and finally live with it, so do it carefully. Things to look for and inquire about are:

1. Choice and variety of print sizes and styles.
2. Ribbon cassette: is it standard and readily available.
3. Printing speed characters per second (c.p.s.)
4. Uni (1) or bi (2) directional printing head.
5. Memory buffer size.
6. Software commands to printer: are these accessible.
7. Compatible graphics print-out for your 80 are on board or can be fitted.
8. Underlining capability (not usually available on 80s unless commanded through software).
9. Friction and/or pin feed (already discussed).

This is by no means an absolutely definitive article but I hope a brief discussion will arm you before you head to your favourite computer salesman. To connect the printer to a System 80 you will need a parallel interface, unless you have the expansion unit on board. People who are lucky enough to have the TRS-80, of course, have no problem; the printer interface is built in.

One last thought about printers in general is the fact that you may in fact up-grade your microprocessor at some later stage. Bearing this in mind will mean you need to have a standardised link up such as RS-232-C, or Centronics (parallel) connections, or better still both options available.

When you have finally made your choice and lugged the thing home (they are inclined to be quite weighty) you can actually get printing.

Bad news for the people who make Twink

The first word-processing package that I tried was the Dick Smith WORP-1, simply because it was readily available to me at a reasonable cost.

For an old tip, tap, thump typist like me the wordprocessor was a dream come true. The amount of Twink or that other white carbon-copy stuff I used to go through was phenomenal plus the waiting time while it dried! Now, Hey presto! Suddenly I can just back space and remove or replace the offending alpha-numeric digit (letter).

The automatic wrap-around of letters also makes for easy pleasant typing, as for the actual keying in this is quite gentle compared to my old portable.

WORP-1 is a BASIC language program and the presentation comes complete with a 30-page manual that describes clearly the instructions for editing and saving the information you have written.

One big problem, however, is the garbage collection routine in BASIC. I presume that WORP opens up a string line (255 characters) and then opens

It is disconcerting to be typing away and find when you look up at the screen that nothing is happening! The cursor has stopped blinking and everything is locked up. After a few seconds everything will suddenly start up again

Turn to page 58

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Graphics and a game

By Steven Cragg

The Spectrum has 21 user defined graphics which can be assigned to the keys a-u in graphics mode. These are programmed using the line
POKE USR "a"+n, BIN X
where n is the row number (see diagram) the a is the letter of the key that the graphic is being assigned to and X is the binary number corresponding to that row. The BIN command is to convert binary to decimal and is extremely useful for the U.D.G.

To see how this works see diagram 1 and the accompanying program for putting it into memory (assigning it to the 'c' key). It is possible to re-define the whole character set and I will cover this in a later article.

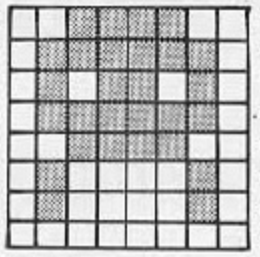

figure 1

PROGRAM

```
10 FOR N = 0 to 7
20 READ A : POKE USR "c" + N, A
30 NEXT N
40 DATA BIN 00111100,
      BIN 01111110, BIN 01011010,
      BIN 01111110, BIN 00111100,
      BIN 01000010, BIN 01000010, 0
```

A game

```
10 BORDER 0: PAPER 0: INK 2
20 GOSUB 1000: LET s=0
30 LET X=100: LET Y=100: LET
M$="p"
40 LET I$=INKEY$
45 IF I$<> " " THEN LET M$=I$
50 LET X=X+(M$="p")-(M$="o")
60 LET Y=Y+(M$="q")-(M$="a")
70 IF POINT (X,Y)=1 THEN GOTO 100
75 PLOT X,Y
80 LET S=S+1: PRINT AT 10,0;
"0000" (TO 4-LEN(STR$(INT(S/10))));
INT(S/10)
90 GOTO 35
100 PRINT AT 15,8;FLASH 1;PAPER
0;INK 7;"***GAME OVER***": GOTO
2000
1000 PLOT 7,7: DRAW 242,0 : DRAW
0,-162: DRAW -242,0: DRAW
0,-162
1010 FOR K=1 to 30: PRINT AT
RND*19+1, RND*29+1; INK
0;"+":NEXT K
1020 RETURN
2000 PRINT AT 6,4;INK 7;PAPER
1;"Any key for another game": PAUSE
0:RUN
```

The game of Worm. This is not a brilliant game but serves only to 'show off' some of the features of the Spectrum.

The keys for playing are:
p — Right
o — Left
q — up
a — down

Be sure that you are in lower case mode before running the program.

Line 10 sets up the global colours.

Line 20 calls the subroutine to draw the border of the playing area and put in the invisible 'mines' (OK + signs to you with no imagination) and sets the score to zero.

Line 30 sets the initial plot position coordinates and sets the initial move direction to the right.

Lines 40 — 60 are the lines to change the direction if the relevant key has been pressed.

Lines 70 — 75 check to see if you have hit anything and if not keep plotting your line.

Line 80 updates the score.

Line 100 is the crash routine.

The object of this game is to last as long as possible. If you go into the same character cell as a 'mine' it turns red and if you are quick you can swerve to avoid them. Also you must be careful not to run into your path.

BBC disk systems

At least two companies have now leapt into the vacuum left by Acorn's failure to produce enough disk operating systems for the BBC. The PACE system from Bradford offers users a ROM that can switch between complete emulation of the BBC DOS or an enhanced version allowing more and longer file names per disk. The ROM also includes a disk formatting program. Other software-controllable functions offer an extended DOS that can if required, work just like an Acorn version. The other system from LVL, of Nottingham, also offers compatibility and extensions. In this case the major extension is the virtual doubling of disk capacities. An 800K disk system is now capable of 1.4 Mb. These systems will be reviewed in full in a forthcoming BBC column.

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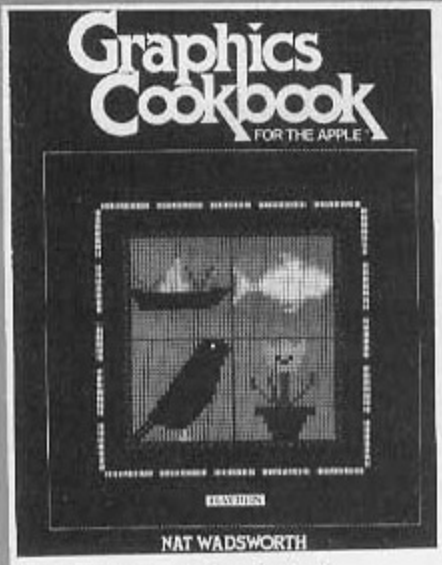

The Easy Guide to Your Apple II
Joseph Kascmer

Learn to use your Apple IIe and II-plus in a matter of hours. Become familiar with keyboard, video screen and disk drives, and see how easily you can write your own BASIC programs. Or skip programming and get on well using commercially available software. Covers creation of video graphics; use of disk drives; forecasts and simulations; customising pre-recorded programs; expanding your system with accessories.

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Graphics Cookbook for the Apple
Nat Wordsworth

A guide to "painting" shapes, objects and letters in low-resolution graphics on the Apple II. Explains method and techniques of drawing pictures using Applesoft BASIC, then provides a library of microcomputer graphics. Works from geometric shapes to multicoloured robots and flying saucers, trees, yachts and colourful backgrounds. Also discusses displaying "birdseed" messages using giant letters and numbers.

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Computer Studies: A Practical Approach
G.M. Croft

For anyone meeting computers for the first time, it emphasises data processing and file handling. It also takes into account the rapid advance in computing and looks ahead to the way in which the subject will develop over the next few years.

Hodder & Stoughton — **Our price $16.10. Save 85c and earn 1 bonus point.**

Language/programming

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.**

Microsoft Basic (2nd edition) — **Ken Knecht**

Shows how easy it is to learn to program. A comprehensive tutorial on programming using Microsoft versions 5.0 with the TRS80/System 80 and other generalised CP/M based systems as examples. This edition has a new chapter on the Microsoft BASIC compiler.

dilithium Press — **Our price $33.70. Save $1.80 and earn 3 bonus points.**

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.**

Pascal for the Apple (book 9 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**

The 68000: Principles and Programming
Leo J. Scanlon

An introduction and full description of the highly complex and powerful 68000 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.**

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**

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.**

Atari

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.**

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.**

Kids and the Atari
Edward H. Carlson

The book is arranged in 33 lessons, with notes for the instructor, containing assignments and review questions. From a "bare bones" introduction to programming, the sequence quickly leads to the point where programs can be written. From there, it's on to more advanced and powerful commands, and finally, the broader aspects of programming such as editing and debugging, and user-friendly programming.

Reston — **Our price $39.80. Save $2.10 and earn 3 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 glossary.

Prentice-Hall — **Our price $19.25. Save $1.05 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.**

CP/M

CP/M and the Personal Computer
Thomas A. Dwyer & Margo Critchfield

Two authors known for their down-to-earth explanations of computing intricacies have produced an up-to-date guide to the microcomputer disk operating system. They break CP/M into its components and combine their explanations with applications and self-study techniques. New users get a "quick tour" of CP/M and there is an insider's view of CP/M's four main applications.

Addison-Wesley — **Our price $39.20. Save $2 and earn 3 bonus points.**

Osborne CP/M User Guide — **Thom Hogan**

Bridges the gap between technical manuals and users' working knowledge of computers. Provides basic, practical information you need, then details all CP/M commands and describes compatible support programs. Many tables and lists as operating references. For more advanced users, the relationship between CP/M and other operating systems is examined, and modifications and use of CP/M for program development is discussed.

Osborne/McGraw-Hill — **Our price $31.50 Save $1.65 and earn 3 bonus points.**

CP/M Printer
Stephen Murtha & Mitchell Waite

Information on the latest CP/M 2.0 version, disk allocation and extents. Tear-out reference card and extensive list of CP/M software.

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

CP/M Bible
Mitchell Waite & John Angermeyer

Reference guide to CP/M, covering all built-in and transient commands. Compares CP/M versions and looks at optional utilities. Describes BASIC, PASCAL, MAC, CBASIC and CB-80. Includes detailed command summary card and extensive bibliography.

Sams — **Our price $39.80. Save $2.10 and earn 3 bonus points**

Soul of CP/M
Mitchell Waite & Robert Lafore

Unlocks the secrets of how to use the hidden power of your CP/M system. Describes the workings of CP/M, and offers a DDT code-fragment approach for getting started quickly. Teaches 8080 assembly language programming, how to use CP/M system calls, how to access CP/M from BASIC, and how to modify BIOS.

Sams — **Our price $37.85. Save $2 and earn 3 bonus points.**

Keyboarding

Quick Keyboarding — **Vonnie Alexander**

Sub-titled "Competent Keyboarding in 6 Hours", this book by New Zealand Vannie 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**

Our new selection

Your First Basic Program
Rodnay Zaks

The author of more than 15 best-selling computer books teaches the basics of BASIC. It doesn't matter whether you're eight or 88, if you want to learn how to program a computer, this book is aimed at you. No computer experience is needed. Written in Zaks' entertaining style and attractively produced with lighthearted but telling graphics.

Sybex — **Our price $20.85 Save $1.10 and earn 2 bonus points.**

How to Use the Timex-Sinclair Computer
Jerry & Deborah Willis

Emphasis is on practical information with introduction to computer and explanation of its basic components; step-by-step instructions on getting it up and running; shows how to load and save programs on standard audio cassettes; tells how to type, use and modify programs from books and magazines.

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Z80 Applications
James W. Coffron

Numerous diagrams and examples help you develop applications using the Z80 microprocessor. Easy reading and clear illustrations provide instructions for controlling peripheral LSI devices. Information on use of ROM and static RAM, input and output devices; dynamic RAMs, interrupts, peripheral devices including the Z80-SIO, PIO and CTC.

Sybex — **Our price $31.30. Save $1.65 and earn 3 bonus points.**

More Uses For Your Timex/Sinclair 1000: Astronomy on your Computer
Eric & Howard J. Burgess

Ready-to-run programs to help you explore the heavens and have fun while learning about the stars and the solar system. Programs will convert time from one system of measurement - and teach you to recognise constellations.

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Bits, Bytes and Buzzwords: Understanding Small Business Computers
Mark Garetz

Explains microcomputers, software and peripherals in a straightforward sensible way, especially for those considering using a computer in their business. Explanation and discussion of computer systems, followed by a comprehensive glossary of computer terms.

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

CP/M Revealed
Jack D. Dennon

Explains technical aspects of CP/M, including console monitor (CCP), system manager (BDOS) and input/output driver package (BIOS). The data structure of the CP/M disk is fully outlined to allow experienced users to realise the full potential of CP/M programming. Advanced users should appreciate discussion of booting up, logging in, changing memory size, mapping disk space, calling programs and interfacing techniques.

Hayden — **Our price $28.45. Save $1.40 and earn 2 bonus points.**

The Timex/Sinclair 1000 Basic Handbook
Douglas Hergert

A computer-size reference to programming. Lists and explains alphabetically each of the Timex/Sinclair's BASIC keywords and function keys. Explanations include special tips and suggestions for using BASIC vocabulary to make programming as simple and efficient as possible.

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VisiCalc for Science and Engineering
Stanley R. Trost & Charles Pomernacki

A technical problem-solving aid which offers more than 50 ways of using an "electronic spreadsheet". Solutions to common engineering, scientific and design problems in such areas as maths, statistics and physics, electrical and electronic engineering, solar engineering, heating, ventilating and air conditioning, control systems, mechanical engineering.

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The Foolproof Guide to Scripsit Word Processing
Jeff Berner

A quick and easy way for TRS80 Model 11, 12 and 16 users to learn the SCRIPSIT program. You can enjoy learning to create and delete files, handle documents, polish texts, prepare form letters and use your printer.

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Introducing Computers
Peter Bishop

A first introduction to computers intended for lower secondary school pupils. Assumes no previous computer knowledge and looks at wide-ranging topics to give an appreciation of the role of information and the structure of computers, jobs done by computers in industry, the development of computers, and their effect on society.

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IBM

Useful BASIC Programs for the IBM PC
Stanley R. Trost

A selection of tested programs for more than 65 home and business tasks. Home finances, business calculators, real estate, data analysis, record keeping and education are some of the fields covered. No knowledge of BASIC programming is needed to use these programs.

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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.

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PET

The Alien, Numbercrater 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, Derron, 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.**

Word processing

Low-Cost Word Processing
Laurence Press

Tells you how to produce memos and reports, easily for mailing, quickly and efficiently — even if you know about computers. Brings together the necessary information, suggestions and tips, outlines the workings of a word processing system, considers options, and discusses the choice of software packages.

Addison-Wesley — **Our price $22.40. Save $1.20 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.**

Hardware

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.

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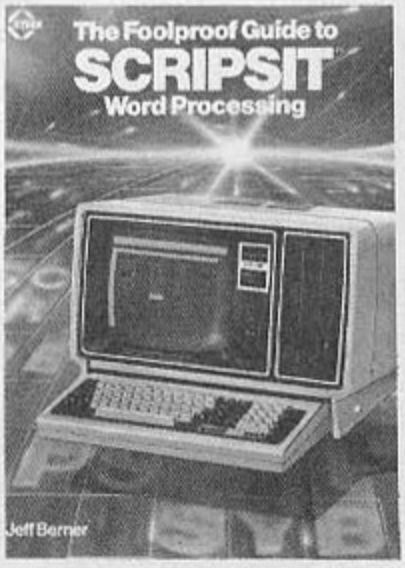
Microcomputer Design and Troubleshooting
Eugene M. Zumchak

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.**



Books for the buff

Business

The Business Guide to Small Computers — **Lawrence Calmus**

A step-by-step guide to the small computer for business. Covers costs, maintenance, implementation, systems design and even environmental impact — of both hardware and software. It starts with an analysis of your organisation's needs and then sets out ready-to-use information clearly and concisely.

Osborne/McGraw Hill — **Our price $38.50 Save $2.00 and earn 3 bonus points**

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.**

Executive VisiCalc for the Apple Computer — **Roger E. Clark**

Shows how to forecast sales, model budgets, perform financial analysis, and how to use VisiCalc for your specific needs. Guides you through the less widely known aspects of VisiCalc and offers tips on getting started, command statements, logic, sample business models, and hardware options.

Addison-Wesley — **Our price $30.60. Save $1.60 and earn 3 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 $25.65. Save $1.30 and earn 2 bonus points.**

Doing Business with VisiCalc — **Stanley R. Trost**

Assumes an introductory-level understanding of VisiCalc. Beyond that it is a quick and easy guide. It has more than 50 planning and forecasting applications ranging from financial statements to master budgets, and pricing models to investment strategies. Each application is described in detail and a complete program for setting up the application in VisiCalc is noted.

Sybex — **Our price $25.65. Save $1.30 and earn 2 bonus points.**

VisiCalc: Home and Office Companion — **David Castlewitz, et al**

Provides extensive coverage of popular VisiCalc programs and can be used by the novice and expert alike. For the novice, it offers 40 models that can be used immediately for personal and business applications. For the expert it is a source of new ideas and techniques. Models created with Apple 3.2 version, but will perform just as well on machines with other versions.

Osborne/McGraw-Hill — **Our price $31.98. Save $1.65 and earn 3 bonus points.**

VIC

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.**

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.**

Commodore 64

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.**

Sinclair

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.**

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.**

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.**

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.

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TRS-80

Interface Projects for the TRS-80 (Mod III) — **Richard C. Hallgren**

For the user with some computer experience. A series of easily built interface projects allowing the discovery of the computer's capabilities. Many fully tested practice hardware projects including review of data transfer formats, analog-to-digital conversion biofeedback projects, and controlling a video playback device.

Spectrum — **Our price $23.25. Save $1.25 and earn 2 bonus points.**

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 price $22.30. Save $1.20 and earn 2 bonus points**

TRS80 For Kids from 8 to 80 Vol 1 — **Michael Zabinski**

Enjoyable, easy to follow, and very effective. Suitable for beginning TRS80 programmers of any age, especially youngsters. No special background is needed. Same principles used at the American National Computer Camp help you quickly begin writing computer programs and encourage you to try many examples. For System 80, too, of course.

Sams — **Our price $19.85. Save $1 and earn 1 bonus point.**

Introduction to TRS-80 Graphics — **Don Inman**

One for all the 80 users! A complete introduction to the basics of graphics programming on the TRS-80, using dozens of examples. It begins with the most basic concepts of line drawing and leads to geometric shapes, moving figure animation, and other more advanced topics.

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

119 Practical Programs for the TRS-80 Pocket Computer — **John Craig**

Collection of software created for the pocket model. Programs range from statistics, numerical analysis and finance to electronics and engineering. Author is a professional programmer.

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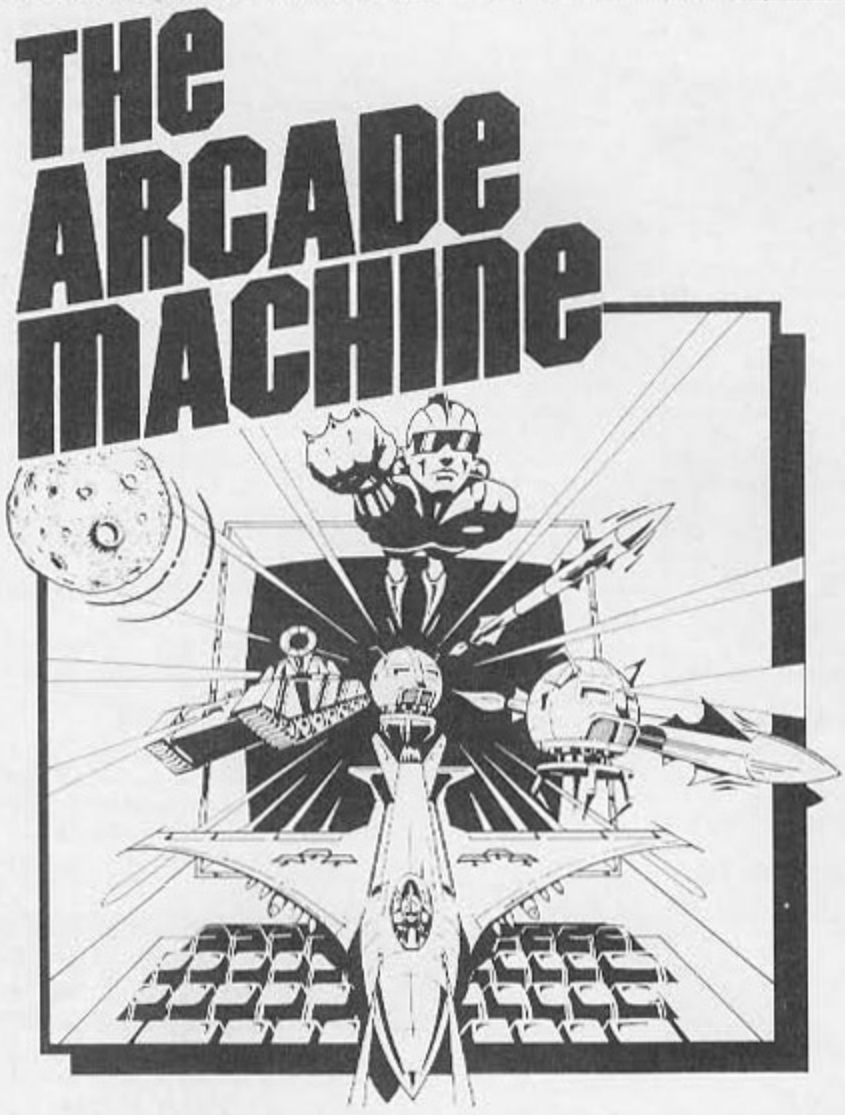
A game writing program

By Stephen MacGibbon (age 12)



Games for the Apple II have been around a long time: especially shoot 'em ups with wonderful animation, colour graphics, and nail-biting suspense.

From the time we got our Apple and watched those games flashing up on the screen I had thought, "Gee I wish I could do something like that!" I learned to create animation, and draw pictures, but never managed to fuse everything together into something usable. When I heard about the Arcade Machine I thought, "This is for me!" (Arcade Machine is a high-resolution game-writing program for the Apple II Plus/IIe.)

I had expected the program to produce any type of game. It didn't. It produces Space Invader-type games. However, I wasn't disappointed.

The program is divided in sections and is menu driven for maximum convenience.

With the *shape creator* you draw shapes that appear on the screen. They can be the little meanies that try to kill you, or the good guy who moves along the bottom of the screen and shoots up at the meanies.

All shoot 'em ups have explosions. The Arcade Machine hasn't forgotten that. You draw explosions for meanies being hit, or yourself being blown to smithereens.

The *path creator* controls where the meanies move on the screen. You can make your meanies dive-bomb you, pause, go fast or slow and many other things. Each meanie can move a different way.

Game options let you choose all sorts of things. For example, how fast meanies bomb, the sound of you getting blown up, or of you blowing the meanies up. Game options let you set the score for killing a meanie. And lots of other things.

Level options allow one to choose things like how many stars should be in the sky. Or they can make the stars fall and flicker to give the impression of being in space. They can determine how fast bombs fall, how fast the good guy moves along, how accurate his shot needs to be to kill an alien, where the aliens appear on the screen, and a lot lot more.

A *background/title creator* allows you to create a background: for example a moon surface, a cityscape or whatever suits you. You put a title on your game with the title creator: "Stampeding Chickens" by A.A. Birdbrain, or whatever. You can also put pictures on the title page.

The games you create can be loaded, saved and catalogued. Up to five different games can be saved on one

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disk.

When your game and title page is finished you can create a special game disk. Just press Y for "yes', and the Arcade Machine does it all for you. The new disk, which is protected (even against Locksmith), boots up showing your title. Press the space bar and away you go, playing your own game just like a bought one.

The finished product of your imagination can look as good and play as well as Apple classics such as "Alien Rain" and "Space Eggs".

Of course, you don't have to be shooting space aliens. You could shoot polar bears, submarines, spacemen, parrots or you could even outwit Superman. The good guy doesn't have to stay at the bottom of the screen: he can go everywhere you want him to. Your game can be completely different from Space Invaders or Galaxians.

The Arcade Machine is surprisingly easy to use. You don't have to know how to program, at least not in the normal way — machine language and all that gobbledygook. However, you do need to do a lot of experimenting and a little bit of figuring out.

I found the drawing program had some drawbacks. It doesn't do circles and some other geometric figures very accurately. Sometimes when you press the space bar to create a dot, you need to press it twice. But the drawing program isn't all bad. Apart from those drawbacks it's easy to use, and similar in operation to E-Z DRAW.

The program is quite expensive. We bought ours when we lived in Australia for $Aust.80. It would be well over $100 here. In America it's $US59.95. But think of all those separate games you might buy at $50 or more each and quickly get tired of. With Arcade Machine you can create as many as you like — for nothing! Because of that I think it's excellent value for money.

Footnote: according to his father, Stephen has spent countless hours glued to the Arcade Machine. His "Interstellar Blobs" and "Ocean Voyage" are already family classics, while his helicopter enhanced Western epic is in the works.

If Arcade Machine is not available from your local Apple Dealer, write to Broderbund Software, Inc., 1938 Fourth St, San Rafael, CA 94901, U.S.A.

Electron

A review of the Electron may be some time off, but British reaction is already well orchestrated. It appears to have all the hallmarks of an Acorn product: late, dearer than originally leaked but technically good. It is sufficiently down-graded from the BBC model B to avoid direct competition with it . . . but compatible enough to encourage buyers wanting to access Beeb software.

Features that differ from the BBC include a different keyboard and loss of the Teletext mode. The keyboard has no dedicated function keys. Instead a "function" shift key allows the numeric keys to be used as function keys. It also lets the user enter BASIC verbs from other keys: Function/D enters DRAW for instance.

The main reported shortcomings are that interface requirements are poorly met and the machine is slower. Interfacing provides a socket for an expansion box, but little else. The most serious omission is a printer port. Speed is sacrificed by both using cheaper (and slower access) RAM and by incorporating video handling into the ULA. Almost all the attractions of the BBC (like the on-board word processors) will depend on further expansion options.

For all that it is judged a good machine . . . but for the growing user may be a cheap way in but an expensive way to go.

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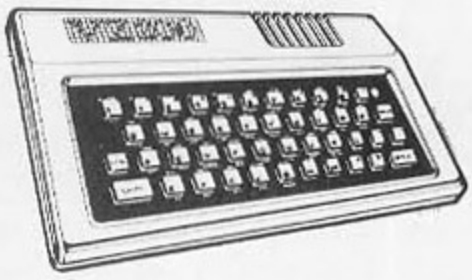

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WELLINGTON:
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Toddlers at the keyboard

By PAT CHURCHILL

Our elder son was just over three when we bought our computer. He took to it like a hungry man to a pork chop.

The day after we took delivery of our PET I called young Ben to come and get his breakfast. As usual, no response. I went through the house looking for him. There he was in the dining-room, sitting at the keyboard "making pictures, Mummy."

He had removed the safety guard from the power point, plugged in the computer, turned on the wall switch and the computer switch, and was filling the screen with pi designs — "little doggies."

Eighteen months later he is a veteran. His 2½-year-old brother, Jamie, isn't far behind.

Providing I load the program for them, they can usually get it to run. They know their way round the various editing keys, shift and return. I'm gradually putting together an alphabet program for them with pictures and noises for each letter. I wasn't too surprised, therefore, to find Ben, now 4½, knew most of his alphabet and could find the various letters on the keyboard. It gave me something of a jolt to discover his little brother did, too.

I'm always on the look-out for a simple program the boys can use. One favourite is How Many? from PET Games and Recreations (Reston Publishing Company). The screen fills up with planes. How many? The boys count them and key in their answer. A correct answer is rewarded with a screenful of happy faces. A wrong response and they are urged to try again. This game has helped their counting skills and taught them the numeric keypad, too.

Another well-used program is one I copied out of *Compute!* magazine. When run, it shows a list of people the boys know — Mummy, Daddy, various relatives and friends. They choose one name by its number and it is shown on the screen by itself. They can then copy it. The computer accepts only correct responses, so spelling is perfect! Once the name has been copied there is an option to print it out via the printer by pressing the @ key. We change the names from time to time depending on current TV heroes or new friends.

The alphabet program I'm writing is also a kind of record of my programming skills, as I learn new things, and also experiment with the computer's sound. I recently invested in the Supergraphics II package which has made it a piece of cake to move a space ship up the screen for the letter S, or have a skier zig-zag down the screen for Z.

The boys have a little friend who is a TV addict. When he gets within 10 metres of a TV, his eyes take on a glazed look and his brain screens out everything else. I've even seen him desert a birthday party in mid festivities to seek out and turn on the TV. The other day when he came over to play, my sons had their alphabet program running. I don't know if it was the built-in monitor that fooled him, but he actually spent a good 20 minutes at the keyboard.

Turn to page 60

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Some "prior knowledge" necessary

"The HP-IL System: An introductory guide to the Hewlett Packard interface loop". By Gerry Kane, Steve Harper and David Ushijima. Published by Osborne/McGraw-Hill. 106 pages, paperback. $35.70.

Reviewed by Mike Thomson

The Hewlett Packard interface loop (HP-IL) is a bit serial interface designed for low cost, battery operable systems such as programmable calculators such as the HP41C and the new portable 75 computer.

The circuit enables these devices to be interfaced to other computers, low cost peripheral devices and test equipment while maintaining its portability and low power attributes.

The first part of this book is given to an overall view and discussion of the concept and principles of the interface loop. Basic configurations and putting the loop together are then discussed, leading to ways in which various instruments, not initially designed for the loop, might be interfaced.

From chapter three on, the reader is given more detail on the principles, protocols, message structure, loop sequences and interface functions – all required knowledge if you are going to use a calculator or portable computer to control test gear and monitor laboratory equipment.

There are many schematic drawings, but no circuit diagrams. This is therefore a book that describes principles rather than a detailed manual of circuits.

If you are an "off the shelf" user and choose just to plug in readymade peripherals according to the instruction manual, this book might not be your best buy. It requires a bit of "prior knowledge". You really should know what bits, bytes and data are all about as well as having some programming experience.

To the novice, this book might become somewhat arcane beyond the first few chapters. On the other hand, if you are already into a bit of interfacing with the HP-IL, or you are considering using the system and want a thorough introductory text, I would say you will find it between these covers.

Browsing for beginners

"What to do When You Get Your Hands on a Microcomputer." By Charles P. Holtzman. Published by TAB. 188 pp. $21.95. Reviewed by Mike Wall.

I picked up this book and felt excited without even opening it. The title is catchy, the cover design is catchy, and the American price printed on the front ($US10.95) is great. The local price bought me down to earth pretty fast and the contents table revealed that, rather than being the ultimate micro user's book, it is really another

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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 (h). 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. 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.

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) 659-391 (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 Jones, 659-738 (h.) Box 6210, Auckland.

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.

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

2650 USERS' GROUP: Trevor Sheffield 676-591 (h).

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

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.

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

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, (Answaphone. 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., Tauranga. 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 8037, Brookfield, Tauranga. Phone: 89-234.

BAY OF PLENTY COMMODORE COMPUTER CLUB: D.J. McVay, of 40 Esk Street, Tauranga.

BEACH COMPUTING CLUB (Waihi): Jamie Clarke Box 132, Waihi Ph: 45-384 Waihi Beach).

ATARI 400/800 USER CLUB: Dave Brown, P.O. Box 6053, Hamilton. Phone (071) 54-692 (h).

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 Stanyer, 49 Coronation Road, Morrinsville. Phone 6695 (h). Meets 1st and 3rd Wednesdays.

WAIHI COMPUTER ENTHUSIASTS: Contact: G.C. Jenkins, 10 Smith St, Waihi (h) WAH 8478. Workshops every Tuesday. Meetings last Tuesday of month.

GISBORNE MICROPROCESSOR USERS' GROUP: Stuart Mullett-Merrick. P.O. Box 488, Gisborne. Phone 88-828.

ROTORUA COMPUTER CLUB: Contact: Ken Blackman, 5 Urquhart Place, Rotorua. Third Tuesday of each month at 7pm, Waiariki Community College, Rotorua.

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

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

BBC USER GROUP: Users of other machines welcome too. 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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NORTH OTAGO COMPUTER CLUB: Contact: Peter George, P.O. Box 281, Oamaru. Phone 29-106 (h) 70-646 (h).

LEADING EDGE HOME COMPUTER CLUB: Elaine Orr, Leading Edge Computers, P.O. Box 2260, Dunedin. Phone 55-268 (w).

DUNEDIN SORD USERS' GROUP: Terry Shand. Phone (024) 771-235 (w), 881-432 (h).

CENTRAL CITY COMPUTER INTEREST GROUP: Robert Edgeler, Eclipse Radio and Computers, Box 5260, Dunedin. Phone 778-102. Meetings every second Tuesday.

OTAGO COMPUTER EDUCATION SOCIETY C/- Peter Brook Otago Girls' High School, Dunedin.

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

N.Z. SOFTWARE EXCHANGE ASSOCIATION: Non-profit group for exchange of software written by programmer members. Contact: Ian Thain, Box 333 Tokoroa.

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

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.

TRS80/SYSTEM 80

From page 44

and this appears to happen regularly, and as you type in more text the garbage collection routine gets longer.

The other major bug is this: two pages of written words and suddenly everything bombs out! Naughty Mr Smith! Really at $99 to have to start debugging is too bad.

The bug is in line 250. Apparently the program was converted from disk BASIC and this line was not changed from 975 to 700. The offending line should read:

250 IF FRE(0)<700 THEN CLS:PRINT @576, "THIS DOCUMENT IS NOW FULL. SAVE IT ON DISK BEFORE EDITING."

:FORA=1TO2500:NEXTA: GOTO70.

The other major concern with WORP-1 is in the garbage collection routine when saving your document to tape. Two pages takes approximately 1 hour to dump. This is an inordinate length of time and completely unacceptable to me, although I must state here that re-loading only takes a few minutes. What happens is that everything again completely shuts down.

I now use WORP-1 for short letters and simply print an extra copy for filing and at this level it is perfect, although the EDIT mode doesn't always do what it is supposed to do easily. This doesn't always matter for short letters; after all I can easily type them in again.

The program does have one advantage. For those poor unfortunates who don't have upper and lower case fitted it will print to the printer in lower case if you so desire, but it will not show of course on the screen, where it will all be upper case.

Final comments: Useful but not suitable in cassette version for any lengthy documentation due to the saving time hang-ups and certainly not a program with an degree of sophistication such as page numbering, headers and footers, or easy ways to erase if you have passed the 255 string except in EDIT and that EDIT mode is fraught with all sorts of silly problems. Why they didn't look at combining with the excellent edit modes already in the ROM I'll never know.

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GLOSSARY

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

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

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

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".

CAD/CAM: Computer-aided design and Computer-aided manufacture. A burgeoning field of computing, marks on mini's, that allows design on-line, and the use of co-ordinates, etc, from designers to be used in manufacturing.

CAI: Computer-aided instruction.

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

CMOS: Chip technology in which a pair of transistors of opposite type are used together.

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.

CPU: Central processing unit. A term from the mainframe days of old. Microprocessor, controller.

CRT: Cathode-ray tube. Usually a synonym for VDU.

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.

EPROM: Erasable, user-programmable, read-only memory.

Ergonomics: The study of the relationship between workers and their environment.

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

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

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 English-like 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).

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.

QWERTY: The standard, traditional keyboard lay-out of typewriters.

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 connection 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.

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.

VCR: Video-cassette recorder.

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

From page 38

```
3040 PRINT "ENTER T to edit TIMING"

3042PRINT"ENTER N to play NOTE"
3045 PRINT"ENTER Q TO QUIT"
3050*FX21,0
3051 A$=INKEY$(2000)
3052X=INSTR("NPATQ",A$)
3060 IF X=0 THEN CLS:GOTO3016
3070 ENDPROC
4000 DEF PROCAMPLITUDE
4010 INPUT"LEVEL 1 should be (0-126)
";ALA%
4020 INPUT"LEVEL 2 should be (0-126)
";ALD%
4030 INPUT"ATTACK rate should be (-
127-127)";ATTCK%
4040 INPUT"DECAY  rate should be (-
127-127)";DECCK%
4050 INPUT"SUSTAIN rate should be (-
127-0) ";SUSTCK%
4060 INPUT"RELEASE rate should be (-
127-0) ";RELCK%
4070 ENDPROC
```

CLASSIFIEDS

INFORMATION WANTED: For upgrading System 80 16K to 48K. Have some info but require more. Dave Kjoss, 399 Somme Pde, Wanganui. Phone 53-100 wk.

ZX81: 16K RAM, power pack, printer and spare roll, raised keyboard, assorted tapes. $300. D. Skinner, 36 Parkdale Dr, Tokoroa. Phone 69-285.

SINCLAIR ZX81: 16K RAM power pack and leads. Manual and games book. Value at $300 ono. Contact Mark Jones, c/o L.A. Jones, Tauranga 33-891.

TRS-80 BOOKS: For sale $45.00 (bought an Apple). TRS-80 interfacing I, III. TRS-80 assembly language, Microsoft BASIC decoded. Phone Auckland 606-129.

MICRO PROFESSOR II: 64K RAM, colour and sound. Applesoft compatible. Disk interface and lots of software. $850 or swap for Apple disk drive and controller. Phone 872-367 Wellington.

INFORMATION WANTED: On how to expand memory on Pegasus Microcomputer from 4K to 16K plus, also wish to borrow copy of graphics manual for above. Phone 818-7386 (Auck), evenings.

BBC PROGRAMMERS: Good royalties paid for all types of original software. FG Software, PO Box 6662, Wellesley St, Auckland.

SPECTRUM 16/48K SOFTWARE: "Games 1". Contains 4 full colour high resolution games. Only $9.95 (incl p & p). All payments to Craig Simmons, RD5, Dannevirke.

ZX81 SOFTWARE CLUB: For info sent SAE to: D. Gilbert, Main Rd,Loburn, R.D.2, Rangiora.

SUPER 80: 32K RAM, all manuals plus tapes and programs. Tape basic. $445. Phone Wellsford 5122.

BOOKS

From page 57

introduction to BASIC programming.

This is one of those gee-whizz, high-energy, "I want to be your best friend" books that only Americans can write without embarrassment. Every chapter has a "cutesy" sub-title and there are about a dozen full-page, "cutesy" drawings scattered through.

Each of the common BASIC statements is explained and an example program is provided. These are quite well annotated and each program builds nicely on what has gone before. The programs are an interesting mixture and numeric techniques are presented, not so much as an end in themselves, but as a mechanism for doing more interesting things. There are no reader exercises.

Any BASIC book which is not machine-specific is bound to run into problems and this one is no exception. It discusses what the RETURN key might be labelled, different commands for clearing the screen and whatever "ready" prompts might be provided. However, it assumes that all micros use the same syntax for random numbers and teaches that the size of the RND argument influences the size of the generated result. Screen formatting is wisely ignored.

For a book with such simple programs, I found an upsetting number of typographical errors.

The book is an interesting browse if you are a beginner. It is also good value for students of psychology because its author is seemingly obsessed by what he calls "overload" and "burnout". At nearly $22 there are better books around.

FOR SALE: Spectrum games — Time Gate, Muncher, Space Intruders, Meteorides. Up to $30 under retail price, $20 each. Phone Christchurch 237-181

COMPUCOLOR II: RGB monitor, disk drive, printer, $3000. TRS-80 COCO, RGB monitor, game cartridges, $2500. Write "Computers", 26 Bolton St, Wellington.

FOR SALE: Games for TRS 80, System 80 16K. Temple of Apshai, Istut, Mission Impossible, The Count, Showdown, Pyramid of Doom, Adventureland, Curse of Cowly Manor. Write A. Large, 100 Seven Mile Rd, Runanga. Phone Runanga 866.

CUSTOM SOFTWARE for Sharp/Casio hand held computers and programmable calculators. Contact J.W. Gifford, 17 Gosset St, Cheh 1. Games, business, scientific, anything!

CREED TELEPRINTER: For sale. Includes 20 milliamp optoisolated driver to protect your computer, plus complete maintenance manual. Software for TRS-80 or System-80 Ascii to Baudot conversion included if desired (drives printer via tape output port). Contact Jay Mann, 330 Centaurus Road, Christchurch. Phone 325-652.

From page 54

in spite of the counter-attraction of the TV.

And I can see one very big advantage of having a computer around to assist them with their learning — it has unlimited patience.

Bumper holiday issue

As well as our regular features the December/January issue of BITS & BYTES will include:

Microcomputer survey — a full (as possible) listing of micro-computers currently available in New Zealand including features and prices. A not to be missed guide for Christmas computer buyers.

Program special — pages full of listings for those who already own a computer. We hope there will be plenty to keep you busy during the holiday break.

Show catalogue a complete lift out catalogue to the Christchurch Computer Show, including companies participating and what will be on display.

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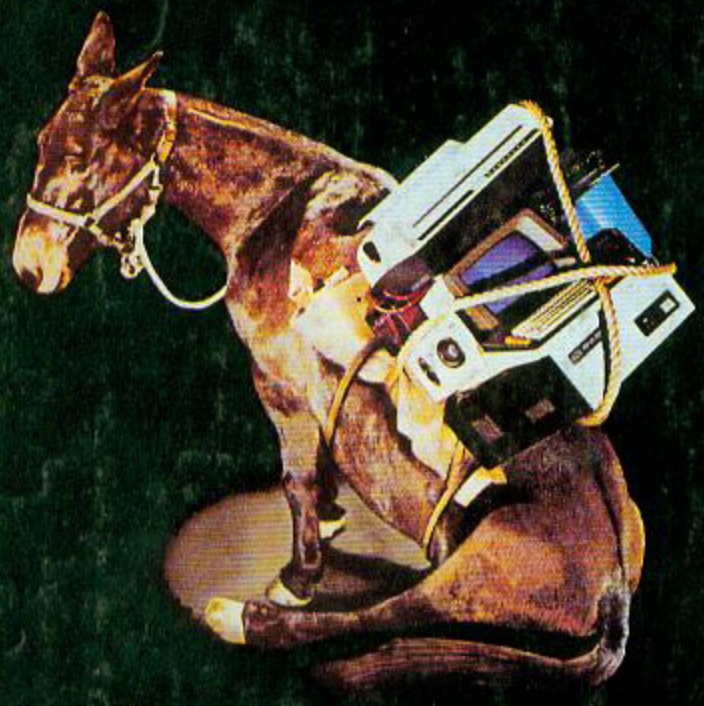

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